Onrobot

USER MANUAL

FOR TECHMAN ROBOTS

v1.8.0

Original Instructions

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 their components:

1.2.1. Screwdriver

Tool	Version
Screwdriver	v1

For the Screwdriver, a Compute Box with hardware version of at least v3.4 is required. To check the HW version of the Compute Box, refer to the sticker on the device. Or check the HW version in the Web Client software.

1.2.2. Software and Firmware

1.2.2.1. Compute Box

The manual covers the following Compute Box software version:

Software	Version
Compute Box	v5.8.1

> **NOTE:**
>
> When the used Compute Box has lower software/firmware version, update the Compute Box. For detailed instructions, see **6.1.5. Web Client: Update Menu**.

1.3. Naming Convention

1.3.1. Compute Box/Eye Box

Eye Box and Compute Box are used interchangeably.

1.4. Copyright

The information contained herein is property of OnRobot A/S and shall not be reproduced in whole or in part without prior written approval of OnRobot A/S. The information herein is subject to change without notice and should not be construed as a commitment by OnRobot A/S. This manual is periodically reviewed and revised.

OnRobot A/S assumes no responsibility for any errors or omissions in this document.

Copyright © 2015–2021 by OnRobot A/S.

The OnRobot A/S logo is trademark of OnRobot A/S.

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 **7.1. 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. Screwdriver Safety Features

2.5.1. Screw-bit System Always Hidden

The Screwdriver has been designed so that the Screw-bit System can always be hidden inside the housing to enhance safety.

The Move Shank command will allow the user to hide the Screw-bit System inside the housing at any time.

Additionally, the software has been designed so that after running a Tighten, Loosen or Pick Screw command, the Screw-bit System will be automatically hidden inside the housing.

NOTE:

As mentioned in the technical sheet, this safety functionality will be achieved if the screw length is equal or less than 35 mm.

2.5.2. Operational Safety

The Screwdriver has been designed so that its operations must be executed when the distance between the Screwdriver's bottom part and the surface where the action takes place is within the range of 0-8 mm (see image below). If the distance is higher than this, the Screwdriver operations will not be successful, and the system will generate an error.

0-8 mm
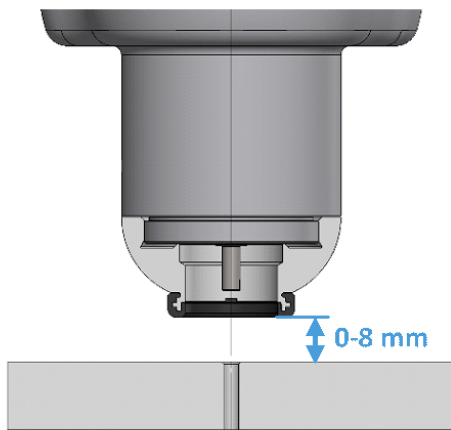
From a safety perspective, this ensures that nothing larger than 8 mm is exposed to be harmed by the Screw-bit System while executing a Screwdriver operation.

For instance, if a hand is located on the workpiece when the robot moves toward the recorded waypoint, the robot in a collaborative installation will have a protective stop when hitting the hand as it does not reach the recorded waypoint (as a hand is thicker than 8 mm). Additionally, If the robot reaches the recorded waypoint and starts the screwing operation, the <8 mm distance prevents the user from placing a hand/finger underneath during a Screwdriver operation.

NOTE:

As mentioned in the technical sheet, this safety functionality will be achieved if the screw length is up to 35 mm.

2.5.3. Automatic Safety Feature

An automatic safety feature has been implemented to reduce the possibility of the users to be in danger.

This safety feature is activated if the Screw-bit System detects a force above 40N during operation. In such a case, a mechanical mechanism will immediately retract the shank and hide it (up to 35 mm screw length).

Screw-bit System out	Automatic Safety Activated

If this happens, the safety state becomes triggered.

To reset from this state, command the shank to a new position.

Additionally, if the bottom part of the Screw-bit System detects an unexpected force above 20N while not in operation, the Screw-bit system will retract and be temporarily hidden into the housing (up to 35 mm screw length). This will not stop the robot program, only temporarily hide the Screw-bit System.

CAUTION:

This retract functionality does not work if the power is interrupted. Further actions may be required to eliminate the risk, identified by the risk assessment.

3. HW Installation

3.1. Overview

For a successful installation the following steps will be required:

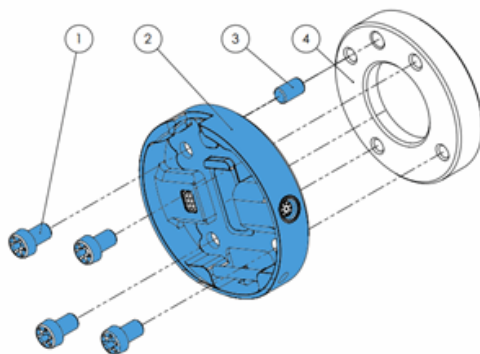• Mount the components
• Setup the software

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

3.2. Robot Mount

1. Mount the robot-specific adapter (if applicable)
2. Mount any optional accessories
3. Mount the Quick Changer option
4. Mount the tool(s) (if applicable)

3.2.1. Quick Changer Mounting

3.2.1.1. 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)
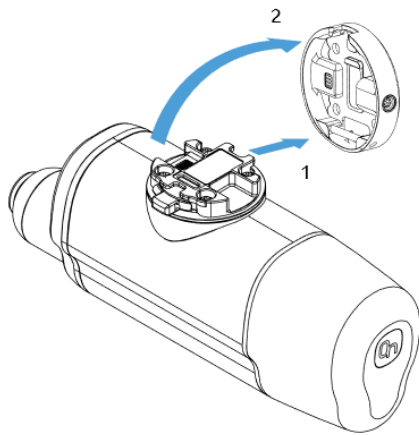4. Adapter/ Robot tool flange (ISO 9409-1-50-4-M6)

Use 10 Nm tightening torque.

3.2.1.2. Screwdriver

Tool	QC-R v2	QC-R v2-4.5 A
Screwdriver	✗	✓

3.2.2. Tools

3.2.2.1. Screwdriver

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.
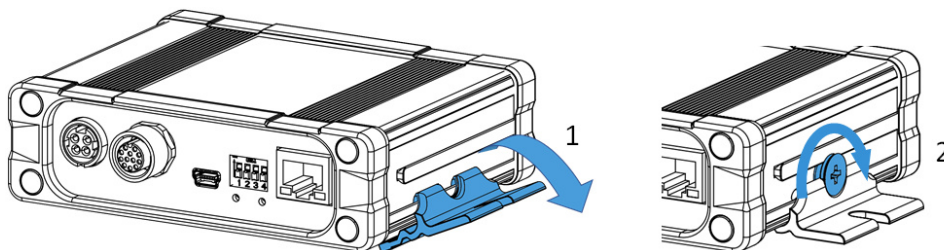
CAUTION:

Make sure to use the 4.5A version of the Quick Changers.

3.3. Compute Box Mount

3.3.1. Optional - Clip-on Bracket

Optionally, fix the Compute Box to a surface using the provided Clip-on Brackets (included only from 17th December 2020).

Do the following on both sides of the Compute Box:

1. Hook the Clip-on Bracket to the rail on the side of the Compute Box and then flip it down.
2. Fasten the Clip-on Bracket with the plastic srew.

3.4. 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
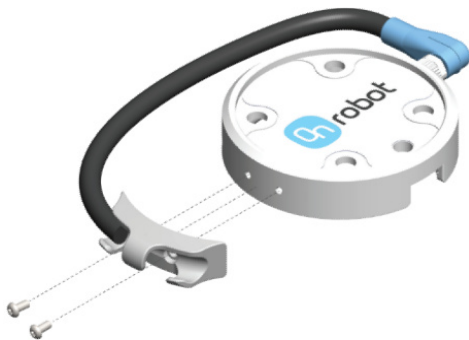- Power supply of the Compute Box
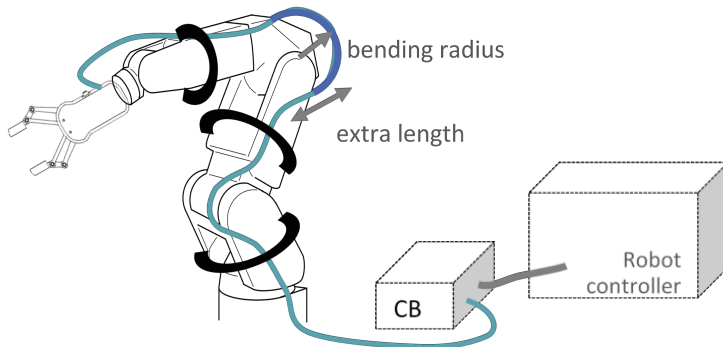
> **NOTE:**
>
> For the Quick Changer - Robot Side no cable is needed to be connected.

3.4.1. Tool Data Cable

3.4.1.1. Cable to Screwdriver

First connect the data cable to the tool.

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.

3.4.1.2. Cable to Compute Box

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.
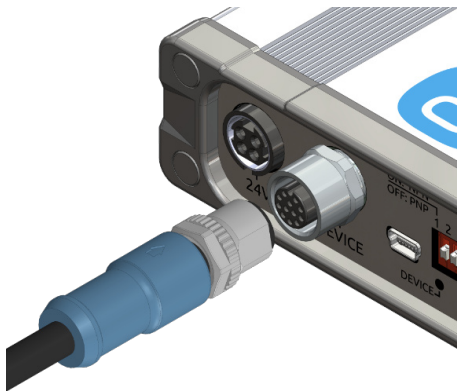
CAUTION:

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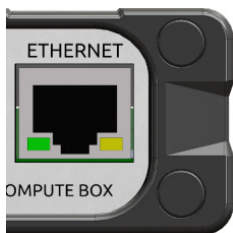
3.4.2. Ethernet Cable

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:

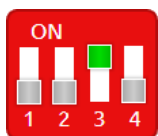Check and make sure that the Compute Box enclosure (metal) and the robot controller enclosure (metal) are not connected (no galvanic connection between the two).

3.4.3. Compute Box DIP Switch Settings

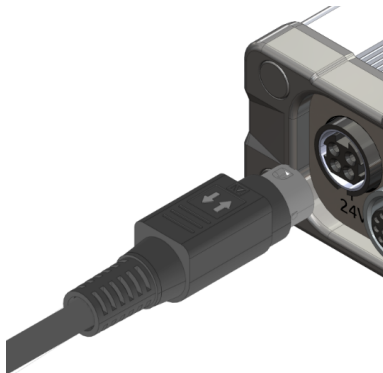Set the DIP switches of the Compute Box as follows:

Set the DIP switch 3 to ON and the DIP switch 4 to OFF position.

For more information about the Ethernet interface settings, see **6.1.1. Ethernet Interface Setup**.

3.4.4. Power Supply: Compute Box

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).

3.4.4.1. Screwdriver

| Power Supply	
1.5 A	✗
5 A	✓
6.25 A	✓

4. SW Installation

4.1. Robot Software Setup

4.1.1. Import Component

OnRobot provides the component in one of the following ways:

1. The component is stored in the accompanying USB stick (OPTIONAL - may not be part of the delivery for some of the devices). Prepare the supplied OnRobot USB stick and plug it into the robot controller.
2. The component can be downloaded from **www.onrobot.com**. Copy the `TM_Export` folder to the root of an empty USB stick, then rename the USB stick to "TMROBOT". Plug the USB stick into the robot controller.

Click on the main menu ≡ icon and go to 🎛 **System** menu.
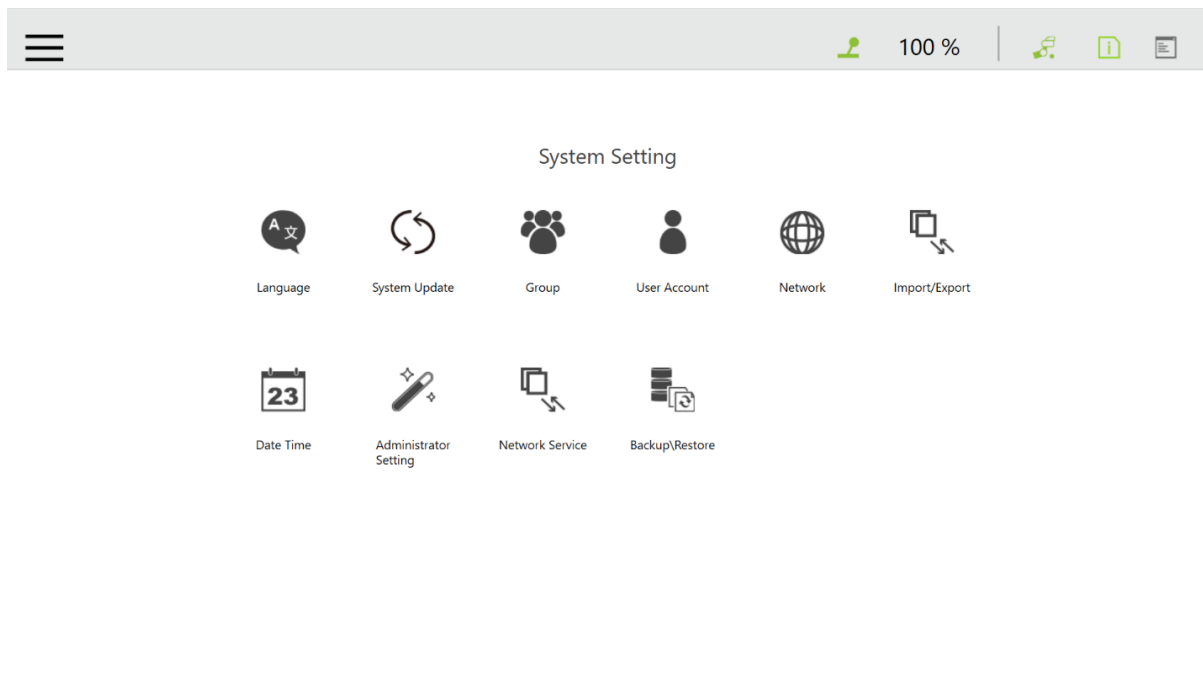
Go to **Import/Export** and click **Import** (upper left corner). Then select your robot from the list and click **OK**.
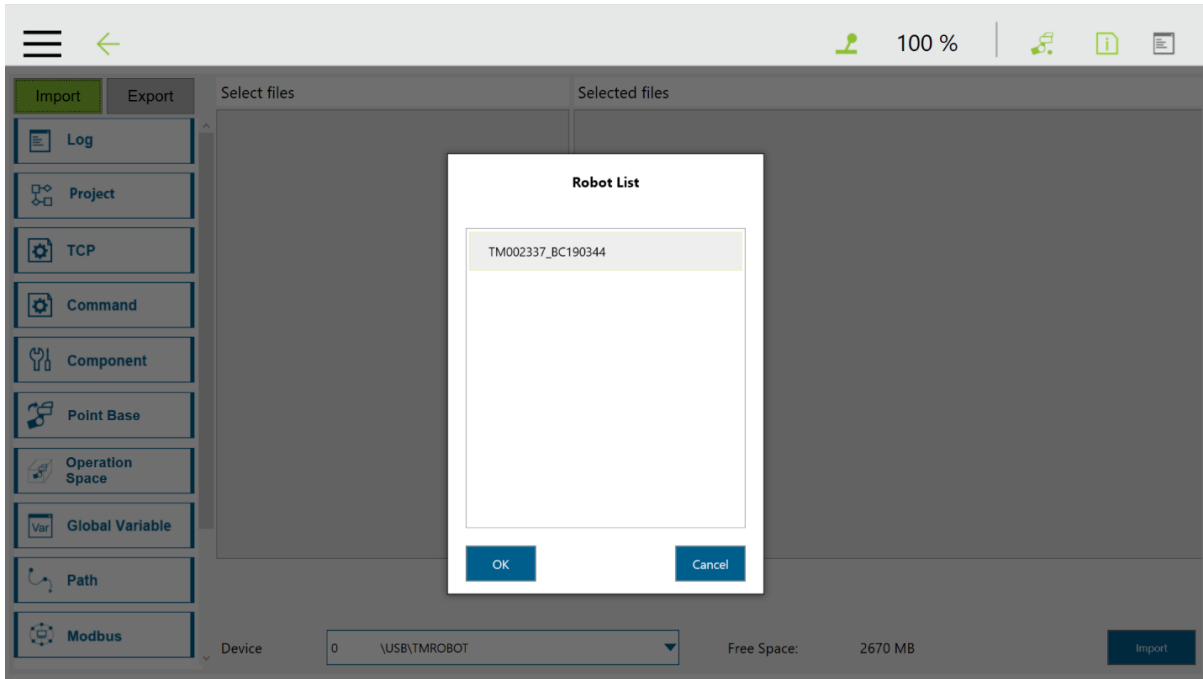
Select the relevant OnRobot components to be added and click **Import**.
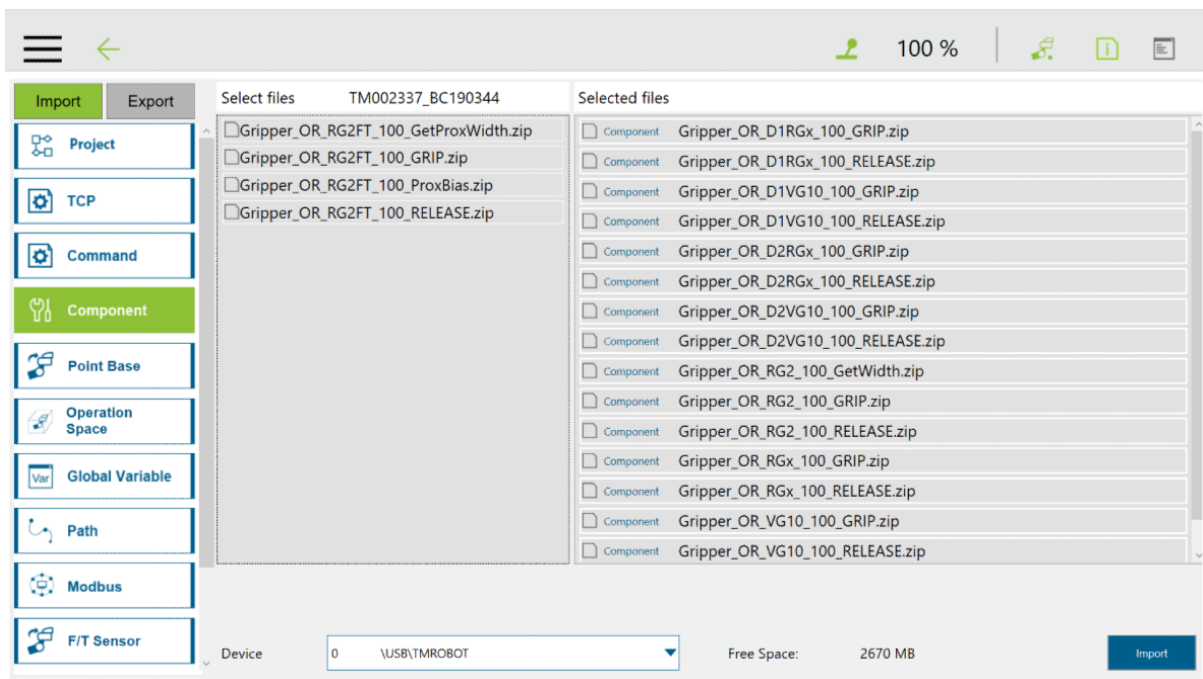
Go back to the main menu (≡) and go to ⊞ **Settings**.
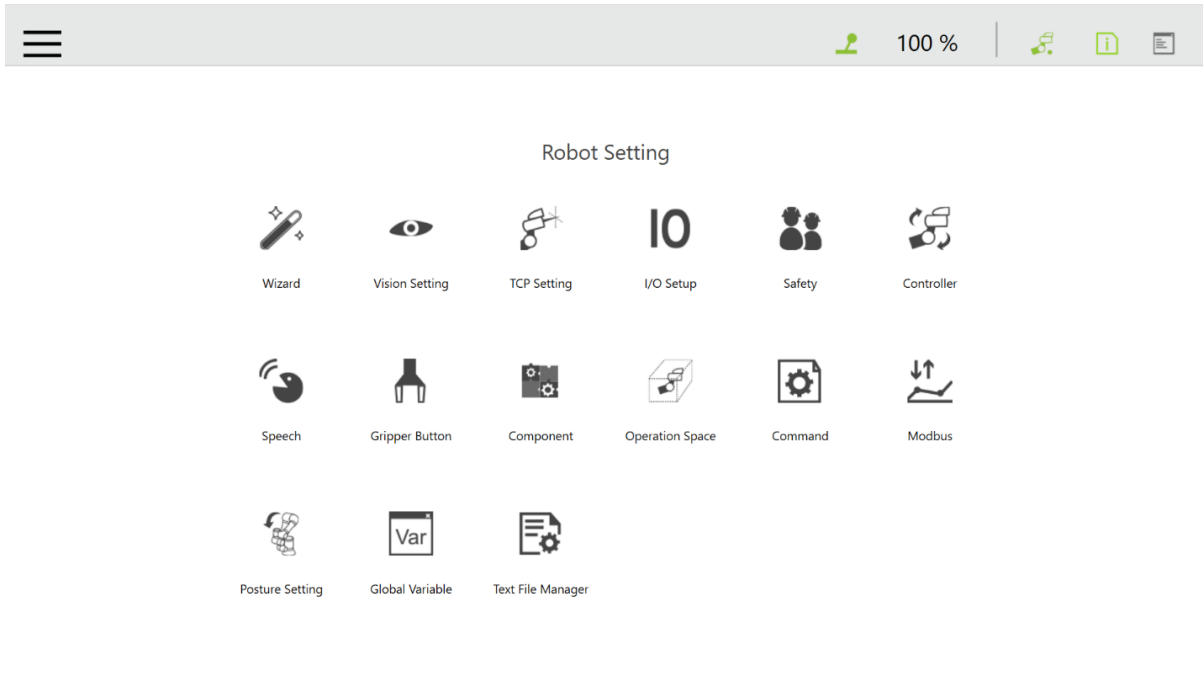
Click **Component** and make sure that all components are enabled that you would like to use.
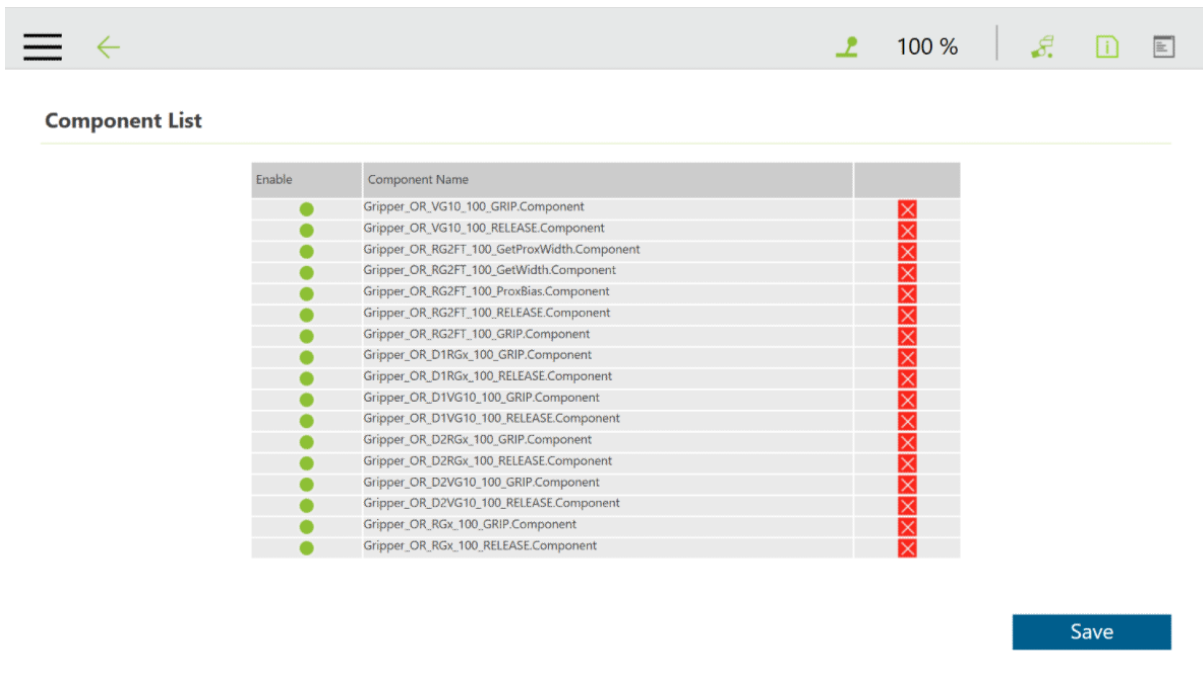
4.1.2. Set Robot Network Settings

Go to the main menu (☰) and go to ⊞ **Settings**.
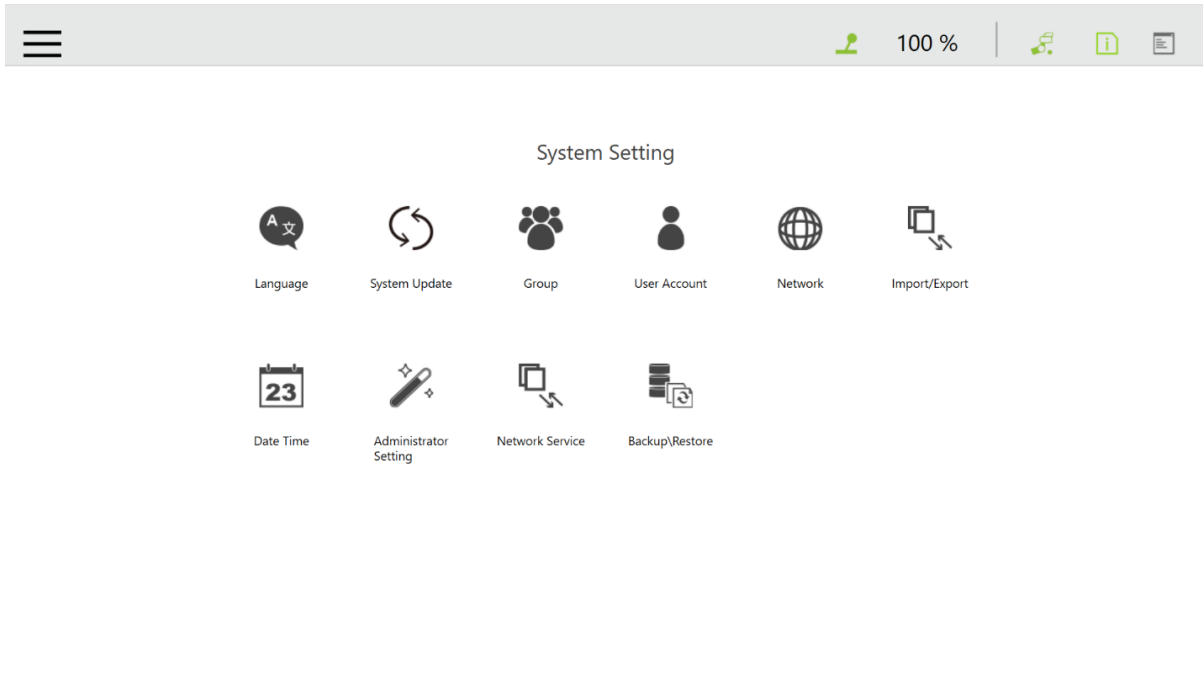
Go to **Network** and setup the IP address of the robot.
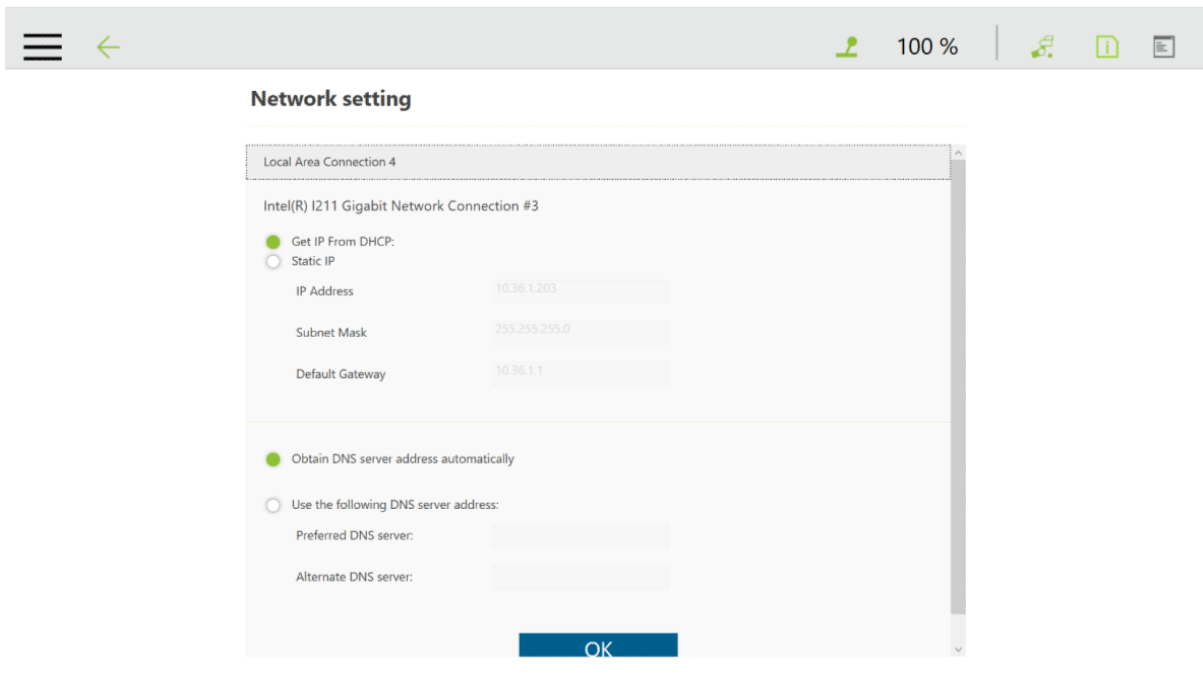
It is recommended to use the factory default settings.

4.1.3. Configure Gripper Buttons

Go to the main menu (☰) and go to 🎛 **Settings**.
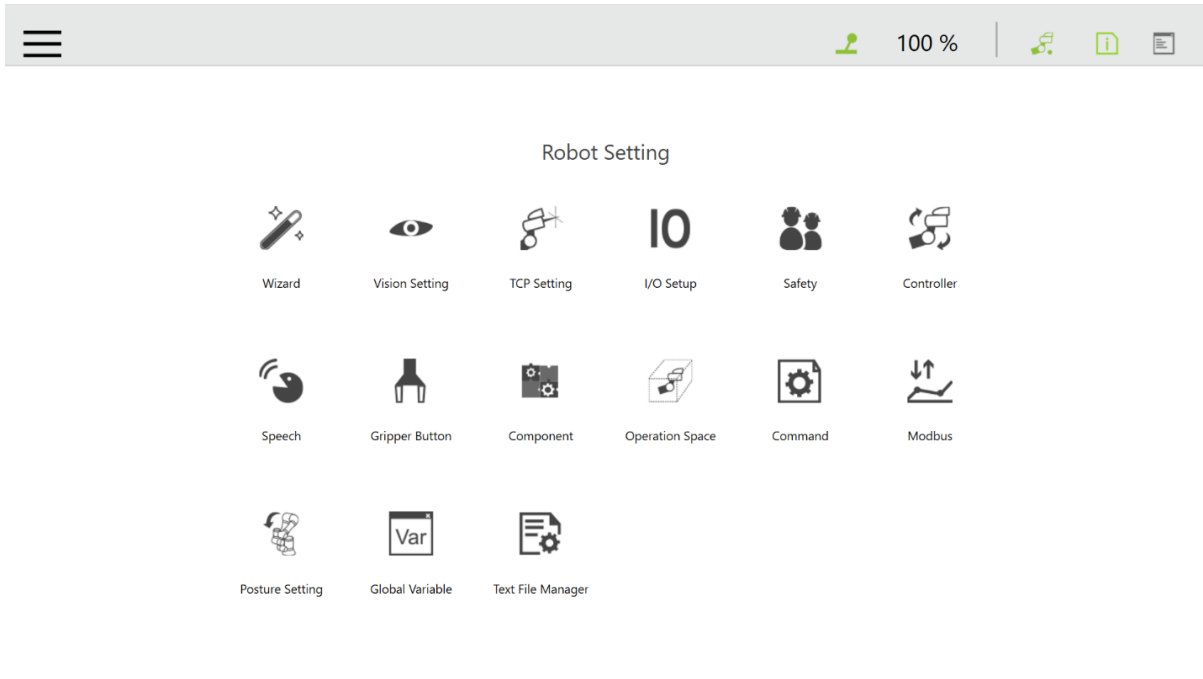
Click on the **Gripper Button** and configure as shown below.
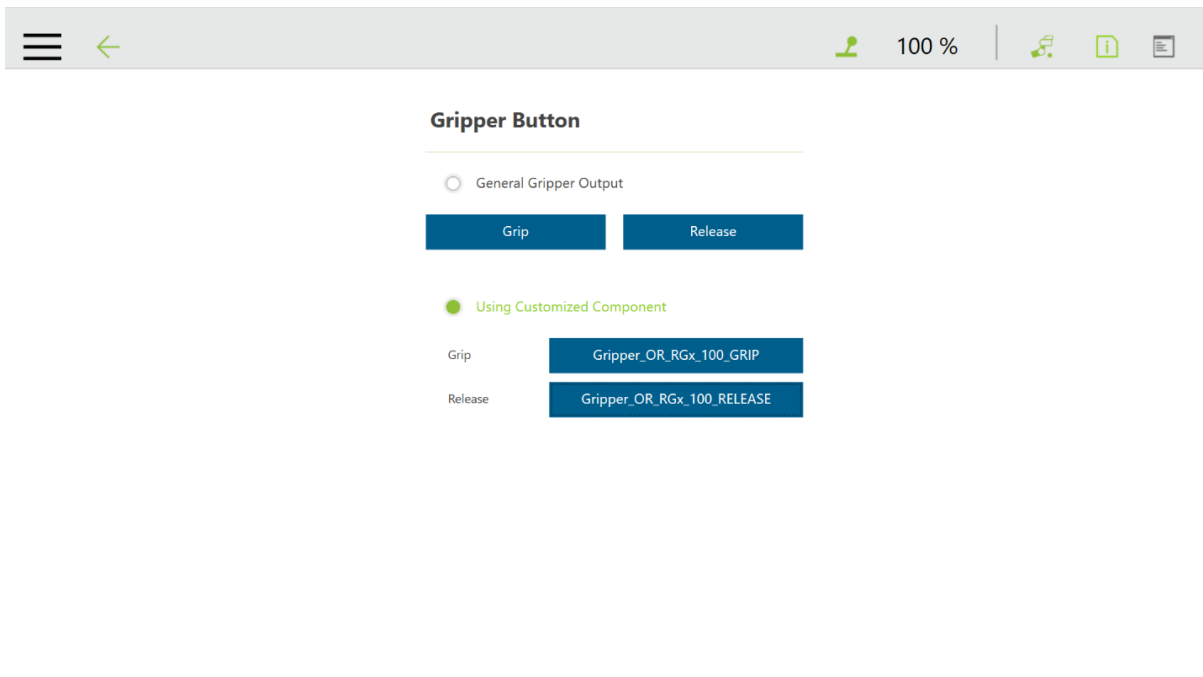
4.1.4. Configuring Modbus TCP for the Components

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 on the right side of **Display** in the upper right corner.
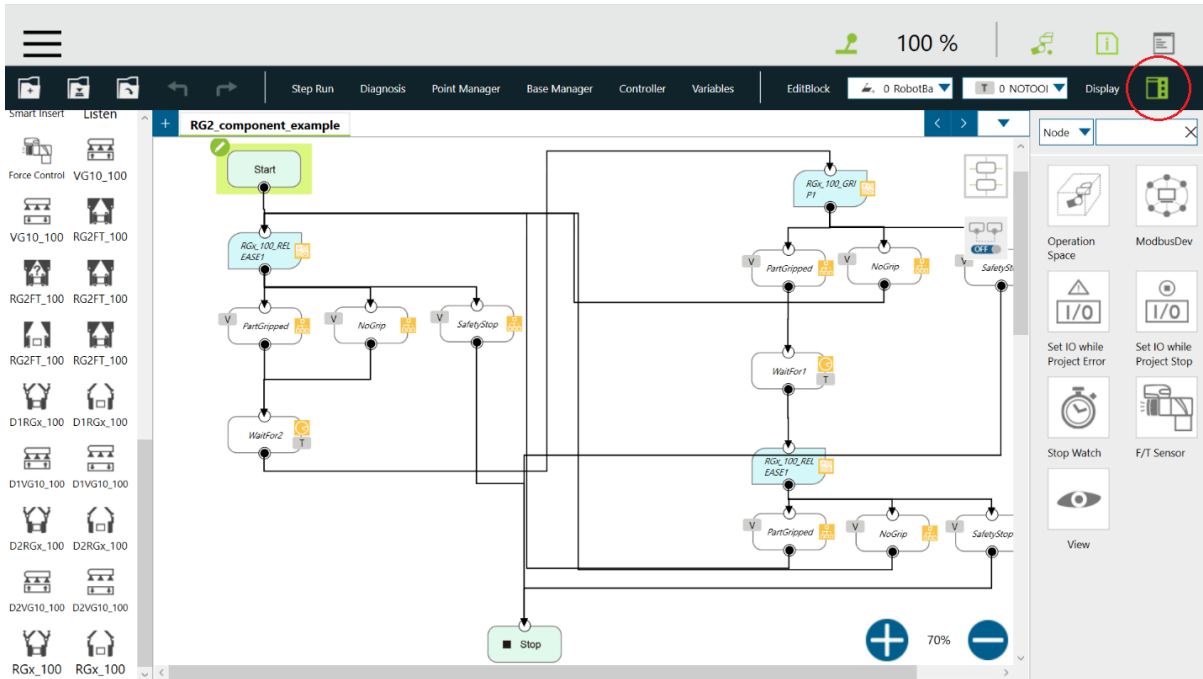
Then click on **ModbusDev**. Select `Gripper_OR_RGx_100_Grip1_mtcp_RG2` and click on the Pencil icon.
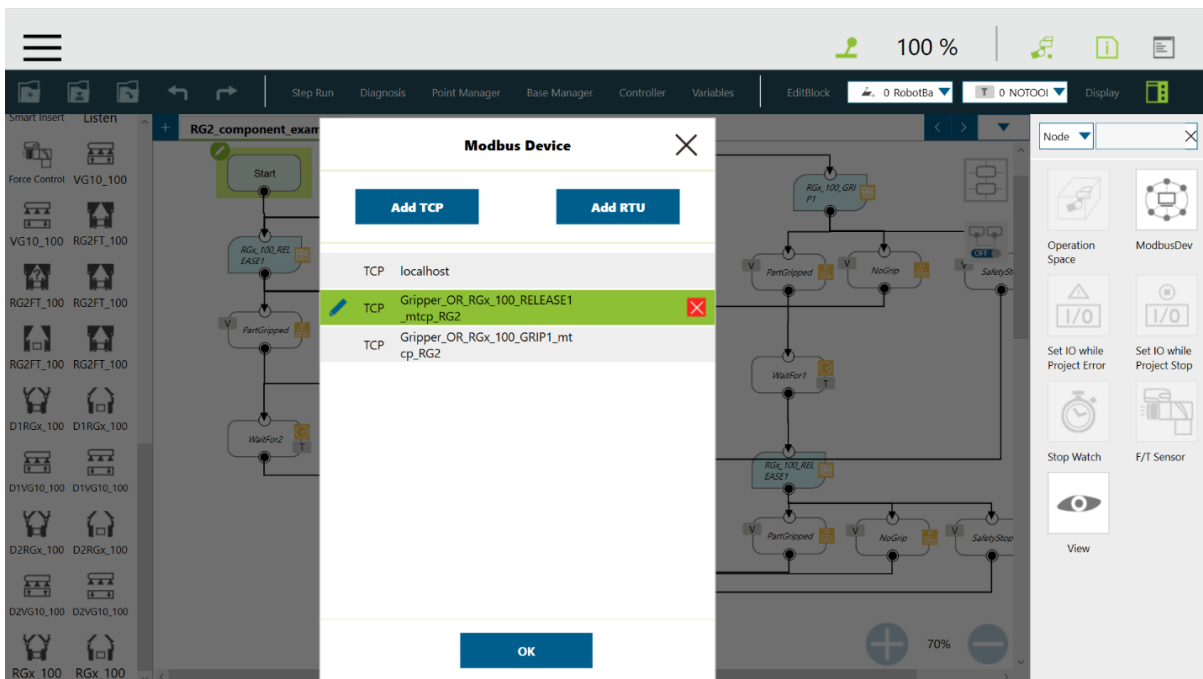
Click on the pencil icon again in the upper right corner.
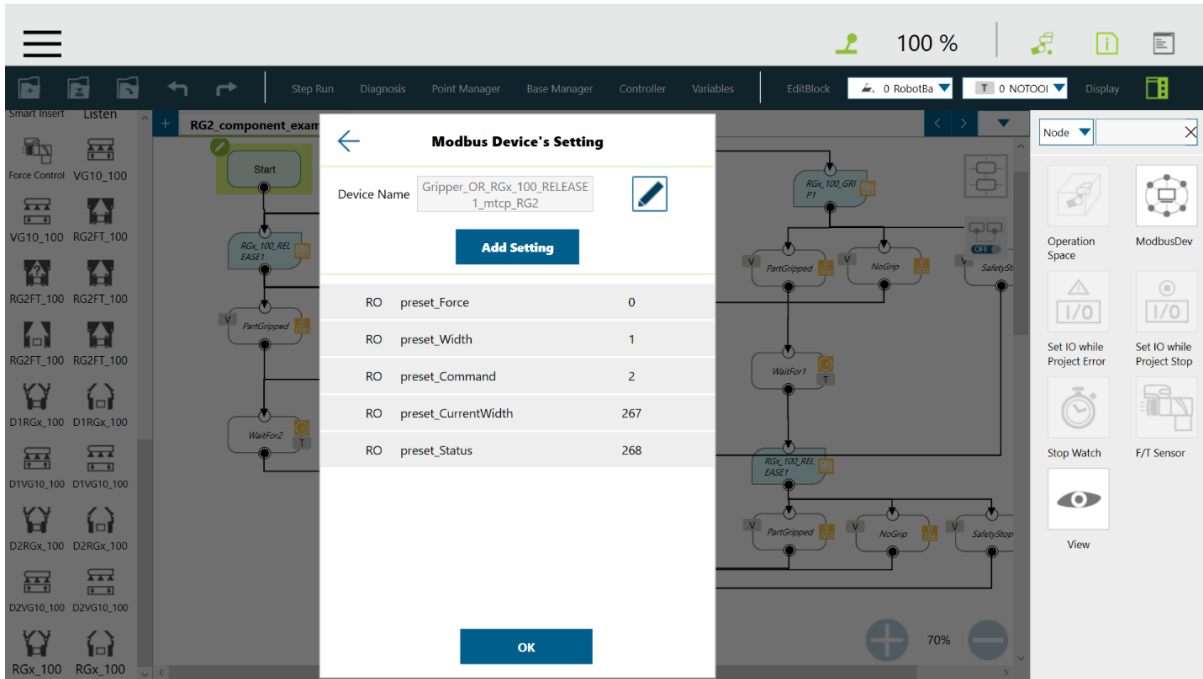
Make sure that the IP address is set correctly.
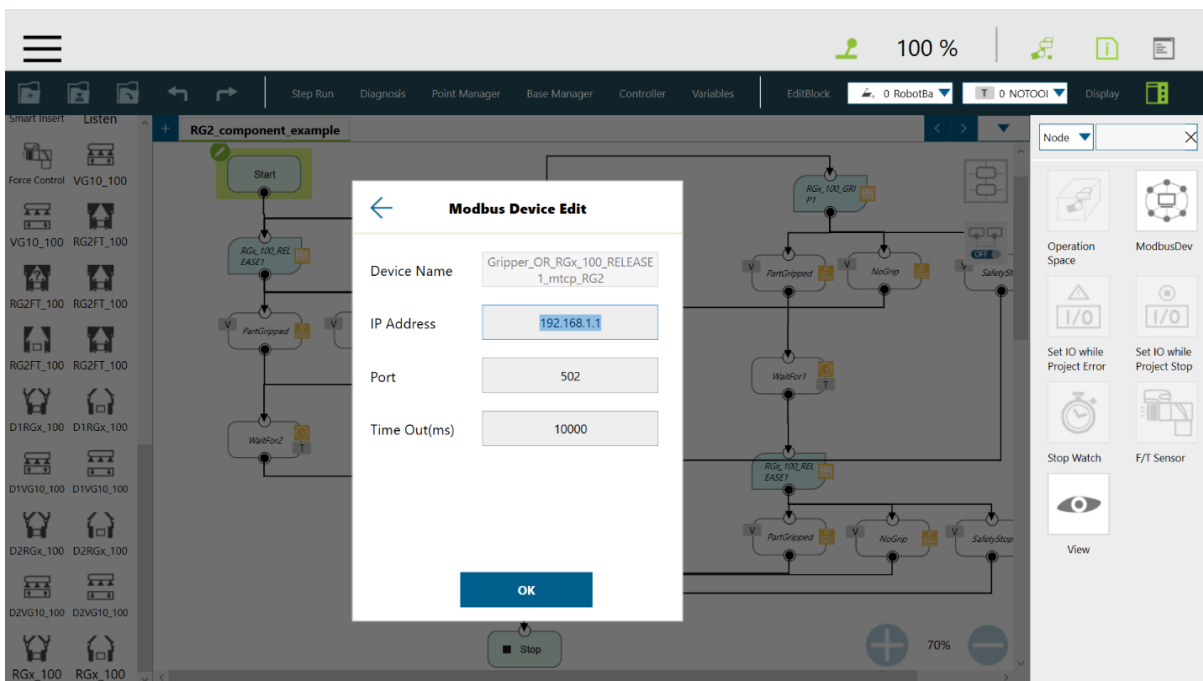
Repeat the same for the other Modbus device if needed.

Software setup is finished.

5. Operation

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

5.1. Robot Operation Overview

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

> **NOTE:**
>
> OnRobot functions only accept input and returns output in metric units. If you have values to provide in US Standard units, use the following conversion rates.

US Standard unit	Metric unit	Convert US Standard unit into metric parameter input	Convert metric function output to US Standard unit
Linear measure (Length/Distance)			
1 inch (in or ")	25.4 millimetres	Multiply the US Standard input by 25.4 to get the metric unit input.	Divide the metric output by 25.4 to get the US Standard unit output.
1 foot (ft or ')	0.304 metre	Multiply the US Standard input by 0.304 to get the metric unit input.	Divide the metric output by 0.304 to get the US Standard unit output.
Mass (Weight)			
1 pound (lb)	0.453 kilogram	Multiply the US Standard input by 0.453 to get the metric unit input.	Divide the metric output by 0.453 to get the US Standard unit output.
Torque			
1 lbft	1.355 Nm	Multiply the US Standard input by 1.355 to get the metric unit input.	Divide the metric output by 1.355 to get the US Standard unit output.

Example

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.

NOTE:

The 100 in the component name corresponds to the actual component version (100=1.00).

You can change `Target width` and `Target force` variables by clicking on the arrow icon on the component.
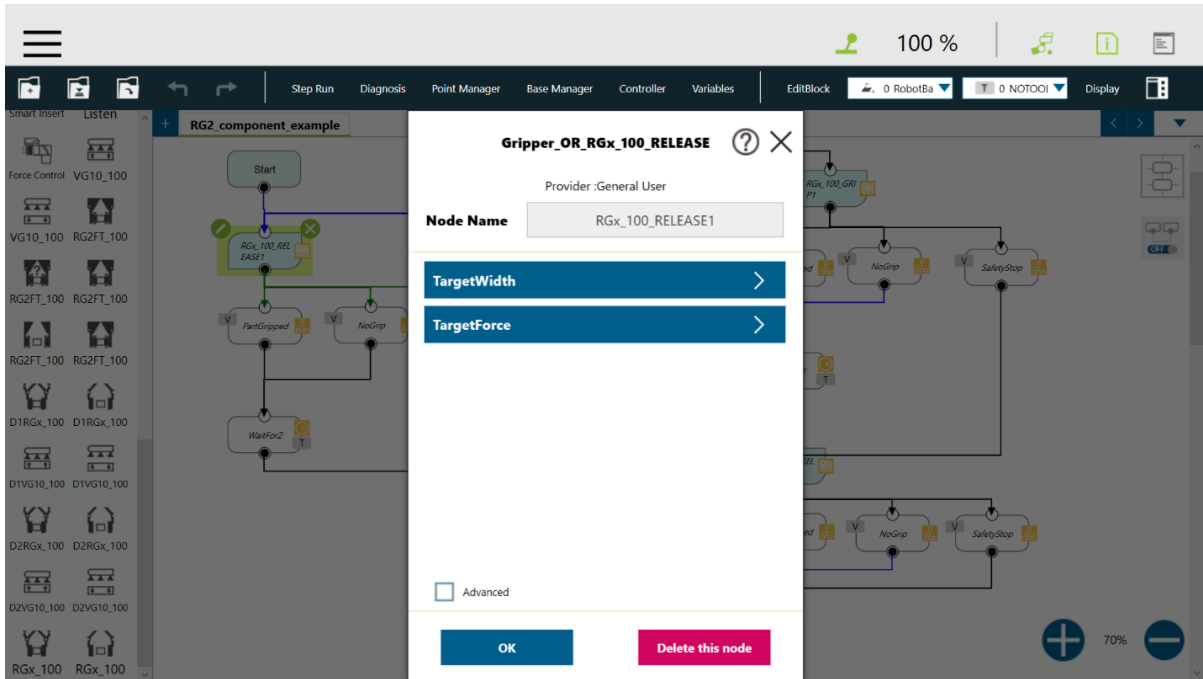
To edit the value, click on the pencil icon.
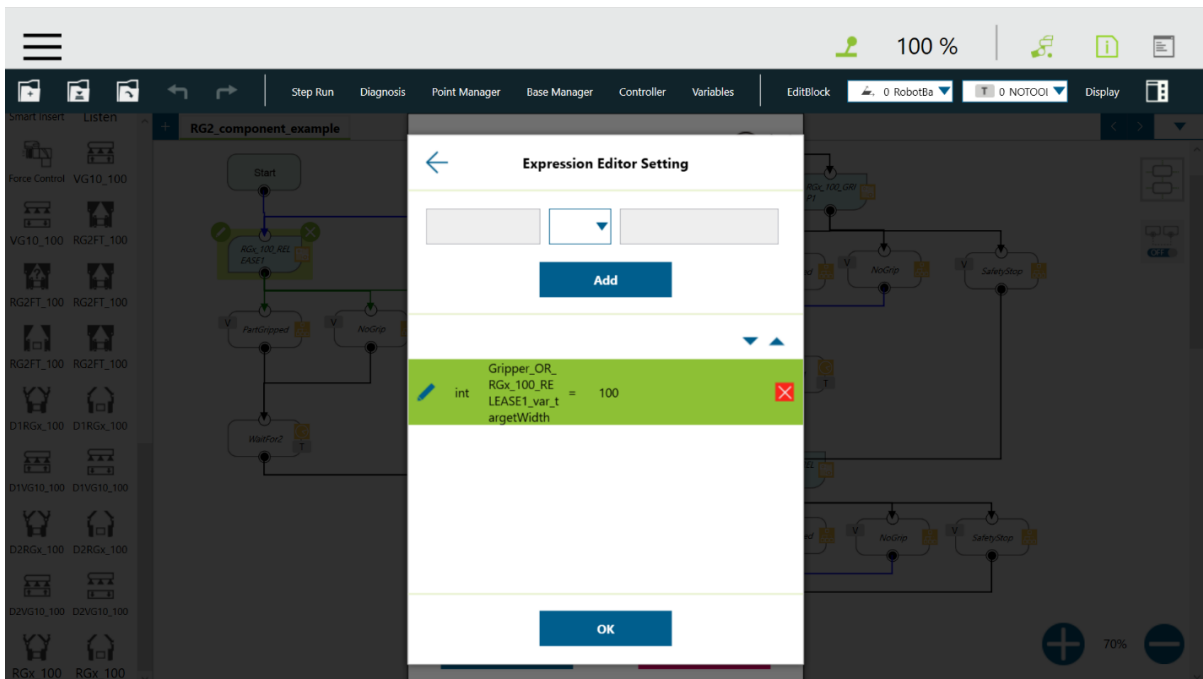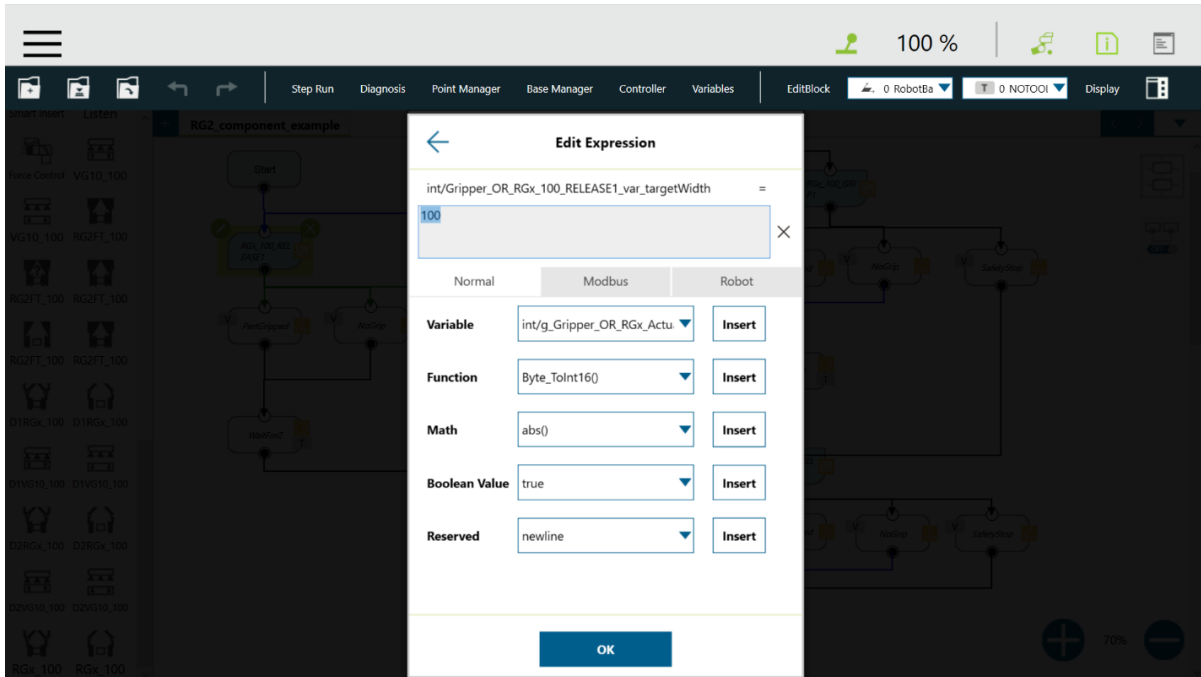
NOTE:

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.

5.2. Screwdriver Components

These components can be used for Screwdriver.

5.2.1. ScrewDriver_OR_SD_100_TIGHTEN

Extends the shank while rotating the bit head clockwise. The screwdriver detects start of the operation when the Z force is applied on the shank. The operation is done when the shank has moved the distance of the screw length and the screw torque is exceeded. Followed by a 10mm retraction of the shank.

This component has three parameters:

- `ZForceN`: The amount of force applied on the shank – 18.0–30.0 [N]
- `ScrewLengthMM`: The length of the screw, the distance the screw needs to go in – 0-35.0 [mm]
- `TorqueN`: The amount of torque required on screw – 0.1-5.0 [N]

The output has six gates:

- `Success`: Operation was completed successfully
- `InitializationError`: Failed to initialize device check the global variable `g_ScrewDriver_OR_SD_InitializationError` for the error code
- `PowerError`: The power requirements of the screwdriver have not been met, check the global variable `g_ScrewDriver_OR_SD_PowerError` for the error code

- `RuntimeError`: The required operation has been failed, check the global variable `g_ScrewDriver_OR_SD_RuntimeError` for the error code
- `Safety`: The maximum safety force was exceeded on the shank; a safety stop was triggered.
- `Timeout`: Operation did not complete in time, error code is not valid in this state

5.2.2. ScrewDriver_OR_SD_100_LOOSEN

Extends the shank while rotating counterclockwise. The screwdriver detects start of the operation when Z force is applied on the shank. The operation is done when shank has moved the length of the screw, and then stops moving. Followed by a 10mm retraction of the shank.

This component has two parameters:

- `ZForceN7`: The amount of force applied on the shank – 18.0–30.0 [N]
- `ScrewLengthMM`: The length of the screw, the distance the screw needs to go in – 0-35.0 [mm]

The output has six gates:

- `Success`: Operation was completed successfully
- `InitializationError`: Failed to initialize device check the global variable `g_ScrewDriver_OR_SD_InitializationError` for the error code
- `PowerError`: The power requirements of the screwdriver have not been met, check the global variable `g_ScrewDriver_OR_SD_PowerError` for the error code
- `RuntimeError`: The required operation has been failed, check the global variable `g_ScrewDriver_OR_SD_RuntimeError` for the error code
- `Safety`: The maximum safety force was exceeded on the shank; a safety stop was triggered.
- `Timeout`: Operation did not complete in time, error code is not valid in this state

5.2.3. ScrewDriver_OR_SD_100_PICKUP

Extends the shank while slowly rotating the bit head to pick up a screw. The pickup is registered when the Z force is applied, this will trigger the screw to be retracted matching the screw length + 10 mm.

This component has two parameters:

- `ZForceN`: The amount of force applied on the shank – 18.0–30.0 [N]
- `ScrewLengthMM`: The length of the screw, the distance the screw needs to go in – 0-35.0 [mm]

The output has six gates:

- `Success`: Operation was completed successfully
- `InitializationError`: Failed to initialize device check the global variable `g_ScrewDriver_OR_SD_InitializationError` for the error code
- `PowerError`: The power requirements of the screwdriver have not been met, check the global variable `g_ScrewDriver_OR_SD_PowerError` for the error code
- `RuntimeError`: The required operation has been failed, check the global variable `g_ScrewDriver_OR_SD_RuntimeError` for the error code

- `Safety`: The maximum safety force was exceeded on the shank; a safety stop was triggered.
- `Timeout`: Operation did not complete in time, error code is not valid in this state

5.2.4. ScrewDriver_OR_SD_100_MOVE

Moves the shank to a specific position.

This component has two parameters:

- `ZPositionMM`: The Z position of the shank where 0 is fully retracted and 55 is fully extended – 0–55 [mm]

The output has six gates:

- `Success`: Operation was completed successfully
- `InitializationError`: Failed to initialize device check the global variable `g_ScrewDriver_OR_SD_InitializationError` for the error code
- `PowerError`: The power requirements of the screwdriver have not been met, check the global variable `g_ScrewDriver_OR_SD_PowerError` for the error code
- `RuntimeError`: The required operation has been failed, check the global variable `g_ScrewDriver_OR_SD_RuntimeError` for the error code
- `Safety`: The maximum safety force was exceeded on the shank; a safety stop was triggered.
- `Timeout`: Operation did not complete in time, error code is not valid in this state

5.2.5. ScrewDriver_OR_SD_100_GetParameters

Gets the parameters of the Screwdriver.

statusZAxisBusy

1 if Z axis is busy.
0 if it is not busy.

additionalResults

The value of the additional status register.

Value	Description
0	No additional result data
1	Command unknown
2	Not screwing in
3	Timout, waiting for the correct torque (2 seconds)
4	Torque exceeded unexpected (premature)
5	Unable to loosen screw (max torque exceeded)
6	Z axis reached the end
7	Z axis obstructed during move

torqueNm

The current torque in [Nm].

ZForceN

The current force of the Z axis in [N].

statusScrewdriverBusy

1 if the Screwdriver is busy.
0 if it is not busy.

zPositionMm

The position of the Z axis shank in [mm].

TorqueAngleGr

The torque angle gradient of the last operation in [Nm/rad].

initializeZStallCurrentNotReached

1 if the Z axis stall current is not reached.
Otherwise it is 0.

initializeNoZIndexMarkFound

1 if no Z index mark found.
Otherwise it is 0.

initializeUnableToHomeZAxis

1 if unable to home Z axis.
Otherwise it is 0.

initializeZIndexPlacementNotOk

1 if Z index placement is not okay.
Otherwise it is 0.

initializeNoIndexMarkFoundOnTorqueEncoders

1 if no index mark is found on the torque encoders.
Otherwise it is 0.

initializeTooBigTorqueDifferenceDuringInitialization

1 if the torque difference is too big during initialization.
Otherwise it is 0.

errorQCType

1 if incorrect QC type is used.
Otherwise it is 0.

errorPowerSupply

1 if incorrect power supply is used.
Otherwise it is 0.

errorZAxisSafetyActivated

1 if Z axis safety was activated.
Otherwise it is 0.

torqueAchievedNm

The value of the achieved torque from the last command in [Nm].

5.2.6. Global Variables

Name	Type	Description
g_ScrewDriver_OR_SD_InitializationError	int	Error codes for initialization errors
g_ScrewDriver_OR_SD_PowerError	int	Error codes for power errors
g_ScrewDriver_OR_SD_RuntimeError	int	Error codes for runtime errors

Initialization Error (g_ScrewDriver_OR_SD_InitializationError)

Error Code	Description
0	No error
1	Z axis stalled power current not reached
2	No Z index marker found
3	Unable to home Z axis
4	Z index placement not ok
5	No index marker found on torque encoders
6	Torque difference to large during startup
7	Torque index marker has changed

Power Error (Mask) (g_ScrewDriver_OR_SD_PowerError)

Error Code	Description
0	No error

Error Code	Description
1	QC does not meet the power requirements
2	Power supply does not meet the power requirements

Runtime Error (`g_ScrewDriver_OR_SD_RuntimeError`)

Error Code	Description
0	No error
1	Command unknown
2	Not screwing in
3	Timeout waiting for correct torque
4	Torque exceeded unexpected (premature)
5	Unable to loosen screw (max torque exceeded)
6	Shank reached the end
7	shank obstructed during move

Any safety or runtime errors should be handled with a SD_MOVE.

6. Additional Software Options

6.1. Compute Box/Eye Box

6.1.1. Ethernet Interface Setup

A proper IP address must be set for the Compute Box/Eye Box and the robot/computer to be able to use the Ethernet interface. The IP address can be configured using DIP switches 3 and 4.

> **WARNING:**
>
> Stop the robot program before you change any Ethernet interface settings.

> **NOTE:**
>
> Configuring DIP switch 3 will remove any previously set static IP address.
>
> To change between modes, first change the DIP switches and then cycle the Compute Box/Eye Box power so the changes will take effect.

DIP 3 - sets the Compute Box / Eye Box IP address

* **ON**: Fixed IP (192.168.1.1)
* **OFF**: Dynamic or Static IP *(can be configured via the Web Client)*

DIP 4 - sets whether the connected robot or laptop will receive IP address from the Compute Box / Eye Box

* **ON**: DHCP server is disabled
* **OFF**:DHCP server is enabled

We recommend to set the DIP switches according to either of the two options below:

* **Fix IP/Auto mode** - in simple installations (no external network and/or no PLC connected)
* **Advanced mode** - in more complex installations (external network and/or PLC are used)
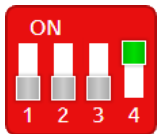
Fix IP/Auto mode (factory default)
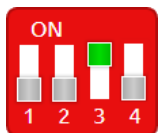
Set the DIP switch 3 to ON and the DIP switch 4 to OFF position and cycle the power so the changes will take effect.

IP Address of the Compute Box/Eye Box	IP Address of the Robot/Computer
The IP address of the Compute Box/Eye Box is fixed 192.168.1.1. This IP address cannot be changed.	The Compute Box/Eye Box will automatically assign an IP address to the connected robot/computer if it was configured to obtain an IP address automatically. **NOTE:** The assigned IP address range is 192.168.1.100-105 (with subnet mask 255.255.255.0). If the Compute Box/Eye Box is used in a company network where a DHCP server is already in use, it is recommended to use Advanced mode.

In this mode, the DHCP server of the Compute Box/Eye Box is enabled.

Advanced mode (any static or dynamic IP/subnet mask)

Set the DIP switch 3 to OFF and the DIP switch 4 to ON position and cycle the power so the changes will take effect.

IP Address of the Compute Box/Eye box	IP Address of the Robot/Computer
Case 1: Static IP address The IP address 192.168.1.1 is already in use in your network or a different subnet needs to be configured.	The Compute Box/Eye Box will not assign an IP address to the robot/computer. Set the IP address of the robot/computer manually. Make sure to have a matching IP setting to your robot/computer network for a proper communication. Use the same subnet but different IP address.
Case 2: Dynamic IP address *	The IP address of the robot/computer is set dynamically. An external DHCP server assigns the IP address to the robot/computer.

* By default, the IP address of the Compute Box/Eye Box is set to Dynamic IP.

The IP address of the Compute Box/Eye Box can be set to any value by using the Web Client. For more details, see section Web Client: Configuration Menu. Under **Network settings**, set the **Network mode** to either **Static IP** or **Dynamic IP**.

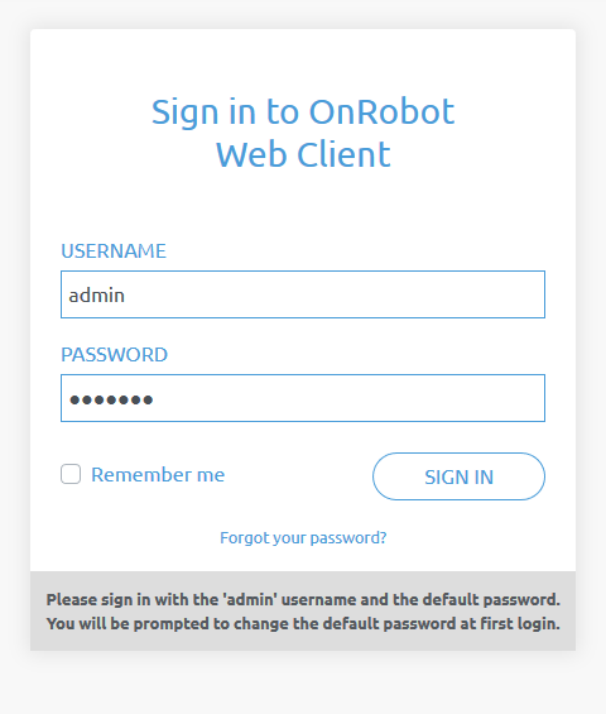In this mode, the DHCP server of the Compute Box/Eye Box is disabled.

6.1.2. 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 the factory default DIP switch settings (DIP 3 On and DIP 4 Off) (for further details see section **6.1.1. 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:

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)

Once signed in the following top menus appear:

- **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
- Account settings (e.g.: change password, add new user)
- Select the language of the Web Client

In the following, these menus will be described.

6.1.3. Web Client: Devices Menu

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

6.1.3.1. Screwdriver

States

Torque	0.014 Nm
Shank position	4.883 mm
Busy	○
Safety triggered	○ (ENABLE)
Last screwing result	-

Screwing

SCREW TYPE   **TORQUE**

| M1.6 ⇕ | 0.17 Nm |

Screwing length = A-B-C: 0 mm

A:	0 mm
B:	0 mm
C:	0 mm

(TIGHTEN)   (LOOSEN)   (STOP)

Other functions

SHANK POSITION

5 mm

0   5   10   15   20   25   30   35   40   45   50   55

SCREW LENGTH

| 0 mm | (PICK UP SCREW) | (STOP) |

The state of the gripper:

- **Torque** - Shows the current torque.
- **Shank position** - Shows the current shank position.
- **Busy** - the screwdriver is in motion
- **Safety triggered** - shows if the mechanical safety is being trigger.
- **Enable** - Press to enable the screwdriver after the mechanical safety is being trigger.
- **Last screwing result** - will show additional results such as:
  - - (no error)

- Not screwing in
- Timeout waiting for torque
- Torque exceeded prematurely
- Unable to loosen screw
- Shank reached the end
- Shank obstructed during move

Screwing parameters and functions:

- **Screw type** - The screw sizes from M1.6 to M6 can be selected. This selection will autofill the standard torque value for that particular screw type.
- **Torque** - Input the target tightening torque.
- **Screwing length = A-B-C:** The resulting screwing length is shown here. This is the amount of the screw that will be screwed into/unscrewed from the thread. To set the value use input fields below and the resulting amount will be **A** (screw length) - **B** (Washer thickness) - **C** (Chamfer deepness).

  The image shows 3 different lengths:

  - **A** = This is the screw length, distance from the bottom to the head of the screw.
  - **B** = This is the washer thickness (or piece in between screw and thread), if no piece is used set it as 0. This amount will be subtracted from the Screw length to provide the resulting Screwing length.
  - **C** = This is the chamfer deepness. This amount will be subtracted from the Screw length to provide the resulting Screwing length.
- **Tighten** - When this command is executed, the screwdriver will move and rotate the Screw-bit system until it reaches the thread. Then, it will start to screw in the screw until 90% of the Screwing length is inside the thread. During the rest 10% of the Screwing length, the screwdriver will tighten the screw applying the Target Torque.
- **Loosen** - When this command is executed, the screwdriver will move and rotate the bit to align it with the screw head. Then, it will loosen and unscrew the screw until it is out the thread (specified screwing length). Afterwards, it will hide the Screw-bit system inside the housing.
- **Stop** - This will stop the screwdriver command that is executed at that time.

Other functions

- **Shank position** - changes the position of the shank immediately.
- **Screw length** - input the length of the screw that will be picked up.
- **Pick up screw** - When this command is executed, the screwdriver will move and rotate the bit to align it with the screw head, then it will pick up the screw and hide it inside the housing.
- **Stop** - This will stop the screwdriver command that is executed at that time.

6.1.4. Web Client: Configuration Menu

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, the Compute Box will not obtain an IP address and its LED is lighting in blue.
* 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 / Eye 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**.

If the **Clock delay** field shows a difference, click **Synchronize clock** to synchronize the Compute Box's time with your computer.

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).

6.1.5. Web Client: Update Menu

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

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.

The loading screens during the update process are the same for the software and the firmware updates.

Software Update

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, see below.

If the update is finished and was successful, the message below is shown.

Firmware Update

The firmware update is only required when any of the components is out of date.

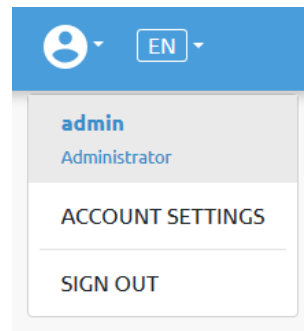To start the firmware update, click on **Update** button in the firmware section of the page, see below.

If the update is finished and was successful, the message below is shown.
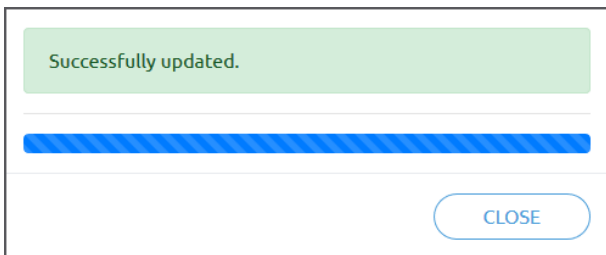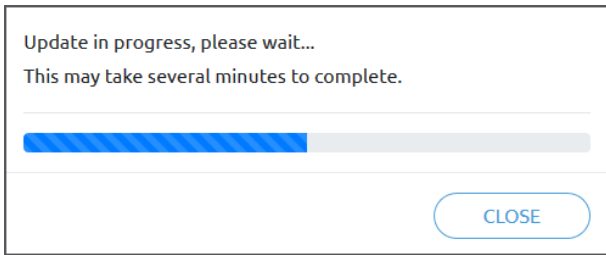
6.1.6. Web Client: Account Settings

This menu can be used to:

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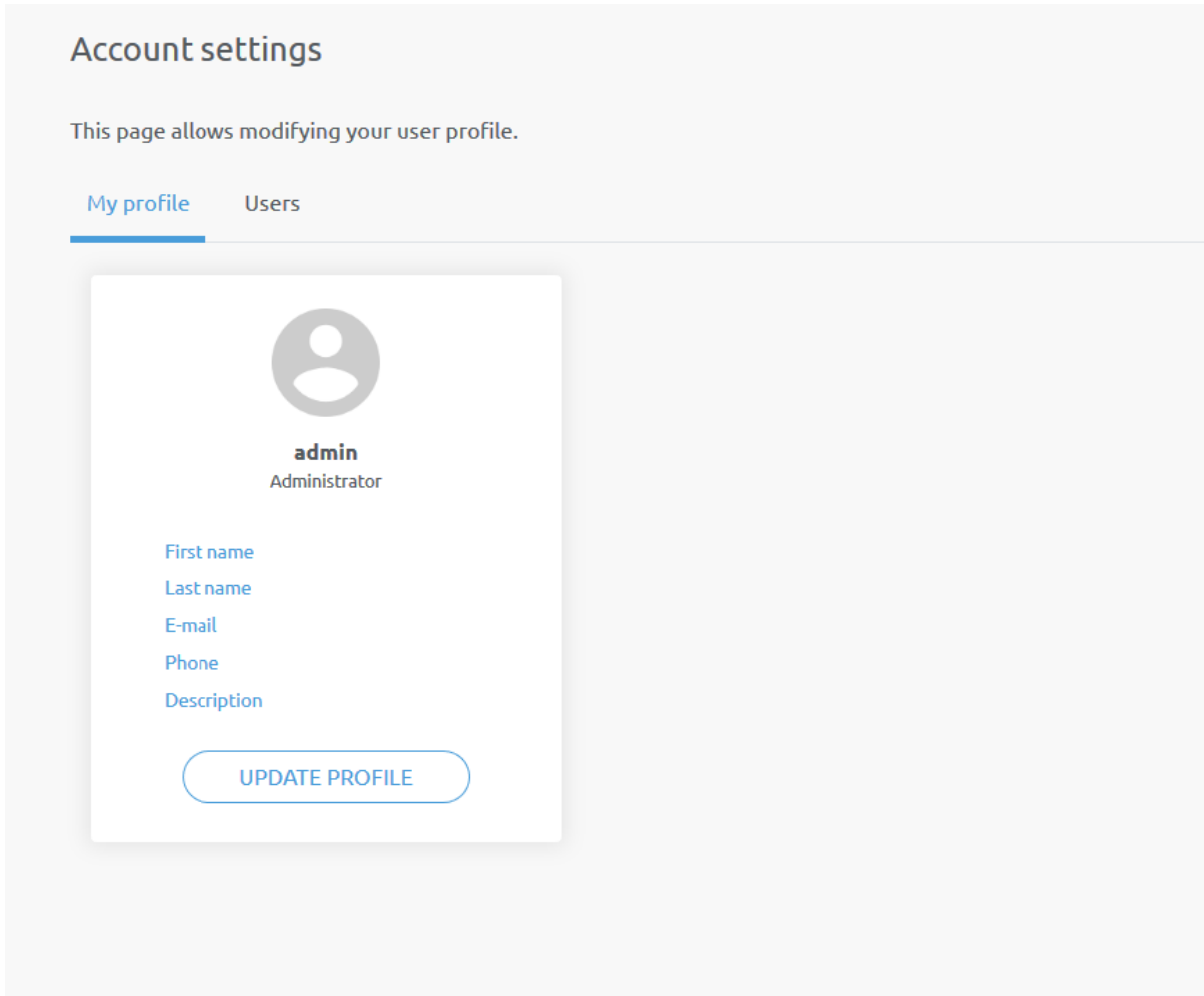- Go to **Account settings**
- Sign-out

Account settings:
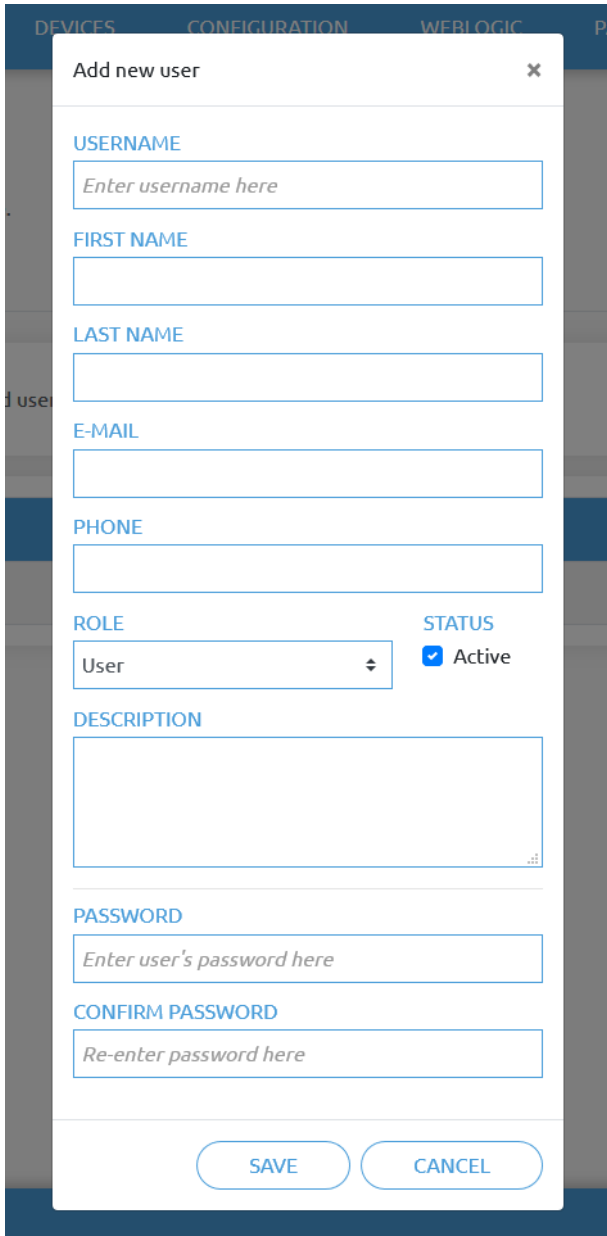
This page has two tabs:

- **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.

7. Hardware Specification

7.1. Technical Sheets

7.1.1. Screwdriver

General Properties		Minimum	Typical	Maximum	Unit
Torque range		0.15	-	5	[Nm]
		0.11		3.68	[lbft]
Torque accuracy*	If torque < 1.33 Nm/ 0.98 lbft	-	0.04	-	[Nm]
			0.03		[lbft]
	If torque > 1.33 Nm/ 0.98 lbft	-	3	-	[%]
Output speed		-	-	340	[RPM]
Screw length within full safety		-	-	35	[mm]
				1.37	[inch]
Shank stroke (screw axis)		-	-	55	[mm]
				2.16	[inch]
Shank preload (adjustable)		0	10	25	[N]
Safety feature force		35	40	45	[N]
Storage temperature		0	-	60	[°C]
		32	-	140	[°F]
Motor (x2)		Integrated, electric BLDC			
IP Classification		IP54			
ESD Safe		Yes			
Dimensions		308 x 86 x 114			[mm]
		12.1 x 3.4 x 4.5			[inch]
Weight		2.5			[kg]
		5.51			[lb]

* See **Torque Accuracy Graph** for further information.

Operating Conditions	Minimum	Typical	Maximum	Unit
Power supply	20	24	25	[V]
Current consumption	75	-	4500	[mA]
Operating temperature	5	-	50	[°C]
	41	-	122	[°F]
Relative humidity (non-condensing)	0	-	95	[%]

Operating Conditions	Minimum	Typical	Maximum	Unit
Calculated MTBF (operating life)	30.000	-	-	[Hours]

Supported Screws Metric					
Material type	Magnetic				
Screw length	Up to 50 mm (35 mm thread length)				
Head type	Cylinder			Counter sunk	Button head
Appearance					
Standard	Din 912 / ISO 4762	ISO 14579	ISO 14580	ISO 14581	DIN 7985A
Supported Thread Size	M1.6	✓	N/A	N/A	N/A	N/A
	M2	✓	✓	N/A	✓	✓
	M2.5	✓	✓	N/A	✓	✓
	M3	✓	✓	✓	✓	✓
	M4	✓	✓	✓	✓	✓
	M5	✓	✓	✓	✓	✓
	M6	✓	✓	✓	✓	✓

Supported Screws US Standard		
Material type	Magnetic	
Screw length	Up to 1.96 inches (1.37 inches thread length)	
Head type	Cylinder	Button head	Counter sunk

Supported Screws US Standard					
Appearance					
Standard	ASME B18.3	ASME B18.6.3	ASME B18.6.3	ASME B18.3	ASME B18.6.3
Supported Thread Size					
1#	✓	N/A	N/A	N/A	N/A
2#	✓	✓	✓	N/A	✓
4#	✓	✓	✓	✓	✓
6#	✓	✓	✓	✓	✓
8#	✓	✓	✓	✓	✓
10#	✓	✓	✓	✓	✓
12#	N/A	✓	✓	N/A	N/A
1/4"	✓	N/A	N/A	✓	N/A

Torque accuracy Metric
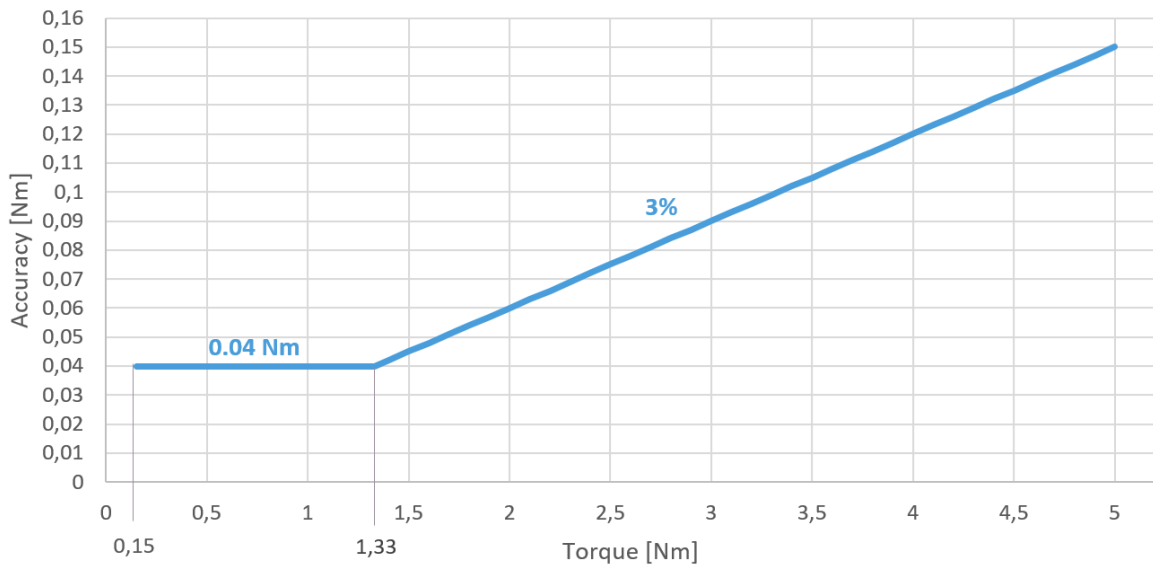
Torque accuracy US Standard
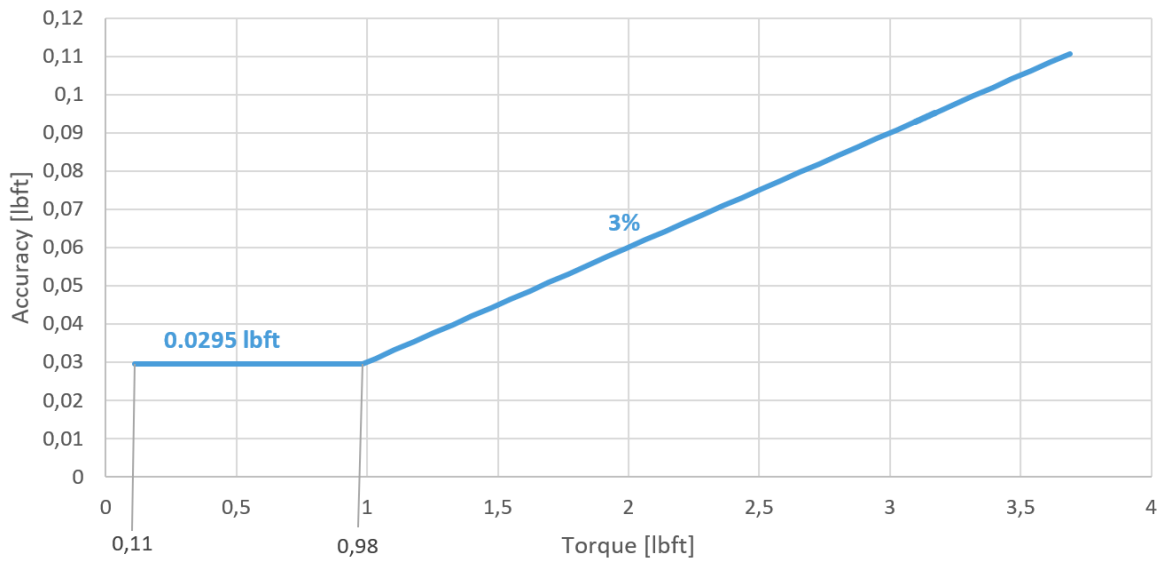
Screw-bit System

This system will highly increase the efficacy of the screws to be picked up, aligned with the bit, moved around with the Screwdriver and screwed in/out. Therefore, it is highly recommended to set up the Screw-bit System correctly to keep a high success rate.

Example of the Screw-bit System for an ISO 14579 screw.

1 - Screw

2 - Screw fix

3 - Screw carrier

4 - Bit

5 - Bit holder
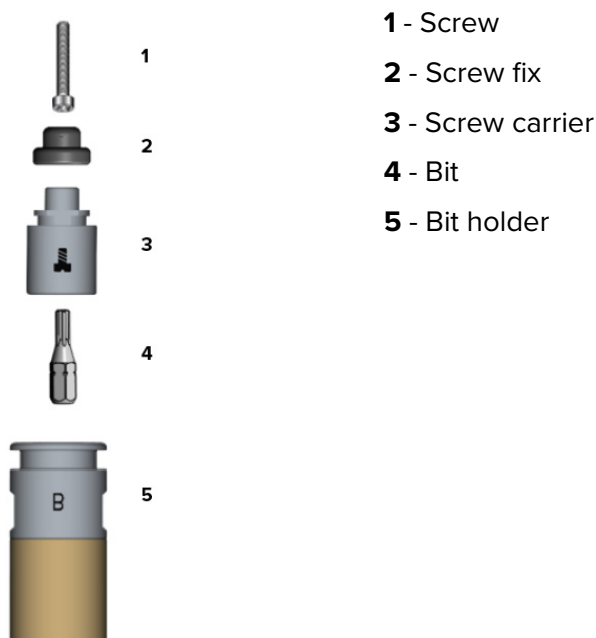
The sections below explain the different components of the Screw-bit System and how to set it up correctly.

In the following tables, an overview of the items needed depending on the Screw type and size are shown.

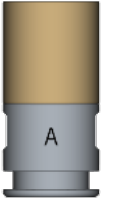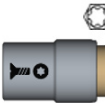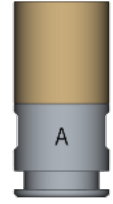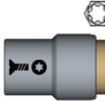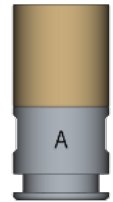## Items Needed Depending on Screw Type and Size for Metric Screws

Items Needed Depending on Screw Type and Size for Metric Screws					
Head type	Cylinder			Counter sunk	Button head
Screw standard	Din 912 / ISO 4762	ISO 14579	ISO 14580	ISO 14581	DIN 7985A
Thread Size	Bit holder, bit, screw carrier and screw fix needed				
M1.6	S1.5 / M1.6 / M1.6 / B	N/A	N/A	N/A	N/A
M2	S1.5 / M2 / M2-3 / A	T6 / M2 / M2-3 / A	N/A	T6 / M2 / B	PH1 / M2 / B
M2.5	S2 / M2.5 / M2-3 / A	T8 / M2.5 / M2-3 / A	N/A	T8 / M2.5 / B	PH1 / M2.5 / B
M3	S2.5 / M3 / M2-3 / A	T10 / M3 / M2-3 / A	T10 / M3 / M2-3 / A	T10 / M3 / A	PH1 / M3 / A
M4	S3 / M4 / M4-6 / A	T20 / M4 / M4-6 / A	T20 / M4 / M4-6 / A	T20 / M4 / A	PH2 / M4 / A
M5	S4 / M5 / M4-6 / A	T25 / M5 / M4-6 / A	T25 / M5 / M4-6 / A	T25 / M5 / A	PH2 / M5 / A

Items Needed Depending on Screw Type and Size for Metric Screws					
M6	S5 M6 M4-6 A	T30 M6 M4-6 A	T30 M6 M4-6 A	T30 M6 A	PH3 M6 A

Items Needed Depending on Screw Type and Size for US Standard Screws

Items Needed Depending on Screw Type and Size for US Standard Screws					
Head type	Cylinder	Button head		Counter sunk	
Screw standard	ASME B18.3 HEX	ASME B18.6.3 Cross recessed	ASME B18.6.3 Torx	ASME B18.3 HEX	ASME B18.6.3 Torx
Thread Size	Bit holder, bit, screw carrier and screw fix needed				
1# (B)	H1/16" 1#	N/A	N/A	N/A	N/A
2# (B)	H5/64" 2#-6#	PH1 2#	T8 2#	N/A	T6 2#
4# (B)	H3/32" 2#-6#	PH1 4#	T10 4#	H1/16" 4#	T8 4#
6# (A)	H7/64" 2#-6#	PH1 6#	T15 6#	H5/64" 6#	T10 6#

Items Needed Depending on Screw Type and Size for US Standard Screws					
8#	H9/64" 8#-1/4"	PH2 8#	T20 8#	H3/32" 8#	T15 8#
10#	H5/32" 8#-1/4"	PH2 10#	T25 10#	H1/8" 10#	T20 10#
12#	N/A	PH3 12#	T27 12#	N/A	N/A
1/4"	H3/16" 8#-1/4"	N/A	N/A	T30 1/4"	N/A

1. Screws

The first step is to know what type of screw is going to be used. The screw type will define what type of bit, screw carrier, screw fix (if any) and bit holder shall be used.

The recommended screw types for the Screwdriver are the ones that have the properties mentioned previously on the **Supported Screws** table.

2. Bit Holder

Select the right bit holder depending on the screw type and size to maximize the efficacy of the Screw-bit System based on the table in section **Items Needed Depending on Screw Type and Size for Metric** or **Items Needed Depending on Screw Type and Size for US Standard Screws**.

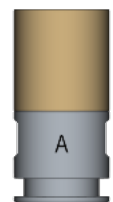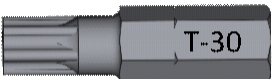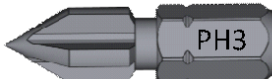The Bit holder generates a magnetic force that will keep the screw attached and aligned to the bit. The Bit holder **A** generates a higher magnetic force than **B**. Therefore, the bit holder B is commonly used for the smaller and lighter screws.

3. Bits

Select the right bit depending on the screw type and size to maximize the efficacy of the Screw-bit System based on the table in section **Items Needed Depending on Screw Type**

and Size for Metric or **Items Needed Depending on Screw Type and Size for US Standard Screws**.

The bits have signifiers to help identifying what bit type and size these are.

Screw type standard	Shows bit size and type
Din 912 / ISO 4762 ASME B18.3 HEX Cylinder	
ISO 14579 ISO 14580 ISO 14581 ASME B18.6.3 Torx Button head ASME B18.6.3 Torx Counter sunk	
DIN 7985A ASME B18.6.3 Cross recessed Button head	

Supported bit shank properties:

• Type 1/4" HEX
• Length 25 mm

NOTE:

Bits longer that 25 mm could be used. However, the screw carrier and the screw fix might not hold the screw properly in place.

4. Screw Carrier and Screw Fix

Select the right screw carrier and screw fix depending on the screw type and the size to maximize the efficacy of the Screw-bit System based on the table on section Items needed depending on Screw type and size.

The screw carriers have signifiers to help identifying what screw type and size these can be used with.

Screw thread size	Screw type illustration

The screw fixes are only needed for the Din 912, ISO 4762, ISO 14579, ISO 14580 and ASME B18.3 HEX Cylinder screw types. The screw fixes also have signifiers to show what size of screw they support.
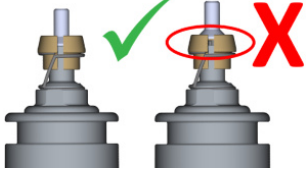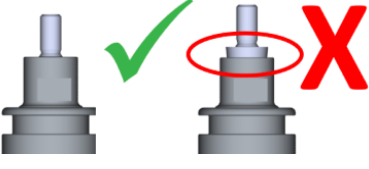
Screw fixes for Metric - Din 912, ISO 4762, ISO 14579, ISO 14580						
M1.6	M2	M2.5	M3	M4	M5	M6

Screw fixes for US Standard - ASME B18.3 HEX Cylinder						
1#	2#	4#	6#	8#	10#	1/4"

All screw carries must be adjusted to ensure high performance of the Screw-bit System.
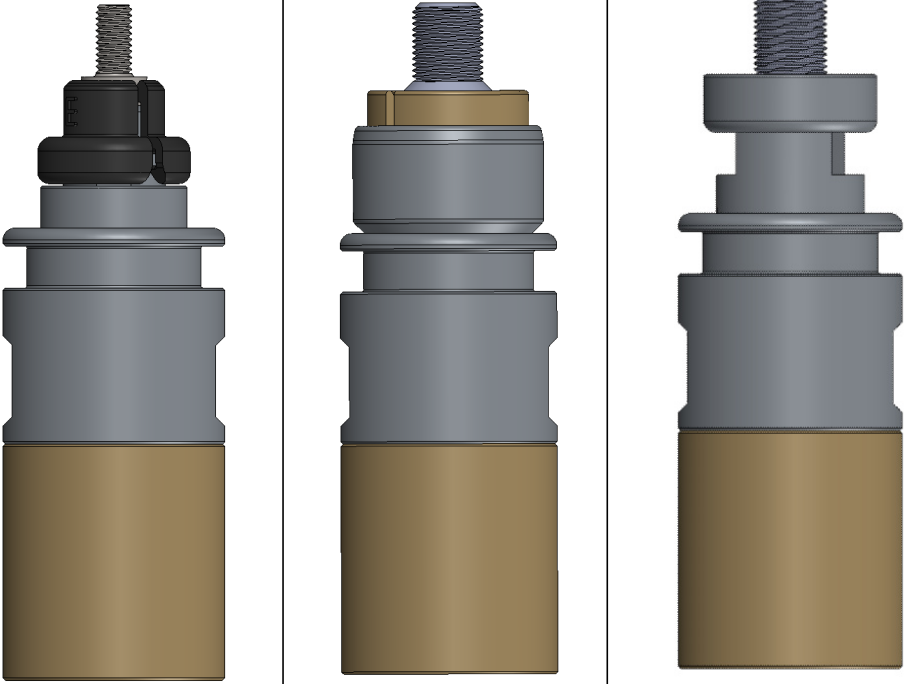
Appearance	Adjustment method

The screw carries must be adjusted so that the screw head seats stable on the screw carrier avoiding a gap in between. See the pictures below as reference.

Din 912 / ISO 4762 / ISO 14579 / ISO 14580 / ASME B18.3 Hex Cylinder		ISO 14581 / ASME B18.6 HEX Counter sunk / ASME B18.6.3 Torx Counter sunk		DIN 7985A / ASME B18.6.3 Cross recessed Button head / ASME B18.6.3 Torx Button head	

When this is achieved, remove the screw and push in the screw fix (only Din 912, ISO 4762, ISO 14579, ISO 14580 and ASME B18.3 HEX Cylinder screw types).

The final setup of the Screw-bit System with the screw in place should look like picture below.

Screw standard	Din 912 / ISO 4762 / ISO 14579 / ISO 14580 / ASME B18.3 Hex Cylinder		ISO 14581 / ASME B18.6 HEX Counter sunk / ASME B18.6.3 Torx Counter sunk		DIN 7985A / ASME B18.6.3 Cross recessed Button head / ASME B18.6.3 Torx Button head	
Screw-bit System appearance						

5. Attaching and Detaching the Screw-bit System to/from the Screwdriver

The last step is to attach the system to the Screwdriver by placing the hex shape of the bit holder inside of the end of the screwdriver's shank as shown in the picture below. The system will be attached to the screwdriver by a magnetic force.
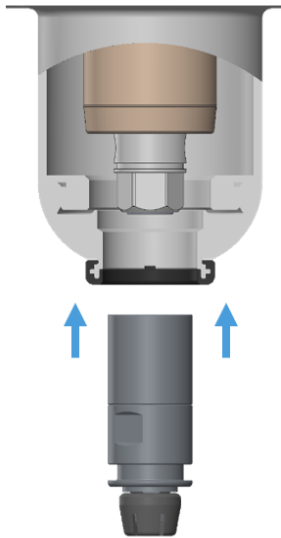
To remove the Bit holder from the screwdriver's shank, follow the steps below:

1. Move the shank all the way out to position 55 by operating the user interface in the robot or in the Web Client.
2. As shown in the images below, use the provided key to grab the Bit holder.
3. While holding the key, move the shank inwards by operating the user interface in the robot or in the Web Client.

Screwdriver Position to Execute Commands

To successfully execute the screwdriver commands, it is fundamental to position the screwdriver correctly. This is achieved if the following two conditions are met:

1. The Screw-bit System must be perfectly aligned to the screw or thread.
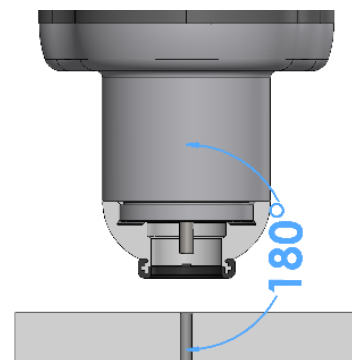
2. The distance between the Screwdriver's bottom part and the surface where the action takes place must be within the range of 0-8 mm [0-0.31 inches].

0-8 mm [0-0.31 inches]
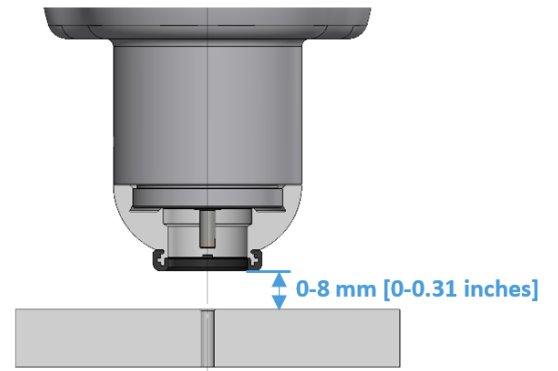
LED - Device Status

The screwdriver has a LED that shows the device status.

Color	Device Status
No light	Power missing
Steady green	Ready to work - Idle - Static
Blinking green	Initializing
Steady orange	Busy – Moving/rotating shank
Blinking orange	Operational malfunction
Steady red	Not working – Hardware problem
Blinking red	Safety – Emergency stop
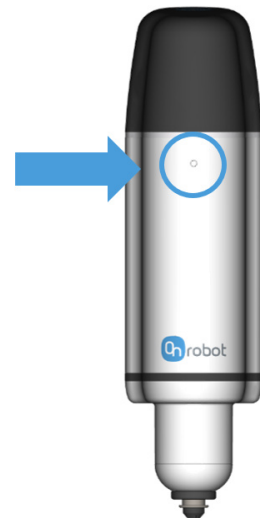
Torque Angle Curve and Torque Gradient

The torque gradient shows how the torque is applied in the last phase of the Tightening screw command. This could be used as an indicator to detect if a Tightening command is performed correctly.

For instance, the torque gradient could be different if:

• The hole thread is not long enough

- The hole thread is different from the screw thread
- The hole thread is not clean (for instance by deburrs from CNC machining)
- The friction between the screw thread and the hole thread is too low or too high
- The friction between the screw head and the tighten part is too low or too high

A torque gradient variable is made available to be checked in the robot program.

The graph below shows a normal Torque/Angle curve. In this case has been made with a M4 screw and 2.4 Nm as target torque.

Torque angle curve Metric
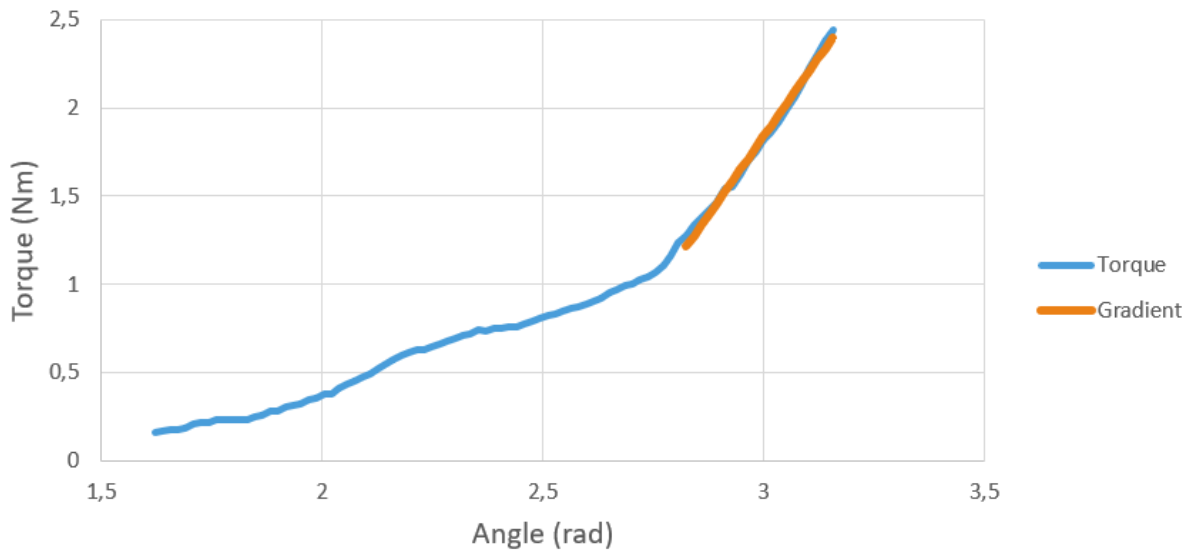
Torque angle curve US Standard
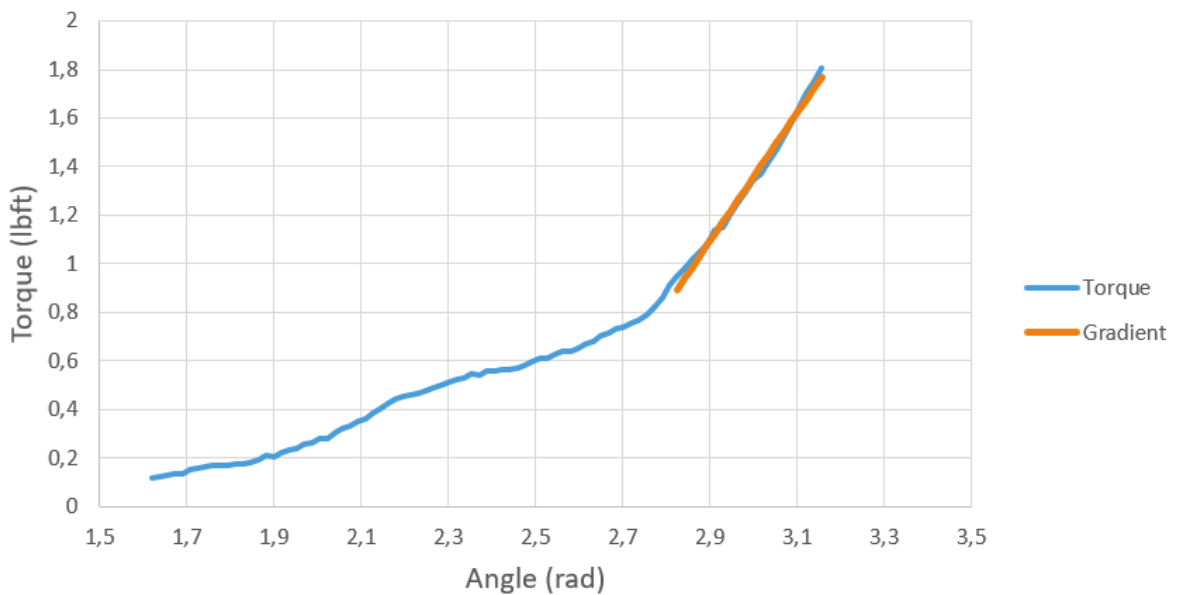
7.1.2. Compute Box

7.1.2.1. With 5A Wall Adapter (120W)

Supplied Wall Adapter	Minimum	Typical	Maximum	Unit
Input voltage (AC)	100	-	240	[V]
Input current	-	-	2	[A]
Output voltage	-	24	-	[V]
Output current	-	5	-	[A]

Compute Box Power input (24V connector)	Minimum	Typical	Maximum	Unit
Supply voltage	-	24	25	[V]
Supply current	-	5	-	[A]

Compute Box Power output (Device connector)	Minimum	Typical	Maximum	Unit
Output voltage	-	24	25	[V]
Output current (CB HW v3.4)	-	5	5.5*	[A]
Output current (CB HW v3.1)	-	4.5	4.5*	[A]

* Peak currents.

7.1.2.2. With 6.25A Wall Adapter (150W)

Supplied Wall Adapter	Minimum	Typical	Maximum	Unit
Input voltage (AC)	100	-	240	[V]
Input current	-	-	2.1	[A]
Output voltage	-	24	-	[V]
Output current	-	6.25	-	[A]

Compute Box Power input (24V connector)	Minimum	Typical	Maximum	Unit
Supply voltage	-	24	25	[V]
Supply current	-	6.25	-	[A]

Compute Box Power output (Device connector)	Minimum	Typical	Maximum	Unit
Output voltage	-	24	25	[V]
Output current	-	4.5	4.5*	[A]

* Peak currents

7.1.2.3. Compute Box I/O interface

Power Reference (24V, GND)	Minimum	Typical	Maximum	Unit
Reference output voltage	-	24	25	[V]
Reference output current	-	-	100	[mA]

Output (DO1-DO8)	Minimum	Typical	Maximum	Unit
Output current - altogether	-	-	100	[mA]
Output resistance (active state)	-	24	-	[Ω]

Input (DI1-DI8) as PNP	Minimum	Typical	Maximum	Unit
Voltage level - TRUE	18	24	30	[V]
Voltage level - FALSE	-0.5	0	2.5	[V]
Input current	-	-	6	[mA]
Input resistance	-	5	-	[kΩ]

Input (DI1-DI8) as NPN	Minimum	Typical	Maximum	Unit
Voltage level - TRUE	-0.5	0	5	[V]
Voltage level - FALSE	18	24	30	[V]
Input current	-	-	6	[mA]
Input resistance	-	5	-	[kΩ]

7.2. Mechanical Drawings

7.2.1. Mountings

7.2.1.1. Quick Changer - Robot Side
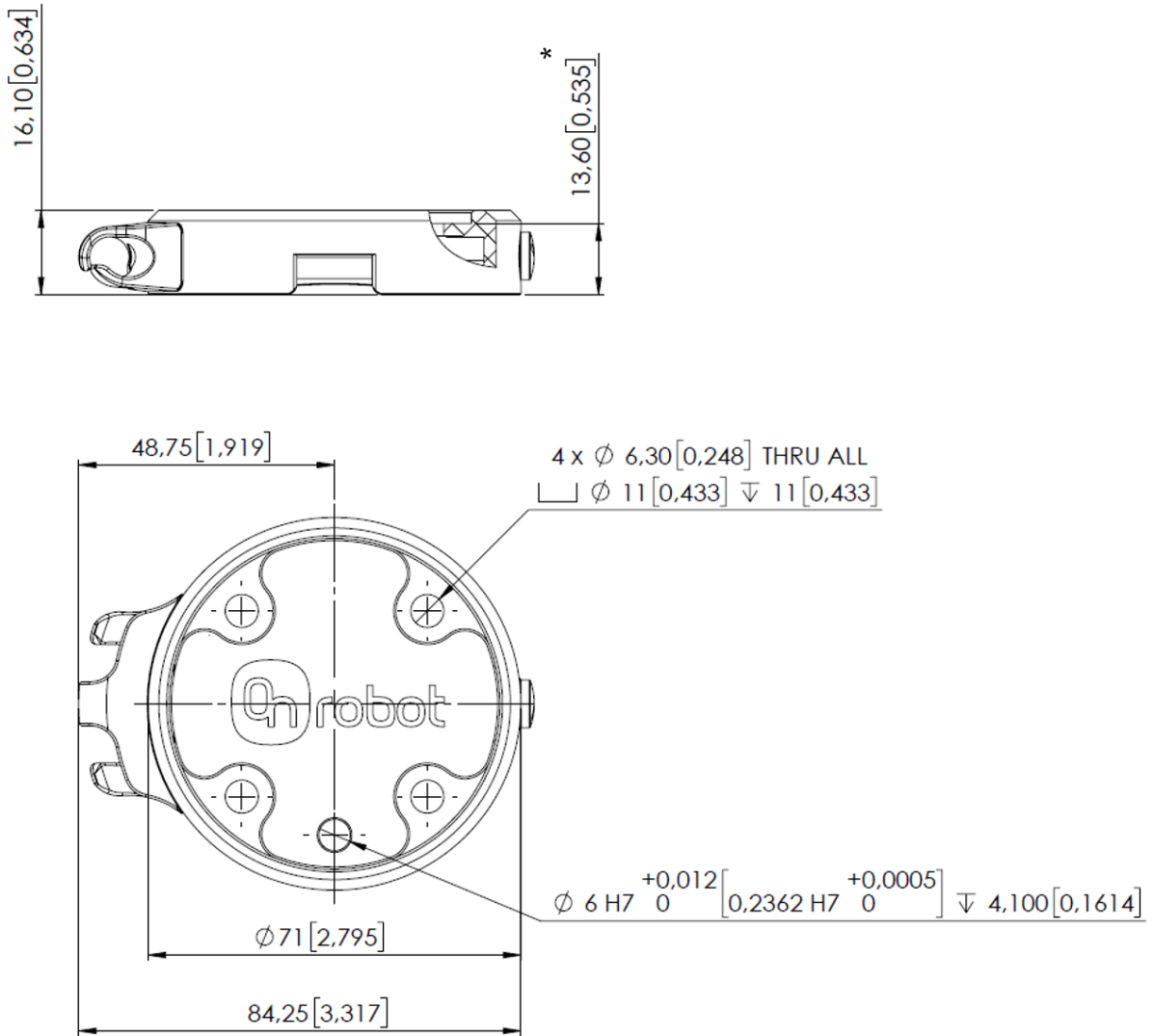
* Distance from Robot flange interface to OnRobot tool.

All dimensions are in mm and [inches].

> **NOTE:**
>
> The cable holder (on the left side) is only required with the long (5 meter) cable.

7.2.2. Tools

7.2.2.1. Screwdriver
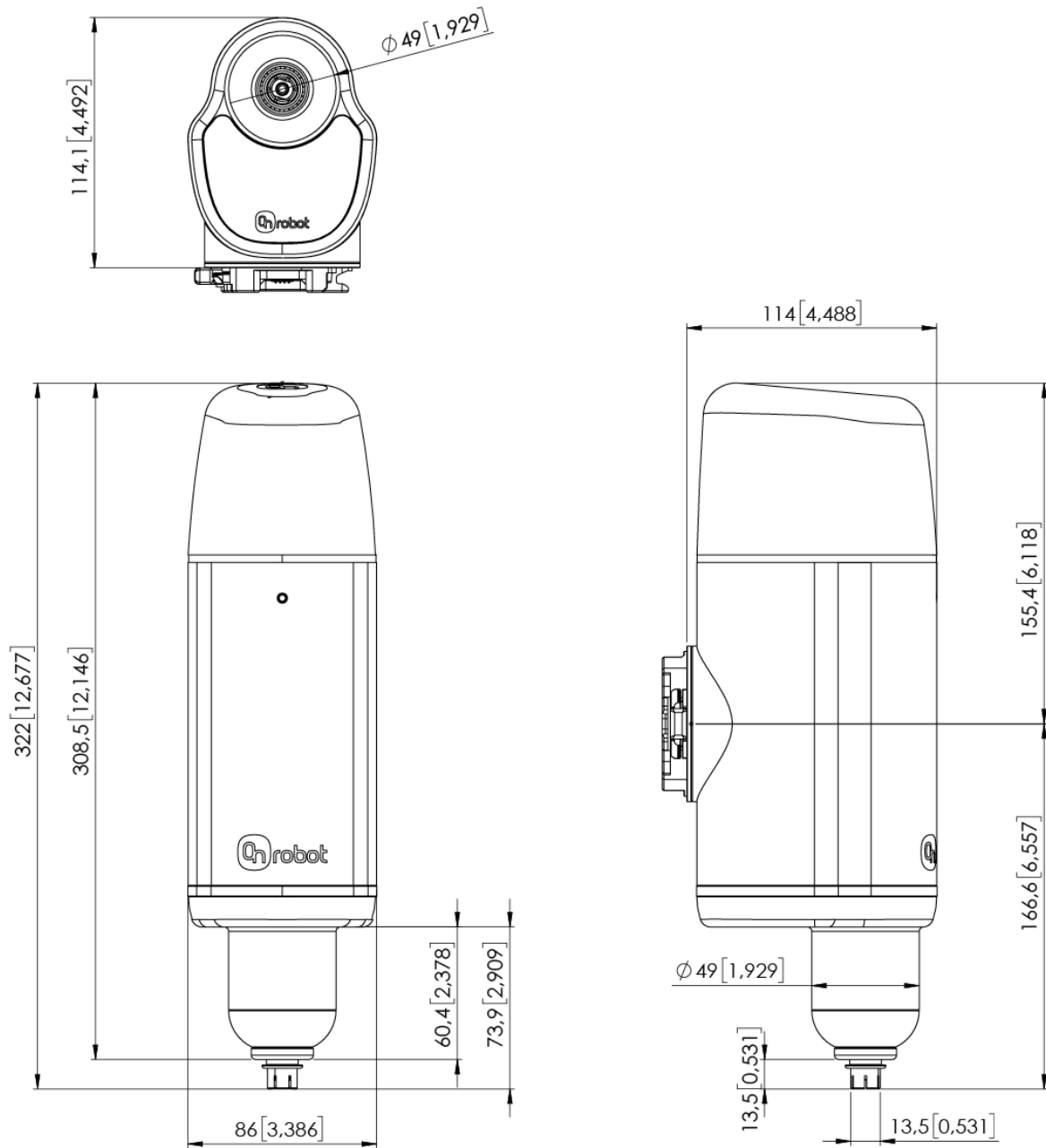
All dimensions are in mm and [inches].

7.2.2.2. Compute Box

Compute Box
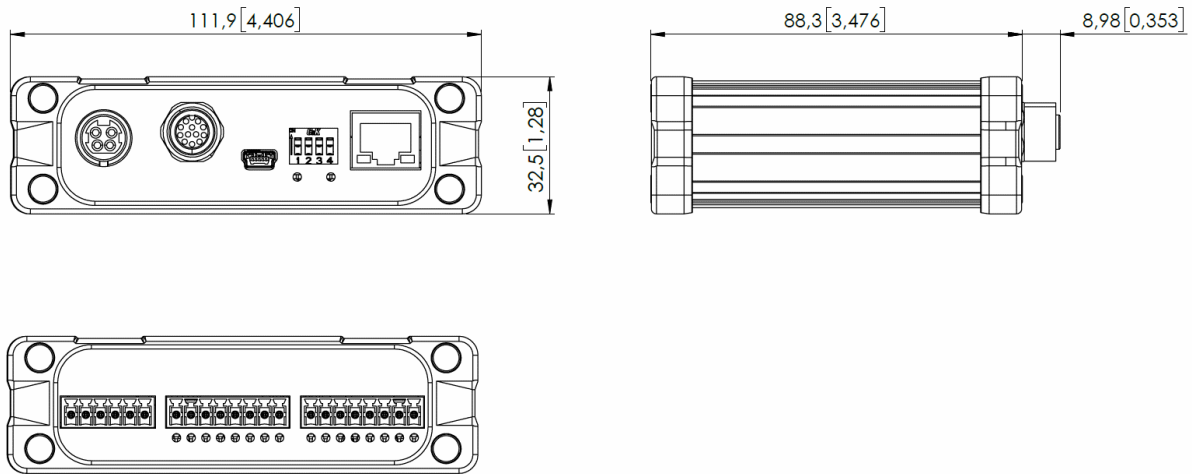
Clip-on Bracket (optional)
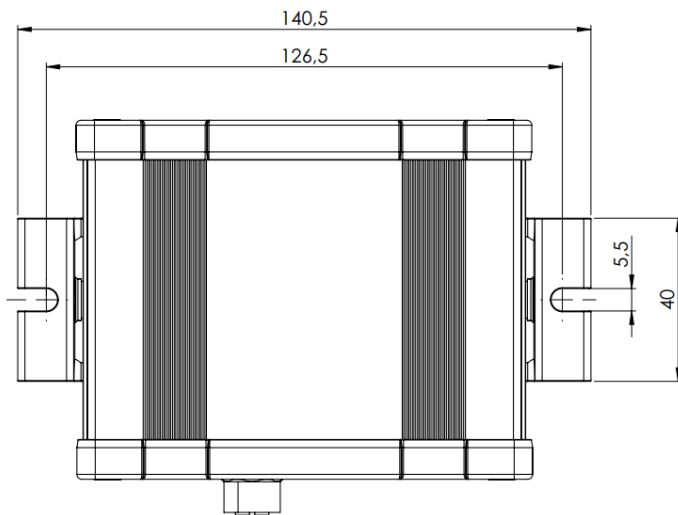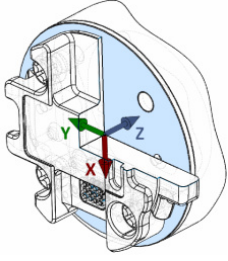
All dimensions are in mm and [inches].

7.3. COG, TCP

COG, TCP, and weight parameters of the single devices (without any mounting/adapter):

7.3.1. Screwdriver

Coordinate system	TCP [mm]	Center of Gravity [mm]	Weight
	X=153 Y=0 Z=81	cX=0 cY=4 cZ=50	2.5 kg 5.51 lb

Use the TCP/COG Calculator to calculate the TCP and COG values for your OnRobot product combination.

The TCP/COG Calculator can be downloaded from **www.onrobot.com/downloads**.

8. 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.

8.1. Screwdriver

Screw Fix and Bit

NOTE:

The screw fixes and bits are wear and tear parts, therefore they must be inspected regularly.

At a minimum, these parts must be inspected once a week or after 60.000 cycles.

If a screw fix is damaged due to misuse, it will be evident enough to be visually detected. In such cases, the screw fix must be replaced.

If the Pick Screw process is failing, this might be an indicator that the screw fix is worn or has been damaged. This is evident enough to be visually detected.

WARNING:

The Screw-bit system should be visually inspected every time the robot is reset or once per week, depending on application and use.

WARNING:

Check the inside of the screw bit holder regularly for debris. Make sure that the magnetic interface is clear from metal shavings and dirt.

Calibration

The Screwdriver has been calibrated at the factory to comply with the specifications stated in the technical sheet. A calibration report has been provided in the Screwdriver packaging.

If used according to recommended guidelines and conditions and maintained correctly, the Screwdriver performs according to these specifications across its lifetime.

In case an updated calibration report is required, please contact the vendor from where the Screwdriver has been purchased.

Spare Parts

- Bit holder A - Spare part kit 1 - PN 104197 (1 unit)
- Bit holder B - Spare part kit 2 - PN 104991 (1 unit)

The table below shows the Kit number and the Part Number of the spare part kits. These are composed of:

- Screw carrier (1 unit)
- Screw fixes (10 units and only for Din 912 / ISO 4762 / ASME B18.3 Hex Cylinder screws)
- Bits (10 units)

For example, the kit 3 - PN 105150 contains the following:

- 1x Screw carrier M1.6 for Din 912 / ISO 4762 screws
- 10x Screw fixes M1.6
- 10x H1.5 Bits

Screw carrier, (screw fix) and bit spare part kits Metric					
Screw Standard	Din 912 / ISO 4762	ISO 14579	ISO 14580	ISO 14581	DIN 7985A
Thread Size	Spare part kit number Part Number				
M1.6	Kit 3 PN 105150	N/A	N/A	N/A	N/A
M2	Kit 4 PN 105151	Kit 10 PN 105157	N/A	Kit 16 PN 105163	Kit 22 PN 105169
M2.5	Kit 5 PN 105152	Kit 11 PN 105158	N/A	Kit 17 PN 105164	Kit 23 PN 105170
M3	Kit 6 PN 105153	Kit 12 PN 105159	Kit 12 PN 105159	Kit 18 PN 105165	Kit 24 PN 105171
M4	Kit 7 PN 105154	Kit 13 PN 105160	Kit 13 PN 105160	Kit 19 PN 105166	Kit 25 PN 105172
M5	Kit 8 PN 105155	Kit 14 PN 105161	Kit 14 PN 105161	Kit 20 PN 105167	Kit 26 PN 105173
M6	Kit 9 PN 105156	Kit 15 PN 105162	Kit 15 PN 105162	Kit 21 PN 105168	Kit 27 PN 105174

Screw carrier, (screw fix) and bit spare part kits US Standard					
Screw Standard	ASME B18.3 Hex Cylinder	ASME B18.6.3 Cross recessed Button head	ASME B18.6.3 Torx Button head	ASME B18.3 Hex Counter sunk	ASME B18.6.3 Torx Counter sunk
Thread Size	Spare part - Part Number				
1#	PN 106310	N/A	N/A	N/A	N/A
2#	PN 106311	PN 106324	PN 106324	N/A	PN 106318
4#	PN 106313	PN 106329	PN 106329	PN 106319	PN 106319
6#	PN 106314	PN 106330	PN 106330	PN 106320	PN 106320
8#	PN 106315	PN 106331	PN 106331	PN 106321	PN 106321
10#	PN 106316	PN 106333	PN 106333	PN 106322	PN 106322
12#	N/A	PN 106334	PN 106334	N/A	N/A
1/4"	PN 106317	N/A	N/A	PN 106323	N/A

9. Troubleshooting

9.1. Robot Has Not Obtained an IP Address

If the Compute Box has not assigned an IP address to the robot, do the following:

Assign a static IP address to the robot that matches your current IP settings on your Compute Box. The default IP address of the Compute Box is 192.168.1.1.

> **NOTE:**
>
> Change the last number in the IP address (if using 255.255.255.0 subnet mask) to avoid an IP conflict with the Compute Box.

Example

If the default fixed (192.168.1.1) IP address is used on the Compute Box, then use the following values:

- IP address: 192.168.1.2
- Subnet Mask: 255.255.255.0

9.2. Error During Operation

If an error occurs during operation, try the following:

1. Restart the robot and check the functionality.
2. If the error is still present, contact the distributor from where the product has been purchased.

10. Warranties

10.1. 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.

10.2. 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.

10.3. 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.

11. Certifications

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

ISO 9001:2015
CERTIFICATION ™
Intertek

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

Carl-Johan von Plomgren
MD, Business Assurance Nordics

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

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request.

11.1. EMC

Attestation of Conformity no. 120-33441-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 - Name (Part no.)
Power Supplies: PSU (104788), VER36U240-JA, VES120PS24, VES150PS24.
Controllers: UR Kit with Compute Box (102344), Doosan Robot kit (102345), Techman/OMRON TM Robot Kit (102359), KUKA-A Robot kit (102360), KUKA-B Robot kit (102361), FANUC Robot kit (102362), Kawasaki-B Robot kit (102363), Kawasaki-C Robot kit (102364), Kawasaki-D Robot kit (102365), Kawasaki-E Robot kit (102366), Yaskawa-F Robot kit (102367), Yaskawa-G Robot kit (102368), Yaskawa-H Robot kit (102369), NACHI-I Robot kit (102370), NACHI-J Robot kit (102371), Hanwha Robot Kit (103208), Eye Box (103707).
Mountings: Dual Quick Changer (101788), Quick Changer Robot side (102037), HEX-E QC (102111), Quick Changer Kit (102277), HEX-H QC (102376), Quick Changer Robot side 4,5A (104277), Dual Quick Changer 4,5A (104293), Quick Changer Kit 4,5A (104388).
Tools: 2FG7 (106376), 3FG15 (103666), MG10 (105202), OnRobot Eyes (103903), RG2 (102012), RG2-FT (102075), RG6 (102021), Sander (106376), Screwdriver (103961), SG Base Part (103546), VG10 (101661), VGC10 (102844), VGP20 (107242).

Manufacturer
OnRobot A/S

Technical documentation
Assessment no. 120-33441-A1

Standards/Normative documents

IEC 61000-3-2:2018	EMC Directive 2014/30/EU, Article 6
IEC 61000-3-3:2013/AMD1:2017	EN 61000-3-2:2014
IEC 61000-6-2:2016	EN IEC 61000-3-2:2019
IEC 61000-6-4:2018	EN 61000-3-3:2013/A1:2019
	EN 61000-6-2:2005/AC:2005
	EN IEC 61000-6-2:2019
	EN 61000-6-4:2007/A1:2011
	EN IEC 61000-6-4:2019

Additionally, for RG2 (102012) and RG6 (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: 2021.03.02
16:14:10 +01'00'

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

GTS   ADVANCED TECHNOLOGY GROUP

FORCE Technology
Venlighedsvej 4
2970 Hørsholm, Denmark
+45 43 25 14 00
+45 43 25 00 10
info@forcetechnology.dk

FORCE Technology Norway AS
Nye Vakås vei 32
1395 Hvalstad, Norway
+47 64 00 35 00
+47 64 00 35 01
info@forcetechnology.no

FORCE Technology
Park Allé 345
2605 Brøndby, Denmark
+45 43 25 00 00
+45 43 25 00 10
info@forcetechnology.dk

71

11.2. Declaration of Incorporation

11.2.1. Screwdriver

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:	Robotic Screwdriver
Model:	OnRobot Screwdriver
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. The following essential requirements of Directive 2006/42/EC are fulfilled: 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4, 1.5.1, 1.5.2, 1.5.4, 1.5.5, 1.5.10, 1.5.11, 1.5.12, 1.6.1. 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)
ANSI/ESD SP10.1-2007 – For the Protection of Electrostatic Discharge Susceptible Items – Automated Handling Equipment (AHE)
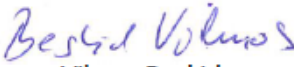
Relevant essential health and safety requirements of the following EU directives are also applied:

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, November 11th, 2020

Group Management

Vilmos Beskid
CTO