



USER MANUAL

- Longo programmable controller
LPC-2.C06
UART module

Version 2



Written by SMARTEH d.o.o.
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User Manual

Document Version: 2
June, 2021



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 (3rd Ed.), IEC 61010-2-01:2013 (1st 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.

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1 ABBREVIATIONS

DC	Direct Current
TTL	Transistor-Transistor Logic
RX	Receive
TX	Transmit
UART	Universal Asynchronous Receiver-Transmitter





2 DESCRIPTION

LPC-2.C06 is a communication module for RS-232, TTL or RS-485 serial UART communication. It's main feature is being a gateway for UART protocols, exchanging UART data with the main module, where all of data is being interpreted. That way, different communication protocols, which are based on the RS-232, TTL or RS-485 UART protocols, can be implemented, e.g. DMX, proprietary protocols.

LPC-2.C06 is controlled and powered from the main module (e.g. LPC-2.MC9) via Right internal bus.





3 FEATURES

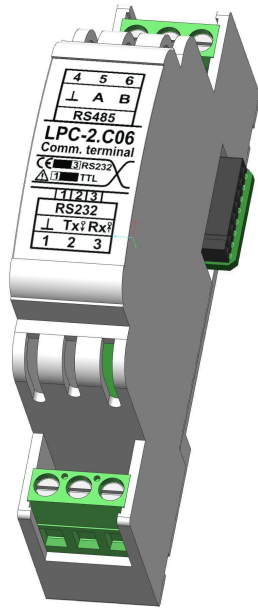


Figure 1: LPC-2.C06 module

Table 1: Technical data

RS-232 port with possibility to use TTL voltage levels (select-able with jumper)
RS-485 port
Signal LEDs
Supplied from main module
Small dimensions and standard DIN EN50022-35 rail mounting





4 OPERATION

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

4.1 Parameters

Input

Protocol type [Protocol_Type]: Protocol type feedback. Intended for future use.

Type: USINT

Raw to engineering data: 0 .. 255 → 0 .. 255

I²C session counter [I2C_Session_Cnt]: It changes after each session when data in module updates. It updates every cca.100 ms.

Type: USINT

Raw to engineering data: 0 .. 255 → 0 .. 255

Receive counter [Rx_Counter]: It changes if new data in Rx_Buffer is available.

Type: USINT

Raw to engineering data: 0 .. 255 → 0 .. 255

Received data length [Rx_Data_Len]: Number of data in Rx Buffer.

Type: UINT

Raw to engineering data: 0 .. 65535 → 0 .. 65535

Received telegram status [Rx_TLG_Status]: Status of received telegram.

Type: USINT

Raw to engineering data:

xxxxxxx0	→ No telegram timeout
xxxxxxx1	→ Telegram timeout
Xxxxxx0x	→ No data (byte) timeout
xxxxxx1x	→ Data (byte) timeout
xxxxx0xx	→ No parity error
xxxxx1xx	→ Parity error
xxxx0xxx	→ No framing error
xxxx1xxx	→ Framing error
xxx0xxxx	→ No data overflow
xxx1xxxx	→ Data overflow

Receive reception status [Rx_Reception_Status]: Status of reception.

Type: USINT

Raw to engineering data:

0	→ No reception
1	→ Reception in progress
2	→ Reception ended (timeout)
3	→ Reception ended (data received)





11 → Error in reception

Maximum receive timeout [Rx_Timeout_Max]: Maximal timeout between received data bytes in received telegram.

Type: UINT

Raw to engineering data: 0 .. 65535 → 0 .. 65535 us

Output

Protocol type [Protocol_Type]: Selector of protocol type. Intended for future use.

Type: USINT

Raw to engineering data: 0 → Universal
2 .. 255 → Custom protocols. If custom protocol is not implemented universal protocol is used.

Protocol option [Protocol_Option]: Protocol options.

Type: USINT

Raw to engineering data: xxxxxxx0 → RS485
xxxxxxx1 → RS232
Xxxxxx0x → Normal TTL Tx signal
xxxxxx1x → Inverted TTL Tx signal
xxxxxx0xx → Normal RS232 and inverted TTL Rx signal
xxxxxx1xx → Inverted RS232 and normal TTL Rx signal

UART speed [UART_Speed]: Selector of baudrate.

Type: USINT

Raw to engineering data: 0 → 300
1 → 600
2 → 1200
3 → 2400
4 → 4800
5 → 9600
6 → 19200 (default)
7 → 38400
8 → 57600
9 → 115200
other → 19200

UART parity [UART_Parity]: Selector of parity.

Type: USINT

Raw to engineering data: 0 → No parity bit
1 → Odd
2 → Even
other → No parity bit

UART databits [UART_Databits]: Number of data bits.



Type: USINT

Raw to engineering data: 5 → 5 bits
6 → 6 bits
7 → 7 bits
8 → 8 bits (default)
other → 8 bits

UART stopbits [UART_Stopbits]: Number of stop bits.

Type: USINT

Raw to engineering data: 0 → 1 bit
1 → 1 bit
2 → 2 bits (default)
other → 2 bits

Received telegram timeout [Rx_TLG_Timeout]: Telegram timeout for receiving data.

Type: UINT

Raw to engineering data: 0 → No timeout
other → Timeout value (in ms)

Received data timeout [Rx_Data_Timeout]: Data timeout for receiving data.

Type: UINT

Raw to engineering data: 0 → No timeout
other → Timeout value (in us)

Received data length [Rx_Data_Len]: Length of received data.

Type: UINT

Raw to engineering data: 0 .. 1000 → Number of expected data.
1001 → AUTO (receive data until timeout or buffer is full)
other → AUTO

Transmitted data length [Tx_Data_Len]: Number of bytes to transmit.

Type: UINT

Raw to engineering data: 0 .. 270 → 0 .. 270 bytes

Transmit counter [Tx_Counter]: Transmit data only when counter changes.

Type: USINT

Raw to engineering data: 0 .. 255 → 0 .. 255

Transmit buffer [Tx_Buffer_{1..270}]: Transmit buffer with content to send over UART. It contains 270 variables, e.g. Tx_Buffer_1, Tx_Buffer_2...

Type: USINT

Raw to engineering data: 0 .. 255 → 0 .. 255



5 INSTALLATION

5.1 Connection scheme

Figure 2: Connection scheme

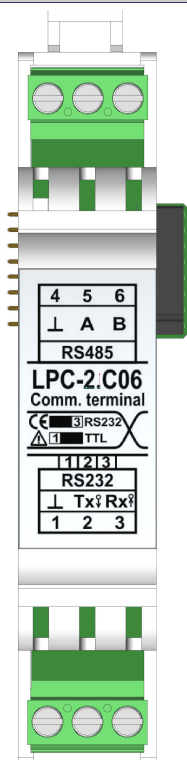


Table 2: RS485¹

RS485.4	⊥	GND
RS485.5	RS-485 (A)	RS-485 standard voltage levels
RS485.6	RS-485 (B)	

Table 3: RS232¹

RS232.1	⊥	GND
RS232.2	RS-232 (Tx)	S1 Position 1-2 (RS232) → RS-232 standard voltage levels S1 Position 2-3 (TTL) → 0 .. 5 V
RS232.3	RS-232 (Rx)	



Table 4: K1

Internal BUS	Data & DC power supply	Connection to I/O module
--------------	------------------------	--------------------------

¹ Wires connected to the module must have cross sectional area at least 0.75 mm². Minimum temperature rating of wire insulation must be 85 °C.





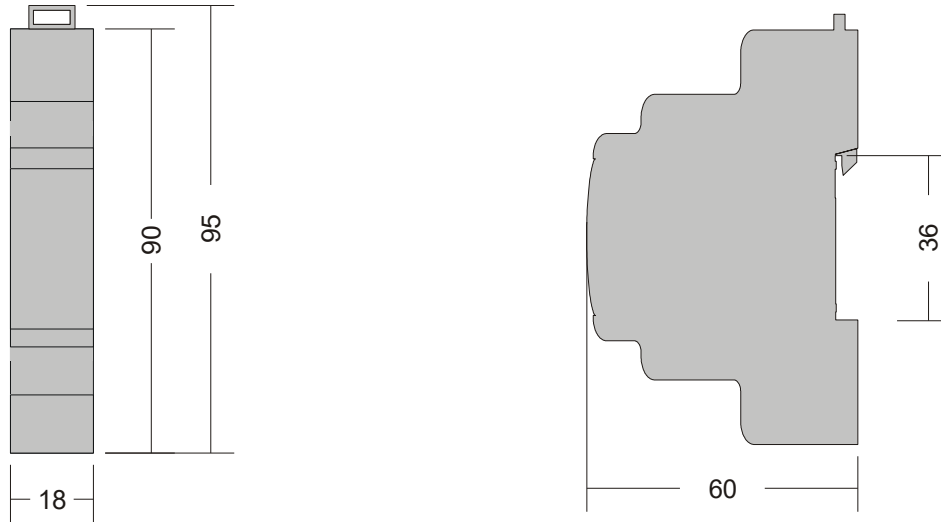
Table 5: K2		
Internal BUS	Data & DC power supply	Connection to I/O module
S1		Position 1-2, RS-232
S1		Position 2-3, TTL





5.2 Mounting instructions

Figure 3: Housing dimensions



- Dimensions in millimeters.



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

Mounting instructions:

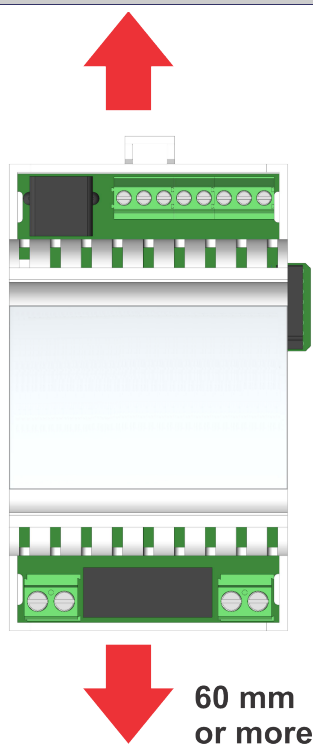
1. Switch OFF main power supply.
2. Mount LPC-2.C06 module to the provided place inside an electrical panel (DIN EN50022-35 rail mounting).
3. Mount other LPC-2 modules (if required). Mount each module to the DIN rail first, then attach modules together through K1 and K2 connectors.
4. Connect input and output 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 4: Minimum clearances



The clearances above must be considered before module mounting.





5.3 Module labeling

Figure 5: Label

Label (sample):

XXX-N.ZZZ
P/N: AAABBBCCDDDEEE
S/N: SSS-RR-YYXXXXXXXXXX
D/C: WW/YY

Label description:

1. **XXX-N.ZZZ** - full product name.
 - **XXX-N** - Product family
 - **ZZZ** - product
2. **P/N: AAABBBCCDDDEEE** - part number.
 - **AAA** - general code for product family,
 - **BBB** - short product name,
 - **CCDDD** - sequence code,
 - **CC** - year of code opening,
 - **DDD** - derivation code,
 - **EEE** - version code (reserved for future HW and/or SW firmware upgrades).
3. **S/N: SSS-RR-YYXXXXXXXXXX** - serial number.
 - **SSS** - short product name,
 - **RR** - user code (test procedure, e.g. Smarteh person xxx),
 - **YY** - year,
 - **XXXXXXXXXX** - current stack number.
4. **D/C: WW/YY** - date code.
 - **WW** - week and
 - **YY** - year of production.

Optional

1. **MAC**
2. **Symbols**
3. **WAMP**
4. **Other**





6 TECHNICAL SPECIFICATIONS

Table 8: Technical specifications

Power supply	from main module via internal bus
Max. power consumption	1 W
Connection type	screw type connector for stranded wire 0.75 to 1.5 mm ²
Dimensions (L x W x H)	90 x 18 x 60 mm
Weight	60 g
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Maximum altitude	2000 m
Mounting position	vertical
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 CHANGES

The following table describes all the changes to the document.

Date	V.	Description
01.06.2021	2	Product name changed.
12.06.2020	1	The initial version, issued as <i>LPC-2.C06 module UserManual</i> .





8 NOTES

