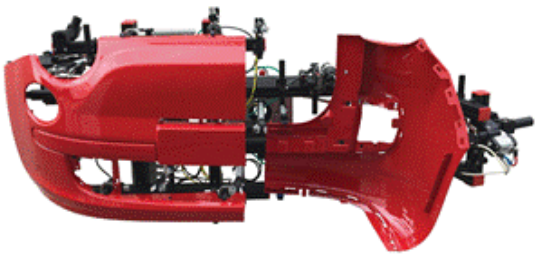
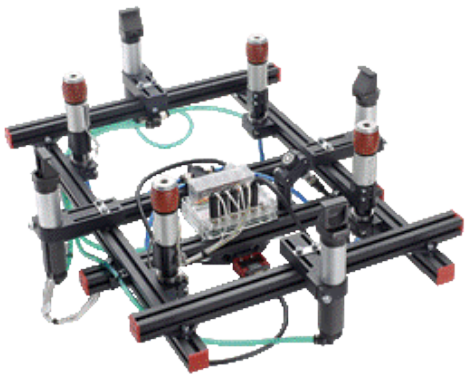
A business of BARNES GROUP INC

RFID Technology

Gimatic Android and Windows applications & Webservice for data sharing and control





USER MANUAL

Version 2.0

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1. INTRODUCTION

The following documentation aims to illustrate the Gimatic solutions regarding the RFID technology.

The RFID technology (Radio Frequency IDentification) is a system for the automatic recognition of gripping tools composed of a RFID reader and a memory TAG. The solution consists in installing a memory TAG on every EOAT (End Of Arms Tool) of a production site and therefore differentiate up to 255 tools, store technical data, manage and improve the maintenance process. In addition, the data collected are shared in a Webservice that allows the client to keep under control its production whenever and wherever he wants.

Using this system, it is easy to control the tools wear and to program maintenance operations becomes easier. In fact, Gimatic allows to set-up warning signals to alert the client when a maintenance is needed. Programming means minor working machine interruptions and therefore time-saving.

The information that can be memorized through the TAGs are listed below, divided in four main sections:

- MAIN DATA: tool name and description, tool ID number, tool mass and overall dimensions, etc.
- MASS PROPERTIES: tool principal moments of inertia, tool centre of gravity coordinates, etc.
- GEOMETRIC PROPERTIES: geometric calibration parameters.
- PARTS LIST: up to 40 entries as parts list with editable description, quantity and edition.

Every TAG is identified by a unique identification number (UID) that cannot be changed by the user.

The Gimatic RFID system includes:

- Gimatic EOAT SolidWorks add-in: useful to easy filling out product info and automatically extracting and generate XLM files required by Gimatic RFID system.
- Gimatic mobile application: useful to instantly have access to the data of the specific EOAT (through the reading of the installed memory TAG), set the maintenance parameters and change the different values described before. Every operations made by the app (read/write/maintenance) is sent to the Webservice.
- Gimatic Windows application “GimaticRFID.exe”: using a dedicated box (called RQCBOX) that allows the communication between PC and memory TAG, reading and writing actions can be done.
- Gimatic Webservice: an exclusive cloud reserved to the client where the data by each production site worldwide are collected. Using a generic device with a browser and a valid account, the customer can keep trace of RFID data. He can observe the data collected, download them, program and control maintenance operations.

All these tools will be explained in the following chapters of this user manual.

Documentations, Gimatic EOAT SolidWorks add-in and Gimatic Windows application “GimaticRFID.exe” are all included in the “GIMATIC RFID SYSTEM” folder available at https://www.gimatic.com/utility/ .

The *Figure 1* shows, in board terms, the data path from the memory TAG to the user devices. When a memory TAG is read by the Gimatic's mobile application, a data packet is automatically sent to the cloud and then it is possible to access all the detailed information.

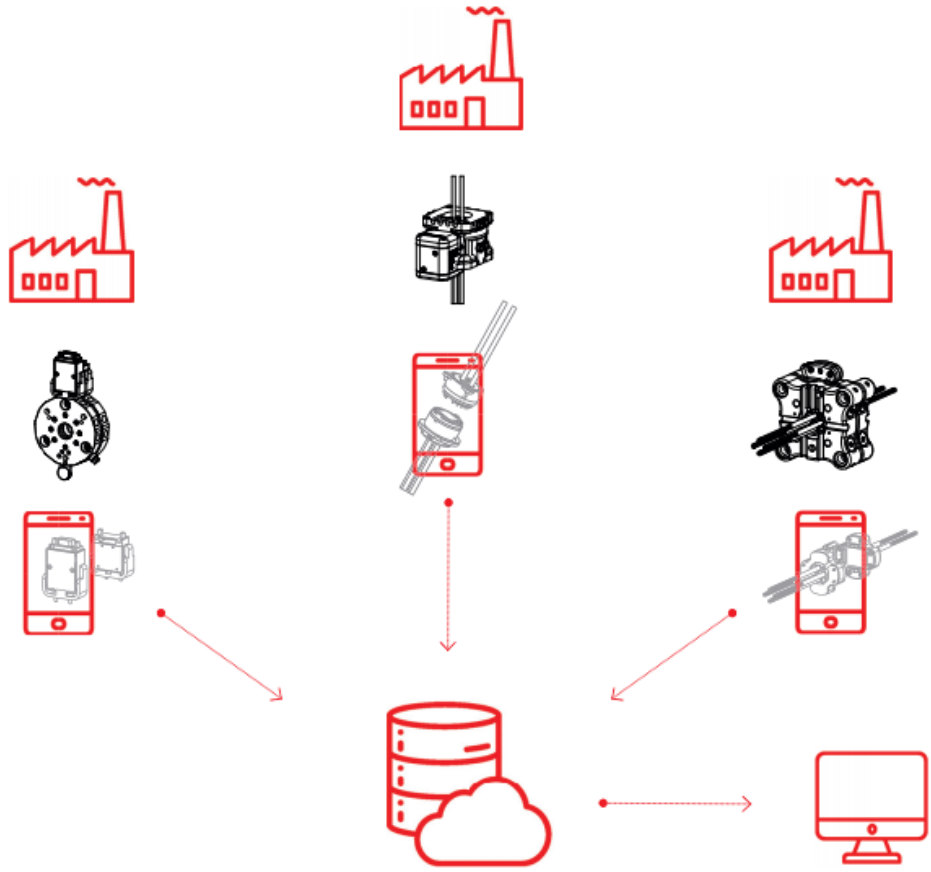


Figure 1 - Gimatic RFID cloud system

For further information, please visit Gimatic website www.gimatic.com .

For consulting all the products related to RFID visit https:/shop.gimatic.com/en or contact Gimatic sales network.

2. LIST OF COMPONENTS

To set up a correct communication, a reader device and a memory TAG are needed. Below are reported the Gimatic codes that can be chosen according to customer's desires and application prerogatives.

2.1 READER

As anticipate, the customer can use the mobile application or the Windows one as RFID reader.

On the automatic working machine, one of the follow products can be used:

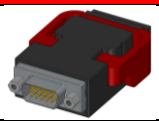
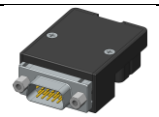
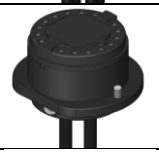
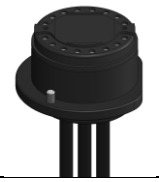
ORDERING CODE	DESCRIPTION	LINK TO THE SHOP	TAG ASSOCIATED	PIC
RAQC	For manual quick changer, PNP outputs	https://shop.gimatic.com/en/raqc	RBQC	
RAQC-C	For manual quick changer, PNP outputs, cable outlet terminals	https://shop.gimatic.com/en/raqc-c	RBQC	
RAQCN	For manual quick changer, NPN outputs	https://shop.gimatic.com/en/raqcn	RBQC	
CRAQC	For QC75 quick changer, PNP outputs	https://shop.gimatic.com/en/craqc	CRBQC	
CRAQCN	For QC75 quick changer, NPN outputs	https://shop.gimatic.com/en/craqcn	CRBQC	
RRAQC	For EQC20 electric quick changer, PNP outputs	https://shop.gimatic.com/en/rraqc	RRBQC	
RRAQCN	For EQC20 electric quick changer, NPN outputs	https://shop.gimatic.com/en/rraqcn	RRBQC	

Table 1 - Gimatic RFID readers

For the details regarding every device, please refer to its own instructions.

2.2 MEMORY TAG

Three TAGs are available depending on which reader has been chosen.

They differ one from the other by the geometric shape and method of mounting, but they all share the same RFID technology.

They are summarized in the following table.

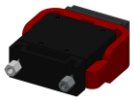
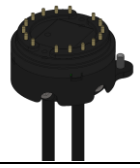
ORDERING CODE	DESCRIPTION	LINK TO THE SHOP	READER ASSOCIATED	PIC
RBQC	RFID identification module	https://shop.gimatic.com/en/rbqc	RAQC/RAQCN	
CRBQC	RFID identification module	https://shop.gimatic.com/en/crbqc	CRAQC/CRAQCN	
RRBQC	RFID identification module	https://shop.gimatic.com/en/rrbqc	RRAQC/RRAQCN	

Table 2 - Gimatic RFID memory TAGs

2.3 RQCBOX

The RQCBOX is a tool that allows the communication between the PC and a RFID reader (and therefore it is necessary to operate with “GimaticRFID.exe”).

Figure 2 - RQCBOX

The communication between PC and RQCBOX is done suing the standard RS232 serial protocol. From RQCBOX to the RFID reader there is a D-SUB 15 pins connector.

In case of use of a RAQC/RAQCN reader, the connection is direct:

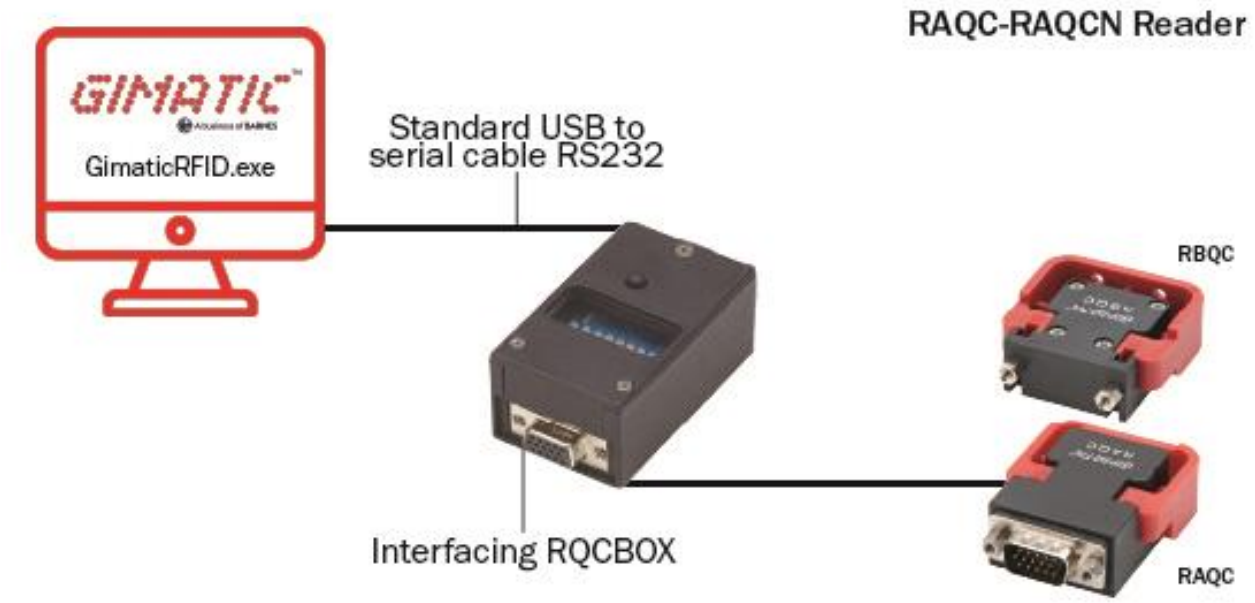


Figure 3 - RQCBOX with RAQC/RAQCN reader

In case of use of a CRAQC/CRAQCN/RRAQC/RRAQCN reader, an adaptor cable is mandatory to use:

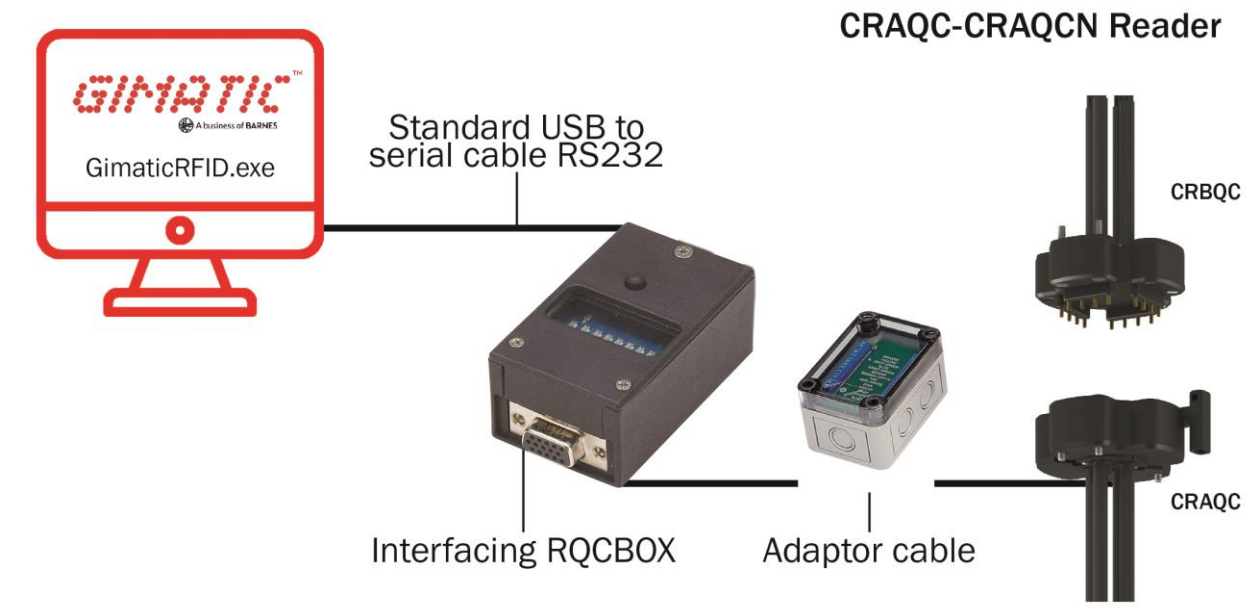


Figure 4 - RQCBOX with CRAQC/CRAQN reader

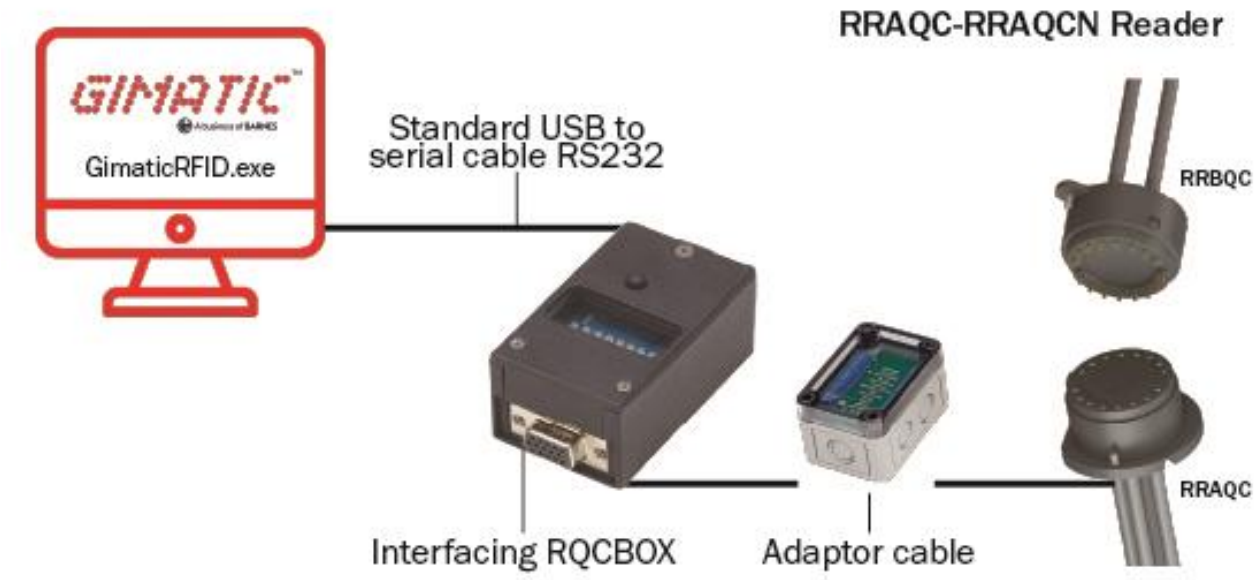


Figure 5 - RQCBOX with RRAQC/RRAQCN reader

At the following link one can find all necessary information and instructions about it (like setup, pinout, wiring, etc.): https://shop.gimatic.com/en/rqcbox .

2.4 KIT-RFID

This kit wants to offer a evaluate solution for the Gimatic RFID system.

It contains:

- 1 piece of RQCBOX
- 1 piece of USB/RS232 converter cable
- 1 piece of Adapter cable (for CRAQC/RRAQC)
- 1 piece of RAQC
- 2 pieces of RBQC

More information at the following link: https://shop.gimatic.com/en/kit-rfid .

3. PARAMETERS DESCRIPTION

On following, the lists of the parameters and their descriptions divided in sections as done in the Windows and Android applications.

MAIN DATA			
PARAMETER	**UNIT**	**DESCRIPTION**	**RANGE/FORMAT**
N	-	String representing the name of the EOAT.	Max length 20 characters
DU	-	Description of the EOAT.	Max length 128 characters
DV	-	User latest date and version.	Format: DD-MM-YYYY_00-00-00 V. xx
ID	-	User ID to discriminate until 255 different tools.	Range: [0,255]
CT	-	Target cycle set by the user after that a maintenance action is required.	Range: [0,16000000]
CL	-	Counter that increases every time the DIN_COUNT is activated.	Range: [0, 16000000] **RESETTABLE ONLY**
NS	-	Counter that increases every time a writing operation is executed on the TAG.	Range: [0, 16000000] **RESETTABLE ONLY**
M	Kg	Mass of the EOAT.	Range: [0.00,655.35]
DiX	mm	EOAT's maximum external dimension along X axis.	Range: [0.00,6553.5]
DiY	mm	EOAT's maximum external dimension along Y axis.	Range: [0.00,6553.5]
DiZ	mm	EOAT's maximum external dimension along Z axis.	Range: [0.00,6553.5]
DC	-	TAG data creation and version.	Format: DD-MM-YYYY_00-00-00 V. xx **READ ONLY**
Link		Link to document folder.	Max length 192 characters

Table 3 - List and description of MAIN DATA

MASS PROPERTIES			
PARAMETER	**UNIT**	**DESCRIPTION**	**RANGE/FORMAT**
Jx	Kg*cm^2	X main moment of inertia.	Range: [0.0,6553.5]
Jy	Kg*cm^2	Y main moment of inertia.	Range: [0.0,6553.5]
Jz	Kg*cm^2	Z main moment of inertia.	Range: [0.0,6553.5]
Gx	mm	Center of mass, X coordinate.	Range: [-3276.8,3276.7]
Gy	mm	Center of mass, Y coordinate.	Range: [-3276.8,3276.7]
Gz	mm	Center of mass, Z coordinate.	Range: [-3276.8,3276.7]
RJ1	rad	Main axis of inertia angle A (rotation offset).	Range: [-3.2768,3.2767]
RJ2	rad	Main axis of inertia angle B (rotation offset).	Range: [-3.2768,3.2767]
RJ3	rad	Main axis of inertia angle C (rotation offset).	Range: [-3.2768,3.2767]

Table 4 - List and description of MASS PROPERTIES

GEOMETRIC PROPERTIES			
PARAMETER	**UNIT**	**DESCRIPTION**	**RANGE/FORMAT**
DX	mm	Geometric center, X coordinate.	Range: [-3276.8,3276.7]
DY	mm	Geometric center, Y coordinate.	Range: [-3276.8,3276.7]
DZ	mm	Geometric center, Z coordinate.	Range: [-3276.8,3276.7]
R1	rad	Orientation angle A (rotation offset).	Range: [-3.2768,3.2767]
R2	rad	Orientation angle B (rotation offset).	Range: [-3.2768,3.2767]
R3	rad	Orientation angle C (rotation offset).	Range: [-3.2768,3.2767]

Table 5 - List and description of GEOMETRIC PROPERTIES

Regarding the PART LIST, it is possible to enter till 40 different parts. For everyone, ordering code, quantity and edition can be insert.

In practical terms, both the working cycles (CL) and the writing cycles (NS) counters increments every time the DIN_COUNT (pin 15, digital input) has a rising edge.

When the number of working cycles equals and exceed the number of target cycle (set by the user), the DO_COUNT (pin 7, digital output) is activated. Please note that if the user set zero as target cycles, this control is not active.

When the number of writing cycles equals and exceed the maximum number of allowed writing (set in the TAG memory by factory settings and so not editable by the user), the DO_Fault (pin 9, digital output) is activated (this output is activated also when the TAG identification fails). The purpose is to protect the TAG from an excessive number of writes.

The operation of the reader/writer is never inhibited, the DOUT_FAULT is always just a warning.

4. GIMATIC EOAT SOLIDWORKS ADD-IN

A SolidWorks add-in has been developed by Gimatic to make easy the processes of filling out product info and extracting XLM/XLS files required by our application GimaticRFID.exe and Gimatic mobile application.

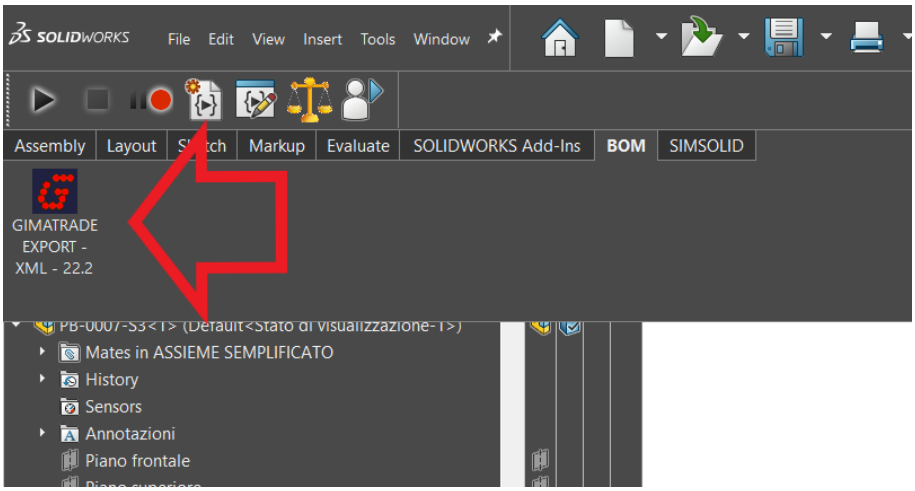


Figure 6 - Gimatic EOAT add-in icon

4.1 MACRO SETTING

Unzip the “RFIDMacro” folder, included in the material downloadable from Gimatic website, on your desktop.

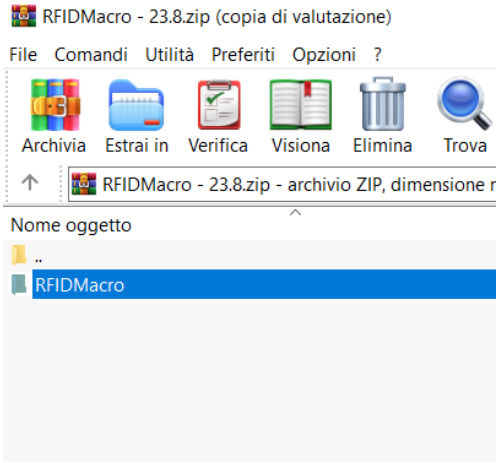


Figure 7 - Unzip "RFIDMacro" folder

Drag & drop a macro button on software panel, upload the file and upload the icon (all included in the macro's folder).

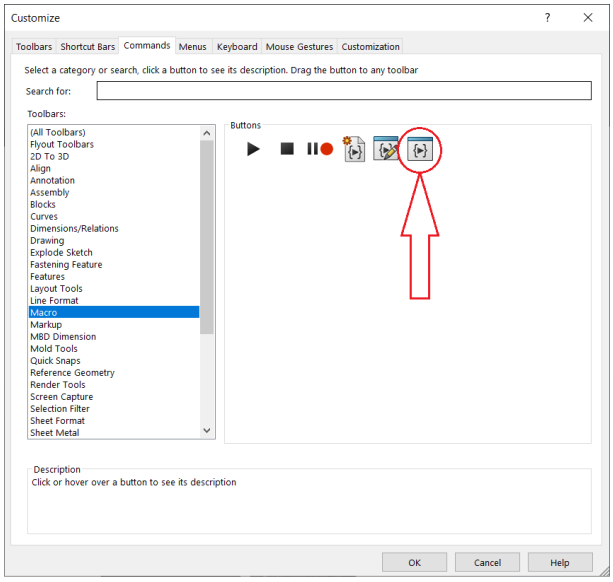


Figure 8 – Customization form

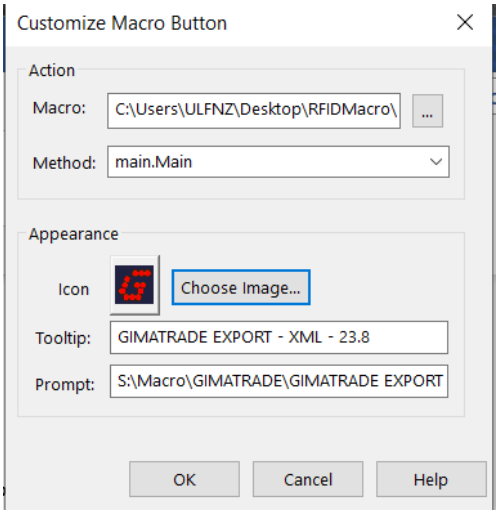


Figure 9 - Icon setting

After setting up the add-in, the user will have two different interfaces depending on if the current drawing is a SolidWorks Assembly or a SolidWorks Part.

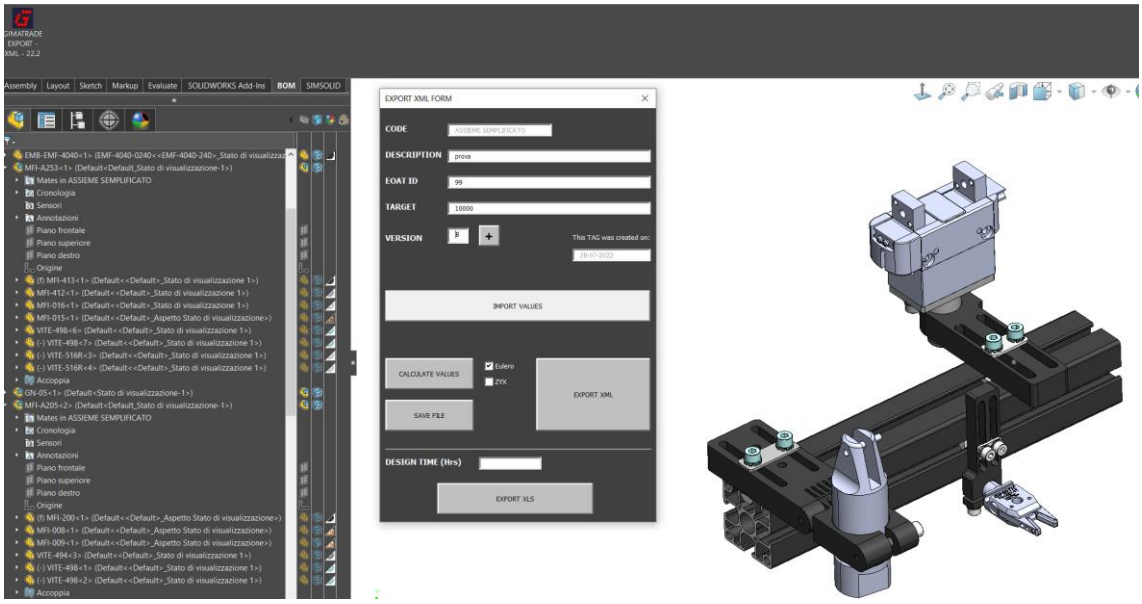


Figure 10 - SolidWorks Assembly

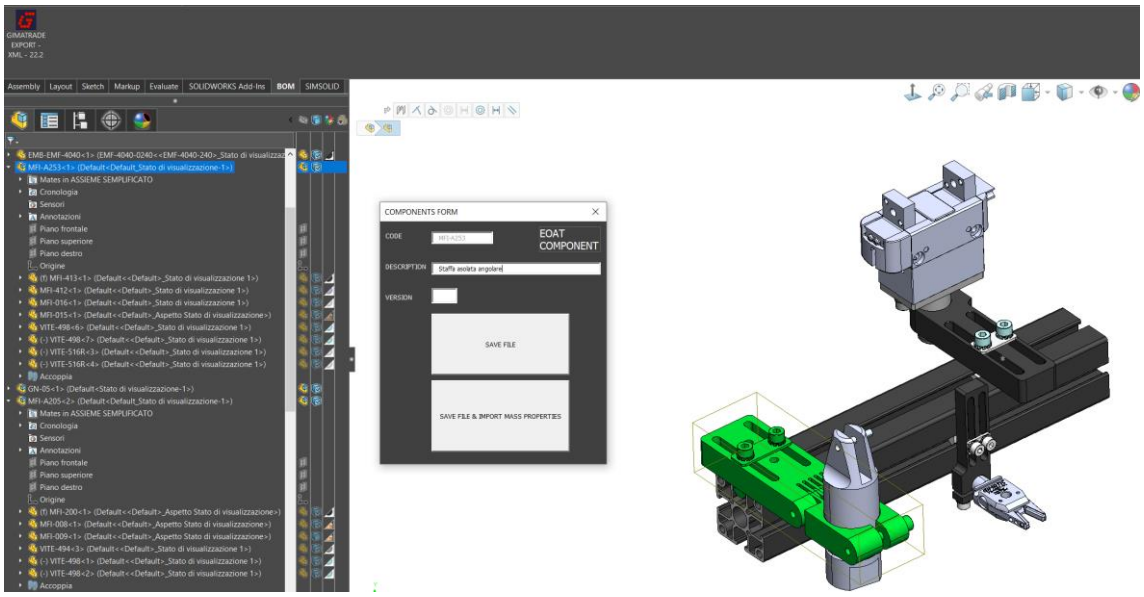


Figure 11 - SolidWorks part

4.2 MASS PROPERTIES CALCULATIONS

Create a new coordinate system and call it “EOAT”.

After filled out the requested fields, the user should import mass values so the properties will be overwritten with the correct values (this because user works with simplified geometries without correct mass properties).

When data import is completed, it is necessary to select the wanted checkbox (Angle calculation with Euler or ZYX method) and push the button “CALCULATE VALUES”: this step is fundamental to get correct XML file values. Finally click on “SAVE FILE”.

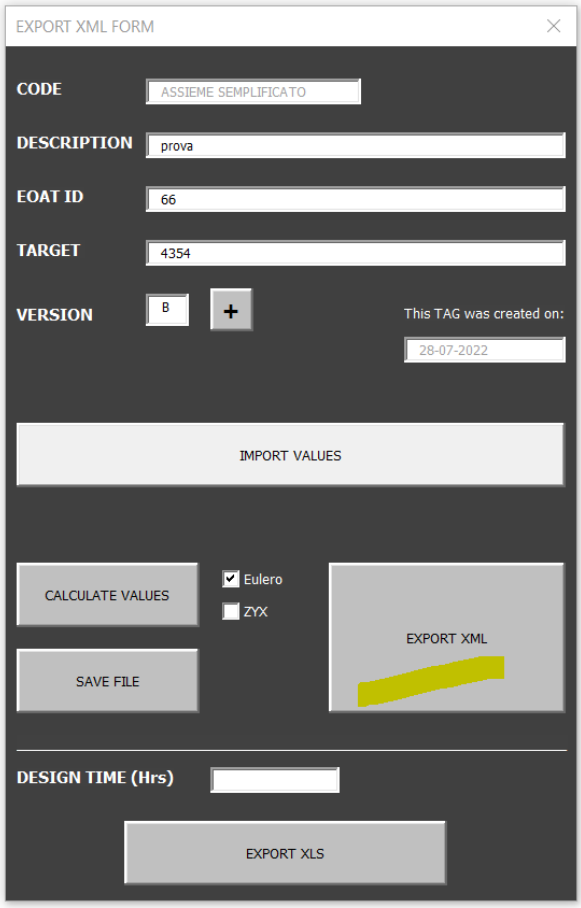


Figure 12 - Export form

Just click on “EXPORT XML” button to save the file ready to be imported in RFID interface. It will be named with the same name as the file.

Click instead on “EXPORT XLS” button to saves a 3-column XLS file (Production BOM No. - Code - Quantity).

5. GIMATIC MOBILE APPLICATION

The instructions to use Gimatic's mobile application is showed in the following lines: the application is useful to perform data exchange with NFC TAGs and to write data into them**. A smartphone with Android system and NFC reader is required**. It's possible to download the Gimatic application from Play Store or using the QR code below.

Figure 13 - Frame to download the Gimatic application

The access to the RFID section is possible from the menu on the left or directly from the main page.

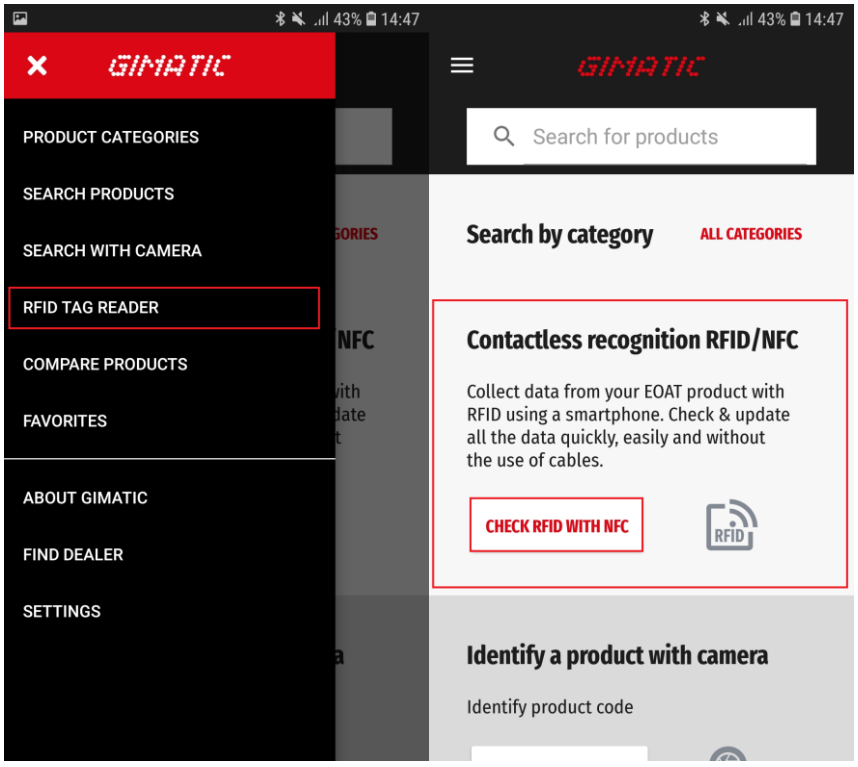


Figure 14 - Access to RFID section

Please remember to activate the NFC functionality on the smartphone.

Once entered in the RFID section, the following screen appears:

Figure 15 - RFID section main page

In the centre of the screen, is where the data eventually read appear.

On the bottom, there is an output zone where some information are showed to the user (like the success or not of a reading, the sharing of data with the cloud, etc.).

The three buttons serve to (from left to right):

- Show or not the output zone
- Force a reading operation
- Set maintenance operations

5.1 READING AND WRITING OPERATION

The reading of the memory TAG is operated continuously and automatically by the app.

Place the memory TAG (for example RBQC) on the back of the smartphone (where NFC reader is placed) and **move RBQC slowly until a popup showing the sentence "TAG read successfully" appears**. Then MAIN DATA can be analyzed. Note that also in the output zone the operation is memorized.

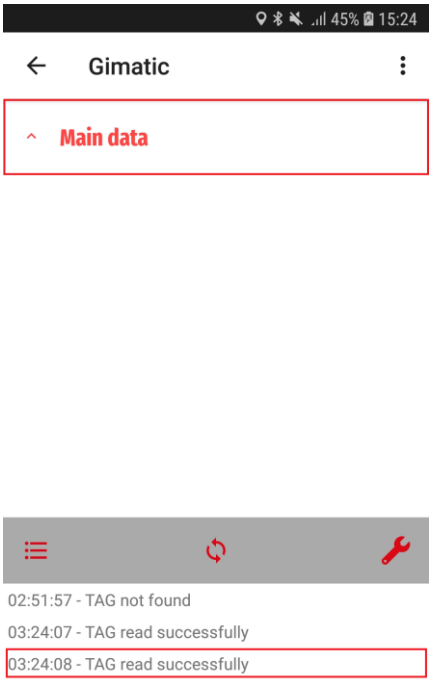


Figure 16 - Reading a TAG

Clicking on the drop-down menu, it is possible to see all the parameters of this section.

In the upper right part of the screen there is an icon the three points ⋮ and by clicking on it the "*Enable expert mode*" text will appear. By checking this option, the full list of data and parameters becomes visible and editable. Please note that enabling expert mode option requires a log in. Without a correct log in the reading of the MAIN DATA section in the only possible operation.

The user can log in into the application using specific username and password (*Figure 17*). **The costumer must ask reference subsidiary for password and username.** There is only one username and one password: with these credentials everyone can modify the TAG parameters, using Gimatic application and memory TAG.

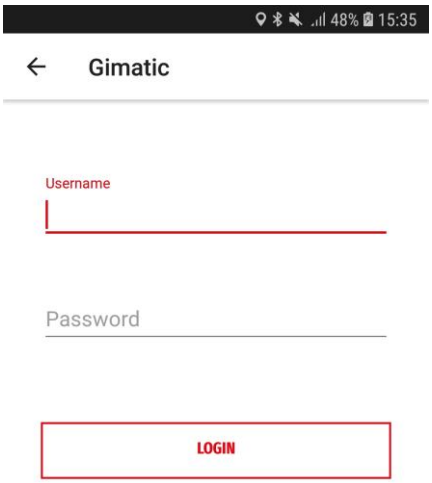


Figure 17 - Log in page

The login operation can be done also offline, without internet connection.

After enabled the expert mode, the new main page will appear like this:

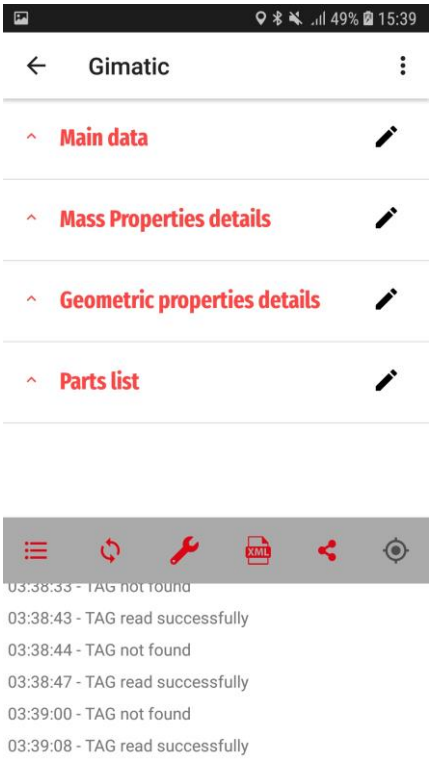


Figure 18 - RFID section main page in expert mode

Again, clicking on specific section, it is possible to see all the parameters related to that section.

This time though, an icon representing a pencil is showed next to the parameters that can be modified by the user (example: the EOAT name is editable, as shown in *Figure 19*).

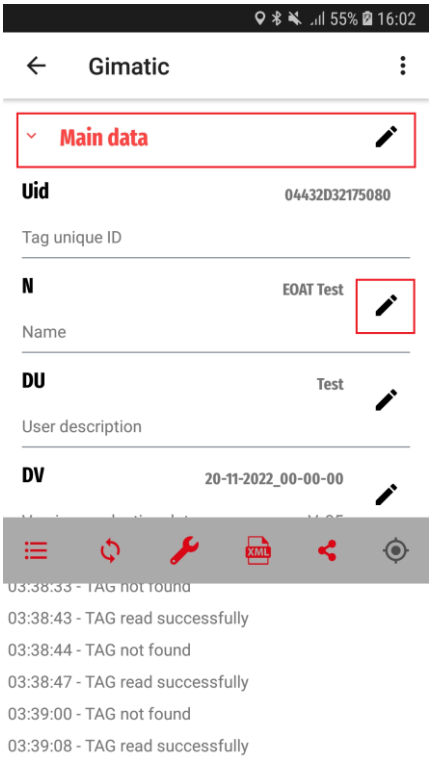


Figure 19 - Reading in expert mode

It is possible to modify the single parameter or the entire section.

To confirm the change and to write the new parameters into the TAG, the “APPLY” button must be pressed, in the upper right part of the screen, **holding the TAG in the position of reading action**. When the update is completed, the application returns to the main screen and automatically operate a reading operation.

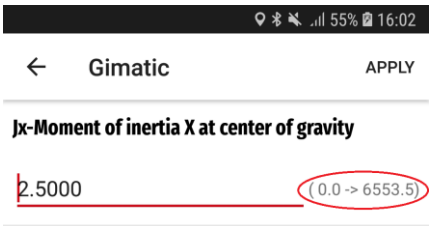


Figure 20 - Modify a value

Next to the editable area, there is reported the field of values allowed for that specific parameter (note for example *Figure 20*).

Every time a TAG is read by the application, if the smartphone is connected to the Internet, a data packet is sent automatically to the Gimatic Cloud. In case of offline reading, the data will be shared as soon as an internet connection is available.

It is also possible to send an extra packet manually, clicking on the wrench icon and then on the red button in the lower right part of the screen. With this function, the user can send to the could some text messages to communicate maintenance action (among a predefined set). The possible choices are: preventive maintenance, component breakdown, component wear, regulation/calibration and configuration. In addition, it is possible to write some notes. This information can be sent also if the expert mode is disabled.

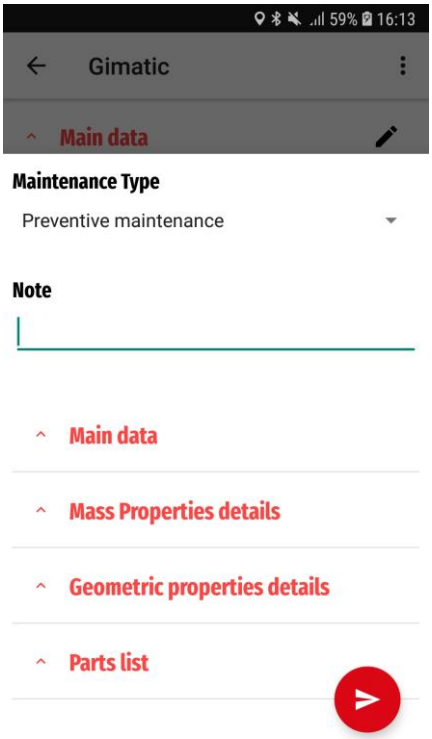


Figure 21 - Maintenance operations

5.2 EXPORT/IMPORT AN XML FILE

Only with the expert mode option active, and using the appropriate button, it is possible to export the data currently show on the screen to an XML file or, vice versa, import an XML file to populate all the TAG parameters with the data contained in the imported file.

To export the data currently displayed on the screen, just click on the XML button, select “EXPORT”, set the file name and a message indicating the saved of the file will appear.

Instead, to import a file, just click on the XML button, select “IMPORT” and then choose the desired file. After that, all the parameters of all four the sections will be populated by the data contained in the just imported file. TAG data memorization process is a generic writing operation, it is therefore possible to either write every single parameter or write an entire section of data.

N.B.: to avoid loss of data or mistake by the user, **the automatic reading is blocked during an XML file import and subsequent writing operations**. This means that after importing a file, a memory TAG is not read even if it is approached to the back of the smartphone where the NFC reader is located. **To return to the standard mode of operation (i.e. automatic reading), just force a reading by clicking the appropriate button.** This is done to avoid unwanted reading during the writing of the parameters imported by the XML file.

In addition, with the expert mode activated and through the classic “share” button, it is possible to share the content of a memory TAG with all the applications allowed (for example, it is possible to send the data by e-mail).

6. GIMATIC WINDOWS APPLICATION: GimaticRFID.exe

The Windows based application GimaticRFID.exe developed by Gimatic allows the user to command read and write operations on a memory TAG and import and export XML files.

The main purpose of the GimaticRFID.exe is to make possible the configuration of a memory TAG (to characterize an EOAT) or check the TAG data through a laptop. It is a more basic alternative to the Gimatic Android app: the same functions (read, write, import, export) can be performed apart from maintenance operations and in this case, there is no connection with webservice.

The following picture shows the user interface of GimaticRFID.exe.

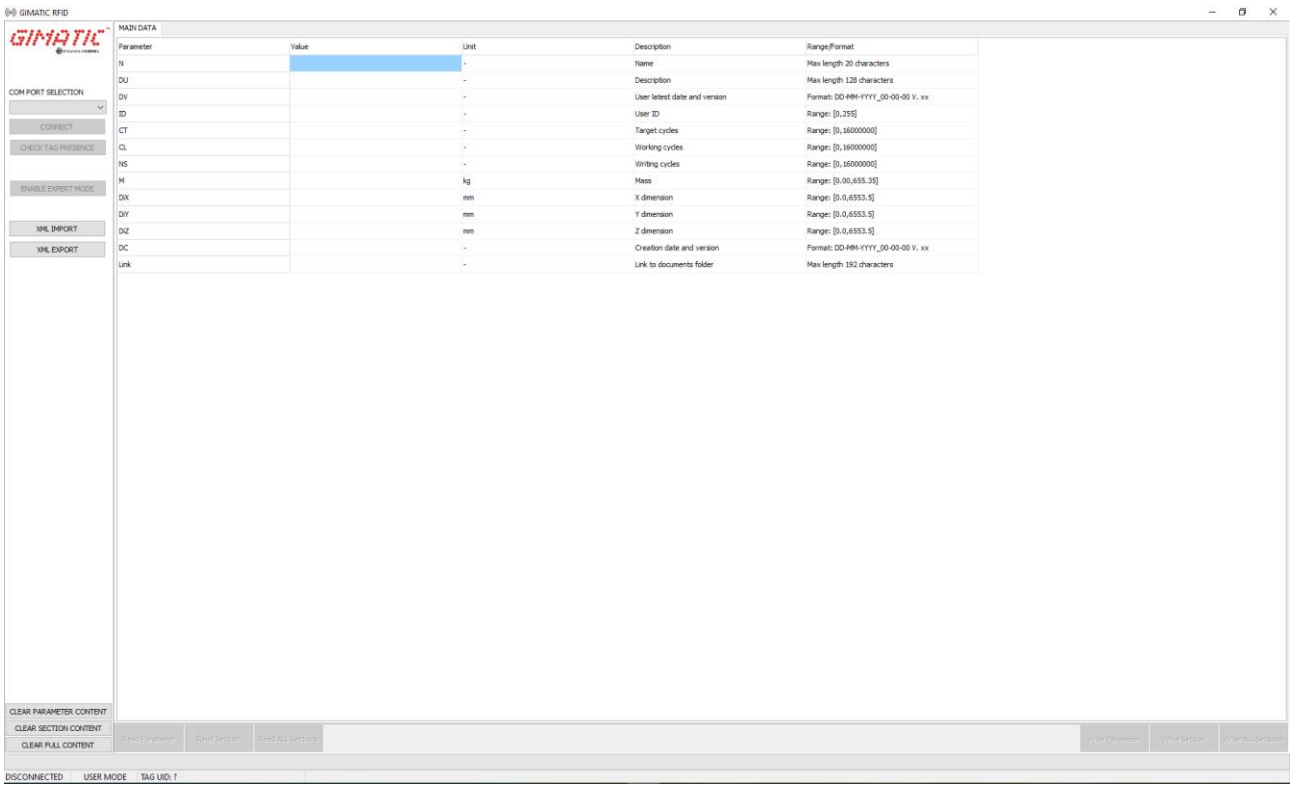


Figure 22 - GimaticRFID.exe interface

This main window is ideally divided into three sections:

- Communication configuration, access to expert mode, XML import/export (left side).
- Data viewing (center side).
- Read/write commands (bottom side).

Communication configuration, access to expert mode, XML import/export

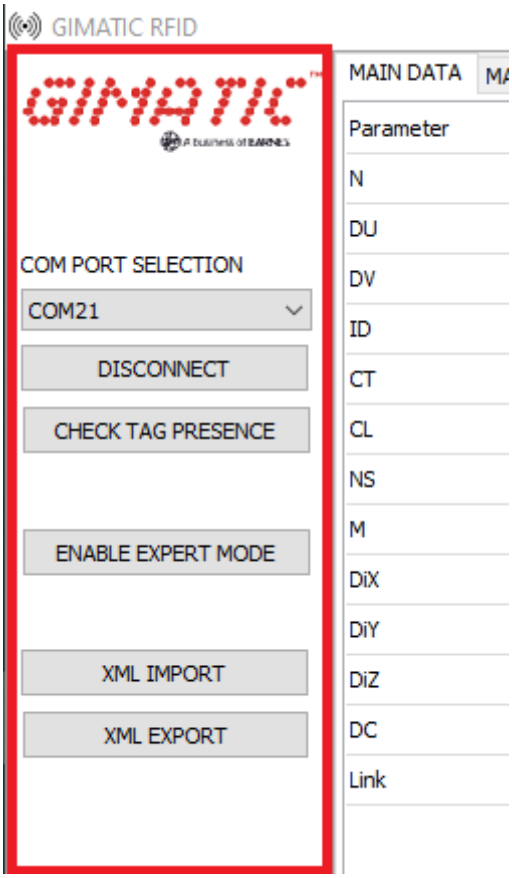


Figure 23 - Communication configuration

On the top, the user can select the COM port used for the USB/serial converter and open and close the serial communication (trough the click on “CONNECT” / ”DISCONNECT” button).

Once the serial communication is opened, it is possible to check the presence of a memory TAG (“CHECK TAG PRESENCE”). In positive case, the follow message appears (reporting the UID of the TAG):

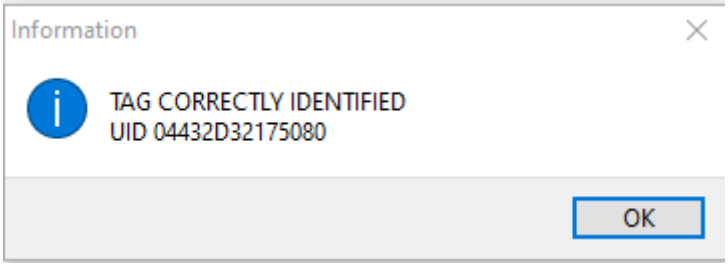


Figure 24 - TAG correctly identified

In case of no TAG read, the following error message appears:

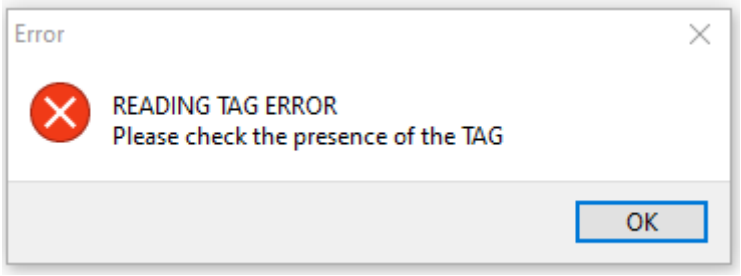


Figure 25 - Reading TAG error

A correct detection of the TAG is mandatory in order to operate with it.

In this section, one can also enable the expert mode (to allow the write operations) and import and export XML files.

To activate the expert mode a password is required. Please contact the reference subsidiary for password.

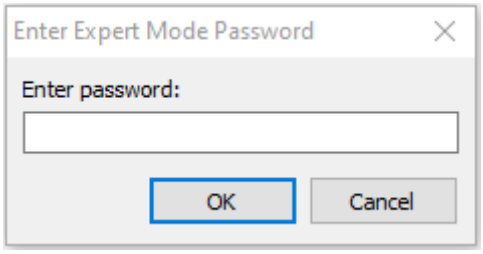


Figure 26 - Activate expert mode

Regarding the import of a XML file, a warning as the one reported in *Figure 27* can occurs:

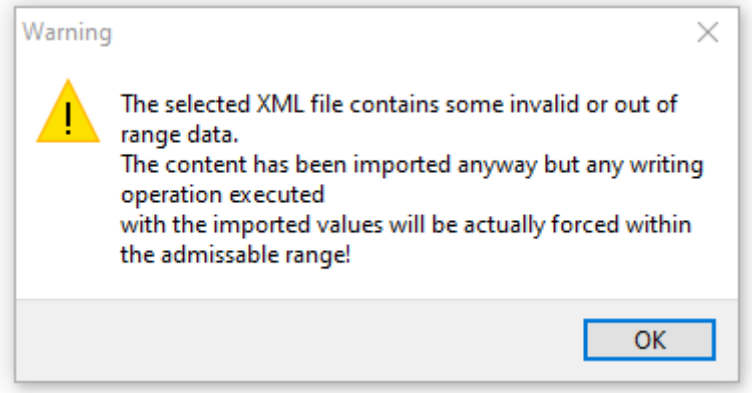


Figure 27 – Warning while importing an XML file

This means that the imported file has one or more parameters containing format or range errors.

Ensure to modify the wrong parameters before writing them on the TAG, to be sure to don't write unwanted values.

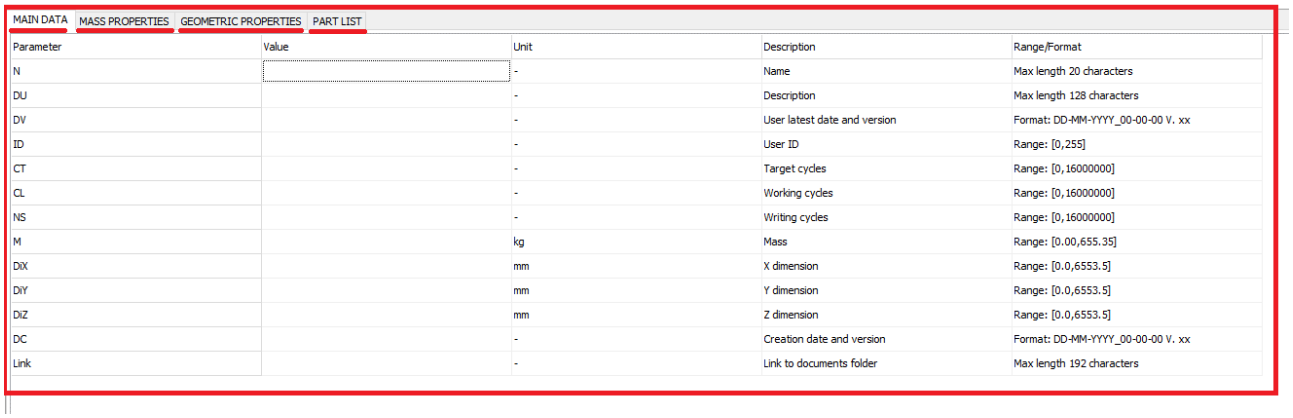
One of the most common errors regards the decimal place separator. In fact, it depends on what is set in the Windows settings of the specific PC where GimaticRFID.exe is executed. Instead, **an XML file exported from the Android app, has always the comma as decimal place separator**.

If, for example, one has the point set as decimal place separator on own laptop and wants to import a file previously exported from Gimatic Android app, is suggested to replace the comma with the point using a simple text editor program.

Please remember that the data imported, are only showed at screen but they are not automatically memorized on the TAG. A write operation is required.

Data viewing

The center of the page shows the data of the TAG, and it is possible navigate through them:


MAIN DATA | MASS PROPERTIES | GEOMETRIC PROPERTIES | PART LIST

Parameter	Value	Unit	Description	Range/Format
N		-	Name	Max length 20 characters
DU		-	Description	Max length 128 characters
DV		-	User latest date and version	Format: DD-MM-YYYY_00-00-00 V. xx
ID		-	User ID	Range: [0,255]
CT		-	Target cycles	Range: [0,16000000]
CL		-	Working cycles	Range: [0,16000000]
NS		-	Writing cycles	Range: [0,16000000]
M		kg	Mass	Range: [0.00,655.35]
DiX		mm	X dimension	Range: [0.0,6553.5]
DiY		mm	Y dimension	Range: [0.0,6553.5]
DiZ		mm	Z dimension	Range: [0.0,6553.5]
DC		-	Creation date and version	Format: DD-MM-YYYY_00-00-00 V. xx
Link		-	Link to documents folder	Max length 192 characters

Figure 28 - Data viewing

As previously explained, the data are divided into four sections, accessible through the appropriate tab (in the top of *Figure 28*).

Initially, the text boxes are all empty. They will be populated after the first read operation, or if edited directly by the user (in this case expert mode must be activated first).

Every parameter has different characteristics, like:

- Parameter: the specific name.
- Value: the value (eventually editable by the user). It is the only field editable.
- Unit: the measure unit of that value.
- Description: a short description of that parameter.
- Range/Format: the allowable range values for that parameter.

Please be aware that, without activating the expert mode, only the MAIN DATA are accessible.

Read/write commands

In the bottom of the interface, the command buttons are present.

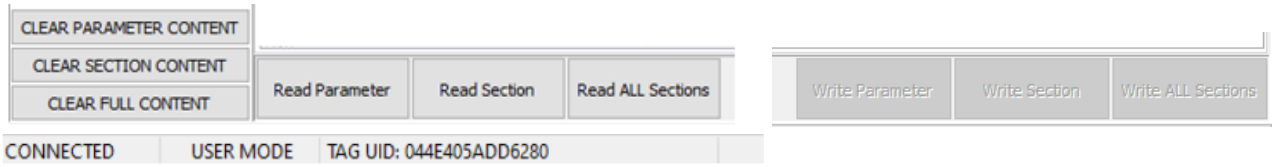


Figure 29 – Read commands (on the left) and write commands (on the right, unlockable through the activation of expert mode)

Using the relative buttons, one can:

- Clear the parameter currently selected.
- Clear the data section currently viewed.
- Clear all the data sections.
- Read the specific parameter selected.
- Read all the parameters of the data section currently viewed.
- Read all the data sections.
- Write the specific parameter selected (expert mode must be activated).
- Write all the parameters of the data section currently viewed (expert mode must be activated).
- Write all the data sections (expert mode must be activated).

During a read or a write operation, a status bar is showed to indicate the status of the operation.

It is recommended to read the data after a write operations just to make sure that the stored data exactly match the desired ones.

At the very bottom of this section, one can see a status bar reporting some important information, like connection status, mode activated (user/expert), UID of the connected TAG and presence of eventually errors.

On following some examples of error strings that can appear:

- Value entered outside the permissible range

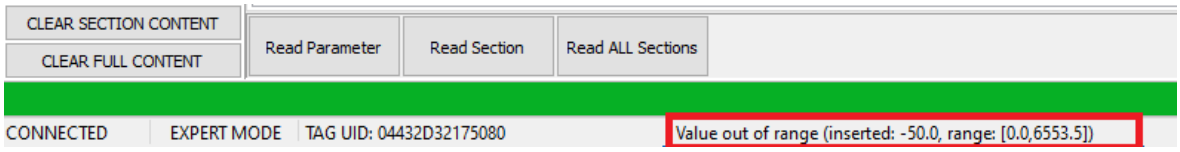


Figure 30 - Example of error that can be appear

- Value entered exceeding the maximum length allowed

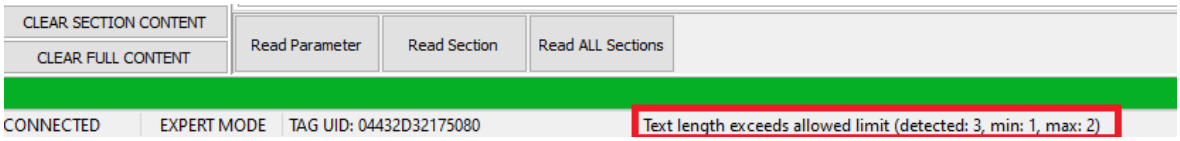


Figure 31 - Example of error that can be appear

- Conversion error (remember that the decimal place separator set is the point)

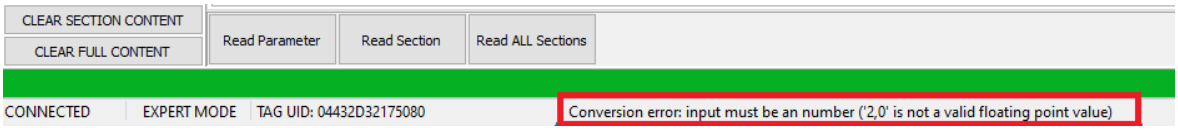


Figure 32 - Example of error that can be appear

7. GIMATIC WEBSERVICE

The server is structured in order to make possible a vertical visualization, so who is on the top can see whoever is at a lower level. There is also the possibility, with a customization of the software, that the customers directly handle their own data without sharing them with Gimatic cloud.

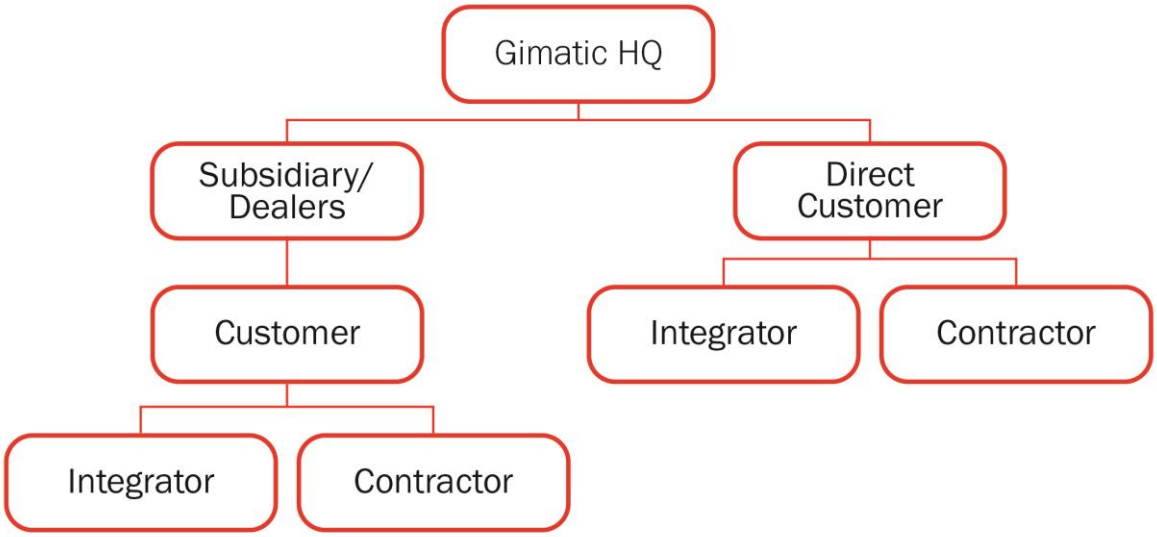


Figure 33 - Gimatic RFID platform structure

As it showed in the figure above, the platform is structured in such a way that it could have five different profiles:

- Subsidiary/Dealers.
- Direct Customer.
- Customer.
- Integrator.
- Contractor.

Customer and Direct Customer have the same privileges, the only difference is that Customer must be linked with a Subsidiary or with a Dealer.

7.1 HOW TO CREATE AN ACCOUNT

The Gimatic Web Service can be reached through Gimatic Website or using the link: https://webservice.gimatic.com/User/Login . In any case, a page will appear, as showed below, where log in or new registration is requested. Clicking on *Register*, a new tab becomes visible, and it allows to fill the details to proceed with the registration. After that, an email will be sent to the address indicated and must be clicked on *Activate Account* to complete the registration.

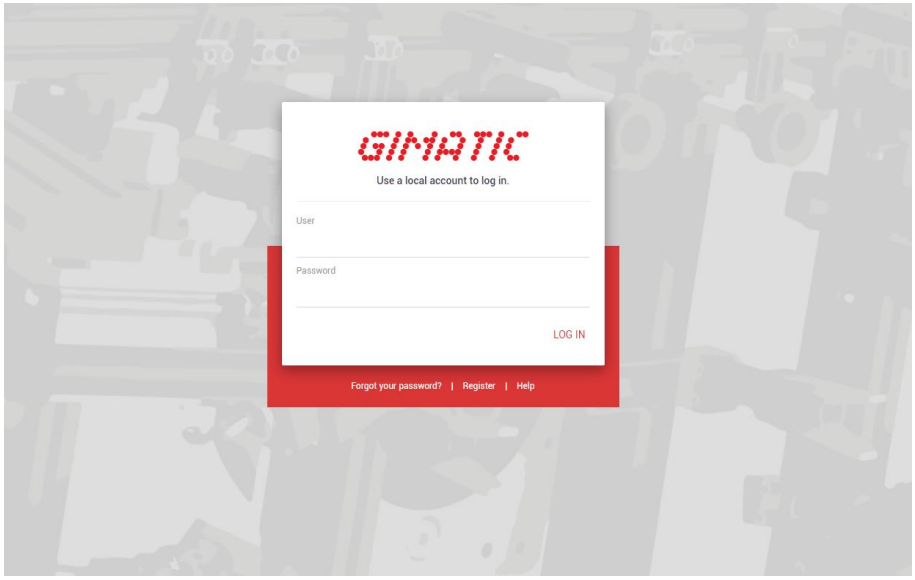


Figure 34 - Webservice log in

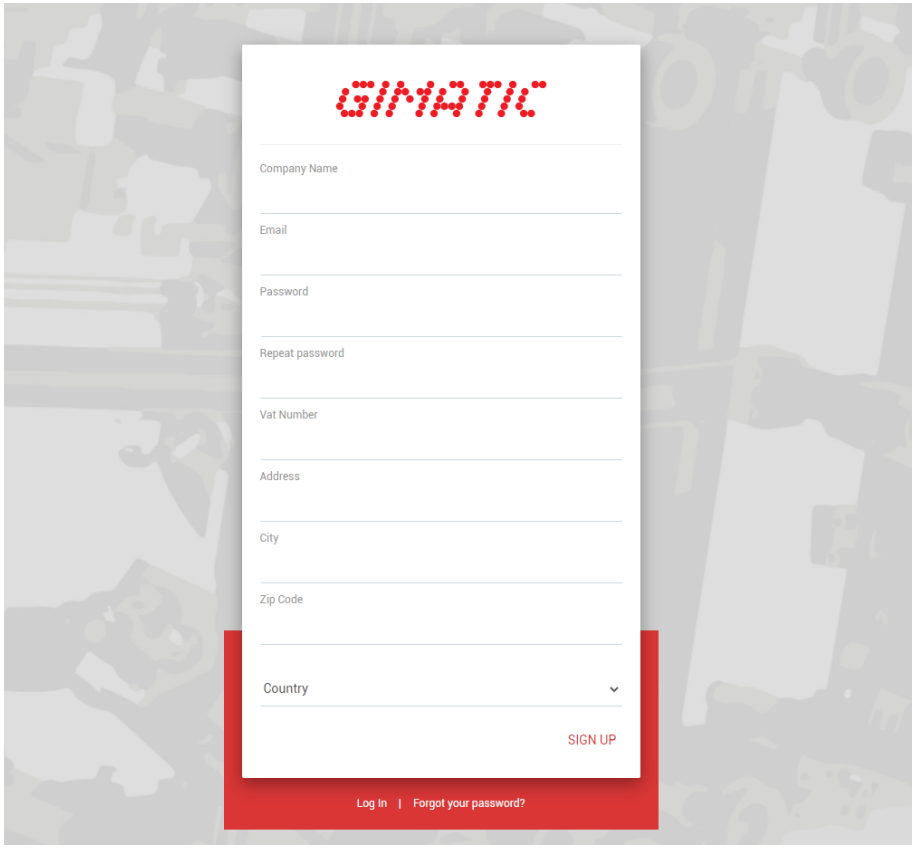


Figure 35 - Webservice registration

7.2 WEB SERVICE MAIN PAGE

Once logged in, the main page will appear. It can be divided in three main areas:

- A: the map shows where the TAGs added by the COSTUMER A are localized. Clicking on the pen , near the customer's name, it will open the window showed in *Figure 37*, and there is the possibility to add integrators or contractors, as showed in the chapter 7.3. If the basket is clicked on, the customer profile will be deleted. In the upper right of this section, there is the possibility to export the XLS file with all the information related to CUSTOMER A.
- B: the filters allow to find the desired TAG assigned to CUSTOMER A.
- C: the TAG list sets out all the TAGs, with some fast information like: UID, ID TAG, last read, numbers of cycle and location. In the upper right there is the button that make it possible to assign a new TAG, this procedure is described in the chapter 7.4.

(The examples are done using the costumer company name: CUSTOMER A)

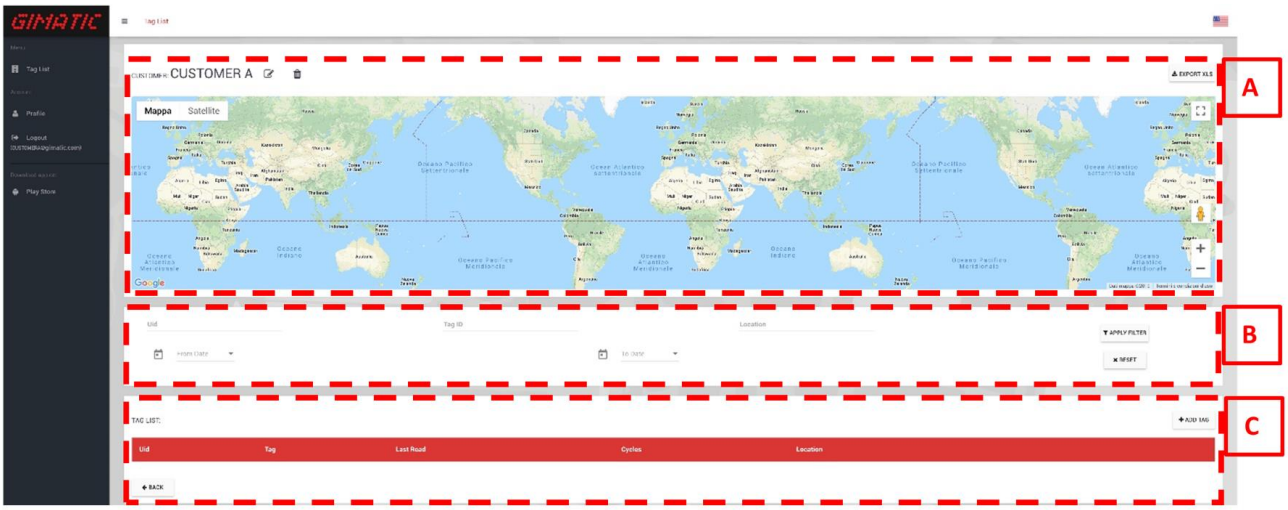


Figure 36 - Main page

7.3 HOW TO ADD CONTRACTORS AND INTEGRATORS TO THE CUSTOMER LIST

To enter a contractor or an integrator, as explained before, shall be clicked on the pen near the customer's name, the picture below (*Figure 37*) shows the window that will appear. In the section A there are details concerning the CUSTOMER A. The section B underline the list of contractors and integrators already added and there is the option to assign a contractor or an integrator to CUSTOMER A. Trying to add a contractor, a form like *Figure 38* will be displayed and to complete the operation must enter the contractor's name and email. The contractor can't see the TAG details assigned to himself, for these reasons it doesn't need and account. An integrator can check all the details of his TAGs. Therefore, the customer must enter email and password during the insertion of an integrator, like in *Figure 38*. The same credentials will be used by the integrator to perform the log in. Then the integrator will receive an email containing a link for the activation of the account (later the integrator can eventually change his username and password).

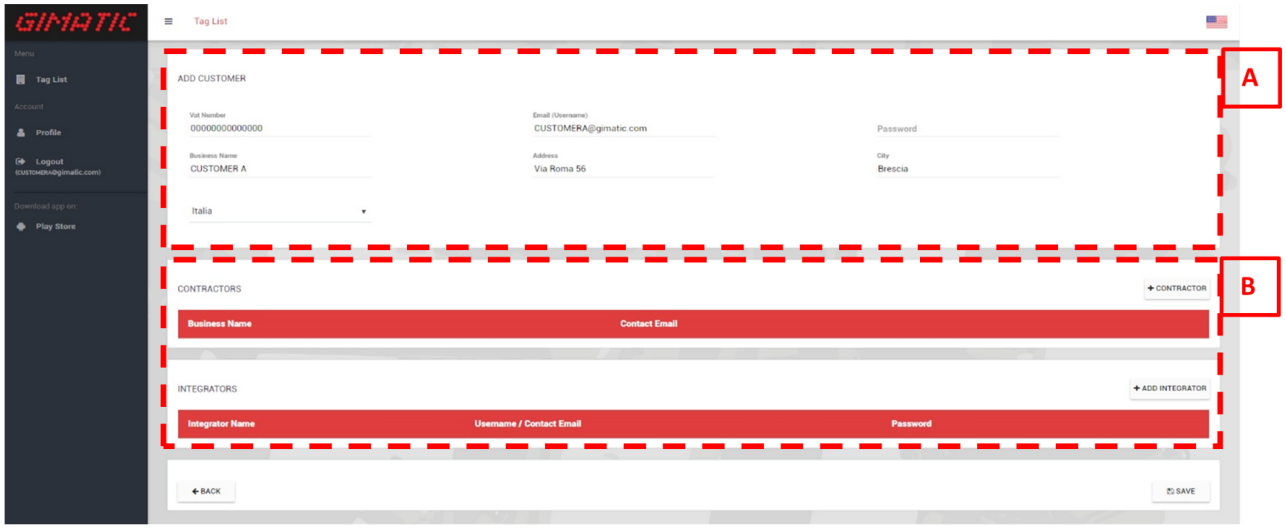


Figure 37 –Customer's main page: customer's details

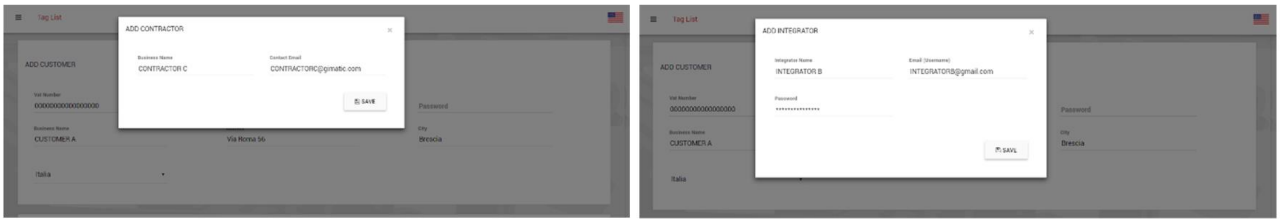


Figure 38 - Add a contractor

Once contractors or integrators have been added to the customer list, the customer's main page will look like *Figure 39*. In the contractors and integrators lists there is the option to delete the user account or to change his name or email, using the basket or the pen icon accordingly.

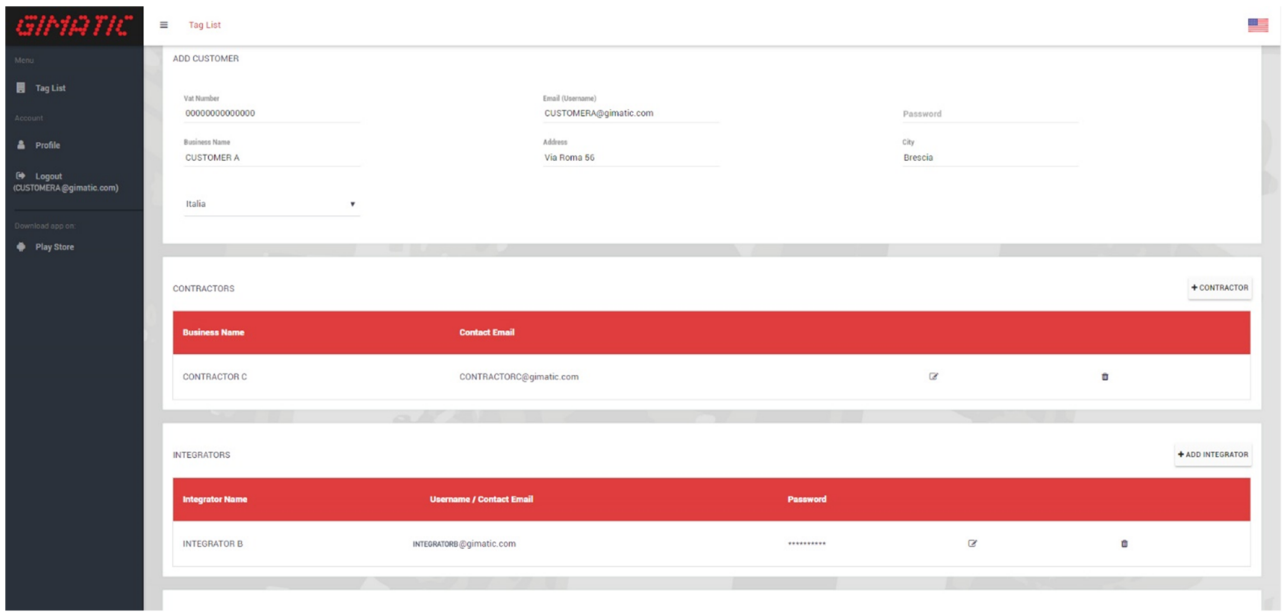


Figure 39 - Updated customer's main page

7.4 HOW TO ASSIGN A TAG TO CONTRACTORS OR INTEGRATORS

The next necessary step to configure the Webservice is to add a memory TAG and to assign it to a user. As highlighted in *Figure 36* at the end of the page there is the function + ADD TAG it makes possible to assign the TAG to a user (contractor or integrator). To complete the process, the UID TAG number and the account name should be entered. The account can be introduced only if before it was created in the customer list. The UID TAG number could be known looking into the XML file, that could be exported from the EOAT SolidWorks add-in (see chapter 4.2) or from mobile application (see chapter 5.2). The XML file is available only after the reading with mobile application. The UID number is a hexadecimal number composed by 14 digits.

Trying to assign a TAG, it could occur two different errors (*Figure 40*). The first one (represented on the left in *Figure 40*) occurs if the TAG has never been read by the mobile application, instead, the second one (represented on the right in *Figure 40*) appears when the UID number entered has a different length from 14 digits.

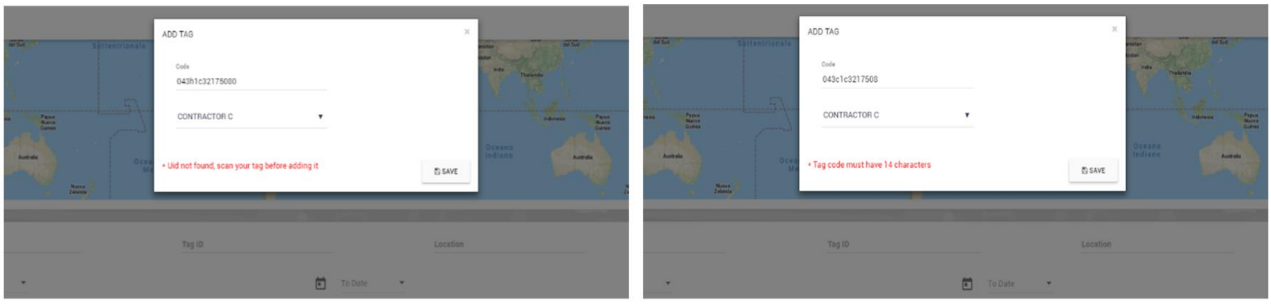


Figure 40 - Possible errors

7.5 TAG DETAILS

Coming back to the home page (*Figure 41*), now, it shows the TAG list with the information regarding the last reading and the TAG geolocation is visible on the map. The information that can be seen in the TAG list are:

- UID TAG number.
- Tag: it represents the TAG ID number. It may vary from 0 to 255 and it can be changed from mobile application or PC software (see the chapters before).
- Last Read: it shows when was done the last reading.
- Cycles: number of EOAT cycles, they can be increased automatically.
- Location: last position from whom the TAG is read. If the location is not indicated it means that the GPS mobile phone position wasn't active during the reading action therefore, the system can't recognize where the reading has been made.

Furthermore, there are three additional functions that are:

- DETAILS: clicking on it, it will appear another window as can be seen in *Figure 42*.
- Export XLS: it permits to see all the details in a XLS file.
- Unpair Tag: it gives the opportunity to unpair the TAG from the user or to reassign the TAG directly to another user.

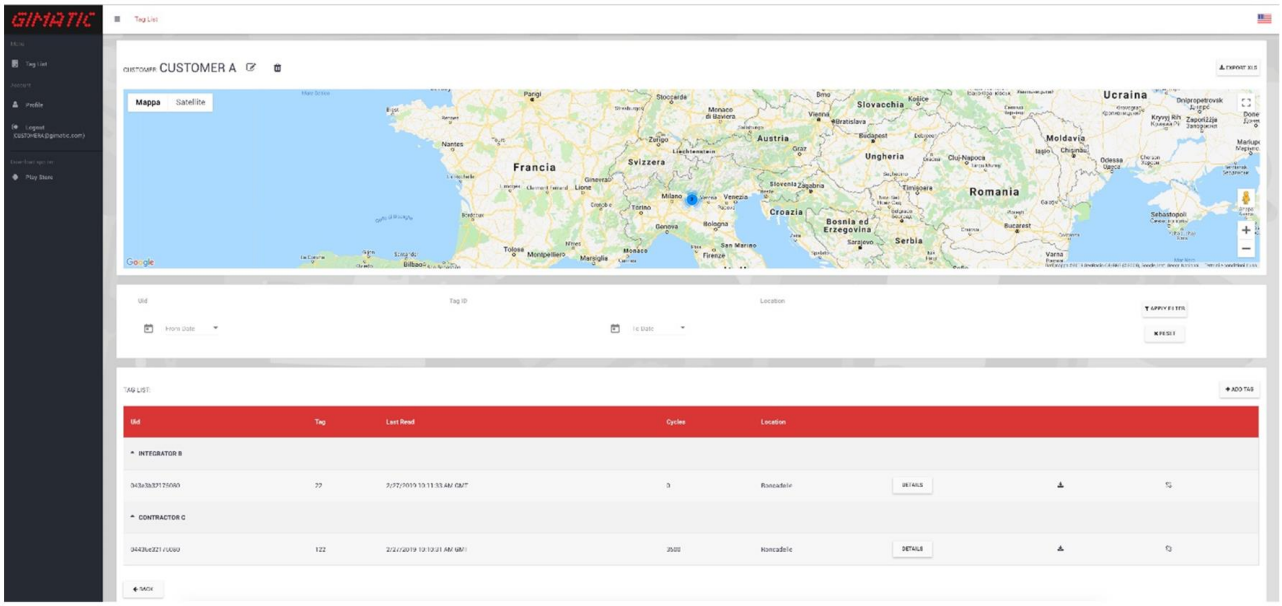


Figure 41 - Home page

Opening the page concerning TAG details, all the information about a specific TAG is available, like geolocation, fast information, chart with cycles progress, bill of material and all the readings done (*Figure 42*).

- A: TAG geolocation.
- B: fast information regarding the last read.
- C: cycle progress, this chart shows the number of cycles performed by the EOAT connected to the RBQC. The graph is updated at every reading action. If a normal reading is carried out, a red point will be present on the chart. If there is a black point it means that was sent a maintenance action message.
- D: bill of material and last reading.
- E: reading history, it contains the literature regarding all the readings performed and they are listed showing date, operation, cycles and notes. In operation column there is the possibility to know what kind of action was done during the maintenance and if there is an attached note. In this case it is showed in *Notes* section with the mark icon ▪ and it can be read by clicking on *DETAILS*.

The permits for an integrator account are different from those of a customer. Indeed, the integrator can only see the TAG's data assigned to him, in the same way explained before. The possibility to add some profile under an integrator is not provided.

Figure 42 – TAG details

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