

PS-VPDM Series

User Manual of DC Digital Controller



Version V1.0
Revised in October 2024

Operating Instructions

- Before using the controller, please read the manual carefully.
- This controller is externally powered by DC 24V. Ensure the switch on the controller is turned off before plugging or unplugging the power cable.
- This controller is only intended for driving our company's lights. If it is used to drive other products in violation of regulations, any resulting damage shall be borne by the customer.
- When connecting the controller to a light or external communication, do not supply power. Before powering on, check whether the input and output connections are correct.
- Do not block the heat dissipation channels of the controller, as inadequate cooling under high-power operating conditions may cause damage.
- If any abnormal conditions are observed before using the controller, do not attempt to disassemble or repair it yourself. Contact the manufacturer promptly.
- When using this controller, ensure it is paired with a light of corresponding power. Do not look directly at the light source when it is illuminated to prevent eye injury.

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1. Product Introduction

1.1 Product Features

1--Supports RS232 communication.

2--Digital display for easy confirmation of set values.

3--Supports external trigger mode.

4--Supports millisecond-level and microsecond-level strobing.

5--Manual brightness and mode adjustment for simple operation.

6--24V bidirectional triggering, compatible with high/low-level trigger modes.

7--Compact size for easy installation via screw mounting or C45 rail mounting.

1.2 Product Selection

Model No.	Built-in Power Supply Wattage	Output voltage	Drive Mode	Maximum Current per Channel	Channel Numbers	Light Interface Type
PS-VPDM3A-24-2	no	24V	Regulating	3A	2	SM-03V
PS-VPDM3A-24-4	no	24V	Regulating	3A	4	SM-03V
PS-VPDM5A-24-2	no	24V	Regulating	5A	2	SM-03V
PS-VPDM5A-24-4	no	24V	Regulating	5A	4	SM-03V

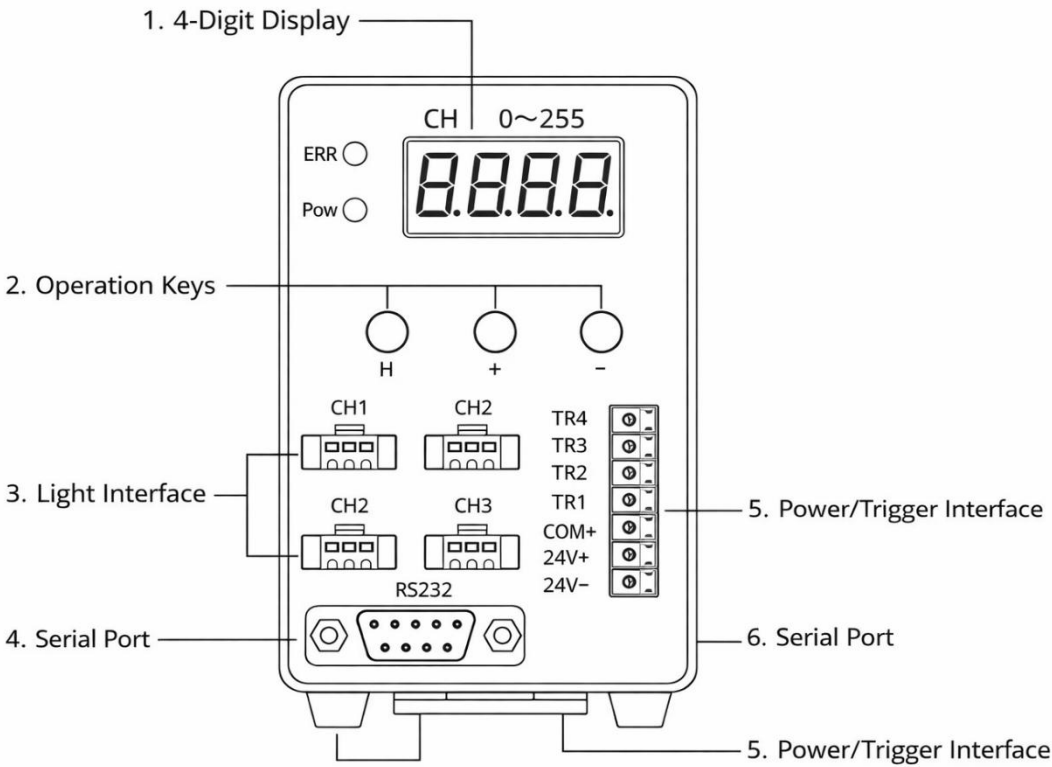
1.3 Product Parameters

Model No.	For details, refer to section 1.2.
Input voltage	DC24V
Output voltage	24V
Output current	For details, refer to section 1.2.
Operating mode	4 modes 0: Constantly Off 1: Constantly On 2: Millisecond-level Strobing 3: Microsecond-level Strobing
Light Emission Method	Constantly On / Constantly Off / Strobing External triggering is available in Constantly Off and Strobing modes.
Trigger Method	Edge + Level Trigger. In strobing mode, edge triggering is used; in constantly on/off modes, level triggering is used.
Brightness Level	0-255 level brightness adjustment
Millisecond-level Strobing Time	1-99 (1-99ms) time unit: ms millisecond
Microsecond-level Strobing Time	1-99 (10-990us) time unit: 10 us Microsecond
Connected Light Type	24V Light . The power of the light must not exceed the total power of the built-in switching power supply
Trigger voltage	DC5~24V
Trigger delay	<80 us
Total power	For details, refer to section 1.2
Communication Method	RS232 Baud Rate 9600 bps
Channel Numbers	For details, refer to section 1.2.
Cooling Method	Natural cooling
Operating Environment Temperature and Humidity	temperature: -5~50℃, humidity: 25~85%RH (Non-condensing)
Storage Environment Temperature and Humidity	temperature: -20~50℃, humidity: 25~85%RH (Non-condensing)
Weight	About 0.2kg
Dimensions	60*58.6*96.6mm
Certificate	CE ROHS ISO9001

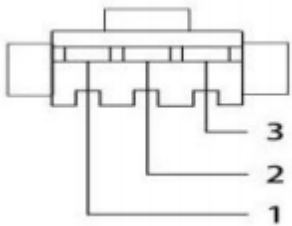
2. Operation Instruction

2.1 Panel Description

1	4-digit display	The leftmost digit indicates the current operating channel, and the following three digits display its corresponding value.
2	Operation key	H : the function toggle button. "+" increases the value, and "-" decreases the value.
3	Light interface	Connect to the light source via the SM-03V interface.
4	Serial port	PC communication via RS232 interface.
5	power/trigger interface	24V Power/External Trigger Input

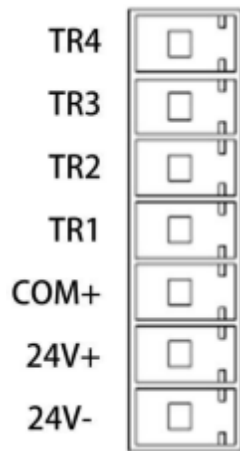


2.2 Light interface



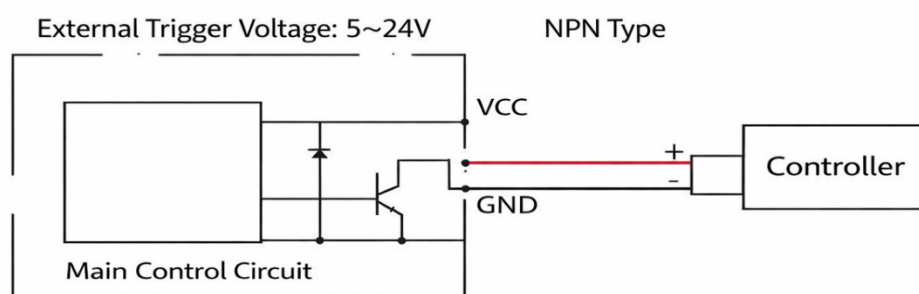
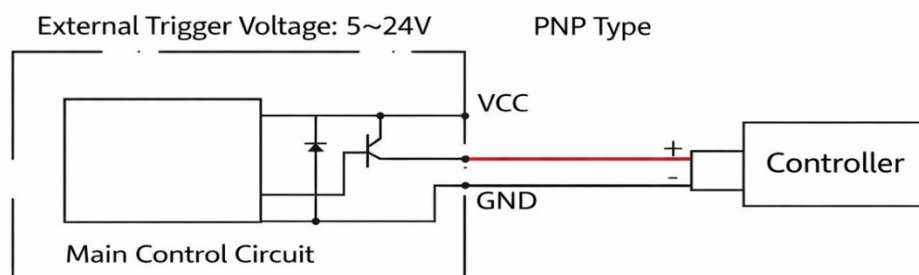
1	positive of light output
2	empty
3	Negative of light output

2.3 External trigger input



TR1	CH1 External input
TR2	CH2 External input
TR3	CH3 External input
TR4	CH4 External input
COM +	Common terminal
24V +	Positive Input for External Power
24V -	Negative Input for External Power

2.4 External Trigger Wiring Example



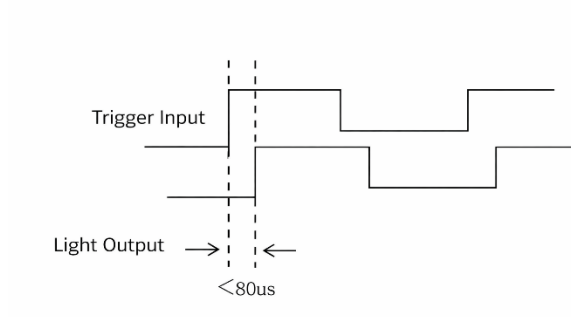
— Positive Voltage Connection
— Ground Connection

— Positive Voltage Connection
— Ground Connection

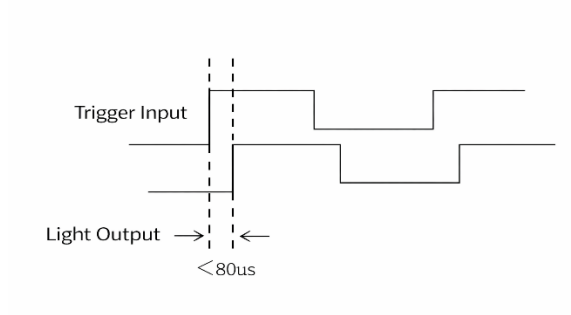
PNP type	Common Cathode	Control positive	Light trigger: External trigger input high level completes the circuit.
NPN type	Common Anode	Control negative	Light trigger: External trigger input low level completes the circuit.

2.5 Trigger Timing Diagram

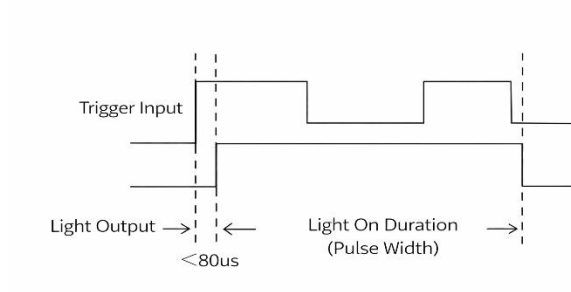
In Normally-Off Mode, the light source is off until activated by a trigger signal.



Normally-On Mode: Light is ON by default, OFF when triggered.



Millisecond/Microsecond Strobe Mode: The light source is inactive by default and emits strobes upon a valid trigger.



2.6 Manual Setting

2.6.1 Brightness setting



Figure 1: Brightness Setting

Display shows channel (1st digit) and brightness (last 3 digits), e.g., "1.100". Toggle channels with **CH**; adjust level with **▼/▲**.

2.6.2 Working Mode Setting

This controller model features four operating modes, which can be set manually via the keys. The four modes — Normally-Off, Normally-On, Millisecond Strobe, and Microsecond Strobe — can be configured independently for each channel.

The following example uses a 4-channel controller to illustrate the setup for Channel 1. The procedure for the other channels is the same.

2.6.3 Normally-Off / Normally-On Mode Setting



Figure 2: Normally-Off Mode Setting



Figure 3: Normally-On Mode Setting

After powering on, the controller displays the screen shown in Figure 1. Briefly press the CH key four times to enter H1 Mode. Then, use the ▼ and ▲ keys to set the value

2.6.4 Millisecond Strobe Mode Setting



Figure 4: Millisecond Strobe Mode Setting



Figure 5: Millisecond Strobe Timing Setting

Starting from the power-on screen (**Figure 1**), press **CH** four times to reach **H1 Mode**. Adjust the value to **H1.2** with the **▼/▲** keys. Next, press **CH** once to proceed to **E1 Mode**, where you can configure the millisecond strobe timing.

2.6.5 Microsecond Strobe Mode Setting



Figure 6: Microsecond Strobe Mode Setting



Figure 7: Microsecond Strobe Timing Setting

3. Communication Protocol(two selectable formats: **String** and **Frame**)

3.1 Serial Port Configuration

Baud Rate	Data Bits	Stop Bits	Parity
9600	8	1	no

3.2 String Communication Format

	Host Application	controller	Description
Set Single-Channel Brightness	set, step, x, y	set, step, ok	x = channel number (1 to max) y = brightness value (0 to 255)
Set Single-Channel Brightness	set, stepall, x	set, stepall, ok	x=0-255 brightness value
Turn On Single-Channel Brightness	set, on, x	set, on, ok	x=channel numbers 1-max.channel numbers
Turn On All-Channel Brightness	set, allon	set, allon, ok	
Turn off Single-Channel Brightness	set, off, x	set, off, ok	x=channel numbers 1-max.channel numbers
Turn Off All-Channel Brightness	set, alloff	set, alloff, ok	

Communication Example

Item	Host application	Controller
Set brightness of channel 1 to 20	set, step, 1, 10	set, step, ok
Set brightness of all channels to 20	set, stepall, 20	set, stepall, ok
Turn off channel 1	set, off, 1	set, off, ok
Turn off all channels	set, alloff	set, alloff, ok
Turn on channel 1	set, on, 1	set, on, ok
Turn on all channels	set, allon	set, allon, ok

3.3 Frame Communication Format

Frame Format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Start Flag	Command Byte	Channel Byte	Data Byte 1	Data Byte 2	Data Byte 3	Checksum High Byte 1	Checksum Low Byte 2

Start Flag = #

Command Byte = 1, 2, 3, 4, 7, 8, 9 are defined as:

1--Turn ON the corresponding channel's power supply.

2--Turn OFF the corresponding channel's power supply.

3--Set parameters for the corresponding channel's power supply. (This command automatically turns ON the channel's power supply. If the channel is already OFF, there is no need to execute the "Turn ON" command first.)

3--Read parameters from the corresponding channel's power supply.

6--Trigger strobe for the corresponding channel. (The target channel is determined by the Channel Byte. This command is invalid if the channel is not in Strobe Mode.)

7--Set operating mode for the corresponding channel. (The target channel is determined by the Channel Byte.)

9--Set strobe timing for the corresponding channel. (The target channel is determined by the Channel Byte. This command is invalid if the channel is not in Strobe Mode.)

❖ When the command byte is 1, 2, 3, 7, 8, or 9: If the controller successfully receives and processes the command, it returns the start flag #. If the controller fails to receive or process the command, it returns &.

1) For Command Byte 4 (Read Parameters):

Success Response: Returns the power supply parameters of the target channel in the same format as the send command.

Error Response: Returns &.

2) The channel byte = 1, 2, 3, or 4, representing output channels 1 through 4, respectively.

Data = 0xXX (where XX is any value from 00 to FF, in hexadecimal). This value represents the power supply setting parameter for the corresponding channel, transmitted with the Most Significant Byte (MSB) first and the Least Significant Byte (LSB) last.

XOR Checksum Field

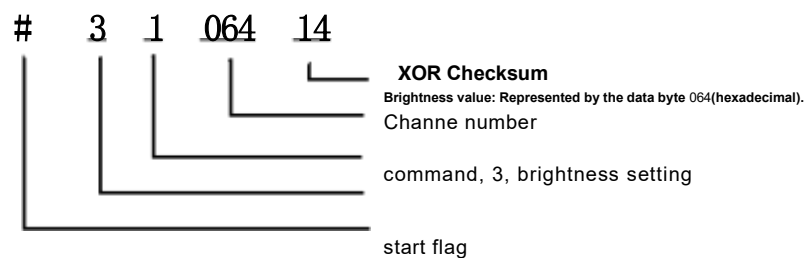
Calculation: The XOR checksum of the following bytes: Start Flag, Command Byte, Channel Byte, and Data Bytes.

Format: The 8-bit checksum value is converted into two ASCII characters representing its hexadecimal value.

Transmission Order: The ASCII character for the high nibble is transmitted first, followed by the character for the low nibble.

Communication Example

Example: To set the brightness of Channel 1 to 100 (Decimal), send the following ASCII command string: #3106413.



The XOR checksum calculation procedure is as follows::

	String	ASCII Code	ASCII codes are represented in hexadecimal.	Convert high/low nibbles to 8421 BCD.
Start flag	#	35	23	0010 0011
Demand bytes	3	51	33	0011 0011
Channel bytes	1	49	31	0011 0001
Data	0	48	30	0011 0000
	6	54	36	0011 0110
	4	52	34	0011 0100
XOR Sum				0001 0011
XOR Checksum				1 3

The following are several sets of experimental data. Users who develop their own demo programs can use this data for comparative testing.

Turn on channel 2: #1206412

	String	ASCII Code	ASCII codes are represented in hexadecimal.	Convert high/low nibbles to 8421 BCD.
Start flag	#	35	23	0010 0011
Demand bytes	1	49	31	0011 0001
Channel bytes	2	50	32	0011 0010
Data	0	48	30	0011 0000
	6	54	36	0011 0110
	4	52	34	0011 0100
XOR Sum				0001 0010
XOR Checksum				1 3

Turn off channel 2: #2202918

	String	ASCII Code	ASCII codes are represented in hexadecimal.	Convert high/low nibbles to 8421 BCD.
Start flag	#	35	23	0010 0011
Demand bytes	2	50	32	0011 0010
Channel bytes	2	50	32	0011 0010
Data	0	48	30	0011 0000
	2	50	32	0011 0010
	9	57	39	0011 1001
XOR Sum				0001 1000
XOR Checksum				1 8

4. Product Dimension Drawing

2.4 Common chassis for 2/4-channel models; front panel varies

