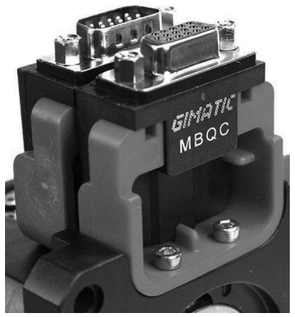
GIMATIC
A business of BARNES GROUP INC

Istruzioni per l'uso (IT)
Operating instructions (EN)

IST-MQC
02/2019



MAQC
MBQC

Modulo di connessione elettrica
Electrical connection module

Modulo di connessione elettrica

- 15 connessioni elettriche.
- pin a tasteggio con teste autopulenti.
- attacco rapido I/O attraverso connettore VGA (opzionale).

Electrical connection module

- *15 electrical connections.*
- *feeler pin with self-cleaning heads.*
- *I/O quick connection using VGA connector (optional).*

MAQC

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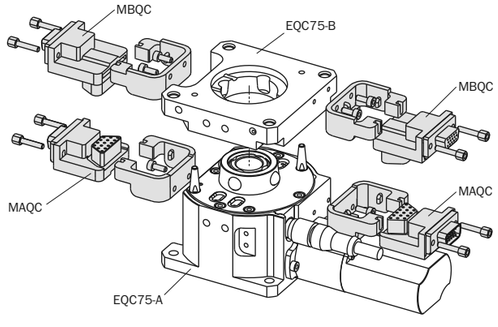
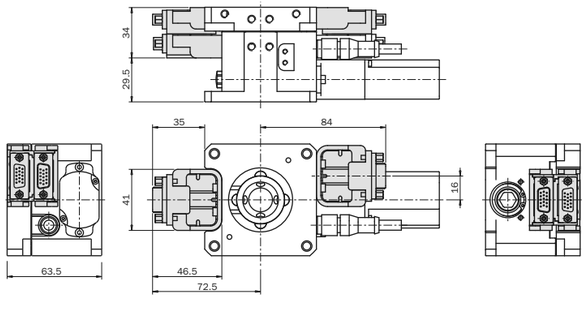
	MAQC	MBQC
Tipo di connessione I/O *I/O connection type*	15 pin D-SUB - Connettore alta densità ad angolo retto - Tipo VGA *15 pins D-SUB - High density elbow type - VGA type*	
Corrente d'esercizio *Working Current*	3 A	
Gamma di tensione *Voltage range*	0 ÷ 250 Vac	
Temperatura di esercizio *Temperature range*	-55°C ÷ +105°C	
Contatti *Contact*	Dorati *Gold plated*	

Fissaggio *Fastening*



Dimensioni (mm) *Dimensions (mm)*



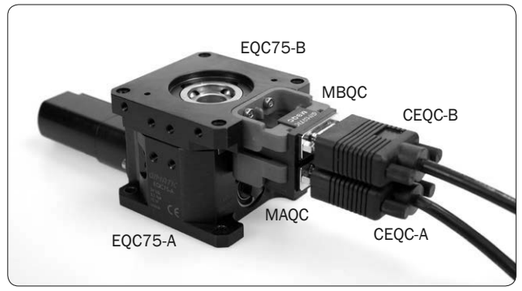
Cavo
A parte sono forniti i cavi maschio e femmina.

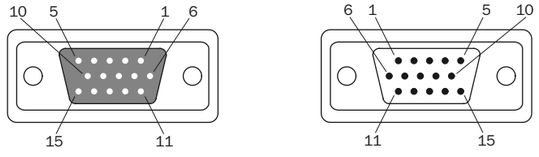
Cable
The male and female cables are supplied separately.

CEQC-A

CEQC-B

	CEQC-A	CEQC-B
Tipo di connessione I/O *I/O connection type*	15 pin D-SUB - Tipo VGA *15 pins D-SUB - VGA type*	
Lunghezza cavo *Cable length*	1500 mm	
Isolamento *Insulation*	PVC codifica colori standard *PVC premium grade color coded*	
Schermatura *Shied*	100% alluminio - Pellicola di mylar - 28÷26 AWG *100% aluminum - Mylar foil - 28÷26 AWG*	
Guaina *Jacket*	PVC nero *Black PVC*	
Temperatura di esercizio *Temperature range*	-55°C ÷ +105°C	
Gamma di tensione *Voltage rating*	0 ÷ 250 Vac	

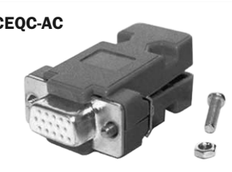




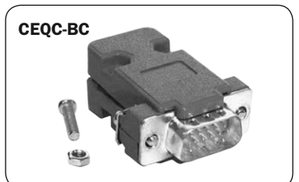
CEQC-AC, CEQC-BC (opzionali)
Sono forniti separatamente i connettori a saldare maschio e femmina.

CEQC-AC, CEQC-BC (optional)
The male and female solder connectors are supplied separately.

CEQC-AC



CEQC-BC



	CEQC-AC	CEQC-BC
Tipo di connessione I/O *I/O connection type*	15 pin D-SUB - Tipo VGA *15-pin D-SUB - VGA type*	
Contatti *Contacts*	Rame *Copper*	
Isolamento *Insulation*	Poliestere *Polyester*	
Temperatura di esercizio *Temperature range*	-20°C ÷ +80°C	
Gamma di tensione *Voltage range*	0 ÷ 250 Vac	
Corrente massima *Max current*	3A	

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Bedienungsanleitung (DE)
Notice d'utilisation (FR)

IST-MQC
02/2019

MAQC
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Elektroverbindungsmodul
Module de connexion électrique

Elektroverbindungsmodul

- 15 elektrische Anschlüsse.
- Abtast-Pins mit selbstreinigenden Köpfen.
- Schnellanschluss I/O mit Hilfe von VGA-Verbinder (optional).

Module de connexion électrique

- *15 connexions électriques.*
- *broche palpeur avec tête auto-nettoyante.*
- *connexion rapide E/S avec connecteur VGA (en option).*

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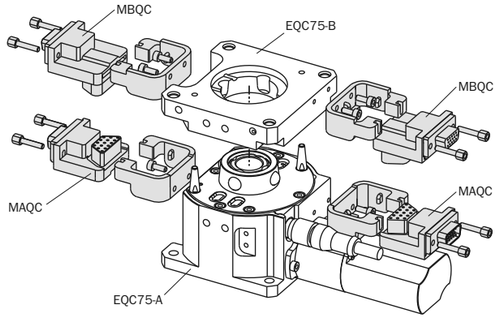
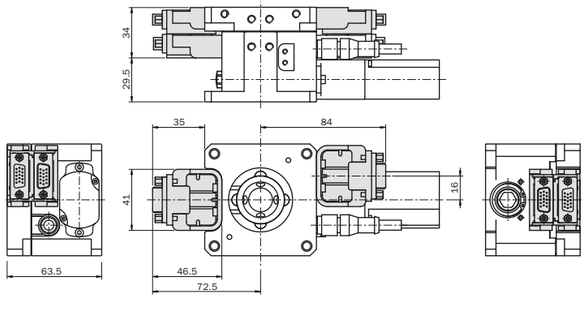
	MAQC	MBQC
Anschlusstyp E/A *Type de connexion I/O*	15 D-SUB-Stifte - Winkelsteckverbinder - Typ VGA *15 goupilles D-SUB - Connecteur haute densité à coude - Type VGA*	
Betriebsstrom *Courant du travail*	3 A	
Spannungsbereich *Plage de tension*	0 ÷ 250 Vac	
Betriebstemperatur *Température d'utilisation*	-55°C ÷ +105°C	
Kontaktstifte *Connexions*	Vergoldet *Dorées*	

Befestigung *Fixage*



Maße (mm) *Abmessungen (mm)*



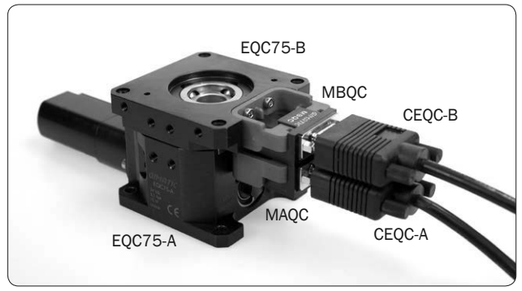
Kabel
The male and female cables are supplied separately.

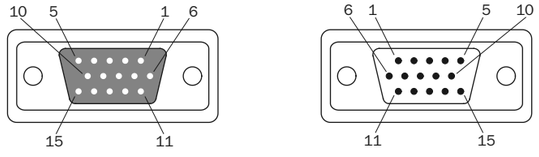
Câble
Les câbles mâle et femelle sont vendus séparément.

CEQC-A

CEQC-B

	CEQC-A	CEQC-B
Anschlusstyp E/A *Type de connexion I/O*	15 D-SUB-Stifte - Typ VGA *15 pins D-SUB - Type VGA*	
Kabellänge *Longueur de câble*	1500 mm	
Isolierung *Isolation*	PVC mit Standard-Farbcodierung *PVC codification couleurs standard*	
Abschirmung *Blindage*	100% Aluminium - Mylarfolie - 28÷26 AWG *100% aluminium - film de mylar - 28÷26 AWG*	
Mantel *Gaine*	Schwarzes PVC *PVC noir*	
Betriebstemperatur *Température d'utilisation*	-55°C ÷ +105°C	
Spannungsbereich *Gamme de tension*	0 ÷ 250 Vac	

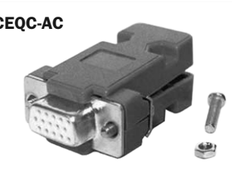




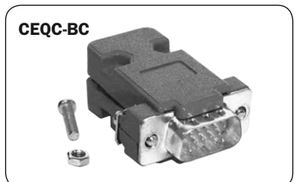
CEQC-AC, CEQC-BC (optional)
Die Vielfach-Schweißverbinder werden separat geliefert.

CEQC-AC, CEQC-BC (en option)
Les connecteurs mâle et femelle à souder sont vendus séparément.

CEQC-AC



CEQC-BC



	CEQC-AC	CEQC-BC
Anschlusstyp I/O *Type de connexion E/S*	15-poliger D-SUB Typ VGA *D-SUB 15 broches - type VGA*	
Kontakte *Contacts*	Kupfer *Cuivre*	
Isolierung *Insulation*	Polyester *Polyester*	
Betriebstemperatur *Plage de température*	-20°C ÷ +80°C	
Spannungsbereich *Plage de tension*	0 ÷ 250 Vac	
Maximaler Strom *Courant maximum*	3A	

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(中文) 操作说明
(JP) 動作の指示

IST-MQC
02/2019

MAQC
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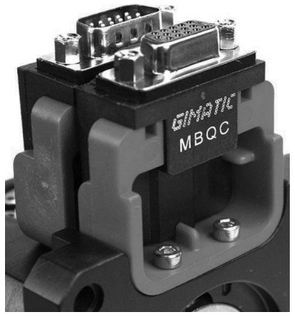
电气连接组件

電気配線用モジュール



电气连接组件

- 15 个电气连接
- 带有自清洁头的触针
- 使用 VGA 连接器（可选）的输入/输出快速连接

電気配線用モジュール

- 15の電気接続;
- 自浄式ヘッド付きのフィーラーピン;
- VGAコネクターを使用するI/Oクイック接続 (オプション).

MAQC

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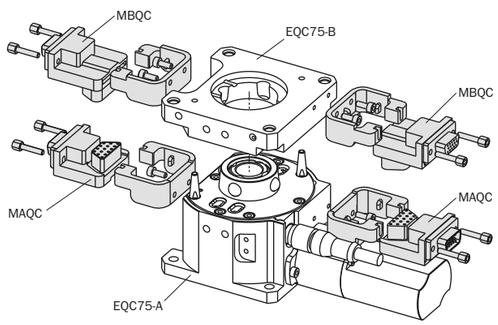
	MAQC	MBQC
I/O连接类型 **I/O接続タイプ**	15 针 D-SUB 高密度弯头型- VGA类型 **15ピン D-SUB - 高密度エルボータイプ VGAタイプ**	
工作电流 **動作電流**	3 A	
额定压力 **電圧定格**	0 ÷ 250 Vac	
温度范围 **温度範囲**	-55°C ÷ +105°C	
接触 **接触**	镀金 **金メッキ**	

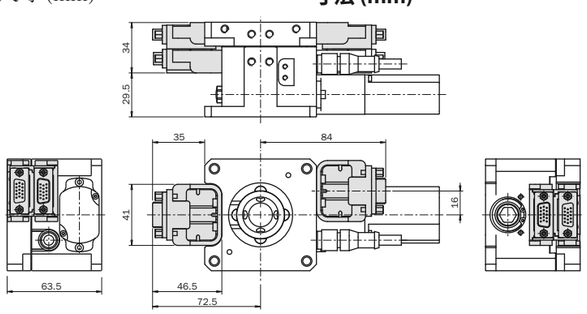
紧固

固定



尺寸 (mm)

寸法 (mm)



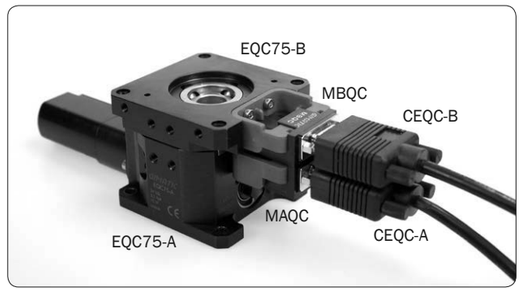
电缆
阴极，阳极电缆分开提供。

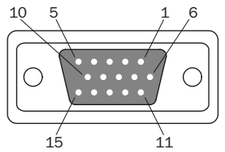
ケーブル
メスおよびオスケーブルは別々に供給されます。

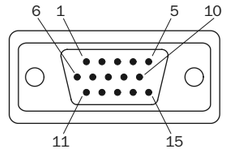
CEQC-A

CEQC-B

	CEQC-A	CEQC-B
I/O连接类型 **I/O接続タイプ**	15 针D-SUB - VGA类型 **15ピン D-SUB - VGAタイプ**	
电缆长度 **ケーブル長さ**	1500 mm	
绝缘体 **絶縁**	PVC 优质高档彩色编码 **PVCプレミアムグレードのカラーコード**	
屏蔽 **シールド**	100% 铝- 聚酯薄膜 箔 - 28÷26 AWG **100%アルミニウム - マイラーホイル - 28÷26 AWG**	
绝热罩 **ジャケット**	黑色 PVC **黒のPVC**	
温度范围 **温度範囲**	-55°C ÷ +105°C	
额定压力 **電圧定格**	0 ÷ 250 Vac	



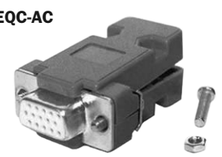




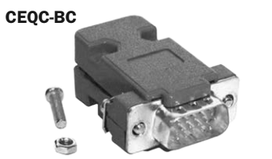
CEQC-AC、CEQC-BC
（可选）
单独提供阳性和阴性焊接连接器。

CEQC-AC、CEQC-BC
(オプション)
オスとメスのハンダコネクターは、別々に供給されます。

CEQC-AC



CEQC-BC



	CEQC-AC	CEQC-BC
输入/输出连接类型 **I/O接続タイプ**	15 针 D-SUB – VGA 型 **15ピンD-SUB - VGAタイプ**	
接触器 **接点**	铜 **銅**	
绝缘体 **絶縁**	聚酯 **ポリエステル**	
温度范围 **温度範囲**	-20°C ÷ +80°C	
电压范围 **電圧範囲**	0 ÷ 250 Vac	
最高电流 **最大電流**	3A	

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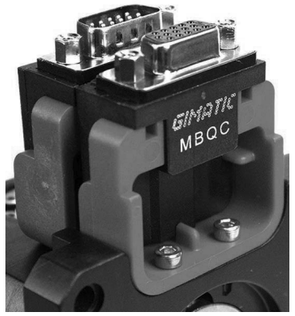
작동 지침(한국어)
(TR) Çalışma talimatları

IST-MQC
02/2019

MAQC
MBQC

전기 배선 모듈

Elektriksel bağlantı modülü



전기 배선 모듈

- 15 전기 연결;
- 자동 세척 헤드가 있는 필러 핀;
- I/O VGA 커넥터를 사용한 빠른 연결 (선택사항).

Elektriksel bağlantı modülü

- 15 elektrik bağlantısı;
- kendini temizleyen başlıklı algılayıcı pin;
- VGA konnektörü ile I/O çabuk bağlantısı (opsiyonel).

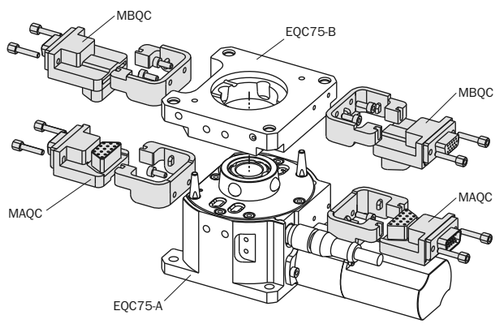
MAQC

MBQC

	MAQC	MBQC
I/O 연결 유형 I/O bağlantı tipi	15 핀 D-SUB – 고밀도 엘보우 유형 – VGA 유형 15 pin D-SUB-yüksek yoğunluklu dirsek tipi – VGA tipi	
동작 전류 Çalışma akımı	3 A	
전압 정격 Voltaj aralığı	0 ÷ 250 Vac	
온도 범위 Çalışma Sıcaklığı	-55°C ÷ +105°C	
접촉 Temas yüzeyi	금도금 Altın kaplamalı	

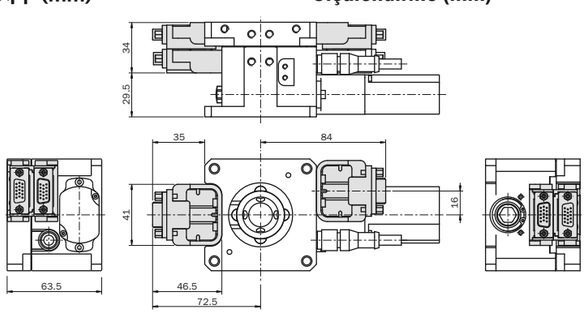
잠금

Bağlantı



치수 (mm)

Ölçülendirme (mm)



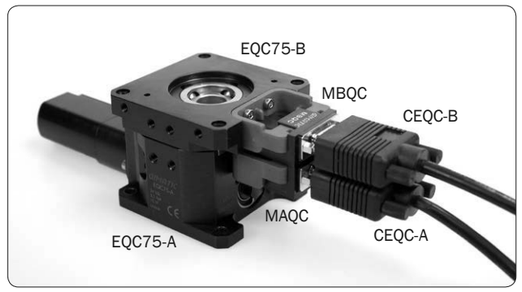
케이블
숫케이블과 암케이블은 별도로 제공됩니다.

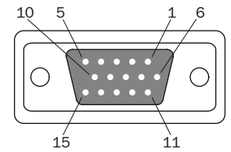
Kablo
Erkek - dişi kablo (kod: CEQC) ayrı olarak tedarik edilir.

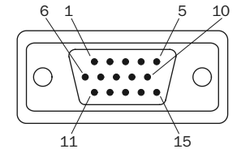
CEQC-A

CEQC-B

	CEQC-A	CEQC-B
I/O 연결 유형 I/O Bağlantı Tipi	15 핀 D-SUB – VGA 유형 15 pin D-Sub- VGA Tipi	
케이블 길이 Kablo uzunluğu	1500 mm	
절연 Yalıtım	PVC 프리미엄급 색상 코드 PVC Standart renk kodlu	
보호막 Kablo koruması	100% 알루미늄 – 마일라 금속 박막 – 28÷26 AWG %100 alüminyum – Mylar folyo – 28÷26 AWG	
재킷 Kablo kılıfı	블랙 PVC Siyah PVC	
온도 범위 Çalışma Sıcaklığı	-55°C ÷ +105°C	
전압 정격 Voltaj aralığı	0 ÷ 250 Vac	



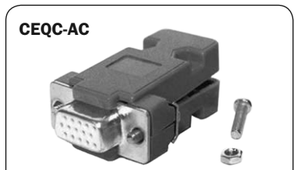




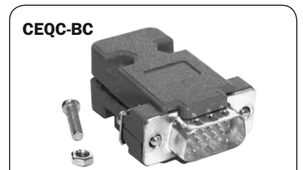
CEQC-AC, CEQC-BC
(선택사항)
암수 케이블 솔더 커넥터가 별도로 제공됩니다.

CEQC-AC, CEQC-BC (optional)
Erkek ve dişi lehimli konnektörler ayrıca tedarik edilmektedir.

CEQC-AC



CEQC-BC



	CEQC-AC	CEQC-BC
I/O 연결 유형 I/O bağlantı tipi	15-pin D-SUB - VGA 유형 15-pin D-SUB - VGA tipi	
연락처 Kontaktlar	구리 Bakır	
절연 Yalıtım	폴리에스터 Poliester	
온도 범위 Sıcaklık aralığı	-20°C ÷ +80°C	
전압 범위 Voltaj aralığı	0 ÷ 250 Vac	
최대 전류 Azami akım	3A	

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.

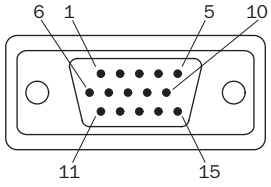
Main characteristics:

- *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.

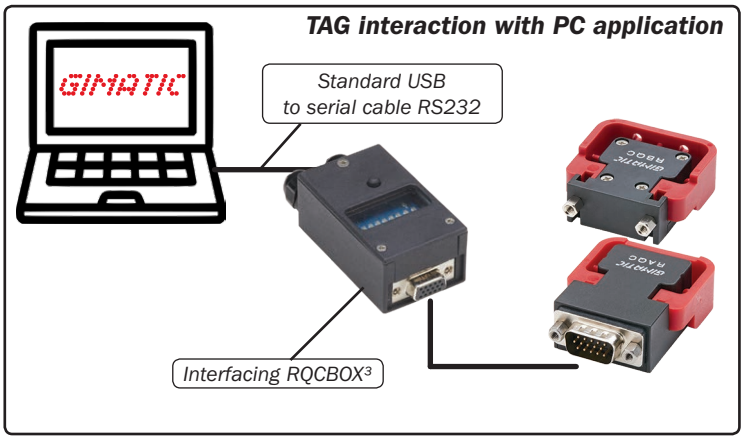


Pin #	Pin name	Description
Pin 1	DO_1	Digital output #1 (bit 1 of the binary representation of tool ID) - LSb
Pin 2	DO_2	Digital output #2 (bit 2 of the binary representation of tool ID)
Pin 3	RS_TX	RS232 Tx signal (only for TAG configuration-optional use)
Pin 4	GND	Power supply GND
Pin 5	RS_RX	RS323 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



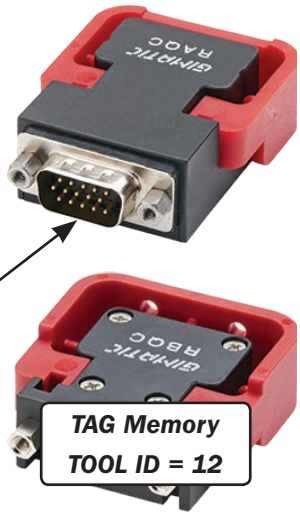
Once the APP has been downloaded and installed from the store, access NFC tag functionality (1) from main menu on the left.
Eventually log-in (2) to access all the avaible RFID features of the APP.
Anonymous users have read only access permissions to the MAIN DATA group.
Registred users can access the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

Data memory of tag

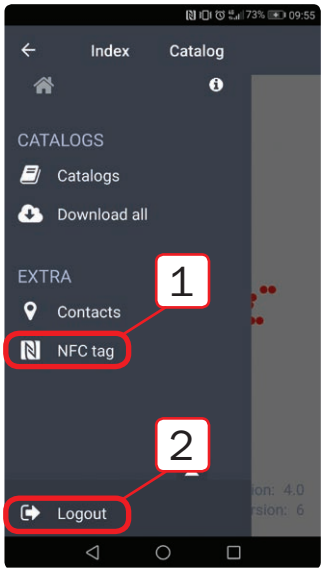
The memory of the TAG is divided into several data groups and the following information can be stored into and retrieved
from the TAG. Additional memory space is available upon request to store custom data.
- MAIN DATA (i.e. tool name and description, tool ID number, tool mass and overall dimensions,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

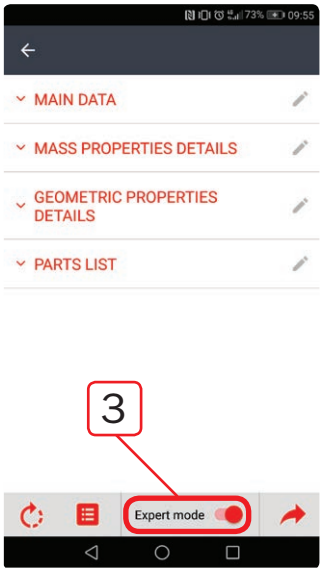
Automatic tool recognition example (RAQC - PNP output type)

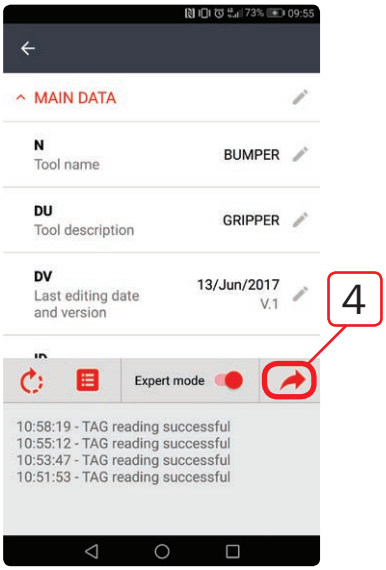
DB 15 connector (DO pin # only)		
DO_1	0	LOW
DO_2	0	LOW
DO_3	1	HIGH
DO_4	1	HIGH
DO_5	0	LOW
DO_6	0	LOW
DO_7	0	LOW
DO_8	0	LOW



App review



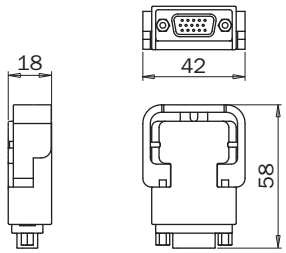




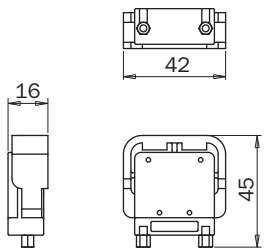
GET IT ON Google Play

Dimensional

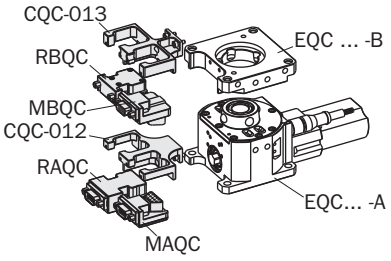
RAQC/RAQCN

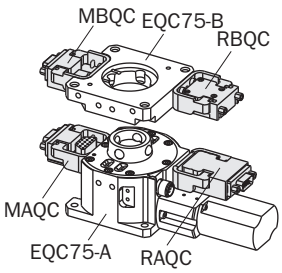


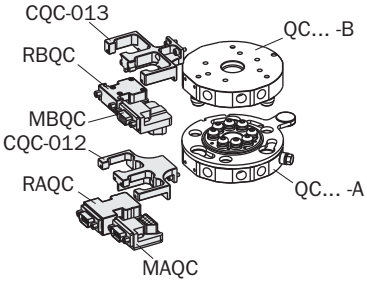
RBQC



Application examples





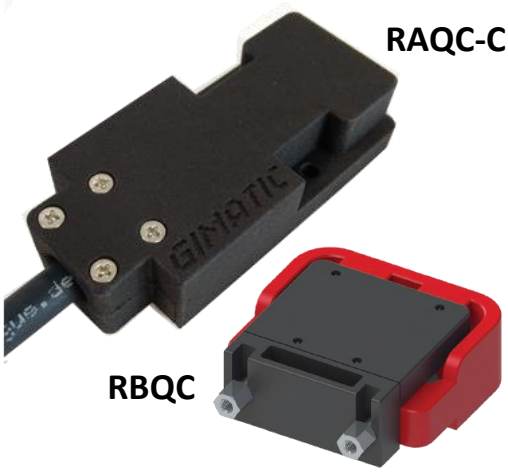


[1]Only smartphones with Android O.S. are currently supportaded.
Download Gimatic APP for free from your Store to interact with TAG (a registration of the APP might be necessary).
[2]A dedicated Windows® based application can be downloaded for free from Gimatic website (www.gimatic.com)
[3]Available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

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
Frame	Nylon PA12	Polycarbonate, glass fibre reinforced
Working distance	< 10 mm	
Working frequency	13.56 MHz	
Allowed temperature range	-20÷65°C	
Dimensions box	72 mm x 34 mm x 17 mm	45 mm x 42 mm x 15 mm
Weight	30 g	10 g
Electrical connection	cable output (max outer ø 10 mm)#	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)	none
Input signals	1 digital (PNP)	none
CE reference norm	EN 60950 2001, EN 300330-2 V1.3.1, EN 301489-1-3 V1.4.1	

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].

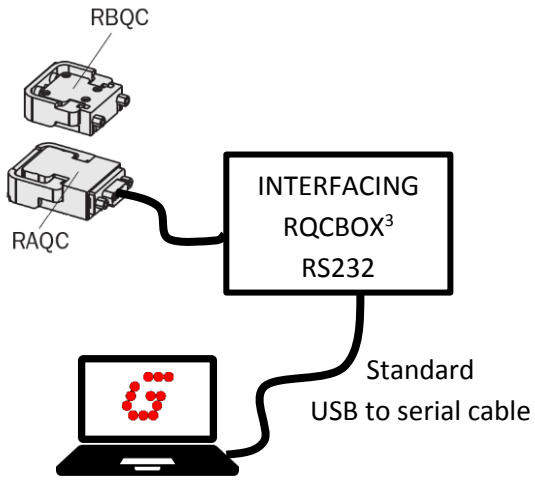
ELECTRIC CONNECTIONS

Pin Name	Description
Vcc	Power Supply 24 Vdc
GND	Power Supply GND
OCNT	Digital output (maintenance alarm) (when set, tool executed the predefined working cycles)
FLT	Digital output (fault condition)
ICNT	Digital input (cycle completed triggering signal) (+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[1] or a software PC[2] 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



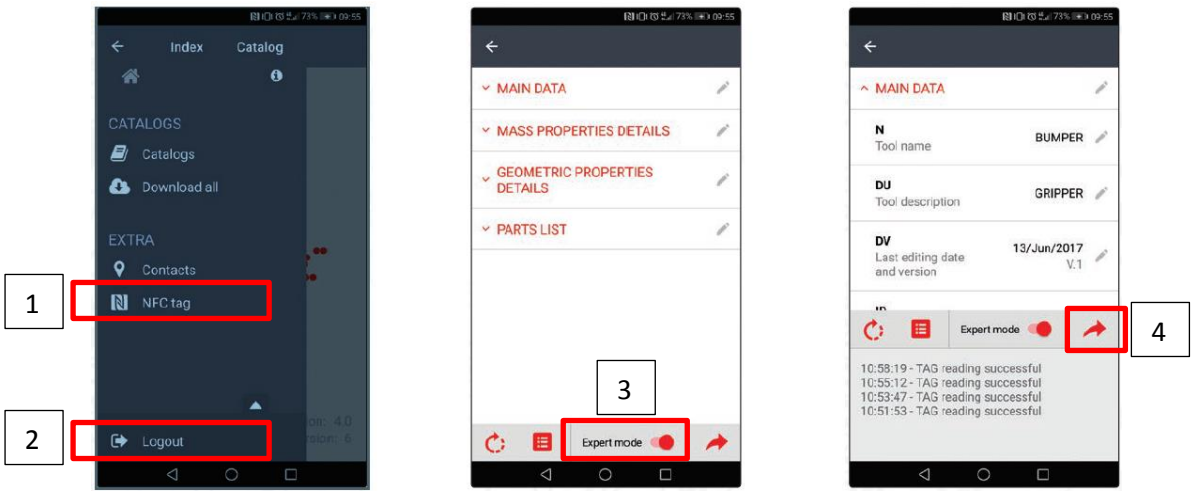
TAG interaction with PC application

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

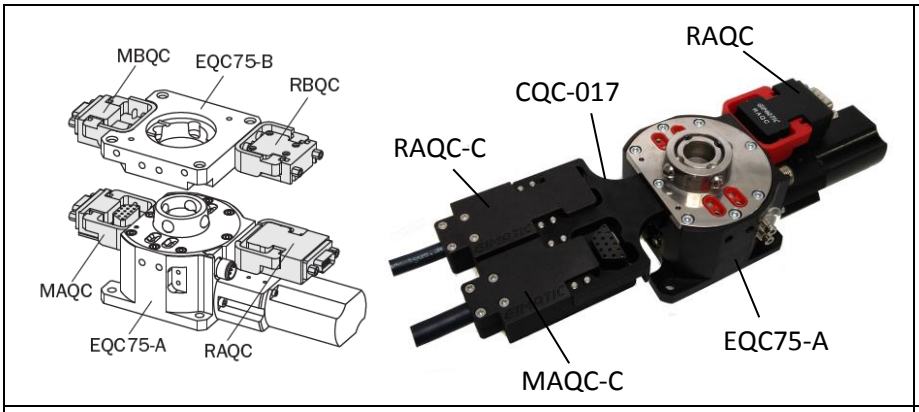


[1]Only smartphones with Android O.S. are currently supported. Download Gimatic APP for free from your Store to interact with the TAG (a registration of the APP might be necessary). [2]A dedicated Windows® based application can be downloaded for free from Gimatic website (www.gimatic.com). [3]Available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

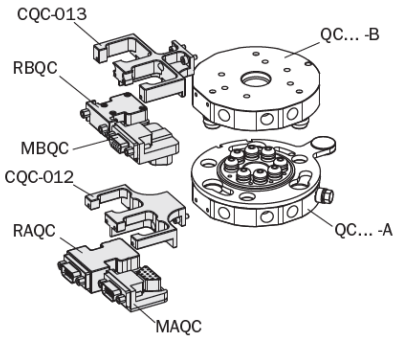
Once the APP has been downloaded and installed from the store, access NFCtag functionality (1) from main menu on the left. Eventually log-in (2) to access all the available RFID features of the APP. Anonymous users have read only access permissions to the MAIN DATA group. Registered users can access 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).

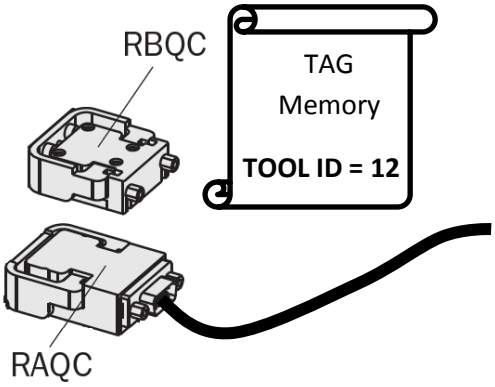


EQC with RFID system



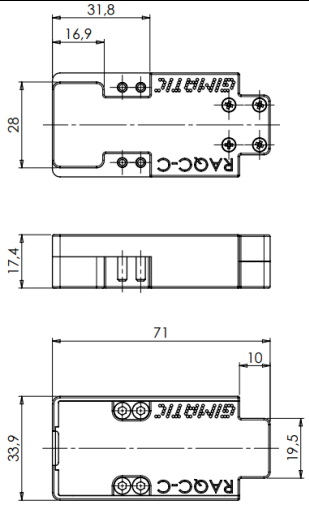
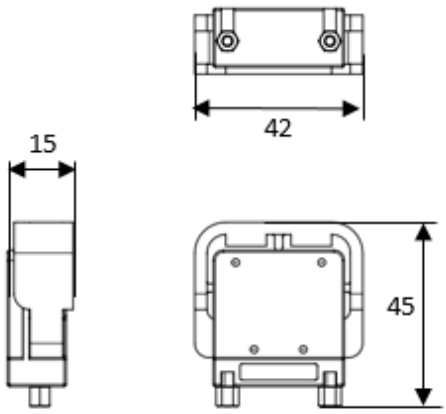
QC with RFID system

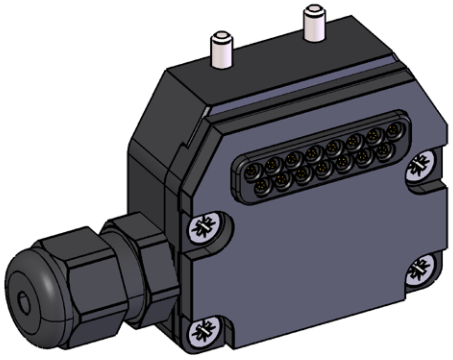
AUTOMATIC TOOL RECOGNITION EXAMPLE (RAQC – PNP OUTPUT TYPE)



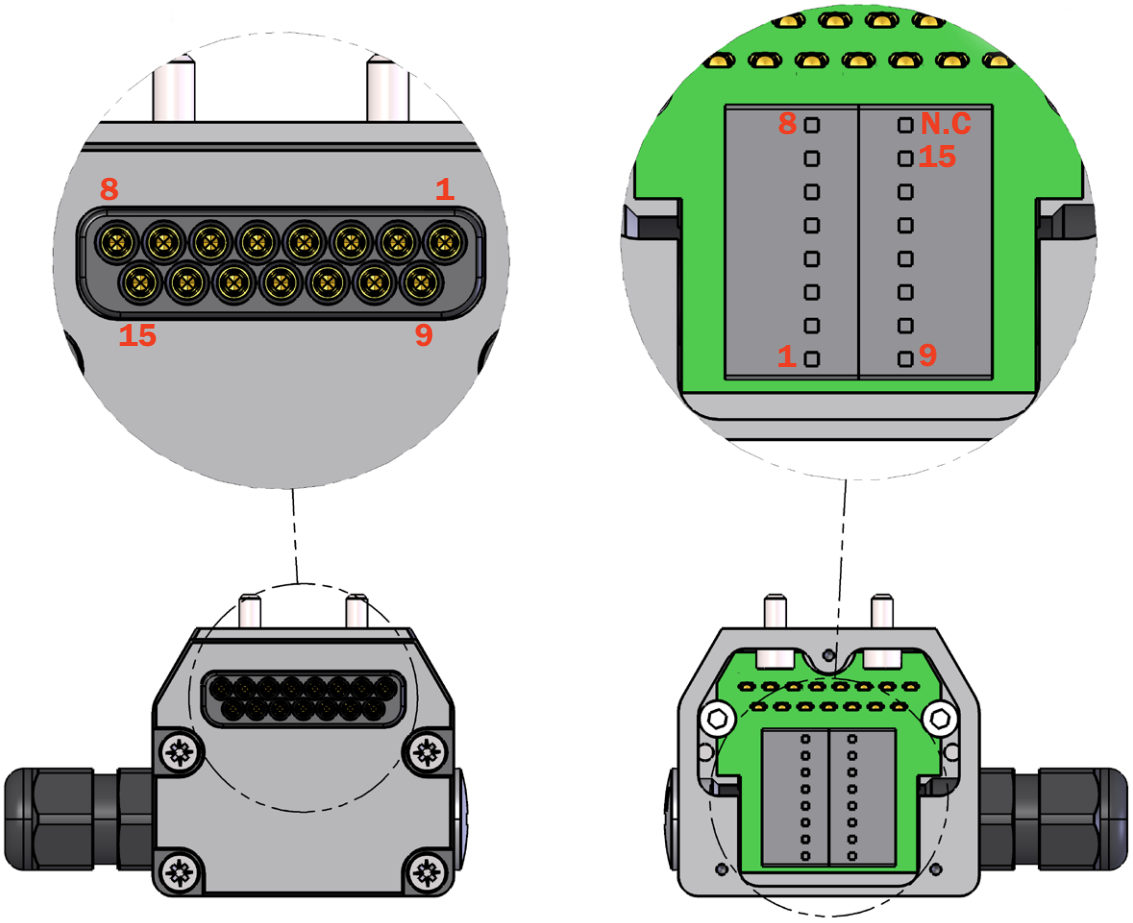
DB 15 connector (DO pin # only)							
DO_1	DO_2	DO_3	DO_4	DO_5	DO_6	DO_7	DO_8
0	0	1	1	0	0	0	0
LOW	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW

DIMENSIONAL DRAWINGS

RAQC-C	RBQC
	

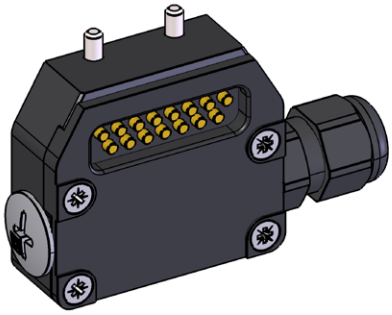


Pinout connector



PMBQC

Male electrical connector



Pinout connector