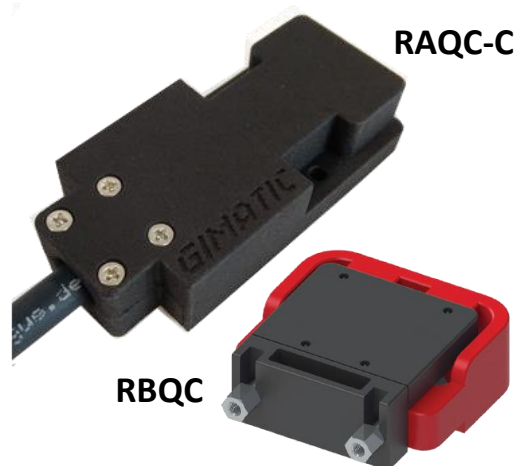


## DESCRIPTION

Automatic recognition system of gripping tool (or EOAT) composed of a RFID reader RAQC-C (PNP version) and one or more memory TAGs RBQC.

Main characteristics:

- customizable cable output of the reader module for reliable application using serial robots and cable carriers;
- up to 255 identifiable tools with a single TAG;
- binary coding of tools by means of 8 digital output signals (24Vdc);
- digital input to counting tool cycles execution (stored in TAG memory);
- memorization of tool technical data and user data memory available.

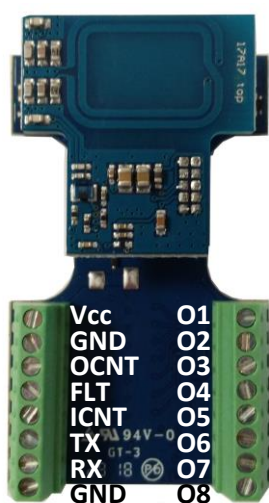


## SPECIFICATIONS

|                                  | RAQC-C                                                  | RBQC                                  |
|----------------------------------|---------------------------------------------------------|---------------------------------------|
| <b>Frame</b>                     | Nylon PA12                                              | Polycarbonate, glass fibre reinforced |
| <b>Working distance</b>          | < 10 mm                                                 |                                       |
| <b>Working frequency</b>         | 13.56 MHz                                               |                                       |
| <b>Allowed temperature range</b> | -20÷65°C                                                |                                       |
| <b>Dimensions box</b>            | 72 mm x 34 mm x 17 mm                                   | 45 mm x 42 mm x 15 mm                 |
| <b>Weight</b>                    | 30 g                                                    | 10 g                                  |
| <b>Electrical connection</b>     | cable output (max outer ø 10 mm) <sup>#</sup>           | none                                  |
| <b>Environmental degree</b>      | IP40                                                    | IP67                                  |
| <b>Power supply</b>              | 24 Vdc ± 10%, 0.15 Arms                                 | none                                  |
| <b>Communication interface</b>   | RS232                                                   | none                                  |
| <b>Memory type</b>               | None                                                    | MIFARE DESFire EV2 4k                 |
| <b>Output signals</b>            | 10 digital (PNP)                                        | none                                  |
| <b>Input signals</b>             | 1 digital (PNP)                                         | none                                  |
| <b>CE reference norm</b>         | EN 60950 2001, EN 300330-2 V1.3.1, EN 301489-1-3 V1.4.1 |                                       |

<sup>#</sup> The plastic housing has been designed to accommodate the cable CF9.02.12 by IGUS (8 [mm] as maximum outer diameter) as standard thus allowing connections for only 12 out of the 15 available pins of the circuit board. However, the housing can be easily re-machined to enlarge the correctly tight cable with external diameter up to 10 [mm].

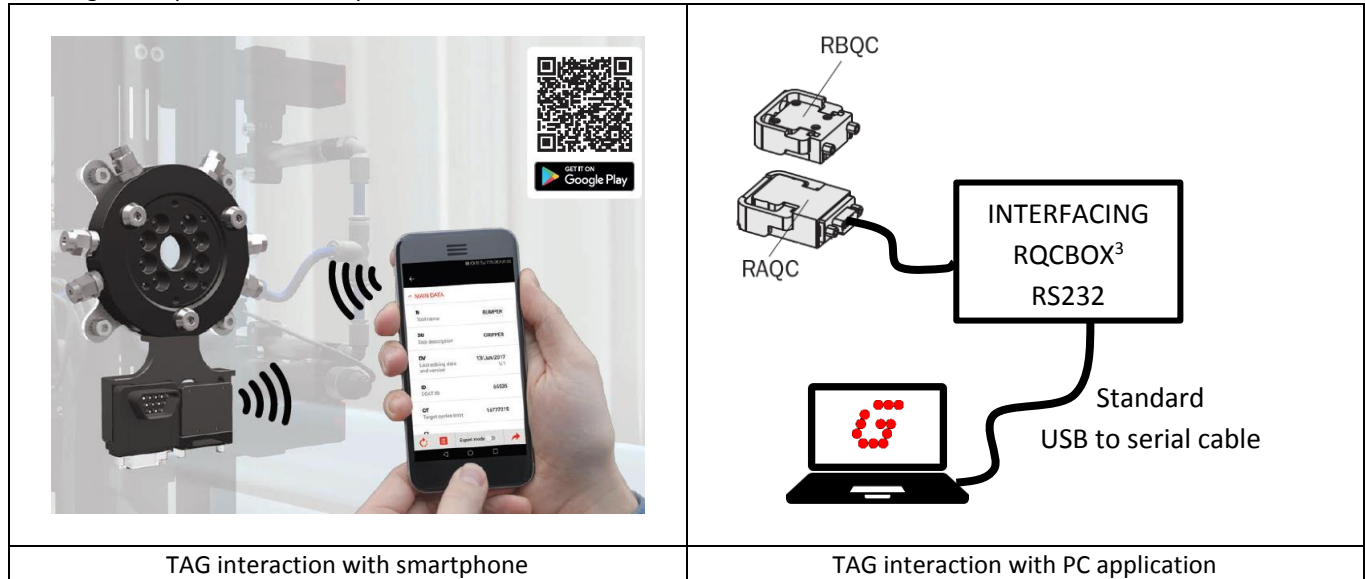
## ELECTRIC CONNECTIONS



| Pin Name | Description                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------------------|
| Vcc      | Power Supply 24 Vdc                                                                                         |
| GND      | Power Supply GND                                                                                            |
| OCNT     | Digital output (maintenance alarm)<br>(when set, tool executed the predefined working cycles)               |
| FLT      | Digital output (fault condition)                                                                            |
| ICNT     | Digital input (cycle completed triggering signal)<br>(+1 executed cycle per any rising edge of this signal) |
| TX       | RS232 Tx signal (only for TAG configuration – optional use)                                                 |
| RX       | RS232 Rx signal (only for TAG configuration – optional use)                                                 |
| O1       | Digital output #1 (bit 1 of the binary code of tool ID) - LSB                                               |
| O2       | Digital output #2 (bit 2 of the binary code of tool ID)                                                     |
| O3       | Digital output #3 (bit 3 of the binary code of tool ID)                                                     |
| O4       | Digital output #4 (bit 4 of the binary code of tool ID)                                                     |
| O5       | Digital output #5 (bit 5 of the binary code of tool ID)                                                     |
| O6       | Digital output #6 (bit 6 of the binary code of tool ID)                                                     |
| O7       | Digital output #7 (bit 7 of the binary code of tool ID)                                                     |
| O8       | Digital output #8 (bit 8 of the binary code of tool ID) – MSb                                               |

## PRINCIPLE OF OPERATION

The primary context of application of the system is the automatic handling of components. Usually to this purpose a robot is used in combination with several EOATs (End Of The Arm Tools) anyone dedicated to a specific operation. In a similar application the robot wrist may be equipped with a reader unit (RAQC-C/RAQC/RAQCN) and any EAOT may be equipped with a TAG memory component (RBQC). During the setup of the application any single TAG can be filled up with EAOT specific information (by using a smartphone with the dedicated APP<sup>1</sup> or a software PC<sup>2</sup> with a dedicated interfacing box) such as an identification number (ID), mass or geometrical proprieties and a part list. All these data are permanently stored into the TAG memory and some of them are eventually updated by the reader unit during normal operation. Whenever the reader approaches a specific TAG the binary representation of the TAG's ID is generated on 8 digital output pins (DO\_1...DO\_8) allowing the robot to verify the correspondence of the installed EOAT with the programmed task. A specific digital input signal (DI\_Count) is also available to counting the number of cycles executed by the EOAT (i.e. signal coming from a sensorbox) allowing the implementation of predictive maintenance.

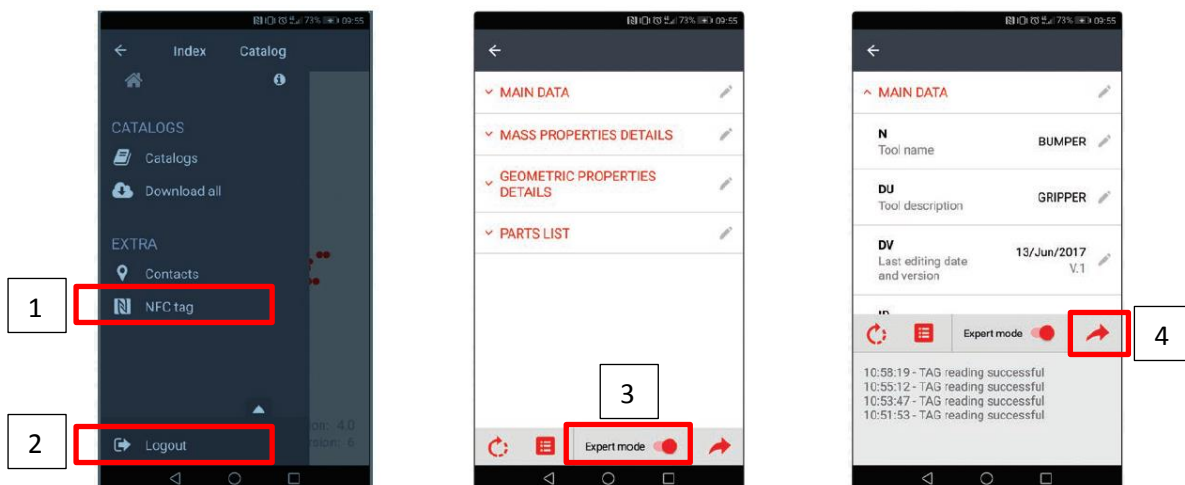


## DATA MEMORY OF THE TAG

The memory of the TAG is divided into several data groups and the following information can be stored into and retrieved from the TAG. Additional memory space is available upon request to store custom data.

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

## APP PREVIEW

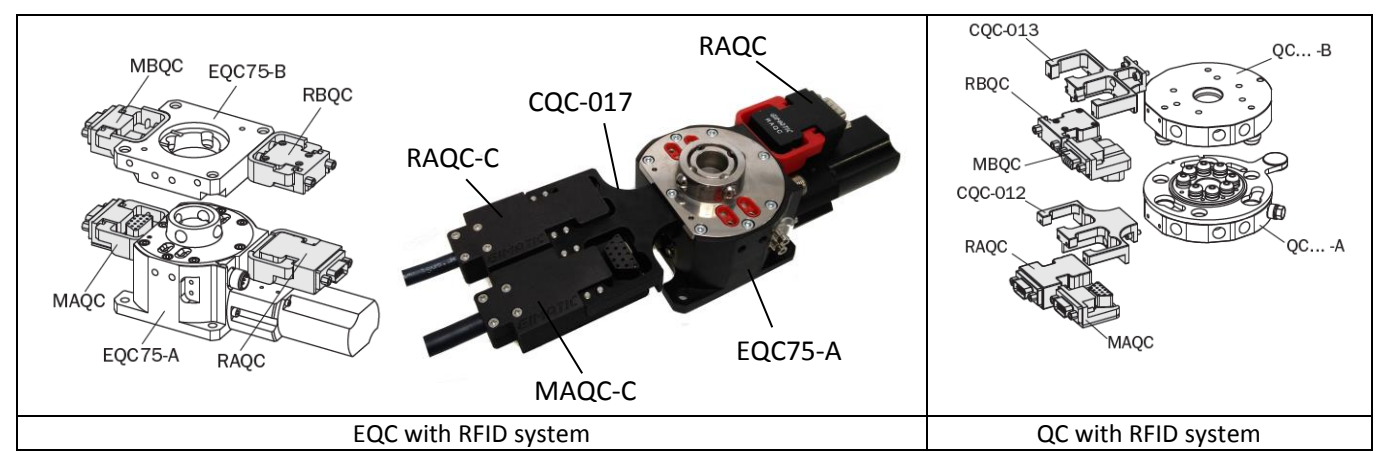


<sup>1</sup>Only smartphones with Android O.S. are currently supported. Download Gimatic APP for free from your Store to interact with the TAG (a registration of the APP might be necessary). <sup>2</sup>A dedicated Windows® based application can be downloaded for free from Gimatic website ([www.gimatic.com](http://www.gimatic.com)). <sup>3</sup>Available as separate product.

Once the APP has been downloaded and installed from the store, access NFCTag functionality (1) from main menu on the left. Eventually log-in (2) to access all the available RFID features of the APP. Anonymous users have read only access permissions to the MAIN DATA group. Registered users can access the Expert mode (3) with read and write permissions of all the data fields. It's also possible to import and export XML formatted files with an image of the data memory of the TAG to simplify data sharing between several users and between smartphone and PC based applications.

APPLICATION EXAMPLES

The following pictures show the application of the RFID system in association with two tool changers: the EQC-A/B (electric) and the QC (manual).



AUTOMATIC TOOL RECOGNITION EXAMPLE (RAQC – PNP OUTPUT TYPE)

RBQC

TAG Memory

TOOL ID = 12

RAQC

| DB 15 connector (DO pin # only) |      |      |      |      |      |      |      |
|---------------------------------|------|------|------|------|------|------|------|
| DO_1                            | DO_2 | DO_3 | DO_4 | DO_5 | DO_6 | DO_7 | DO_8 |
| 0                               | 0    | 1    | 1    | 0    | 0    | 0    | 0    |
| LOW                             | LOW  | HIGH | HIGH | LOW  | LOW  | LOW  | LOW  |

DIMENSIONAL DRAWINGS

