



## Benefits

- **Integration** XAP 1.0 includes all the tools to set up and operate building automation functions.
- **Scalability.** Together with the UWP platform, it offers a complete solution from top to bottom to manage an efficient building.
- **Openness.** XAP 1.0 can be easily programmed and connected to other devices thanks to standards such as CODESYS, OPC UA, KNX IP, BACnet.
- **Reliability:** Trusted and secure Linux-based operating system.
- **Connectivity.** XAP 1.0 is a server platform for connecting multiple and different devices and sub-systems.
- **Interoperability.** IoT data distribution via MQTT
- **Powered by MAIA Cloud:** secure and reliable system for remotely managing, setting and operating BTM panels Worldwide.

## Description

XAP 1.0 is a rugged and compact controller designed as a powerful IIoT gateway and a programmable unit for building automation functions. It is empowered by a configurable web interface which makes it an outstanding HMI without screen. It integrates the standard IEC 61131 PLC (Codesys), so that any building automation function can be programmed by means of a standard and well-known tool. Together with the UWP platform, XAP 1.0 delivers a complete solution in building automation from the management level down to the field level. The powerful software Wizard permits an easy set-up of graphic pages, functions and protocols.

## Applications

XAP 1.0, as IIoT gateway, offers unique solutions for a wide range of applications in building automation and energy efficiency.

## Main functions

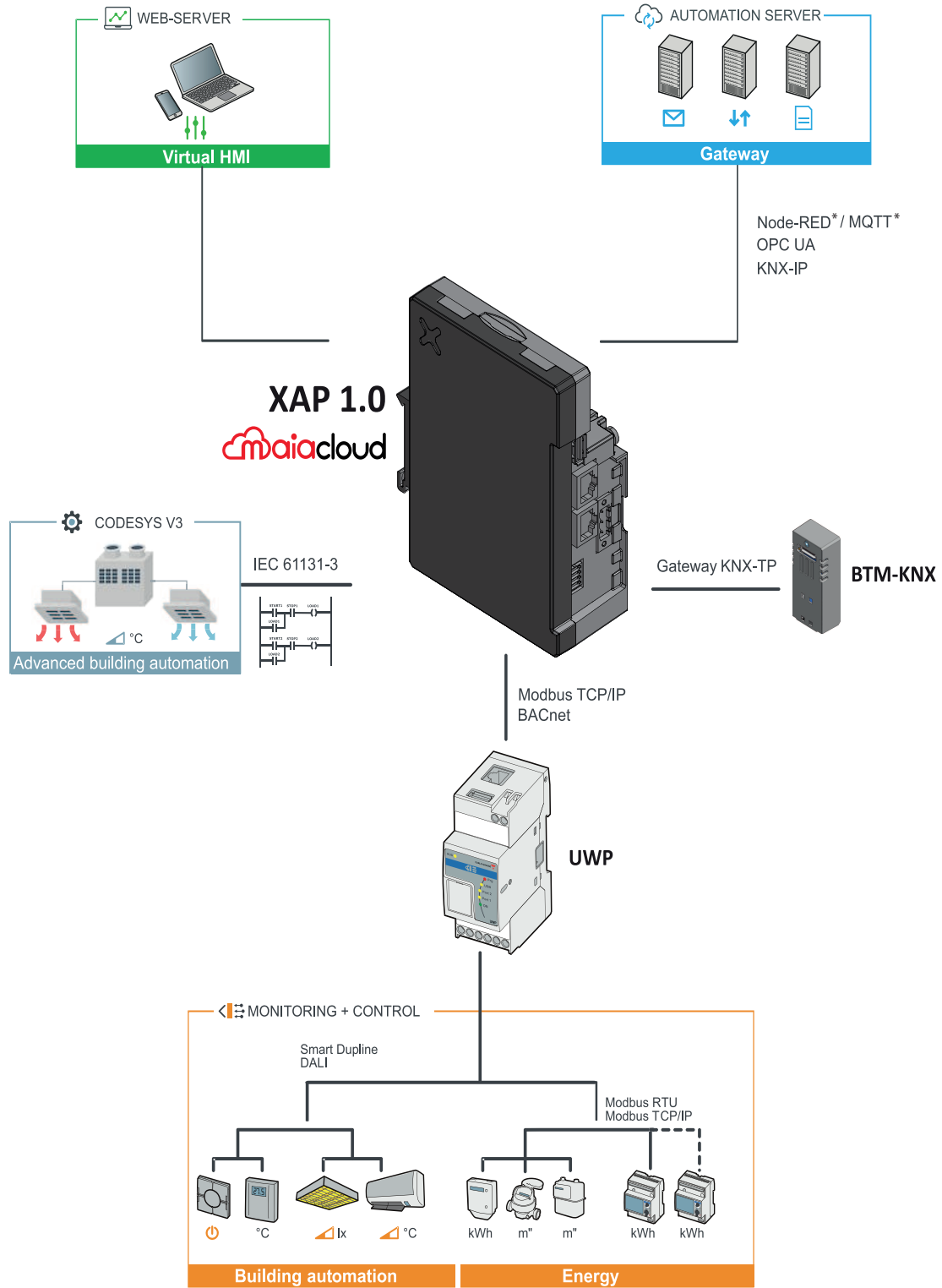
- Controller and gateway, HMI, PLC, PLC for building automation function
- Data communication: OPC UA\*
- Cloud connectivity thanks to Node-RED\*
- Operating System Linux
- Secure web server access: HTTPS
- Protocols: Modbus RTU/TCP-IP master and slave, BACnet client, KNX IP, KNX TP using an expansion module

*\*Note: optional*

## Main features

- Compatible with CODESYS V3: it supports network stacks and local I/O expandability
- 2 Ethernet ports for network separation WAN/LAN
- Customizable web interface, with different access types according to the type of user
- Up to 32 Modbus devices connected to the RS485 port
- Connectible to UWP via BACnet or Modbus/TCP
- Remote monitoring and control with MAIA Cloud

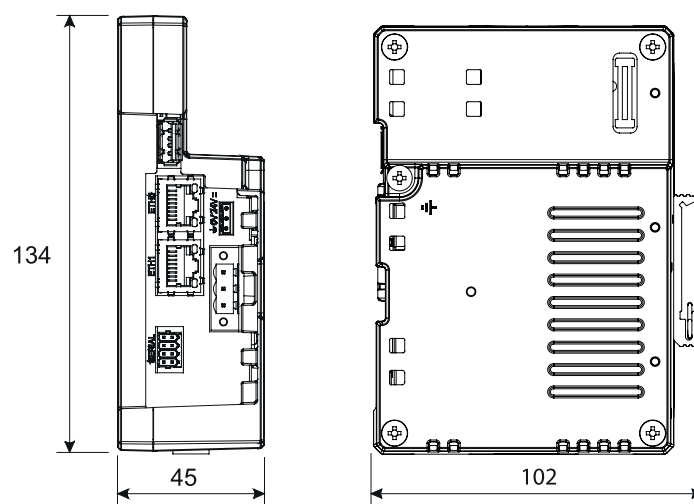
# Architecture



## Features

### General

<b>Material</b>	Metal
<b>Dimensions</b>	2-DIN module
<b>Weight</b>	600 g
<b>Protection degree</b>	IP20
<b>Terminals</b>	8 terminals, screw-type; Section: 1.5 mm <sup>2</sup> maximum; Torque: from 0.4 to 0.8 Nm



### Environmental specifications

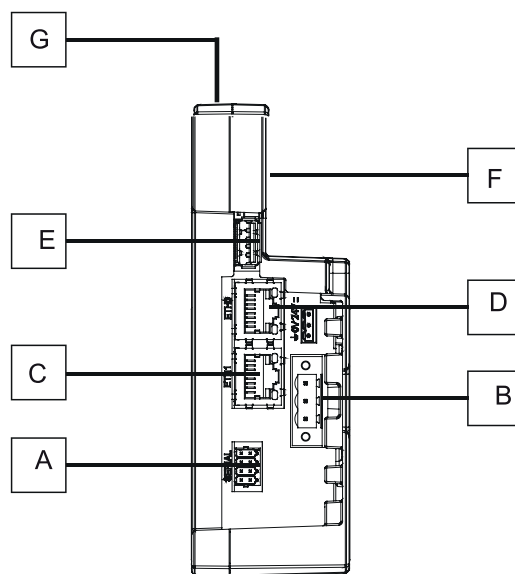
<b>Operating temperature</b>	-20° to +60 °C
<b>Storage temperature</b>	-20° to +70 °C
<b>Humidity (non-condensing)</b>	5 to 85 % RH
<b>Shock</b>	± 50 g, 11 ms, 3 pulses per axis
<b>Vibration</b>	5 ÷ 9 Hz, 7 mm p-p 9 ÷ 150 Hz, 1 g

### Power Supply

<b>Power Supply</b>	24 VDC: 10-32 VDC
<b>Current rating</b>	0.35 A @ 24 VDC

Note: For applications requiring compliance with EN 61131-2 and specifically in reference to 10 ms voltage dips, the power supply range voltage is 18-32 Vdc.

## Structure





Area	Description
A	Serial port
B	Power supply
C	Ethernet port 1 (10/100 Mb)
D	Ethernet port 0 (10/100 Mb)
E	USB port 1
F	Expansion slots for plug-in module (BTM-KNX)
G	SD card slot

## Compatibility and conformity

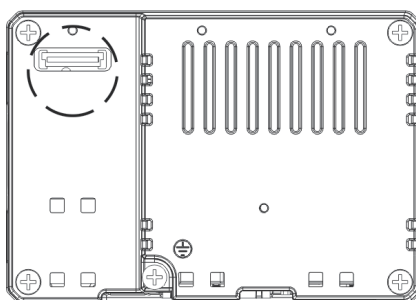
<b>Standards</b>	Electromagnetic compatibility (EMC) - immunity: EN 61000-6-1, EN 61000-6-2
	Electromagnetic compatibility (EMC) - emissions: EN61000-6-3, EN 61000-6-4
	EN 60945, EMC emissions and immunity for marine applications
	Radiated disturbance test: CISPR 22, CISPR 16-2-3, CLASS A



<b>Directives</b>	EMC 2014/30/EU RoHS 2011/65/EU
<b>Approvals</b>	 

## Battery

<b>Backup battery</b>	3V 50 mAh Lithium, rechargeable, not user-replaceable, model VL2330.
<b>Recharge</b>	At first installation it must be charged for 48 hours. When the battery is fully charged, it ensures a period of 3 months of data backup at 25°C



## System resources

<b>CPU</b>	ARM Cortex-A8 1 GHz
<b>Operating System</b>	Linux RT
<b>Flash</b>	4 GB
<b>RAM</b>	512 MB
<b>Real Time Clock</b>	RTC Backup; Buzzer: Yes; Accuracy <100 ppm



## Ports

<b>Ethernet port</b>	2 (eth 0 - 10/100, eth 1 - 10/100)
<b>USB</b>	1 (Host v. 2.0, max. 500 mA)
<b>Serial port</b>	1 (RS232, RS485, RS422, configurable software)
<b>SD card</b>	Yes
<b>Expansion</b>	1 slot for plug-in modules

## MAIA Cloud ports

### Inbound communication (Through the tunnel)

Port number	Description	Purpose
443	HTTPS	Access to the internal web-server, virtual HMI
443	HTTPS	Access to the System settings, configuration and settings

### For tunnelling

Access	Ports
MAIA Cloud Web	443/tcp and 1194/udp
MAIA Cloud App PC software	443/tcp and 1194/udp

*Note: through the tunnelling service, all the above-mentioned ports are supported.*

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## Software and interfaces

### BTM Studio Suite

BTM Studio is a software suite that includes the following applications.



It is an integrated development environment for easily designing and managing custom HMI thanks to a large embedded library of widgets. A unified design approach for native and web HMI projects that permits user to create pages optimized for display on the BTM panels, XAP 1.0, BTM-PC-RUNTIME and any web client (PC or smart devices). The design and management can be carried out in a single development environment so to reduce the application development and maintenance costs.



BTM-PC-CLIENT is a standalone application that provides remote access to the BTM panels, XAP 1.0 and PC on which the BTM-PC-RUNTIME is operating. It is a lightweight Microsoft® Windows® application released for free in the BTM Studio suite. BTM-PC-CLIENT acts as remote client and communicates with the Runtime software. This way, users can view the HMI project on the BTM panel or BTM-PC-RUNTIME on the same network, even if they are installed in different installation locations.



It is a powerful application that turns the Microsoft® Windows® computer into a HMI panel. This is the Windows® version of the HMI Runtime software that operates on the BTM panels. The BTM-PC-RUNTIME provides a set of HMI and data automation features of the BTM panels with a PC flexibility and expandability. BTM-PC-IDE permits user to design and manage the BTM-PC-RUNTIME projects.

*\*You need a BTM-PC-RUNTIME software license for any PC on which the Runtime operates.*

The BTM-PC-IDE software provides the following key-features for the areas presented below:

#### Design and UI experience

- It provides a widget gallery with a lot of symbols and vector objects and native support of SVG graphical objects and TrueType fonts.
- The data can be numbers, texts, bar graphs, analog indicators and graphical image formats for a high user interface experience.
- Users can change the properties of basic and advanced widgets. The widgets can be managed dynamically to control their visibility, transparency, position and other features.

- The HMI and web projects can be easily created and managed in multiple languages so to meet global requirements.
- A rich set of state-of-the-art HMI features permits to create a fully operational application for data acquisition and recording, presentation of trends, alarm management, schedulers, security and user management, e-mail.
- On-/Offline simulation to test HMI project on real time.
- Efficient scripting tool to create embedded functions.

### Communication protocols

- A wide communication protocols permits user to meet all the different applications' requirements.
- Thanks to the gateway/routing capabilities, the communication among different communication protocols is possible.
- Easy integration into the UWP ecosystem through plug'n play import of Modbus maps and EDE BACnet files.

### Design and planning

- The same tool software for the development and management of the HMI / HMI web projects and data automation for BTM panels, XAP 1.0 and BTM-PC-RUNTIME.

Below the resources table for HMI projects:

Resource	BTM Panels	BTM-PC-RUNTIME
Data points		<b>10.000</b>
Schedulers		<b>30</b>
Alarms	<b>2.000</b>	10.000
Data transfer items (conversion between different protocols)		<b>1.000</b>
Actions programmable per button state		<b>32</b>
Trend buffers		<b>30</b>
Tags per trend buffer		<b>200</b>
Number of curves per trend widget		<b>5</b>
Number of physical protocols		<b>4</b>
<b>Widget</b>		
Basic widgets		<b>2000 per page</b>
Recipes		<b>32</b>
Parameter sets for a recipe		<b>1.000</b>
Elements per Recipe		<b>1.000</b>
<b>Pages and pop-up</b>		
Pages		<b>1000</b>
Dialogue pages (pop-up)		<b>50</b>
Dialogue pages that can be opened at the same time		<b>5</b>

Resource	BTM Panels	BTM-PC-RUNTIME
Number of templates pages		50
Number of languages		24
<b>User and Groups</b>		
Number of user groups		50
Number of users		500
Number of concurrent remote clients		4
JavaScript		YES
Concurrent FTP sessions		4
FTP additional folders		5
PDF report generation		YES

## MAIA Cloud

Remote access is the key to minimize the Total Cost Of Ownership of an energy monitoring and building automation installation; by leveraging the networking capabilities of MAIA Cloud, it is possible to take control of remote installations without leaving your office.

### Benefits

- Reduced costs. Thanks to the VPN safe remote access, users do not need to travel and consequently waste money and time to solve their customers' issues.
- Easy automatic remote networking
- Hassle free regardless of destination and IP address.

### Main functions

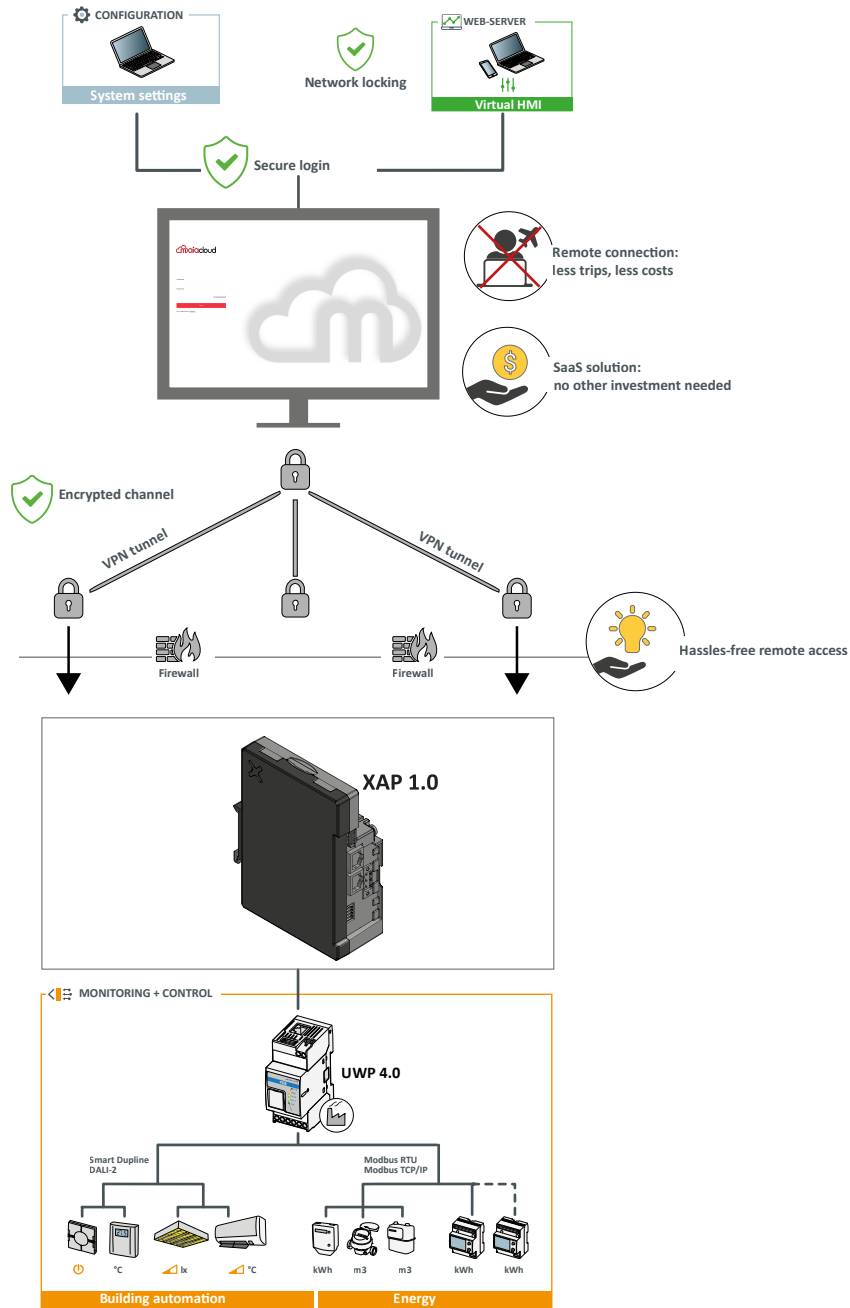
- Authentication: MAIA Cloud users can remotely access their XAP fleets and manage them if needed.
- Security. Remote connections to MAIA Cloud and to the remote XAP units thanks to encrypted tunnelling.
- Hassle-free. Thanks to the MAIA Cloud tunnelling functions, you do not need to worry about IP address changes and firewalls. You could always access your device, according to your security policies.
- Remote set-up and operation. Thanks to MAIA Cloud, it is possible now to remotely access:

- the settings page of the panel

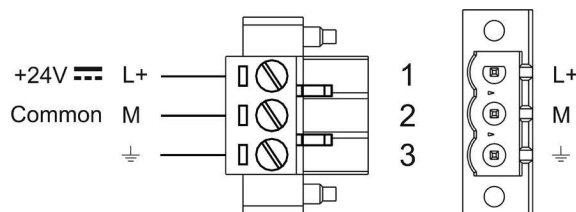
- the UWP devices added in the same LAN of the XAP

- the XAP web server

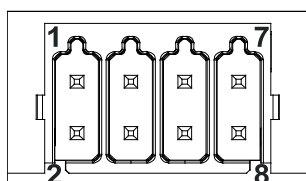
# Architecture



## Connection diagram



**Fig. 1** Power supply



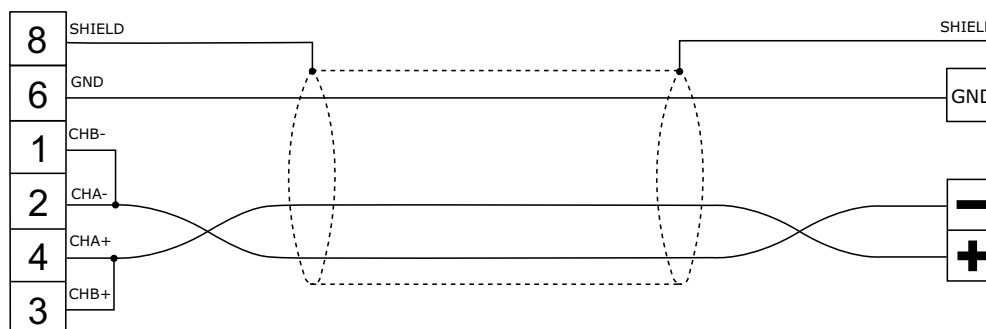
To operate in RS485 pins 1-2 and 3 - 4 must be connected externally (see Fig.4).

Pin	RS485	RS422	RS232
1	CHB-	CHB-	RX
2	CHA-	CHA-	TX
3	CHB+	CHB+	CTS
4	CHA+	CHA+	RTS
5	+5V output	+5V output	+5V output
6	GND	GND	GND
7			
8	SHIELD	SHIELD	SHIELD

**Fig. 2** Serial port pinout\*

XAP 1.0

Modbus device



**Fig. 3** Connection diagram for RS485\*\*

\*The serial port is software programmable. Make sure you select the appropriate interface in the programming software.

\*\*It can be used as reference when the pinout of the PLC is not known.

## References



XAP10RSEXX

### Further readings

Document	Where to find it
XAP 1.0 - Instruction manual	<a href="http://www.gavazziautomation.com/XAP1.0_im.pdf">www.gavazziautomation.com/XAP1.0_im.pdf</a>
UWP 4.0 - Data sheet	<a href="http://www.gavazziautomation.com/UWP_4.0_DS_ITA.pdf">www.gavazziautomation.com/UWP_4.0_DS_ITA.pdf</a>
UWP 3.0 - Data sheet	<a href="http://www.gavazziautomation.com/UWP_3.0_DS_ITA.pdf">www.gavazziautomation.com/UWP_3.0_DS_ITA.pdf</a>
BTM Studio manual	<a href="http://www.gavazziautomation.com/BTMStudioManual.pdf">www.gavazziautomation.com/BTMStudioManual.pdf</a>
MAIA Cloud system - user manual	<a href="http://www.productselection.net/MAIA-CLOUD.htm">www.productselection.net/MAIA-CLOUD.htm</a>

### MAIA Cloud licences

Information	Description	Document
UWP-LICENCE-M01B	MAIA PLUS LICENCE-12 MONTHS VPN	MAIA Licence A4 pdf Licence Code EIM pdf
UWP-LICENCE-M02A	MAIA STANDARD LICENCE-2 DEVICES	
UWP-LICENCE-M02B	MAIA PLUS LICENCE-24 MONTHS VPN	
UWP-LICENCE-M04B	MAIA PLUS LICENCE-48 MONTHS VPN	
UWP-LICENCE-M05B	MAIA PLUS LICENCE-60 MONTHS VPN	
UWP-LICENCE-M10A	MAIA STANDARD LICENCE-10 DEVICES	
UWP-LICENCE-M25B	MAIA PLUS LICENCE-300 MONTHS VPN	
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