

MCV-Light Series Digital Controller

MLEF-A015G2DT

Instruction Manual

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1. Introduction

Read and make sure you understand these instructions to use the MLEF-A015G2DT MCV-Light Series Digital Controller safely. Always keep this manual handy for future reference.

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

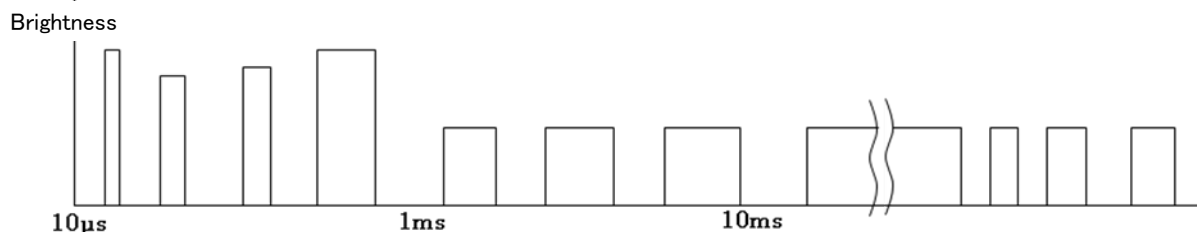


Warning

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

Connected LED illumination is lighted in three different systems: PWM, STB, and STBO.

Strobe mode: Total 8-bit; in 190 gradations		PWM mode
STBO: 100 gradations in 10 μ s increments	STB: 90 gradations in 0.1 ms increments	PWM: 8-bit; in 250 gradations



STBO: To protect the LED, trigger input signals are not accepted until a time equivalent to 10 times the set time has elapsed.

- **PWM: Pulse width modulated dimming**

250-step dimming.

0 (OFF) to 250 (max.; DC continuous lighting)

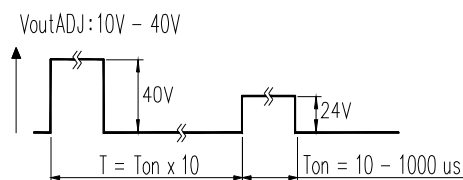
- **STB: Strobe dimming**

Lighting time is adjustable between 1.1 and 10.0 ms, synchronously with trigger signals, in increments of 0.1 ms (100 μ s) (90 steps).

- **STBO: Strobe overdrive dimming**

Lighting time is adjustable between 10 and 1000 μ s, synchronously with trigger signals, in increments of 10 μ s (100 steps).

Output voltage is adjustable between 10 and 40 V.



- **Memory function**

Settings are saved in and called from memory in manual and remote mode (CH1/2 simultaneous memory).

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**

LAN and parallel ports for external control of the controller are selectable with the MODE button on the front panel.

- **Polarity of input signal**

The polarities of the input signal of the parallel port and trigger are selectable with the MODE button on the front panel.

The set-up mode for lighting without external trigger signals is available in the STB and STBO modes.

- **Protection**

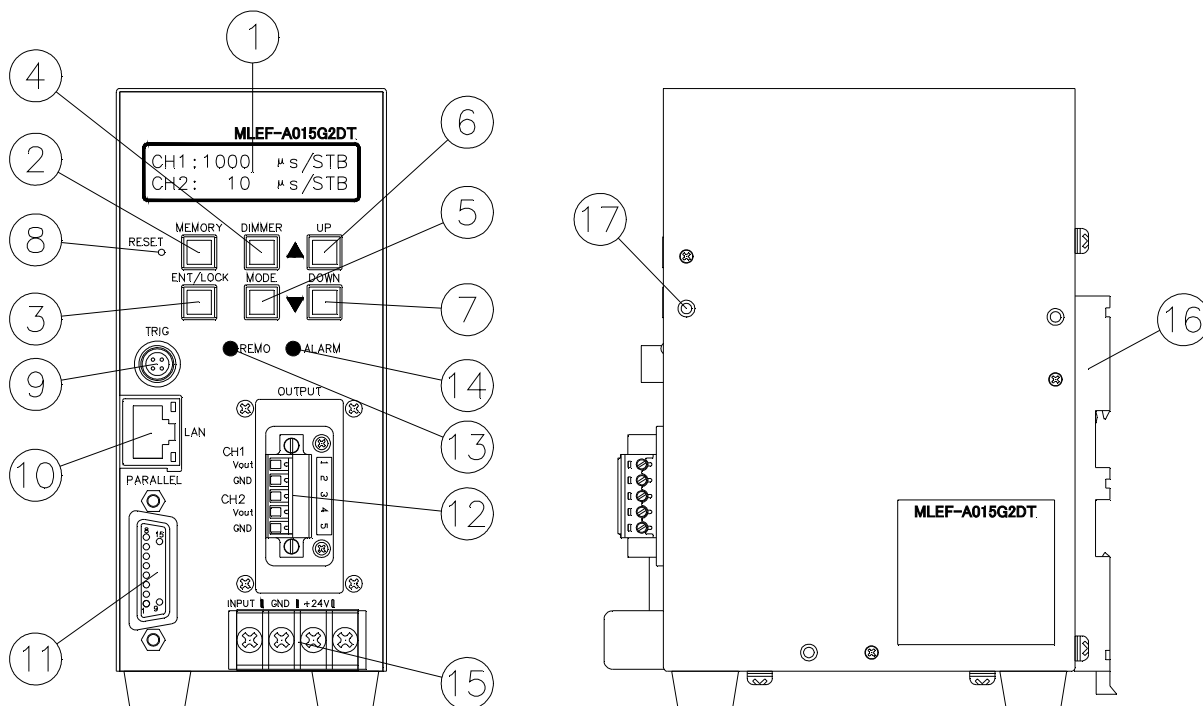
OCP (over-current protection): Output is shut off when over-current outputs continue for more than a specified time period.

OVP (over-voltage protection): Output is shut off when over-voltage outputs continue for more than a specified time period.

OTP (over-time protection): Output is shut off when output waveforms continue for more than a specified time period in the STB and STBO modes.

3. Installation

Names and Functions of Components



①	Front panel	Displays the status of the controller.
②	MEMORY button	Saves the current settings in the ROM memory. Calls settings from the ROM memory.
③	ENT/LOCK button	Sets the selection and the entered data. Settings are saved in the internal ROM.
④	DIMMER button	DIMMER select button. Selects lighting modes (PWM, STB, STBO, and VOUTADJ). Selects lighting time and adjustable voltage.
⑤	MODE button	MODE select button. Selects the mode of the input signals. Input signal: Selects the signal polarity. Operating condition: Selects between Panel, External Control, and LAN.
⑥	UP button	Increases lighting time and adjustable voltage.
⑦	DOWN button	Decreases lighting time and adjustable voltage.
⑧	RESET	Resets the system to the factory default settings. See Setting, Section 5, Operation.
⑨	TRG input terminal	STB/STBO: For inputting the lighting trigger signals. PWM: Use as lighting ON/OFF signals.
⑩	LAN port	For LAN control (external control)
⑪	Parallel port	For parallel control (external control)
⑫	Output terminal	For connecting to MCV illumination.
⑬	REMO LED	Lights when the external control is in use.
⑭	ALARM LED	Blinks upon detecting an alarm.
⑮	Input terminal	Accepts 24 VDC input.
⑯	DIN rail adapter	Conforms to 35 mm wide DIN rails.
⑰	Screw hole for fastening	For fastening the controller.

Installation



Warning

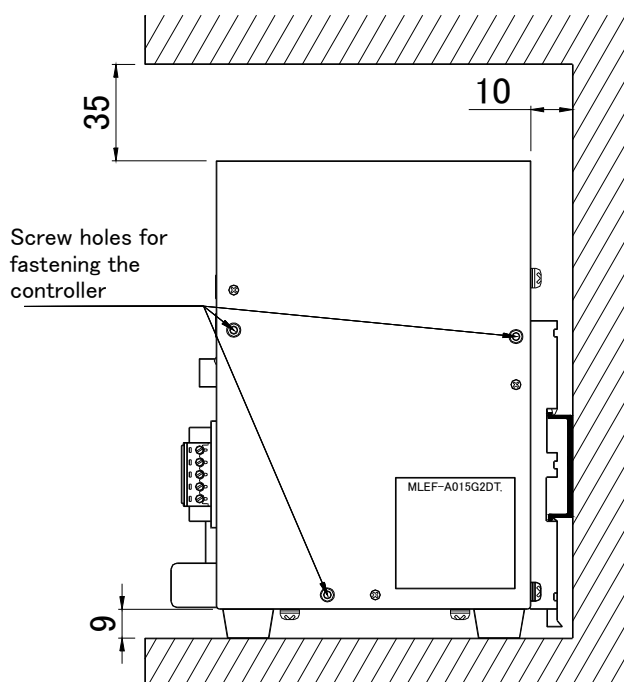
Provide the specified minimum space around the controller.
Without adequate space for ventilation, heat buildup can cause a risk of fire.

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.)



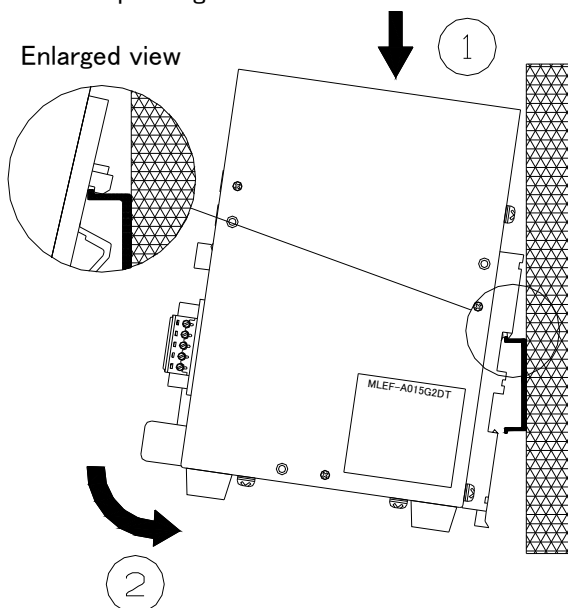
Warning

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

■ Installing the Controller

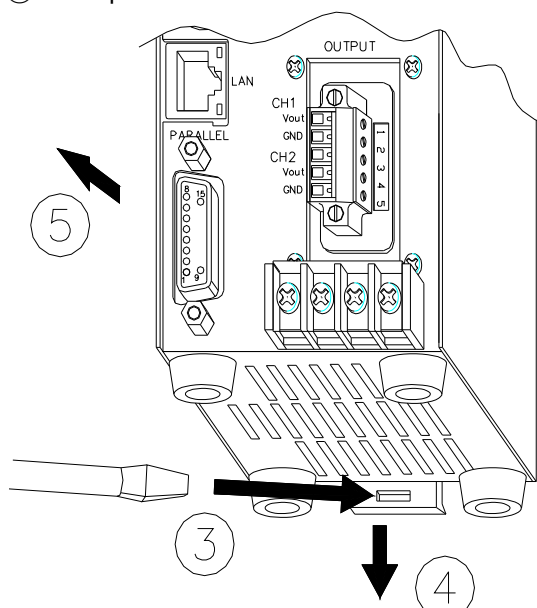
- ① Engage the hook on the upper part of the controller with the DIN rail.
- ② Push the controller in the direction of the arrow while pushing it downward.

Enlarged view



■ 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



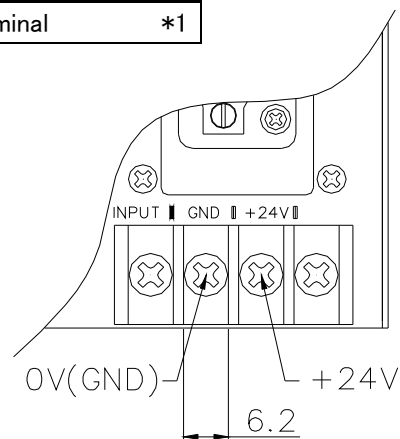
Warning

- 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

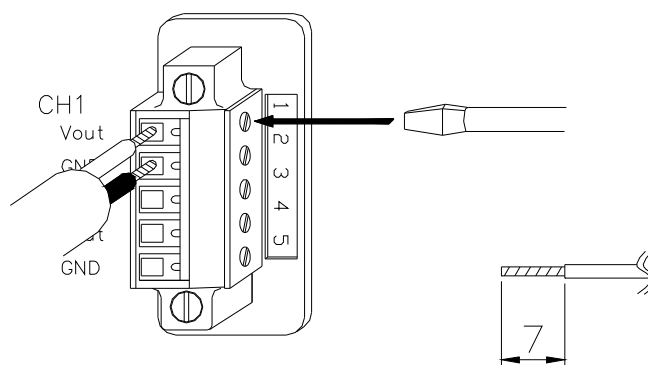
*1: M3 round crimp terminals are recommended to connect to the terminal board. Also note that if the crimp terminal size is large, the resins around the screw on the terminal board may be damaged. Use care when connecting.



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 mm ² (AWG: 28–16) Stripped length: 7 mm

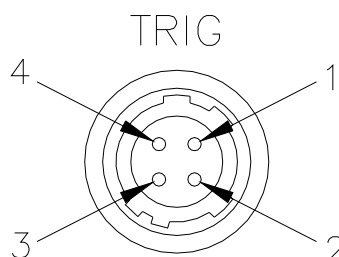
No.	Name
1	CH1 Vout
2	CH1 GND
3	N.C.
4	CH2 Vout
5	CH2 GND



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 (+)



5. Operation

Setting

Settable items include selection of the operation port, reversal of the input signal polarity of the parallel port and trigger signals, selection of an external or internal trigger, and LAN communication setting.

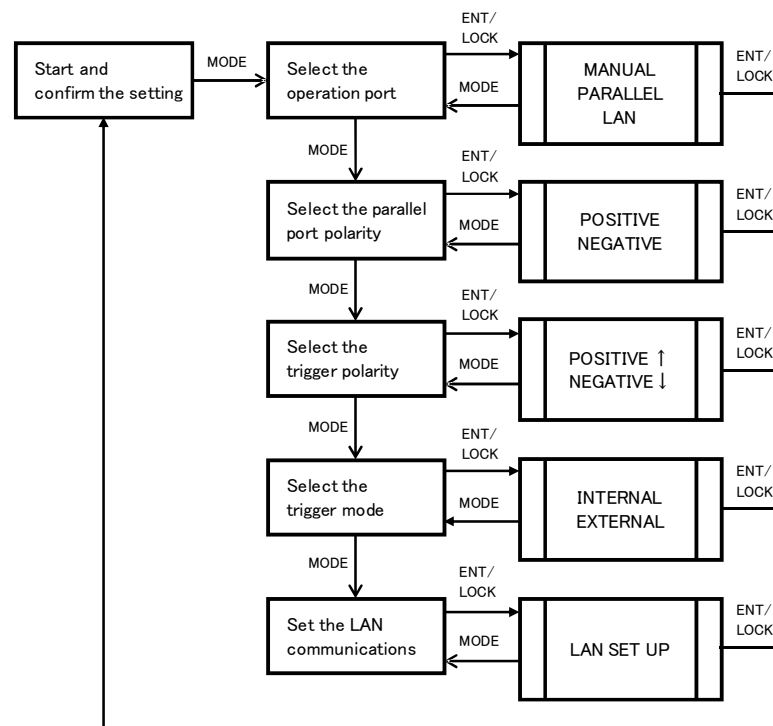
Default factory settings (initial settings) are shown below. Pressing the RESET button on the front panel initializes the system to the default settings.

Default factory settings

Item		Initial setting
Operation 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

Flow of Initial Setting

Press the MODE button, move in the direction of the arrow, and select the state you wish to set with the ENT/LOCK button. To save your selection, press the ENT/LOCK button again.



Control Set Up

Selecting the Operation Port

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

Selects the port for operation.

Selecting the Parallel Port Polarity

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

Selects the polarity of the parallel port.

[POS]: Positive logic

[NEG]: Negative logic

Selecting the Trigger Polarity

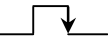
T	R	G	T	Y	P	E	S	E	L				
P	/	R	I	S	E	[	N	/	B	O	T	M	]

Selects the polarity of the signals.

STB (O): Trigger signal

PWM: ON/OFF signal

[P/RISE] : 

[N/BOTM]: 

Selecting the Trigger Mode

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

Selects the output of the trigger signals.

[INT]: Lights with the internal trigger signals. Lighting time is limited as shown below.

•STBO : $10\mu\text{s}$ / $1000\mu\text{s}$

•STB : 5ms / 10ms

[EXT]: External trigger signals are output to the TRG terminal for lighting.

LAN Set Up

Setting the LAN Communications

IP ADDRESS SET

N	E	T	S	E	T	I	P	A	D	R				
1	9	2	.	1	6	8	.	0	0	0	.	0	0	1

SUB NET MASK SET

N	E	T	S	E	T	S	U	B	N	E	T			
2	5	5	.	2	5	5	.	2	5	5	.	0	0	0

DEFAULT GATE WAY

N	E	T	S	E	T	G	A	T	E	W	A	Y		
1	9	2	.	1	6	8	.	0	0	1	.	0	0	1

PORT NO SET

N	E	T	S	E	T	P	O	R	T
						2	0	0	0

Settable range is 0 to 65535.

MAC ADDRESS

N	E	T	S	E	T	M	A	C	A	D	R	
	0	4	A	3	4	3	5	F	4	3	2	3

Eigenvalue; no change is possible.

Manual Control

The front panel is used to manually select a lighting mode (PWM, STB, STBO, or STBO VOUTADJ). It is also used to control the ROM memory function.

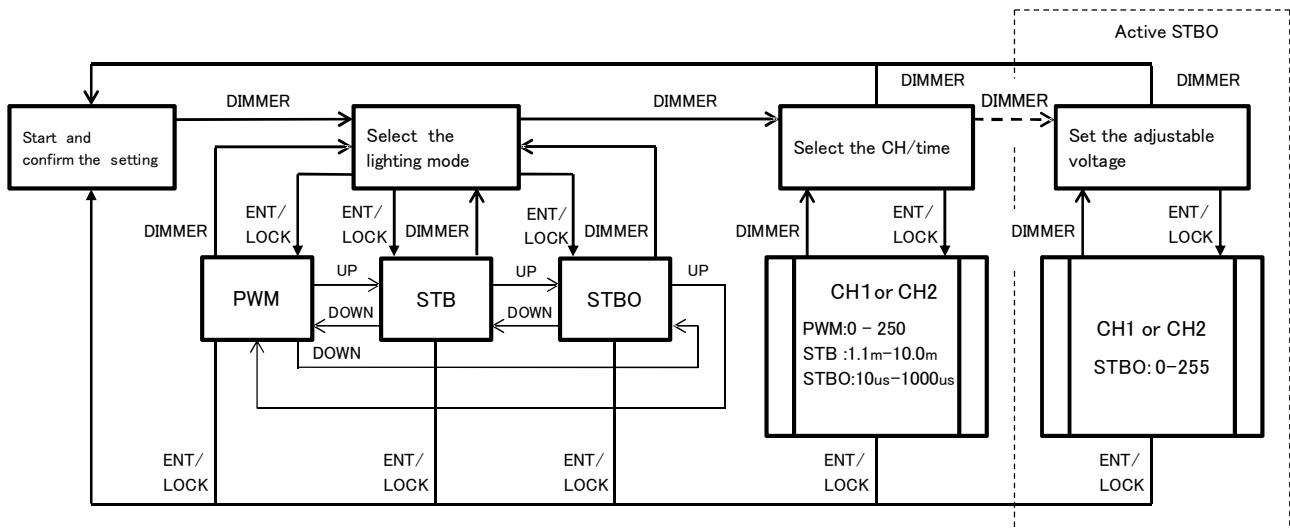
First select the lighting mode, then select the channel and lighting conditions.

Press the DIMMER button several times until the lighting mode you wish to select is displayed.

Press the ENT/LOCK button to confirm your selection. Enter a value with the UP and DOWN buttons.

Press the ENT/LOCK key again to save your entered value.

Flow of Lighting Mode Setting



DIMMER: Move to select the lighting mode. ENT/LOCK: Select and confirm the setting. UP/DOWN: Set a value

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

[Example]

Setting procedure for STBO (strobe overdrive) lighting of CH1 with a lighting time of 1000 μ s and an output voltage of 40 V (max.).

-- Setting Conditions --

Lighting system: STBO (strobe overdrive)

Channel: CH2

Lighting time: 1000 μ s

Output voltage: 40 V (max.)

Setting Lighting System and Output Voltage

1. Current Display

C H 1	:	2 0 0		M O D E
2	:	2 0 0		[P W M]

2. Select a lighting system with the DIMMER button.

C H 1	:	2 0 0		M O D E
2	:	2 0 0		[P W M]

[and] blink, prompting you to change the mode.

3. Confirm your selection with the ENT/LOCK button.

C H 1	:	2 0 0		M O D E
2	:	2 0 0		[P W M]

Confirm the change of the mode for now.

The mode display blinks.

4. Select a lighting system with the UP/DOWN buttons.

C H 1	:	2 0 0		M O D E
2	:	2 0 0		[S T B O]

Select STBO.

5. Press the ENT/LOCK button to save the selected lighting system.

C H 1 :	1 0 u	M O D E
2 :	1 0 u	[S T B O]

The selected lighting system STBO has been set.
The lighting time has been initialized to 10 μ s.

6. Select the adjustable voltage with the DIMMER button.

	V O U T	A D J
1 :	1 7 0	2 : 1 7 0

Select VOUTADJ.

7. Confirm your selection with the ENT/LOCK button.

	V O U T	A D J
1 :	1 7 0	2 : 1 7 0

Confirm the change of mode for now.
CH1 blinks, prompting you to select a channel.

8. Select a channel with the UP/DOWN buttons.

	V O U T	A D J
1 :	1 7 0	2 : 1 7 0

Select CH2 with the UP/DOWN buttons.

9. Confirm your selection with the ENT/LOCK button.

	V O U T	A D J
1 :	1 7 0	2 : 1 7 0

When your selection is confirmed, the indicated value blinks, prompting you to set it. Press the ENT/LOCK button to move to the 2nd digit.

10. Select a channel with the UP/DOWN buttons.

	V O U T	A D J
1 :	1 7 0	2 : 2 5 5

Set "255" with the UP/DOWN buttons.

11. Confirm your selection with the ENT/LOCK button.

C H 1 :	1 0 u	M O D E
2 :	1 0 u	[S T B O]

Lighting system and output voltage have been set.

Setting the Lighting Time

12. Select the CH/Time setting with the DIMMER button.

C H 1 :	1 0 u	M O D E
2 :	1 0 u	[S T B O]

"CH" blinks, prompting you to set the channel.

13. Confirm your selection with the ENT/LOCK button.

C H 1 :	1 0 u	M O D E
2 :	1 0 u	[S T B O]

When the selection is confirmed, "CH1" blinks, prompting you to select a channel.

14. Select a channel with the UP/DOWN buttons.

C H 1 :	1 0 0 0 u	M O D E
2 :	1 0 u	[S T B O]

Select CH2.

15. Confirm your selection with the ENT/LOCK button.

C H 1 :	1 0 u	M O D E
2 :	1 0 u	[S T B O]

When the selection is confirmed, the first digit of CH2 blinks, prompting you to set the lighting time. Press the ENT/LOCK button to advance through the digits one at a time (up to the third digit).

16. Set the lighting time with the UP/DOWN button.

C H 1 :	1 0 u	M O D E
2 :	1 0 0 0 u	[S T B O]

Set 1000 with the UP/DOWN button.

17. Confirm your selection with the ENT/LOCK button.

C H 1 :	1 0 u	M O D E
2 :	1 0 0 0 u	[S T B O]

This completes the setting procedure.

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	→ 10 μ s	24V	→ *
STB	→ PWM	1.1-10.0ms	→ -	24V	→ 0V
STB	→ STBO	1.1-10.0ms	→ 10 μ s	24V	→ *
STBO	→ PWM	10 μ s-1000 μ s	→ -	10-40V	→ 0V
STBO	→ STB	10 μ s-1000 μ s	→ 1.1ms (5ms)	10-40V	→ 24V

- *1. A setting will blink while waiting for confirmation. If blinking is allowed to continue for 2 minutes, the current status is automatically confirmed.
- *2. Once confirmed, settings are saved in the built-in ROM.
- *3. An asterisk (*) indicates that the value is the same as the one set in the previous STBO setting.
- *4. Figures in parentheses () are the values for the TRG INT setting.

Manual Memory Function

Current settings are saved in and called from the built-in ROM memory using the MEMORY button.

1. Select the MEMORY SAVE No.

M E M O R Y S A V E
N O = 1

Select the Save mode with the MEMORY button, and confirm your selection with the ENT/LOCK button. Select the No. with the UP/DOWN buttons, and press the ENT/LOCK button.

2. Confirm the MEMORY SAVE operation.

N O 1 S A V E ?
[Y E S] N O

Confirm the Save No. and press the ENT/LOCK button.

3. Confirm the MEMORY SAVE operation.

S A V E D
N O 1

The save result is displayed.

1. Select the Memory RECALL No.

M E M O R Y R E C A L L
N O = 1

Select the Recall mode with the MEMORY button, and confirm your selection with the ENT/LOCK button. Select the No. with the UP/DOWN buttons, and press the ENT/LOCK button.

Settings saved in the ROM memory are retrieved.

Ⓢ. When there is no data in memory

N O D A T A

A NO DATA message is displayed and blinks three times, and then the normal screen returns.

Button Lock Function

The lock function locks and unlocks the button operations.

LOCK

B U T T O N L O C K

Press and hold the ENT/LOCK button for more than 3 sec. to disable the button operations.

* Effective for the ENT/LOCK and RESET buttons only.

UN LOCK

B U T T O N U N L O C K

Press and hold the ENT/LOCK button for more than 3 sec. to release the lock.

PRODUCT RESET Function

The PRODUCT RESET Function resets the controller to the factory default settings.

PRODUCT RESET

P R O D U C T R E S E T

The above message appears when you press the RESET button.

The message blinks 3 times, and then the controller is reset.

Remote Control _ Parallel Port

A parallel port connection is available for controlling lighting modes (PWM, STB, STBO, and STBO VOUTADJ).

It can also be used to control the RAM memory function. Note that the valid range of the 8-bit value D is limited in the lighting system. Operation may not be satisfactory if this range is exceeded. (See the truth table.)

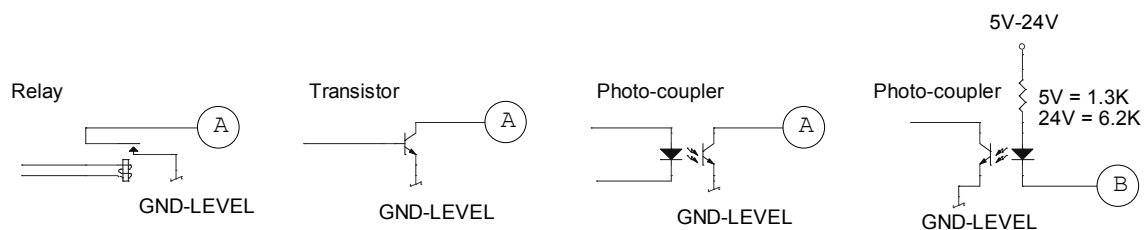
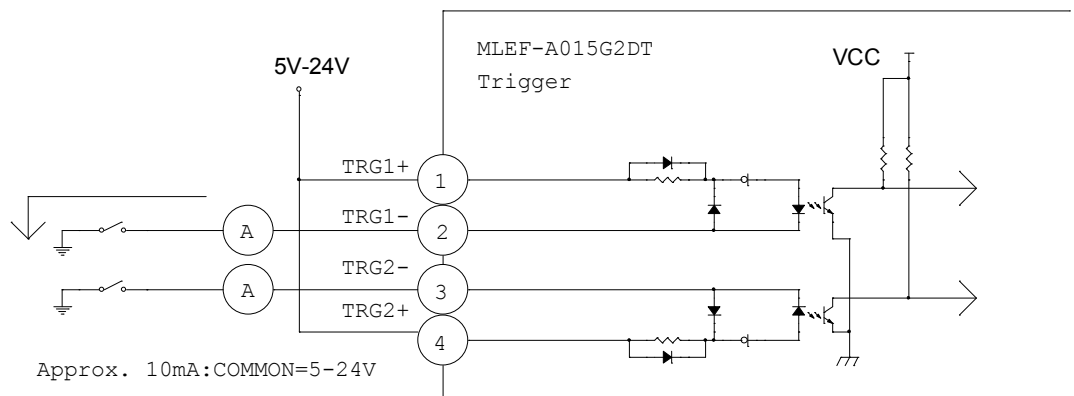
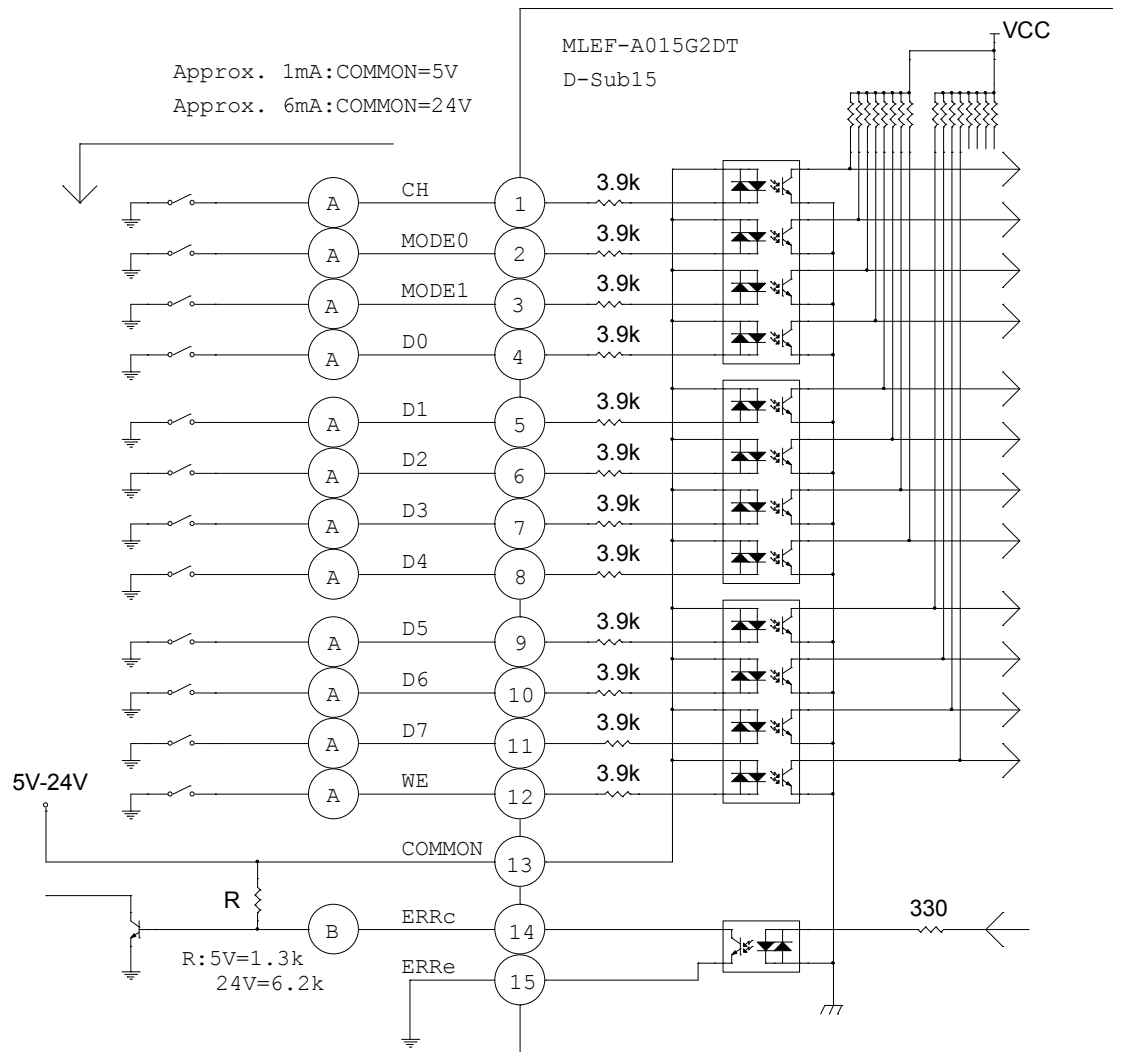
Connectors

Connectors of the controller	Connectors of external cables
HDAB-15P(05) male (HRS)	HDAB-15S(05): Connector, female (HRS) or equivalent
Clamp screw M2.6 (HRS)	HAD-CTH: Connector case (HRS) or equivalent

Pin Assignment

No.	Signal name	I/O	Description
1	CH	Input	Specifies the output channel. L = CH1; H = CH2
2	MODE0	Input	Selects the operation mode of the lighting system PWM, STB, VOUTADJ, and MEMORY.
3	MODE1	Input	
4	D0	Input	
5	D1	Input	The function varies with the mode selected. D0 to D7: For the Indicated values in the PWM/STB mode. D0 to D7: For the indicated values in the VOUTADJ mode. D0: For selection of READ or WRITE when the MODE is MEMORY. D1, D2: For address instruction when the MODE is MEMORY.
6	D2	Input	
7	D3	Input	
8	D4	Input	
9	D5	Input	
10	D6	Input	
11	D7	Input	
12	WE	Input	For writing and confirming the settings in the internal register.
13	COMMON	—	For impressing 5 to 24 V. Do not let input vary while the controller is in operation.
14	ERRc	Output	Signifies controller errors. Normal: nonconductive; Error: conductive. *See Typical Connection Circuit.
15	ERRe	Output	

Typical Connection Circuit



Truth Table

Definition of the high (H) or low (L) status of signal level from the parallel port (see Typical Connection Circuit): When 5 to 24 V is impressed on the COMMON terminal, H refers to no current flowing through a photocoupler (if COMMON is 5V, input is also 5V), and L refers to current flowing through a photocoupler.

H : Status where no current flows through a photocoupler

L : Status where current flows through a photocoupler

X : Any value.

- : Status of no signal change

PWM Truth Table (when setting POS and N/BOTM)

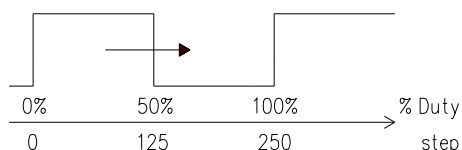
MODE		Set range		Data setting : Dx								TRG	Output status
MODE1	MODE0	Duty	DEC	D7	D6	D5	D4	D3	D2	D1	D0		
L	H	X	X	X	X	X	X	X	X	X	X	H	Lighting OFF
		0%	0	L	L	L	L	L	L	L	L	L	Lighting ON
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
		25%	63	L	L	H	H	H	H	H	H		
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
		50%	125	L	H	H	H	H	H	L	H		
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
		100%	250	H	H	H	H	H	L	H	L		

The range of Dx from 0 to 250 is the PWM operation area. Settings cannot be determined at greater values.

©Dim value

0 : OFF

250 : 100% (DC continuous output)



STB Truth Table (when setting POS and N/BOTM)

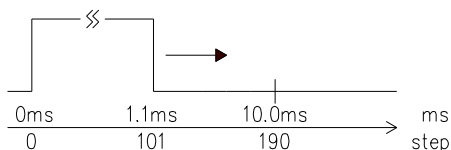
MODE		Set range		Data setting : Dx								TRG	Output status
MODE1	MODE0	time	DEC	D7	D6	D5	D4	D3	D2	D1	D0		
L	L	X	X	X	X	X	X	X	X	X	X	-	Lighting OFF
		1.1m	101	L	H	H	L	L	H	L	H		Lighting ON
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
		2.0m	110	L	H	H	L	H	H	H	L		
		2.1m	111	L	H	H	L	H	H	H	H		
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
		9.9m	189	H	L	H	H	H	H	L	H		
		10.0m	190	H	L	H	H	H	H	H	L		

The range of Dx from 101 to 190 is the STB operation area. Settings cannot be determined at greater values.

©Dim value

101 : 1.1ms

190 : 10.0ms



STBO Truth Table (when setting POS and N/BOTM)

MODE		Set range		Data setting : Dx								TRG	Output status
MODE1	MODE0	time	DEC	D7	D6	D5	D4	D3	D2	D1	D0		
L	L	x	x	x	x	x	x	x	x	x	x	—	Lighting OFF
		0 μ s	0	L	L	L	L	L	L	L	L		Lighting ON
		10 μ s	1	L	L	L	L	L	L	L	H		
		20 μ s	2	L	L	L	L	L	L	H	L		
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓		
		990 μ s	99	L	H	H	L	L	L	H	H		
		1000 μ s	100	L	H	H	L	L	H	L	L		

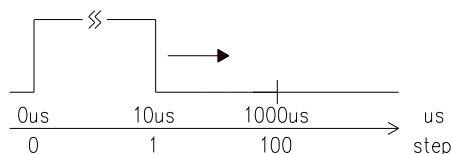
The range of Dx from 0 to 100 is the STBO operation area.

In the STBO mode, voltage adjustment (VOUTADJ) is also available between 10 and 40 V. (See the VOUTADJ Truth Table.)

◎調光値

0 : 0 μ s

100 : 1000 μ s



VoutADJ Truth Table (when setting POS)

MODE		Set range		Data setting : Dx							
MODE1	MODE0	Volt	DEC	D7	D6	D5	D4	D3	D2	D1	D0
H	L	10V	0	L	L	L	L	L	L	L	L
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
		30V	170	H	L	H	L	H	L	H	L
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
		40V	255	H	H	H	H	H	H	H	H

The VOUTADJ (voltage adjustment) function is available only in the STBO mode.

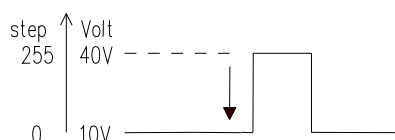
To use the VOUTADJ function, first select the STBO mode and then select the VOUTADJ mode.

Dx is set to a value between 0 and 255. The volt values for DEC (Dx) should be considered a guide.

◎Dim value

0 : 10V

255 : 40V



Remote MEMORY Truth Table (when setting POS)

MODE		Dx				RAM No.	Function
MODE1	MODE0	D0	D1	D2	D3-7		
H	H	L	L	L	x	1	Read
		L	H	L	x	2	
		L	L	H	x	3	
		L	H	H	x	4	
		H	L	L	x	1	Write
		H	H	L	x	2	
		H	L	H	x	3	
		H	H	H	x	4	

The current settings are written to and read from the RAM memory.

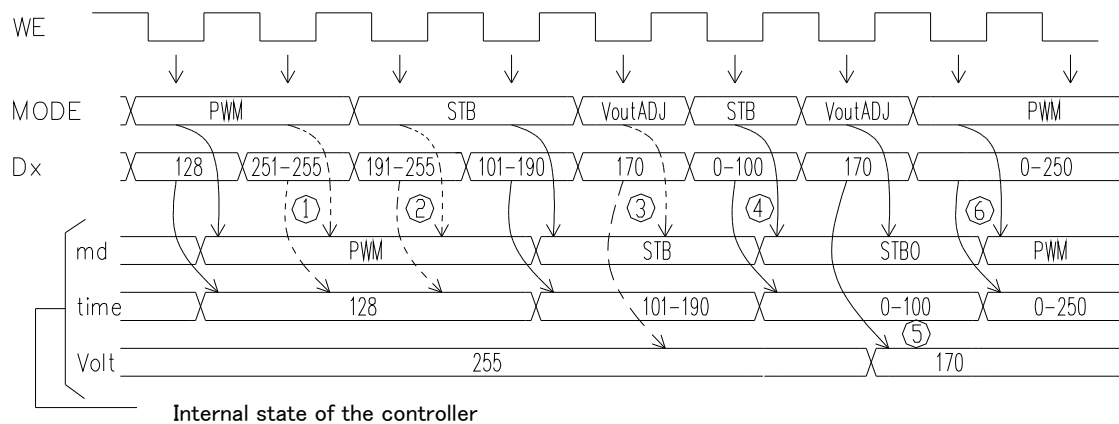
Of the data input signal Dx, D0 is the memory read/write select signal, and D1 and D2 denote the memory number.

D3 through D7 are arbitrary numbers, and do not affect the system setting.

<< Caution >> Any data written to RAM memory is lost when the main power is turned off.

Time Chart (when setting POS and N/BOTM)

Writing from the Parallel Port



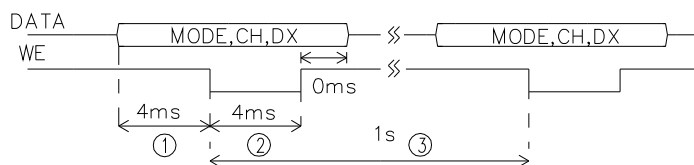
When writing from the parallel port, when the relevant data value is incompatible with the current mode the output will not change even if a write trigger is output.

[Examples]

1. Change is not accepted because Dx is greater than 251.
2. Change is not accepted because Dx is greater than 191.
3. Change is not accepted because the mode is not STBO (strobe overdrive).
4. To enter the STBO mode, set Dx to a value between 0 and 100 in the STB mode and change the setting at WE.
5. Set the MODE to VOUTADJ and set Dx to the desired value. Input WE, and the output voltage is changed to the desired value.
6. The output voltage is automatically changed to 24 V when the STBO mode is switched to the PWM or STB mode.

Write Trigger WE and Setting Data

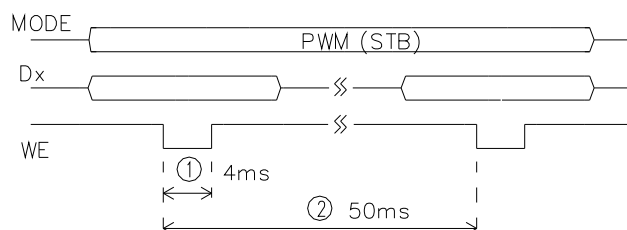
The time chart is used for writing the lighting mode, channel, and set value simultaneously.



1. Finalize the data to enter at least 4 ms before inputting the write trigger.
2. The low level must last at least 4 ms.
3. About 1 sec of wait time is required between each successive mode change command.

Write Trigger WE and Indicated Dx Value

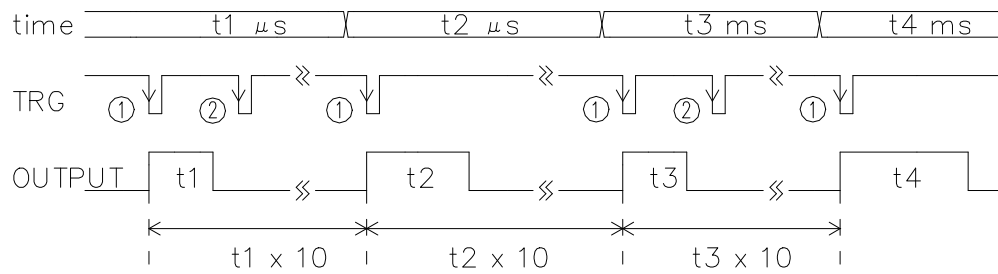
The time chart is used for changing only the set value, with the lighting mode fixed.



1. Finalize the data to enter at least 4 ms before inputting the write trigger.
2. About 50 ms of wait time is required between each successive mode change command.

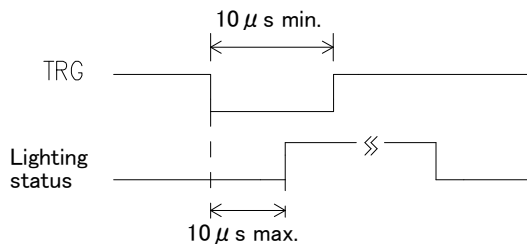
Trigger Signal (TRG) and Lighting Time

The relationship between the trigger signal and lighting time is shown below. The Time value set by WE is shown.

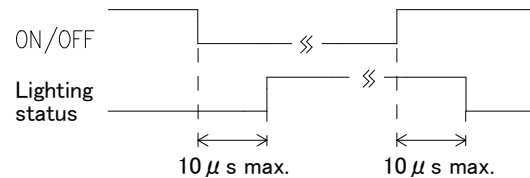


1. The output starts at the edge of each trigger signal.
2. Trigger input signals are not accepted until a time equivalent to 10 times the set time has elapsed.

Trigger Delay



ON/OFF Delay



Remote Control _ LAN Port

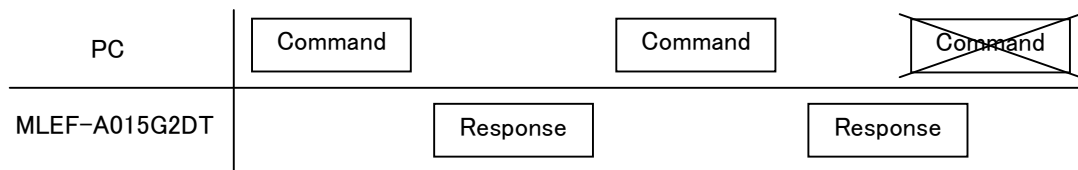
The LAN port is available for controlling the lighting modes (PWM, STB, STBO, and STBO VOUTADJ).

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

Protocol level	TCP protocol	IPv4 protocol	Ethernet		
Specifications	Applicable standards	Applicable standards	Applicable standards	Transfer rate	Transmission media
	RFC793	RFC791	IEEE 802.3 IEEE 802.3u IEEE 802.3x	10Mbps 100Mbps (Automatic detection)	10BASE-T 100BASE-TX

Auto-negotiation-compatible

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

※1. In an error, except for a status command, even if it transmits other right commands, INVARIDCOM is replied

※2. When sending the next command after the response, please send after it passes more than 500msec.

Commands

Function	Header	Command/ response	[y]	Parameter (command/response)				[xx]	Delimiter	Initial value
			Channel	Data	Channel	Data				
Set PWM dimming	&	PW	0-2	000-250	0-2	000-250	<CR><LF>	&PW0,000<CR><LF>		
Set STB lighting time		SB		000-100(STBO)		000-100(STBO)		&SB0,001<CR><LF>		
				101-190(STB)		101-190(STB)				
Set VOUTADJ		VO	※2	000-255	※2	000-255		&VO0,000<CR><LF>		
Memory Read		MR	1-3	---	1-3	---		---		
Memory Write		MW		---		---		---		
Status information		ST	---	---	---	---		---		
Version information		V	---	---	---	---		---		
Set IP address		IP	000.000.000.000 – 255.255.255.255					192.168.000.001		
Set Subnet Mask		SB	* Match the number of digits of the values.					255.255.255.000		
Default Gateway		DG						192.168.001.001		
Set port		PT	00000 – 65535					02000		
			* Match the number of digits of the values.							
MAC Address		MAC	---	---	---	---		---		
Reset	REST	---	---	---	---	---				

* 1 Data length: 256 Byte max. format: &yxx<CR><LF>

* 2 Channel Number

Parameter	Setting
0	CH1/2 same value setting
1	CH1 setting
2	CH2 setting

* 3 MEMORY Number

Parameter	Setting
1	RAM No.1
2	RAM No.2
3	RAM No.3

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 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.

[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.

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.

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

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

[3] Set adjustable voltage: &VO

Function: Sets the voltage in the STBO mode.

Format 1:

&	V	O	n	,	x	x	x	,	n	,	x	x	x	<CR><LF>
---	---	---	---	---	---	---	---	---	---	---	---	---	---	----------

Format 2:

&	V	O	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.

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.

This command to set the voltage is available in the STBO mode only. When it is used in the PWM and STB modes, the following is returned to notify the operator that the mode is not correct:

N O - S B O N O T A D J <CR><LF>

[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:

& M R n , N O D A T A <CR><LF> n: 1, 2, or 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: & S T , MODE CH1,CH2 E:ERR <CR><LF>

Response 2: & S T , MODE CH1,CH2 VOCH1,CH2 E:ERR <CR><LF>

MODE

Indicates the current lighting mode.

PW	PWM
SB_	STB
SBO	STBO

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 : N O R	Normal
E : O C P	OCP error
E : O V P	OVP error
E : O T P	OTP error

Example 1: & S T , S B _ 1 2 8 , 1 5 2 E : N O 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.

Example 2: & S T , S B O 0 2 1 , 0 5 2 V O 1 5 2 , 0 8 2 E : N O 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: **Example:** & V S 1 . 0 0 N 1 . 0 0 P 1 . 0 0 <CR><LF>

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

[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 :

&	S	B	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 Default Gateway address 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.

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.

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	DC 24 V $\pm$ 10 % (21.6 – 26.4 V)	
Input current	Max. 1.8 A	
Efficiency	70 %	
Number of outputs	2ch	
Output power	PWM: 30 W (total of 2 channels) STB: 15 W/channel	
Output voltage	PWM / STB : 24 V _{p-p} , STBO : 40 V _{p-p}	
Output current	PWM / STB : 1.25 A _{p-p} , STBO : 4.0 A _{p-p}	
Output variable range	PWM / STB : 0 – 100 % STBO : 10 – 40V	※1
Remote control	LAN/parallel ports	
PWM mode	PWM frequency: 100 kHz (dimming steps: 250 gradations)	
STB mode	Lighting time: 1.1 – 10.0 ms (90 gradations in 0.1 ms increments) << Effective bits: bit setting between 101 and 190 with 8 bits >>	
STBO mode	Lighting time: 10 – 1000 μ s (100 levels in 10 μ s increments) Flash period restriction: 10% duty (min. period: 10 times the set time) << Effective bits: bit setting between 0 and 100 with 8 bits >> VOUTADJ: 0 – 100% (256 levels)	
Trigger input	Input voltage range: 5 – 24VDC STB/STBO_TRG input response time: 10 μ s max. PWM_ON/OFF input response time: 10 μ s max.	
Setup mode	STB : 5ms / 10ms STBO : 10 μ s / 1000 μ s	
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 (4.0 A fuse) At least 1 sec after powering off	※2
Time before repowering	1 second or more	
Environmental conditions	Indoor use Altitude: 2000 m max. Temperature: 0 – 45°C Humidity: 80% RH up to 31°C, then decreases linearly to 50% RH at 40°C. Contamination level 2	
Storage temperature and humidity	–20 – +80°C / 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. 800 g	
CE marking	EMC Directive: EN55011 , EN61000-6-2	※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.

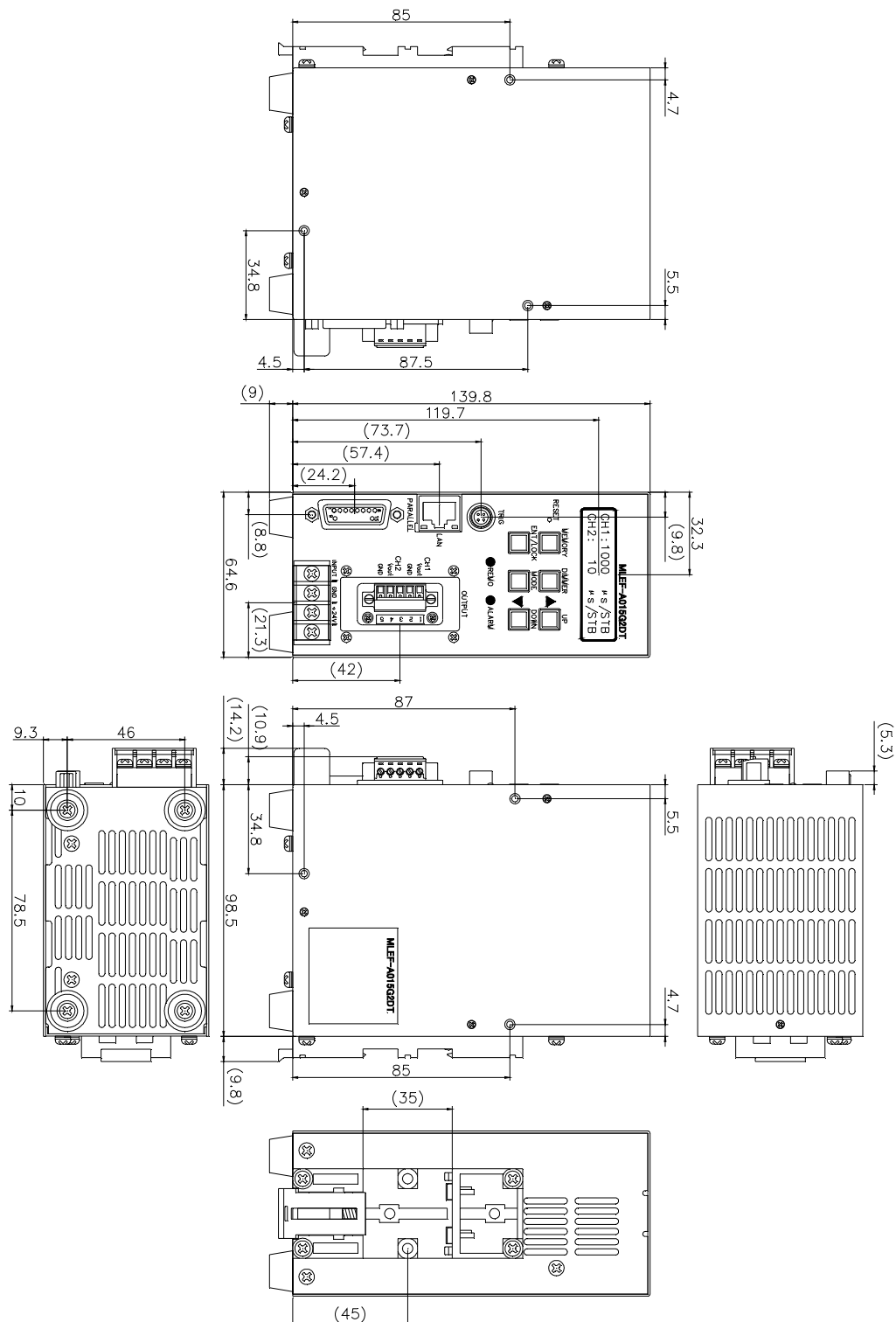
*3. Openings in the case are designed to keep out solid objects 12.5 mm in diameter or larger. The case is not water-resistant or water-proof.

*4. Extension or branch cables up to 10 m long may be used to connect MCV-Light illumination to the controller.

Package Contents Checklist

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

Outside Dimensions



お問い合わせは…….

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