



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

# USER MANUAL

- Additional equipment  
LCS-1.C01  
Condensation sensor

Version 1

Written by SMARTEH d.o.o.  
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User Manual

Document Version: 1  
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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 230 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 LCS-1 - if no modifications are performed upon and are correctly connected by authorized personnel - in consideration of maximum allowed connecting power, we offer warranty for 24 months from date of sale to end buyer. 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 LCS-1 complies to the following standards:

- EMC: IEC/EN 61000-6-2, IEC/EN 61000-6-4,
- LVD: IEC 61010-1:2010 (3<sup>rd</sup> Edition), 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.

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## 1 ABBREVIATIONS

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Sorted by order of appearance in document:

LED      Light emitting diode



## 2 DESCRIPTION

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The LCS-1.C01 is a 4 wire condensation sensor used in combination with the input modules (e.g., LPC-2.I16, LPC-2.DI1, LPC-2.DI5, LPC-2.R01, LPC-2.R02) to avoid condensation on pipes or on the surface of cooling ceiling elements and with this preventing “room rain”.

Trimmer T1 enables sensitivity adjustment. Default setting of trimmer is set to middle position. In case adjustment to local conditions is needed, turn trimmer to the right (clockwise) for early sensor response or left (anticlockwise) for late sensor response .

Used switching element is current protected bipolar transistor.



### 3 FEATURES

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Figure 1: LCS-1.C01 Condensation sensor

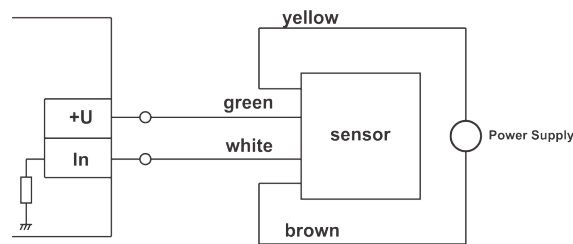
Table 1: Features
Wide power supply range: 5 .. 32 V DC/AC
Output voltage free contact
Condensation two LEDs indication
Provided spring for pipe mounting



## 4 INSTALLATION

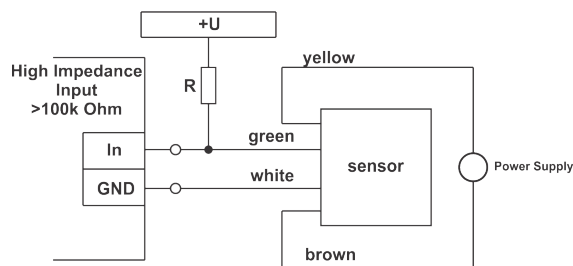
### 4.1 Connection scheme

**Figure 2: Connection scheme with Smarteh modules<sup>1</sup>**



Power Supply = 5 .. 32 V AC/DC

**Figure 3: Connection scheme with pull-up resistor**



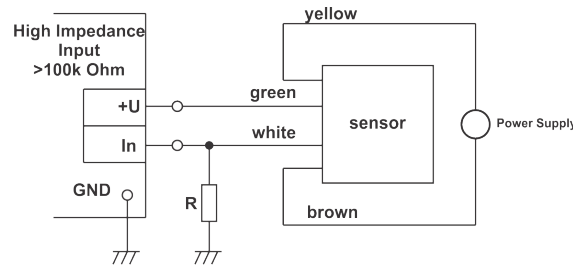
	+U = 10 .. 32 V DC	R = 3 .. 20 kΩ	Power Supply = 5 .. 32 V AC/DC
Option 1:	Condensation present: voltage drop on sensor > 95 % Vcc. Condensation not present: voltage drop on sensor < 2 V.		
	+U = 5 V DC	R = 1 .. 20 kΩ	Power Supply = 5 .. 32 V AC/DC
Option 2:	Condensation present: voltage drop on sensor > 4 V. Condensation not present: voltage drop on sensor < 1 V.		

<sup>1</sup> Smarteh input modules (e.g., LPC-2.116, LPC-2.D11, LPC-2.DI5, LPC-2.R01, LPC-2.R02).



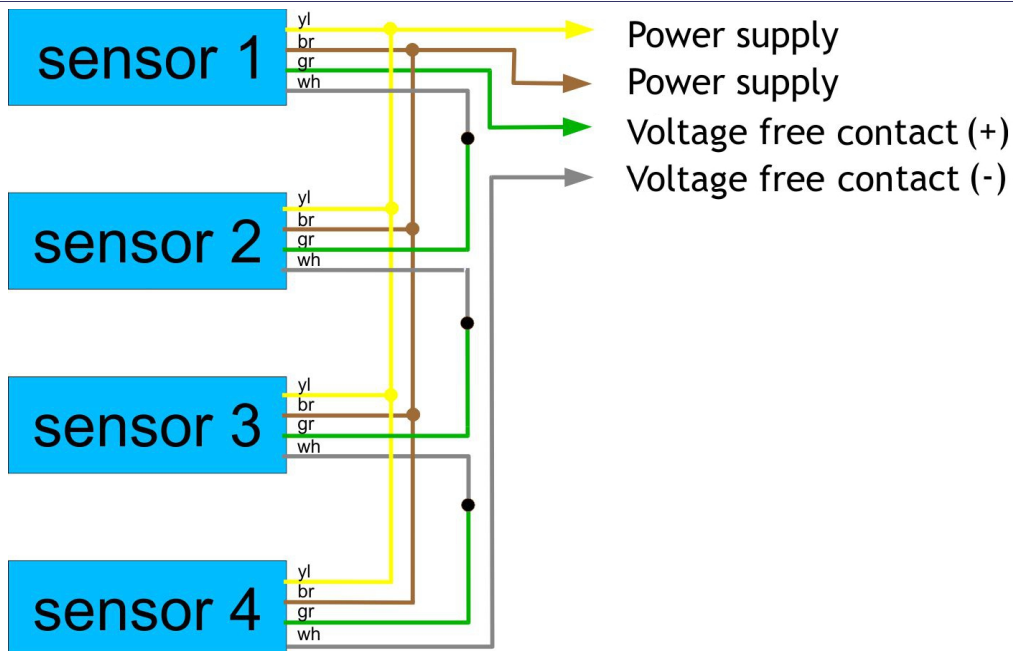
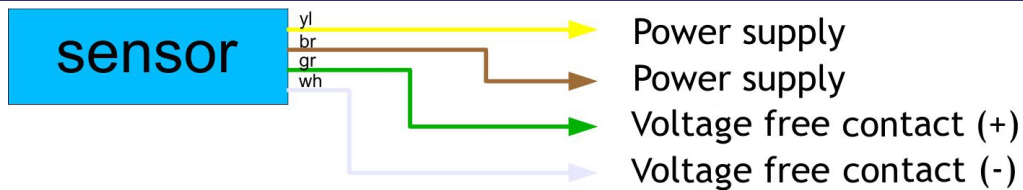


**Figure 4: Connection scheme with pull-down resistor**



	+U = 10 .. 32 V DC	R = 3 .. 20 kΩ	Power Supply = 5 .. 32 V AC/DC
Option 1:	Condensation present: voltage drop on sensor > 95 % Vcc. Condensation not present: voltage drop on sensor < 2 V.		
	+U = 5 V DC	R = 1 .. 20 kΩ	Power Supply = 5 .. 32 V AC/DC
Option 2:	Condensation present: voltage drop on sensor > 4 V. Condensation not present: voltage drop on sensor < 1 V.		

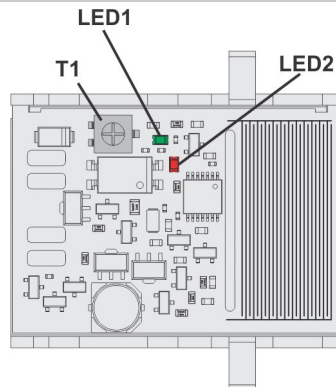
**Figure 5: Connection scheme for single or multiple sensors<sup>2</sup>**



<sup>2</sup> Maximum allowed number of multiple sensors is 4.



**Figure 6: Connection scheme**



**Table 2: Flying lead wires**

Yellow	5 .. 32 V AC/DC <sup>3</sup>	Power supply
Brown	GND	Ground
Green	5 .. 32 V DC (positive)	NC voltage free contact
White	0 V DC (negative)	NC voltage free contact

**Table 3: LEDs & Trimmers**

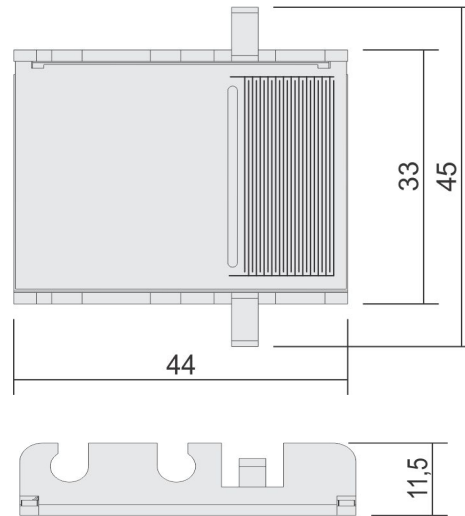
LED1: green	No condensation indication	ON: no condensation - voltage free contact closed OFF: condensation present - voltage free contact opened, power supply missing or power off
LED2: red	Condensation presence indication	ON: condensation present - voltage free contact opened OFF: no condensation - voltage free contact closed, power supply missing or power off
T1	Sensitivity trimmer	ROTATING CLOCKWISE: increasing sensitivity ROTATING ANTICLOCKWISE: decreasing sensitivity

<sup>3</sup> In case of 5 .. 10 V DC power supply, use of stabilized power supply is mandatory.



## 4.2 Mounting instructions

**Figure 7: Housing dimensions**



Dimensions in millimeters.



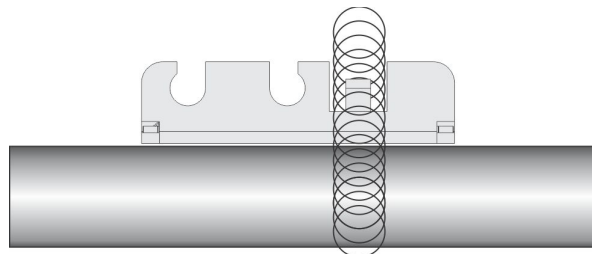
All connections, module attachments and assembling must be done while module is not connected to the main power supply.

### Mounting instructions:

The condensation sensor should be mounted on the coldest spot of the cooling area or directly on the chilled water supply inlet pipe. The condensation sensor housing should have good thermal contact to the measured surface. Use of thermo-contact grease between sensor and measuring surface is recommended. Before mounting make sure that the surface is completely clean and dry. Don't paint the condensation sensor and avoid contact with other metal pieces.

1. Mount LCS-1.C01 sensor on the measuring surface. On pipe fixing should be performed with spring provided.
2. Connect wires to input module according to Figure 2, 3 or 4.

**Figure 8: Mounting instructions for LCS-1.C01**



## 5 TECHNICAL SPECIFICATIONS

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**Table 5: Technical specifications**

Power supply	5 .. 32 V AC/DC <sup>4</sup>
Consumption	max. 15 mA
Voltage free contact power supply <sup>5</sup>	5 .. 32 V DC
Output type	transistor (NC)
Output current	max. 15 mA, internally limited
Dimensions (L x W x H)	44 x 45 x 11.5 mm
Weight	65 g
Wire length connection	2 m, 7 m
Ambient temperature	0 to 50 °C
Transport and storage temperature	-20 to 60 °C

4 In case of 5 .. 10 V DC power supply, use of stabilized power supply is mandatory.

5 See figure 2,3 and 4 for wiring scheme.





## 6 SPARE PARTS

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For ordering spare parts following Part Numbers should be used:

LCS-1.C01 Condensation sensor, 2 m	
LCS-1.C01	P/N: 204C0116001001
LCS-1.C01 Condensation sensor, 7 m	
LCS-1.C01	P/N: 204C0116002001





## 7 CHANGES

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The following table describes all the changes to the document.

Date	V.	Description
09.09.16	1	The initial version, issued as <i>LCS-1.C01 User Manual</i> .





Additional equipment LCS-1.C01

## 8 NOTES

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