



# QCG-63 Technical Instructions

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Machine Name: **Gimatic QCG-63**

Revision: 01

Last Revision Date: 03.05.2024

Instruction – User Manual

## Original instructions – User manual

### 1 Introduction

The **Gimatic** QCG-63/Tool Change system is designed for manual or automatic robotic tool change. The **Gimatic** Tool Change system is one of, if not the fastest Robot Tool Change system Globally today. We can offer our Tool Change system to Small robots, Collaborative Robots, SCARA Robots, Delta Robots, Small and Large Industrial Robots. **Gimatic QCG63** Tool Change set consists of three units:

A Tool Storage (QCG63-C), a Robot Side (QCG63-A), and Tool Side (QCG63-B) with pneumatical (and electrical as an optional) connection. Several tool change set variations and application tool selections are therefore possible.

With a fast cycle time Change, **Gimatic QCG63** is giving Robot installation flexibility and increasing the usage of Robots in general. With the equipment of **Gimatic QCG63**, you are ready to automate more tasks, in shorter time, not being bound by Robot choice. **Gimatic QCG63** operates as a mechanical shifter and does not interfere with software communication. This way **Gimatic QCG63** supports all manufacturers of Robots and machines that need parallel or multiple tasking operations during an operation.

## Product information:

**Machine type:** *GIMATIC QCG-63 Tool Changer System*

### List of Components:

- Robot Side (QCG63-A)
- Tool Side (QCG63-B)
- Tool Storage (QCG63-C)
- Stabilization Plate (QCG6-BS)
- Manifold (QCG63-BA)
- M8 Female Connector (QCG63-AF1)
- M8 Male Connector (QCG63-BM1)



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### 3 General description

#### 3.1 The Gimatic QCG63 Tool Change System

The automatic and manual **GIMATIC** tool changer can connect mechanical, pneumatically and electrical tools for robots and consists of following three main units:

A Robot Side (QCG63-A), mounted on the robot such as the Universal Robots or similar equipment. Tool Storage (QCG63-C) and Tool side (QCG63-B)s applies in a number and variations depending on demands for tool applications at the robot. In automatic mode, the robot exchange tools in a simple process sequence by placing a Tool side (QCG63-B) in an empty Tool Storage (QCG63-C) and select another Tool side (QCG63-B) from another Tool Storage (QCG63-C).

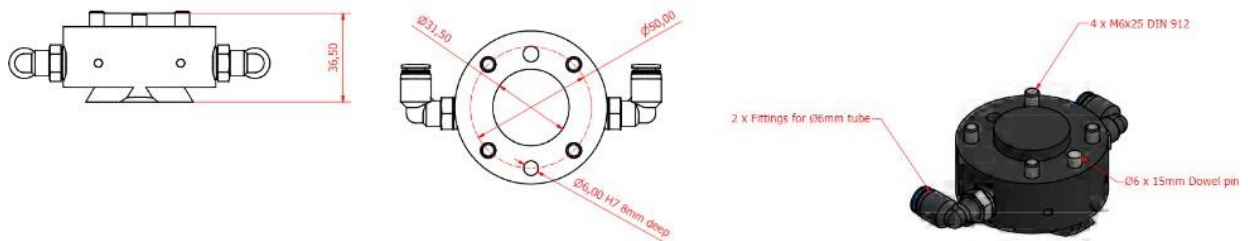
Tools also exchanges manually if desired.



### 3.2 Robot Side (QCG63-A) specification

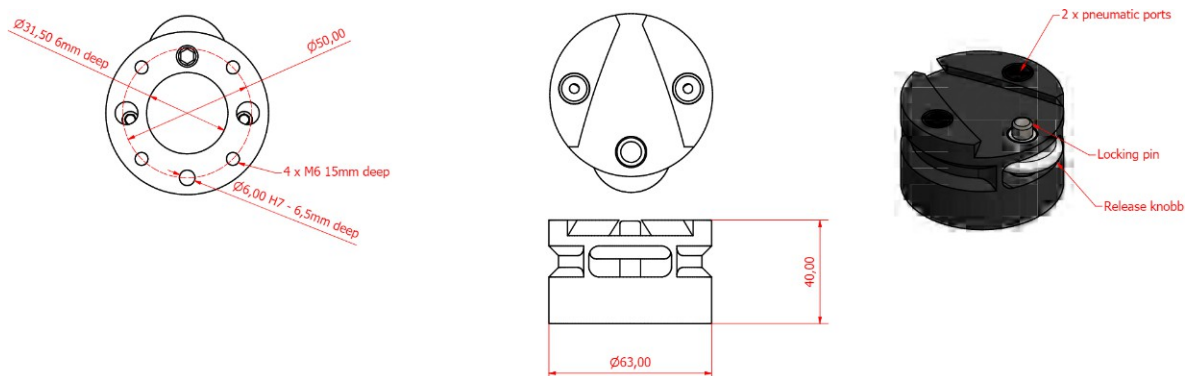
Recommended for robots handling payload up to: 50 kg  
Pneumatic/Vacuum connection: Double connection with two G1/8"  
Electrical connection: Up to eight pins  
Outer diameter: 63 mm  
Flange diameter 31.5 mm h7  
Reference diameter: Ø 50 mm  
Total Weight: 150 g  
Material: POM-C (The entire part is POM-C)

Adapter for other Robot flange fit, on demand/on stock.



### 3.3 Tool side (QCG63-B) specification

Recommended for robots handling payload up to: 50 kg  
Pneumatic/Vacuum connection: Double connection with two G1/8"  
Electrical connectors: Up to 8 pins  
Outer diameter: 63 mm  
Flange diameter 31.5 mm h7  
Reference diameter: Ø 50 mm  
Total Weight: 255 g  
Material: Aluminium 6082-T6 Anodized (Tool side (QCG63-B) and Disc) stainless steel (Locking pin), Rubber (Air pass through sealants)

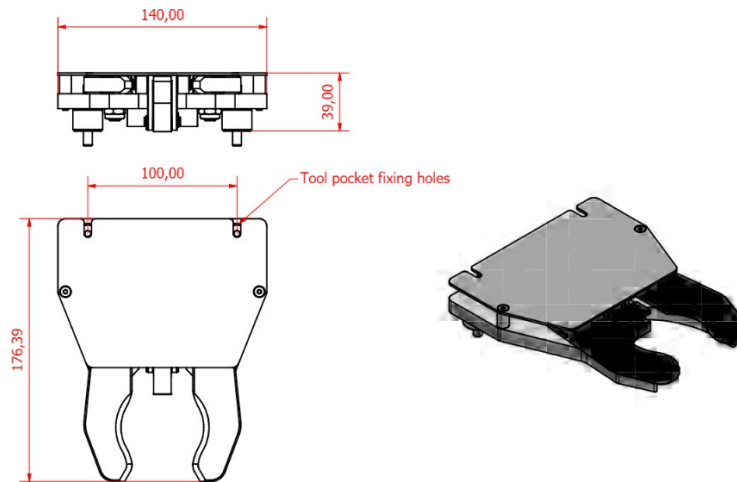


### 3.4 Tool Storage (QCG63-C) specification

Recommended handling weight: Up to 5 kg

Total weight: 710 g

Materials: Aluminium 6082-T6 Anodized (Bottom plate, top plate), POM-C (Gripper holder arms), stainless steel EN10278 (Spacers) PVC (Sticker)



### 3.5 Robot Side Electrical (QCG63-AF1) specification

Recommended for robots handling payload up to: 50 kg

Pneumatic/Vacuum connection: Double connection with two G1/8"

Electrical connection: Up to eight pins

Outer diameter: 63 mm

Flange diameter 31.5 mm h7

Reference diameter: Ø 50 mm

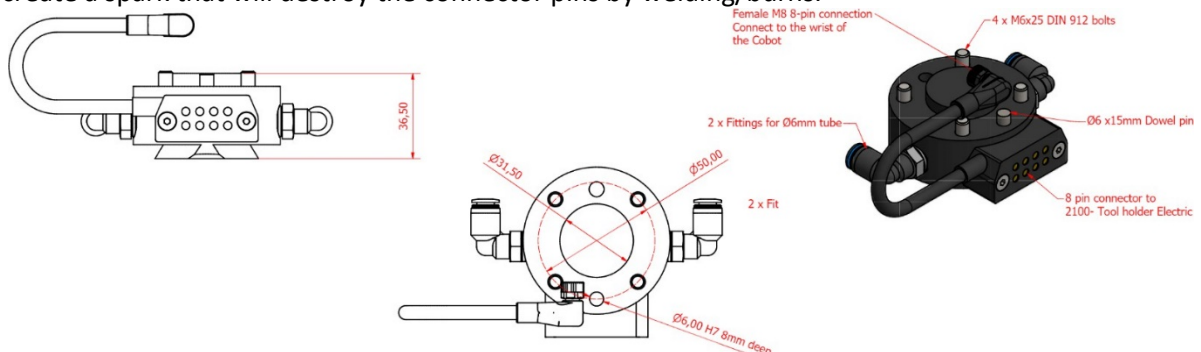
Total Weight: 180 g

Material: POM-C (The entire part is POM-C)

Eight pins electrical pass-through rated for 2.0 AMP per 8 pin

Materials: Brass, Silver coated, copper cable, ABS plastic

**IMPORTANT:** Power connection must be OFF during clutching in and out. A charged pin will create a spark that will destroy the connector pins by welding/burns.



### 3.6 Tool Side Electrical (QCG63-BM1) specification

Recommended for robots handling payload up to: 50 kg

Pneumatic/Vacuum connection: Double connection with two G1/8"

Electrical connectors: Up to 8 pins

Outer diameter: 63 mm

Flange diameter 31.5 mm h7

Reference diameter: Ø 50 mm

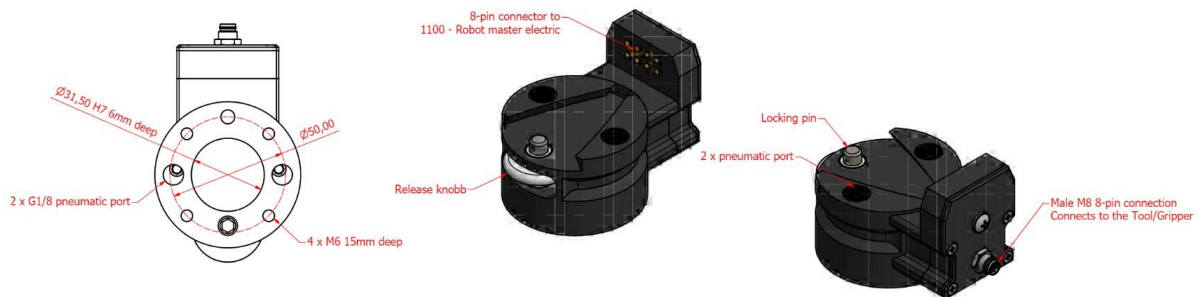
Total Weight: 310 g

Material: Aluminium 6082-T6 Anodized (Tool side (QCG63-B) and Disc) stainless steel  
(Locking pin), Rubber (Air pass through sealants)

Eight pins electrical pass-through rated for 2.0 AMP per 8 pin

Materials: Brass, Soldering tin, copper cable, ABS plastic

**IMPORTANT:** Power connection must be OFF during clutching in and out. A charged pin will create a spark that will destroy the connector pins by welding/burns.







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## 4 Safety instructions

### 4.1 General safety

Keep hands and tools away from all **Gimatic** components when the program is running. Follow this manual carefully also regarding maintenance and recommended weight. Always have security data sheet for recommended lubrication available.

If the **Gimatic** tool changer is damaged, then stop using immediately and contact **Gimatic srl** for replacement parts. Notice that the Tool storage QCG63-C) and Tool side (QCG63-B) is spring loaded, and the electrical units carries current. **Gimatic** is not responsible for damage to people and property caused by using damaged components.

## 5 Mounting

Please mount Robot Side (QCG63-A) directly onto the Robot flange or on similar equipment using the provided flange mounting screws. If flange fit is other than standard QCG Tool Change unit, use provided adapter. If no adaptor is supplied, contact **Gimatic srl**.

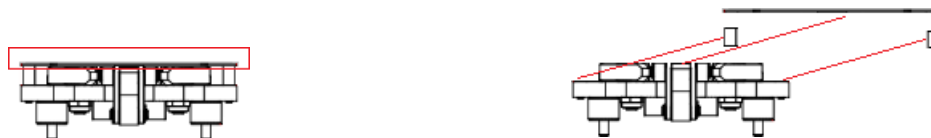
Mount the Tool Storage (QCG63-C) horizontally and place it so that the robot easily can pick and place Tool sides (QCG63-B) from Tool Storage (QCG63-C). Mount the tool for your application on the Tool side (QCG63-B), recommended handling weight is 5 kg. The owner is fully responsible for mounting the **Gimatic** tool changer securely.

### 5.1 Setup guide Tool Pocket

Unscrew the top plate by loosening the two M4 screws.



Remove the top-plate and the two cylindrical spacers under the top-plate.



Put two M6 screws through the two mounting holes on top of the gripper plate and through the two larger cylindrical spacers provided (see mount units bag attached on delivery).

Put the gripper on top of a flat and stable surface with threaded holes and tighten down the two M6 screws.



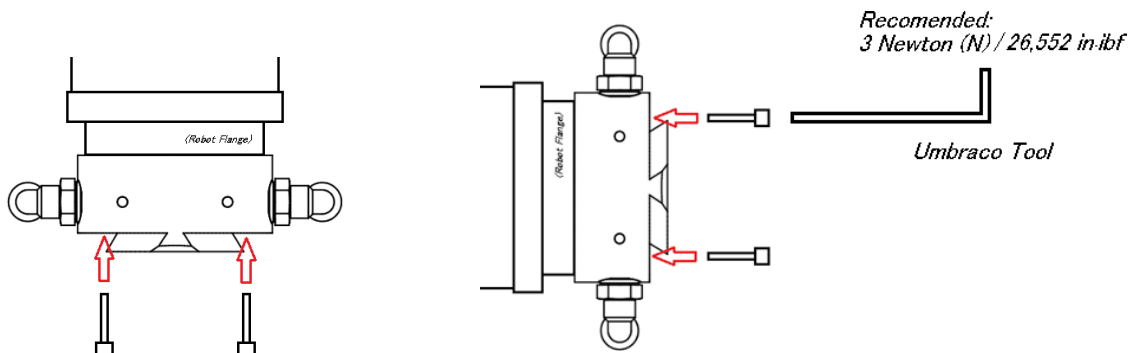
Put the top-plate back on the gripper with the spacer cylinders and tighten down the two M4 screws just enough to keep the top plate from moving.

## 5.2 Setup guide Robot Side

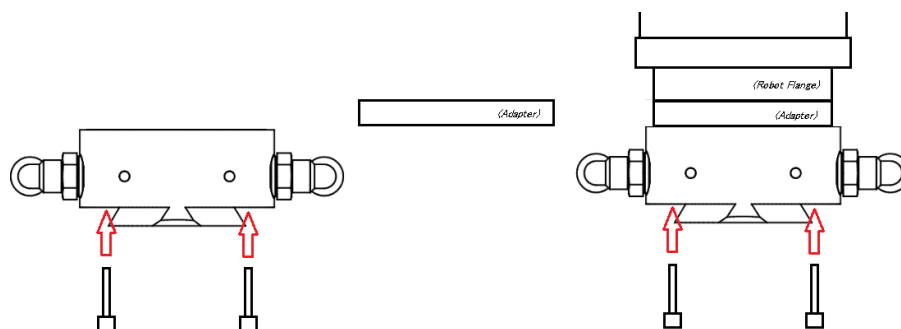
**Gimatic** mounting of Robot Side (QCG63-A) is intended directly on to the Robot (of choice) flange connection. **Gimatic** delivers a standard size:

- Outer diameter: 63 mm
- Flange diameter 31.5 mm h7
- Reference diameter:  $\varnothing$  50 mm

The 4-screw connection (included on delivery) is to be mounted directly on to the Robot flange with a force of no more than recommended 3 Newton (N) / 26,552 in.lbf to ensure the Tool Change system is accurately mounted. More pressure than the recommended force could result in damage or uneven surface that can inflict on the accuracy pick up of the Robot Side (QCG63-A) and Tool side (QCG63-B). If damaged, tightened to hard and uneven pick up is registered, please contact **Gimatic srl**. If no Torque tool, we recommend using the Umbraco as shown.

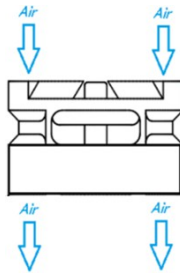


If the Robot flange does not provide a precise fit, please reach out to Gimatic srl to understand how to ensure a proper connection.



### 5.3 Setup guide Manifold (pneumatic)

**Gimatic** delivers every item with Pneumatic functionality. By using Pneumatic/Vacuum connection: Double connection with two G1/8", use of compressed air is installed on all units on delivery.



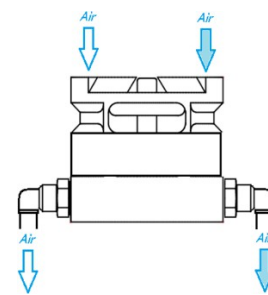
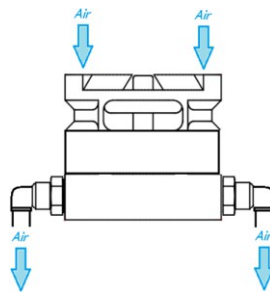
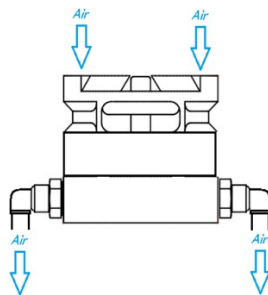
The Manifold is the component that directs the air out from the sides, under the Tool side (QCG63-B) . With two G1/8", **QCG63** to handling complex and multi-functional vacuum applications is either using:



two air ports for vacuum

two ports for compressed air

one port for vacuum and one for compressed air



**Gimatic** Manifold is to be used if the air is to be directed out on the sides and not directly in to the tool, mounted on the Tool side (QCG63-B) .

In many cases there is **NO NEED** for the **Gimatic** Manifold, since the air is to be connected directly into the tool, from under the Tool side (QCG63-B) .



### 5.4 Pneumatic "Add on" extended multifunction

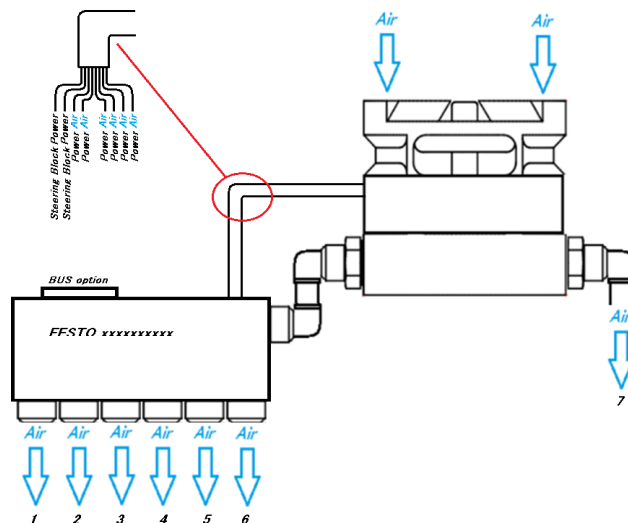
**Gimatic QCG63** Tool Change system is delivered with Double connection with two G1/8". When, or, if in need of more or several pneumatic ports, the **Gimatic QCG63** Tool Change is built with the intention and purpose to remove all unnecessary cablings and tubing's along the Robots flange area. This way **Gimatic** wants to provide safety in terms of potential damage when using a Robot in a multitask and high tech solution environment.

With the two pneumatic ports, **Gimatic** can lift the payload equal to the payload max weight of the Tool Change system. Max lift capacity set at 50 Kg payload. This depending on correct use of vacuum cups in size, surface arranged equipment and quantity needed.

The **Gimatic** pneumatic "Add On" multifunction recommend the use of a pneumatic steering block included "BUS" connection for signal transfer and technical use. By using the M8 8 pin connecting cables (suggested is the Industrial version, or, cutting of the M8 connector) wiring is needed to attach the pneumatic steering block. Be sure to use professional assistance (**Gimatic** is not eligible for any damage done by non-certified personnel) when wiring.

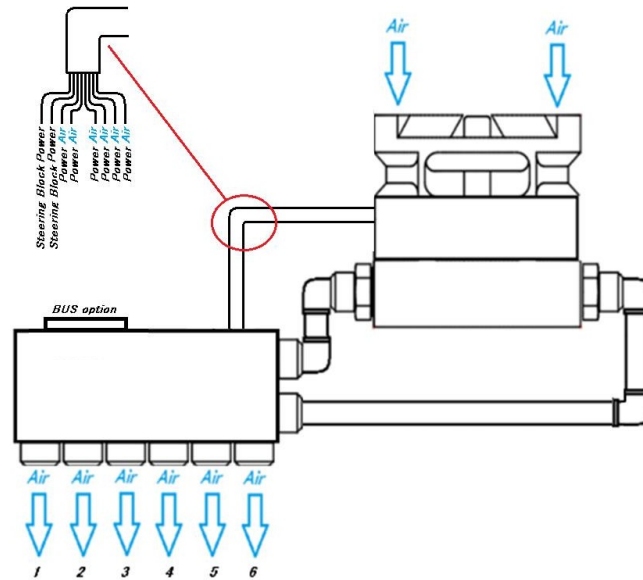
When employing a pneumatic steering block, you can expand the number of ports from the initial 2 pneumatic ports by utilizing multi-use tooling. If necessary, you can further enhance the system by upgrading to a Bus for signal transfer.

(Picture example: Pneumatic steering Gripper XXXXXXXXXXXXXXXXXXXXXXXXXXXX, giving 7 airports and option for Bus communication)



If in need of extra supply of air pressure, the second air port on the Tool side (QCG63-B) can be added on to the steering Block.

*Picture example: Pneumatic steering Gripper XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX, giving 7 airports and option for Bus communication*



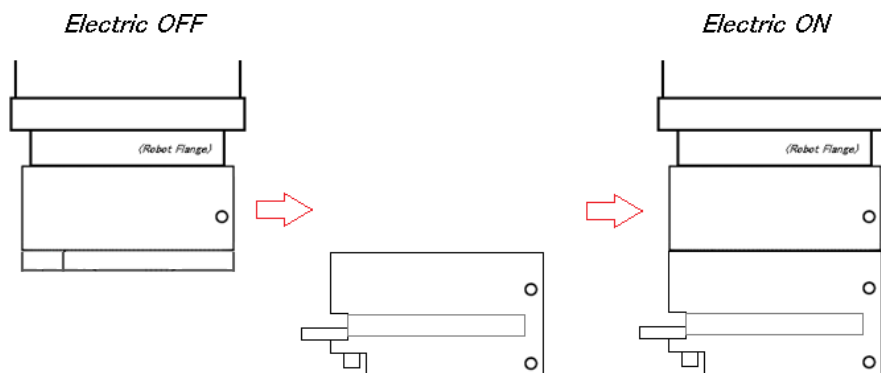
## 6 Electric Tool Change

When running an electric tool change sequence, it is important to remember switching on and off the electric flow.

*Example: Robot + **Gimatic** Tool Change + electric tool.*

During operation, there will be a continuous power flow from the robot to the electric tool. Gimatic QCG electric tools function purely as pass-through units and do not regulate the power flow when using the Tool Change system. Consequently, it's essential to initiate an On/Off movement when picking up or returning the electric tool to the Tool Storage (QCG63-C). Failure to execute this command on the robot may result in damage to either the robot or the electric tool due to the risk of short-circuiting. As a mechanical system with only a pure pass-through function, Gimatic is not liable for any damage resulting from the use of external units.

When pick up of tool, turn off power supply to tool. Once tool is picked up, turn power supply on again. The same is done on delivery in the opposite direction.



## 7 Workspace

**Gimatic** Tool Change system has a 50 Kg Payload max work force (the Tool Change units used + weight on what the Robot will be lifting). The Tool Change system has a repeatability of 0.05mm measured within the “Green zone” of the Tool Change measurement system. Working outside of this area the repeatability may exceed the 0.05mm accuracy from TCP (Tool centre point).

**Gimatic** accuracy is measured at:

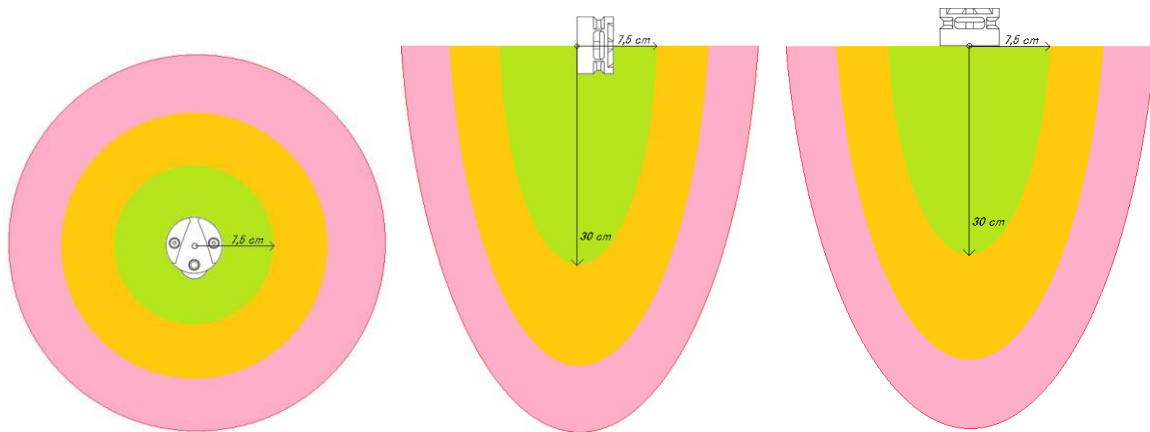
- Horizontal distance from scenter TCP 0 cm to 7,5 cm;
- Vertical distance from scenter TCP 0 cm to 30 cm.

Degrees (hot/cold) work environment set at +5 / + 40 C. (At low temperature below 0 C and above +40 C the **Gimatic QCG63** Tool Changer can still be run, but increased friction outside the 0.05 mm repeated accuracy between Robot Side (QCG63-A) and Tool side (QCG63-B) may be exceeded.)

At low weight, repeatability may though be accurate even with extended tool ad-on. If deviation accrues **Gimatic** suggest centering the on mounted tooling for more accurate repeatability, or use off loader support systems.

General explanation; closer to TCP – higher payload.

*Examples: Heavy weld Torch, uneven rods and poles, uneven balanced tools.*





## 8 Electric Cable connection

### Collaborative Robots

**Gimatic** uses as standard M8 8 pin 24 V AMP, Female and Male connector.

The connectors are generally used as standard connectors on the Collaborative robots. Female, Male, or both Female and Male connectors vary from manufacturer to manufacturer. When installing a **Gimatic** Robot Side (QCG63-A) on to the flange connection on a Collaborative robot with the M8 8 pin connector, **Gimatic** Robot Side (QCG63-A) installs as a plug-n-play function.

**IMPORTANT!** Be sure to have the correct connector match. (*Example; Male connector on flange of robot – Female connector on **Gimatic** Robot Side (QCG63-A) – Then Male connector on **Gimatic** Tool side (QCG63-B).*)

**Gimatic** also offers the standard M8 8 pin connectors as add-on. The M8 8 pin connector ad on units makes **Gimatic QCG63** Tool Change unique, functioning as a “lego” system where you can upgrade existing units without electric connection, or unmount the electrical connection ad on if no need for electrical use.



### Industrial Robots

The Gimatic Tool Changer utilizes the standard M8 8-pin 24V AMP connectors, both Female and Male. However, when installing the Gimatic Robot Side (QCG63-A) on industrial robots, it requires the Industrial version of the M8 8-pin connector. This connector is supplied without the M8 8-pin flange connector and is directly installed onto the electrical system of the industrial robot wiring or electric junction box. The standard cable length is approximately 1 meter, but custom lengths can be ordered upon request.



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## **9 Maintenance**

### **9.1 General**

Ensure that the GIMATIC QCG63 is always maintained in a clean environment. If chips or other large particles become lodged between the Robot side (QCG63-A) and the Tool side (QCG63-B), it can reduce the lifespan of the GIMATIC system. Gimatic advises utilizing air blow cleaning as part of the recommended maintenance procedure.

### **9.2 Lubrication**

Every two week, apply a few drops of silicone-based lubricant (silicone spray) onto every rubber seal, as well as a few drops on each surface to ensure smooth sliding of components against each other. Additionally, apply a few drops onto the locking pin to maintain its easy sliding functionality. The recommended silicone spray for this purpose is WD-40 300014 silicone oil or an equivalent silicone-based lubricant.

Silicon Lubricant to be used on: V-shaped connection area, lock pin, lock wheel and (important) sealing of pneumatic connections.



## 10 Mounting of Ad on Electric M8 8 pin connector to Master and Tool side (QCG63-B) unit

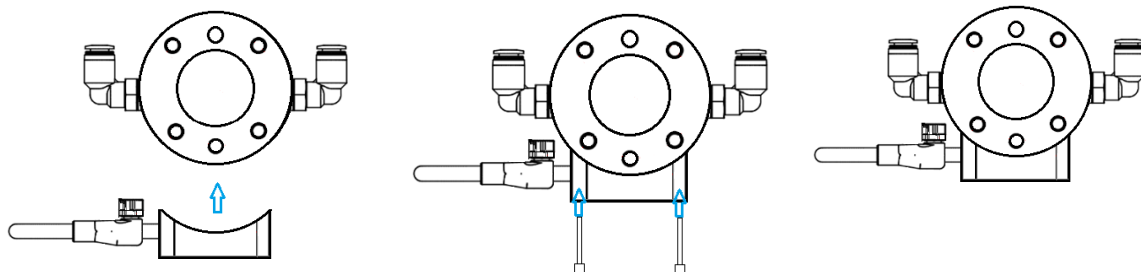
The **Gimatic QCG63** Tool Change system offers flexibility with its add-on feature, enabling users to select from mechanical manual or automatic change systems, pneumatic systems, and electric (pass-through) systems. Designed for ease of installation and removal, this system allows you to customize its functionality based on your specific requirements. The M8 8 pin connector system can be ordered for installation later (if needed). The M8 8 pin connector consists of an electric unit attached to the Robot Side (QCG63-A), and one unit attached to the Tool side (QCG63-B). For electric function you are to need both units to connect.

The complete electric system is set up as a “opposite” connection system.

If the Robot has the Male connector, you are to need a Female Master (RM) connector, then a Male Tool side (QCG63-B) connector. The opposite function is needed if you have a Robot with a Female connector, you are to need a Male Side connector, then a Female Tool side (QCG63-B) connector.

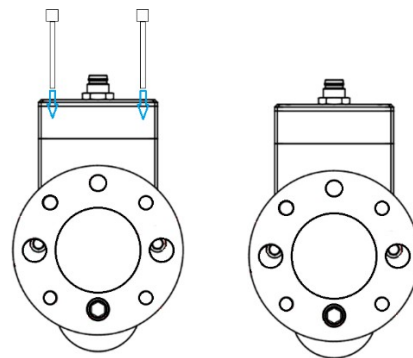
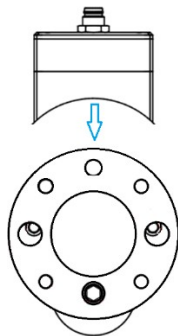
When installing the electrical ad on, you are to install the units carefully for a functional fit.

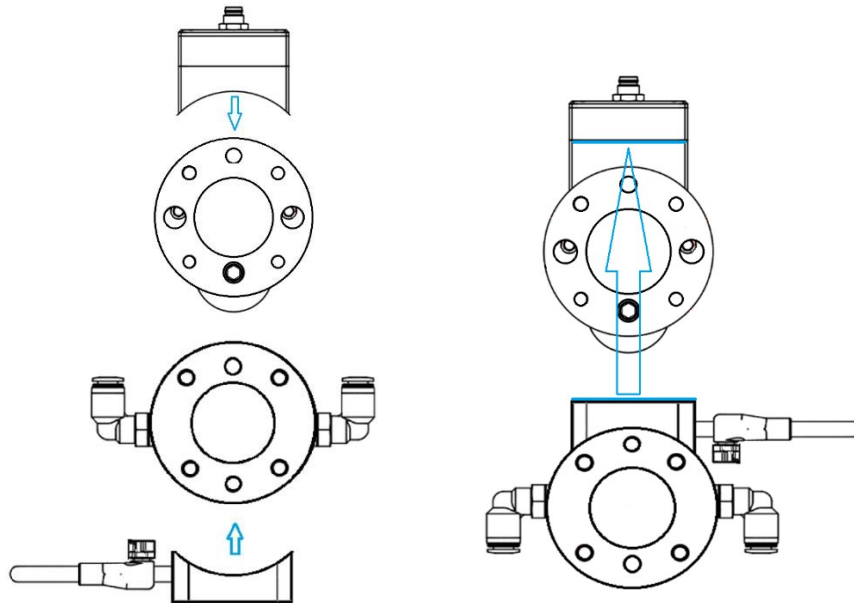
When installing the Master (RM) electrical M8 8 pin ad on, you can use the supplied (or use purchased) M4 x 4 bolts added on delivery. The tightening of the M8 8 pin Master electrical unit can be tightened well. No need of controlled force.



When installing the Tool side (QCG63-B) electrical M8 8 pin ad on, you can use the supplied (or use purchased) M4 x 4 bolts added on delivery. When tightening of the M8 8 pin Tool side (QCG63-B) electrical unit it is very important to NOT over tighten the bolts. The unit must be carefully tightened so that the space between the (already tightened) Master M8 8 pin connector and the Tool side (QCG63-B) M8 8 pin connector has a space between 1-1,5 mm of distance.

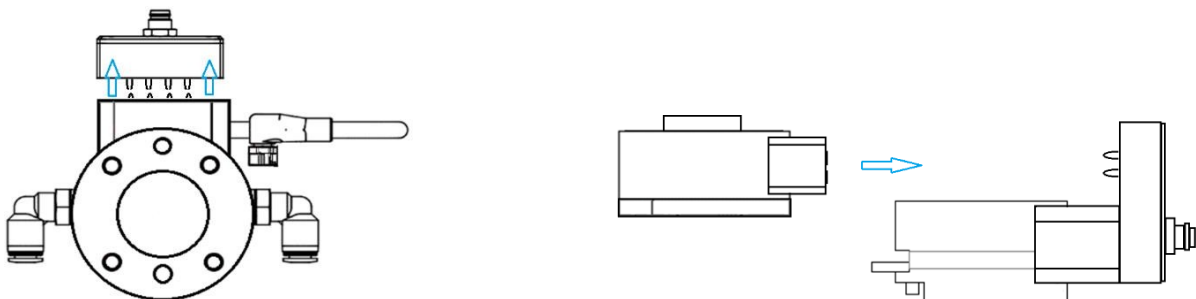
It is important to use the “crossover” tightening method (like when tightening a wheel on a car) to ensure it is not tightened unevenly, tilting or angling unaligned, but is set up even and vertical in the connection (see pic). This tightening must be done with precision and ease to make sure the connections are aligned. **Gimatic** encourages end users to purchase finished installed units, but in case of after installation use the following steps to be sure the connection is aligned and functional. If connection is not responding on all 8 of the M8 8 pin connections, re install the unit for an aligned installation.





## 11 Aligned Installing Electrical Ad on

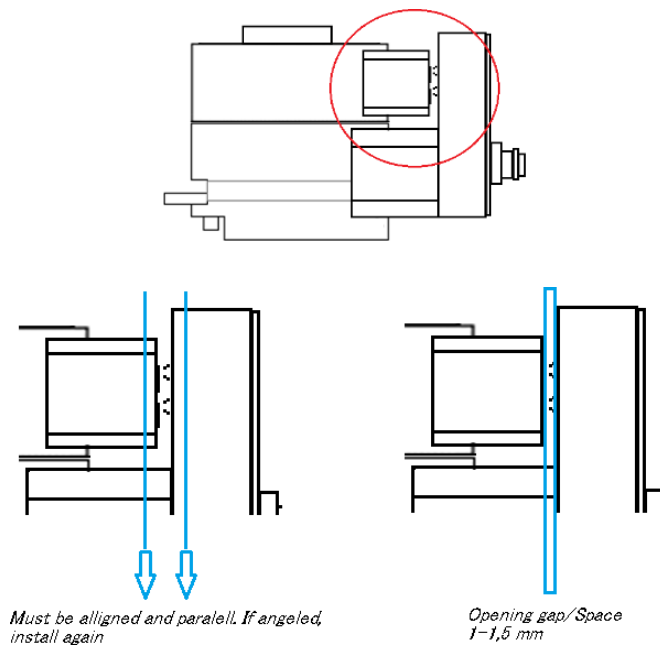
When installing the electrical components (ad on) the important factor of the installation is the mounting of the Tool side (QCG63-B) unit. Be sure to address the connection and connection bolts addressed in the manual and supplied on delivery. The connection sequence is: Male (towards) Female, or opposite. Sliding the Horizontal function, the **Gimatic QCG63** will now execute a perfect connect and dis connect sequence.



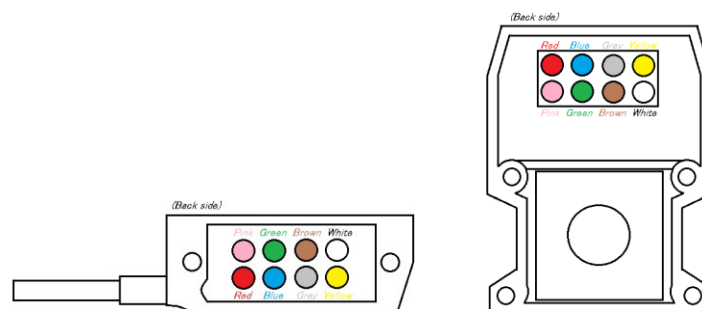
While mounting the connector ad on units, an important factor is to ensure the connection is in correct order.

Be sure to use the “car wheel phenomime” cross tightening when tightening the bolts on the Tool side (QCG63-B). The connection will be connecting accurately when the Robot Side (QCG63-A) connector and the Tool side (QCG63-B) connector is aligned and even in its location. An important factor in this installation is also to ensure the electric connector on the Tool side (QCG63-B) unit is not squeezed too tight. If so, the unit connector may be tilted unevenly, creating a non-linear interaction.

If the Connection is not functional, repeat the installation, as shown below:



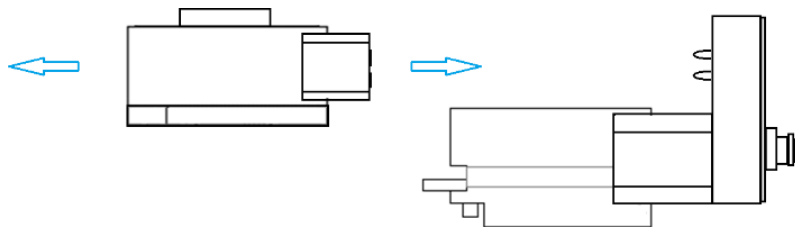
When connecting the wires on the **Gimatic** Tool Change system, beware to follow the pre- installed pattern of wires for the electrical system.



## 12 General usage

The **Gimatic** Tool Change system is made to increase the Robot and Machine usage in terms of cycle time and repetitive tasks. With the ease-of-use function and adaptability use of the **Gimatic** Tool Change, covering any Robot and Machine manufacturer specification, the **Gimatic** Tool Change system is a system that “fits all” and modifies to any purpose and Robot type (Collaborative, Small Industrial, SCARA, Delta, +).

“120 Accurate Changes per 40 sec.”



### 13 TCP setup

When setting up the TCP (Tool Centre Point) on your Robot, with **Gimatic QCG63**, use the following information.

The Tool Change system, Robot side (QCG63-A) + Tool side (QCG63-B) , has a height of 65 mm total when connected together. You must there for include/ad on the 65 mm when measuring from the Robot Flange and to your TCP on tool of choice (for instance a Grippers or welding torch etc.).

Weight Automatic Tool Change units

Robot Side                      150 gram              (non el.)

Robot Side Electric   180 gram

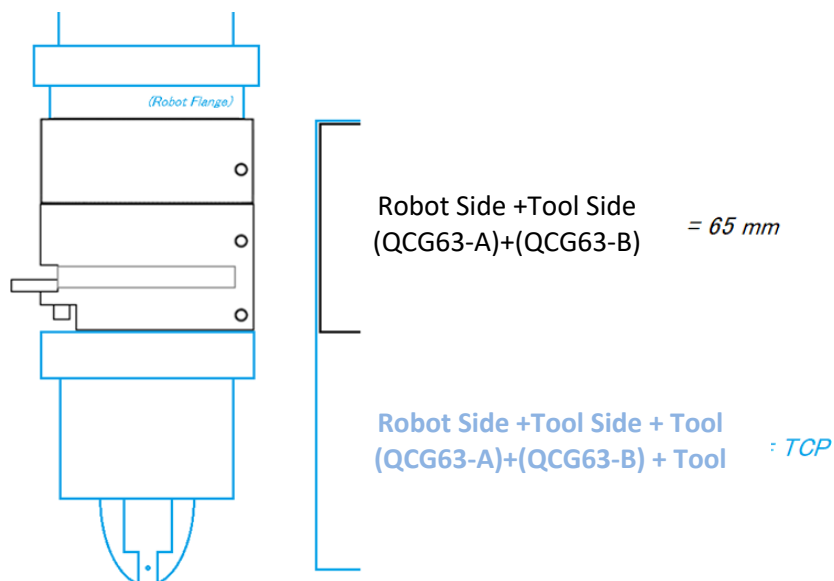
Tool side (QCG63-B)   255 gram              (non el.)

Tool side (QCG63-B) Electric              310

gram

Manifold                      110 gram

*(for more specifications, please contact Gimatic srl)*

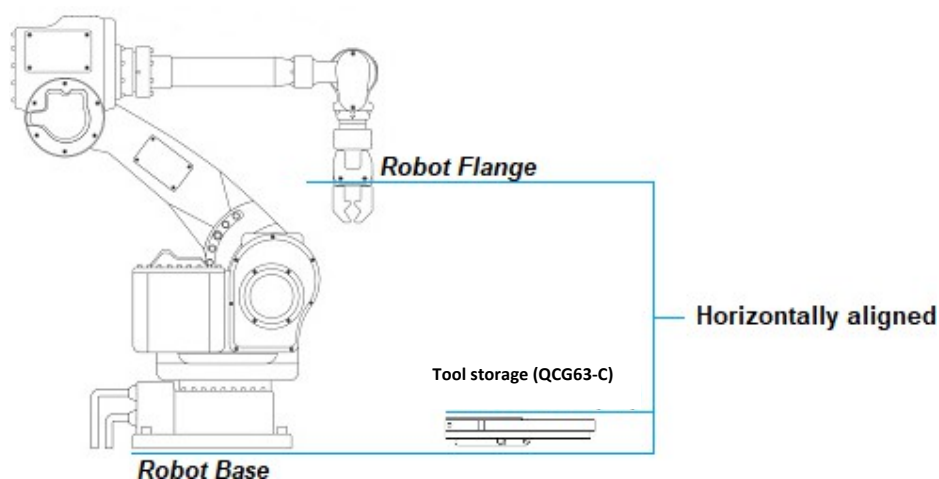




## 14 Running Tool Change operation – Pick up setup

Setting up a pickup and drop of the Tool side (QCG63-B) in to and out of the Tool Storage (QCG63-C) is a simple operation done in minutes. By following the 3-step procedure, the setup will be secure and running correct. If the Robot Side (QCG63-A) is tilted at an angle, pick up will not be smooth and the Robot can possibly push the Tool side (QCG63-B) out of the Tool Storage (QCG63-C) under pick up move. For accurate return, **Gimatic** suggests to first run and log pick up direction, then copy the same way points for return and delivery.

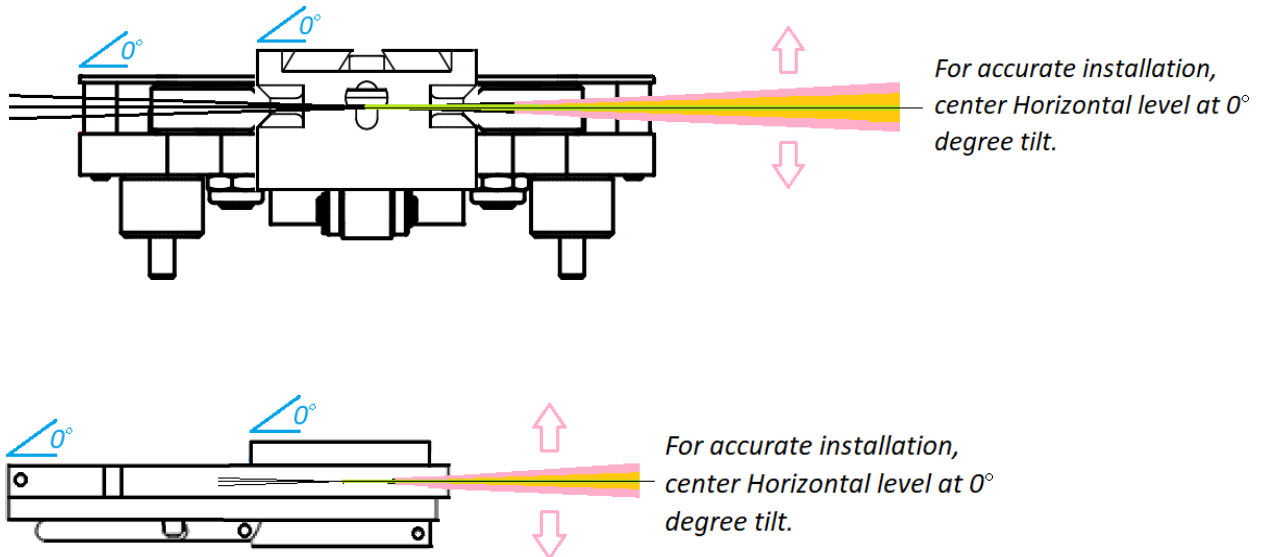
For accurate pick up and drop of movement, the Robot Base, Robot flange and **Gimatic** Tool Storage (QCG63-C) shall best be aligned and levelled. Alignment of the Robot Base and Robot Flange (control your robot function to be sure this function exists) is normally done by running the Alignment button on your Robots Teach Pendant, XYZ. XYZ can be set at different angles (Horizontally and Vertically) and or tilted Regardless of this Robot Base mounting angle, to install the tools for accurate pick up and drop of, the three positionings are best installed by aligning and levelling the Robot Base, the Tool Flange and the Tool Storage (QCG63-C).



*(Basic installation. Contact your Dealer or **Gimatic** srl for further information)*

If the Robot Base, Robot flange and **Gimatic** Tool Storage (QCG63-C) are not aligned, the Installation of pick up and drop of will need precision steering of the Robot function. In case of unaligned mounting is needed (eks. uneven workspace), **Gimatic** recommends the installation to be done by a trained Robot Integrator technician.

To secure a correct installation and use of **Gimatic** tools, alignment of **Gimatic** Robot Side (QCG63-A), Robot Tool Side (QCG63-B) and Tool Storage (QCG63-C) must be within the allowed measurements.



Green zone: +/-	0-2°
Yellow zone: +/-	2-4°
Red zone: More than +/-	4°

Running installation procedure (ex.):

**POS. 1:**

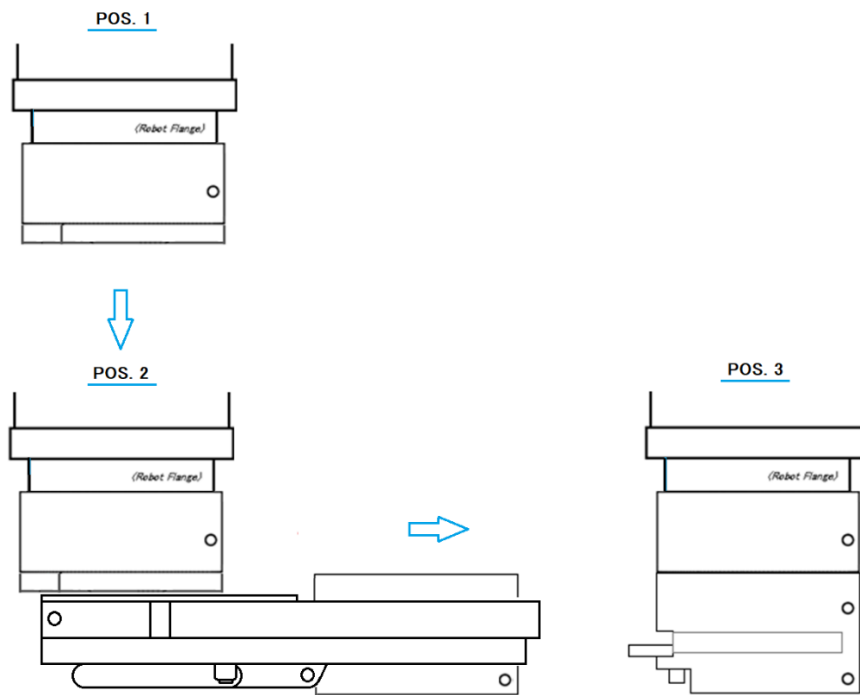
Place Robot with **Gimatic** Robot Side (QCG63-A) above the backend of the Tool Storage (QCG63-C).

**POS. 2:**

Lower the Robot with **Gimatic** Robot Side (QCG63-A) down to the Tool Pocket, making sure the bottom end of the Robot Side is placed at three millimetres from the cover plate of the Tool Storage (QCG63-C) (cover plate thickness 1 mm).

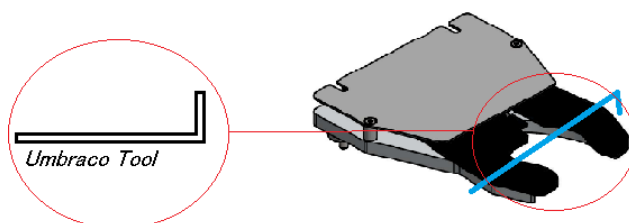
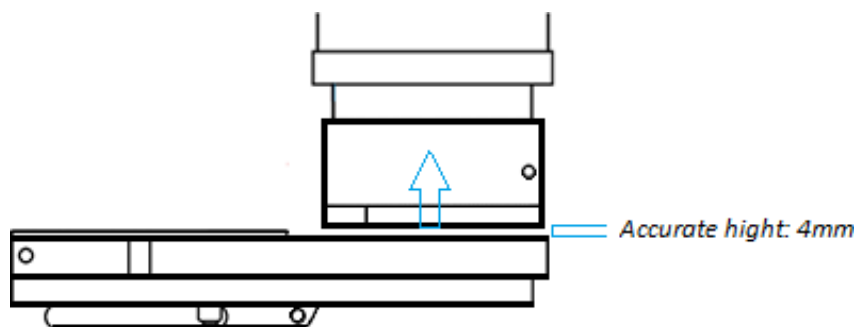
**POS. 3:**

Run the Robot with the **Gimatic** Robot Side (QCG63-A) horizontally and aligned straight forward through the Tool side (QCG63-B) that is placed in the Tool Storage (QCG63-C) out in front of the Tool Storage (QCG63-C).



Control that the “face” of the master (side towards the Tool Pocket) is set at 4 mm high from the fingers of the Tool Storage (QCG63-C).

If in need, use a 4 mm L-Key tool across the two Tool Pocket fingers as a height adjustment control post.



When moving from POS. 2 to POS. 3, be sure to align the Robot path both Horizontally and directly out of the Tool Storage (QCG63-C) Vertically aligned.

Do not add another way point between POS.2 and POS.3. **Gimatic** Tool Change system is a mechanical system that is spring feathered tightened in the Tool Storage (QCG63-C). To make an accurate pick up you need a one movement path going over and out of the Tool Storage (QCG63-C). By using a one movement path between POS.2 and POS.3, the Tool Storage (QCG63-C) (set at 5.0 Kg payload) have solved accurate pick up down to 3.0 Kg payload Robots.

