GIMATIC
A business of BARNES GROUP INC

*Operating instructions (EN)*

**IST-RQC**
*02/2019*

# RQC
## RFID identification modules.

### *Description*

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

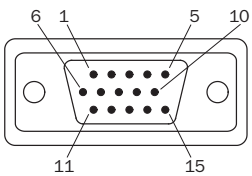
*Main characteristics:*

- *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.*

| | RAQC | RAQCN | RBQC |
|---|---|---|---|
| Frame | Polycarbonate, glass fibre reinforced | | |
| Working distance | <10mm | | |
| Working frequeny | 13.56 MHz | | |
| Allowed temperature range | -20÷65 °C | | |
| Dimensions box | 58mm x 42mm x 18mm | | 45mm x 42mm x 15mm |
| Weight | 30 g | | 10 g |
| Electrical connection | DB 15 pins male (HD) | | None |
| Environmental degree | IP40 | | IP67 |
| Power supply | 24 Vdc ± 10%, 0.15 Arms | | None |
| Communication interface | RS232 | | None |
| Memory type | None | | MIFARE DESfire EV2 4K |
| Output signals | 10 digital (PNP) | 10 digital (NPN) | None |
| Input signals | 1 digital (PNP) | 1 digital (NPN) | None |
| CE reference norm | EN 60950 2001, EN 300330-2 V1.3.1, EN 301489-1-3 V1.4.1 | | |

### *Electric connections*

*Electric connections to the reader unit (RAQC or RBQC) is avaible by means of a 15 pins (high density) DB male connector according to the following schema.*

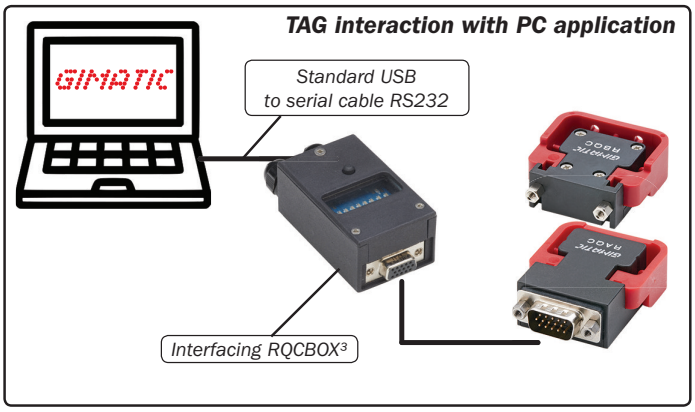



| Pin # | Pin name | Description |
|---|---|---|
| Pin 1 | DO_1 | Digital output #1 (bit 1 of the binary representation of tool ID) - LSb |
| Pin 2 | DO_2 | Digital output #2 (bit 2 of the binary representation of tool ID) |
| Pin 3 | RS_TX | RS232 Tx signal (only for TAG configuration-optional use) |
| Pin 4 | GND | Power supply GND |
| Pin 5 | RS_RX | RS323 Rx signal (only for TAG configuration-optional use) |
| Pin 6 | 24 Vdc | Power supply 24 Vdc |
| Pin 7 | DO_Count | Digital output (maintenance alarm) (when set, tool executed the predefined number of working cycles) |
| Pin 8 | DO_3 | Digital output #3 (bit 3 of the binary representation of tool ID) |
| Pin 9 | DO_Fault | Digital output (fault condition) |
| Pin 10 | DO_4 | Digital output #4 (bit 4 of the binary representation of tool ID) |
| Pin 11 | DO_5 | Digital output #5 (bit 5 of the binary representation of tool ID) |
| Pin 12 | DO_6 | Digital output #6 (bit 6 of the binary representation of tool ID) |
| Pin 13 | DO_7 | Digital output #7 (bit 7 of the binary representation of tool ID) |
| Pin 14 | DO_8 | Digital output #8 (bit 8 of the binary representation of tool ID) |
| Pin 15 | DI_Count | Digital input (cycle completed triggering signal) (the number of executed cycles is increased by one per any rising edge of this signal) |

### *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/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 APP1 or a software PC2 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.*

***TAG interaction with smartphone***




*Once the APP has been downloaded and installed from the store, access NFC tag functionality (1) from main menu on the left.*
*Eventually log-in (2) to access all the avaible RFID features of the APP.*
*Anonymous users have read only access permissions to the MAIN DATA group.*
*Registred users can access the Expert mode (3) with read and write permissioms 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.*

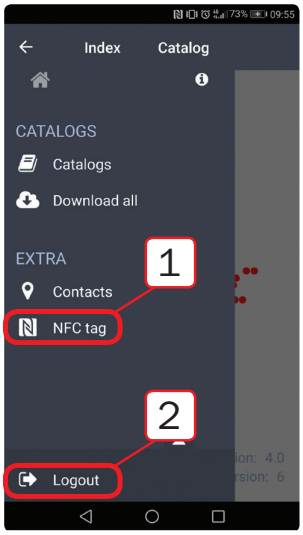
### Automatic tool recognition example (RAQC - PNP output type)

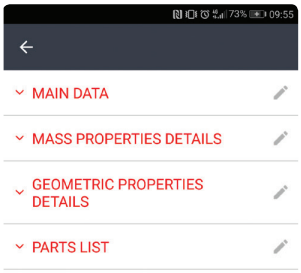
| DB 15 connector (DO pin # only) | | |
|---|---|---|
| **DO_1** | 0 | LOW |
| **DO_2** | 0 | LOW |
| **DO_3** | 1 | HIGH |
| **DO_4** | 1 | HIGH |
| **DO_5** | 0 | LOW |
| **DO_6** | 0 | LOW |
| **DO_7** | 0 | LOW |
| **DO_8** | 0 | LOW |

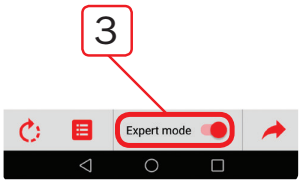

### Data memory of tag

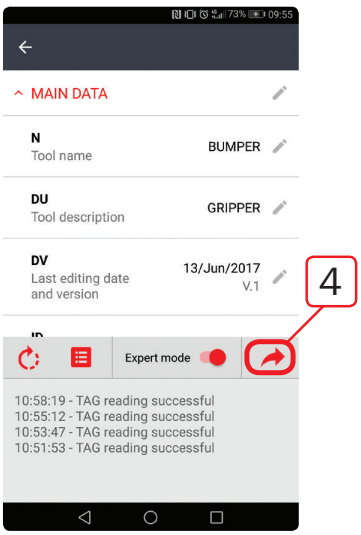
*The memory of the TAG is divided into several data groups and the following information can be stored into and retrieved from the TAG. Additional memory space is available upon request to store custom data.*
*- MAIN DATA (i.e. tool name and description, tool ID number, tool mass and overall dimensions, 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 review

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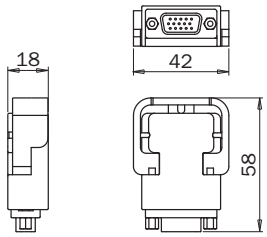
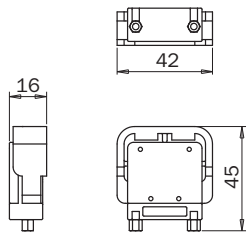
### Dimensional

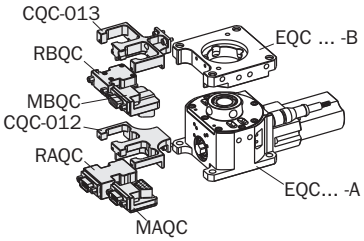
*RAQC/RAQCN*

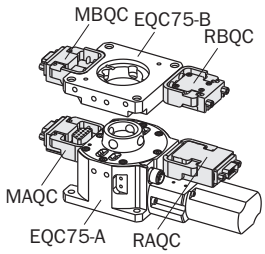


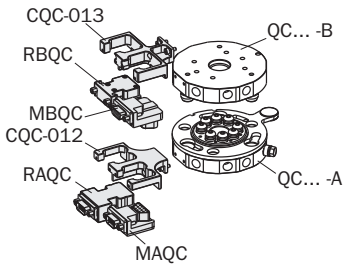

*RBQC*




### Application examples




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