



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

# USER MANUAL

- ▶ Longo programmable controller  
LPC-2.A02  
Analog Output module

Version 4

Written by SMARTEH d.o.o.  
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User Manual

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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.A02

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## 1 DESCRIPTION

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LPC-2.A02 module is used for temperature measurements, supporting different types of temperature sensors (Thermocouples E, J, K, N, R, S, T, NTC, Pt100, Pt1000 and Ni1000). The characteristic curves are linearized and the reference temperature for measurement with thermocouples is determined directly within the terminal. Temperatures output values are in 1/10 °C. Module has error detection when the measured temperature goes out of the range, which can be used for broken or short wire detection.

The terminal is fully configurable via internal BUS (sensor & type select).

## 2 FEATURES

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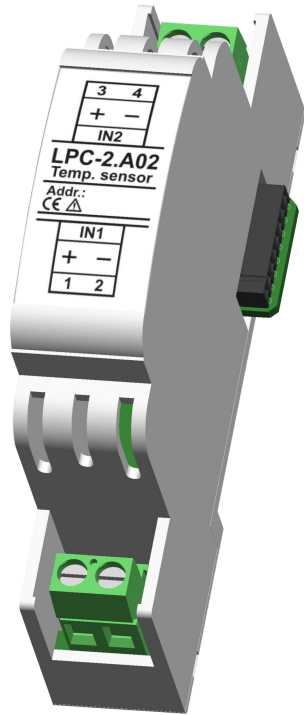


Figure 1: LPC-2.A02 analog module.

**Table 1: Technical data**

Different sensor type supported

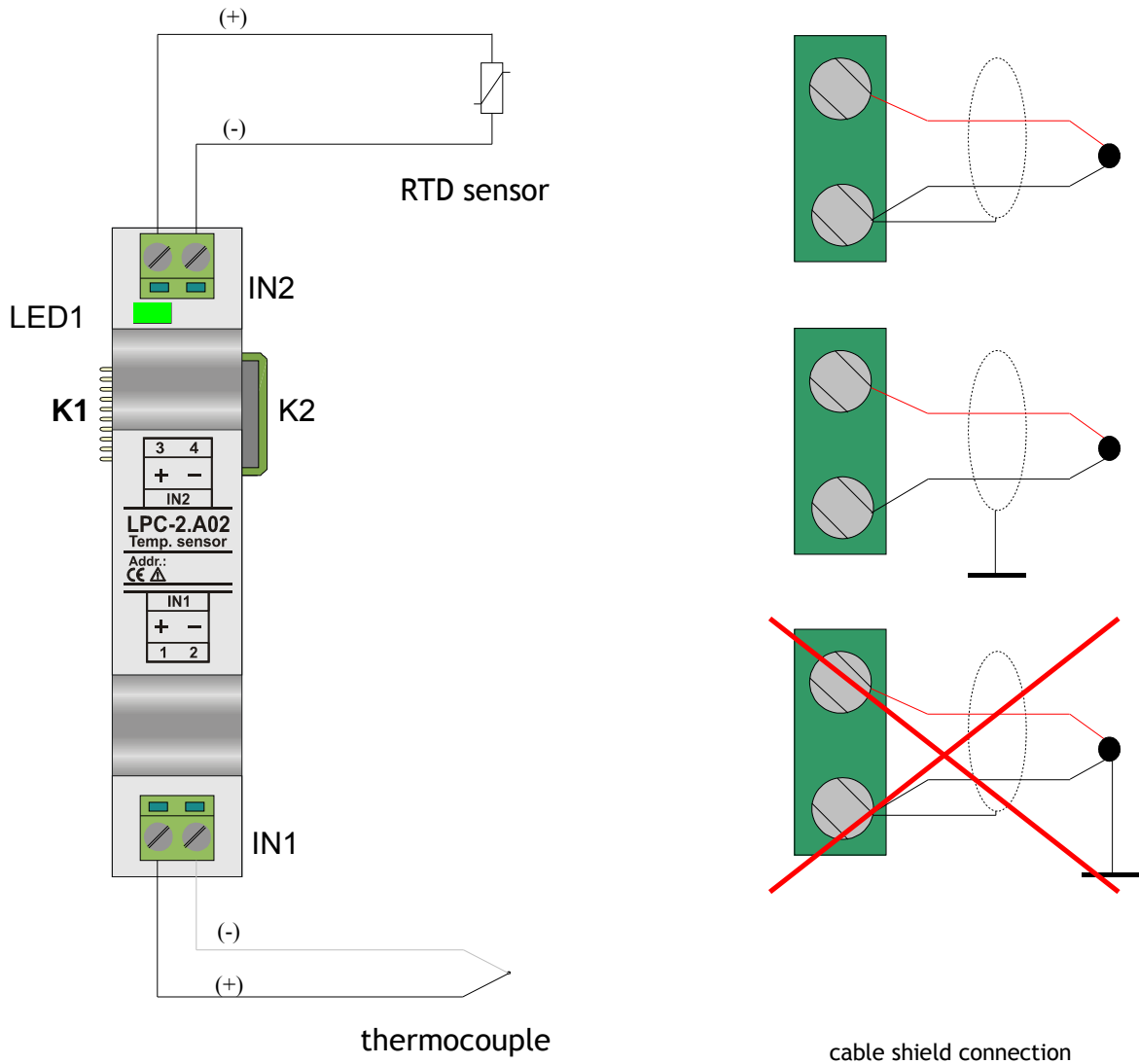
Two channels

Internal cold junction measurement and compensation

### 3 INSTALLATION

#### 3.1 Connection scheme example

Figure 2: Connection scheme example





**Table 1: Inputs**

IN1.1	sensor positive connection
IN1.2	sensor negative connection
IN2.3	sensor positive connection
IN2.4	sensor negative connection

**Table 2: K1**

Internal BUS	Data & DC power supply	Connection to I/O module
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**Table 3: K2**

Internal BUS	Data & DC power supply	Connection to I/O module
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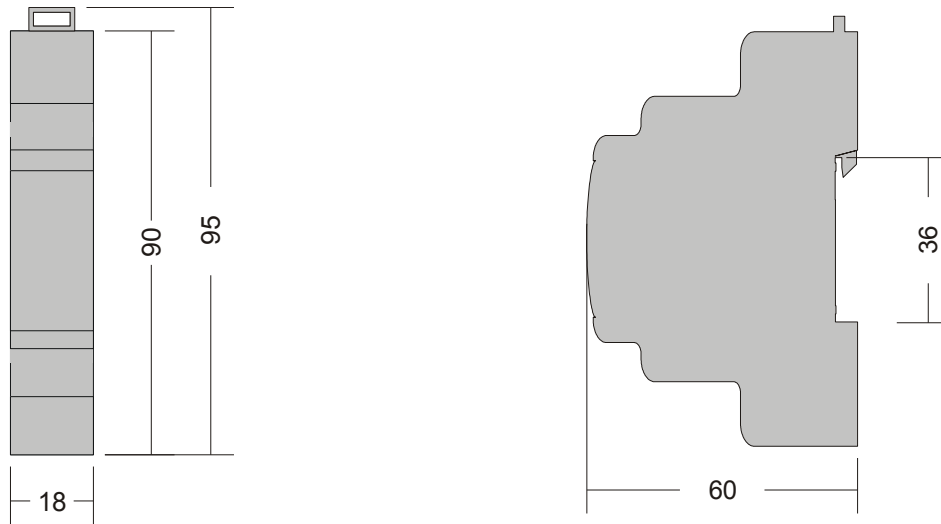
**Table 4: LED1**

Status	permanent	normal operation
	blinking	error present: see LPC2.A02 help file for detailed explanation



### 3.2 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.A02 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 devices and sensor wires according to the connection scheme in Figure 2.
5. Switch ON main power supply.
6. Green LED should turn on according to the Table 4.

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.

### 3.3 Module labeling

**Figure 4: Labels on housing**

Label 1:

**LPC-2.A02**  
P/N:225A0206001001  
D/C: 16/06

Label 2:

S/N: A02-S9-0600000190

**Label 1 description:**

1. **LPC-2.A02** is the full product name.
2. **P/N:225A0206001001** is the part number.
  - **225** - general code for LPC-2 product family,
  - **A02** - short product name,
  - **06001** - sequence code,
    - **06** - year of code opening,
    - **001** - derivation code,
  - **001** - version code (reserved for future HW and/or SW firmware upgrades).
3. **D/C:16/06** is the date code.
  - **16** - week and
  - **06**- year of production.

**Label 2 description:**

1. **S/N:A02-S9-0600000190** is the serial number.
  - **A02** - short product name,
  - **S9** - user code (test procedure, e.g. Smarteh person xxx),
  - **0600000190** - year and current stack code,
    - **06** - year (last two cyphers),
    - **00000190** - current stack number; previous module would have the stack number **00000189** and the next one **00000191**.

## 4 PROGRAMMERS GUIDE

**Table 5:**

Variable	Description	RAW range	ENG range	Type
A02_N_IN1	Input 1 value	0 .. 65535	Min..Max [0.1 °C]	Word
A02_N_IN2	Input 2 value	0 .. 65535	Min..Max [0.1 °C]	Word
A02_N_INErr1	Input 1 Error	0 .. 2	Error type (table 6)	Word
A02_N_INErr2	Input 2 Error	0 .. 2	Error type (table 6)	Word
A02_N_1SSel	Input 1 Sensor select	0 .. 3	Sensor type (table 7)	Word
A02_N_1TSel	Input 1 Type select	0 .. 7	Sensor value (table 7)	Word
A02_N_2SSel	Input 2 Sensor select	0 .. 3	Sensor type (table 7)	Word
A02_N_2TSel	Input 2 Type select	0 .. 7	Sensor value (table 7)	Word

**Table 6: Error type**

Value	Meaning
0	no error
1	temp > high_limit_temp (out of range)
2	temp < low_limit_temp (out of range)

**Table 7: Sensor selection**

Type	__Ssel	Value	_Tsel	Raw range	ENG range
thermocouple	1	E	1	8000 .. 20000	-200 .. 1000 °C
thermocouple	1	J	2	7900 .. 22000	-210 .. 1200 °C
thermocouple	1	K	3	8000 .. 23720	-200 .. 1372 °C
thermocouple	1	N	4	8000 .. 23000	-200 .. 1300 °C
thermocouple	1	R	5	9500 .. 27680	-50 .. 1768 °C
thermocouple	1	S	6	9500 .. 27680	-50 .. 1768 °C
thermocouple	1	T	7	8000 .. 14000	-200 .. 400 °C
PT	2	100	0	8050 .. 16500	-195 .. 650 °C
PT	2	1000	1	8050 .. 15500	-195 .. 550 °C
Ni	2	1000	3	9700 .. 11600	-30 .. 160 °C
NTC	3	10k	0	9900 .. 11750	-10 .. 175 °C

## 5 TECHNICAL SPECIFICATIONS

**Table 8: Technical specifications**

Power supply	from internal BUS
Number of analog inputs	2
Connection type	screw type connector for stranded wire 0.75 to 2.5 mm <sup>2</sup>
Max. power consumption	2 W
Sensor input type	NTC 10k, PT100, PT1000, Ni1000, TC (E, J, K, N, R, S, T)
Resolution	0.1 °C
Measuring error TC (E, J, K, N, R, S, T) * 50 °C to TC on full scale	< ± 5 °C
Measuring error NTC, PT, Ni on full scale	< ± 1%
Max. transition time per channel	1 s
ADC resolution	14 bit
Dimensions (L x W x H)	90 x 53 x 60 mm
Weight	100 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
Protection class	IP 30

\* NOTE: Measurement accuracy bellow 50 °C can be outside specified value.

## 6 CHANGES

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The following table describes all the changes to the document.

Date	V.	Description
1.2.2015	004	Updated technical data.
1.7.2012	003	CGP General update.
27.2.2012	002	Updated technical data.
30.5.2006	001	The initial version, issued as <i>LPC-2.A02 module UserManual</i> .

## 7 NOTES

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