



**SMARTEH**<sup>®</sup>  
LIVING SYSTEMS

# USER MANUAL

- ▶ Longo programmable controller  
LPC-2.PW1  
4 Channel PWM Signal Output  
module

Version 2

Written by SMARTEH d.o.o.  
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User Manual

Document Version: 2  
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**STANDARDS AND PROVISIONS:** Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 100 .. 240 V AC network is allowed for authorized personnel only.

**DANGER WARNINGS:** Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation.

**WARRANTY CONDITIONS:** For all modules LONGO LPC-2 - if no modifications are performed upon and are correctly connected by authorized personnel - in consideration of maximum allowed connecting power, warranty of 24 months is valid from the date of sale to the end buyer, but not more than 36 months after delivery from Smarteh. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.

This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.

Hazardous voltage in the device can cause electric shock and may result in personal injury or death.

**NEVER SERVICE THIS PRODUCT YOURSELF!**

This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).

If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.

Waste electrical and electronic equipment (WEEE) must be collected separately!

LONGO LPC-2 complies to the following standards:

- EMC: EN 61000-6-3:2007 + A1:2011, EN 61000-6-1:2007, EN 61000-3-2:2006 + A1:2009 + A2: 2009, EN 61000-3-3:2013
- LVD: IEC 61010-1:2010 (3<sup>rd</sup> Ed.), IEC 61010-2-201:2013 (1<sup>st</sup> Ed.)

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

**MANUFACTURER:**

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**Longo programmable controller LPC-2.PW1**

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## 1 ABBREVIATIONS

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LED      Light emitting diode

PWM     Pulse width modulation



## 2 DESCRIPTION

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LPC-2.PW1 is a 4 channel PWM signal output module. Its main field of application is controlling PWM dimmable ballasts in lighting system.

LEDs indicate state of signal present on corresponding module output. Their brightness corresponds to the output setting 0 .. 100%.

LPC-2.PW1 is controlled and powered from the main module (e.g., LPC-2.MC8, LPC-2.MC9) via Right internal bus.



### 3 FEATURES

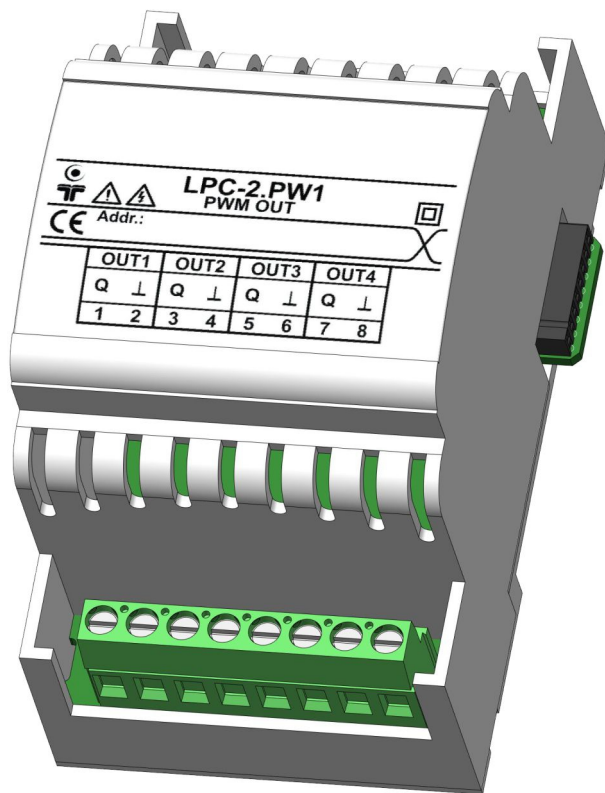


Figure 1: LPC-2.PW1 module

#### Table 1: Features

4 channel PWM signal output

Galvanic isolated outputs

100 mA per output with overload protection

Push-pull transistor outputs capable of driving the signal over up to 100 nF capacitance on the lines.

Adjustable transition time (fade effect) between various output settings

Status LEDs

Standard DIN EN50022-35 rail mounting



## 4 OPERATION

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Module parameters can be read or written via Smarteh IDE software.

### 4.1 Parameters

If parameter is set to logical “1”, is considered to be active, enabled or set. If parameter has logical value “0” is considered to be inactive, disabled or cleared.

Parameter can be a output, input, status or setting. Output and input parameters corresponds to the physical output and input pins of the module. Status parameters are used for additional information from the module, where setting parameters are used to select different settings on the module.

Output:

**Q1 - PWM output [OUT1]:** Output setting.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0.00 .. 100.00%

**Q2 - PWM output [OUT2]:** Output setting.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0.00 .. 100.00%

**Q3 - PWM output [OUT3]:** Output setting.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0.00 .. 100.00%

**Q4 - PWM output [OUT4]:** Output setting.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0.00 .. 100.00%

Setting:

**Fade effect timer for Q1 [OUT1FadeTimer]:** Parameter for adjusting the transition time (fade effect) between 0% and 100% and vice versa on Q1.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0 .. 10 s

**Fade effect timer for Q2 [OUT2FadeTimer]:** Parameter for adjusting the transition time (fade effect) between 0% and 100% and vice versa on Q2.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0 .. 10 s

**Fade effect timer for Q3 [OUT3FadeTimer]:** Parameter for adjusting the transition time (fade effect) between 0% and 100% and vice versa on Q3.

Type: WORD

Raw to engineering data: 0 .. 10000 → 0 .. 10 s

**Fade effect timer for Q4 [OUT4FadeTimer]:** Parameter for adjusting the transition time (fade effect) between 0% and 100% and vice versa on Q4.

Type: WORD

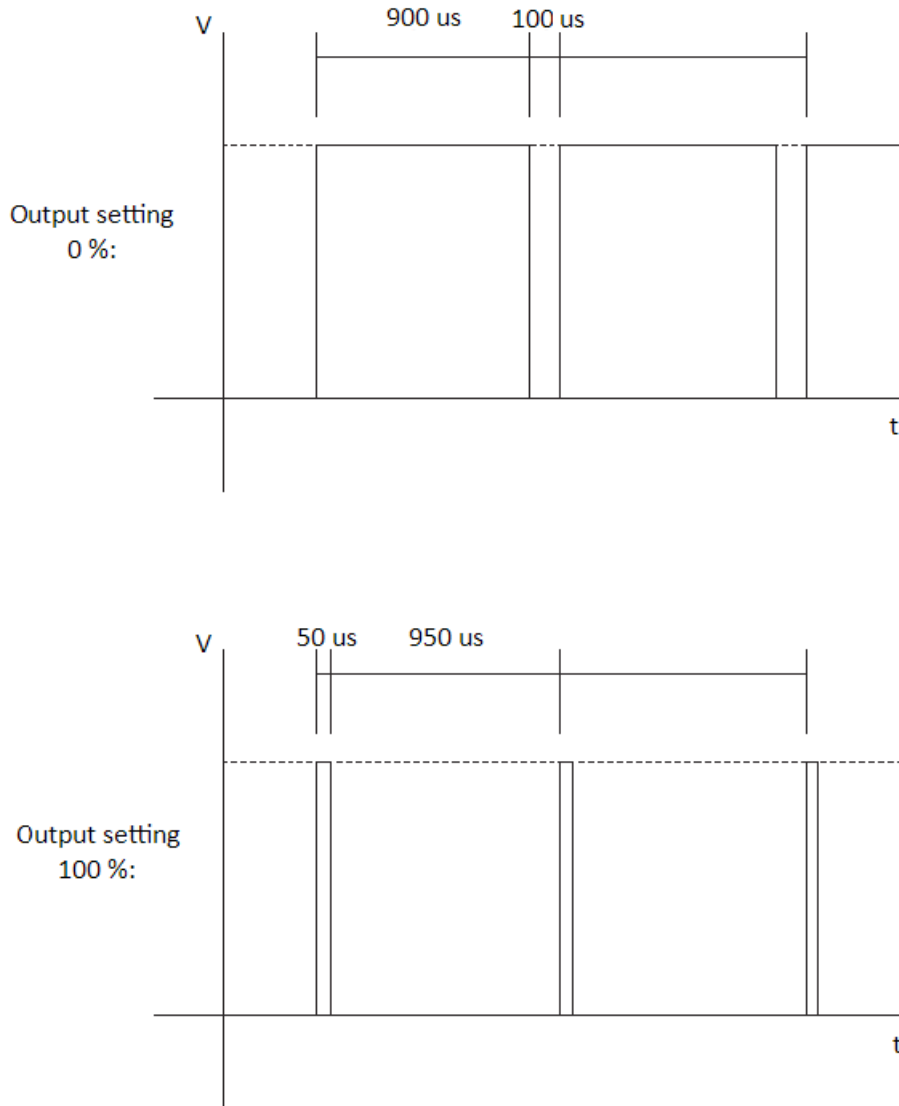
Raw to engineering data: 0 .. 10000 → 0 .. 10 s





## 4.2 Output waveform for output setting 0% and 100%

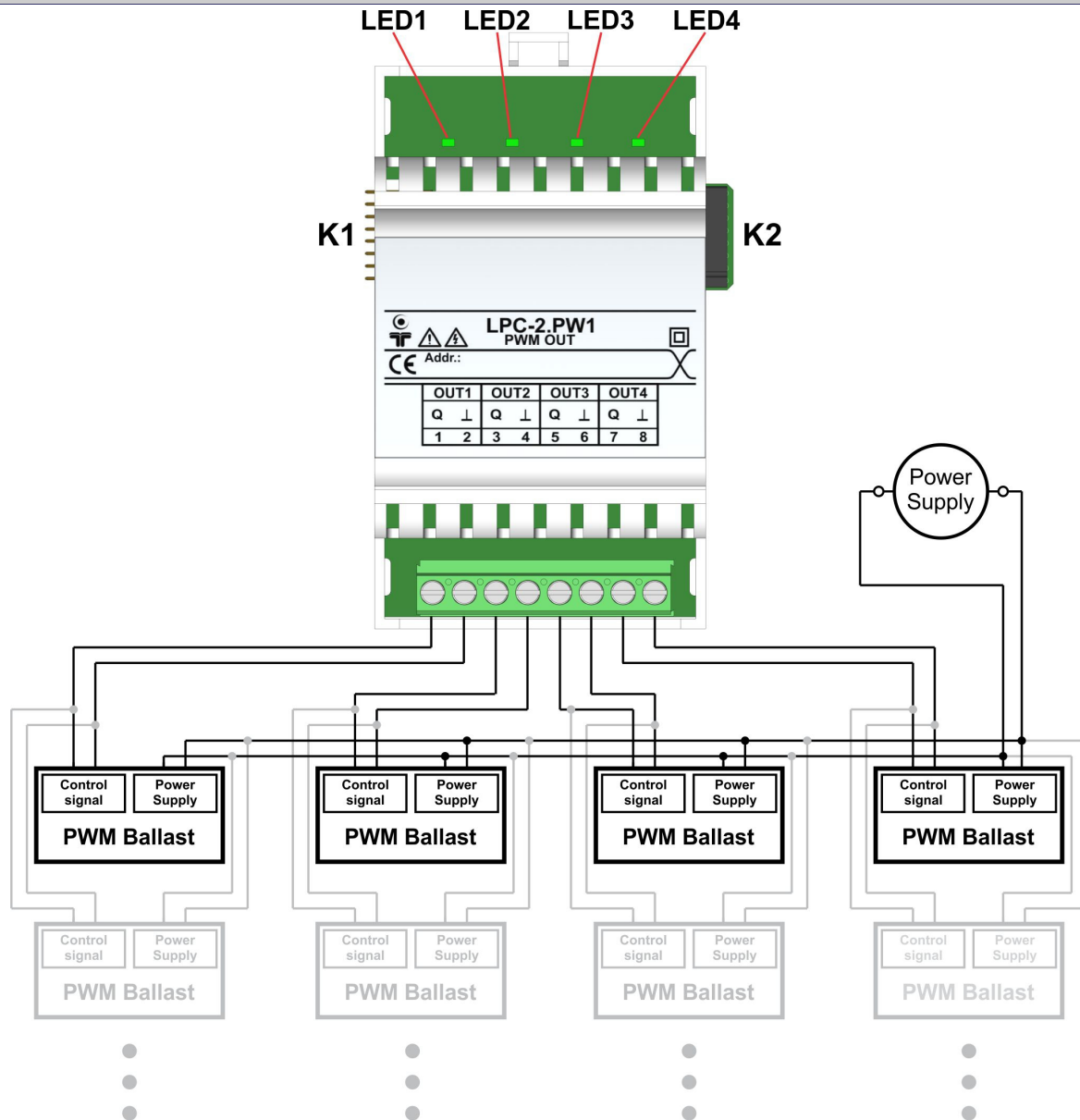
Figure 2: Output waveform for output setting 0% and 100%



## 5 INSTALLATION

### 5.1 Connection scheme

Figure 3: Connection scheme<sup>1</sup>



<sup>1</sup> Outputs must not be connected together.



**Table 2: OUT<sup>2</sup>**

OUT1.1	Q1	PWM output
OUT1.2	GND	GND
OUT2.3	Q2	PWM output
OUT2.4	GND	GND
OUT3.5	Q3	PWM output
OUT3.6	GND	GND
OUT4.7	Q4	PWM output
OUT4.8	GND	GND

**Table 3: K1**

Internal BUS	Data & DC power supply	Connection to I/O module
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**Table 4: K2**

Internal BUS	Data & DC power supply	Connection to I/O module
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**Table 5: LEDs**

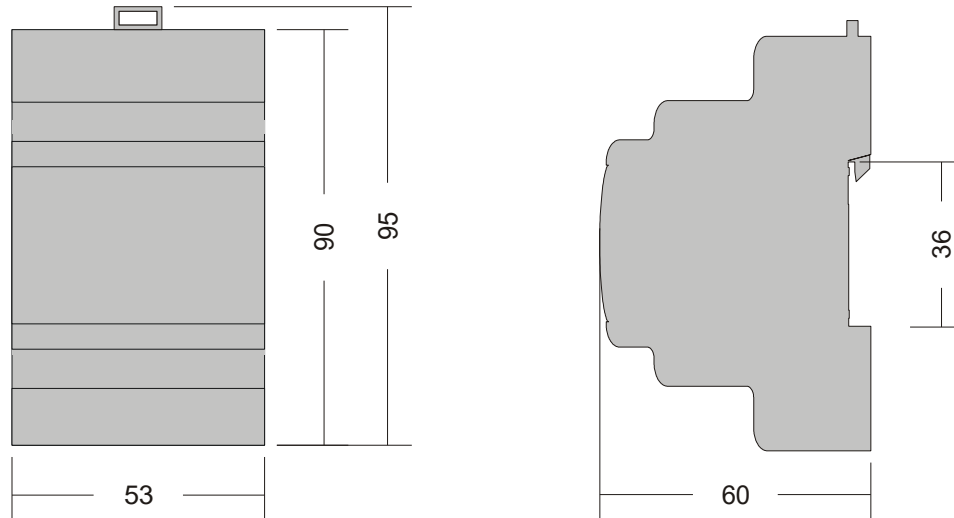
LED1: green	Q1 output state	ON (gradually): Q1 output >0% OFF: Q1 output on 0%
LED2: green	Q2 output state	ON (gradually): Q2 output >0% OFF: Q2 output on 0%
LED3: green	Q3 output state	ON (gradually): Q3 output >0% OFF: Q3 output on 0%
LED4: green	Q4 output state	ON (gradually): Q4 output >0% OFF: Q4 output on 0%

<sup>2</sup> Outputs must not be connected together.



## 5.2 Mounting instructions

**Figure 4: Housing dimensions**



Dimensions in millimeters.



All connections, module attachments and assembling must be done while module is not connected to the power supply.

### Mounting instructions:

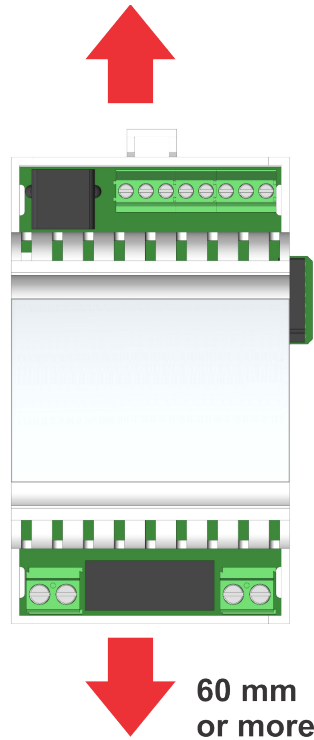
1. Switch off main power supply.
2. Mount LPC-2.PW1 module to the provided place inside an electrical panel (DIN EN50022-35 rail mounting).
3. Mount other LPC-2 modules (if required). Mount each module to the DIN rail first, then attach modules together through K1 and K2 connectors.
4. Connect digital inputs and outputs wires according to the connection scheme in Figure 2.
5. Switch on main power supply.

Dismount in reverse order. For mounting/dismounting modules to/from DIN rail a free space of at least one module must be left on the DIN rail.

**NOTE:** LPC-2 main module should be powered separately from other electrical appliance connected to LPC-2 system. Signal wires must be installed separately from power and high voltage wires in accordance with general industry electrical installation standard.



**Figure 5: Minimum clearances**



The clearances above must be considered before module mounting.



### 5.3 Module labeling

**Figure 6: Labels**

Label 1 (sample):

**LPC-2.PW1**  
P/N:225PW117001001  
D/C: 01/17

Label 2 (sample):

S/N: PW1-S9-170000002

**Label 1 description:**

1. **LPC-2.PW1** is the full product name.
2. **P/N:225PW117001001** is the part number.
  - **225** - general code for product family,
  - **PW1** - short product name,
  - **17001** - sequence code,
    - **17** - year of code opening,
    - **001** - derivation code,
  - **001** - version code (reserved for future HW and/or SW firmware upgrades).
3. **D/C:17/01** is the date code.
  - **17** - week and
  - **01** - year of production.

**Label 2 description:**

1. **S/N:PW1-S9-1700000002** is the serial number.
  - **PW1** - short product name,
  - **S9** - user code (test procedure, e.g. Smarteh person xxx),
  - **17000000002** - year and current stack code,
    - **17** - year,
    - **00000002** - current stack number; previous module would have the stack number 00000001 and the next one 00000003.



## 6 TECHNICAL SPECIFICATIONS

**Table 6: Technical specifications**

Power supply	from internal BUS
Power consumption	5 W
Output voltage in "high" state	11 V $\pm$ 10 % @ load current 0 .. 100 mA
Load current per channel	max. 100 mA
Number of outputs	4
Output resolution	< 1 us
Output jitter	< 500 ns
Pulse width accuracy of the full scale value	$\pm$ 2 %
Load capacitance	max. 100 nF
Fuse	no
Connection type	screw type connectors for stranded wire 0.75 to 2.5 mm <sup>2</sup>
Dimensions (L x W x H)	90 x 53 x 60 mm
Weight	70 g
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Transport and storage temperature	-20 to 60 °C
Pollution degree	2
Overvoltage category	II
Electrical equipment	Class II (double insulation)
Protection class	IP 30



## 7 SPARE PARTS

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For ordering spare parts following Part Numbers should be used:

LPC-2.PW1, 4 Channel PWM Signal Output module	
LPC-2.PW1	P/N: 225PW117001001

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## 8 CHANGES

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The following table describes all the changes to the document.

Date	V.	Description
15.01.18	2	Technical update. Page 7, 11.
15.11.17	1	The initial version, issued as <i>LPC-2.PW1 module UserManual</i> .



## 9 NOTES

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