USER MANUAL

FOR **TECHMAN**/OMRON ROBOTS

ORIGINAL INSTRUCTION (EN)

v1.05

Contents

1 Introduction

1.1 Important Safety Notice

DANGER:

You must read, understand, and follow all safety information in this manual, and the robot manual and all associated equipment before initiating robot motion. Failure to comply with safety information could result in death or serious injury.

1.2 Scope of the Manual

The manual covers the following OnRobot products and its components:

Grippers	Version
Gecko Gripper	v2
RG2	v2
RG2-FT	v2
RG6	v2
VG10	v2
VGC10	v1

Sensors	Version
HEX-E QC	v3
HEX-H QC	v3

Where applicable the combination of the products is also covered in the manual.

NOTE:

Generally, the products without the Quick Changer v2 interface, are not in the scope of this manual.

1.3 Naming convention

In the user manual Gecko Gripper is called Gecko only.

The RG2 and RG6 names as model variants are used separately or together as RG2/6 if the information is relevant for both variants.

The HEX-E QC and HEX-H QC names as model variants are used separately or together as HEX-E/H QC if the information is relevant for both variants.

1.4 How to read the Manual

The manual covers all OnRobot products and its components that is available for your robot.

To make it easy to follow what type of product (or combination) or component is the given information is relevant for, the following visual highlights are used:

RG2

This is an instruction relevant for the RG2 product only.

RG2-FT

This is an instruction relevant for the RG2-FT product only.

VG10

This is an instruction relevant for the VG10 product.

All text without these visual marks are relevant for all products or components.

For convenience, in each part that contains visual highlights (that span across pages) a table is provided in the beginning, to guide you which page contains the relevant information for your product or component:

2   Safety

The robot integrators are responsible for ensuring that the applicable safety laws and regulations in the country concerned are observed and that any significant hazards in the complete robot application are eliminated. This includes, but is not limited to:

- Performing a risk assessment for the complete robot system
- Interfacing other machines and additional safety devices if defined by the risk assessment
- Setting up the appropriate safety settings in the robot software
- Ensuring that the user will not modify any safety measures
- Validating that the total robot system is designed and installed correctly
- Specifying instructions for use
- Marking the robot installation with relevant signs and contact information of the integrator
- Collecting all documentation in a technical file; including the risk assessment and this manual

2.1   Intended Use

OnRobot tools are intended to be used on collaborative robots and light industrial robots with different payloads depending on the end-of-arm tooling specifications. OnRobot tools are normally use in pick-and-place, palletizing, machine tending, assembly, quality testing and inspection and surface finishing applications.

The end-of-arm tooling should only operate under conditions noted in **Technical sheets** section.

Any use or application deviating from intended use is deemed to be impermissible misuse. This includes, but is not limited to:

- Use in potentially explosive atmospheres
- Use in medical and life critical applications
- Use before performing a risk assessment
- Use outside the permissible operational conditions and specifications
- Use close to a human's head, face and eye area
- Use as a climbing aid

2.2 General Safety Instructions

Generally, all national regulations, legislations and laws in the country of installation must be observed. Integration and use of the product must be done in compliance with precautions in this manual. Particular attention must be paid to the following warnings:

DANGER:

You must read, understand, and follow all safety information in this manual, and the robot manual and all associated equipment before initiating robot motion. Failure to comply with safety information could result in death or serious injury.

The information in this manual does not cover designing, installing, and operating a complete robot application, nor does it cover other peripheral equipment that can influence the safety of the complete system. The complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the robot is installed.

Any safety information provided in this manual must not be construed as a warranty, by OnRobot A/S, that the robot application will not cause injury or damage, even if robot application complies with all safety instructions.

OnRobot A/S disclaims any and all liability if any of OnRobot tools tooling are damaged, changed or modified in any way. OnRobot A/S cannot be held responsible for any damages caused to any of OnRobot tools tooling, the robot, or any other equipment due to programming errors or malfunctioning of any of OnRobot tools.

WARNING:

OnRobot tools are not allowed to be exposed to condensing conditions when power is on or when connected to a robot. If condensing conditions appear during transport or storage, the product must be placed between 20 and 40 Celsius degrees for 24 hours before power is applied or before connected to a robot.

It is recommended that OnRobot tools are integrated in compliance with the following guides and standards:

- ISO 10218-2
- ISO 12100
- ISO/TR 20218-1
- ISO/TS 15066

2.3 Risk Assessment

The robot integrator must perform a risk assessment on the complete robot application. OnRobot tools are only components in a robot application and therefore they can be only safely operated if the integrator has considered the safety aspects of the whole application. OnRobot tools are designed with relatively smooth and round design with a limited amount of sharp edges and pinch points

In collaborative applications, the trajectory of the robot can play a significant safety role. The integrator must consider the angle of contact with a human body, e.g. orientate OnRobot tools and workpieces so that the contact surface in the direction of movement is as large as possible. It is recommended that the tool connectors are pointed in the direction opposite to the movement.

OnRobot A/S have identified the potential hazards listed below as significant hazards that must be considered by the integrator:

- Objects flying from OnRobot tools due to loss of grip
- Objects falling down from OnRobot tools due to loss of grip
- Injuries due to collisions between humans and workpieces, OnRobot tools tooling, robot or other obstacles
- Consequences due to loosen of bolts
- Consequences if OnRobot tools cable gets stuck to something
- Workpiece itself represents a hazard

2.4 Environmental Safety

OnRobot A/S products must be disposed of in accordance with the applicable national laws, regulations and standards.

The product is produced with restricted use of hazardous substances to protect the environment; as defined by the EU RoHS Directive 2011/65/EU. These substances include mercury, cadmium, lead, chromium VI, polybrominated biphenyls and polybrominated diphenyl ethers.

Observe national **registration** requirements for importers according to EU WEEE Directive 2012/19/EU.

2.5 PLd CAT3 Safety Function
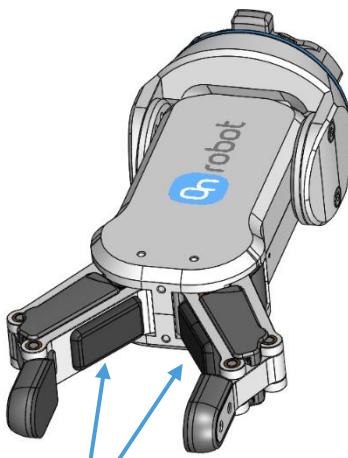
RG2
RG6

A safety-rated function has been designed as two buttons at the two arms of the product, conforming to ISO 13849-1 PLd CAT3.

This Safety Function has a max response time of 100 ms and a MTTF of 2883 years.

The behavior of the safety system is described below:

If something activates the two Safety Buttons, see picture below, the safety control system stops motion of the two arms of the product. Motion is then prevented as long as one or both of the two buttons are activated.

PLd CAT3 Safety Buttons

If this happens while running the robot program, the provided RGx components can be used to detect and execute any necessary steps via the `Safety stop` gate.

To come back to normal operation with the gripper the `Safety reset condition` parameter can be used.

⚠️ **CAUTION:**

Before resetting the gripper always make sure that no part will be dropped due to the loss of gripper power. If Dual Quick Changer is used it will cycle the power for both sides.

For further details refer to the Operation section.

3 Installation

3.1 Overview

For a successful installation the following steps will be required:

- Mount the components
- Wire the cables
- Setup the software

In the following sections, these installation steps will be described.

3.2 Mounting
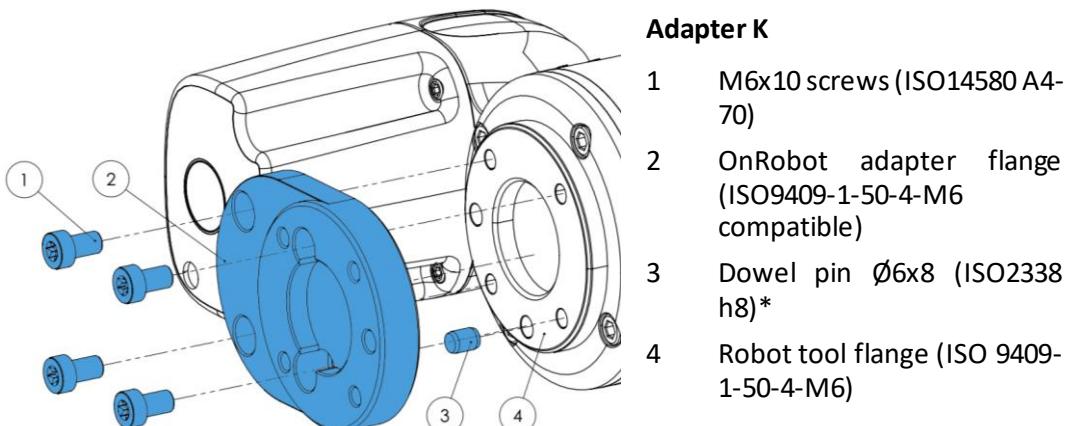
Required steps:

- Mount the robot dependent adapter
- Mount the Quick Changer option
- Mount the tool(s)

In the following three subsections these three mounting steps will be described.

3.2.1 Adapter(s)
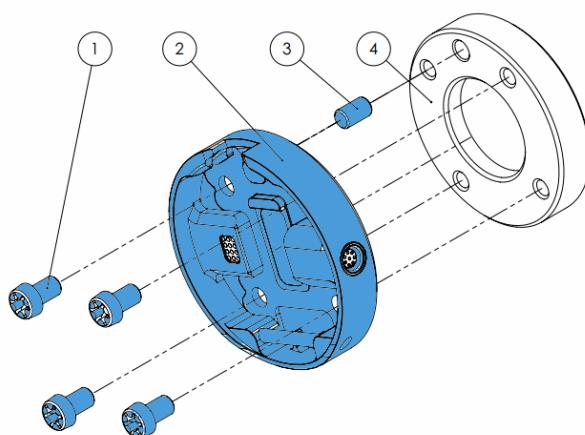
Adapter is only required when single VG10 or single Gecko is used.

Adapter K

1. M6x10 screws (ISO14580 A4-70)
2. OnRobot adapter flange (ISO9409-1-50-4-M6 compatible)
3. Dowel pin Ø6x8 (ISO2338 h8)*
4. Robot tool flange (ISO 9409-1-50-4-M6)

Use 10 Nm tightening torque.

*In early kits, it is not present.

3.2.2 Quick Changer options

**Quick Changer -
Robot Side**
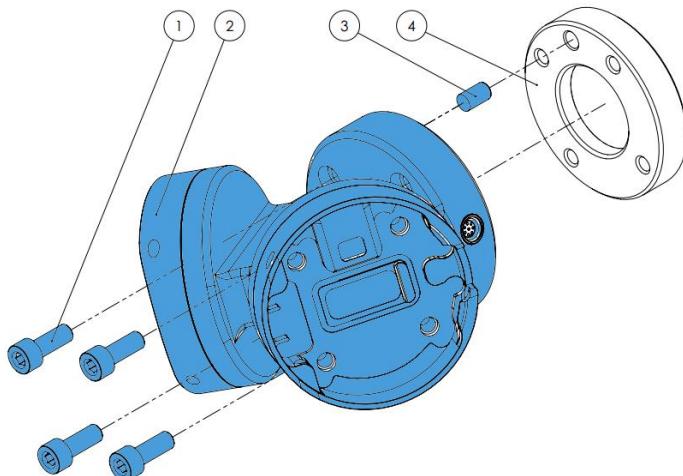
Quick Changer - Robot Side

1   M6x8mm (ISO14580 8.8)

2   Quick Changer (ISO 9409-1-50-4-M6)

3   Dowel pin Ø6x10 (ISO2338 h8)

4   Adapter/ Robot tool flange (ISO 9409-1-50-4-M6)

Use 10 Nm tightening torque.
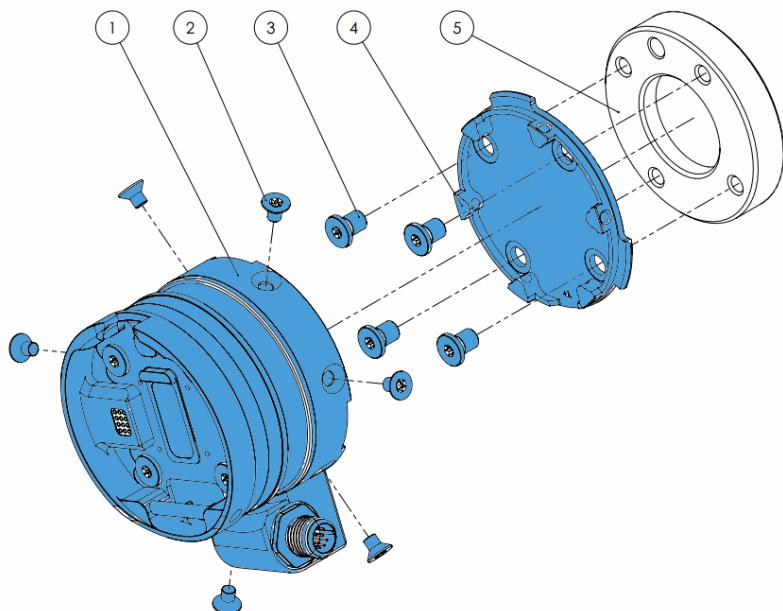
Dual Quick Changer

Dual Quick Changer

1   M6x20mm (ISO14580 8.8)

2   Dual Quick Changer

3   Dowel pin Ø6x10 (ISO2338 h8)

4   Adapter/ Robot tool flange (ISO 9409-1-50-4-M6)

Use 10 Nm tightening torque.

HEX-E/H QC

HEX-E/H QC

1   HEX-E/H QC sensor

2   M4x6mm (ISO14581 A4-70)

3   M6x8mm (NCN20146 A4-70)

4   HEX-E/H QC adapter

5   Adapter/ Robot tool flange (ISO 9409-1-50-4-M6)
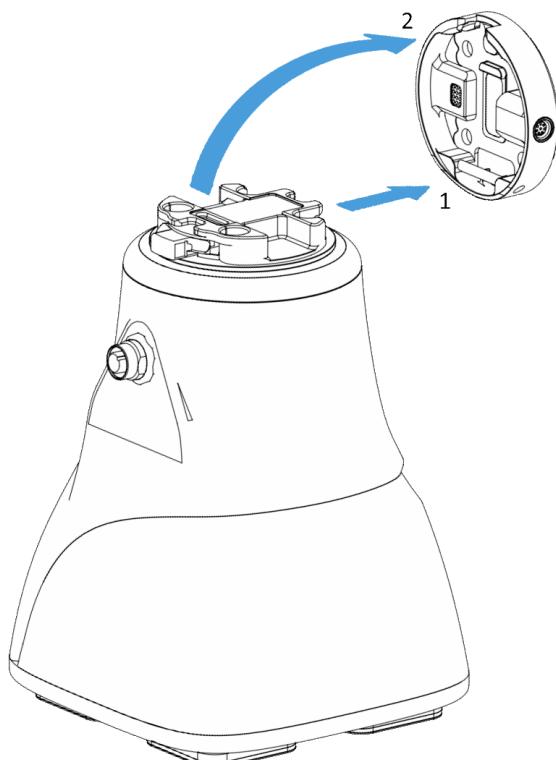
Use 1.5 Nm tightening torque. for M4x6mm

Use 10 Nm tightening torque. for M6x8mm

3.2.3 Tools

Gecko

Step 1:

Move the tool close to the Quick Changer as illustrated.

The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.

Step 2:

Flip the tool until it is fully mated, and you hear a clicking sound.
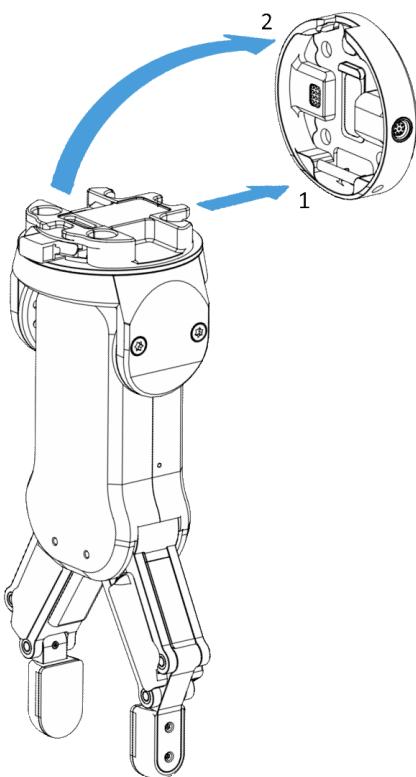
To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.

CAUTION:

With a Dual Quick Changer the Gecko Gripper can only be mounted on the Secondary (2) side. Mounting on the Primary (1) side will prevent the devices to function correctly.

RG2

Step 1:

Move the tool close to the Quick Changer as illustrated.

The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.

Step 2:

Flip the tool until it is fully mated, and you hear a clicking sound.

To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.
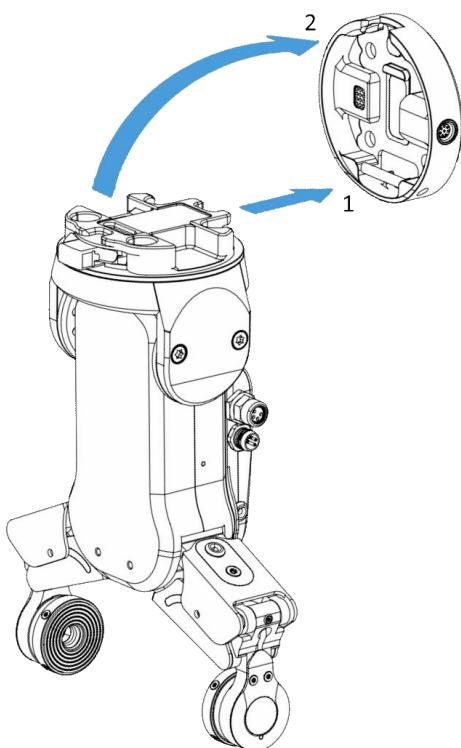
To change the relative angle of the gripper to the Quick Changer:

- first remove the four M4x6 screws
- tilt the gripper between -90° and 90°
- then put the four M4x6 screws back and use 1.35 Nm tightening torque to fix it.

WARNING:

Never use the device while any of the four M4x6 screws are removed.

RG2-FT

Step 1:

Move the tool close to the Quick Changer as illustrated.

The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.
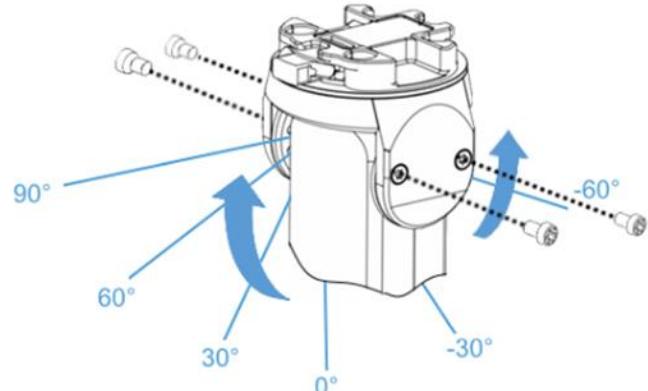
Step 2:

Flip the tool until it is fully mated, and you hear a clicking sound.

To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.
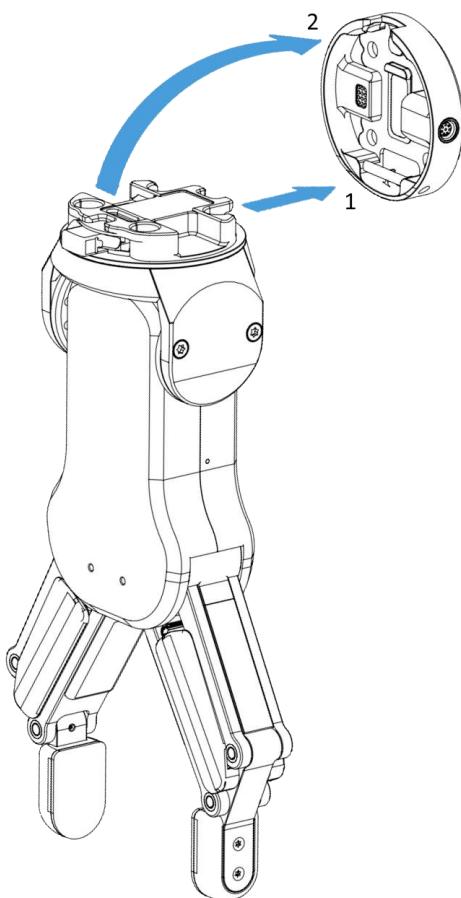
To change the relative angle of the gripper to the Quick Changer:

- first remove the four M4x6 screws
- tilt the gripper between -60° and 90°
- then put the four M4x6 screws back and use 1.35 Nm tightening torque to fix it.

WARNING:

Never use the device while any of the four M4x6 screws are removed.

RG6

Step 1:

> Move the tool close to the Quick Changer as illustrated.

> The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.

Step 2:

> Flip the tool until it is fully mated, and you hear a clicking sound.

To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.

To change the relative angle of the gripper to the Quick Changer:

- first remove the four M4x6 screws

- tilt the gripper between -90° and 90°

- then put the four M4x6 screws back and use 1.35 Nm tightening torque to fix it.

WARNING:

Never use the device while any of the four M4x6 screws are removed.

VG10

Step 1:
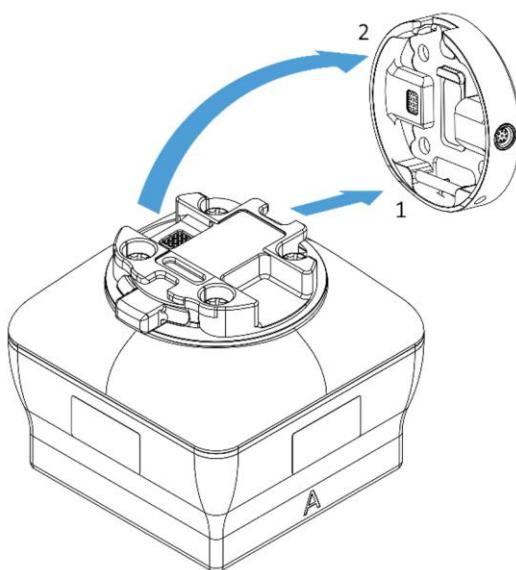
Move the tool close to the Quick Changer as illustrated.

The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.

Step 2:

Flip the tool until it is fully mated, and you hear a clicking sound.

To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.

VGC10

Step 1:
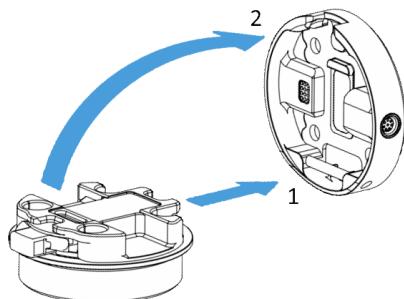
Move the tool close to the Quick Changer as illustrated.

The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.

Step 2:

Flip the tool until it is fully mated, and you hear a clicking sound.

To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.

Installation

OnRobot

Quick Changer - Tool side

Step 1:

Move the tool close to the Quick Changer as illustrated.

The hook mechanism (rod and hook tongue) will keep the lower part locked once mounted.

Step 2:
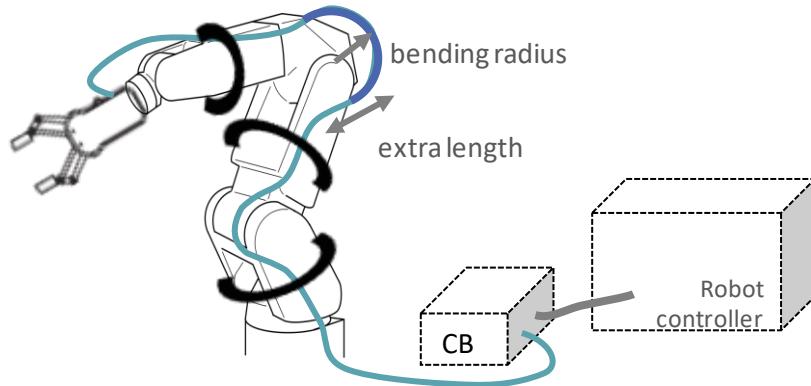
Flip the tool until it is fully mated, and you hear a clicking sound.

To unmount the tool, press the aluminum button on the Quick Changer and repeat the steps in the reverse order.

3.3 Wiring

Three cables need to be connected to wire the system properly:
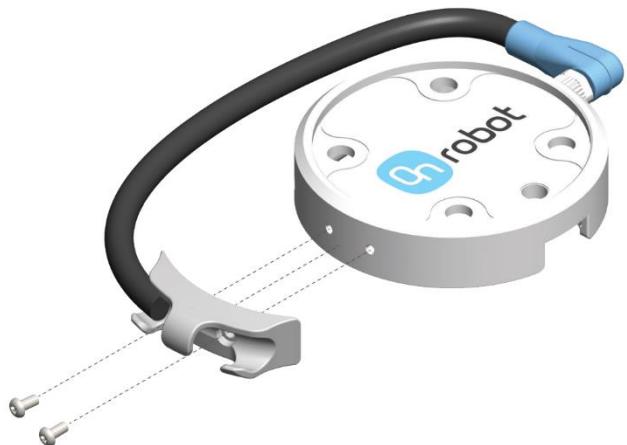
- Tool data cable between the tool(s) and the Compute Box
- Ethernet communication cable between the robot controller and the Compute Box
- Power supply of the Compute Box

3.3.1 Tool data cable

First connect the data cable to the tool.

For Single or Dual RG2, RG6, VG10, VGC10 or Gecko Gripper

Use the M8-8pin connector on the Quick Changer or on the Dual Quick Changer.
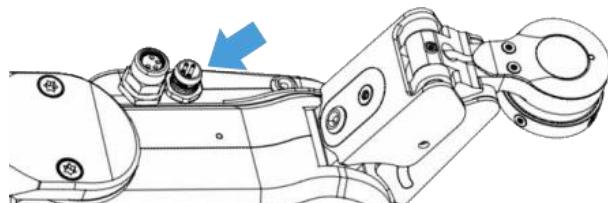
Use the cable holder as illustrated on the left.
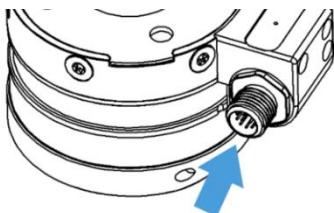
CAUTION:

Make sure to use the supplied cable holder to prevent any excessive strain on the 90-degree M8 connector caused by the rotation of the cable.

For RG2-FT

For RG2-FT the Quick Changer tool data connector cannot be used. Instead use the marked M8-4pin connector

For HEX-E/H QC

Use the marked M12-12pin connector on the HEX-E/H QC.

Then route the Tool data cable to the Compute Box (CB) and use the supplied Velcro tape (black) to fix it.

NOTE:

Make sure that during the routing some extra length is used at the joints so that cable is not pulled when the robot moves.

Also make sure that the cable bending radius is minimum 40mm (for the HEX-E/H QC it is 70mm)

Finally, connect the other end of the Tool data cable to the Compute Box's DEVICES connector.

CAUTION:

Use only original OnRobot tool data cables. Do not cut or extend these cables.

CAUTION:

Quick Changer and Dual Quick Changer can only be used to power OnRobot tools.

3.3.2 Ethernet cable

Connect one end of the supplied Ethernet (UTP) cable to the robot controller's Ethernet (LAN) port.

NOTE:

If the robot controller's Ethernet port is in use, use a standard 4-port Ethernet switch to be able to use two network devices at the same time.

Connect the other end of the supplied cable to the Compute Box's ETHERNET connector.

CAUTION:

Use only shielded, maximum 3m long Ethernet cables.

WARNING:

Check and make sure that the Compute Box enclosure (metal) and the robot controller enclosure (metal) are not connected (no galvanic connection between the two).

3.3.3 Power supply

Connect the supplied power supply to the Compute Box 24V connector.

NOTE:

To disconnect the power connector, make sure to pull the connector housing (where the arrows are shown) and not the cable.

CAUTION:

Use only original OnRobot power supplies.
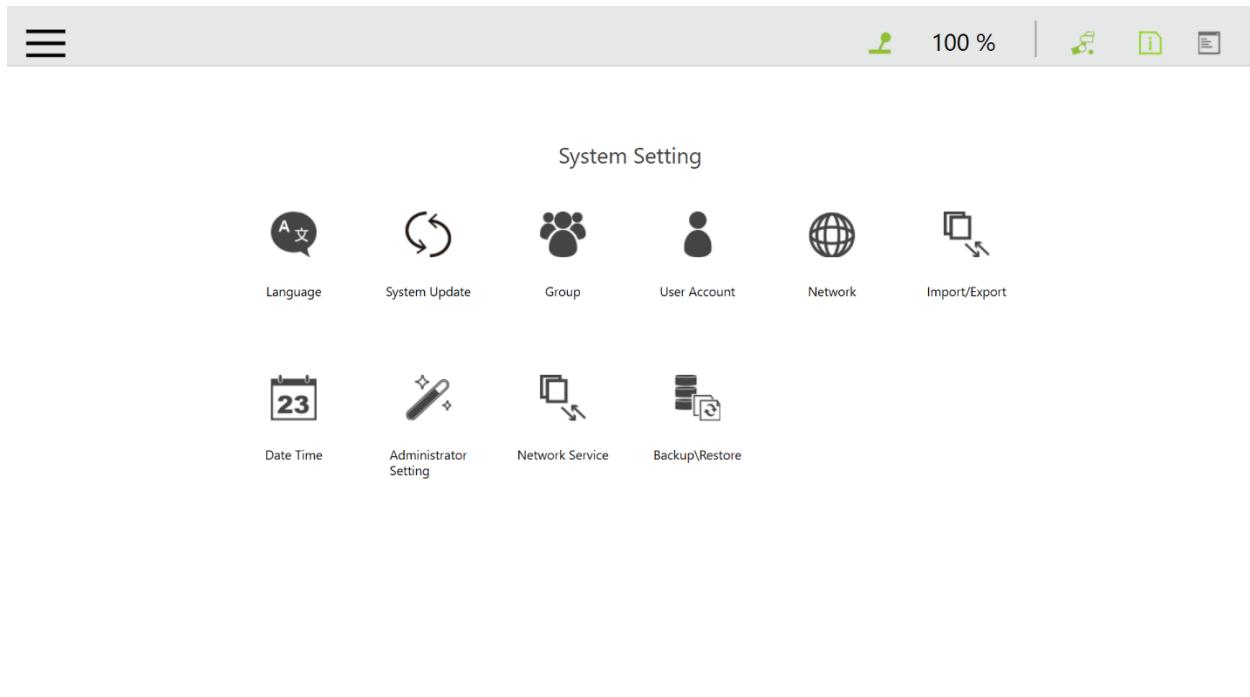
Finally, power up the power supply that will power the Compute Box and the connected Tool(s).

3.4 Software setup

3.4.1 Import Component
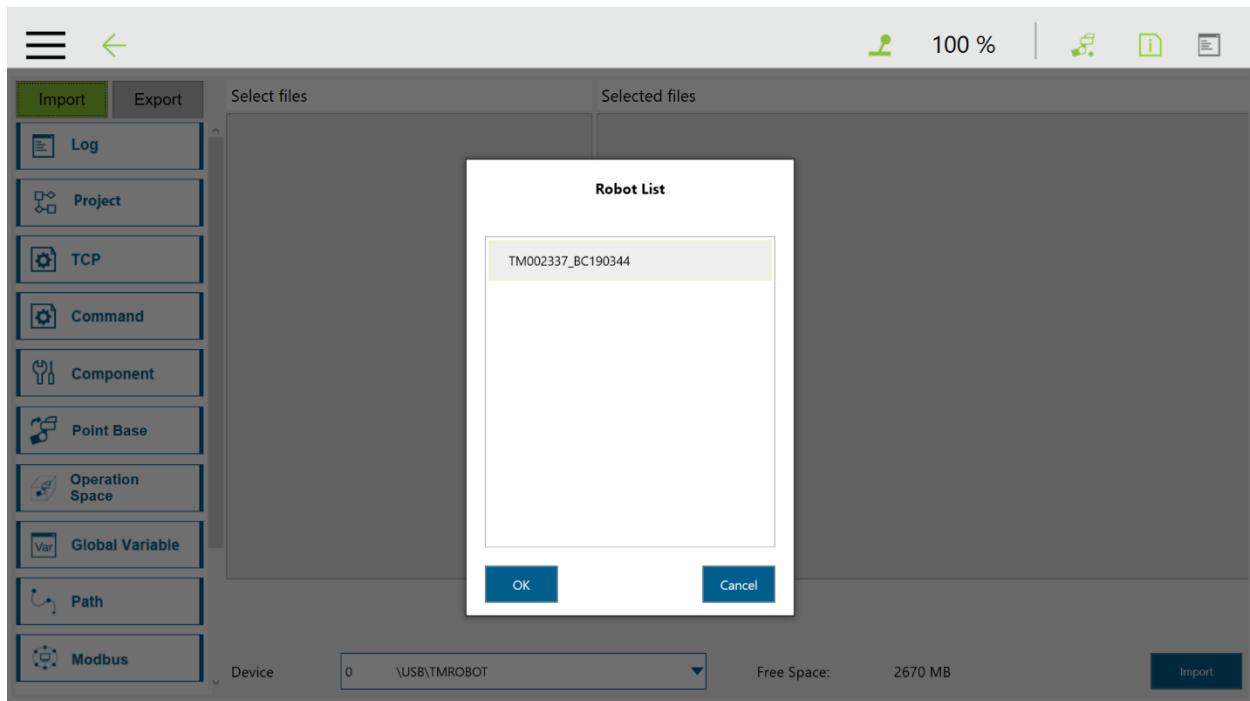
Prepare the supplied OnRobot USB stick and plug it into the robot controller.

Click on the main menu ☰ icon and go to System menu.
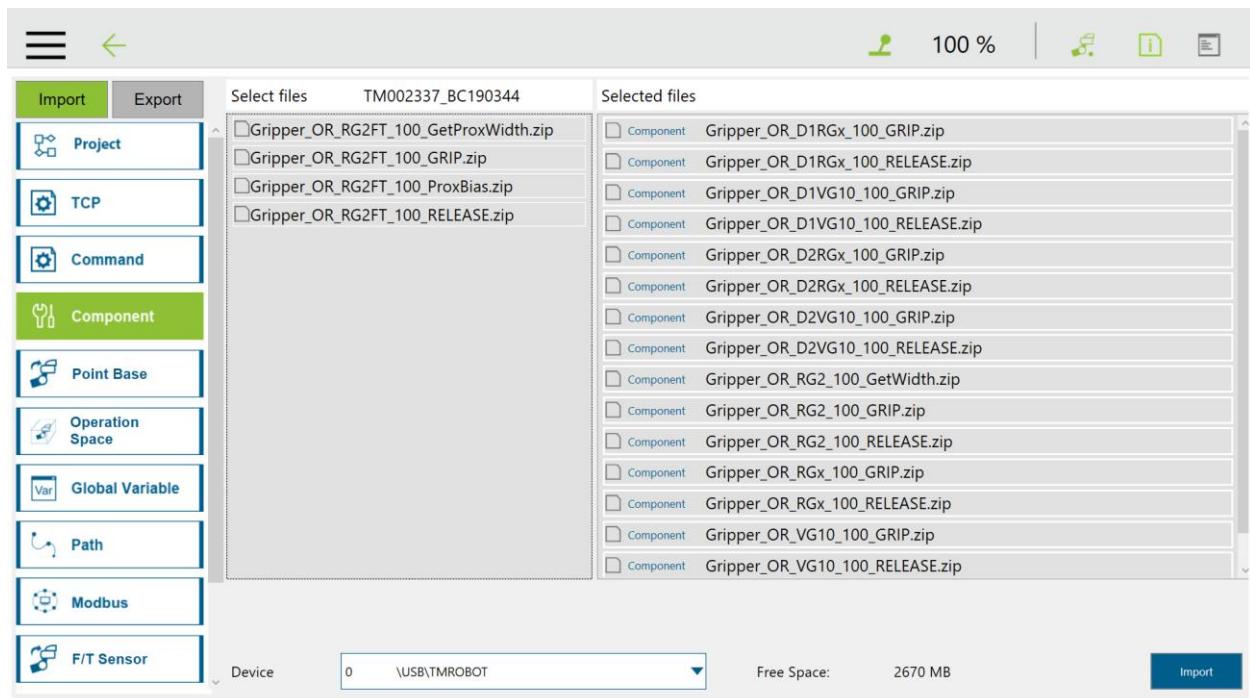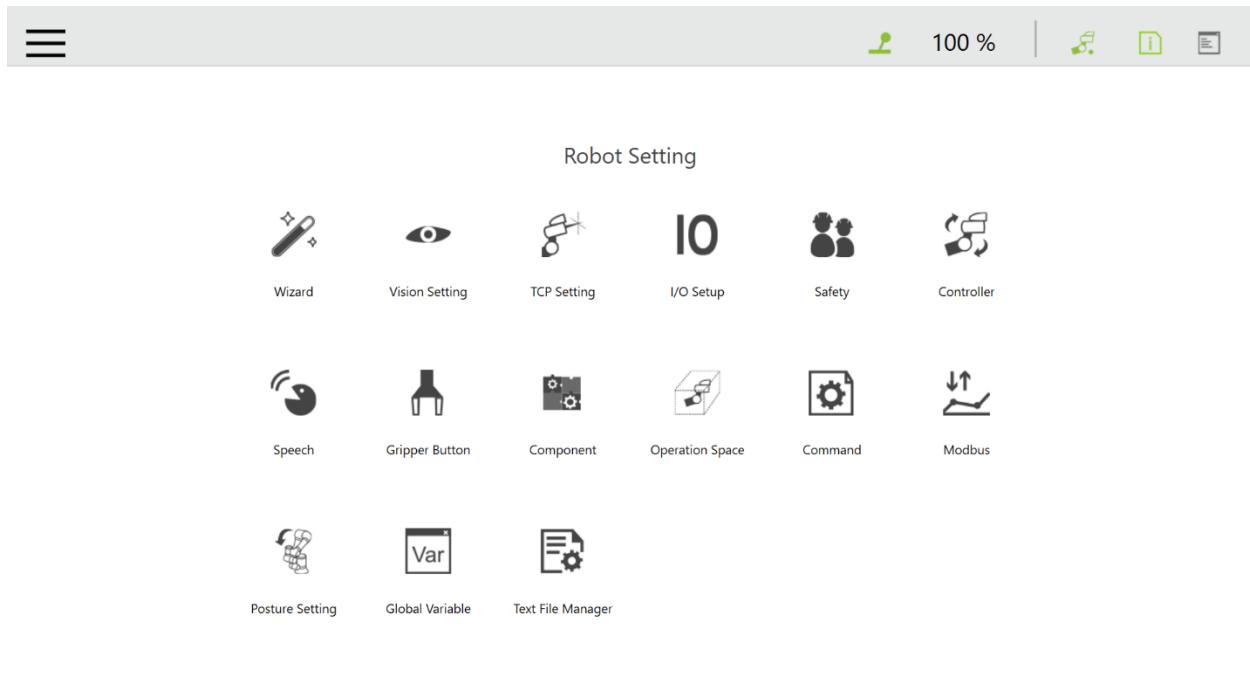
Go to **Import/Export** and click **Import** (upper left corner). Then select your robot from the list and click **OK**.
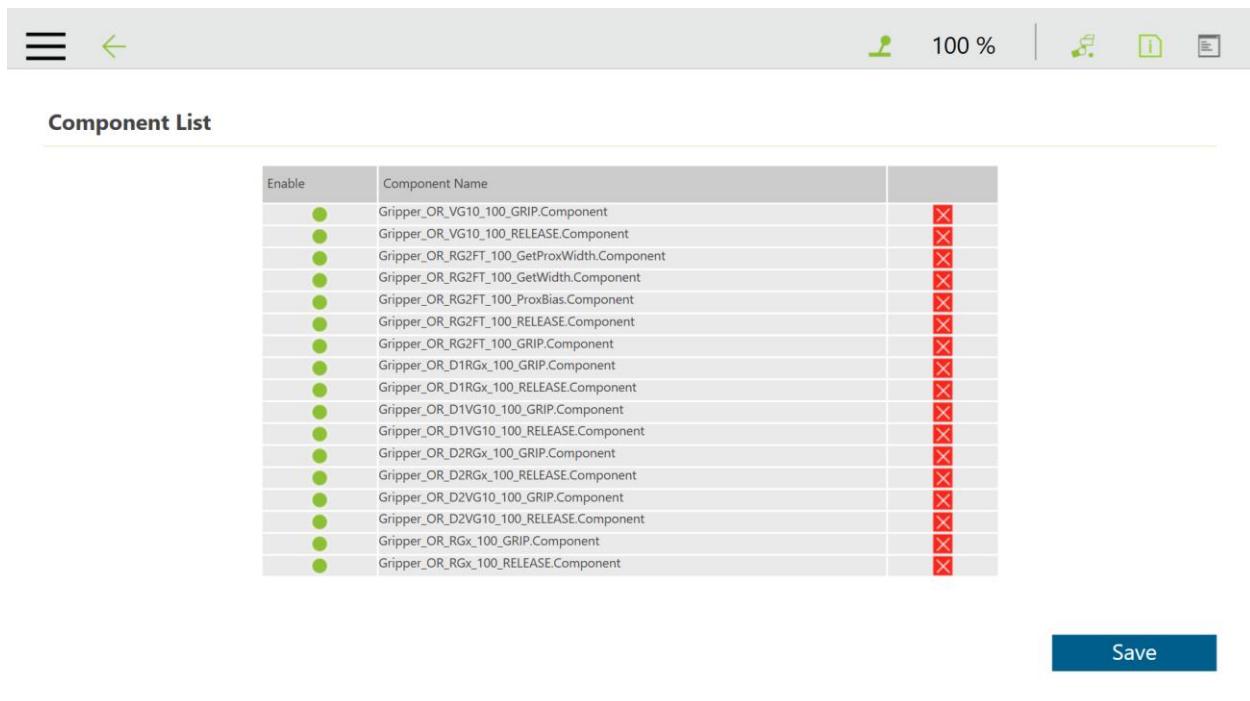
Select the relevant OnRobot components to be added and click **Import**.

Go back to the main menu (☰) and go to 🎛 **Settings**.

Robot Setting

Wizard	Vision Setting	TCP Setting	I/O Setup	Safety	Controller

Speech	Gripper Button	Component	Operation Space	Command	Modbus

Posture Setting	Global Variable	Text File Manager
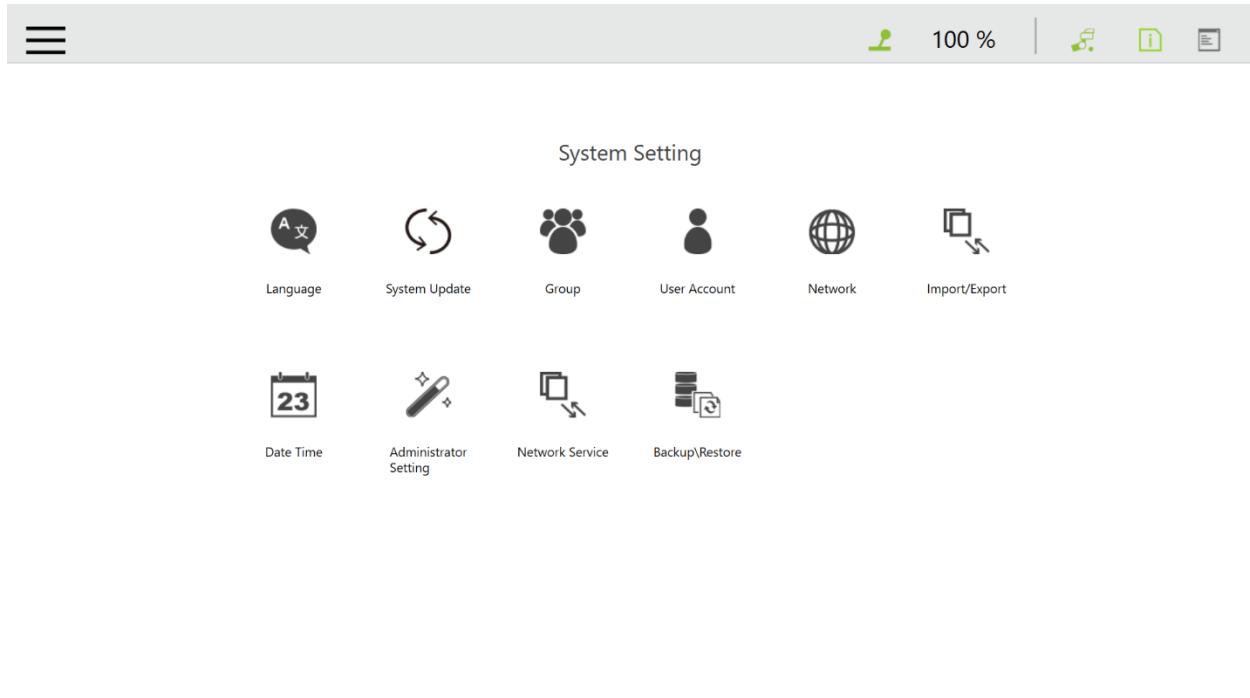
Click **Component** and make sure that all components are enabled that you would like to use.

Component List

Enable	Component Name	
●	Gripper_OR_VG10_100_GRIP.Component	✖
●	Gripper_OR_VG10_100_RELEASE.Component	✖
●	Gripper_OR_RG2FT_100_GetProxWidth.Component	✖
●	Gripper_OR_RG2FT_100_GetWidth.Component	✖
●	Gripper_OR_RG2FT_100_ProxBias.Component	✖
●	Gripper_OR_RG2FT_100_RELEASE.Component	✖
●	Gripper_OR_RG2FT_100_GRIP.Component	✖
●	Gripper_OR_D1RGx_100_GRIP.Component	✖
●	Gripper_OR_D1RGx_100_RELEASE.Component	✖
●	Gripper_OR_D1VG10_100_GRIP.Component	✖
●	Gripper_OR_D1VG10_100_RELEASE.Component	✖
●	Gripper_OR_D2RGx_100_GRIP.Component	✖
●	Gripper_OR_D2RGx_100_RELEASE.Component	✖
●	Gripper_OR_D2VG10_100_GRIP.Component	✖
●	Gripper_OR_D2VG10_100_RELEASE.Component	✖
●	Gripper_OR_RGx_100_GRIP.Component	✖
●	Gripper_OR_RGx_100_RELEASE.Component	✖

Save

3.4.2 Set robot network settings

Go to the main menu (☰) and go to **Settings**.
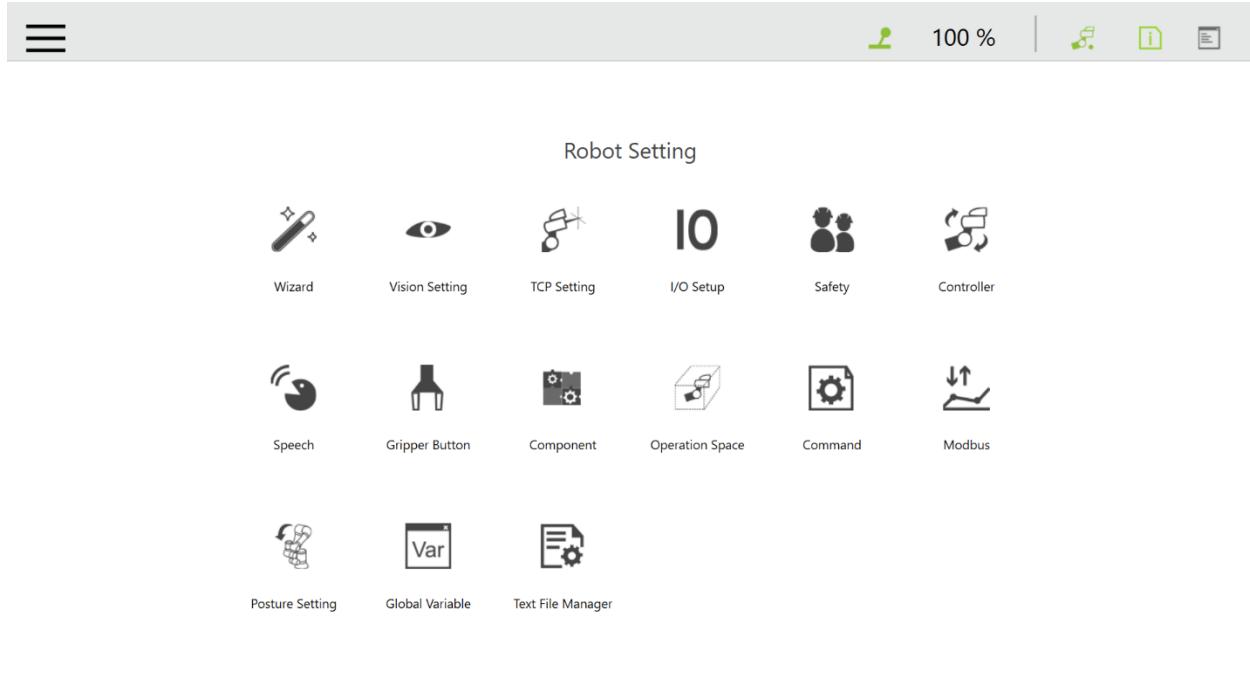
Go to **Network** and setup the IP address of the robot.
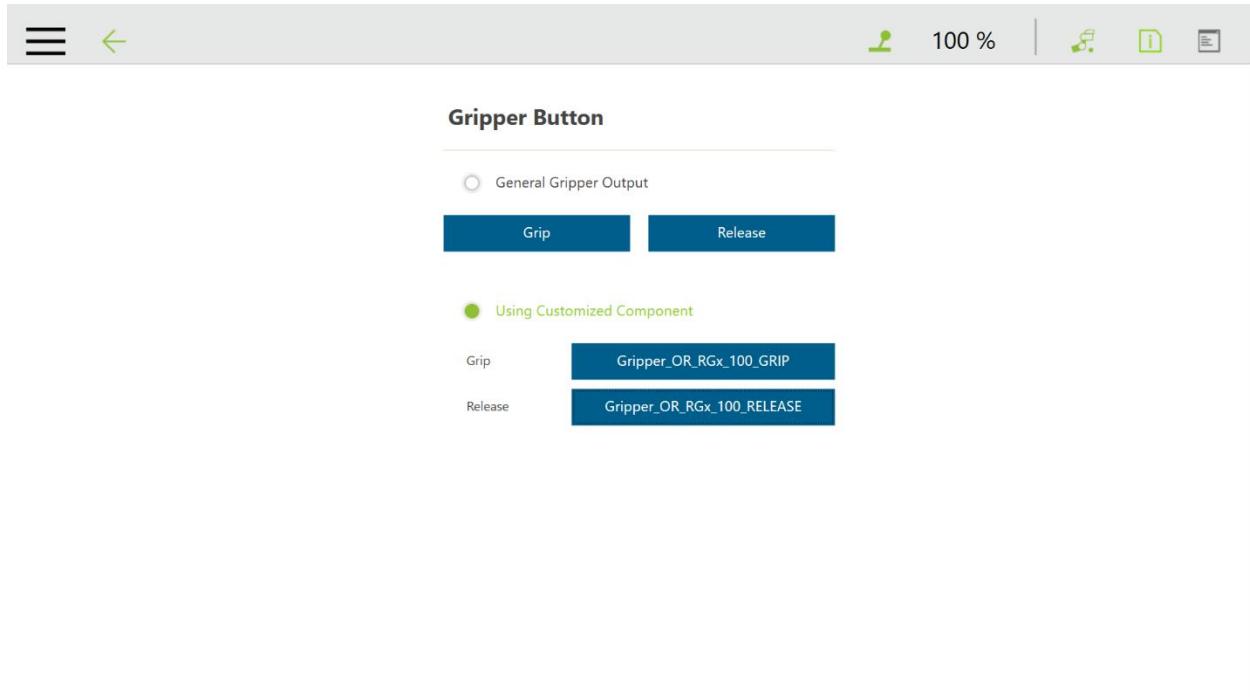
It is recommended to leave the options in automatic configuration.

3.4.3 Configure gripper buttons

Go to the main menu (☰) and go to ⚙ **Settings**.

Click on the **Gripper Button** and configure as shown below.
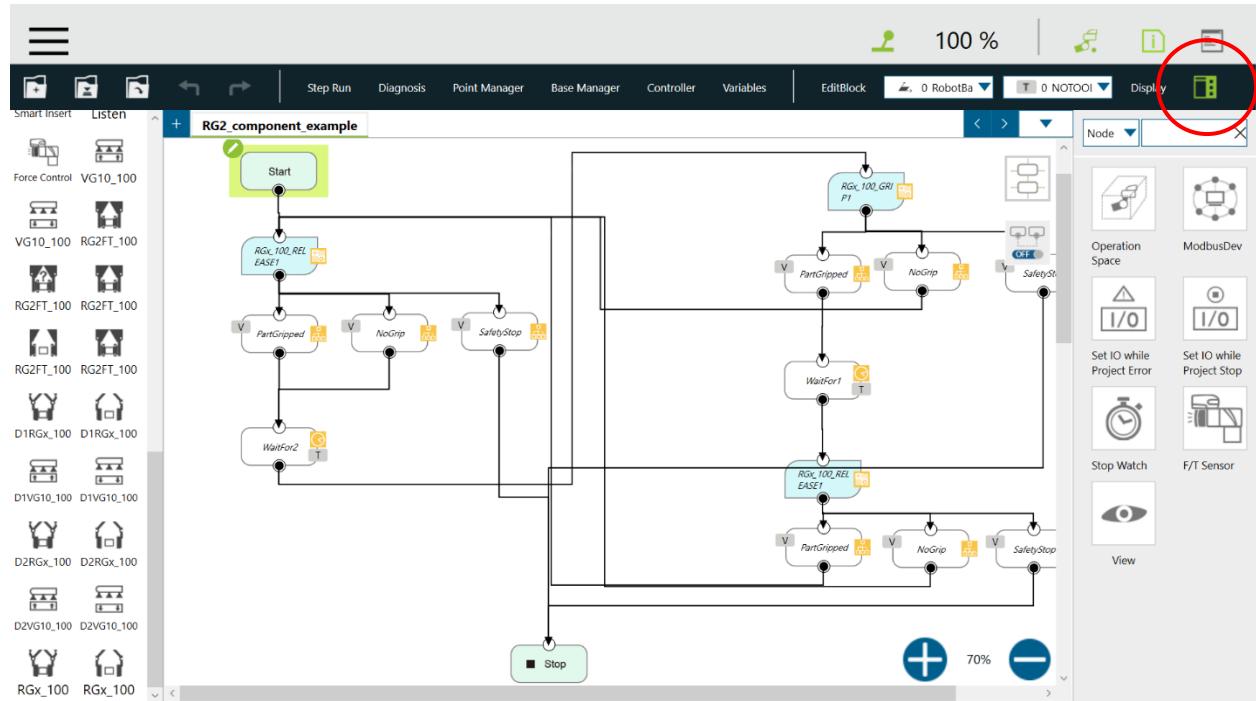
3.4.4 Configuring Modbus TCP for the components

You can open the `RG2_component_example` project or create a new project.
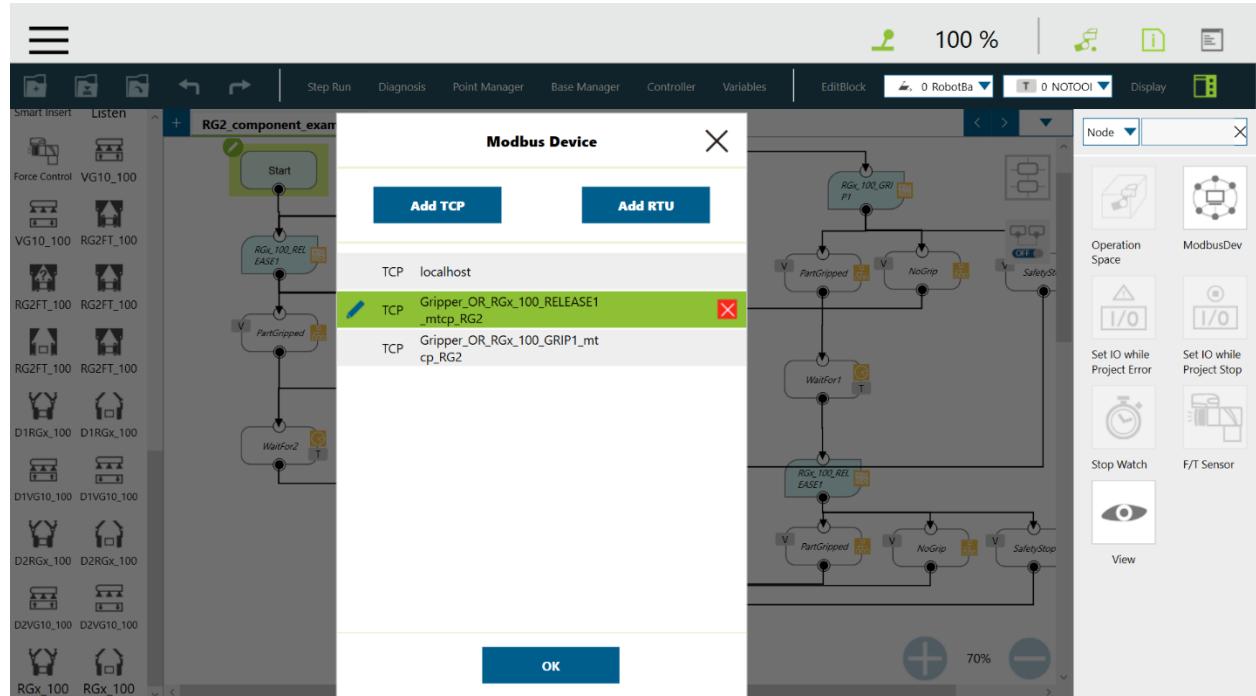
Add the `RGx_100_GRIP1` component from the left side. Note that not the full component name is shown only the RGx_100. You can use the icons to select the right action.

If you are not using the default Compute Box IP (192.168.1.1) then you need to set it. Click on the [icon] icon on the right side of **Display** in the upper right corner.
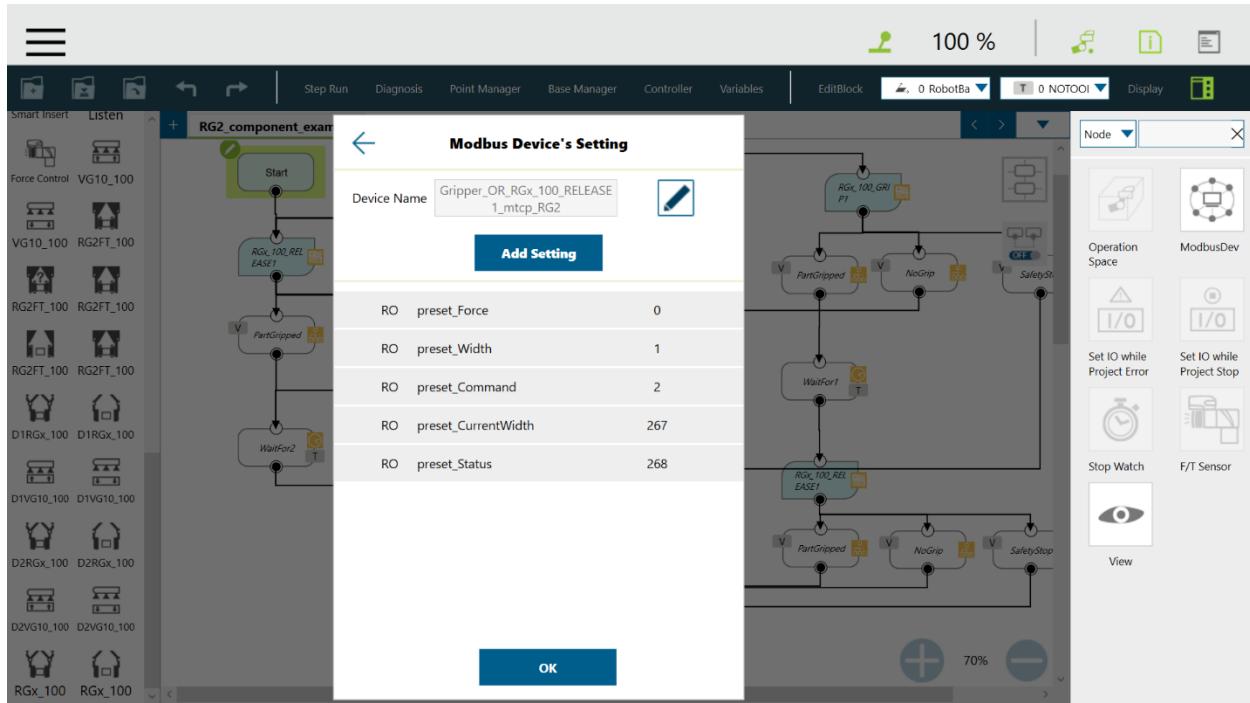
Then click on **ModbusDev**. Select `Gripper_OR_RGx_100_Grip1_mtcp_RG2` and click on the Pencil icon.
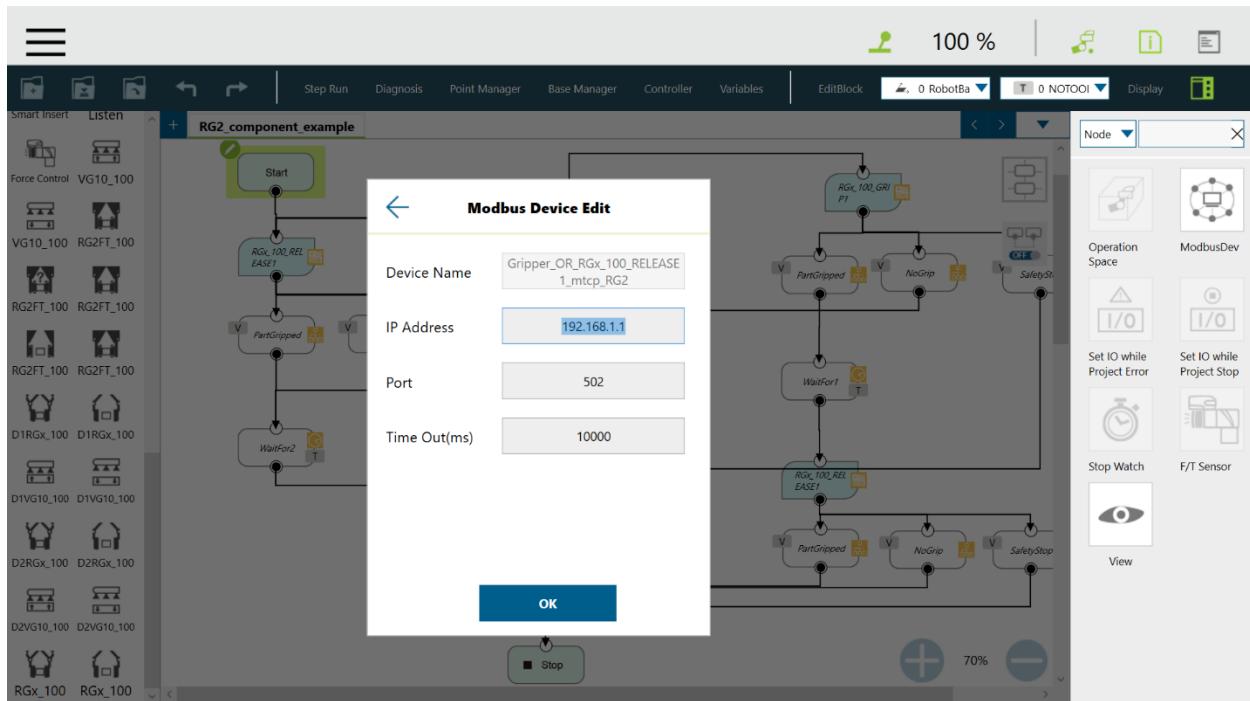
Click on the pencil icon again in the upper right corner.

Make sure that the IP address is set correctly.

Repeat the same for the other Modbus device if needed.

Software setup is finished.

4   Operation

NOTE:

It is assumed that the Installation has finished successfully. If not, first do the installation steps in the previous section.

4.1 Overview

You can use the previously installed OnRobot components to operate the OnRobot devices from the robot.

There are five groups of OnRobot components:
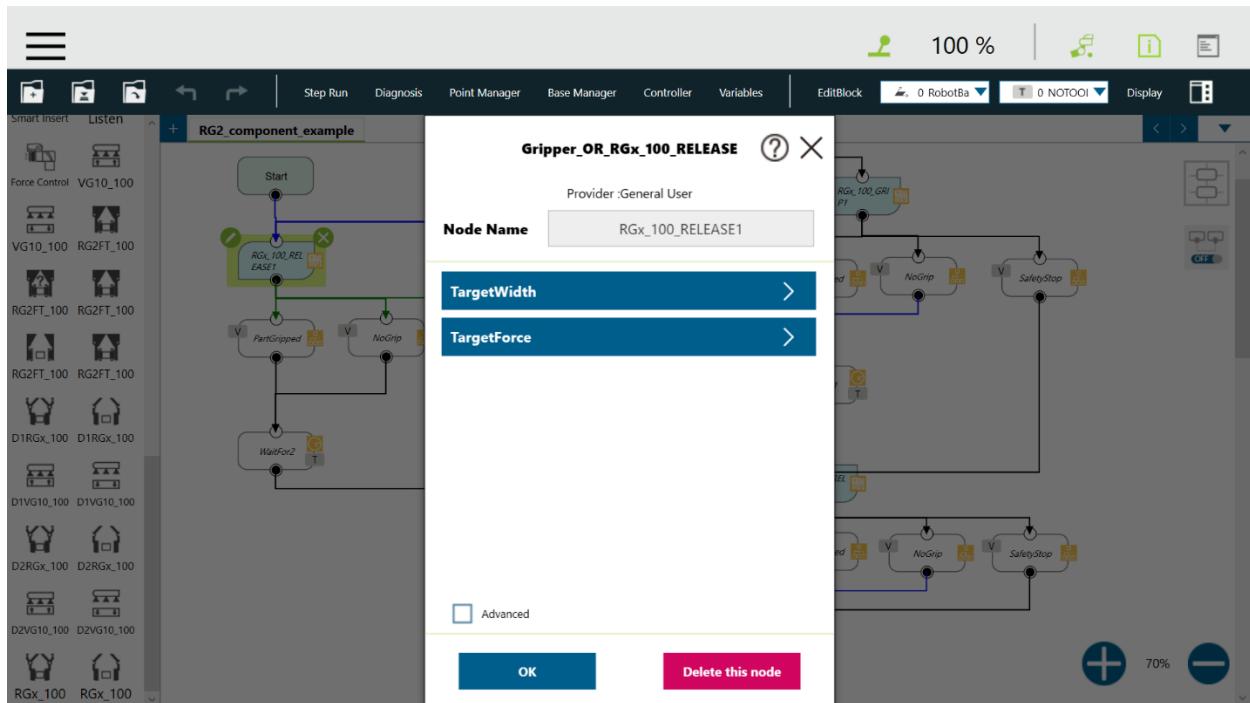
- RGx Components
- VG10 / VG10 Components
- RG2-FT Components
- HEX Components
- Gecko Components

In the following subsections these components will be described.
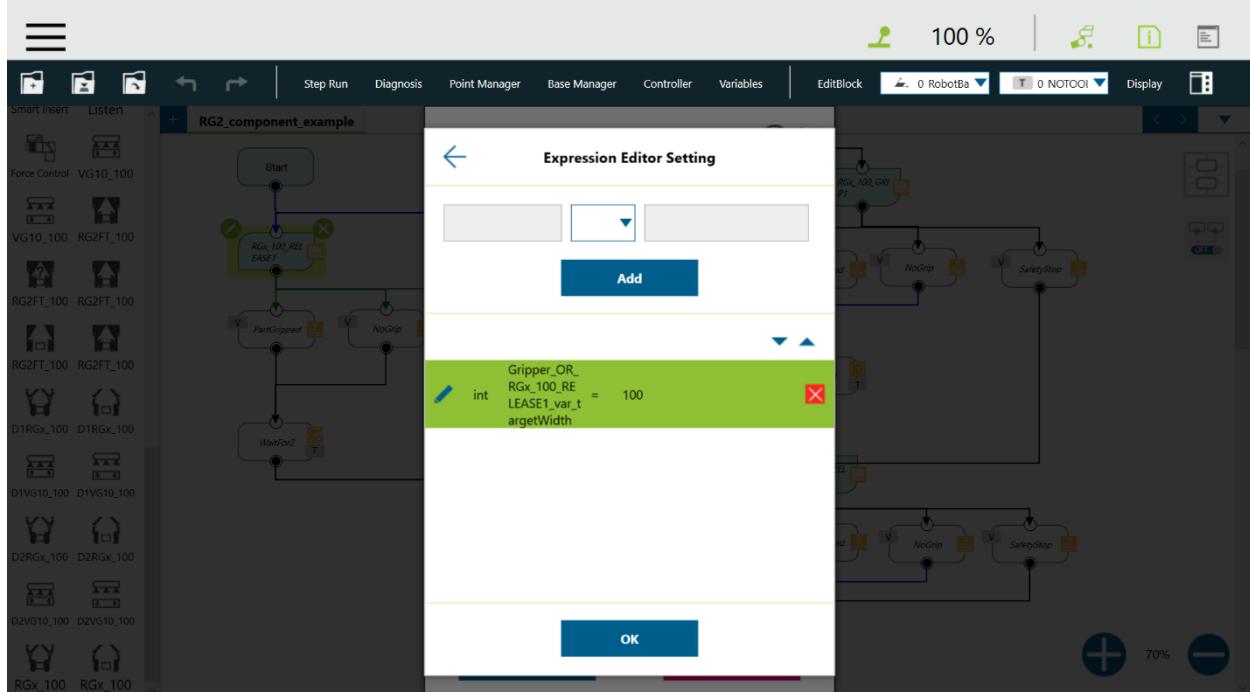
Before that, here is one example how to use generally these components:
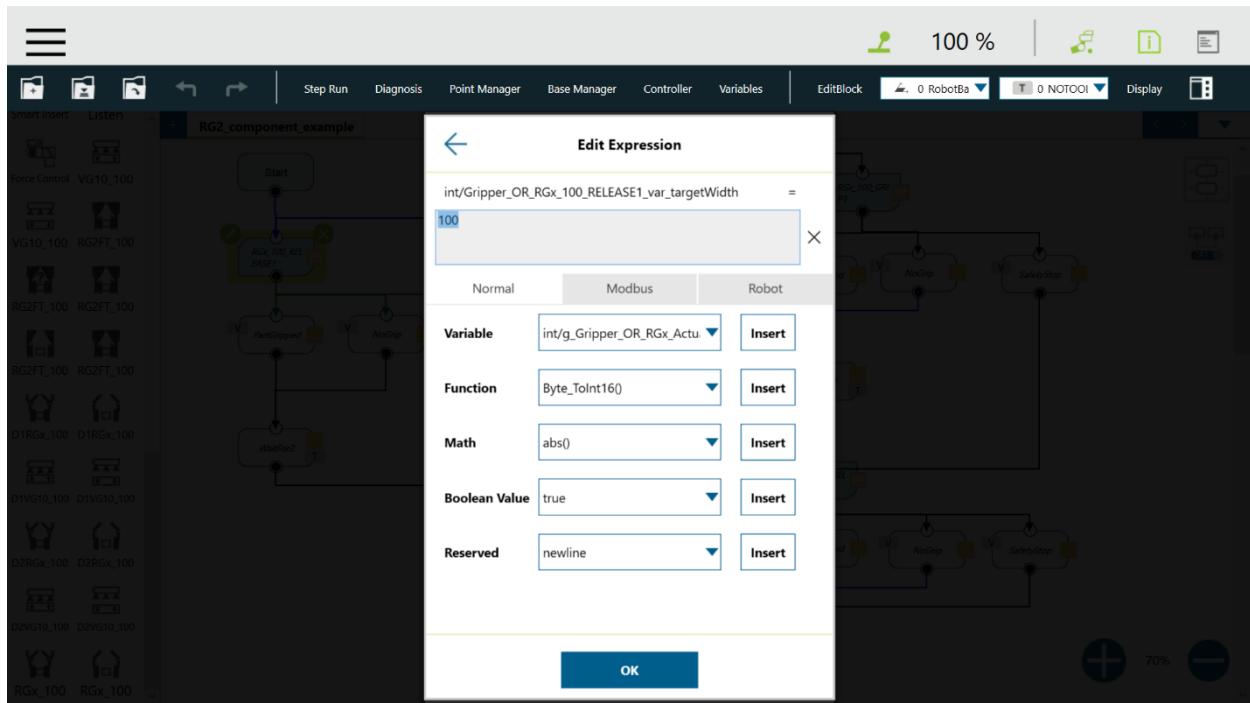
For example, `RGx_100_Grip1` is capable of opening and closing the gripper. The `RGx_100_Release1` is only added so that the Gripper Button can work as well.

You can change `Target  width` and `Target  force` variables by clicking on the arrow icon on the component.

To edit the value, click on the pencil icon.

> **NOTE:**
>
> The components with D1 and D2 prefix can be used only with Dual Quick Changer and the given device needs to be connected to 1 - primary or 2 - secondary side.

4.2 Gecko Components

Quick Changer

HEX-E/H QC

4.2.1 Gripper_OR_Gecko_GRIP

Push the pads of the Gecko gripper OUT.

4.2.2 Gripper_OR_Gecko_RELEASE

Pulls the pads of the Gecko gripper IN.

4.2.3 Gripper_OR_Gecko_DistanceRead

Returns the measured value of the Ultrasonic distance sensor as the global variable `g_Gripper_OR_Gecko_DistanceValue`.

Dual Quick Changer

These components can be used with Dual Quick Changer mounting option.

NOTE:

For Gecko Gripper use only the 2- secondary side of the Dual Quick Changer.

4.2.4 Gripper_OR_D2Gecko_GRIP

4.2.5 Gripper_OR_D2Gecko_RELEASE

4.2.6 Gripper_OR_D2Gecko_DistanceRead

The components work exactly the same way as the single device components above.

4.3 HEX Components

4.3.1 SENSOR_OR_HEX_100_Read

Reads the HEX sensor force/torque values and writes them to the following global variables:

- `g_SENSOR_OR_HEX_FX`
- `g_SENSOR_OR_HEX_FY`
- `g_SENSOR_OR_HEX_FZ`
- `g_SENSOR_OR_HEX_TX`
- `g_SENSOR_OR_HEX_TY`
- `g_SENSOR_OR_HEX_TZ`

4.3.2 SENSOR_OR_HEX_100_Set

Zeroes out the sensor and sets the filter.

This component has two parameters:

- `Bias`: Boolean variable telling the sensor to use the current value as a bias (true) to zero the reading or disable biasing (false).
- `Filter`: Sets the filter to be used with the sensor.

Value	Cut-off frequency
0	No filtering
1	500 Hz
2	150 Hz
3	50 Hz
4	15 Hz
5	5 Hz
6	1.5 Hz

4.4 RG2-FT Components

This component can be used for RG2-FT only.

4.4.1 Gripper_OR_RG2FT_100_GRIP

Completely closes (default) a single RG2-FT gripper.

This component has two parameters:

- `Target width`: What the final width of the gripper should be. If this width is smaller than the part width, the gripper will stop when it reaches `Target force`.
- `Target force`: Defines the closing speed and gripping force of the gripper when grabbing an object.

The output has two gates:

- `Part gripped`: The gripper is stopped by hitting an object.
- `No grip`: The gripper reached its target width without hitting an object.

This component also writes the global variable `g_Gripper_OR_RGx_ActualWidth` which represents the final width of the gripper after stopping.

4.4.2 Gripper_OR_RG2FT_100_RELEASE

Completely opens (default) a single RG2-FT gripper.

This component has two parameters:

- `Target width`: What the final width of the gripper should be. If this width is smaller than the part width, the gripper will stop when it reaches `Target force`.
- `Target force`: Defines the closing speed and gripping force of the gripper when grabbing an object.

The output has three gates:

- `Part gripped`: The gripper is stopped by hitting an object.
- `No grip`: The gripper reached its target width without hitting an object.

This component also writes the global variable `g_Gripper_OR_RGx_ActualWidth` which represents the final width of the gripper after stopping.

The difference between this and the `GRIP` component is the default values. Can be useful when using the `Gripper` button on the robot arm.

4.4.3 Gripper_OR_RG2FT_100_GetProxWidth

Read the proximity sensor values as `Part width`, which is:

Left proximity value + Right proximity value – Current gripper width.

This value is returned as a global variable, called `g_Gripper_OR_RG2FT_proxValue`.

4.4.4 Gripper_OR_RG2FT_100_ProxBias

Sets the current proximity sensor values to zero. This component should be used when the gripper is completely closed, thus `GetProxWidth` will return the detected part width. This component has no parameters and a single gate.

4.5 RGx Components

<div>
Quick Changer

HEX-E/H QC
</div>

These components can be used for RG2 or RG6.

4.5.1 Gripper_OR_RGx_100_GRIP

Closes the gripper all the way, if a part is present between the fingertips the gripper stops at the prescribed grip force. Returns the current gripper width as the global variable `g_Gripper_OR_RGx_ActualWidth`.

This component has three parameters:

- `Target width`: What the final width of the gripper should be. If this width is smaller than the part width, the gripper will stop when it reaches `Target force`. Width range: RG2: 0-110 [mm], RG6: 0-160 [mm].
- `Target force`: Defines the closing speed and gripping force of the gripper when grabbing an object. Force range: RG2: 0-40 [N], RG6: 0-120 [N].
- `Safety reset condition`: You can choose what action should reset the safety trigger (e.g. a digital input). Note that if a part is stuck between the arms by the time this condition is met, the safety switch will be re-triggered, and the component won't attempt another reset.

The output has three gates:

- `Part gripped`: The gripper is stopped by hitting an object.
- `No grip`: The gripper reached its target width without hitting an object.
- `Safety stop`: The gripper was stopped mid-movement by the safety switches on the gripper arm.

This component also writes the global variable `g_Gripper_OR_RGx_ActualWidth` which represents the final width of the gripper after stopping.

4.5.2 Gripper_OR_RGx_100_RELEASE

Opens to 100mm (default) a single RG2/6 gripper.

This component has three parameters:

- `Target width`: What the final width of the gripper should be. If this width is smaller than the part width, the gripper will stop when it reaches `Target force`. Width range: RG2: 0-110 [mm], RG6: 0-160 [mm].
- `Target force`: Defines the closing speed and gripping force of the gripper when grabbing an object. Force range: RG2: 0-40 [N], RG6: 0-120 [N].
- `Safety reset condition`: You can choose what action should reset the safety trigger (e.g. a digital input). Note that if a part is stuck between the arms by the time this condition is met, the safety switch will be re-triggered, and the component won't attempt another reset.

CAUTION:

Before resetting the gripper always make sure that no part will be dropped due to the loss of gripper power. If Dual Quick Changer is used it will cycle the power for both sides.

The output has three gates:

- `Part gripped`: The gripper is stopped by hitting an object.
- `No grip`: The gripper reached its target width without hitting an object.
- `Safety stop`: The gripper was stopped mid-movement by the safety switches on the griper arm.

This component also writes the global variable `g_Gripper_OR_RGx_ActualWidth` which represents the final width of the gripper after stopping.

The difference between this and the `GRIP` component is the default values. Can be useful when using the `Gripper` button on the robot arm.

Dual Quick Changer

These components can be used with Dual Quick Changer mounting option.

1 - Primary side

4.5.3 Gripper_OR_D1RGx_100_GRIP

4.5.4 Gripper_OR_D1RGx_100_RELEASE

2 - Secondary side

4.5.5 Gripper_OR_D2RGx_100_GRIP

4.5.6 Gripper_OR_D2RGx_100_RELEASE

The components work exactly the same way as the single device components above.

4.6 VG10 / VGC10 Components

Quick Changer

HEX-E/H QC

4.6.1 Gripper_OR_VG10_100_GRIP

Applies the chosen amount of vacuum to a specific side of the gripper.

This component has two parameters:

- `Target vacuum A`: The target vacuum in [%] of the A-side of the gripper. A value of 0 opens the valve in the gripper and releases all vacuum on this side.
- `Target vacuum B`: The target vacuum in [%] of the B-side of the gripper. A value of 0 opens the valve in the gripper and releases all vacuum on this side.
- `No grip timeout`: Amount of time to wait in [ms] until the component returns with no grip detected.

The output has two gates:

- `Part gripped`: The gripper reached the target vacuum level and the part is secured to the gripper.

- `Timeout`: The gripper couldn't reach the desired level of vacuum (no part, or partial contact) within the timeframe specified by `No grip timeout`.

This component writes no global variables.

4.6.2 Gripper_OR_VG10_100_RELEASE

Releases the vacuum from the chosen side of the gripper.

This component has two parameters:

- `Release A`: Boolean variable, if set to true, the vacuum on side A will be released.
- `Release B`: Boolean variable, if set to true, the vacuum on side B will be released.

The output has a single gate and the component always returns on this branch.

This component writes no global variables.

Dual Quick Changer

These components can be used with Dual Quick Changer mounting option.

1 - Primary side

4.6.3 Gripper_OR_D1VG10_100_GRIP

4.6.4 Gripper_OR_D1VG10_100_RELEASE

2 - Secondary side

4.6.5 Gripper_OR_D2VG10_100_GRIP

4.6.6 Gripper_OR_D2VG10_100_RELEASE

The components work exactly the same way as the single device components above.

5 Additional Software Options

5.1 Compute Box

5.1.1 Interfaces

There are two interface types that could be used:

- **Ethernet interface**

    This interface can be used to access the Web Client that can be used to monitor, control, and update the grippers/devices. Furthermore, via this interface the OnRobot WebLogic can also be accessed to program the Digital I/O Interface.

- **Digital I/O interface**

    This interface could be used to communicate via simple digital I/O lines with the robots. There are 8 digital input and 8 digital output that could be used. These inputs and outputs can be programmed through the OnRobot WebLogic that requires the Ethernet interface to be used (only for programming time).

5.1.2 Web Client
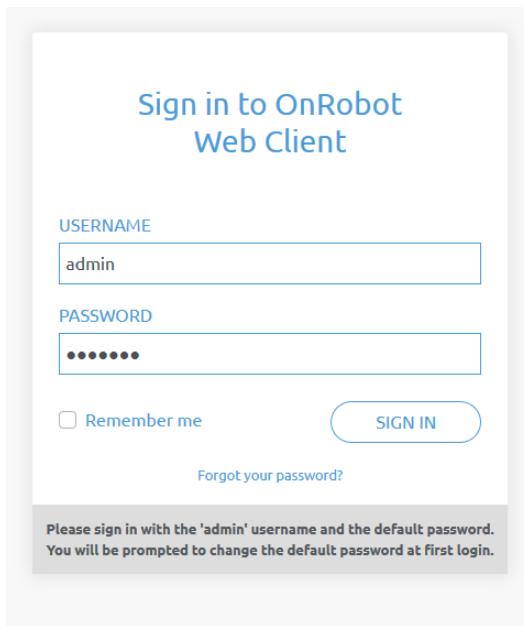
To access the Web Client on your computer first the Ethernet interface needs to be set up to have a proper communication between your computer and the Compute Box. It is recommended to use Auto mode (for further details see section **Ethernet Interface Setup**).

Then do the following steps:

- Connect the Compute Box to your computer with the supplied UTP cable.
- Power the Compute Box with the supplied power supply
- Wait one minute for the Compute Box LED to turn from blue to green.
- Open a web browser on your computer and type in the IP address of the Compute Box (factory default is 192.168.1.1).
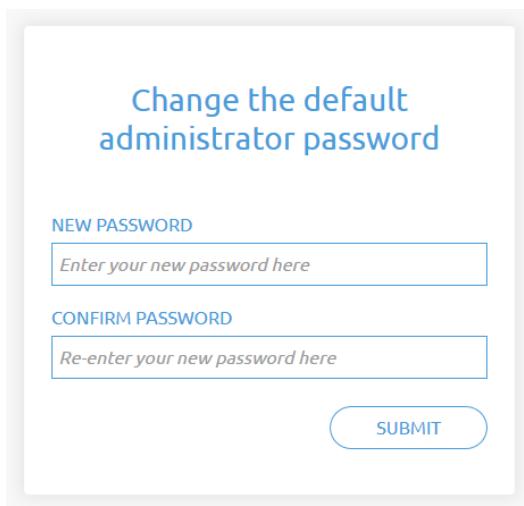
The Sign-in page opens:

Sign in to OnRobot
Web Client

USERNAME

admin

PASSWORD

•••••••

☐ Remember me   SIGN IN

Forgot your password?

Please sign in with the 'admin' username and the default password.
You will be prompted to change the default password at first login.

The factory default administrator login is:

Username: admin

Password: OnRobot

For the first login a new password needs to be entered: (password must be at least 8 characters long)

Change the default
administrator password

NEW PASSWORD

Enter your new password here

CONFIRM PASSWORD

Re-enter your new password here

SUBMIT

Once signed in the following top menus appear:

DEVICES   CONFIGURATION   WEBLOGIC   PATHS   UPDATE   👤▾   EN ▾

- **Devices** - Monitor and control the connected devices (e.g.: grippers)
- **Configuration** - Change the Compute Box's settings
- **WebLogic** - Program the Digital I/O interface through OnRobot WebLogic
- **Paths** - Import/export the recorded Paths (not available to all robots)
- **Update** - Update the Compute Box and the devices

Additional Software Options

- - Account settings (e.g.: change password, add new user)

- - Select the language of the Web Client

In the following, these menus will be described.

Devices menu

To control/monitor a device click on the **Select** button.

Please select from the detected device(s):

| Compute Box | HEX-E/H QC | RG2 |
| SELECT | SELECT | SELECT |

Gecko

Gecko Gripper

This page allows the device to be monitored and controlled. By navigating to the Device info tab the device status is shown. (Some functions might not be accessible without Admin permission.)

Monitor and control   Device info

Actual values

Preload force	0 N
Object distance	1.76 mm
Pad position	Pads are out
Part detected	●
Busy	○

(RESET ERRORS)

Set values

PAD POSITION

(PADS OUT)   (PADS IN)

PRELOAD THRESHOLD

50 N

50   90   120

There is a force and an ultrasonic distance sensor in the gripper. The actual values of these sensors are:

- **Preload** - the current forces acting on the pads (below 50N it displays 0N)
- **Object distance** - how far the object is from the bottom of the gripper

The state of the gripper could be:

- **Pad position** - Pads are either In or Out (out means ready for gripping)
- **Part detected** - the set preload force limit is reached, and object distance is < 18mm
- **Busy** - the pads are moving

The pads can be controlled by clicking on the **Out** and **In** buttons.

The **Preload threshold** value can be changed if higher preload force is required for a proper grip.

This value is only used to generate a proper **Part detected** signal.

NOTE:

Preload threshold value set on this page is not stored permanently and are restored to the default value (90N) on power reset.

If a part was detected and the object distance becomes > 18mm (part is lost) BEFORE the pads are set to be IN (normal release) the **Pads worn** warning is displayed in the **Device info** tab.

To reset the warning:

- either click on the **RESET ERRORS** button
- or click on the **Out** button.

HEX-E/H QC

HEX-E/H QC

This page allows the device to be monitored and controlled. By navigating to the Device info tab the device status is shown. (Some functions might not be accessible without Admin permission.)

Monitor and control   Device info

Force/Torque values

HEXHC001	
Fx (N)	-0.31
Fy (N)	0.16
Fz (N)	-1.00
Tx (Nm)	-0.008
Ty (Nm)	0.060
Tz (Nm)	0.003

ZERO

The force and torque values (**Fx,Fy,Fz** and **Tx,Ty,Tz**) are shown in N/Nm.

The **Zero** toggle switch can be used to zero the force and torque reading.

NOTE:

Zero value set on this page is not stored permanently and are restored to the default values on power reset.

RG2/6

RG2

This page allows the device to be monitored and controlled. By navigating to the Device info tab the device status is shown. (Some functions might not be accessible without Admin permission.)

Monitor and control   Device info

States

○ Busy
○ Grip detected

Safety

RG2 GRIPPER	SWITCH 1	SWITCH 2
Pushed	○	○
Triggered	○	○

(POWER CYCLE)

Set width and force
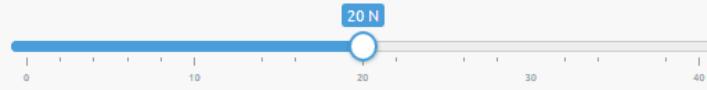
FINGERTIP OFFSET

[5] mm (SAVE)

WIDTH

[51 mm]

0   9   18   27   36   45   55   64   73   82   91   100

FORCE

[20 N]

0   10   20   30   40

Current width: 51 mm

The state of the gripper could be:

- **Busy** - the gripper is moving
- **Grip detected** - the set force limit is reached but the set width is not.

The status of the two safety switch shows:

- **Pushed** - the safety switch 1/2 is still being pushed
- **Triggered** - the safety switch 1/2 has been activated and gripper is stopped.

To recover from a Triggered state:

- Check if any of the safety switch is being pushed
- If yes, remove the object pushing the switch

- Click on **Power cycle** to power all devices off and then on to recover.

Fingertip offset must be set according to the current fingertips attached to the gripper. Offset is measured from the inner mating face of the bar metal fingertips. To save the value to the gripper permanently click **Save**.

The gripper can be controlled by adjusting the **Force** and **Width** value. First set the required gripping force and then adjust the width slider that will immediately control the gripper.

RG2-FT

RG2-FT

This page allows the device to be monitored and controlled. By navigating to the Device info tab the device status is (Some functions might not be accessible without Admin permission.)

Monitor and control   Device info

Force/Torque and Proximity sensor values

LEFT / HEXSD329		HEXSD356 / RIGHT	
0 mm	Proximity		0 mm
0.01	Fx (N)		-0.02
-0.02	Fy (N)		0.00
0.06	Fz (N)		0.08
0.000	Tx (Nm)		-0.001
-0.001	Ty (Nm)		0.001
0.000	Tz (Nm)		0.000

ZERO

PROXIMITY OFFSET

LEFT   **RIGHT**

19 mm   25 mm   SAVE

Set width and force

WIDTH

0 mm

0   10   20   30   40   50   60   70   80   90   100

FORCE

20 N

0   10   20   30   40

Current width: 0 mm

The force and torque values (**Fx,Fy,Fz** and **Tx,Ty,Tz**) are shown in N/Nm along with the Proximity sensor values (optical distance sensor built in the fingertip) are show in mm for the left and right fingertip sensor.
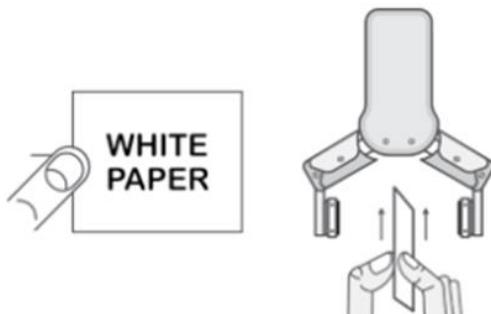
The **Zero** toggle switch can be used to zero the force and torque reading.

NOTE:

Zero value set on this page is not stored permanently and are restored to the default values on power reset.

The **Proximity Offset** can be used to calibrate the proximity reading. The calibration requires the following steps to be done:

- Write 0 mm to the **Left** and **Right** edit box and click on the **Save** button.
- Close the gripper fully (set the **Width** to 0) while you hold a white paper between the fingertips.

- Read the actual **Left** and **Right Proximity** values (e.g.: 19mm and 25mm).
- Write these values to the **Left** and **Right** edit boxes and click on the **Save** button to store it permanently.
- Open the gripper and the calibration is finished.

NOTE:

Setting the offsets too high may clip the proximity reading at 0 mm (negative distance is not shown). In case of clipping (reading 0 mm), try to decrease the offset values.

The gripper can be controlled by adjusting the **Force** and **Width** value. First set the required gripping force and then adjust the width slider that will immediately control the gripper.

VG10 / VGC10

VG10

This page allows the device to be monitored and controlled. By navigating to the Device info tab the device status is shown.
(Some functions might not be accessible without Admin permission.)

Monitor and control   Device info

Actual values

Power limit	500 mA
Channel A	0 kPa
Channel B	0 kPa

Set values

POWER LIMIT

500 mA

| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1 000 |

CHANNEL A

0%

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

RELEASE

☐ Lock

CHANNEL B

0%

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

RELEASE

The actual vacuum level for **Channel A** and **Channel B** can be seen in percentage (in the range of 0...80 kPa vacuum). The actual value of the **Power limit** is shown in mA.

The **Power limit** can be adjusted in the range of 0...1000mA with the slider.

NOTE:

The power limit set in this page is not stored permanently and always restored to the default value on power reset.

Higher power limit value means the required vacuum level is reached faster (higher airflow), but if it is set too fast overshoot may occur.

Low power limit may not be sufficient for higher percentage of vacuum and the target vacuum level may not be reached.

The **Channel A** and **Channel B** vacuum level can be set individually or in tandem by checking the **Lock** checkbox.

Make sure to set high enough vacuum before you grip and lift any object.

To release the gripped object, click on the **Release** button.

Configuration menu
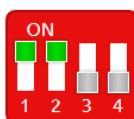
Configuration

This page allows the configuration of the Compute Box.

⚠️ **CAUTION**

Incorrect settings may cause the device to lose network connectivity.

1. Digital input mode: NPN
2. Digital output mode: NPN
3. Compute Box IP setting is configured on this page.
4. DHCP server enabled: Compute Box tries to assign IP to the robot.

NETWORK SETTINGS

MAC address	b8:27:eb:0e:c9:a3
Network mode	Static IP
IP address	192.168.1.1 ✏️
Subnet mask	255.255.255.0 ✏️

SAVE

☐ **ETHERNET/IP SCANNER SETTINGS**

IP address to connect to	___.___.___.___
Origin-to-target instance id	1
Target-to-origin instance id	1
Configuration instance id	0
Requested packet interval (ms)	8

SAVE

COMPUTE BOX SETTINGS

Display name	✏️

SAVE

Network settings:

The **MAC address** is a world-wide unique identifier that is fixed for the device.

The **Network mode** drop-down menu can be used to decide if the Compute Box will have a static or a dynamic IP address:

- If it is set to **Dynamic IP**, the Compute Box expects an IP address from a DHCP server. If the network that the device is connected to has no DHCP server, then the fixed 192.168.1.1 IP is used for the device (after 60 seconds of timeout).

- If it is set to **Static IP**, then a fixed IP address and subnet mask must be set.

- If it is set to **Default Static IP**, the fixed IP revert to the factory default and cannot be changed.

After all parameters are set, click on the **Save** button to store the new values permanently. Wait 1 minute and reconnect to the device using the new settings.

Compute Box settings:

In case, more than one Compute Box is used within the same network, for identification purpose any user specific name can be entered to the **Display name**.

EtherNet/IP scanner settings:

NOTE:

This is a special option of the EtherNet/IP connection for some robots.

In case when the robot is the Adapter and the Compute Box needs to be the Scanner the following addition information is required for the communication:

- **IP address to connect to** - the robot IP address
- **Origin-to-target instance id** - refer to the robot's EtherNet/IP manual (Scanner mode)
- **Target-to-origin instance id** - refer to the robot's EtherNet/IP manual (Scanner mode)
- **Configuration instance id** - refer to the robot's EtherNet/IP manual (Scanner mode)
- **Requested packet interval (ms)** - RPI value in ms (minimum 4)

Check the checkbox and the Compute Box will try to automatically connect to the robot (via the given IP address).

Paths menu

NOTE:

The Path feature may not be available to your robot type.

This page can be used to import, export, and delete the previously recorded paths. In this way a Path can be copied to a different Compute Box.

Manage paths

This page allows uploading and downloading path files.

IMPORT   You can import a path file from your computer.

PATH NAME	SIZE (IN BYTES)		
1539	1,692	↓	🗑
3923	1,972	↓	🗑
3924	1,972	↓	🗑

To import a previously exported Path (.ofp file) click on **Import** and browse for the file.

The available Paths are listed at the end of the page. Any paths can be exported and downloaded as a .ofp file or permanently deleted to free up the list if a path is not needed anymore.

NOTE:

Always make sure that you do not delete any path that is currently in use in any of your robot programs. Otherwise the path will need to be re-recorded, since the delete operation cannot be undone.

The Compute Box can store up to 100 Mbytes of paths that is roughly equal to 1000 hours of recordings.

Update menu

This page can be used to update the software on the Compute Box and the firmware on the devices.

Update

This page allows updating the software and firmware.

> ⚠ **CAUTION**
> Installing updates may take several minutes to complete. Please do not power off or unplug your Compute Box or any of the connected devices during the update process.

SOFTWARE

No update file selected yet...   BROWSE

Click here to download the result of the last update.

FIRMWARE
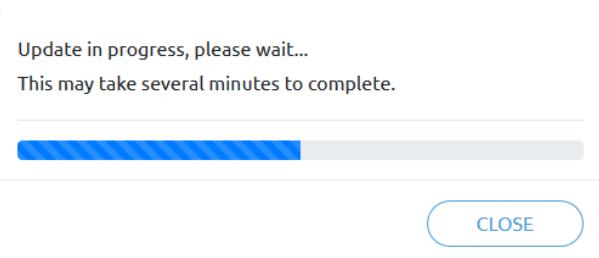
COMPONENTS	CURRENT VERSION	REQUIRED VERSION	
Compute Box (CBOX_RPT)			
Firmware	150	150	✓
HEX-E/H QC (HEXEX006)			
Firmware	208	208	✓

UPDATE

✓ Up-to-date   ↻ Update required   ✗ Downgrade not supported

Start the software update by clicking on the **Browse** button to browse for the .cbu software update file.

Then the **Browse** button will turn to **Update**.

Click on that **Update** button to start the software update process:
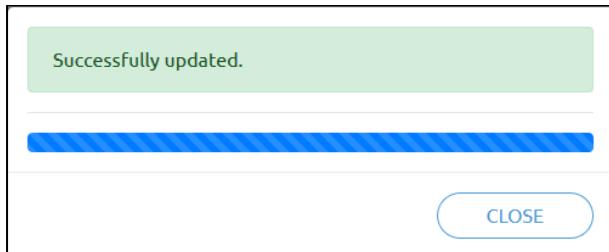
Update in progress, please wait...
This may take several minutes to complete.

CLOSE

⚠ **CAUTION:**

During the update process (takes about 5-10 minutes) DO NOT unplug any device or close the browser window. Otherwise the updated device could be damaged.

If the update is finished and was successful, the following message is shown:

> Successfully updated.
>
> CLOSE

Now disconnect the device and use it as usual.
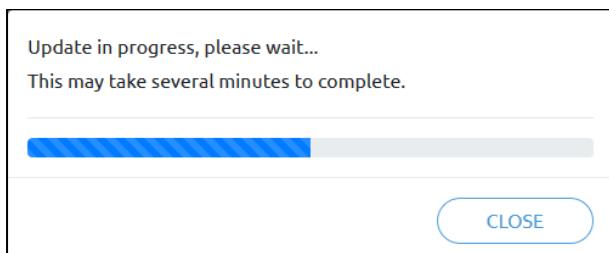
NOTE:

If the software update failed, please contact your distributor.

The firmware update is only required when any of the components ↻ is out of date.
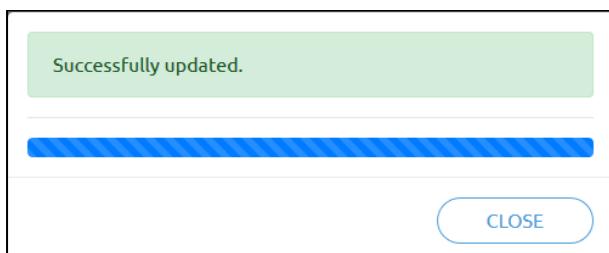
To start the firmware update, click on **UPDATE** button in the firmware section of the page.

> Update in progress, please wait...
> This may take several minutes to complete.
>
> CLOSE

CAUTION:

During the update process (takes about 5-10 minutes) DO NOT unplug any device or close the browser window. Otherwise the updated device could be damaged.

If the update is finished and was successful, the following message is shown:

> Successfully updated.
>
> CLOSE

Now disconnect the device and use it as usual.

NOTE:
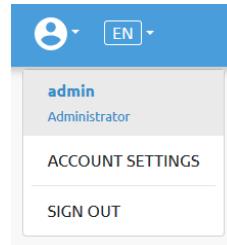
If the update is failed, please contact your distributor.

Account settings

This menu can be used to:

- See the currently sign-id user
- Go to **Account settings**
- Sign-out
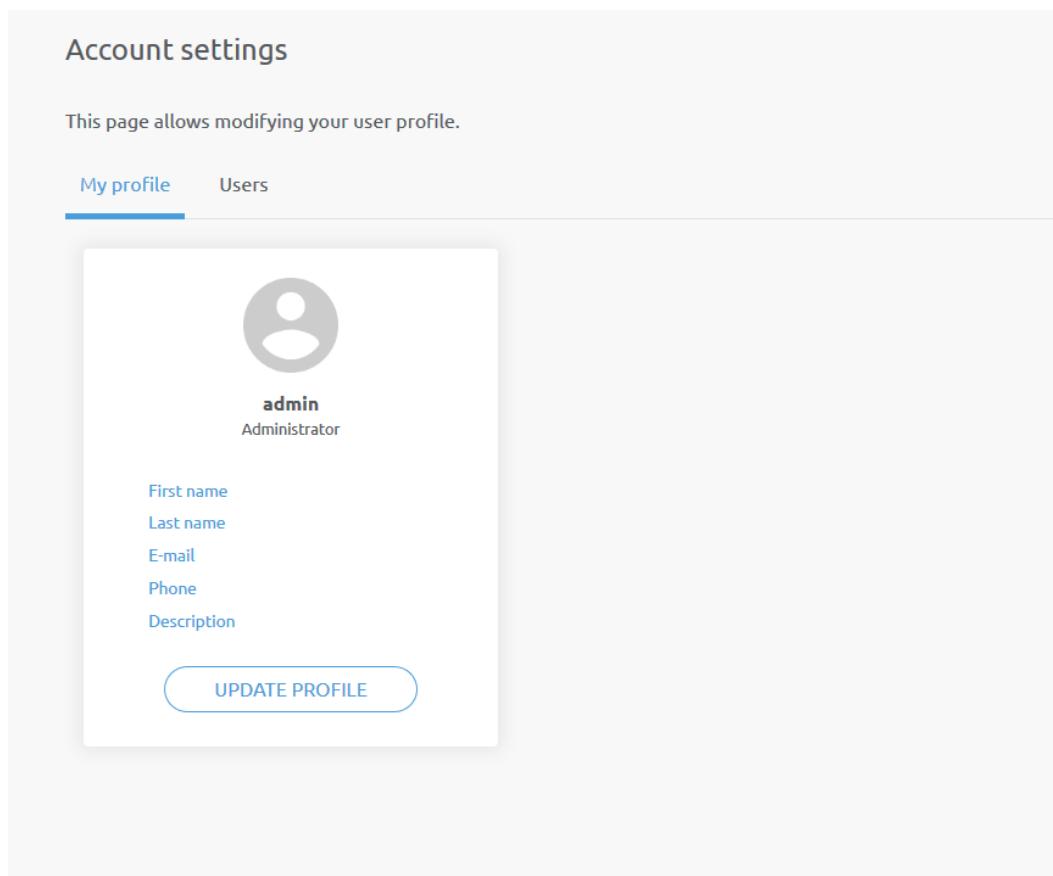
Account settings:

This page has two tabs:

- **My profile** - to see and update the currently logged in users profile (e.g.: change password)
- **Users** - to manage users (e.g.: add/remove/edit)

On the **My profile** tab to change any profile data (e.g.: password) click on the **Update profile** button.

Account settings

This page allows modifying your user profile.

My profile   Users
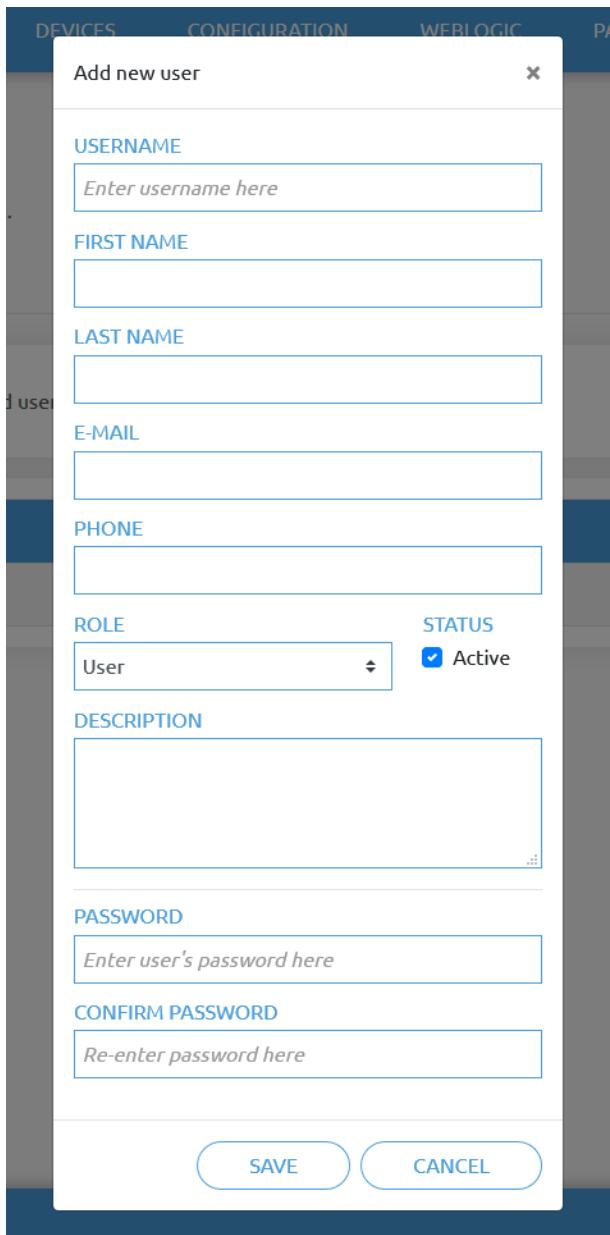
admin
Administrator

First name
Last name
E-mail
Phone
Description

UPDATE PROFILE

On the **Users** tab click on the **Add new user** button to add more users:
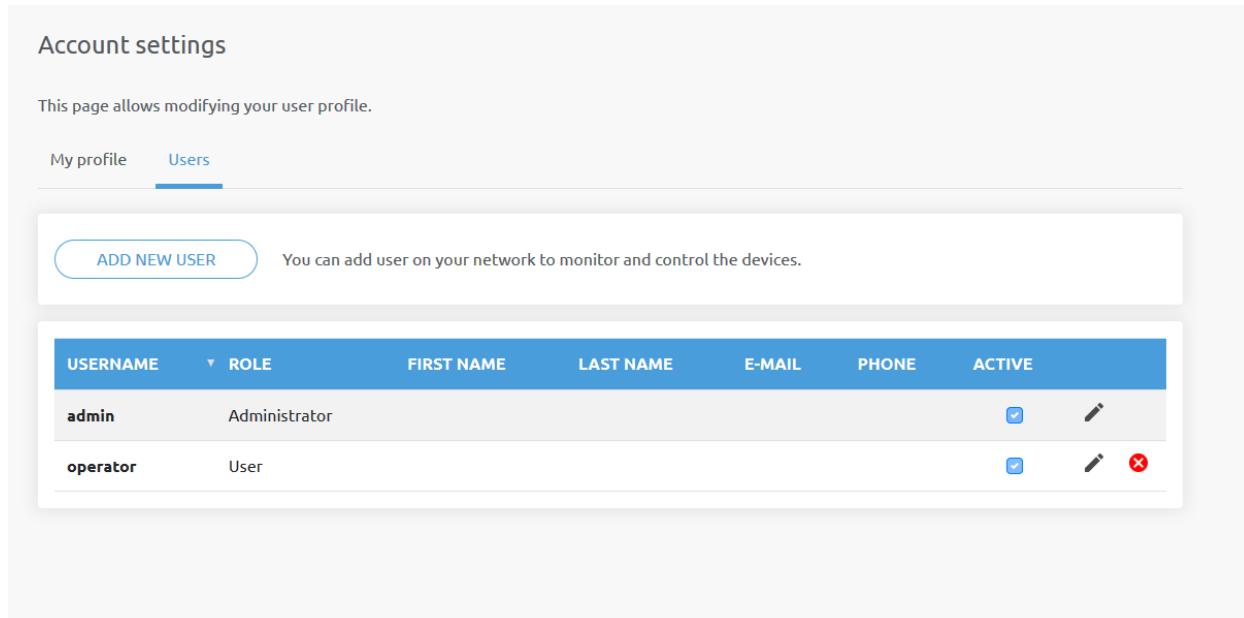
There are three user levels:

- Administrator
- Operator
- User

Fill in the user information and click **Save**.

Later on to change any user information just click on the edit ✏ icon.

To prevent a user to sign-in either could be:

- deactivated by changing its **Active** status in the edit mode
- or removed by clicking the delete ⊗ icon.

5.2 Modbus TCP

MODBUS TCP uses Ethernet as the physical layer, otherwise it is very similar to Modbus RTU. For further details on the protocol, please refer to modbus.org's MODBUS Application Protocol Specification (http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf).

NOTE:

In this section the address and register values are written in the following format:
- DD (HH) where the DD is in decimal and the HH is in hexadecimal format.

5.2.1 Settings

The table below shows the required settings to be used when communicating with the OnRobot's products over MODBUS TCP.

Settings	
Modbus TCP server IP address	Compute Box IP address (default is 192.168.1.1)
Port number	502
Number of concurrent connections	1

For the Gecko gripper, RG2, RG6 and VG10 the Device address depends only on the mounting option and not on the gripper type:

	via Quick Changer	via HEX-E/H QC	via Dual Quick Changer
Device address	65 (0x41)	65 (0x41)	Primary side (1) - 66 (0x42) Secondary side (2) - 67 (0x43)

For HEX-E/H QC and RG2-FT the Device address is fixed:

	HEX-E/H QC	RG2-FT
Device address	64 (0x40)	65 (0x41)

For the Compute Box the Device address is fixed (it has only one functionality to reset the tool power):

	Compute Box
Device address	63 (0x3F)

5.2.2 Function codes

OnRobot products currently support the function codes listed below. The products will respond with an appropriate exception code, if the function is not executed correctly. Please refer to MODBUS Application Protocol page 48 for detailed description of the different exception codes. Note that the product will provide no response if the settings are not correct.

3 (0x03) Read Holding Registers

Use this function code to read out one or multiple consecutive registers. Please refer to MODBUS Application Protocol page 15 for frame and response details.

6 (0x06) Write Single Register

Use this function code to set the value of a single register. Please refer to MODBUS Application Protocol page 19 for frame and response details.

16 (0x10) Write Multiple Registers

Use this function code to set the values of multiple consecutive registers. Please refer to MODBUS Application Protocol page 19 for frame and response details.

23 (0x17) Read/Write Multiple Registers

Use this function code to set the values and read out one or multiple consecutive registers. Note that the registers to be set are set before the registers to be read are read. Please refer to MODBUS Application Protocol page 38 for frame and response details.

5.2.3 Registers

Gecko

The table below provides an overview of the available MODBUS registers in the Gecko Gripper.

All writable registers can be accessed using function codes 6, 16 or 23 and all readable registers can be accessed using function codes 3 or 23.

Address		Register	Access
0	0x0000	Pad Control	Read + Write
4	0x0004	Preload force threshold	Read + Write
256	0x0100	Part detected	Read only
257	0x0101	Pads worn	Read only
260	0x0104	Busy	Read only
261	0x0105	Actual preload force	Read only
262	0x0106	Actual ultrasonic range	Read only
263	0x0107	Pad position	Read only

0 (0x0000) Pad Control (Read + Write)

Controls the pad position.

Value	Description
0x0000	Pull Pads IN
0x0001	Push Pads OUT

4 (0x0004) Preload force threshold (Read + Write)

Sets the threshold for the preload force signal (Preloaded). Available options are:

Value	Description
0x0000	50N
0x0001	90N
0x0002	120N (default)

256 (0x0100) Part detected (Read only)

Reads high (0x0001) when the pads are OUT, the preset preload force has been reached and the Actual ultrasonic range is lower than 18mm, otherwise low (0x0000). It is cleared when the pads are pulled IN.

257 (0x0101) Pads worn (Read only)

Reads high (0x0001) when the pads need to be replaced.

260 (0x0104) Busy (Read only)

Reads high (0x0001) when pads are in motion otherwise reads low (0x0000).

261 (0x0105) Actual preload force (Read only)

Reads the actual preload force in 1/100 N.

262 (0x0106) Actual ultrasonic range (Read only)

Reads the actual preload force in 1/100 mm.

263 (0x0107) Pad position (Read only)

Reads the actual position of the pads:

Value	Description
0x0000	Pads IN
0x0001	Pads OUT

HEX-E/H QC

The table below provides an overview of the available MODBUS registers in the HEX-E/H QC.

All writable registers can be accessed using function codes 6, 16 or 23 and all readable registers can be accessed using function codes 3 or 23.

Address		Register	Access
0	0x0000	Zero	Read + Write
257	0x0101	Status	Read only
259	0x0103	Fx	Read only
260	0x0104	Fy	Read only
261	0x0105	Fz	Read only
262	0x0106	Tx	Read only
263	0x0107	Ty	Read only
264	0x0108	Tz	Read only

0 (0x0000) Bias (Read + Write)

Zero the force and torque values to cancel any offset.

Value	Description
0x0000	Un-Zero
0x0001	Zero

256 (0x0100) Status (Read only)

Reads low (0x0000) when there is no error.

259 (0x0103) Fx (Read only)

Force value along the X axis (in the sensor coordinate system) in 1/10 N. The value is signed INT.

260 (0x0104) Fy (Read only)

Force value along the Y axis (in the sensor coordinate system) in 1/10 N. The value is signed INT.

261 (0x0105) Fz (Read only)

Force value along the Z axis (in the sensor coordinate system) in 1/10 N. The value is signed INT.

262 (0x0106) Tx (Read only)

Torque value about the X axis (in the sensor coordinate system) in 1/100 Nm. The value is signed INT.

263 (0x0107) Ty (Read only)

Torque value about the Y axis (in the sensor coordinate system) in 1/100 Nm. The value is signed INT.

264 (0x0108) Tz (Read only)

Torque value about the Z axis (in the sensor coordinate system) in 1/100 Nm. The value is signed INT.

RG2
RG6

The table below provides an overview of the available MODBUS registers in the RG2/6.

All writable registers can be accessed using function codes 6, 16 or 23 and all readable registers can be accessed using function codes 3 or 23.

Address		Register	Access
0	0x0000	Target force	Write
1	0x0001	Target width	Write
2	0x0002	Control	Write
258	0x0102	Fingertip offset	Read only
263	0x0107	Actual depth	Read only
264	0x0108	Actual relative depth	Read only
267	0x010B	Actual width	Read only
268	0x010C	Status	Read only
275	0x0113	Actual width with offset	Read only
1031	0x0407	Set Fingertip offset	Write only

0 (0x0000) Target force (Write)

This field sets the target force to be reached when gripping and holding a workpiece. It must be provided in 1/10th Newtons. The valid range is 0 to 400 for the RG2 and 0 to 1200 for the RG6.

1 (0x0001) Target width (Write)

This field sets the target width between the finger to be moved to and maintained. It must be provided in 1/10th millimeters. The valid range is 0 to 1100 for the RG2 and 0 to 1600 for the RG6. Please note that the target width should be provided corrected for any fingertip offset, as it is measured between the insides of the aluminum fingers.

2 (0x0002) Control (Write)

The control field is used to start and stop gripper motion. Only one option should be set at a time. Please note that the gripper will not start a new motion before the one currently being executed is done (see busy flag in the Status field). The valid flags are:

Value	Name	Description
1 (0x0001)	grip	Start the motion, with the preset target force and width. Width is calculated without the fingertip offset. Please note that the gripper will ignore this command if the busy flag is set in the status field.
8 (0x0008)	stop	Stop the current motion.
16 (0x0010)	grip_w_offset	Same as grip, but width is calculated with the set fingertip offset.

258 (0x0102) Fingertip offset (Read only)

Indicates the current fingertip offset in 1/10 millimeters. Please note that the value is a signed two's complement number.

263 (0x0107) Actual depth (Read only)

Indicates the current depth of the gripper, to be used for depth compensation. The depth is relative to the fully closed position, provided in 1/10 millimeters. Please note that the value is a signed two's complement number.

264 (0x0108) Actual relative depth (Read only)

Indicates the current depth of the gripper, to be used for depth compensation. The depth is relative to the position at which the latest motion was initiated and is provided in 1/10 millimeters. Please note that the value is a signed two's complement number.

267 (0x010B) Actual width (Read only)

Indicates the current width between the gripper fingers in 1/10 millimeters. Please note that the width is provided without any fingertip offset, as it is measured between the insides of the aluminum fingers.

268 (0x010C) Status (Read only)

This status field indicates the status of the gripper and its motion. It is composed of 7 flags, described in the table below.

Bit	Name	Description
0 (LSB)	busy	High (1) when a motion is ongoing, low (0) when not. The gripper will only accept new commands when this flag is low.
1	grip detected	High (1) when an internal- or external grip is detected.
2	S1 pushed	High (1) when safety switch 1 is pushed.
3	S1 trigged	High (1) when safety circuit 1 is activated. The gripper will not move while this flag is high; can only be reset by power cycling the gripper.
4	S2 pushed	High (1) when safety switch 2 is pushed.
5	S2 trigged	High (1) when safety circuit 2 is activated. The gripper will not move while this flag is high; can only be reset by power cycling the gripper.
6	Safety error	High (1) when on power on any of the safety switch is pushed.
10-16	Reserved	Not used

275 (0x0113) Actual width with offset (Read only)

Indicates the current width between the gripper fingers in 1/10 millimeters. The set fingertip offset is considered.

1031 (0x0407) Set Fingertip offset (Write only)

This field sets the Fingertip offset in 1/10 mm. Positive number means an inward offset (decreases how much the gripper can be closed).

RG2-FT

The table below provides an overview of the available MODBUS registers in the RG2-FT.

All writable registers can be accessed using function codes 6, 16 or 23 and all readable registers can be accessed using function codes 3 or 23.

Address		Register	Access
0	0x0000	Zero	Read + Write
2	0x0002	Target force	Write
3	0x0003	Target width	Write
4	0x0004	Control	Write
5	0x0005	Proximity Offset (L)	Read + Write
6	0x0006	Proximity Offset (R)	Read + Write
257	0x0101	Status (L)	Read only
259	0x0103	Fx (L)	Read only
260	0x0104	Fy (L)	Read only
261	0x0105	Fz (L)	Read only
262	0x0106	Tx (L)	Read only
263	0x0107	Ty (L)	Read only
264	0x0108	Tz (L)	Read only
266	0x010A	Status (L)	Read only
268	0x010C	Fx (L)	Read only
269	0x010D	Fy (L)	Read only
270	0x010E	Fz (L)	Read only
271	0x010F	Tx (L)	Read only
272	0x0110	Ty (L)	Read only
273	0x0111	Tz (L)	Read only
274	0x0112	Proximity Status (L)	Read only
275	0x0113	Proximity Value (L)	Read only
277	0x0115	Proximity Status (R)	Read only
278	0x0116	Proximity Value (R)	Read only
280	0x0118	Actual gripper width	Read only
281	0x0119	Gripper Busy	Read only
282	0x011A	Grip detected	Read only

0 (0x0000) Bias (Read + Write)

Zero the force and torque values to cancel any offset.

Value	Description
0x0000	Un-Zero
0x0001	Zero

2 (0x0002) Target force (Write)

This field sets the target force to be reached when gripping and holding a workpiece. It must be provided in 1/10 Newtons. The valid range is 0 to 400.

3 (0x0003) Target width (Write)

This field sets the target width between the finger to be moved to and maintained. It must be provided in 1/10th millimeters. The valid range is 0 to 1000. Please note that the target width should be provided corrected for any fingertip offset, as it is measured between the insides of the aluminum fingers.

4 (0x0004) Control (Write)

The control field is used to start and stop gripper motion. Only one bit should be set at a time. Please note that the gripper will not start a new motion before the one currently being executed is done (see busy flag in the Status field). The valid flags are:

Value	Name	Description
0x0000	stop	Stop the current motion.
0x0001	grip	Start the motion, with the preset target force and width. Please note that the gripper will ignore this flag if the busy flag is set in the status field.

5 (0x0005) Proximity Offset L (Read + Write)

This field sets the offset of the left proximity sensor that is subtracted from the raw signal. It must be provided in 1/10 millimeters.

6 (0x0006) Proximity Offset R (Read + Write)

Same as the left above.

256 (0x0100) Status (L) (Read only)

Reads low (0x0000) when there is no error with the left finger sensor.

259 (0x0103) Fx (L) (Read only)

Left finger sensor's force value along the X axis (in the sensor coordinate system) in 1/10N. The value is signed INT.

260 (0x0104) Fy (L) (Read only)

Left finger sensor's force value along the Y axis (in the sensor coordinate system) in 1/10N. The value is signed INT.

261 (0x0105) Fz (L) (Read only)

Left finger sensor's force value along the Z axis (in the sensor coordinate system) in 1/10N. The value is signed INT.

262 (0x0106) Tx (L) (Read only)

Left finger sensor's torque value about the X axis (in the sensor coordinate system) in 1/100 Nm. The value is signed INT.

263 (0x0107) Ty (L) (Read only)

Left finger sensor's torque value about the Y axis (in the sensor coordinate system) in 1/100 Nm. The value is signed INT.

264 (0x0108) Tz (L) (Read only)

Left finger sensor's torque value about the Z axis (in the sensor coordinate system) in 1/100 Nm. The value is signed int.

266 (0x010A) Status (R) (Read only)

Same as the left above.

268 (0x010C) Fx (R) (Read only)

Same as the left above.

269 (0x010D) Fy (R) (Read only)

Same as the left above.

270 (0x010E) Fz (R) (Read only)

Same as the left above.

271 (0x010F) Tx (R) (Read only)

Same as the left above.

272 (0x0110) Ty (R) (Read only)

Same as the left above.

273 (0x0111) Tz (R) (Read only)

Same as the left above.

274 (0x0112) Proximity Status (L) (Read only)

Reads low (0x0000) when there is no error with the left proximity sensor.

275 (0x0113) Proximity Value (L) (Read only)

Reads the current distance from the left proximity sensor in 1/10 mm. The value is signed INT.

277 (0x0115) Proximity Status (R) (Read only)

Same as the left above.

278 (0x0116) Proximity Value (R) (Read only)

Same as the left above.

280 (0x0118) Actual gripper width (Read only)

Indicates the current width between the gripper fingers in 1/10 millimeters. Please note that the width is provided without any fingertip offset, as it is measured between the insides of the aluminum fingers.

281 (0x0119) Gripper busy (Read only)

High (1) when a motion is ongoing, low (0) when not. The gripper will only accept new commands when this flag is low.

282 (0x011A) Grip detected (Read only)

High (1) when an internal- or external grip is detected.

VG10 / VGC10

The table below provides an overview of the available MODBUS registers in the VG grippers.

All writable registers can be accessed using function codes 6, 16 or 23 and all readable registers can be accessed using function codes 3 or 23.

Address		Register	Access
0	0x0000	Channel A Control	Read + Write
1	0x0001	Channel B Control	Read + Write
2	0x0002	Current limit	Read + Write
258	0x0102	Channel A actual vacuum	Read only
259	0x0103	Channel B actual vacuum	Read only

0 (0x0000) Channel A Control (Read + Write)

This register allows for control of channel A. The register is split into two 8-bit fields:

Bits 15-8	Bits 7-0
Control mode	Target vacuum

The Control mode field must contain one of these three values:

Value	Name	Description
0 (0x00)	Release	Commands the channel to release any work item and stop the pump, if not required by the other channel.
1 (0x01)	Grip	Commands the channel to build up and maintain vacuum on this channel.
2 (0x02)	Idle	Commands the channel to neither release nor grip. Workpieces may "stick" to the channel if physically pressed towards its vacuum cups, but the VG will use slightly less power.

The Target vacuum field sets the level of vacuum to be build up and maintained by the channel. It is used only when the control mode is 1 (0x01) / Grip. The target vacuum should be provided in % vacuum. It should never exceed 80.

Examples:

Setting the register value 0 (0x0000) will command the VG to release the work item.

Setting the register value 276 (0x0114) will command the VG to grip at 20 % vacuum.

Setting the register value 296 (0x0128) will command the VG to grip at 40 % vacuum.

Setting the register value 331 (0x014B) will command the VG to grip at 75 % vacuum.

Setting the register value 512 (0x0200) will command the VG to idle the channel.

1 (0x0001) Channel B Control (Read + Write)

Same as in channel A above.

2 (0x0002) Current limit (Read + Write)

Set and read the current limit. The limit is provided and must be given in mA (milli-amperes). The limit is 500mA per default and should never be set above 1000 mA.

258 (0x0102) Channel A actual vacuum (Read only)

Reads the actual vacuum on Channel A. The vacuum is provided in (1/1000 of relative vacuum. Please note that this differs from the setpoint given in percent, as extra accuracy is desirable on the actual vacuum.

259 (0x0103) Channel B actual vacuum (Read only)

Same as in channel A above.

Compute Box

The table below provides an overview of the available MODBUS registers for the Compute Box.

All writable registers can be accessed using function codes 6, 16 or 23 and all readable registers can be accessed using function codes 3 or 23.

Address		Register	Access
0	0x0000	Reset tool power	Write

0 (0x0000) Reset tool power (Write)

Writing 2 to this field powers the tool off for a short amount of time and then powers them back. This can be used to reset the RG2 or RG6 after the safety switch is triggered. It could take 1-2 seconds.

6   Hardware Specification

6.1   Technical sheets

Gecko

General Properties					Unit
Gripper					
Workpiece Material	**Polished Steel**	**Acrylic**	**Glass**	**Sheet Metal**	
Maximum payload (x2 safety factor)	6.5 14.3	6.5 14.3	5.5 12.1	5.5 12.1	[kg] [lb]
Preload required for max adhesion	140				[N]
Detachment time	300				[msec]
Holds workpiece on power loss?	yes				
Pads					
Change-out interval	150 000 to 200 000 cycles for HIGH preload 200 000 to 250 000 cycles for LOW preload				[cycles]
Manual Cleaning	Isopropyl alcohol and lint free cloth				
Robotic cleaning system	Cleaning Station				
Robotic cleaning interval and % recovery	Refer to Cleaning Station User Guide				
Sensors					
	Pre-load sensor		Ultrasonic Range sensor		
Range	45 [N] 9 [lb]	140 [N] 31 [lb]	0	260 [mm] 10 [inch]	[N][mm] [lb][inch]
Error	7%		2%		
IP Classification	42				
Dimensions (HxW)	187 x 146 7.3 x 5.7				[mm] [inch]
Weight	2.85 6.3				[kg] [lb]

NOTE:

Avoid preloading the gripper with an inverted robot or in non-vertical loading conditions. If preloaded whilst inverted, preload sensor will not meet typical performance standards.

Operating Conditions	Minimum	Typical	Maximum	Unit
Temperature	0 32	- -	50 122	[°C] [°F]
Surface Characteristics*	Matte finish	Highly polished	-	

* Smoother surfaces require less preload force for a desired payload force.

Specification or Feature	Target value
Parts Presence Sensing	Yes (Ultrasonic)
Pad Material	Proprietary silicone blend
Wear Properties	Depends on surface roughness and preload
Pad Attachment Mechanism	Magnetic
Change-out interval	150000 − 200000 for HIGH PRELOAD 200000 − 250000 for LOW PRELOAD
Cleaning system	Cleaning station
Cleaning interval and % recovery	See Cleaning Station Manual

Effectiveness on Different Materials

The Gecko Gripper is best suited for smooth, low surface roughness substrates that are generally flat, stiff, and rigid. For other materials, the Gecko Gripper's effectiveness drops depending the stiffness and roughness of the picking surface. The table below shows a relationship between rigid and flexible substrates, surface finish, payload and the required preload to pick up said substrate. For example, if the customer knows that their part/substrate is rigid, with a mirror-like finish and weighs 2kg, the preload required to pick up the part/substrate is a medium-level preload.

Flexibility	Surface finish	Payload (kg)	Required Preload
Rigid	Mirror-like finish	0 to 2	Low
		2 to 4	Medium
		4 to 6	High
	Smooth	0 to 2	Medium
		2 to 4	High
		4 to 6	N/A
	Matte	0 to 2	High
		2 to 4	N/A
		4 to 6	N/A
Flexible	Mirror-like finish	0 to 2	Medium
		2 to 4	High
		4 to 6	N/A
	Smooth	0 to 2	High
		2 to 4	N/A
		4 to 6	N/A
	Matte	0 to 2	N/A
		2 to 4	N/A
		4 to 6	N/A

To further elaborate the significance between preload and payload, the table below shows visual matrix that displays the capability of the gecko gripper to pick up different materials with varying stiffness and roughness, at three different preload values (low 40N, medium 90N, high 140N).

Stiffness	Roughness	Example of material	Preload - 140N Payload [kg]						Preload - 90N Payload [kg]						Preload - 40N Payload [kg]					
			0.1	0.5	1	2	4	6	0.1	0.5	1	2	4	6	0.1	0.5	1	2	4	6
1	1	Mylar	✓	✓	✓	*			✓	✓	*				✓	*				
5	1	Transparency sheet	✓	✓	✓	✓	*		✓	✓	*				✓	*				
10	1	Polished mirror-like steel, solar panel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	*	✓	✓	✓	✓	*	
1	5	Cling film, ziploc bags	✓	✓	*				✓	*					✓	*				
5	5	Glossy carboard (cereal box)	✓	✓	*				✓	*					✓	*				
10	5	Printed circuit board	✓	✓	✓	✓	*		✓	✓	*				✓	*				
1	10	Laminating plastic / film	*																	
5	10	Corrugated cardboard																		
10	10	Sandblasted aluminum																		

✓ the gripper can easily pick up the material

* the gripper can pick up the material in some cases (requires caution and testing to verify)

Nothing the gripper cannot pick up this type of material.

NOTE:

This table is to be utilized as a guide to better understand the payload capacity and substrate type for the Gecko Gripper.

The criteria for stiffness and roughness is a basic scale from 1-10, here are the benchmarks used to determine the values.

Stiffness	Description	Example
1	Flexible	Fabric
5	Semi-flexible	Cardboard
10	Stiff	Metal

Roughness	Description	Example	RMS Value
1	Polished/Smooth	Polished Metal	0.1 micron
5	Textured	Carboard	7 microns
10	Rough	Sandblasted Metal	28 microns

HEX-E QC

General Properties	6-Axis Force/Torque Sensor				Unit
	Fxy	Fz	Txy	Tz	
Nominal Capacity (N.C)	200	200	10	6.5	[N] [Nm]
Single axis deformation at N.C (typical)	± 1.7 ± 0.067	± 0.3 ± 0.011	± 2.5 ± 2.5	± 5 ± 5	[mm] [°] [inch] [°]
Single axis overload	500	500	500	500	[%]
Signal noise* (typical)	0.035	0.15	0.002	0.001	[N] [Nm]
Noise-free resolution (typical)	0.2	0.8	0.01	0.002	[N] [Nm]
Full scale nonlinearity	< 2	< 2	< 2	< 2	[%]
Hysteresis (measured on Fz axis, typical)	< 2	< 2	< 2	< 2	[%]
Crosstalk (typical)	< 5	< 5	< 5	< 5	[%]
IP Classification	67				
Dimensions (H x W x L)	50 x 71 x 93 1.97 x 2.79 x 3.66				[mm] [inch]
Weight (with built-in adapter plates)	0.347 0.76				[kg] [lb]

* Signal noise is defined as the standard deviation (1 σ) of a typical one second no-load signal.

Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	7	-	24	[V]
Power consumption	-	-	0.8	[W]
Operating temperature	0 32	- -	55 131	[°C] [°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[Hours]

Complex loading

During single-axis loading, the sensor can be operated up to its nominal capacity. Above the nominal capacity the reading is inaccurate and invalid.

During complex loading (when more than one axis is loaded) the nominal capacities are reduced. The following diagrams show the complex loading scenarios.

The sensor cannot be operated outside of the Normal Operating Area.

Txy & Fxyz

Txy (Nm)

Normal

Operating Area

Fxyz (N)

Tz & Fxyz

Tz (Nm)

Normal

Operating Area

Fxyz (N)

HEX-H QC

General Properties	6-Axis Force/Torque Sensor				Unit
	Fxy	**Fz**	**Txy**	**Tz**	
Nominal Capacity (N.C)	200	200	20	13	[N] [Nm]
Single axis deformation at N.C (typical)	± 0.6 ± 0.023	± 0.25 ± 0.009	± 2 ± 2	± 3.5 ± 3.5	[mm] [°] [inch] [°]
Single axis overload	500	400	300	300	[%]
Signal noise* (typical)	0.1	0.2	0.006	0.002	[N] [Nm]
Noise-free resolution (typical)	0.5	1	0.036	0.008	[N] [Nm]
Full scale nonlinearity	< 2	< 2	< 2	< 2	[%]
Hysteresis (measured on Fz axis , typical)	< 2	< 2	< 2	< 2	[%]
Crosstalk (typical)	< 5	< 5	< 5	< 5	[%]
IP Classification	67				
Dimensions (H x W x L)	50 x 71 x 93 1.97 x 2.79 x 3.66				[mm] [inch]
Weight (with built-in adapter plates)	0.35 0.77				[kg] [lb]

* Signal noise is defined as the standard deviation (1 σ) of a typical one second no-load signal.

Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	7	-	24	[V]
Power consumption	-	-	0.8	[W]
Operating temperature	0 32	- -	55 131	[°C] [°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[Hours]

Complex loading

During single-axis loading, the sensor can be operated up to its nominal capacity. Above the nominal capacity the reading is inaccurate and invalid.

During complex loading (when more than one axis is loaded) the nominal capacities are reduced. The following diagrams show the complex loading scenarios.

The sensor cannot be operated outside of the Normal Operating Area.

Txy & Fxyz

Txy (Nm) vs Fxyz (N) — Normal Operating Area

Tz & Fxyz

Tz (Nm) vs Fxyz — Normal Operating Area

| Quick Changer |
| Quick Changer for I/O |
| Dual Quick Changer |
| Quick Changer - Tool side |

If not specified, the data represent the combination of the different Quick Changer types/sides.

Technical data	Min	Typical	Max	Units
Permissible force*	-	-	400*	[N]
Permissible torque*	-	-	50*	[Nm]
Rated payload*	- -	- -	20* 44	[kg] [lbs]
Repeatability	-	-	±0.02	[mm]
IP Classification	64			
Operating life (Tool change)	-	5.000	-	[cycles]
Operating life (Robot operation)	10	-	-	[M cycles]

* See load capacity graph below.

	Quick Changer	Quick Changer for I/O	Dual Quick Changer	Quick Changer - Tool Side	Units
Weight	0.06 13.22	0.093 2.05	0.41 90.39	0.14 30.86	[kg] [lb]
Dimensions	See Mechanical dimension section				

Load capacity

RG2-FT

General Properties	Min	Typical	Max	Units
Payload Force Fit	- -	- -	2 4.4	[kg] [lb]
Payload Form Fit	- -	- -	4 8.8	[Kg] [lb]
Total stroke (adjustable)	0 0	- -	100 3.93	[mm] [inch]
Finger position resolution	- -	0.1 0.004	- -	[mm] [inch]
Repetition accuracy	- -	0.1 0.004	0.2 0.007	[mm] [inch]
Reversing backlash	0.2 0.007	0.4 0.015	0.6 0.023	[mm] [inch]
Gripping force (adjustable)	3	-	40	[N]
Gripping speed*	55	110	184	[mm/s]
Gripping time**	0.04	0.07	0.11	[s]
Adjustable bracket tilting accuracy	-	< 1	-	°
Ambient operating temperature	5	-	50	[°C]
Storage temperature	0	-	60	[°C]
Motor	Integrated, electric BLDC			
IP Classification	IP54			
Dimensions	219 x 149 x 49 8.6 x 5.9 x 1.9			[mm] [inch]
Product weight	0.98 2.16			[kg] [lb]

* see speed table 76

** based on 8mm total movement between fingers. The speed is linearly proportional to the force. For more details see speed table on page 76.
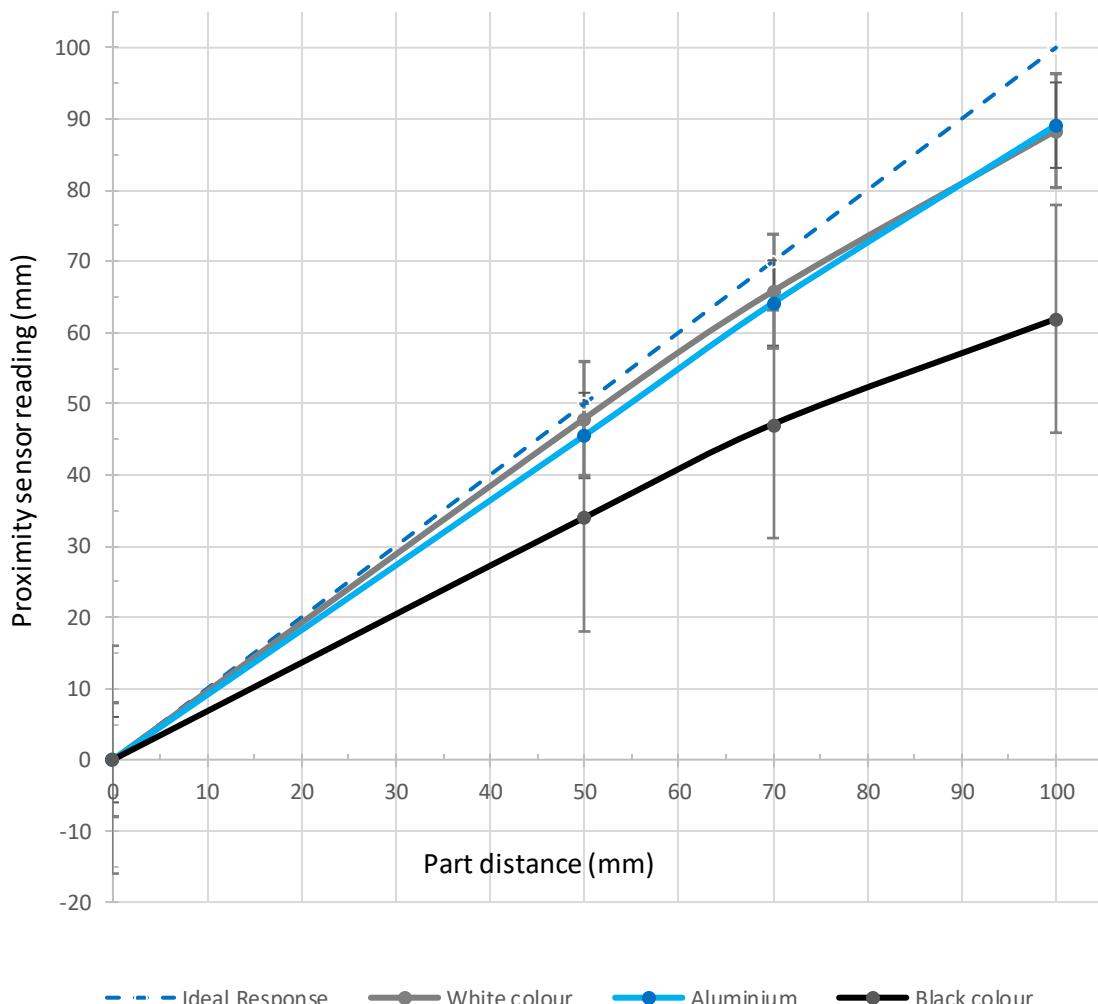
Force Sensor Properties	Fxy	Fz	Txy	Tz	Units
Nominal capacity (N.C.)	20	40	0.7	0.5	[N] [Nm]
Single axis overload	200	200	200	200	[%]
Noise free resolution	0.1	0.4	0.008	0.005	[N] [Nm]
Single axis deformation at N.C.	0.4 0.015	0.1 0.04	2	5	[mm] [°] [inch] [°]
Full scale nonlinearity Temperature compensation	< 2				[%]

| Proximity Sensor Properties	Min	Typical	Max	Units
Sensing range	0	-	100	[mm]
	0	-	3.93	[inch]
Precision	-	2	-	[mm]
	-	0.078	-	[inch]
Non-linearity*	-	12	-	[%]
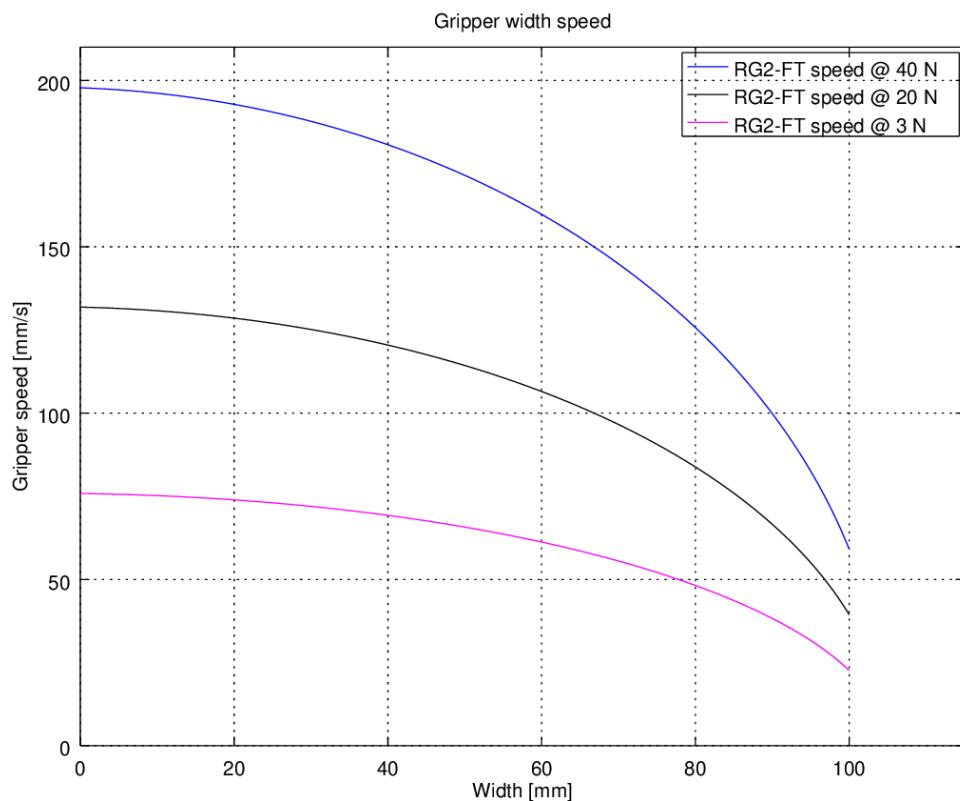
* the non-linearity refers to the max value and depends on the object properties (e.g. surface type and color)

Operating Conditions	Minimum	Typical	Maximum	Unit
Power requirement (PELV)	24	-	24	[V]
Power consumption	6.5	-	22	[W]
Operating temperature	0	-	55	[°C]
	32	-	131	[°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[Hours]
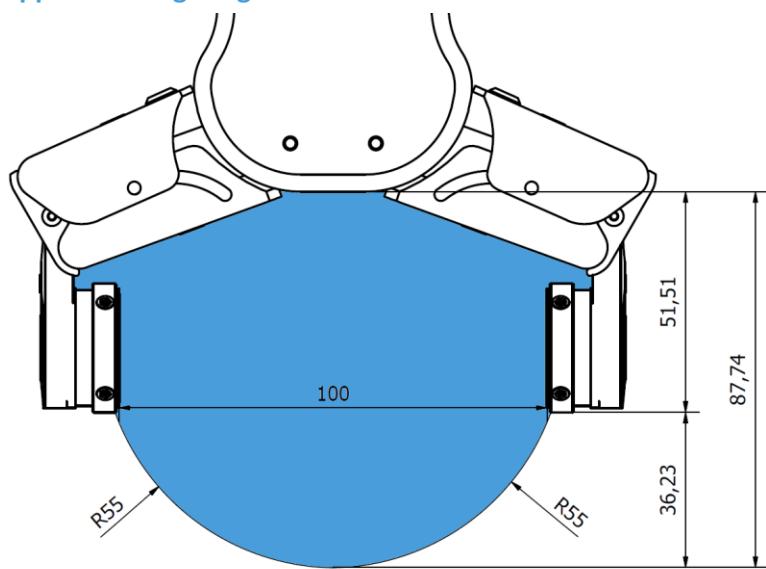
Proximity sensor typical accuracy

RG2-FT Gripping Speed Graph
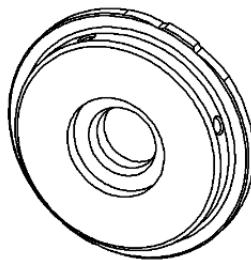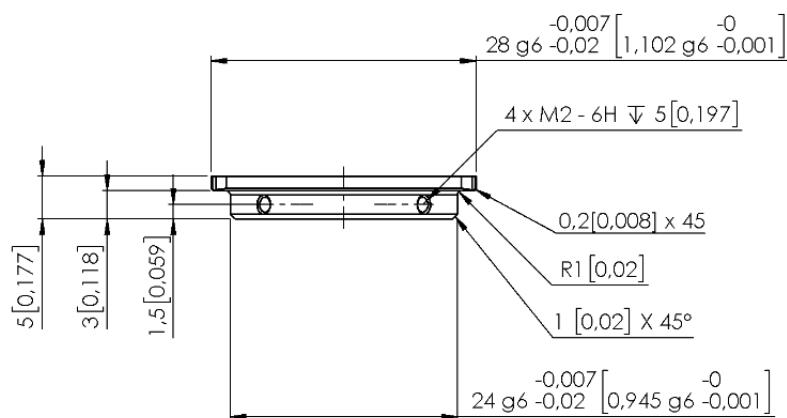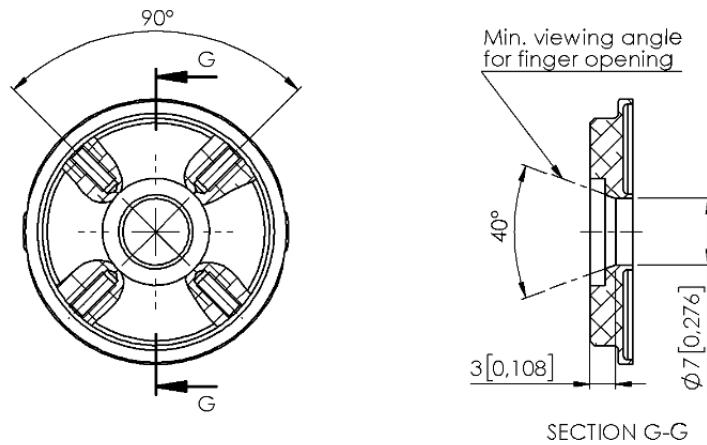
Gripper Working Range

The dimensions are in millimeters.

Fingertips

The standard fingertips can be used for many different workpieces. If custom fingertips are required, they can be made to fit the Gripper fingers.

Dimensions of the Gripper's finger, in millimeters.

NOTE:

During the fingertip design, the following shall be considered to maintain optimal performance:

Clear optical path for the proximity sensors

Protect the proximity sensors from direct sunlight or strong light source

Avoid dust and liquid penetration

WARNING:

The proximity sensors are sensitive parts and shall be protected against:

Direct strong light (such as directional laser sources)

Direct high temperature

Mechanical contacts in any case

Expose to any liquid or fine conductive dust

NOTE:

Please clean regularly the proximity sensor surface with low pressure compressed air (<5 bar) from a 5 cm distance. For stronger contamination use isopropyl alcohol with a soft cotton swab to keep it clean.

Finger Thickness

The default fingertips are considered while the finger thickness has been set and could not be changed in the software. In case when custom fingertips are used, the user should manually compensate for the difference in the finger thickness.

RG2

General Properties		Minimum	Typical	Maximum	Unit
Payload Force Fit		-	-	2	[kg]
		-	-	4.4	[lb]
Payload Form Fit		-	-	5	[kg]
		-	-	11	[lb]
Total stroke (adjustable)		0	-	110	[mm]
		0	-	4.33	[inch]
Finger position resolution		-	0.1	-	[mm]
		-	0.004	-	[inch]
Repetition accuracy		-	0.1	0.2	[mm]
		-	0.004	0.007	[inch]
Reversing backlash		0.1	-	0.3	[mm]
		0.004	-	0.011	[inch]
Gripping force (adjustable)		3	-	40	[N]
Gripping force deviation			±25		%
Gripping speed*		38	-	127	[mm/s]
Gripping time**		0.06	-	0.21	[s]
Adjustable bracket tilting accuracy		-	< 1	-	°
Storage temperature		0	-	60	[°C]
		32	-	122	[°F]
Motor		Integrated, electric BLDC			
IP Classification		IP54			
Dimensions		213 x 149 x 36			[mm]
		8.3 x 5.9 x 1.4			[inch]
Weight		0.78			[kg]
		1.72			[lb]

*See table on the next page

** based on 8mm total movement between fingers. The speed is linearly proportional to the force. For more details see speed table on next page.
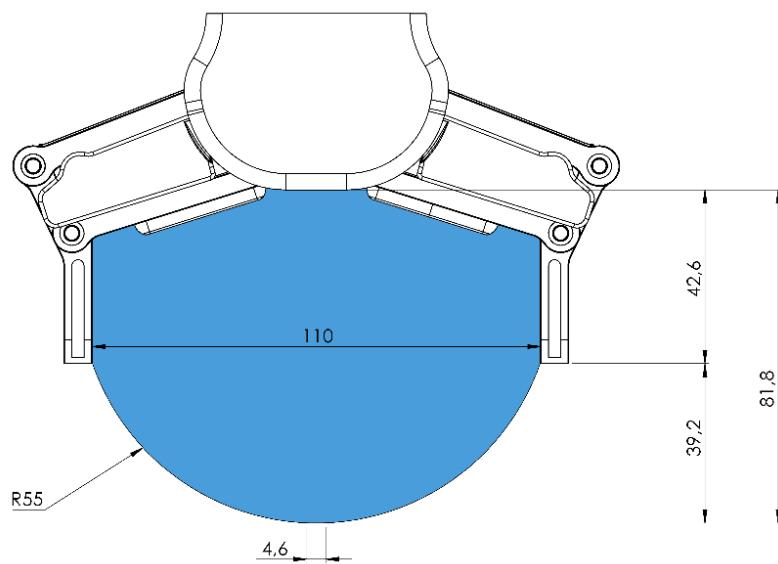
Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	20	24	25	[V]
Current consumption	70	-	600*	[mA]
Operating temperature	5	-	50	[°C]
	41	-	122	[°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[Hours]

*Current spikes up to 3A (max 6mS) may occur during the release action.
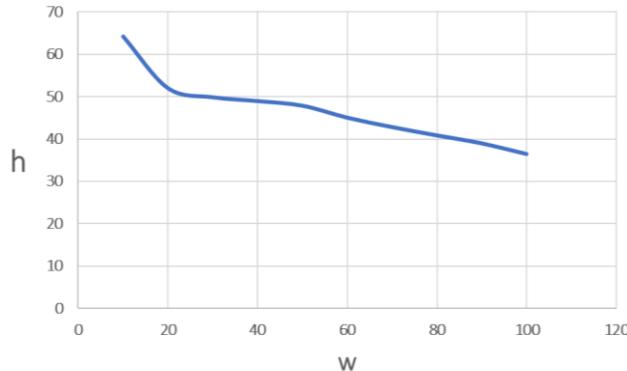
RG2 Gripping Speed Graph
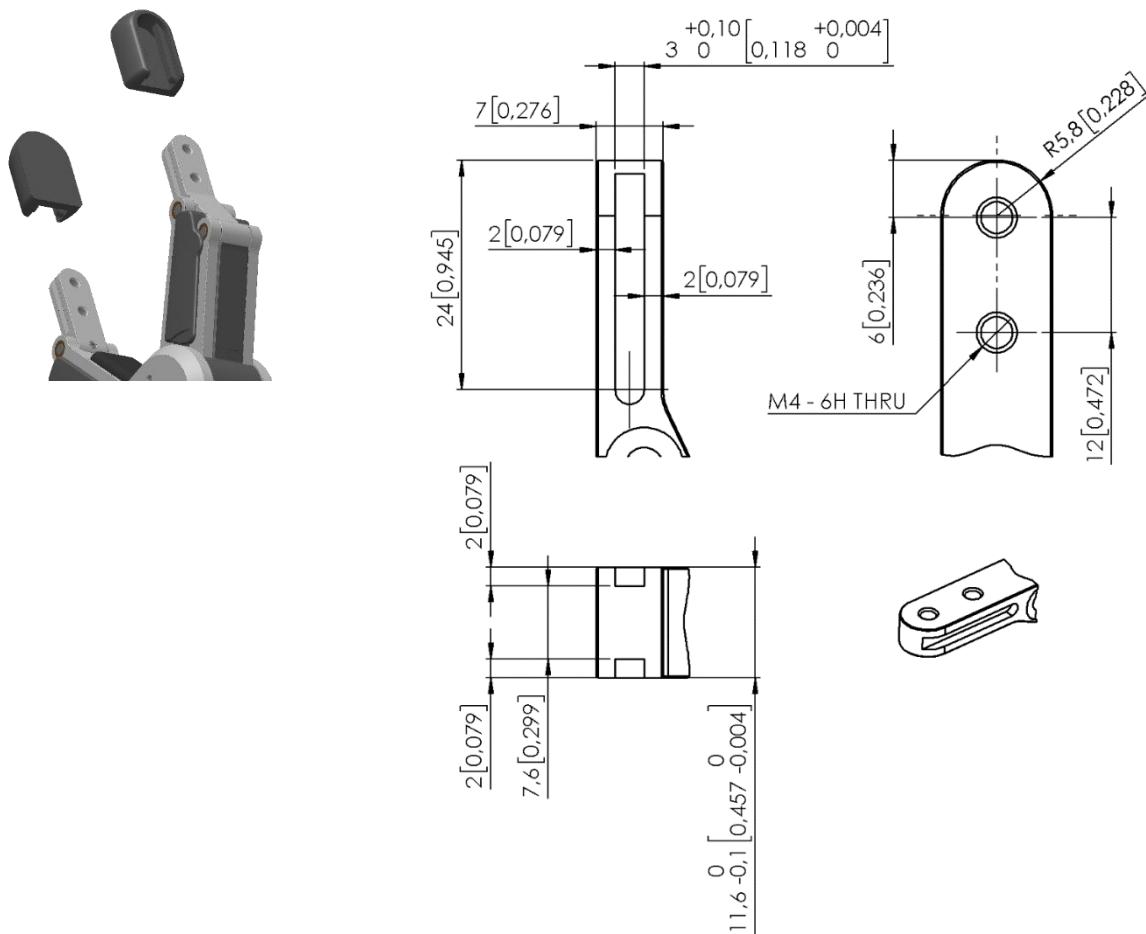
Gripper width speed

RG2 Work Range

Gripping on long objects can unintentionally activate the Safety switches. The maximum workpiece height (calculated from the end of the fingertips) is dependent on the gripping width (w). For various width values the height (h) limit is given below:

Fingertips

The standard fingertips can be used for many different workpieces. If custom fingertips are required, they can be made to fit the Gripper's fingers according to the dimensions (mm) shown below:

RG6

General Properties		Minimum	Typical	Maximum	Unit
Payload Force Fit		-	-	6	[kg]
		-	-	13.2	[lb]
Payload Form Fit		-	-	10	[Kg]
		-	-	22.04	[lb]
Total stroke (adjustable)		0	-	160	[mm]
		-	-	6.3	[inch]
Finger position resolution		-	0.1	-	[mm]
		-	0.004	-	[inch]
Repetition accuracy		-	0.1	0.2	[mm]
		-	0.004	0.007	[inch]
Reversing backlash		0.1	-	0.3	[mm]
		0.004	-	0.011	[inch]
Gripping force (adjustable)		25	-	120	[N]
Gripping force deviation			±25		%
Gripping speed*		51	-	160	[mm/s]
Gripping time**		0.05	-	0.15	
Adjustable bracket tilting accuracy			< 1		°
Storage temperature		0		60	[°C]
		32		122	[°F]
Motor		Integrated, electric BLDC			
IP Classification		54			
Dimensions		262 x 212 x 42			[mm]
		10.3 x 8.3 x 1.6			[inch]
Weight		1.25			[kg]
		2.76			[lb]
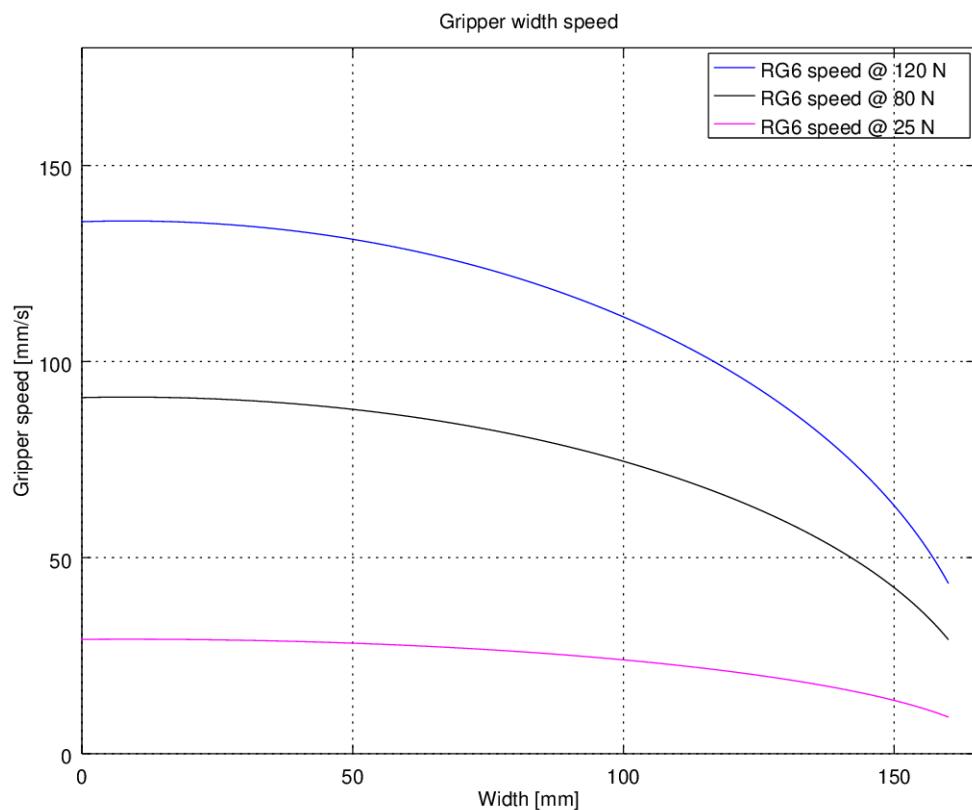
*See table on the next page

** based on 8mm total movement between fingers. The speed is linearly proportional to the force. For more details see speed table on next page.
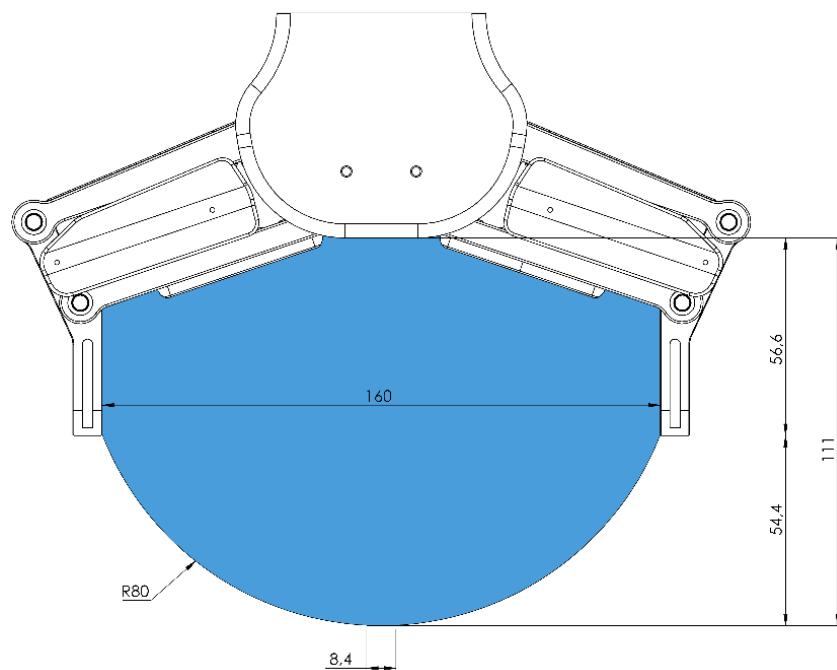
Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	20	24	25	[V]
Current consumption	70	-	600*	[mA]
Operating temperature	5	-	50	[°C]
	41	-	122	[°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[Hours]

*Current spikes up to 3A (max 6mS) may occur during the release action.
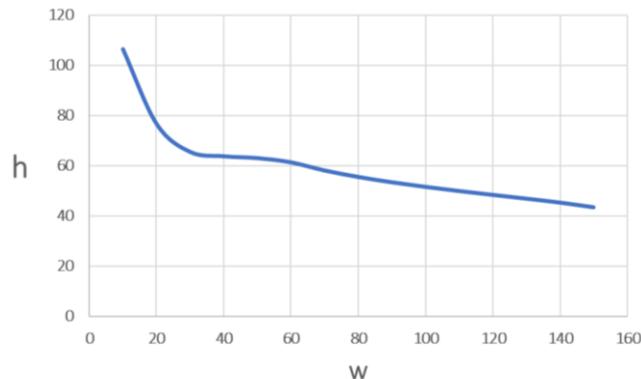
RG6 Gripping Speed Graph

RG6 Work Range
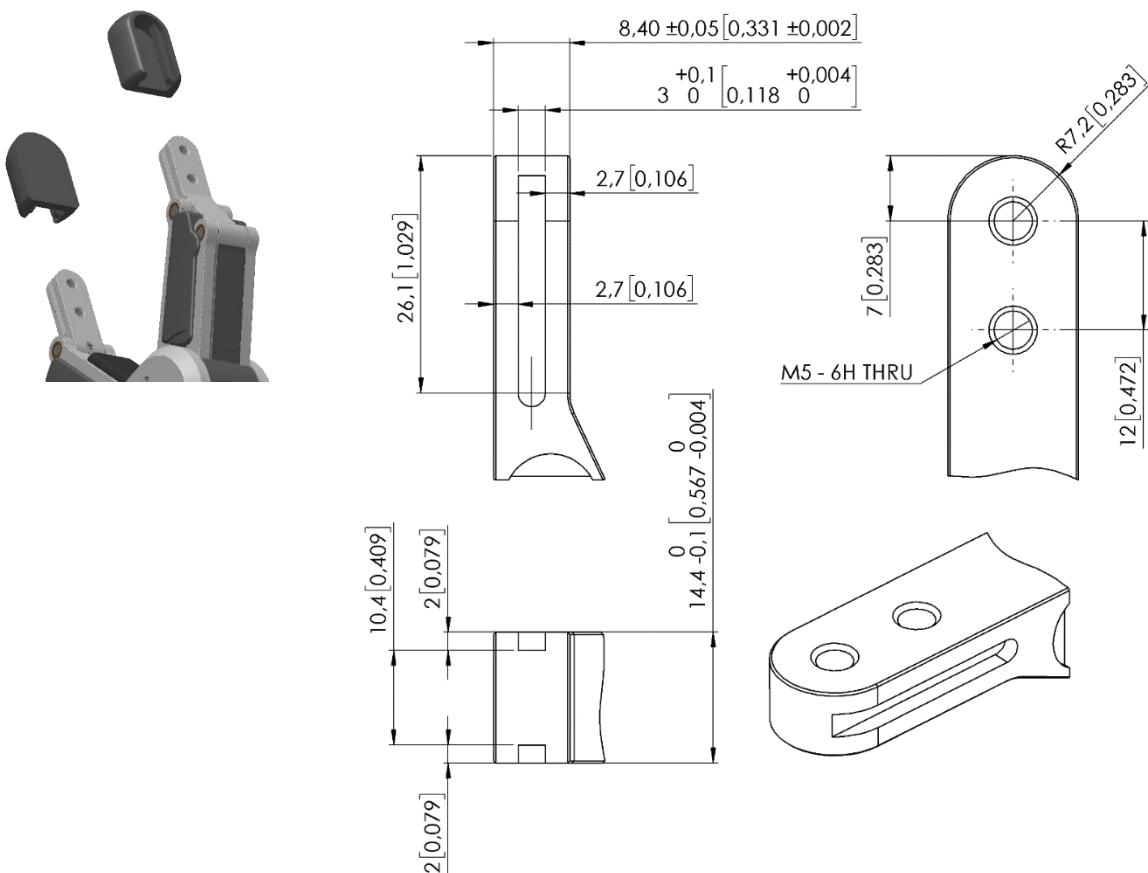
Gripping on long objects can unintentionally activate the Safety switches. The maximum workpiece height (calculated from the end of the fingertips) is dependent on the gripping width (w). For various width values the height (h) limit is given below:

Fingertips

The standard fingertips can be used for many different workpieces. If custom fingertips are required, they can be made to fit the Gripper's fingers according to the dimensions (mm) shown below:

VG10
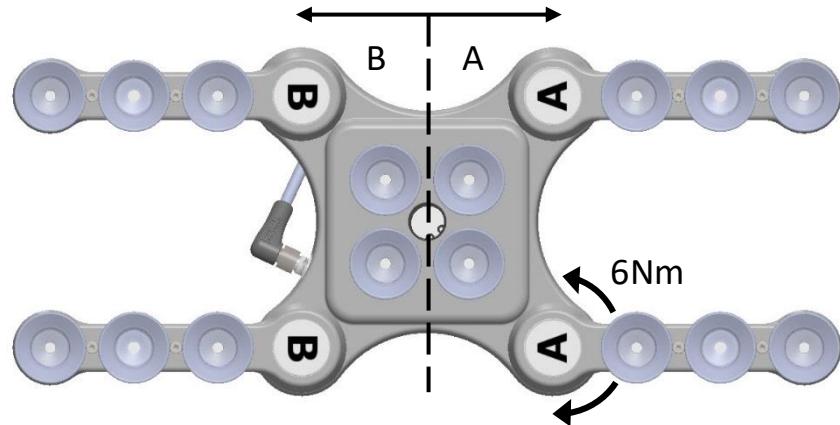
General Properties		Minimum	Typical	Maximum	Unit
Vacuum		5 % -0.05 1.5	- - -	80 % -0.810 24	[Vacuum] [Bar] [inHg]
Air flow		0	-	12	[L/min]
Arms adjustment		0	-	270	[°]
Arm holding torque		-	6	-	[Nm]
Payload	Rated	10 22			[kg] [lb]
	Maximum	15 33			[kg] [lb]
Vacuum cups		1	-	16	[pcs.]
Gripping time		-	0.35	-	[s]
Releasing time		-	0.20	-	[s]
Foot-inch-foot		-	1.40	-	[s]
Vacuum pump		Integrated, electric BLDC			
Arms		4, adjustable by hand			
Dust filters		Integrated 50µm, field replaceable			
IP Classification		IP54			
Dimensions (folded)		105 x 146 x 146 4.13 x 5.75 x 5.75	[mm] [inch]		
Dimensions (unfolded)		105 x 390 x 390 4.13 x 15.35 x 15.35	[mm] [inch]		
Weight		1.62 3.57	[kg] [lb]		

Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	20.4	24	28.8	[V]
Current consumption	50	600	1500	[mA]
Operating temperature	0 32	- -	50 122	[°C] [°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[hours]

Positioning the VG10 arms and channels

The arms can be folded to the preferred position simply by pulling in the arms. The torque needed to overcome the friction in the rotatable joints of the arm is high (6 N/m) to ensure that the arms do not move when handling 15 kg payloads.

The VG10 suction cups are grouped into two independent channels.

When the four arms are adjusted to preferred angles, it is recommended to add the accompanied arrow stickers. This allows for easy realignment and exchanging between different work items.

Payload

The lifting capacity of the VG grippers depends primarily on the following parameters:

- Vacuum cups

- Vacuum

- Air flow

Vacuum Cups

Choosing the right vacuum cups for your application is essential. The VG grippers come with common 15, 30 and 40 mm silicone vacuum cups (see table below) which are good for hard and flat surfaces, but not good for uneven surfaces and it might leave microscopic traces of silicone on the workpiece which can cause issues with some types of painting processes afterwards.

Image	External Diameter [mm]	Internal Diameter [mm]	Gripping Area [mm2]
	15	6	110
	30	8	200
	40	12	450

For non-porous materials, the OnRobot suction cups are highly recommended. Some of the most common non-porous materials are listed below:

- Composites
- Glass
- High density cardboard
- High density paper
- Metals
- Plastic
- Porous materials with a sealed surface
- Varnished wood

In an ideal case, working with non-porous material workpieces where there are no air flow going through the workpiece, the table below shows the number of cups and the cup size needed depending on the payload (workpiece mass) and the vacuum used.

Number of Cups needed for non-porous materials depending on payload and vacuum:

Payload (kg)	15mm Vacuum (kPa)				30mm Vacuum (kPa)				40mm Vacuum (kPa)			
	20	40	60	75	20	40	60	75	20	40	60	75
1	7	4	3	2	4	2	2	1	2	1	1	1
2	14	7	5	4	8	4	3	2	4	2	2	1
3	-	11	7	6	12	6	4	3	5	3	2	2
4	-	14	9	8	15	8	5	4	7	4	3	2
5	-	-	12	9	-	10	7	5	9	5	3	3
6	-	-	14	11	-	12	8	6	10	5	4	3
7	-	-	16	13	-	13	9	7	12	6	4	4
8	-	-	-	15	-	15	10	8	14	7	5	4
9	-	-	-	-	-	-	12	9	15	8	5	4
10	-	-	-	-	-	-	13	10	-	9	6	5
11	-	-	-	-	-	-	14	11	-	9	6	5
12	-	-	-	-	-	-	15	12	-	10	7	6
13	-	-	-	-	-	-	16	13	-	11	8	6
14	-	-	-	-	-	-	-	14	-	12	8	7
15	-	-	-	-	-	-	-	15	-	13	9	7

NOTE:

To use more than 7 (15mm), 4 (30mm) or 3 (40mm) vacuum cups with the VGC10 a customized adaptor plate is needed.

The table above is created with the following formula that equalizes the lifting force with the payload considering 1.5g of acceleration.

$$\text{Amount}_{\text{Cups}} \cdot \text{Area}_{\text{Cup}}[\text{mm}\} = 19600 \frac{\text{Payload [kg]}}{\text{Vacuum [kPa]}}$$

It is often a good idea to use more vacuum cups than needed, to accommodate for vibrations, leaks and other unexpected conditions. However, the more vacuum cups, the more air leakage (air flow) is expected and the more air is moved in a grip resulting in longer gripping times.

When using porous materials, the vacuum that can be achieve by using the OnRobot suction cups will depend on the material itself and will be between the range stated in the specifications. Some of the most common non-porous materials are listed below:

- Fabrics
- Foam
- Foam with open cells

- Low density cardboard

- Low density paper

- Perforated materials

- Untreated wood

See the table below with general recommendations, in case other suction cups are needed for specific materials.

Workpiece surface	Vacuum cup shape	Vacuum cup material
Hard and flat	Normal or dual lip	Silicone or NBR
Soft plastic or plastic bag	Special plastic bag type	Special plastic bag type
Hard but curved or uneven	Thin dual lip	Silicone or soft NBR
To be painted afterwards	Any type	NBR only
Varying heights	1.5 or more bevels	Any type

NOTE:

It is recommended to consult a vacuum cup specialist to find the optimal vacuum cup where the standard types are insufficient.

Fittings and Blind Screws.

It is possible to change suction cups simply by pulling them off the fittings. It might be a bit challenging to remove the 15 mm Diameter vacuum cups. As suggestion try to stretch the silicon to one of the sides and then pull it out.

Unused holes can be blinded using a blind screw, and each fitting can be changed to a different type to match the desired suction cup. The fittings and the blinding screws are mounted or dismounted by screwing (2Nm tightening torque) or unscrewing them with the provided 3 mm Allen key.

.

The thread size is the commonly used G1/8"; allowing for standard fittings, blinders and extenders to be fitted directly to the VG grippers.

Vacuum

Vacuum is defined as the percentage of absolute vacuum achieved relative to atmospheric pressure, i.e.:

% vacuum	Bar	kPa	inHg	Typically used for
0%	0.00rel. 1.01 abs.	0.00rel. 101.3 abs.	0.0rel. 29.9 abs.	No vacuum / No lifting capacity
20%	0.20rel. 0.81 abs.	20.3rel. 81.1 abs.	6.0rel. 23.9 abs.	Cardboard and thin plastics
40%	0.41rel. 0.61 abs.	40.5rel. 60.8 abs.	12.0rel. 18.0 abs.	Light workpieces and long suction cup life span
60%	0.61rel. 0.41 abs.	60.8rel. 40.5 abs.	18.0rel. 12.0 abs.	Heavy workpieces and strongly secured grips
80%	0.81rel. 0.20 abs.	81.1rel. 20.3 abs	23.9rel. 6.0 abs.	Max. vacuum. Not recommended

The vacuum in kPa setting is the target vacuum. The pump will run at full speed until the target vacuum is achieved, and then run at a lower speed necessary to maintain the target vacuum.

The pressure in the atmosphere varies with weather, temperature and altitude. The VG grippers automatically compensate for altitudes up to 2km, where the pressure is about 80% of sea level.

Air flow

Air flow is the amount of air that must be pumped to maintain the target vacuum. A completely tight system will not have any air flow, whereas real life applications have some smaller air leakages from two different sources:

- Leaking vacuum cup lips

- Leaking workpieces

The smallest leak under a vacuum cup can be hard to find (see picture below).

Leaking workpieces can be even harder to identify. Things that look completely tight might not be tight at all. A typical example is coarse cardboard boxes. The thin outer layer is often requiring a lot of air flow to create a pressure difference over it (see figure below).

Therefore, the users must be aware of the following:

- VG grippers are not suitable for most uncoated, coarse cardboard boxes.

- Extra attention must be paid to leakages, e.g. vacuum cup shape and surface roughness

The air flow capability of a VG grippers is shown in the graph below:

VG pump, air flow performance

NOTE:

The easiest way to check if a cardboard box is sufficiently tight is simply to test it using the VG grippers.

A high vacuum percentage setting does not give a higher lifting capacity on corrugated cardboard. In fact, a lower setting is recommended, e.g. 20%.

A low vacuum setting results in less air flow and less friction below the vacuum cups. This means VG gripper filters and vacuum cups will last longer.

VGC10

General Properties		Minimum	Typical	Maximum	Unit
Vacuum		5 % -0.05 1.5	- - -	80 % -0.810 24	[Vacuum] [Bar] [inHg]
Air flow		0	-	12	[L/min]
Payload	With default attachments	- -	- -	6 * 13.2 *	[kg] [lb]
	With customized attachments	- -	10 22	15 33.1	[kg] [lb]
Vacuum cups		1	-	7	[pcs.]
Gripping time		-	0.35	-	[s]
Releasing time		-	0.20	-	[s]
Vacuum pump		Integrated, electric BLDC			
Dust filters		Integrated 50µm, field replaceable			
IP Classification		IP54			
Dimensions		101 x 100 x 100 3.97 x 3.94 x 3.94		[mm] [inch]	
Weight		0.814 1.79		[kg] [lb]	

* By using three 40mm cups. More info in a table on .

Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	20.4	24	28.8	[V]
Current consumption	50	600	1500	[mA]
Operating temperature	0 32	- -	50 122	[°C] [°F]
Relative humidity (non-condensing)	0	-	95	[%]
Calculated MTBF (operating life)	30.000	-	-	[hours]
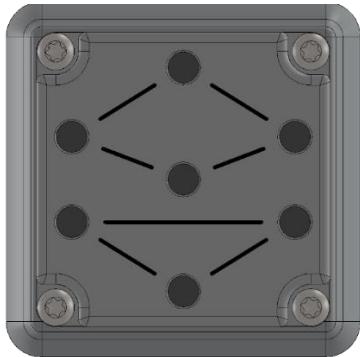
2 channels

The VGC10 has 4 holes to use fittings with vacuum cups or blinding screws as needed. It also has lines which show the holes that are communicated together. This is useful when using channels A and B independently for vacuum.
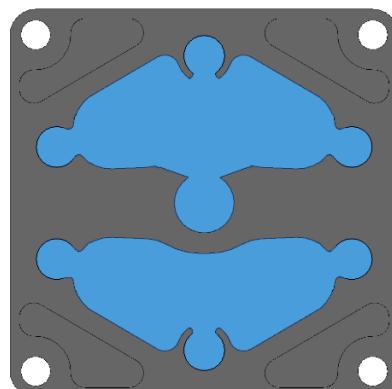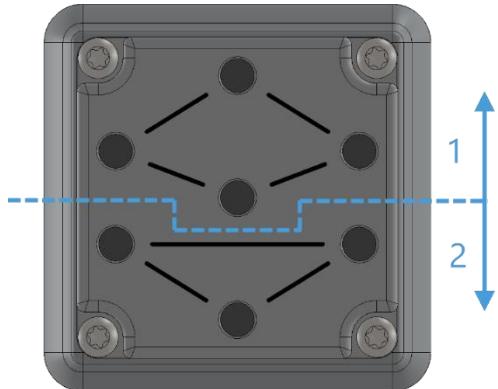
Adaptor Plate
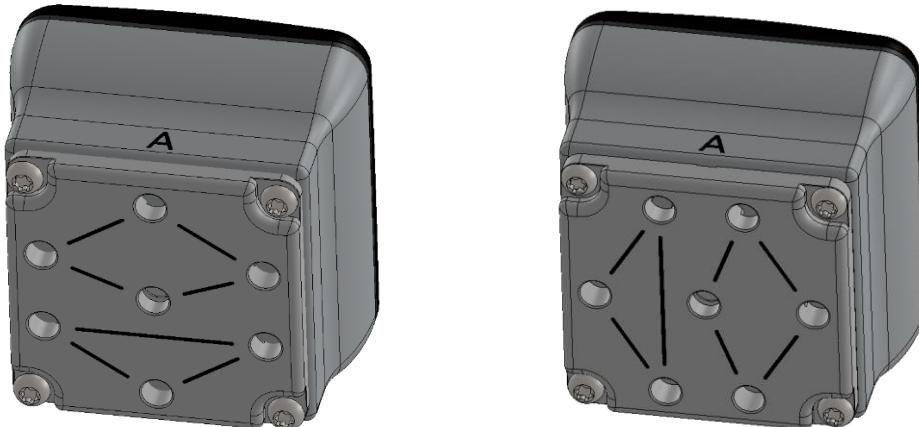
The VGC10 comes with an Adaptor Plate which provides extra flexibility to locate the vacuum cups in different configurations.
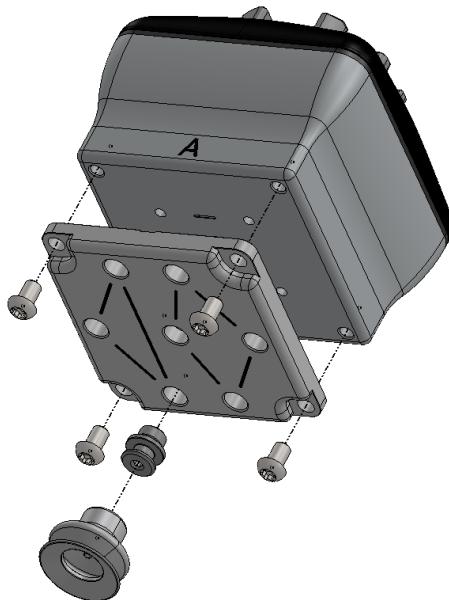
The Adaptor Plate has 7 holes to use fittings with vacuum cups or blinding screws as needed. It also has lines which show the holes that are communicated together. This is useful when using channel A and B independently for vacuum.

The Adaptor Plate can be placed in different positions by rotating it 90º. Having as reference the letters A and B written on the gripper housing, the Adaptor Plate can be placed to separate both channels or to communicate them. If the Adaptor Plate is placed as in picture below on the left, both channels will be separated, and they can be used independently or combined. If the Adaptor Plate is placed as in picture below on the right, both channels will be communicated and a higher air flow can be achieved, although both channels will have to be used combined.

To mount the Adaptor Plate simply remove the 4 fittings or blinding screws from the gripper, place the Adaptor Plate by choosing the right angle according to the desired configuration, and tighten the 4 screws with 4 Nm tighten torque.

NOTE:

Please, note that the O-Ring in the Adaptor Plate is not glued therefore it can be pulled out. If that happens simply put it back in place and the gripper will work as before.

Extension Pipe

The Extension Pipe provides an extra length of 50 mm to reach narrow spaces.

NOTE:

Remember to use the Adaptor Plate rotated to achieve a higher air flow when using both channels together.

The Extension Pipe can be mounted in any of the holes by simply screwing it in and adding a fitting on top as shown in the image below.
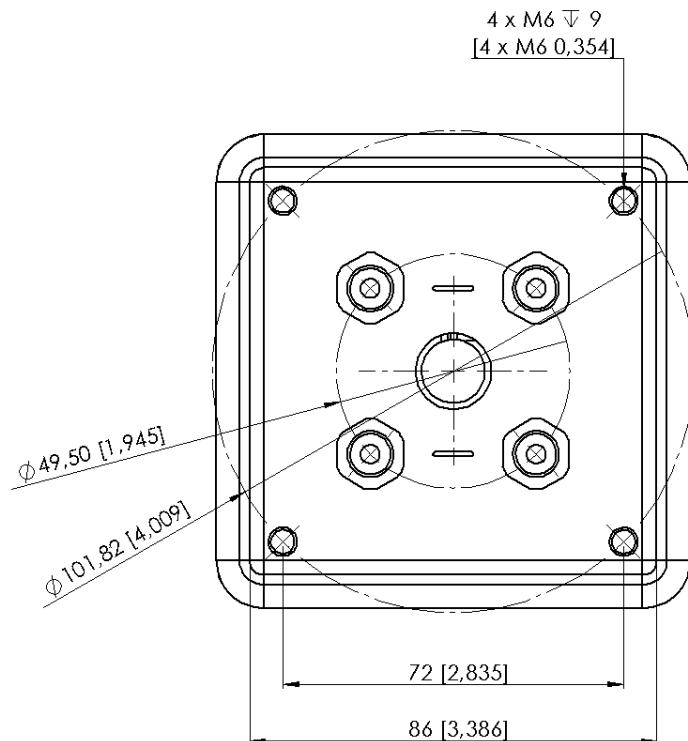
Below different mounting configurations with the provided attachments are shown.

Customized Adaptor Plates and Push-in Fittings

The design of the VGC10 is meant to facilitate the users to make their own adaptor plates to create different kinds of configurations. The dimensions needed to create a customized adaptor plate are shown in the image below.

4 x M6 ⍌ 9
[4 x M6 0,354]

Ø 49,50 [1,945]

Ø 101,82 [4,009]

72 [2,835]

86 [3,386]
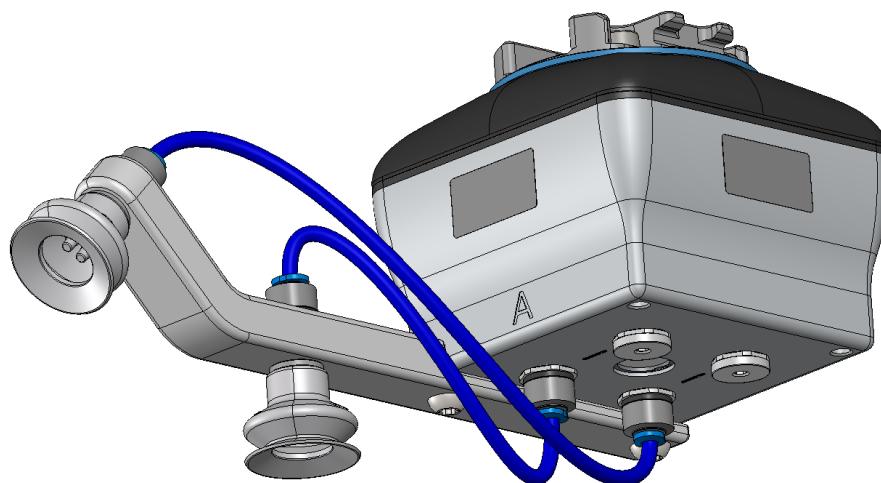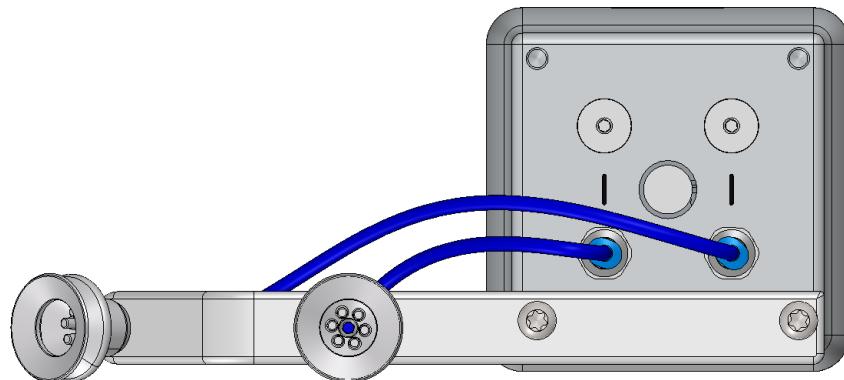
The Push-in Fittings are used to attach 4 mm vacuum tubes to create customized configuration that required remote vacuum. In most cases, this size is enough for generating the needed vacuum from the pump in the gripper.
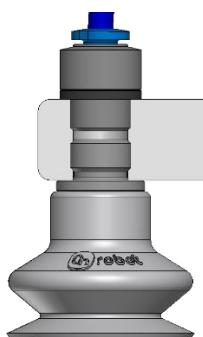
The commercial name of the Push-in Fittings is Fitting QSM-G1/8-4-I-R in case some more units need to be purchased.

An example of a customized configuration with a homemade adaptor plate and remote vacuum is shown below.

The image below shows how the push-in fittings and the normal fittings are communicated.

Payload

The lifting capacity of the VG grippers depends primarily on the following parameters:

- Vacuum cups
- Vacuum
- Air flow

Vacuum Cups

Choosing the right vacuum cups for your application is essential. The VG grippers come with common 15, 30 and 40 mm silicone vacuum cups (see table below) which are good for hard and flat surfaces, but not good for uneven surfaces and it might leave microscopic traces of silicone on the workpiece which can cause issues with some types of painting processes afterwards.

Image	External Diameter [mm]	Internal Diameter [mm]	Gripping Area [mm2]
	15	6	110
	30	8	200
	40	12	450

For non-porous materials, the OnRobot suction cups are highly recommended. Some of the most common non-porous materials are listed below:

- Composites

- Glass

- High density cardboard

- High density paper

- Metals

- Plastic

- Porous materials with a sealed surface

- Varnished wood

In an ideal case, working with non-porous material workpieces where there are no air flow going through the workpiece, the table below shows the number of cups and the cup size needed depending on the payload (workpiece mass) and the vacuum used.

Number of Cups needed for non-porous materials depending on payload and vacuum:

Payload (kg)	15mm Vacuum (kPa)				30mm Vacuum (kPa)				40mm Vacuum (kPa)			
	20	40	60	75	20	40	60	75	20	40	60	75
1	7	4	3	2	4	2	2	1	2	1	1	1
2	14	7	5	4	8	4	3	2	4	2	2	1
3	-	11	7	6	12	6	4	3	5	3	2	2
4	-	14	9	8	15	8	5	4	7	4	3	2
5	-	-	12	9	-	10	7	5	9	5	3	3
6	-	-	14	11	-	12	8	6	10	5	4	3
7	-	-	16	13	-	13	9	7	12	6	4	4
8	-	-	-	15	-	15	10	8	14	7	5	4
9	-	-	-	-	-	-	12	9	15	8	5	4
10	-	-	-	-	-	-	13	10	-	9	6	5
11	-	-	-	-	-	-	14	11	-	9	6	5
12	-	-	-	-	-	-	15	12	-	10	7	6
13	-	-	-	-	-	-	16	13	-	11	8	6
14	-	-	-	-	-	-	-	14	-	12	8	7
15	-	-	-	-	-	-	-	15	-	13	9	7

NOTE:

To use more than 7 (15mm), 4 (30mm) or 3 (40mm) vacuum cups with the VGC10 a customized adaptor plate is needed.

The table above is created with the following formula that equalizes the lifting force with the payload considering 1.5g of acceleration.

$$\text{Amount}_{\text{Cups}} \cdot \text{Area}_{\text{Cup}} [\text{mm}\} = 19600 \, \frac{\text{Payload [kg]}}{\text{Vacuum [kPa]}}$$

It is often a good idea to use more vacuum cups than needed, to accommodate for vibrations, leaks and other unexpected conditions. However, the more vacuum cups, the more air leakage (air flow) is expected and the more air is moved in a grip resulting in longer gripping times.

When using porous materials, the vacuum that can be achieve by using the OnRobot suction cups will depend on the material itself and will be between the range stated in the specifications. Some of the most common non-porous materials are listed below:

- Fabrics
- Foam
- Foam with open cells
- Low density cardboard
- Low density paper
- Perforated materials
- Untreated wood

See the table below with general recommendations, in case other suction cups are needed for specific materials.

Workpiece surface	Vacuum cup shape	Vacuum cup material
Hard and flat	Normal or dual lip	Silicone or NBR
Soft plastic or plastic bag	Special plastic bag type	Special plastic bag type
Hard but curved or uneven	Thin dual lip	Silicone or soft NBR
To be painted afterwards	Any type	NBR only
Varying heights	1.5 or more bevels	Any type

NOTE:

It is recommended to consult a vacuum cup specialist to find the optimal vacuum cup where the standard types are insufficient.

Fittings and Blind Screws.

It is possible to change suction cups simply by pulling them off the fittings. It might be a bit challenging to remove the 15 mm Diameter vacuum cups. As suggestion try to stretch the silicon to one of the sides and then pull it out.

Unused holes can be blinded using a blind screw, and each fitting can be changed to a different type to match the desired suction cup. The fittings and the blinding screws are mounted or dismounted by screwing (2Nm tightening torque) or unscrewing them with the provided 3 mm Allen key.

.

The thread size is the commonly used G1/8"; allowing for standard fittings, blinders and extenders to be fitted directly to the VG grippers.

Vacuum

Vacuum is defined as the percentage of absolute vacuum achieved relative to atmospheric pressure, i.e.:

% vacuum	Bar	kPa	inHg	Typically used for
0%	0.00rel. 1.01 abs.	0.00rel. 101.3 abs.	0.0rel. 29.9 abs.	No vacuum / No lifting capacity
20%	0.20rel. 0.81 abs.	20.3rel. 81.1 abs.	6.0rel. 23.9 abs.	Cardboard and thin plastics
40%	0.41rel. 0.61 abs.	40.5rel. 60.8 abs.	12.0rel. 18.0 abs.	Light workpieces and long suction cup life span
60%	0.61rel. 0.41 abs.	60.8rel. 40.5 abs.	18.0rel. 12.0 abs.	Heavy workpieces and strongly secured grips
80%	0.81rel. 0.20 abs.	81.1rel. 20.3 abs	23.9rel. 6.0 abs.	Max. vacuum. Not recommended

The vacuum in kPa setting is the target vacuum. The pump will run at full speed until the target vacuum is achieved, and then run at a lower speed necessary to maintain the target vacuum.

The pressure in the atmosphere varies with weather, temperature and altitude. The VG grippers automatically compensate for altitudes up to 2km, where the pressure is about 80% of sea level.

Air flow

Air flow is the amount of air that must be pumped to maintain the target vacuum. A completely tight system will not have any air flow, whereas real life applications have some smaller air leakages from two different sources:

- Leaking vacuum cup lips
- Leaking workpieces

The smallest leak under a vacuum cup can be hard to find (see picture below).

Leaking workpieces can be even harder to identify. Things that look completely tight might not be tight at all. A typical example is coarse cardboard boxes. The thin outer layer is often requiring a lot of air flow to create a pressure difference over it (see figure below).

Therefore, the users must be aware of the following:

- VG grippers are not suitable for most uncoated, coarse cardboard boxes.

- Extra attention must be paid to leakages, e.g. vacuum cup shape and surface roughness

The air flow capability of a VG grippers is shown in the graph below:

VG pump, air flow performance

NOTE:

The easiest way to check if a cardboard box is sufficiently tight is simply to test it using the VG grippers.

A high vacuum percentage setting does not give a higher lifting capacity on corrugated cardboard. In fact, a lower setting is recommended, e.g. 20%.

A low vacuum setting results in less air flow and less friction below the vacuum cups. This means VG gripper filters and vacuum cups will last longer.

6.2   Mechanical Drawings

6.2.1 Adapter plate(s)

Adapter K
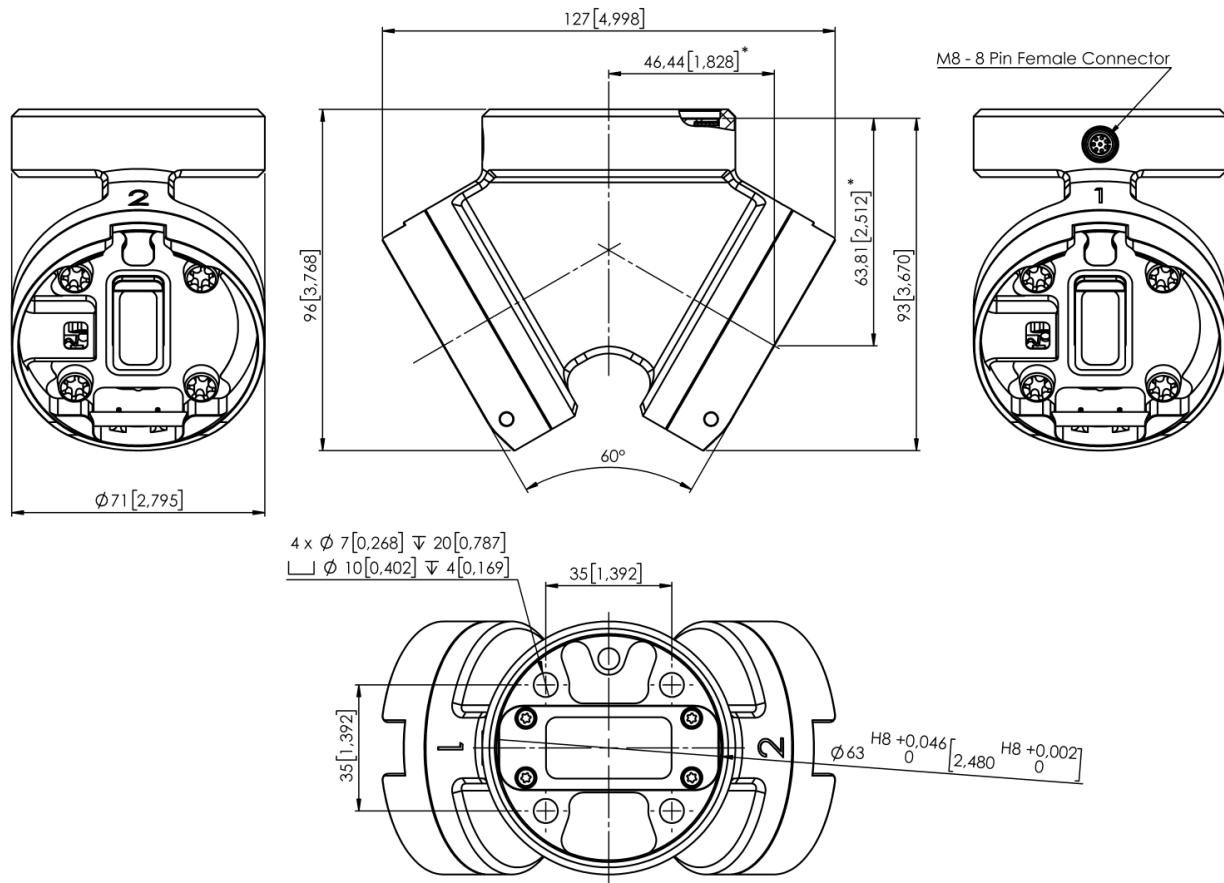
SECTION A-A

6.2.2 Mountings

**Quick Changer -
Robot side**

13,60 [0,535] *

M8 - 8 Pin Female Connector

16 [0,634]

∅ 71 [2,795]

35 [1,392]

35 [1,392]

4 x ∅ 6 [0,248] THRU ALL
⌴ ∅ 11 [0,433] ⍇ 11 [0,433]

* Distance from Robot flange interface to OnRobot tool.
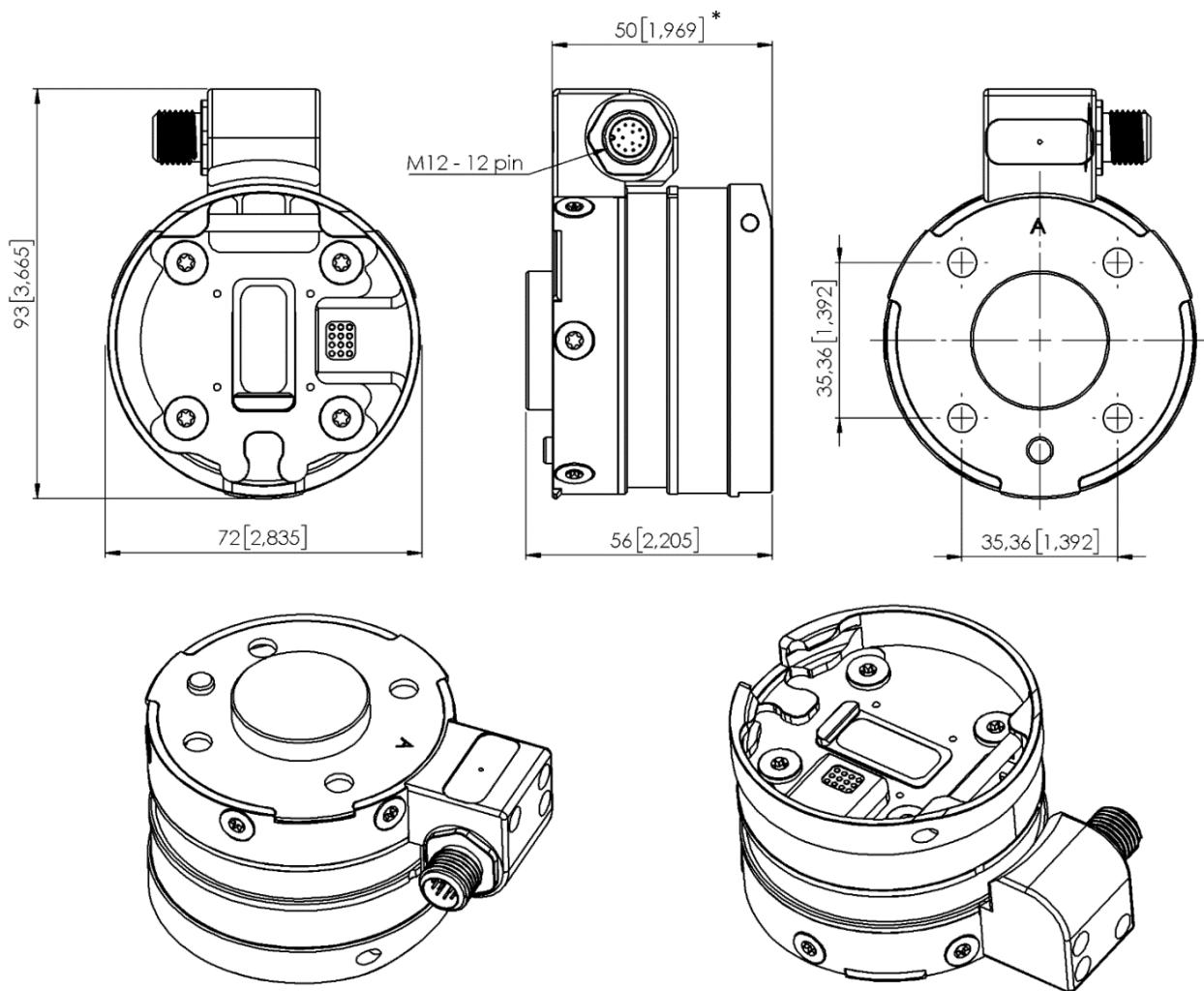
All dimensions are in mm and [inches].

Dual Quick Changer

127[4,998]

46,44[1,828]*

M8 - 8 Pin Female Connector

96[3,768]

63,81[2,512]*

93[3,670]

Ø71[2,795]

60°

2

1

4 x Ø 7[0,268] ⊽ 20[0,787]
⊔ Ø 10[0,402] ⊽ 4[0,169]

35[1,392]

35[1,392]

Ø 63 $^{H8\ +0,046}_{0}$ [2,480 $^{H8\ +0,002}_{0}$]

* Distance from Robot flange interface to OnRobot tool

All dimensions are in mm and [inches].

HEX-E/H QC

50[1,969] *

M12 - 12 pin

93[3,665]

72[2,835]

56[2,205]

35,36[1,392]

35,36[1,392]
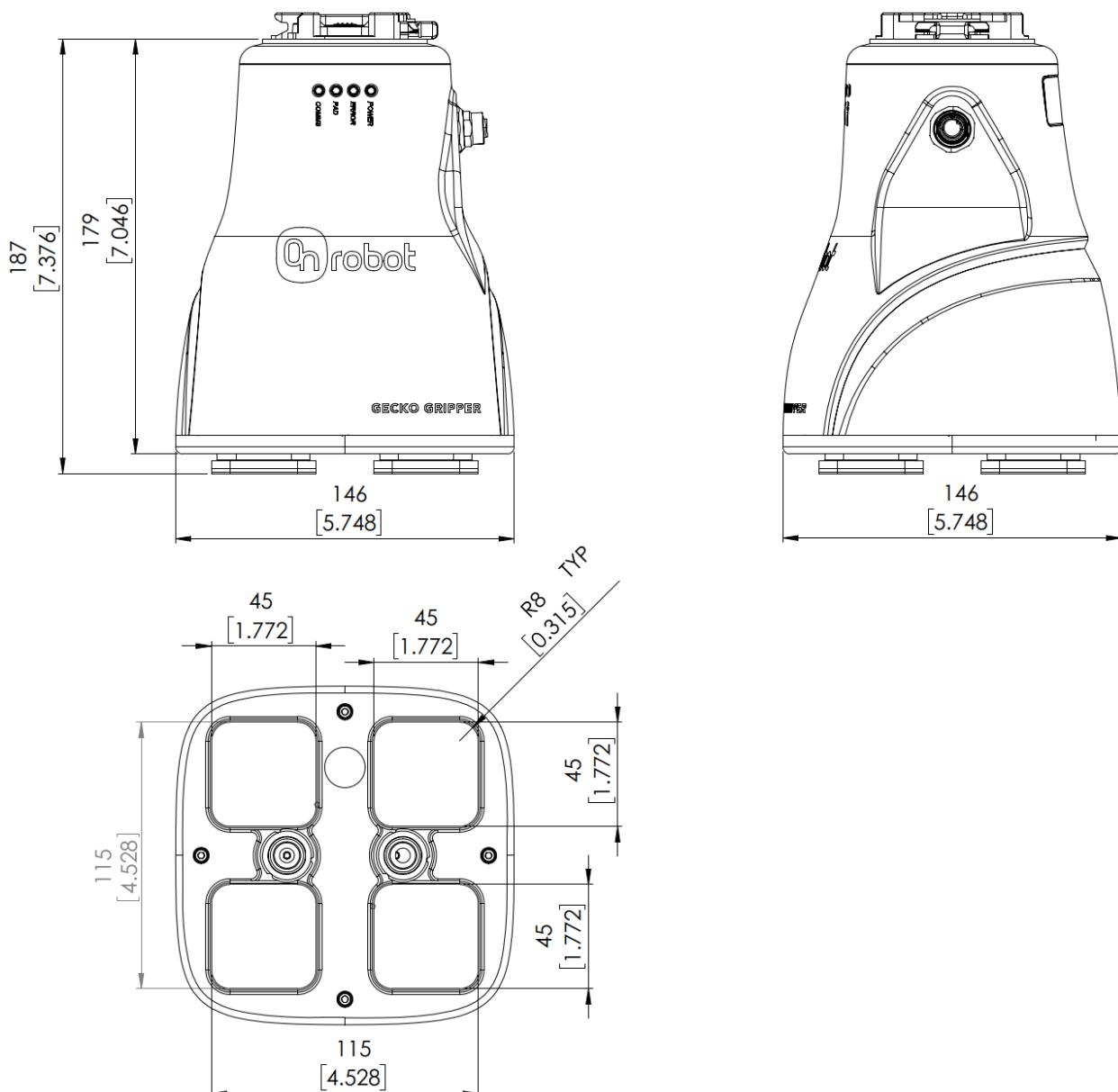
* Distance from Robot flange interface to OnRobot tool

All dimensions are in mm and [inches].

6.2.3 Tools

Hardware Specification
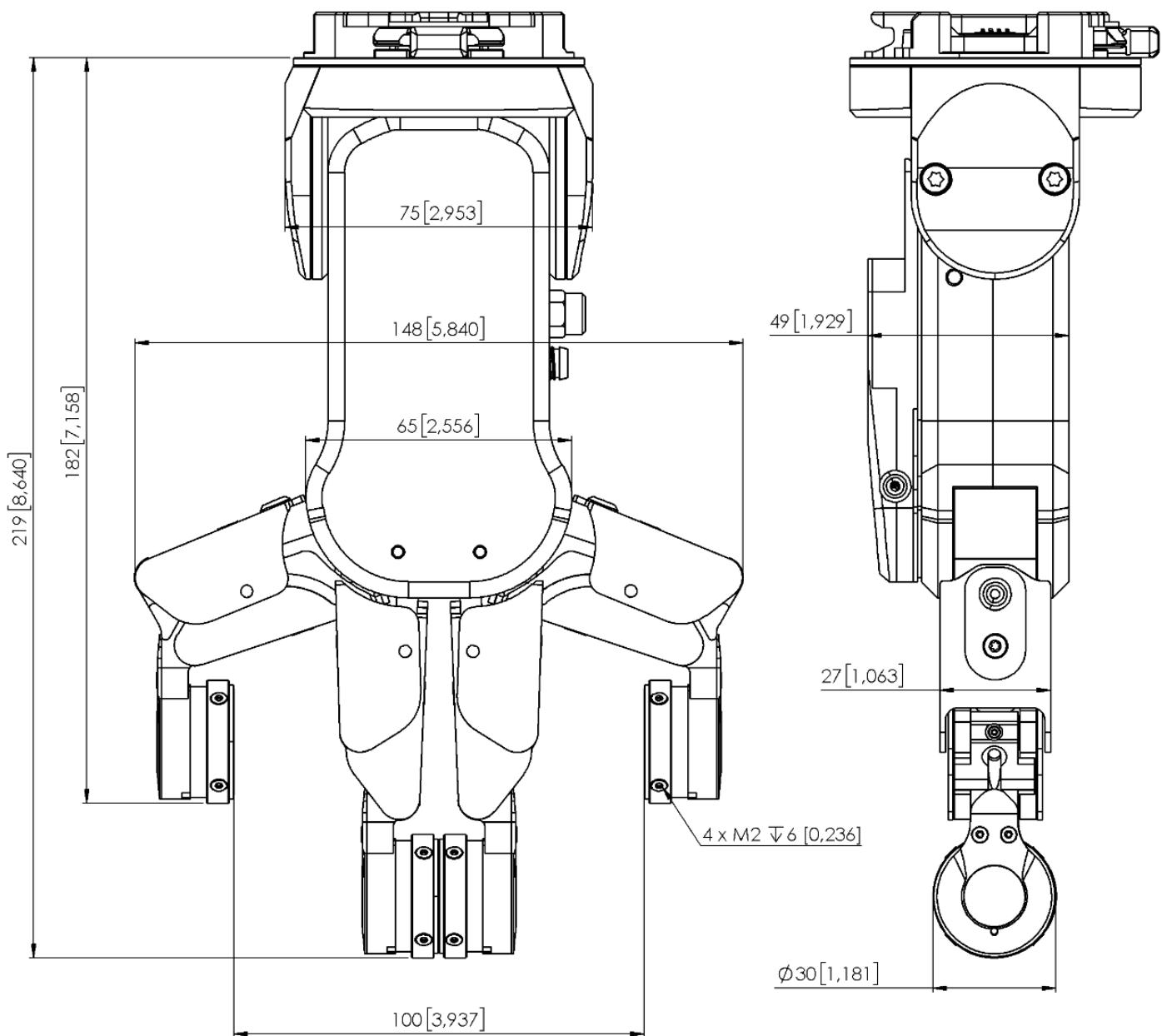
Gecko
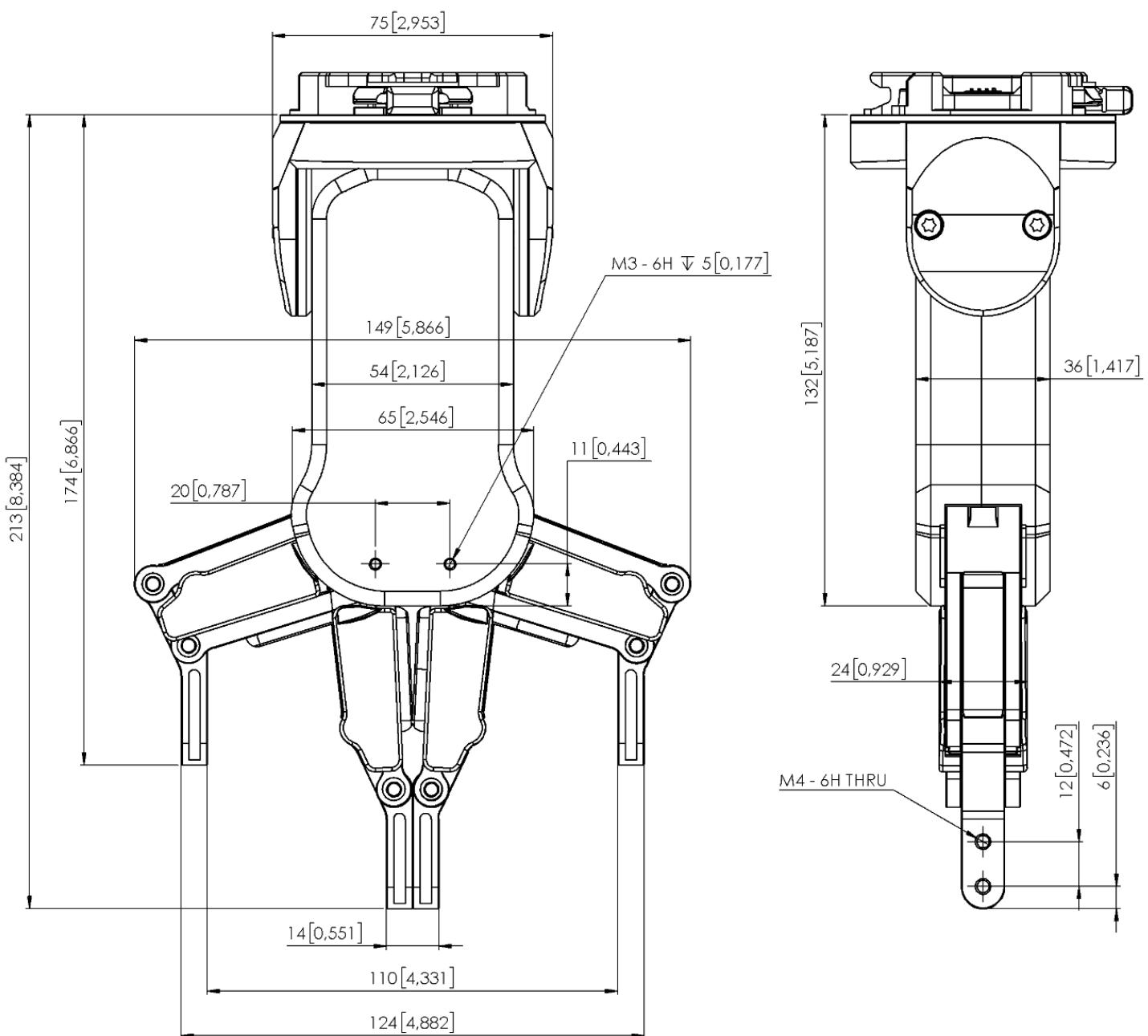
All dimensions are in mm and [inches].

RG2-FT

75 [2,953]

148 [5,840]

65 [2,556]

219 [8,640]

182 [7,158]

100 [3,937]

49 [1,929]

27 [1,063]

4 x M2 �álv 6 [0,236]

⌀30 [1,181]
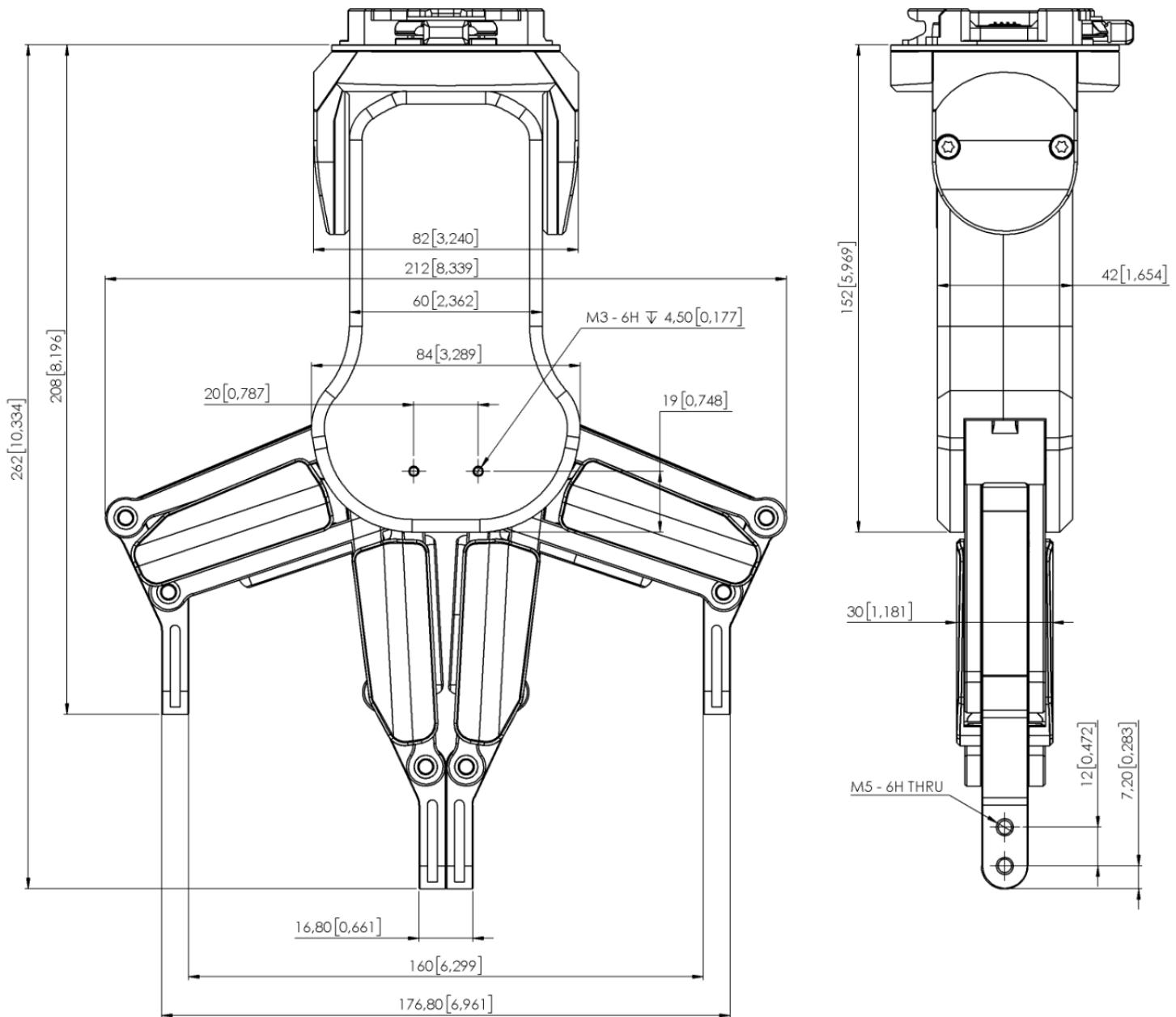
All dimensions are in mm and [inches].

RG2
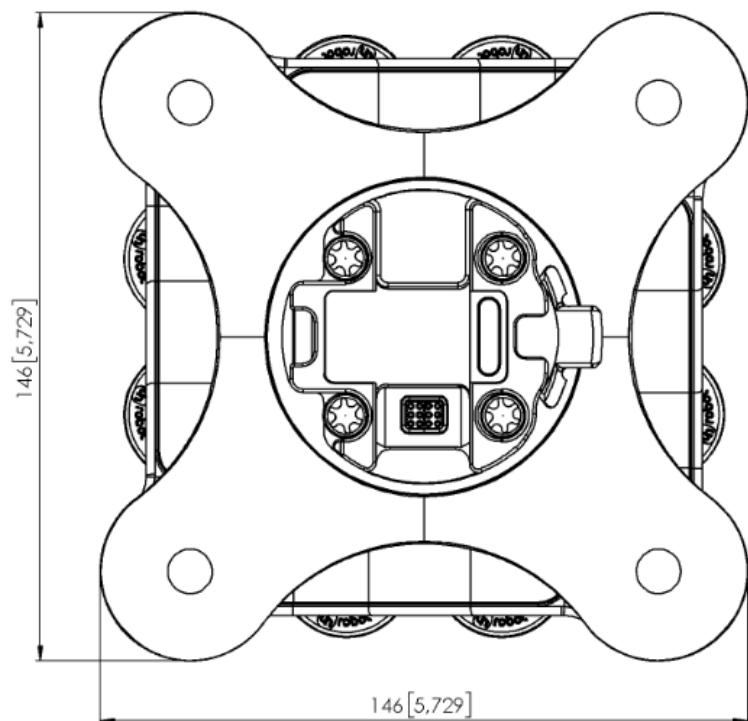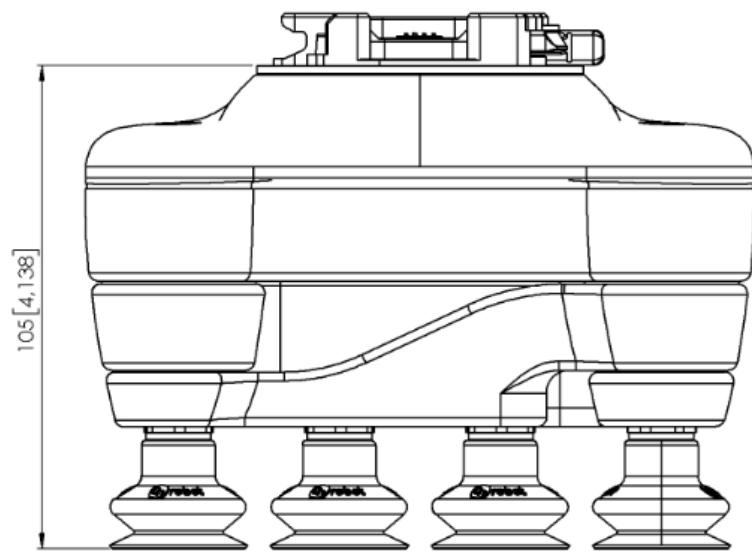
All dimensions are in mm and [inches].

RG6
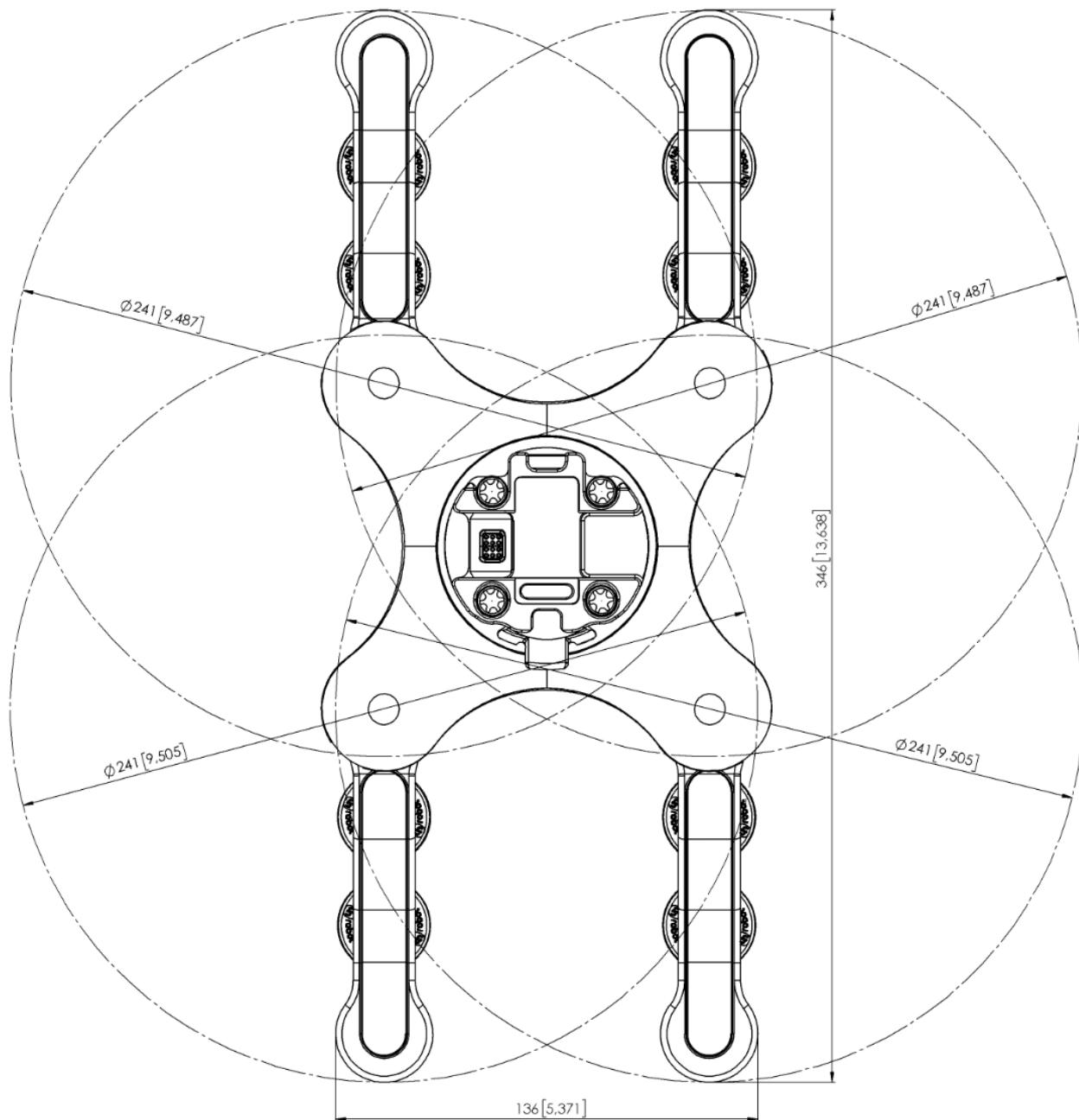
All dimensions are in mm and [inches].

VG10	
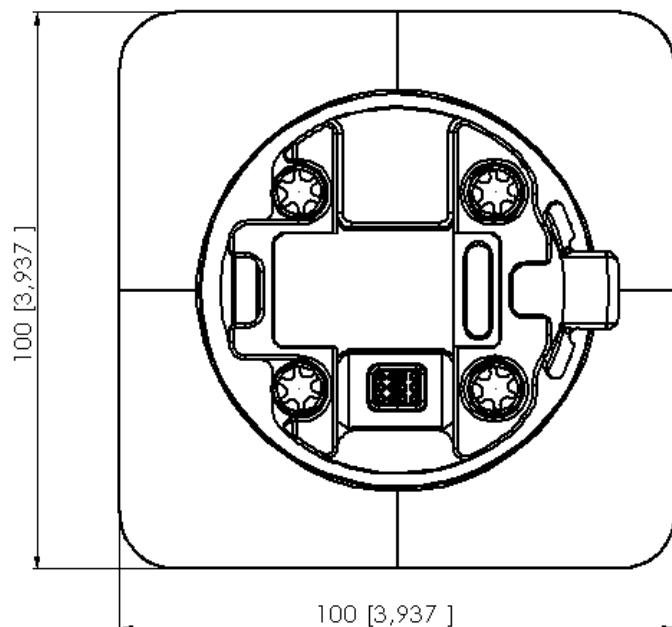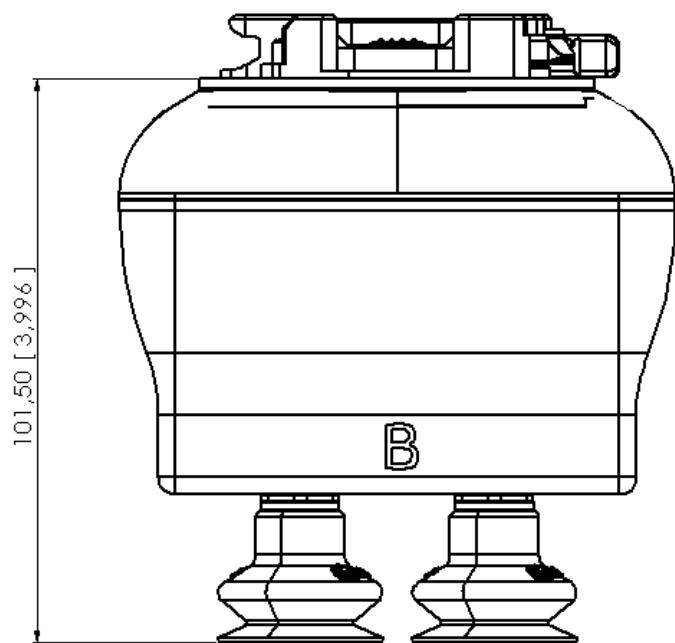
All dimensions are in mm and [inches].
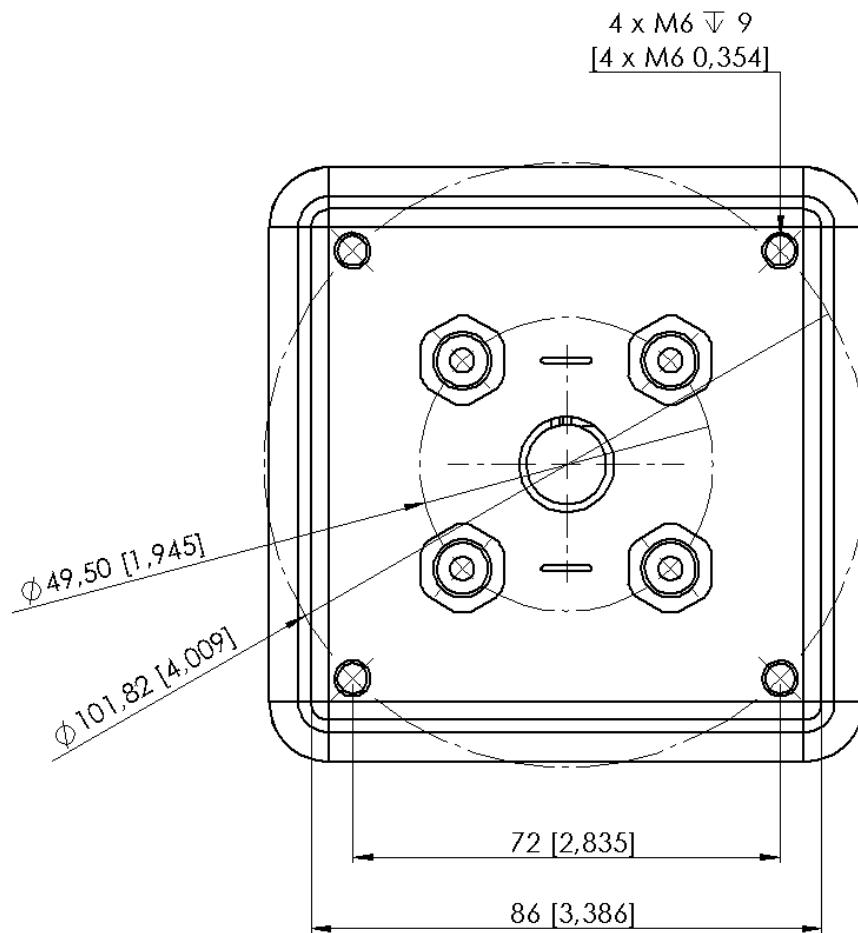
Ø241 [9.487]
Ø241 [9.487]
Ø241 [9.505]
Ø241 [9.505]
346 [13.638]
136 [5.371]

All dimensions are in mm and [inches].

Hardware Specification

VGC10

101,50 [3,996]

B

100 [3,937]

100 [3,937]

All dimensions are in mm and [inches].

4 x M6 ⍲ 9
[4 x M6 0,354]

Ø 49,50 [1,945]

Ø 101,82 [4,009]

72 [2,835]

86 [3,386]
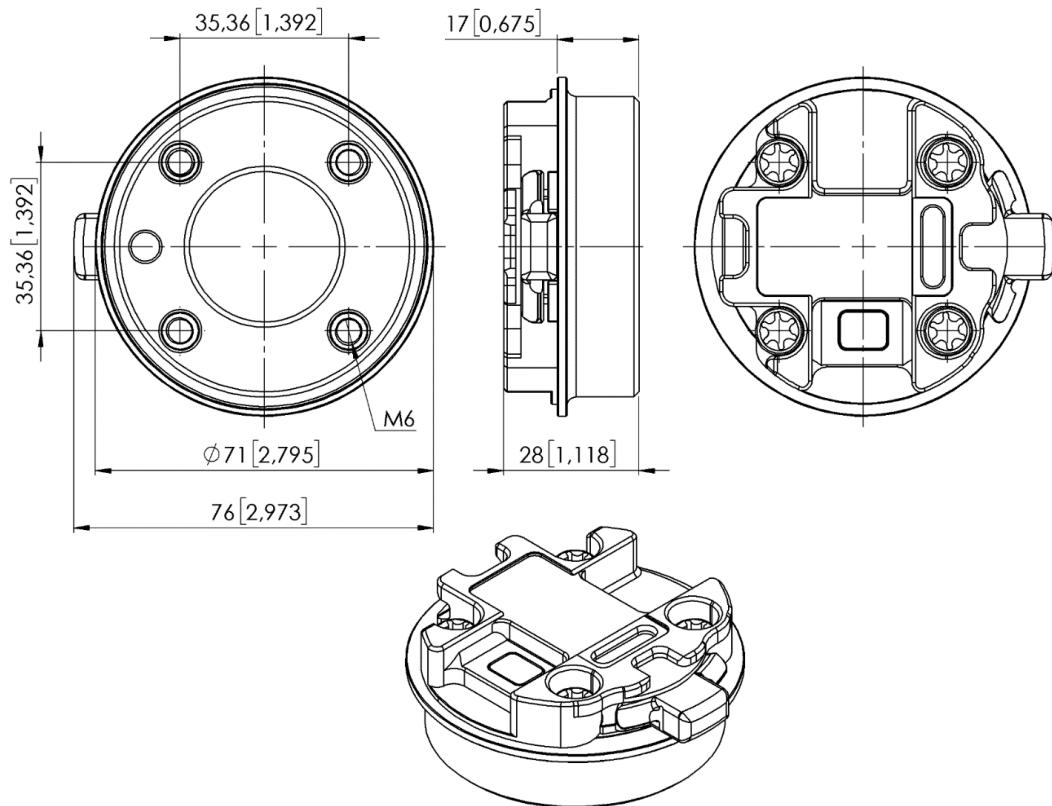
All dimensions are in mm and [inches].
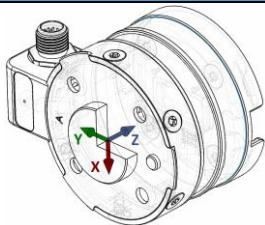
Quick Changer - Tool side

All dimensions are in mm and [inches].
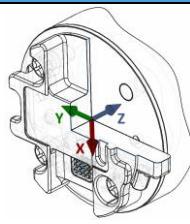
6.3 Center of Gravity

COG, TCP, and weight parameters of the single devices (without any mounting/adapter):
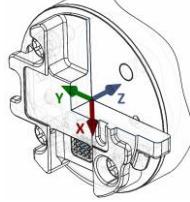
HEX-E/H QC

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=50	cX=0 cY=5 cZ=20	0.35 kg 0.77 lb

Gecko
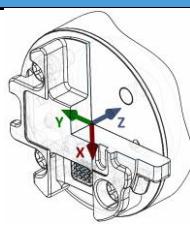
Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=187	cX=0 cY=0 cZ=113	2.83 kg 6.10 lb

RG2-FT

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=205	cX=0 cY=0 cZ=65	0.98 kg 2.16 lb
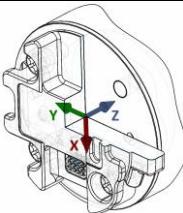
* Mounted at 0°

RG2

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=200	cX=0 cY=0 cZ=64	0.78 kg 1.72 lb

* Mounted at 0°

Hardware Specification
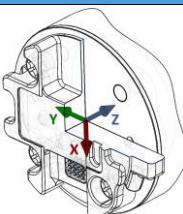
RG6

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=250	cX=0 cY=0 cZ=90	1.25 kg 2.76 lb
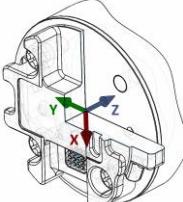
* Mounted at 0°

VG10

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=105	cX=15 cY=0 cZ=54	1.62 kg 3.57 lb

* With arms folded back

VGC10

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=0 Y=0 Z=7	cX=-1 cY=-1 cZ=37	0.814 kg 1.79 lb

* With no attachments

7   Maintenance

> ⚠️ **WARNING:**
>
> An overall inspection of the OnRobot's End of Arm Tooling must be performed regularly and at least once every 6 months. This inspection must include but is not limited to check for defective material and clean gripping surfaces.
>
> Use original spare parts, and original service instructions for the OnRobot's End of Arm Tooling and the robot. Failure to comply with this precaution can cause unexpected risks, resulting in severe injury.

If you have questions regarding spare parts and repair, please visit our website **www.onrobot.com** to contact us.

Gecko

Gecko Gripper pads are made from a precision cast silicone or polyurethane film with a gecko microstructure. Contact with sharp objects may damage the pad surface and impair function. The Gecko Gripper performance is maximized when the pads are clean and dry. The pads can collect dust, so it is best to use the Gecko Gripper in a clean environment and/or establish a routine cleaning schedule.
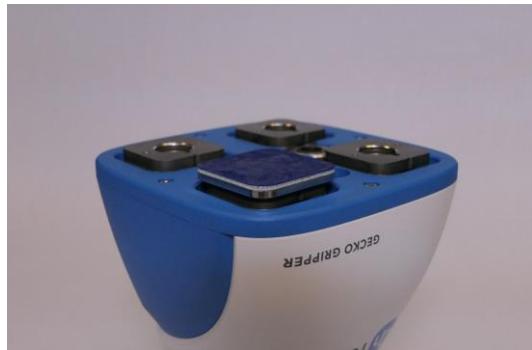
Part	Description of Maintenance	Frequency
Pad Cleaning	Routine cleaning: Cleaning Station	Dependent on operating conditions. Guidelines are: See Cleaning Station User Guide
Pad Wear	Replacement due to wear	150000 – 200000 for HIGH preload operation 200000 – 250000 for LOW preload operation

Replacing the Gripper Pads

Gecko Gripper pads are designed to last for 200,000-300,000 cycles under typical operating conditions. If the pads do not seem to be gripping properly, even with routine cleaning (see table in the previous page), we recommend fully replacing the gripper pads.

To replace the gripper pads, use the provided pad removal tool.
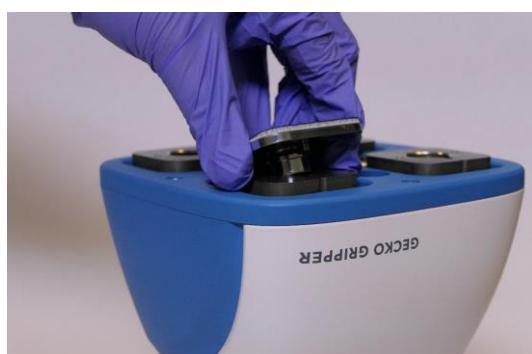
Step 1: Move gripper pads to the maximum extruded setting such that the pads are maximally exposed/visible.

Step 2: Insert the edge of the pad removal tool between the shiny silver plate of the pads and the dull backing plate. Leverage the pad removal tool against the gripper housing to pry off the used pad. Repeat for all pads.

Step 3: To install new replacement pads, align the notch of the pad with the tab in the mounting hole. Push the pad into the gripper until there are no gaps between the shiny silver pad plate and backing plate.

RG2/6

WARNING:

An overall inspection of the PLd CAT3 Safety Buttons must be performed regularly and at least once every 6 months.

RG2-FT

WARNING:

Please clean the proximity sensor surface regularly with low pressure compressed air (<5 bar) from a 5 cm distance. For stronger contamination use isopropyl alcohol with a soft cotton swab to keep it clean.

VG10 / VGC10

The VG grippers are equipped with one filter for each suction cup socket, and one filter for the exhaust. How often the filters need to be changed depends on the nature of the work piece and the working environment. The VG grippers automatically de-dust the filters every time a grip is released. However, particles can eventually get stuck and build up inside the filter, lowering the VG grippers performance.

A filter service kit is available, which include both new filters and tools needed.

Filter service kit for VG10, PN 100064

Filter service kit for VGC10, PN 103757

Neither use nor power on the VG grippers without filters. Dust, hair and larger particles can get stuck in pump membranes and valve seats, causing permanent damage to the VG grippers.

DANGER:

Identify how often the filters need service and schedule maintenance with a fixed period short enough to ensure a firm grip at all times.

An overall inspection of the VG grippers must be performed regularly and at least once every 6 months.

Never power the VG grippers without filters or with filters mounted incorrectly. Failure to comply with this precaution can cause irreversible failure of pump or valves.

8 Warranties

8.1 Patents

Products of OnRobot A/S are protected by several patents; some still in global publication process (Patents pending). All manufacturers of copies and similar products violating any patent claims will be prosecuted.

8.2 Product Warranty

Without prejudice to any claim the user (customer) may have in relation to the dealer or retailer, the customer shall be granted a manufacturer's warranty under the conditions set out below:

In the case of new devices and their components exhibiting defects resulting from manufacturing and/or material faults within 12 months of entry into service (maximum of 15 months from shipment), OnRobot A/S shall provide the necessary spare parts, while the customer (user) shall provide working hours to replace the spare parts, either replace the part with another part reflecting the current state of the art, or repair the said part. This warranty shall be invalid if the device defect is attributable to improper treatment and/or failure to comply with information contained in the user guides. This warranty shall not apply to or extend to services performed by the authorized dealer or the customer themselves (e.g. installation, configuration, software downloads). The purchase receipt, together with the date of purchase, shall be required as evidence for invoking the warranty. Claims under the warranty must be submitted within two months of the warranty default becoming evident. Ownership of devices or components replaced by and returned to OnRobot A/S shall vest in OnRobot A/S. Any other claims resulting out of or in connection with the device shall be excluded from this warranty. Nothing in this warranty shall attempt to limit or exclude a customer's statutory rights nor the manufacturer's liability for death or personal injury resulting from its negligence. The duration of the warranty shall not be extended by services rendered under the terms of the warranty. Insofar as no warranty default exists, OnRobot A/S reserves the right to charge the customer for replacement or repair. The above provisions do not imply a change in the burden of proof to the detriment of the customer. In case of a device exhibiting defects, OnRobot A/S shall not be liable for any indirect, incidental, special or consequential damages, including but not limited to, lost profits, loss of use, loss of production or damage to other production equipment.

In case of a device exhibiting defects, OnRobot A/S shall not cover any consequential damage or loss, such as loss of production or damage to other production equipment.

8.3 Disclaimer

OnRobot A/S continues to improve reliability and performance of its products, and therefore reserves the right to upgrade the product without prior warning. OnRobot A/S ensures that the content of this manual is precise and correct but takes no responsibility for any errors or missing information.

9 Certifications

ZERTIFIKAT
CERTIFICATE

Hiermit wird bescheinigt, dass die Firma / *This certifies that the company*

OnRobot A/S
Teglværksvej 47H
5220 Odense SØ
Denmark

berechtigt ist, das unten genannte Produkt mit dem abgebildeten Zeichen zu kennzeichnen
is authorized to provide the product mentioned below with the mark as illustrated

Fertigungsstätte:
Manufacturing plant:

OnRobot A/S
Teglværksvej 47H
5220 Odense SØ
Denmark

Beschreibung des Produktes:
(Details s. Anlage 1)
Description of product:
(Details see Annex 1)

Safety Gripper for collaborative robots
RG2 v2 and RG6 v2

Geprüft nach:
Tested in accordance with:

EN ISO 13849-1:2015 Cat. 3, PL ,d'

Registrier-Nr. / *Registered No.* 44 780 18106002
Prüfbericht Nr. / *Test Report No.* 3523 2689
Aktenzeichen / *File reference* 8000489144

Gültigkeit / *Validity*
von / *from* 2019-06-04
bis / *until* 2024-06-03

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2019-06-04

TÜV NORD CERT GmbH   Langemarckstraße 20   45141 Essen   www.tuev-nord-cert.de   technology@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

intertek

Total Quality. Assured.

CERTIFICATE
OF REGISTRATION

This is to certify that the management system of:

OnRobot A/S

Main Site: Teglværksvej 47 H, 5220 Odense SØ, Denmark
Chamber of Commerce: 36492449

Additional Site: OnRobot A/S, Cikorievej 44, 5220 Odense SØ, Denmark

has been registered by Intertek as conforming to the requirements of

ISO 9001:2015

The management system is applicable to:

Development and sales of End-of-Arms tools for industrial customers worldwide.

Certificate Number:
0096721

Initial Certification Date:
26 November 2019

Date of Certification Decision:
26 November 2019
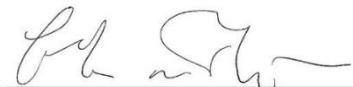
Issuing Date:
26 November 2019

Valid Until:
25 November 2022

Accred. no. 1639
Certification of
Management
Systems
ISO/IEC 17021-1

Intertek

Carl-Johan von Plomgren
MD, Business Assurance Nordics

Intertek Certification AB
P.O. Box 1103, SE-164 22 Kista, Sweden

GENERAL REPORT SUMMARY

This electromagnetic emission and immunity test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Device Tested:	Gecko Gripper Model: GEN2 S/N: RAPUNZEL
Product Description:	The equipment under test is a robotic attachment that makes it possible to lift flat, smooth, and level surfaces.
Modifications:	The EUT was not modified in order to comply with specifications.
Customer:	OnRobot Los Angeles 8928 Ellis Avenue Los Angeles, California 90034
Test Dates:	October 4; November 12, 13, 14 and 15, 2019

Test Specifications covered by Accreditation:
Emissions and Immunity Requirements European Standards:

EN 61000-6-2 (2005), EN 55011 (2016) + A1 (2017); IEC 61000-3-2 (2014); and IEC 61000-3-3 (2013)

NVLAP TESTING
NVLAP LAB CODE 200528-0

ilac-MRA

EN 61000-6-2 (2005) is a product family immunity standard that references the following specifications:

EN 61000-4-2 (2009)
EN 61000-4-3 (2006) + A1 (2008) + A2: 2010
EN 61000-4-4 (2004) + A1 (2010)
EN 61000-4-5 (2006)
EN 61000-4-6 (2009)
EN 61000-4-8 (2009)
EN 61000-4-11 (2004)

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Newbury Park Division
1050 Lawrence Drive
Newbury Park, CA 91320
(805) 480-4044

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Attestation of Conformity no. 119-29901-A1

FORCE Technology has performed compliance testing on electrical products since 1967. FORCE Technology is an accredited test house according to EN17025 and participates in international standardization with organizations such as CEN/CENELEC, IEC/CISPR and ETSI. This attestation of conformity with the below mentioned standards and/or normative documents is based on accredited tests and/or technical assessments carried out at FORCE Technology.

Attestation holder
OnRobot A/S Teglværksvej 47H 5220 Odense SØ Denmark.
Product identification
Compute box with Power Supply Unit (PSU) VER36U240-JA. Mountings: HEX-E QC V3 (101904), QC – R v2 (102037), Dual QC v2 (101788). Tools: VG10 v2 (101661), RG2 v2 (102012), RG2-FT v2 (102075), RG6 v2 (102021).
Manufacturer
On Robot A/S
Technical documentation
Assessment no. 119-29901-A1

Standards list no. 1:

IEC 61000-3-2:2014	EMC Directive 2014/30/EU, Article 6
IEC 61000-3-3:2013	EN 61000-3-2:2014
IEC 61000-6-2:2016	EN 61000-3-3:2013
IEC 61000-6-4:2018	EN 61000-6-2:2005
	EN 61000-6-2:2019
	EN 61000-6-4:2007 + A1:2011

Standard list no. 2: (applicable specifically to RG2 v2 (102012) and RG6 v2 (102021))

IEC 61326-3-1:2017, Industry locations, SIL 2

The product identified above has been assessed and complies with the specified standards/normative documents. The attestation does not include any market surveillance. It is the responsibility of the manufacturer that mass-produced apparatus have the same properties and quality. This attestation does not contain any statements pertaining to the requirements pursuant to other standards, directives or laws other than the above mentioned.

Signature

Knud A. Baltsen

Digitally signed by Knud A. Baltsen
Date: 2019.11.15 19:38:04 +01'00'

Signed by: Knud A. Baltsen, Senior Specialist, Product Compliance

Attestation of Conformity no. 118-33022-A1

FORCE Technology has performed compliance testing on electrical products since 1967. FORCE Technology is an accredited test house according to EN17025 and participates in international standardization with organizations such as CEN/CENELEC, IEC/CISPR and ETSI. This attestation of conformity with the below mentioned standards and/or normative documents is based on accredited tests and/or technical assessments carried out at FORCE Technology.

Attestation holder	
OnRobot A/S Teglværksvej 47H 5220 Odense SØ Denmark	
Product identification	
Gripper RG2 2.0	
Manufacturer	
OnRobot A/S	
Technical documentation	
FORCE Technology Test Report 117-29737, dated 01 September 2017 FORCE Technology Assessment Sheet 1668, dated 17 October 2017 FORCE Technology Test Report 118-33022-2 Rev. 1, dated 06 February 2019 FORCE Technology Assessment 118-33022-A1, dated 21 February 2019	

Standards/Normative documents

IEC 61000-6-2:2005 IEC 61000-6-4:2006 + A1:2010 IEC 61326-3-1:2017, Industrial locations, SIL 2 FCC Part 15B, Class A	EMC Directive 2014/30/EU, Article 6 EN 61000-6-2:2005 + AC:2005 EN 61000-6-4:2007 + A1:2011 EN 61326-3-1:2017, Industrial locations, SIL 2

The product identified above has been assessed and complies with the specified standards/normative documents. The attestation does not include any market surveillance. It is the responsibility of the manufacturer that mass-produced apparatus have the same properties and quality. This attestation does not contain any statements pertaining to the requirements pursuant to other standards, directives or laws other than the above mentioned.

Signature

Knud A. Baltsen
2019-02-21

Digitally signed by Knud A. Baltsen
kab@force.dk
Senior Specialist

Signed by: Knud A. Baltsen, Senior Specialist, Product Compliance

Attestation of Conformity no. 118-33022-A2

FORCE Technology has performed compliance testing on electrical products since 1967. FORCE Technology is an accredited test house according to EN17025 and participates in international standardization with organizations such as CEN/CENELEC, IEC/CISPR and ETSI. This attestation of conformity with the below mentioned standards and/or normative documents is based on accredited tests and/or technical assessments carried out at FORCE Technology.

Attestation holder

OnRobot A/S
Teglværksvej 47H
5220 Odense SØ
Denmark

Product identification

Gripper RG6 2.0

Manufacturer

OnRobot A/S

Technical documentation

FORCE Technology Test Report 117-29737, dated 01 September 2017
FORCE Technology Assessment Sheet 1668, dated 17 October 2017
FORCE Technology Test Report 118-33022-2 Rev. 1, dated 06 February 2019
FORCE Technology Assessment 118-33022-A1, dated 21 February 2019

Standards/Normative documents

IEC 61000-6-2:2005
IEC 61000-6-4:2006 + A1:2010
IEC 61326-3-1:2017, Industrial locations, SIL 2
FCC Part 15B, Class A

EMC Directive 2014/30/EU, Article 6
EN 61000-6-2:2005 + AC:2005
EN 61000-6-4:2007 + A1:2011
EN 61326-3-1:2017, Industrial locations, SIL 2

The product identified above has been assessed and complies with the specified standards/normative documents. The attestation does not include any market surveillance. It is the responsibility of the manufacturer that mass-produced apparatus have the same properties and quality. This attestation does not contain any statements pertaining to the requirements pursuant to other standards, directives or laws other than the above mentioned.

Signature

Knud A. Baltsen
2019-02-21

Digitally signed by Knud A. Baltsen
kab@force.dk
Senior Specialist

Signed by: Knud A. Baltsen, Senior Specialist, Product Compliance

9.1 Declaration of Incorporation

Gecko

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type:	Industrial Robot Gripper
Model:	Gecko Gripper
Generation:	V2
Serial:	1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

Additionally, the product declares in conformity with the following directives, according to which the product is CE marked:

2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

HEX-E

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type:	Industrial Force/Torque Sensor
Model:	HEX-E QC
Generation:	V3
Serial:	1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

Additionally, the product declares in conformity with the following directives, according to which the product is CE marked:

2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

HEX-H

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

> OnRobot A/S
> Teglværskvej 47H
> DK-5220, Odense SØ
> DENMARK

declares that the product:

> Type: Industrial Force/Torque Sensor
> Model: HEX-H QC
> Generation: V3
> Serial: 1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

Additionally, the product declares in conformity with the following directives, according to which the product is CE marked:

> 2014/30/EU — Electromagnetic Compatibility Directive (EMC)
> 2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

> 2014/35/EU — Low Voltage Directive (LVD)
> 2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

RG2-FT

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type: Industrial Robot Gripper
Model: RG2-FT
Generation: V2
Serial: 1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

Additionally, the product declares in conformity with the following directives, according to which the product is CE marked:

2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

RG2

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type:	Industrial Robot Gripper
Model:	RG2
Generation:	V2
Serial:	1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

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2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

RG6

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type:	Industrial Robot Gripper
Model:	RG6
Generation:	V2
Serial:	1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

Additionally, the product declares in conformity with the following directives, according to which the product is CE marked:

2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

VG10

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type:	Industrial Robot Gripper
Model:	VG10
Generation:	V2
Serial:	1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

Additionally, the product declares in conformity with the following directives, according to which the product is CE marked:

2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO

VGC10

CE/EU Declaration of Incorporation (Original)

According to European Machinery Directive 2006/42/EC annex II 1.B.

The manufacturer:

OnRobot A/S
Teglværskvej 47H
DK-5220, Odense SØ
DENMARK

declares that the product:

Type:	Industrial Robot Gripper
Model:	VGC10
Generation:	V1
Serial:	1000000000-1009999999

may not be put into service before the machinery in which it will be incorporated is declared in conformity with the provisions of Directive 2006/42/EC, including amendments, and with the regulations transposing it into national law.

The product is prepared for compliance with all essential requirements of Directive 2006/42/EC under the correct incorporation conditions, see instructions and guidance in this manual. Compliance with all essential requirements of Directive 2006/42/EC relies on the specific robot installation and the final risk assessment.

Technical documentation is compiled according to Directive 2006/42/EC annex VII part B and available in electronic form to national authorities upon legitimate request. Undersigned is based on the manufacturer address and authorized to compile this documentation.

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2014/30/EU — Electromagnetic Compatibility Directive (EMC)
2011/65/EU — Restriction of the use of certain hazardous substances (RoHS)

Relevant essential health and safety requirements of the following EU directives are also applied:

2014/35/EU — Low Voltage Directive (LVD)
2012/19/EU — Waste of Electrical and Electronic Equipment (WEEE)

A list of applied harmonized standards, including associated specifications, is provided in this manual.

Budapest, December 16th, 2019

Group Management

Vilmos Beskid
CTO