



IOT STARTER KIT USER MANUAL

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1 Introduction

This manual is intended for installation, configuration and use of Alleantia's IOT Starter Kit: integrated software and hardware systems.



2 IOT STARTER KIT hardware

2.1 General characteristics

The IOT STARTER KIT is a useful tool for the final user to become familiar with the IoT world (Internet of Things), Industry 4.0, monitoring and control systems, plants, machines, as well as communication with third-party applications.

It consists of firm plexiglas base, a console with connectors, selectors and measuring equipment, as well as more detailed software and hardware systems and together with additional hardware, compatible with IOT STARTER KIT, make up a complete kit for the IOT users.

The power supply is included in the package together with Advantech UTX-3117.

2.2 Product description and constructive schemes

The IOT Starter Kit, as said before, is a console that allows the user to interact in a simple way with the IOT world. There are prewired and available functionalities described below.

The IOT Starter Kit includes:

- firm plexiglas base, 8mm thick;
- holes to install Advantech UTX-3117 gateway;
- firm plexiglas button panel, 5 mm thick.

The console includes:

- On/Off power toggle switch, 16 Amp
- 12 V power jack, 5,5x2,5mm
- 2 Connectors 4mm insulated skt RED/BLACK for optional connection with the gateway (positive/negative poles on the gateway)
- DO 0 status LED green 12Vcc (DO0 on Yotta A-5289)
- DO 1 status LED red 12Vcc (DO1 on Yotta A-5289)
- 2 Connectors 4mm insulated skt RED/BLACK modbus RS485
- 3 Connectors 4mm insulated skt BLACK/BLACK/RED to connect digital inputs DI2, DI3, COM (DI2, DI3, COM on Yotta A-5289)
- 2 toggle switches SP On/Off 16A 250Vac IP67 for digital inputs DI0-DI1 (DI0, DI1 on Yotta A-5289)
- Potentiometer with 22mm knob, equipped with rotation meter (10 rotations) (AIO on Yotta A-1010)
- Analogue voltmeter 0-10 V (AO0 on Yotta A-1010)

2 IOT STARTER KIT hardware

- Yottacontrol A-5289 D - controller;
- Yottacontrol A-1010 - remote I/O device;
- Spare parts:
 - ALLEANTIA CABLE KIT
 - DIN BAR KIT

The IOT Starter Kit constructive schemes are attached.

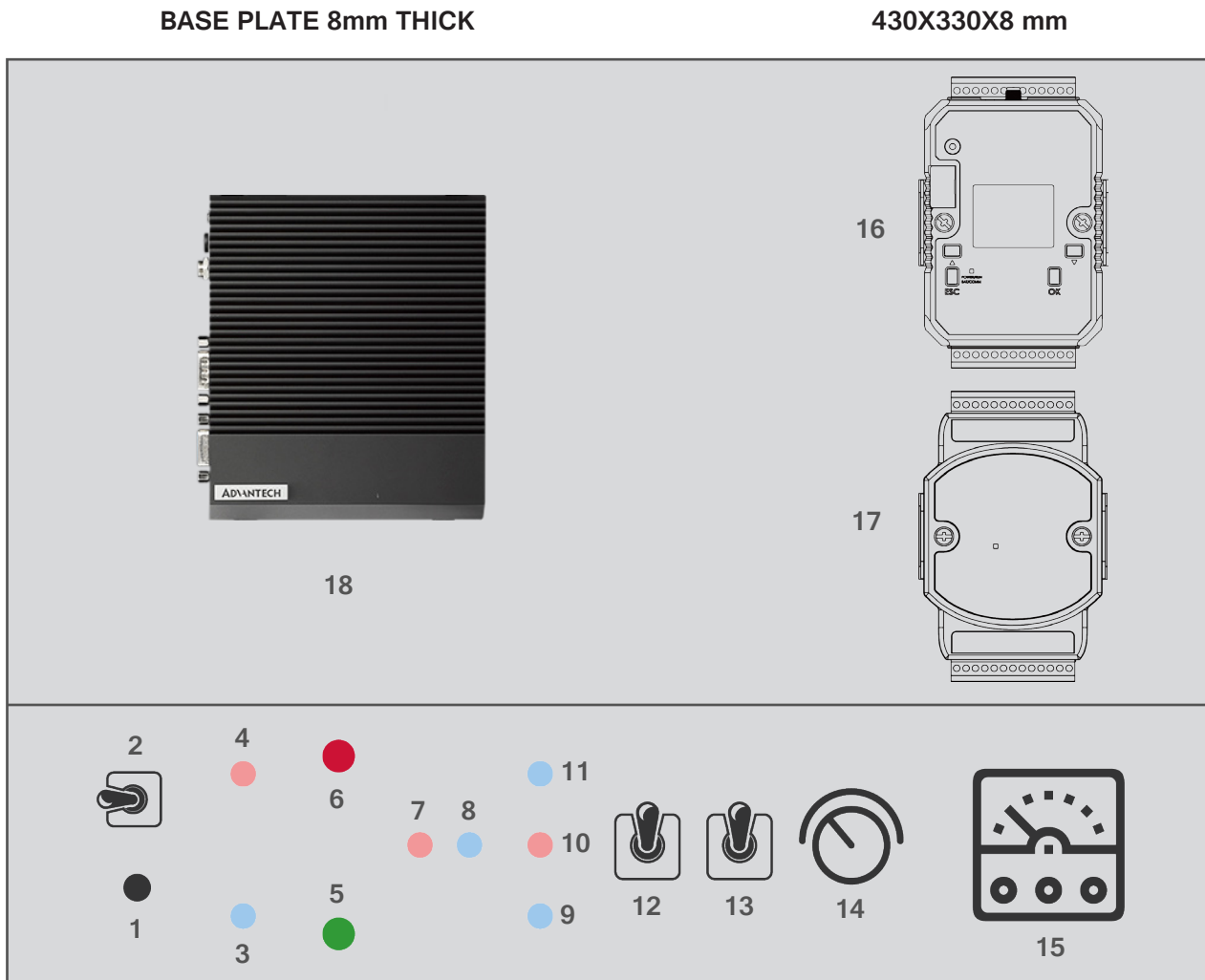


Figure 1 - IOT Starter Kit constructive schemes

- | | |
|--|--|
| 1 - 12 V power port, 70 Amp | 10 - Ground DI2-DI3 (Yotta A-5289D) |
| 2 - Power toggle switch (On/Off) | 11 - Digital input 3 DI3 (Yotta A-5289D) |
| 3 - Power (negative) | 12 - Toggle switch 0 – DIO (Yotta A-5289D) |
| 4 - Power (positive) | 13 - Toggle switch 1 – DI1 (Yotta A-5289D) |
| 5 - DO0 status LED 1 green (Yotta A-5289D) | 14 - Potentiometer (AIO Yotta A-1010) |
| 6 - DO1 status LED 2 red (Yotta A-5289D) | 15 - Voltmeter 0-10 V (AO0 Yotta A-1010) |
| 7 - Modbus (D+) | 16 - Yotta A-5289D Controller |
| 8 - Modbus (D-) | 17 - Yotta A-1010 Expansion I/O |
| 9 - Digital input 2 DI2 (Yotta A-5289D) | 18 - Advantech UTX-3117 gateway |

2 IOT STARTER KIT hardware

2.3 Default software configuration

The Yottacontrol devices' software, installed on IOT Starter Kit, is configured by default in the way that the user can interact with the components installed on the same IOT Starter Kit (selectors, potentiometer, etc.) via Advantech UTX-3117 gateway via Modbus protocol on serial line 485.

The Yottacontrol devices are connected on the same serial line through daisy-chain connection.

In the following table there are communication parameters of Yottacontrol devices:

A-5289D	
Modbus node	1
Baud rate (bps)	115200
Data bits	8
Stop bits	1
Parity	none

A-1010	
Modbus node	2
Baud rate (bps)	115200
Data bits	8
Stop bits	1
Parity	none

Through Advantech UTX-3117 gateway it is possible to monitor and control the configuration parameters of Yottacontrol devices' software thanks to the pre-loaded drivers.

2 IOT STARTER KIT hardware

In the following table, there are the variables which you can find in Advantech UTX-3117, that let you interact with the components installed on the console, through the Yottacontrol:

DEVICE	SECTION	VARIABLE	DATA TYPE	ACCESS TYPE	DESCRIPTION
A-5289D (Controller)	DIGITAL INPUT VALUE	DI0 (SELECTOR 1)	BOOLEAN	READ	S1 Selector status installed on the console
A-5289D (Controller)	DIGITAL INPUT VALUE	DI1 (SELECTOR 1)	BOOLEAN	READ	S2 Selector status installed on the console
A-5289D (Controller)	DIGITAL INPUT VALUE	DI2 (DIGITAL AUX 1)	BOOLEAN	READ	DI0 Input status installed on the console
A-5289D (Controller)	DIGITAL INPUT VALUE	DI3 (DIGITAL AUX 2)	BOOLEAN	READ	DI1 Input status installed on the console
A-5289D (Controller)	DIGITAL OUTPUT VALUE	DO0 (LED 1)	BOOLEAN	READ	DO0 LED status installed on the console
A-5289D (Controller)	DIGITAL OUTPUT VALUE	DO1 (LED 2)	BOOLEAN	READ	DO1 LED status installed on the console
A-5289D (Controller)	DIGITAL FLAG	M1 (LED 1)	BOOLEAN	READ / WRITE	DO0 LED Switch On/Off commands installed on the console
A-5289D (Controller)	DIGITAL FLAG	M2 (LED 2)	BOOLEAN	READ / WRITE	DO1 LED Switch On/Off commands installed on the console
A-5289D (Controller)	FUNCTION BLOCK PARAMETER	B1_PAR2 (RAMP)	INTEGER	READ	Auto-incremented value (0-1000 range), generated completely by the Controller
A-1010 (I/O Module)	ANALOG INPUT VALUE	AIO (POTENTIOMETER)	INTEGER	READ	0-10V Potentiometer value, converted in a 0-1000 value
A-1010 (I/O Module)	ANALOG OUTPUT VALUE	AO0 (VOLTMETER)	INTEGER	READ / WRITE	Value to control to the AO analog output (0-10V) of the module. The values to control through variables are included in a 0-1000 range

Table 1 - Variables of interaction between Advantech UTX-3117 gateway and the console components

To display all variables from the previous table via web interface, connect your PC or laptop to Advantech UTX-3117 on the console via Ethernet interface.

By default, Advantech UTX-3117 installed on the IOT Starter Kit, has the following network configuration:

2 IOT STARTER KIT hardware

IP	192.168.1.29
Subnet Mask	255.255.255.0
Gateway	192.168.1.1

Figure 2 - Default network configuration

For more information on the connection and use of web interface, see Alleantia's user manuals on the website www.alleantia.com.

2.3.1 Customization

Thanks to the programming software, that can be downloaded for free from www.yottacontrol.com (Yotta EDITOR e Yotta UTILITY) and the possibility to create custom drivers through the service cloud.alleantia.com you can customize the IOT Starter kit functions.

2.4 Powering on the IOT Starter Kit

There is a 12 V power socket, 5,5x2,5 mm, to insert the power supply unit (sold separately). Point 1 in Figure 1 represents the power socket.

The appropriate characteristics of the AC/DC power supply input 220/230 V, output 12V 70Watt 7 Amp, Hamlet XPWNB70USL model or similar.

WARNING: check power and voltage compatibility of the power supply before connection, as there is a risk of damaging the IOT Starter Kit's electronic equipment.

After connection, switch the power toggle to ON (point n.2 in Figure 1).

2.5 The console

Below there is a description of the console and tools.

2.5.1 LED indicators

On the front panel there are 2 LED indicators:

- LED Green: indicates the DO0 digital output state of Yotta A-5289D (n. 5 in Figure 1).

Color	Description
Off	DO0 - no signal/alarm
Green	DO0 - active signal/alarm

- LED Red: indicates the DO1 digital output state of Yotta A-5289D (n. 6 in Figure 1).

2 IOT STARTER KIT hardware

2.5.2 Modbus

IOT Starter Kit has 2 connectors (RED/BLACK 4mm) for Modbus RS485, on the button panel for simple and immediate connections. The Modbus connection is done on the dedicated terminals D+ /D- Yotta A-5289D – Advantech UTX-3117.

2.5.3 DI2 and DI3 digital inputs

There are 2 digital inputs through 4mm Jack connectors on the button panel of the IOT Starter Kit.

You can run tests, activating the digital inputs 2 and 3 (DI2 and DI3 Yotta A-5289D).

2.5.4 Toggle switches

On the button panel, there are 2 toggle switches for the activation of digital inputs 0 and 1 (DIO and DI1 on Yotta A-5289D).

The user will be able to run function tests and simulations.

To activate DIO turn the toggle S1 to ON. To switch off, turn the toggle to OFF.
To activate DI1 turn the toggle S2 to ON. To switch off, turn the toggle to OFF.

2.5.5 Potentiometer

The IOT Starter Kit includes a potentiometer with setting wheel provided with a scale (10 rotations). The potentiometer modifies the variable value set by the user.

The user can run tests, increasing or decreasing the variable value, set up to the desired value and view the results, set on the programming rules (thresholds, alarms, etc.).

Also, it is possible to view the varying signal strength on the analog voltmeter.

The potentiometer output is connected to the terminal AIO Yotta A-1010.

2.5.6 Voltmeter

The IOT Starter Kit includes analog voltmeter with 0-10 V graduated scale.

It measures the signal strength, set by the user, on a scale of 0-10 V, and provides stating changes made by the user through the potentiometer.

The voltmeter is connected to the AOO analog output of Yotta A-1010.

2 IOT STARTER KIT hardware

2.6.7 Hardware Controller and Remote I/O

The IOT Starter Kit includes two pieces of hardware:

- **Yottacontrol A-5289 D** controller with LCD display. The device has numerous digital and analog inputs and outputs. Also, it has internal, freely programmable software. The user can program, use algorithms and functions, already installed in the Yottacontrol software. The user can connect accessories to the inputs and outputs on the terminal block.

For more information on the product, functions, connections and programming the device, see the user manual, included in the IOT Starter Kit documentation.

To make full use of the product, download **Yotta Utility** and **Yotta Editor** from the manufacturer website www.yottacontrol.com.

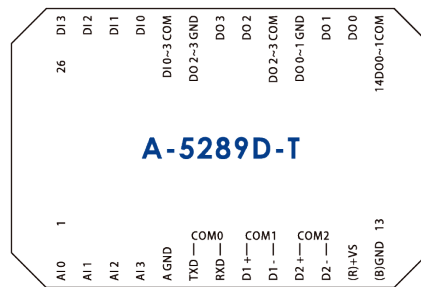


Figure 3 - Yotta A-5289D I/O List

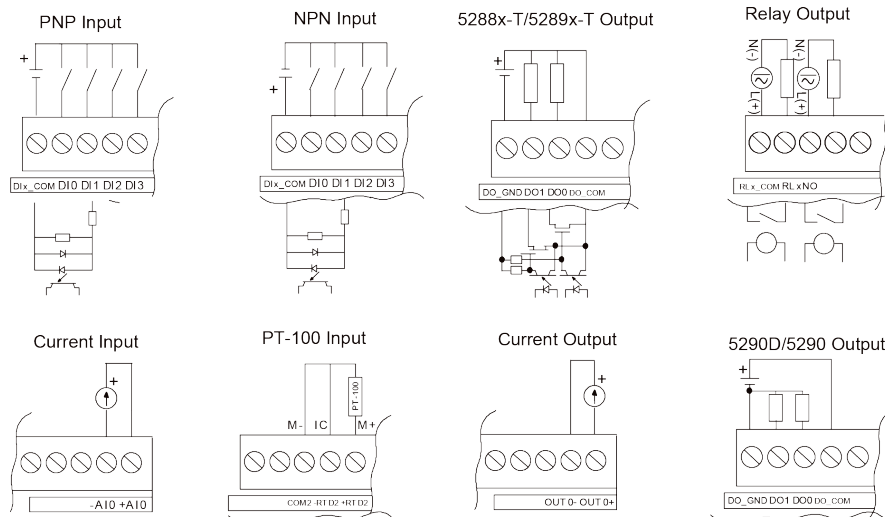


Figure 4 - Yotta A-5289D I/O connections scheme

2 IOT STARTER KIT hardware

- Yottacontrol Remote I/O A-1010 provides more inputs and outputs. Particularly, it has 2 analog outputs 0-10 V, used for the simulations. The user can connect accessories, use digital and analog inputs and outputs on the terminal block of the device.

For more information on the product, functions, connections and programming the device, see the user manual, included in the IOT Starter Kit documentation.

To make full use of the product, download Yottacontrol from the manufacturer website www.yottacontrol.com.

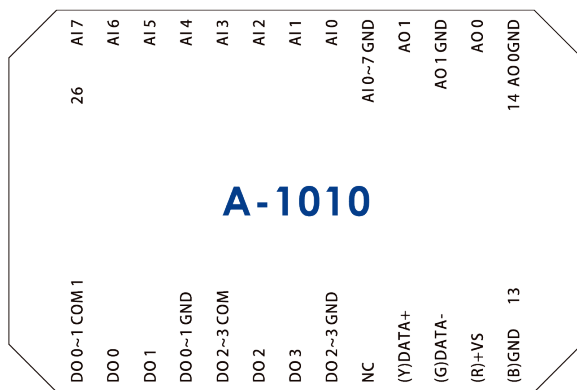


Figure 5 - Yotta A-1010 I/O List

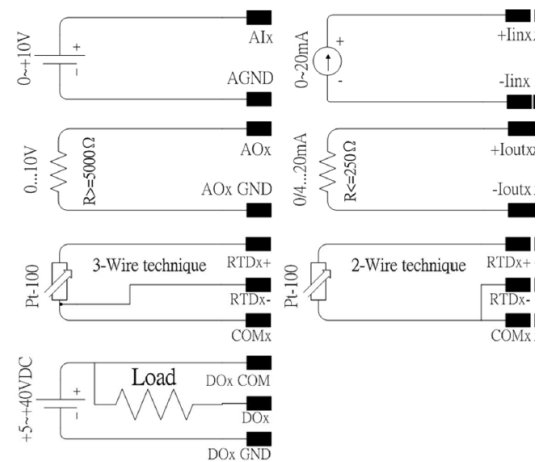


Figure 6 - Yotta A-1010 I/O connections scheme

3 Advantech UTX-3117 gateway

There are four M3 holes to fix Advantech UTX-3117 gateway (holes n°19 in Figure 7).

Make sure that in the package there are the product's power supply and user manuals. In case of loss, see the manufacturer website. The gateway should be installed according to the manufacturer requirements and the user manual.

Proceed with the following steps:

1. **Before making any connection, make sure that the IOT Starter Kit is off and is not powered.**
2. Place Advantech UTX-3117 gateway in the space provided, as shown in Figure 7.
3. Tighten the screws in the holes n°19, as shown in Figure 7.
4. Connect the power supply to the device from the Advantech package, as described in the manufacturer user manual.
5. Connect Advantech UTX-3117 gateway to its serial output on the IOT Starter Kit, where one cable end is free and another end is connected to Yotta A-5289D. Make the connection according to the manufacturer user manual.
6. Connect the dedicated power supply (not included in the IOT Starter Kit package, sold separately) to 220/230V power outlet. **Use only appropriate power supplies.**
7. Switch on the IOT Starter Kit with the On/Off toggle switch and check that the LED indicators are on. The Yotta devices have power buttons. Check that these buttons are on.
8. Switch on Advantech UTX-3117 gateway with its power button.
9. The IOT Starter Kit and Advantech UTX-3117 are ready to use!

In general, read carefully the instructions and the user manuals, provided by manufacturers Advantech, Yottacontrol and Alleantia, in order to use the hardware in a correct and secure way.

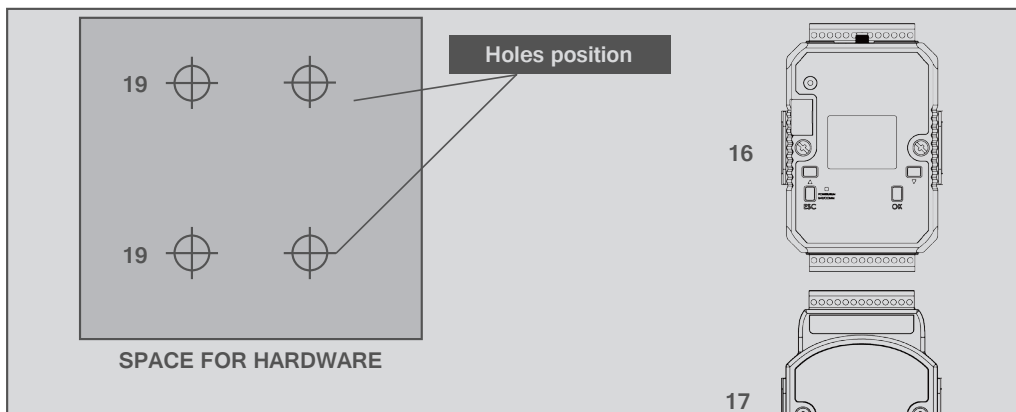


Figure 7 - Holes to fix Advantech UTX-3117 gateway

4 Connections

The IOT Starter Kit has limitless potential, quantity of serial, analog and digital ports that lets the user to make various function tests.

It is possible to connect plenty of equipment and sensors to the terminal block on the console, Yottacontrol devices and Advantech UTX-3117. For example, temperature, humidity, proximity sensors, alarms, indicators, flashing lights, etc.

4.1 IOT Starter Kit connections

As described in the previous sections, the IOT Starter Kit has a console, where the user can connect sensors and devices in a simple and effective way:

1. Modbus connection.

Connect 2 cables with connectors (not included in the package) to 2 jacks with 4mm diameter. Pay attention to the polarity and relative colors (D+ red and D- black). Modbus and the connection to Yotta A-5289D is with Advantech UTX-3117.

2. DI2, DI3 and COM digital inputs connection.

Connect 3 cables with appropriate connectors (not included in the package) to 2 jacks with 4 mm diameter. Pay attention to the polarity and relative colors (red and black). The jacks of the console are connected to DI2, DI3 and COM of Yotta A-5289D.

There are **video tutorials** available on the website www.alleantia.com and on Vimeo channel vimeo.com/alleantia.

4.2 Yottacontrol connections

As said in the previous sections, the IOT Starter Kit includes two Yottacontrol devices, which have terminal blocks, where the user can connect sensors and equipment, even if in a less simple and intuitive way, compared to the jacks on the console.

WARNING:

only expert users can connect the hardware on the terminal blocks

- **Yottacontrol A-5289D controller:**

To make connections to the available ports and the relative terminal blocks, refer to the product's user manual. The manual is included in the IOT Starter Kit package. Also, the manual is available at the manufacturer website www.yottacontrol.com.

The **video tutorials** are available at www.alleantia.com and on Vimeo channel vimeo.com/alleantia.

The following terminals are occupied on the console:

- DO0, DO1 – green and red LEDs
- DI0, DI1 – toggle switches S1 and S2
- DI2, DI3, COM – digital inputs
- D+, D- Modbus

- **Yottacontrol A-1010 – I/O device:**

4 Connections

To make connections to the available ports and the relative terminal blocks, refer to the product's user manual. The manual is included in the IOT Starter Kit package. Also, the manual is available at the manufacturer website www.yottacontrol.com.

The **video tutorials** are available at www.alleantia.com and on Vimeo channel vimeo.com/alleantia.

The following terminals are occupied on the console:

- AIO – Potentiometer
- AOO – Voltmeter

4.3 Advantech UTX-3117 connections

Advantech UTX-3117 gateway has ports, where the user can connect various equipment, even if in a less simple and intuitive way, compared to the jacks on the console.

WARNING:
only expert users can connect the hardware on the terminal blocks

To make connections to the available ports and the relative terminal blocks, refer to the product's user manual. The manual is not included in the IOT Starter Kit package but in the Advantech package. Also, the manual is available at the manufacturer website www.advantech.com.

5 IOT STARTER KIT Software

In order to let the user to interact with the IOT world and program, in this section you can find the details on the software.

The hardware has Alleantia IOT SCADA software.

The software user manual is available at www.alleantia.com.

The **video tutorials** are available at vimeo.com/alleantia.

The user manuals are available on the manufacturer websites www.yottacontrol.com and www.advantech.com.



Alleantia s.r.l

www.alleantia.com

Tel: (+39) 050 9911933

Fax: (+39) 050 9655139

@: info@alleantia.com

