



ROBOTIQ USER INTERFACE INSTRUCTION MANUAL

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Revisions

Robotiq may modify this product without notice, when necessary, due to product improvements, modifications or changes in specifications. If such modification is made, the manual will also be revised, see revision information. See the latest version of this manual online at <http://support.robotiq.com/>.

Revision 190430

Major software revision

- Section 3
- Section 4
- Section 5

Revision 141203

Modbus RTU parameters section added

Revision 140310

Manual Release

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Information provided by Robotiq in this document is believed to be accurate and reliable. However, no responsibility is assumed by Robotiq for its use. There may be some differences between the manual and the product if the product has been modified after the edition date.

The information contained in this document is subject to change without notice.

1. Terms of Service

The following manual describes the Robotiq User Interface software provided with Robotiq's Adaptive Robot Grippers. The Robotiq User Interface is a software compatible with all up-to-date Robotiq products.

Disambiguation:

The terms "User Interface", "Robotiq UI", "Control Software" all refer to the Robotiq User Interface.

Proper use:

The User Interface is designed to allow Gripper:

- Testing.
- Demo mode.
- Xbox remote control mode.
- Communication protocol configuration.

Note

Robotiq User Interface software is designed for the testing, debugging and demo control of Robotiq's Grippers. It is not a production purpose or continuous control software.

Disclaimer:

By using the Robotiq User Interface to operate your Robotiq device, you agree that under no circumstances whatsoever shall Robotiq be liable to any person, user or purchaser, firm or corporation for any special, indirect or consequential damages, wheter for breach of contract, negligence, misrepresentation or otherwise and whether resulting in lost profits, interest on borrowed or invested money, impairment of goods, work stoppage or otherwise in any way arising out of the purchase or use of any product or service provided by Robotiq or any other transaction to which Robotiq's Standard Terms applies.

visit <http://support.robotiq.com> to get the latest version of the Robotiq User Interface.

2. Requirements

To use this version of the Robotiq User Interface, you will need:

- Any Robotiq Adaptive Robot Gripper and its power cable (see your Gripper Wiring section in the proper Instruction Manual)
- A computer with :
 - Windows 7 or newer.
 - At least 50MB of main memory.
 - A USB port and/or an Ethernet port (Modbus TCP optional).
- A 24V power source for the Gripper.
- A small Phillips screwdriver (for 3-Finger Adaptive Robot Gripper).
- Optional:
 - Modbus TCP communication protocol : Ethernet cable.
 - Xbox controls : Xbox controller.

Note

Required USB cable may be different for 3-Finger Adaptive Robot Gripper models older than version 7. See documentation archives.

Note

Modbus TCP is available if you have the Modbus TCP communication protocol option present on your Robotiq product. Note that EtherNet IP and EtherCAT, although they use RJ45 cables, are not compatible with standard Ethernet cards and are not supported by the User Interface.

3. Installation

Warning

Be sure to read and understand the Instruction Manual related to your Robotiq Gripper prior to installation.

Caution

You will need administrator access on your personal computer to install the Robotiq User Interface.

3.1 Software Installation

To install the Robotiq User Interface software:

1. Launch the Robotiq User Interface installer from "Robotiq User Interface Setup.exe" provided by Robotiq.

Tip

Get the latest version at support.robotiq.com

2. Choose the installer language and click "OK".
3. Follow the setup steps until you can click "Install". See Figure 3.1.1

Tip

You can leave the settings on default or choose an installation directory of your own.

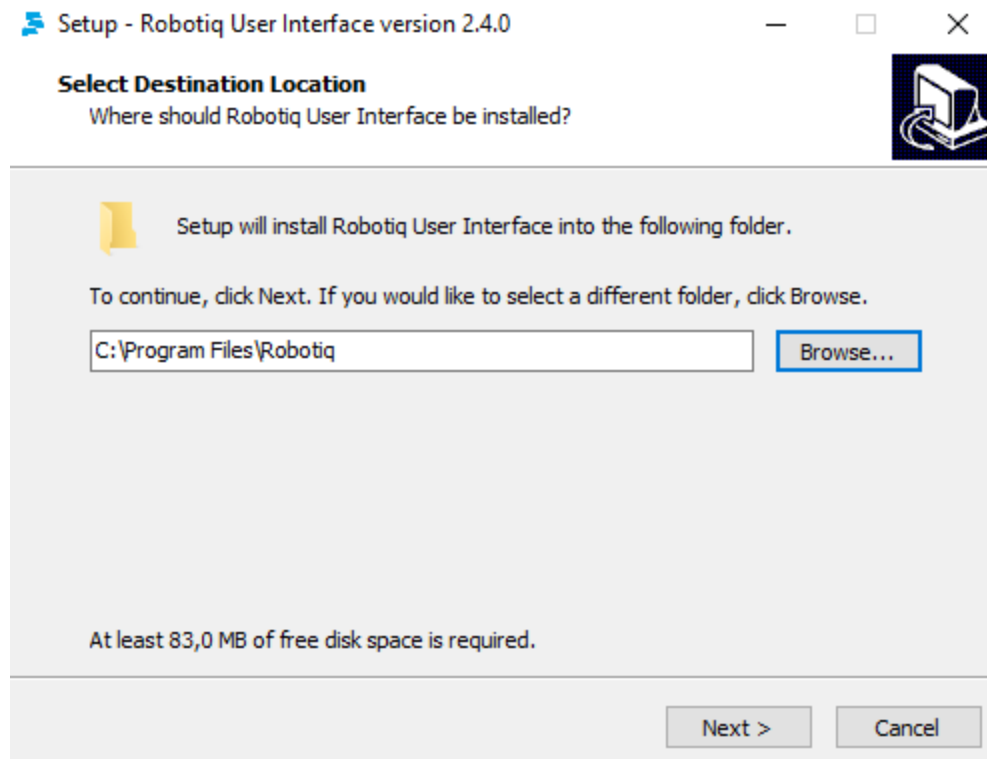


Figure 3.1.1 : Robotiq User Interface Install.

4. After installation is completed you can launch the Robotiq User Interface, if you do not have the required drivers for the USB connection with the Gripper,

please select the box shown in figure 3.1.2.

Warning

To use the Modbus RTU communication protocol via the USB port, you need to select the driver installation shown in Figure 3.1.2.

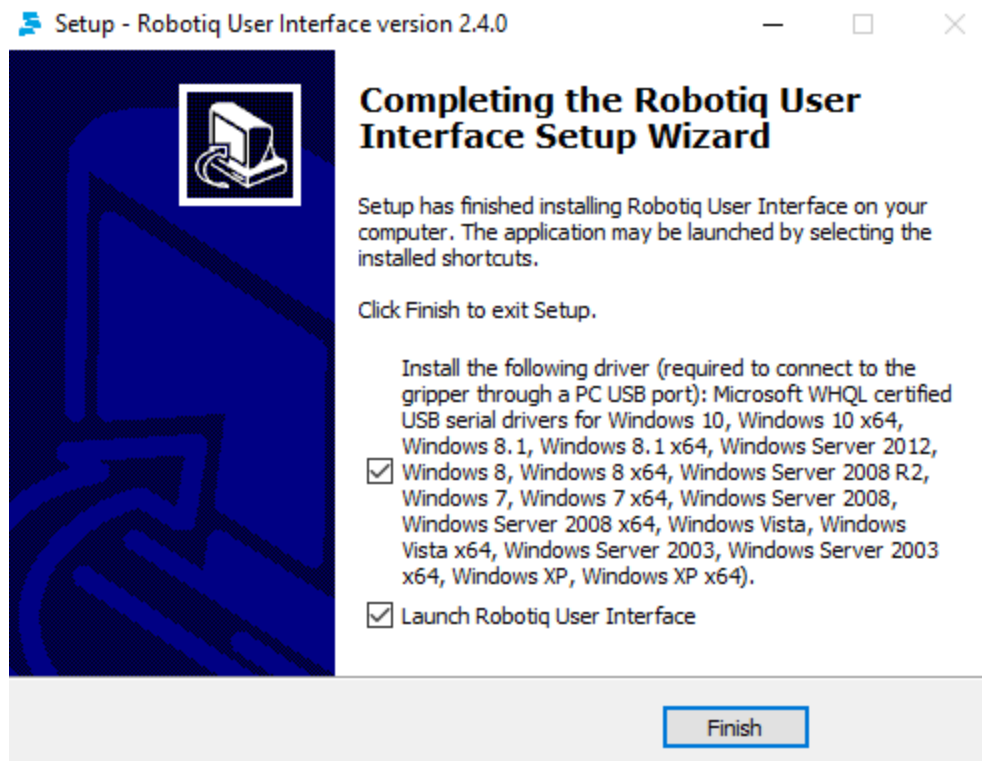


Figure 3.1.2 : Completing the installation of Robotiq User Interface.

USB driver installation:

1. If the driver install option was selected, then "FTDi CDM Drivers" will automatically open once the Robotiq User Interface install program is completed.
2. Select "Extract" shown in figure 3.1.3, and the drivers will be installed.

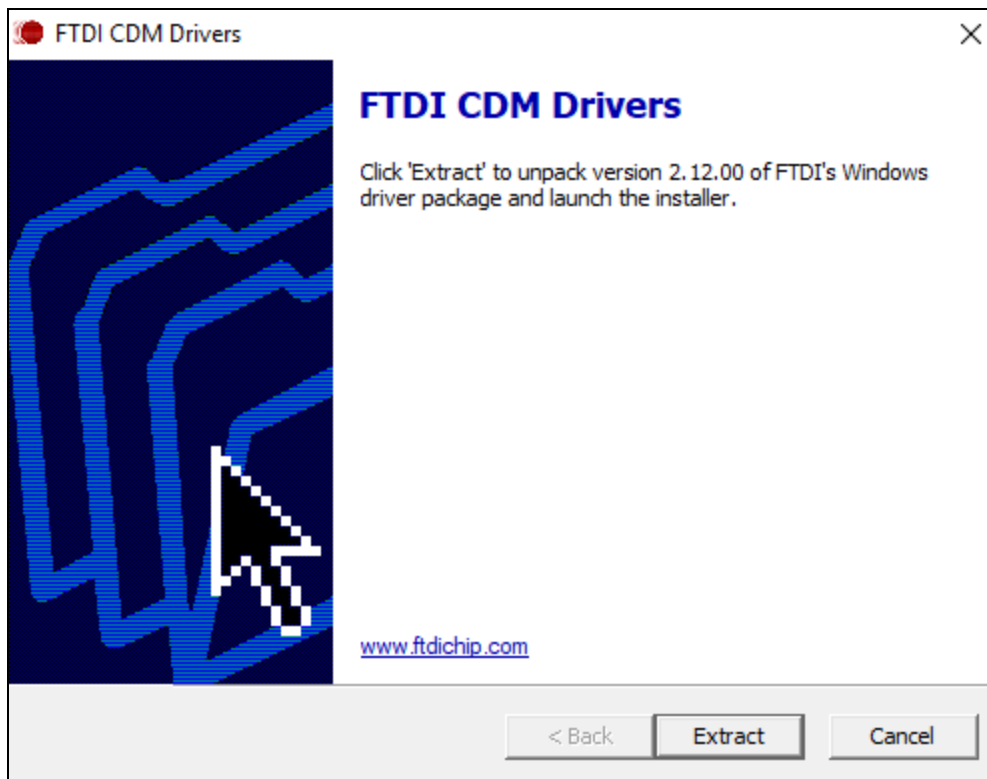


Figure 3.1.3 : Extracting USB drivers.

3. Select "Finish" shown in Figure 3.1.4.

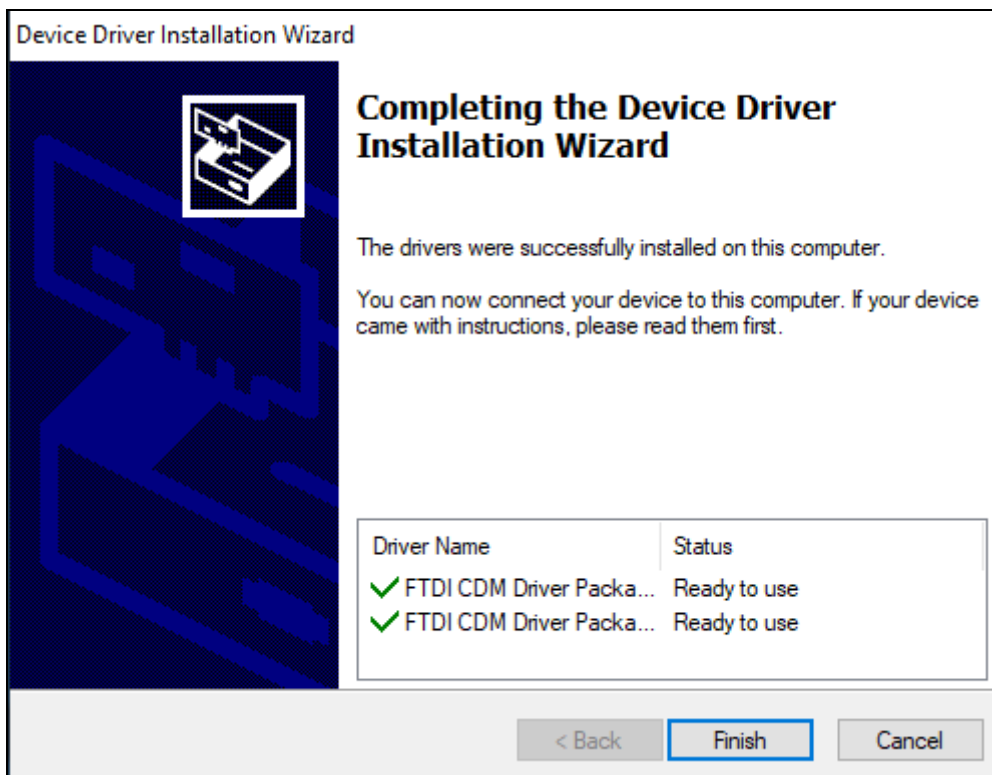


Figure 3.1.4: Finish the USB drivers installation

3.2 Connection via Modbus RTU

Info

The USB cable needed is provided with your Adaptive Gripper.

In order to connect the Adaptive Gripper via USB for Modbus RTU:

1. For Robotiq 3-Fingers Adaptive Robot Gripper :
 - a. Unplug the Gripper from the power source by disconnecting the power cable from the Gripper.
 - b. Remove the USB port panel by unscrewing the two screws (shown in Figure 3.2.1). A Phillips screwdriver is needed.
 - c. Connect the Gripper to your computer with a USB 2.0 Male-A to Male-A cable.
 - d. Reconnect the power cable to the power receptacle and your Gripper, then power up the Gripper with a 24V power source (not included) as described in the Wiring section.



Figure 3.2.1 : Completed USB connection of the 3-Finger Adaptive Robot Gripper.

2. For Adaptive Grippers or Vacuum Grippers:
 - a. Connect the Gripper to a coupling with a pigtail.
 - b. Connect the pigtail to a RS-485 to USB converter, as explained in the user manual of the product.
 - c. Connect the red and the black wires to a 24 V power supply.
 - d. Connect the USB of the RS-485 to USB converter to the computer.

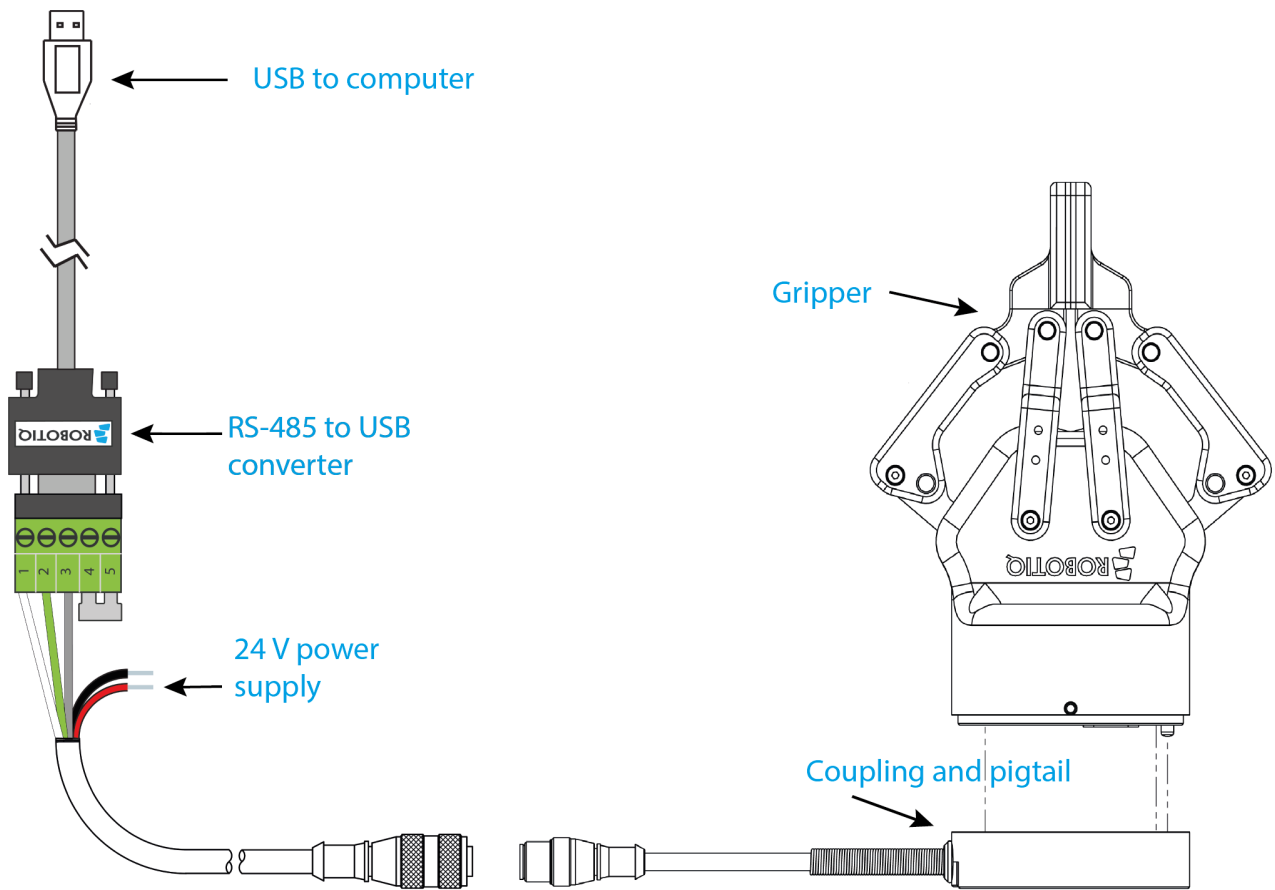


Figure 3.2.2 : Completed USB connection of the Gripper.

If you are connected through the USB port and the configuration is finished, follow these steps to access the Gripper:

1. Disconnect the Gripper with the Disconnect button found in the User Interface menu or simply quit the program.
2. Unplug the Gripper from the power source by disconnecting the power cable.
3. Unplug the Gripper from your PC by removing the USB cable.
 - a. For 3-Finger Adaptive Robot Grippers : Replace the USB port panel by screwing back the two screws (shown in Figure 3.2.1). A Phillips screwdriver is needed.
4. Reconnect the power and communication cables to the Gripper as described in the associated Wiring section.

3.3 Connection via Modbus TCP

Info

The Ethernet cable needed is optional and may not be provided with your Adaptive Gripper or your Vacuum Gripper.

To connect to your Gripper via Ethernet port for Modbus TCP:

1. Unplug the Gripper from the power source by disconnecting the power cable from the 3-Finger Gripper (Figure 3.3.1) or the power connector from the Controller for the Adaptive Gripper or Vacuum Gripper (Figure 3.3.2).
2. Connect the Ethernet cable to your computer by either:
 - a. 3-Finger Adaptive Robot Gripper : Connect Ethernet cable M12 connector to the COM Gripper receptacle.
 - b. Adaptive Gripper and Vacuum Gripper series : Connect the Ethernet cable RJ45 connector to the Robotiq Controller.

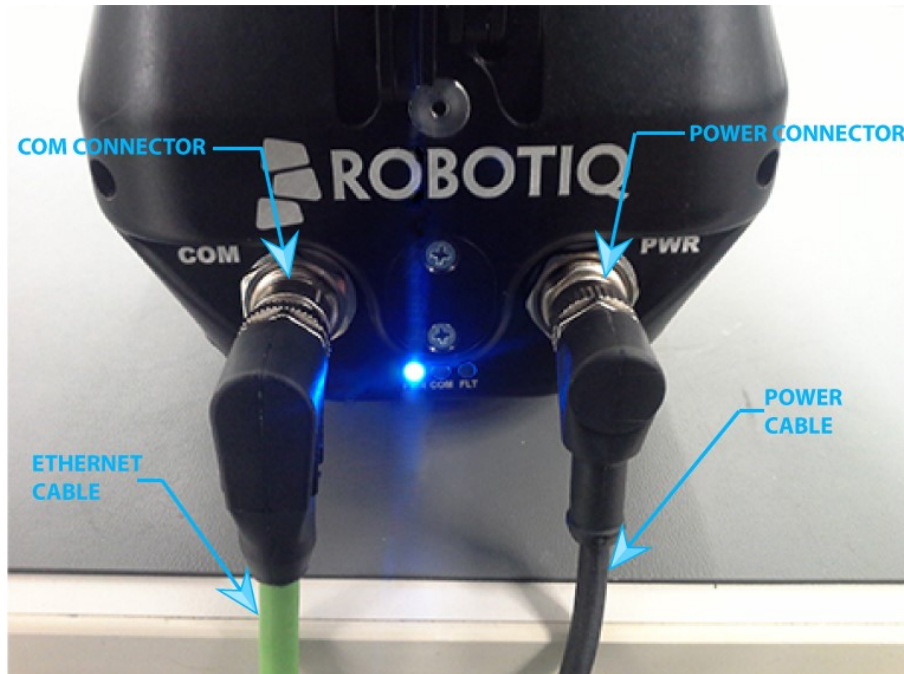


Figure 3.3.1 : Modbus TCP cabling setup for Robotiq 3-Finger Adaptive Robot Gripper

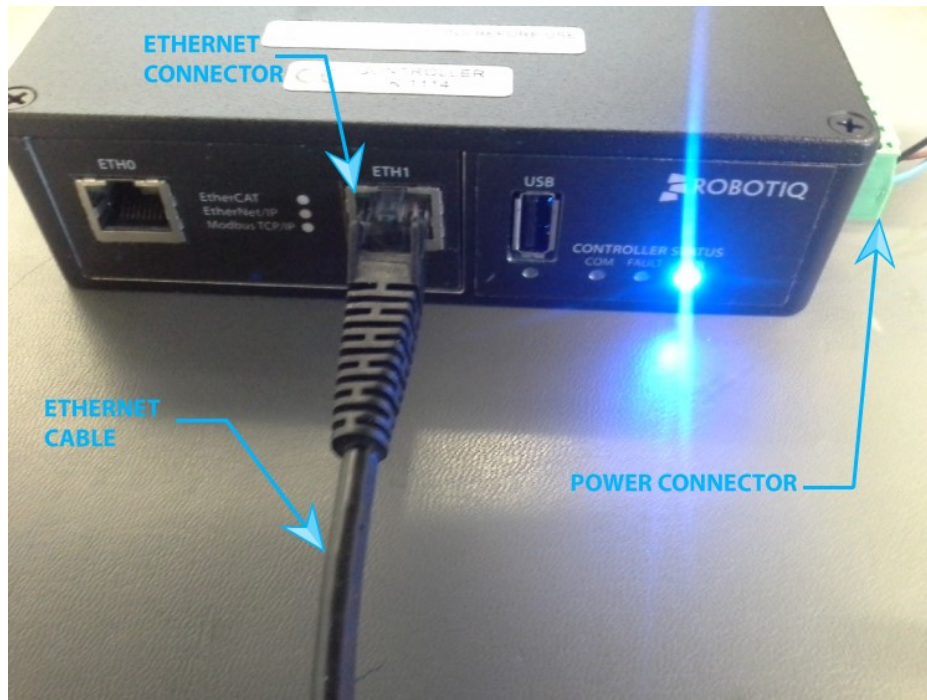


Figure 3.3.2 : Modbus TCP cabling setup for Adaptive Robot Gripper and Vacuum Gripper Series.

3. Reconnect the power cable to either the Gripper or the Controller, then power up the Gripper with a 24V power source (not included) as described in the Wiring section.

3.4 Connection of the I/O Coupling

Info

The Gripper is optional while setting up the coupling. It can be used to test the settings when connected to a robot.

To set up the I/O Coupling, a computer is required.

3.4.1 Connection with a robot

To connect the I/O Coupling with a robot :

1. Download the latest version of the Robotiq User Interface and the URCaps for the I/O Coupling on the support website : support.robotiq.com. Install the Robotiq User Interface as shown in Section 3.1.
2. Delete any Gripper URCaps on the robot. Install the URCaps on the UR robot.

Caution

The URCaps is compatible with Polyscope version 3.10 and higher.

3. Install the Coupling on the robot wrist without connecting the Coupling to the wrist connection.
4. Install the Gripper on the coupling and connect the wrist connection.

Caution

When connecting the wrist connection, the gripper will automatically do the activation

5. In the I/O Tab, go in the **Tool Output** section. In the Controlled by dropdown menu, select to **Robotiq_Wrist_Connection**. The voltage will automatically change to 24V, as shown in Figure 3.4.1.1.

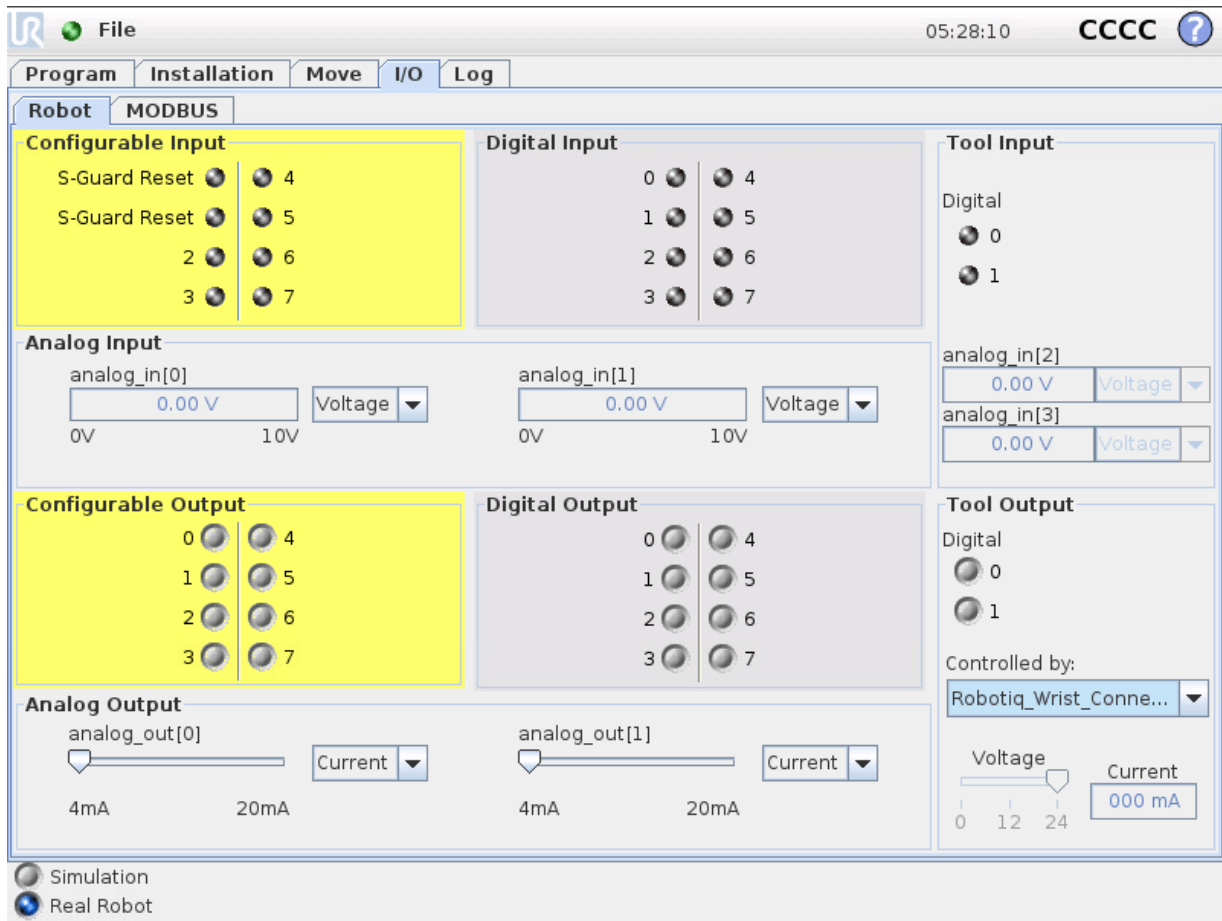


Figure 3.4.1.1 : Changing the Voltage at the Tool Flange

6. Connect the Coupling to a computer using the USB cable.
7. Start the Robotiq User Interface on the computer. Select the I/O Coupling in the list and connect to the Coupling using the **Auto Connect** option (see Figure 4.2). If the firmware of the coupling or the gripper needs to be updated, a pop-up message will notify the user.
8. Choose the desired presets. While the gripper is connected to the robot, it is possible to test the different settings directly, as explained in the section 5.4.
9. Save the settings in the Coupling using the **Save presets configuration to I/O Coupling** button.
10. Close the Robotiq User Interface first and then disconnect the Coupling from the computer. The node **Wrist Connection** can be used in the program to control the gripper.

3.4.2 Connection without a robot

To connect the I/O Coupling without a robot :

1. Download the latest version of the Robotiq User Interface and the URCaps for the I/O Coupling on the support website : support.robotiq.com. Install the Robotiq User Interface as shown in Section 3.1.
2. Connect the Coupling to a computer using the USB cable.
3. Start the Robotiq User Interface on the computer. Select the I/O Coupling in the list and connect the Coupling using the **Auto Connect** option (see Figure 4.2). If the firmware of the coupling needs to be updated, a pop-up message will notify the user.
4. Select the desired coupling.
5. Choose the desired presets.

Caution

The settings cannot be tested if the gripper is not connected to a 24V power source.

6. Save the settings in the Coupling using the **Save presets configuration to I/O Coupling** button.
7. Close the Robotiq User Interface first and then disconnect the Coupling from the computer. The node **Wrist Connection** can be used in the program to control the gripper.

8. Delete any Gripper URCaps on the robot. Install the URCaps on the UR robot. When the gripper will be connected to robot, the gripper firmware can be undapted if needed. In the **I/O** Tab, go in the **Tool Output** section. In the Controlled by dropdown menu, select to **Robotiq_Wrist_Connection**. The voltage will automatically change to 24V, as shown in Figure 3.4.1.1.

Caution

The URCaps is compatible with Polyscope version 3.10 and higher.

4. User Interface description

Before connecting to your Robotiq Gripper you will need to agree to Robotiq's Terms of Service (see Figure 4.1).

The terms are detailed in Section 1. Terms of Service.

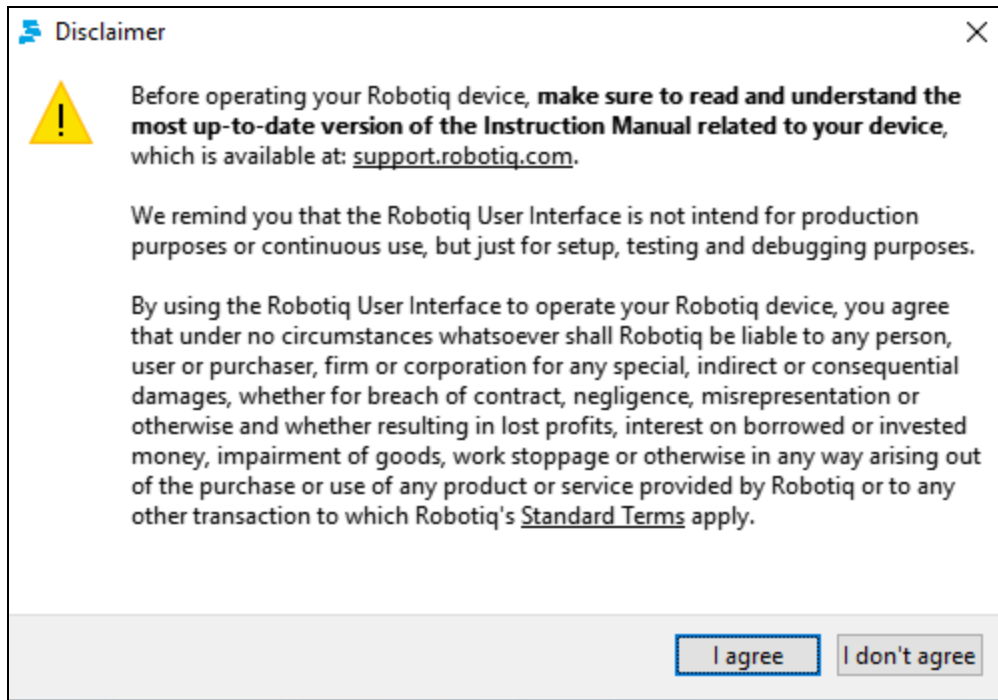


Figure 4.1 Robotiq Disclaimer.

After accepting the Terms of Service, you will be granted access to the Robotiq User Interface connection screen. You need to connect to the Robotiq Gripper you will be using (see Figure 4.2).

Tip

To connect to a device, simply double click its address, enter the address manually and press Enter or use the Auto-Connect feature.

1. First, choose between **Gripper Types**, you can either choose 2-Finger (model 85 or 140), Vacuum or 3-Finger. If you choose the **Auto-Connect** feature, Gripper Type will be automatically determined.
2. Address:
 - a. You can **manually** enter the **IP address** for the Modbus TCP connection or leave it blank for **Auto-Connect**. You can also use **Search for device** if you want to determine if a Robotiq Gripper is detected. shows the Robotiq User Interface start page.

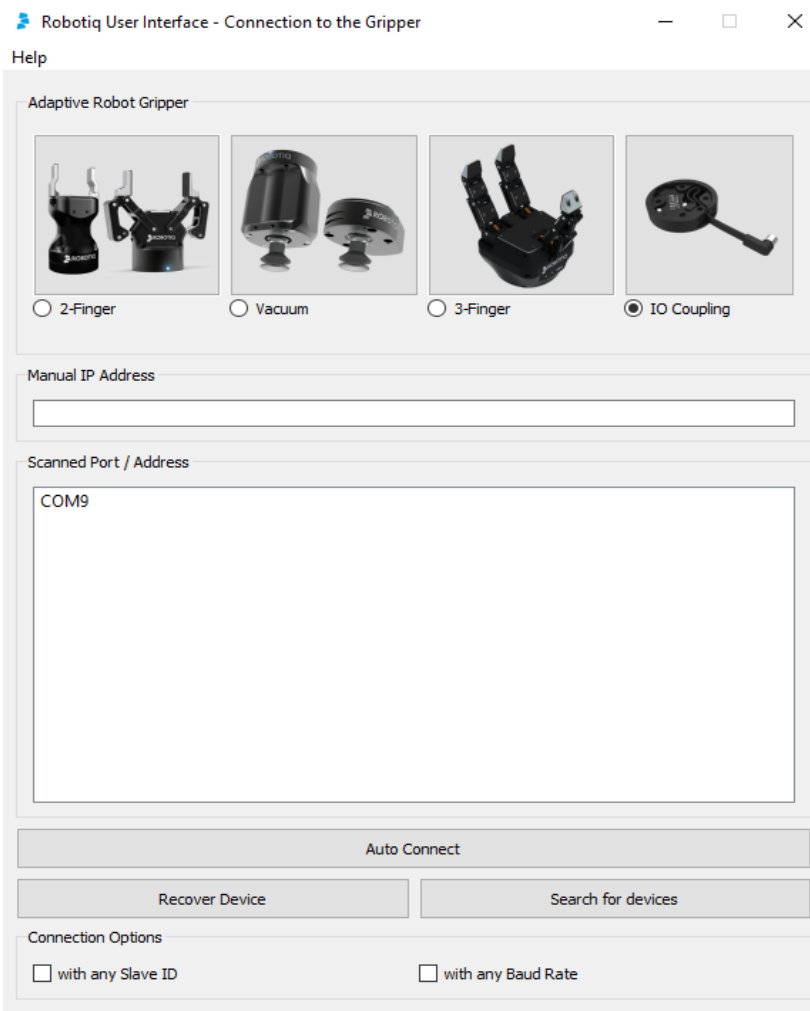


Figure 4.2 Device found (left) and no device found (right).

3. Select **Auto-Connect** to connect to the first Robotiq device found.
If your device is not detected automatically, it can be due to one of the following issues:
 - slave ID is not **9**
 - baud rate is not **115 200**
 - miscellaneous

Slave is not 9

When the slave ID of a gripper is different than 9, the Robotiq User Interface cannot detect the gripper if you select **Search for Devices**. If a gripper is not detected, check the **with any slave ID** box, and try searching for your device once again.

Baud Rate is not 115 200

If the Baud Rate of the device is different than 115 200, the Robotiq User Interface cannot detect the gripper if you select **Search for Devices**. Check the **with any Baud Rate** box, and try searching for your device once again. Make sure that the baud rate is standard. Standard baud rates are: 1200, 2400, 4800, 9600, 19 200, 38 400, 57 600, and 115 200.

Miscellaneous

If you cannot find your device using the previous methods, you can still recover it. Press **Recover Device** and execute a power cycle. Instructions are provided on-screen. The program will attempt booting the device during 10 seconds using its default communication parameters.

Once you are connected to a Robotiq device, the first tab becomes activated (shown in Figure 4.3 for 3-Finger Gripper and in Figure 4.4 for Adaptive Grippers). The first tab is the **Simple Control Tab** (detailed in Section 5.), it can be split into the following:

- Initialization and Gripper Fault Status
- Interface Options
- Operation Mode (only for 3-Finger Gripper)
- Control Parameters
- Gripper Feedback
- Menus: Connection, View and Help

An optional **Advanced Control Tab** (detailed in Section 5.1.6) is available for the Robotiq 3-Finger Adaptive Robot Gripper.

Caution

Simple Control Tab and **Advanced Control Tab** are only accessible via Modbus RTU since control is not allowed in Modbus TCP for security reasons.

The second tab is the **Communication Protocol Tab** (detailed in Section 6.) and will be identified as the name of your communication option.

The third tab is the **Device Information Tab** (detailed in Section 7.) and will show your device firmware information.

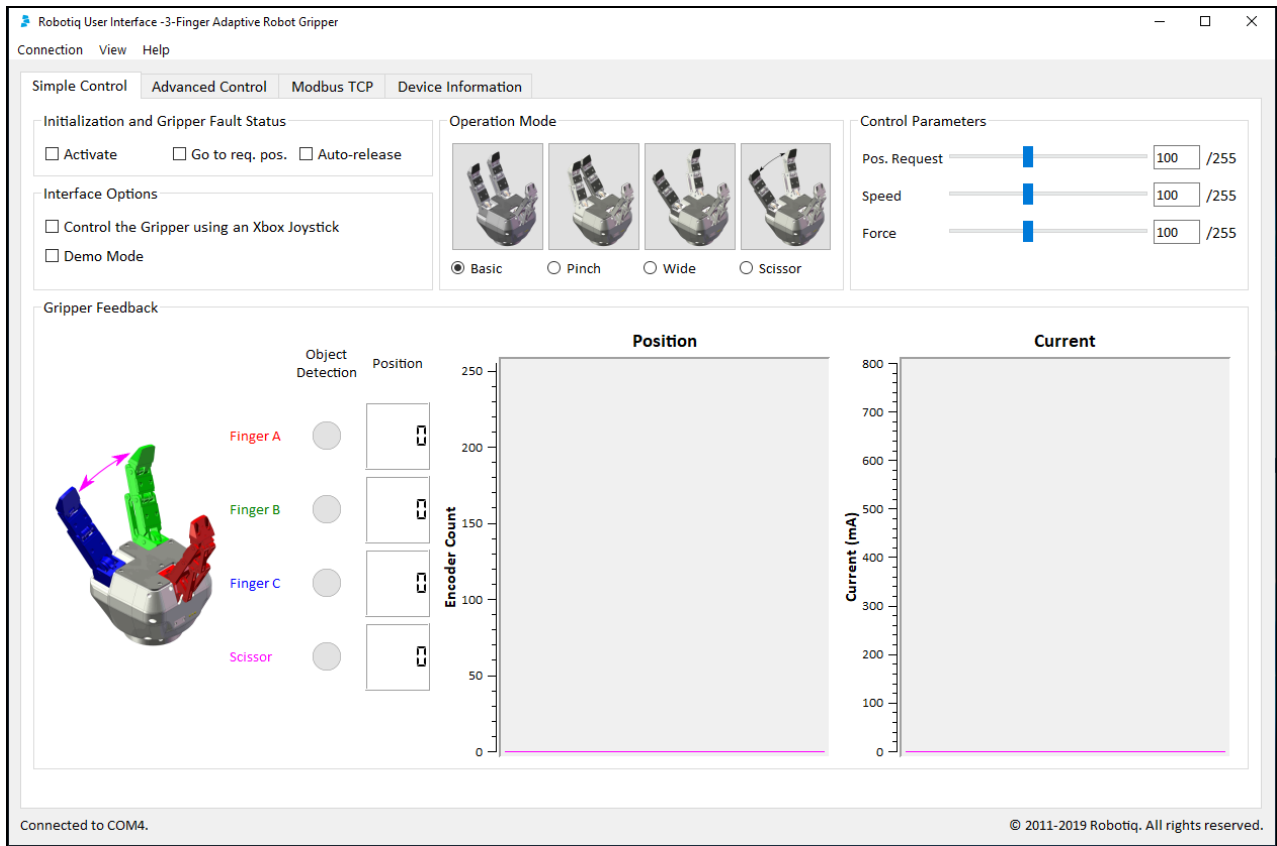


Figure 4.3 The Robotiq User Interface tabs for the 3-Finger Gripper.

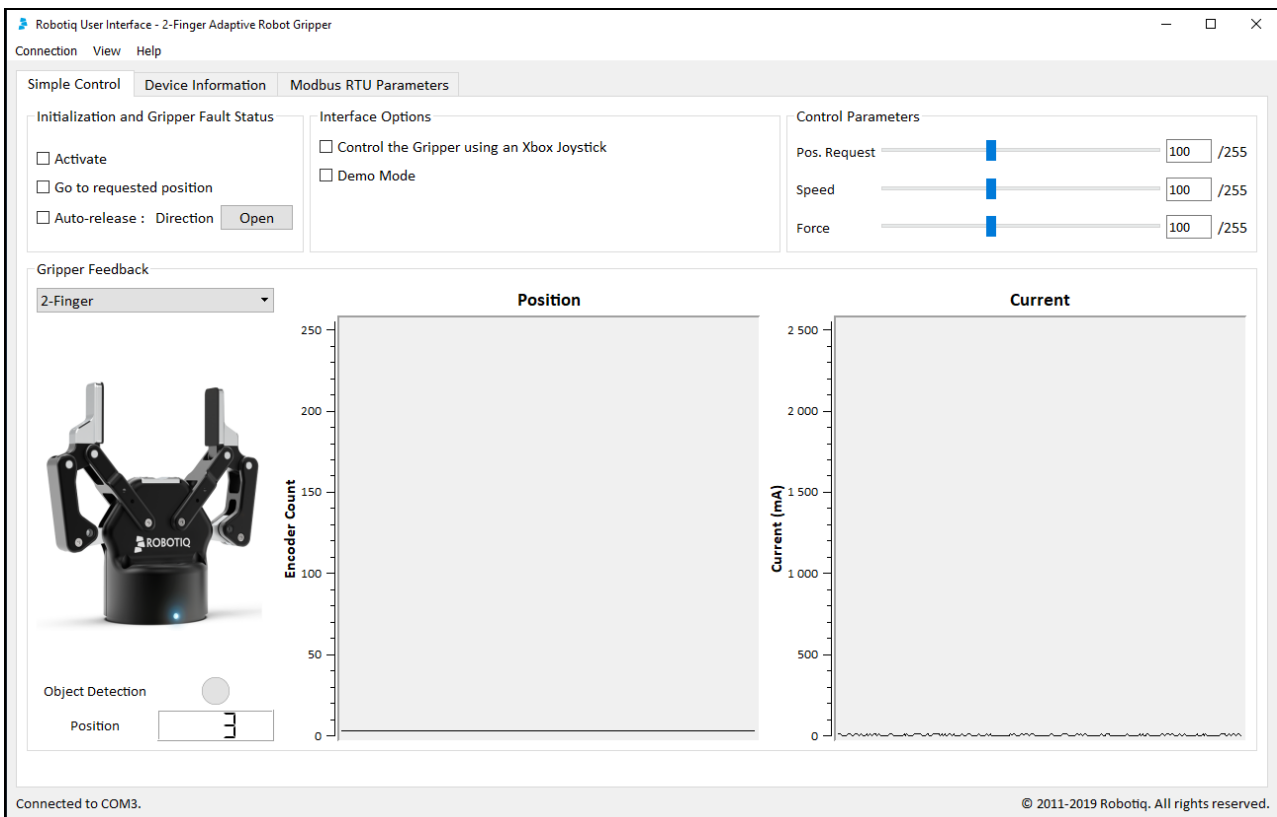


Figure 4.4 The Robotiq User Interface tabs for the Adaptive Grippers

5. Control

Control Tabs will vary according to your Gripper. For control of the 3-Finger Adaptive Robot Gripper consult Section 5.1, while control of the 2-Finger Adaptive Robot Gripper series are in Section 5.2.

Details of the **Communication Tab** and **Device Information Tab** are common to all products and can be found in Section 6 and Section 7 respectively.

5.1 Control of the 3-Finger Gripper

Once you are connected to your 3-Finger Gripper, the first tab becomes activated (see Figure 5.1.1).

The first tab is the **Simple Control** tab, it can be split into the following:

- Initialization and Gripper Fault Status
- Interface Options
- Operation Mode
- Control Parameters
- Gripper Feedback
- Menus: Connection, View and Help



Figure 5.1.1 Gripper Simple Control tab description.

The Advanced Control tab will be detailed in Section 5.1.6

5.1.1 Initialization & Gripper Status

Activate

Once on the Simple Control tab page, the Adaptive Gripper needs to be activated before being used. Simply click the "Activate" button in the Initialization and Gripper Fault Status section. The Gripper will start its initialization procedure and once completed the Gripper status text box located under the "Activate" button will display "No Fault".

Warning

The Gripper must be solidly affixed before initialization.
Do not interfere with the Gripper during the initialization process.

After the initialization process is completed the Gripper is ready to be used.

Info

The Activate button must stay checked while using the Gripper.

Go to requested position

Commands the Gripper to go to the selected "Position Request" as designated by the slider in the Control Parameters section.

Auto-release

Commands the Gripper to slowly open, overriding all previous commands. After Auto-release is completed the Gripper must be reactivated, the "Activate" button must be unchecked and rechecked.

Caution

Auto-release is only meant for emergency procedures, use the "Go to requested position" command for normal use.

5.1.2 Interface Options

"Interface Options" allows you to choose between two options:

- **Xbox Joystick control** allows control of the Gripper using a remote Xbox controller (see Figure 5.1.2.1 for a summary of the available controls).
- **Demo Mode** commands the Gripper to cycle through its operation modes with pauses after every move.

To disable any of the options simply uncheck the corresponding box.

You can view the Joystick Controls from the View menu by clicking Xbox Controls

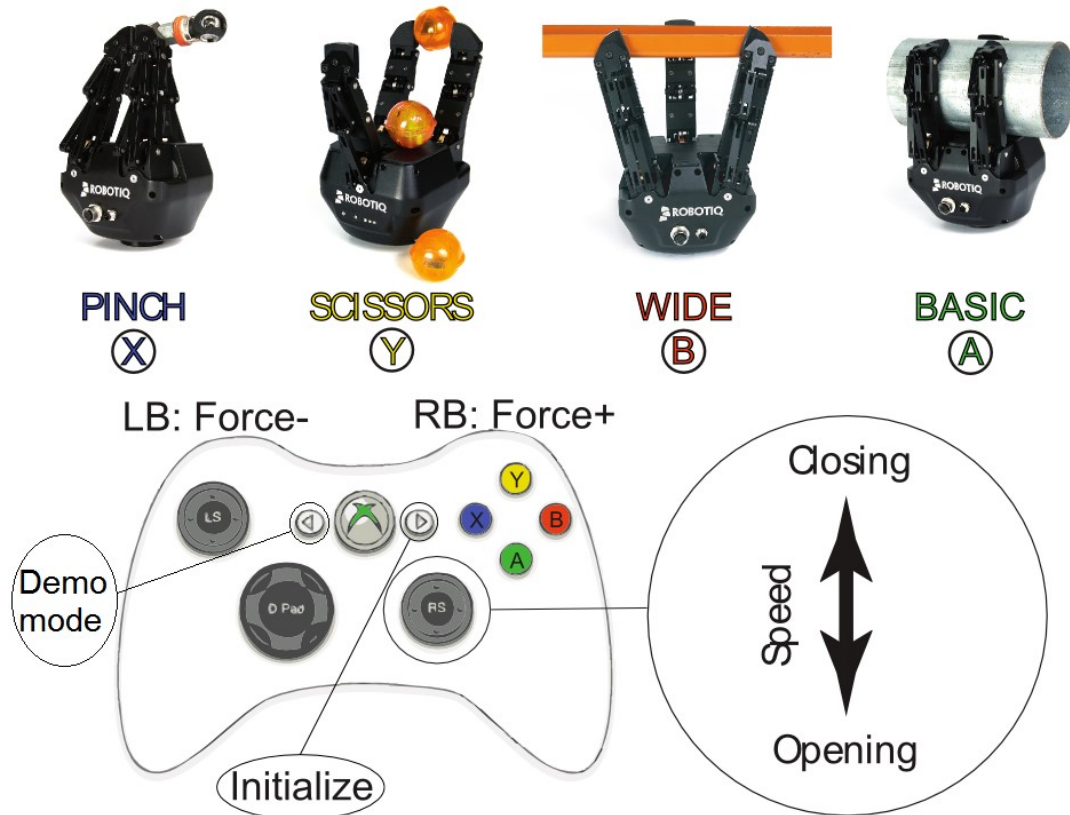


Figure 5.1.2.1 : Xbox Controls for the 3-Finger Adaptive Robot Gripper.

5.1.3 Operation Mode

You can select the operation mode of your Gripper in the "Operation Mode" section of the Robotiq User Interface. Simply check the corresponding radio button or click on the corresponding picture to activate any mode.

For a description of the operation modes see the general presentation in Section 1 of the 3-Finger Adaptive Robot Gripper Instruction Manual.

5.1.4 Control Parameters

The "Control Parameters" section of the User Interface can customize all the parameters for the Gripper (see Figure 5.1.4.1):

- Pos. Request slider sets the reach position of the Gripper when the "Go to requested position" button of the Initialization and Gripper Fault Status sections are filled with a numeric value. The value can be set anywhere between 0 (fully open) and 255 (fully closed).

Hint

You can set the desired position with the slider or numeric values.

- Force slider will control the gripping force limit of the Gripper. The value can be set anywhere between 0 and 255 with 255 being the maximum force.
- Speed slider will control the closing or opening speed of the Gripper. The value can be set anywhere between 0 and 255 with 255 being the maximum speed.

Info

Force or speed settings at 0 does not mean null value, it means minimum value, see your Adaptive Gripper Instruction Manual for details.

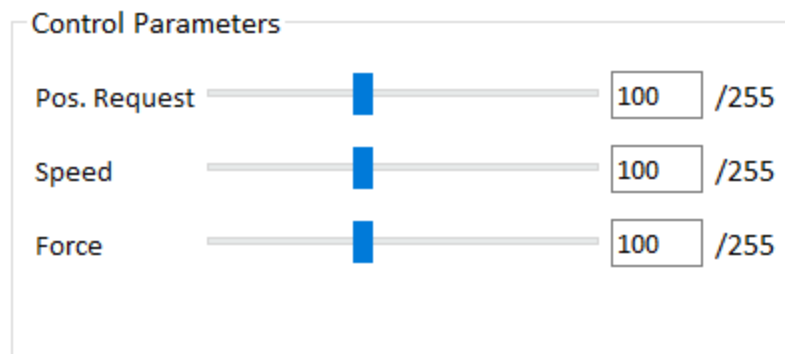


Figure 5.1.4.1 : Changing the Control Parameters of the Gripper

5.1.5 Gripper Feedback

The "Gripper Feedback" section provides you with information concerning the current status of the Adaptive Gripper .

- Object Detection:** If the Gripper detects a contact with an object when closing, the "Object Detection" display turns yellow on the corresponding finger (see Figure 5.1.5.1). Object detections are displayed independently for each of the three fingers and the scissor axis.

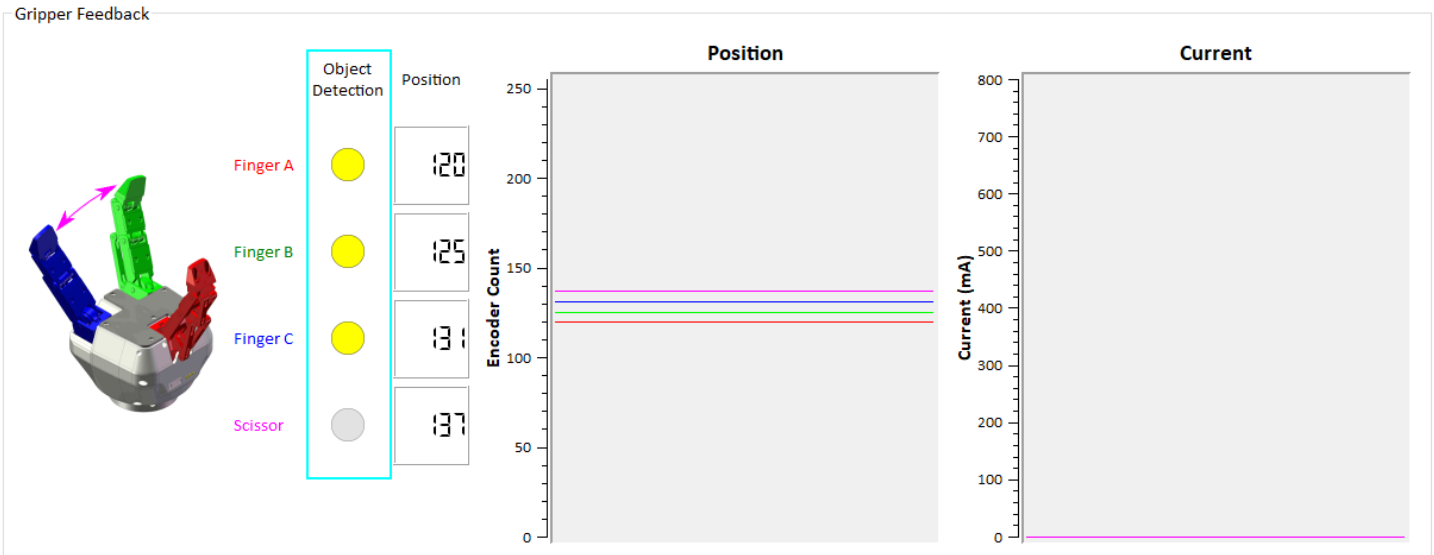


Figure 5.1.5.1 : Positive object detection is registered when the object detection dot turns yellow.

- Position (numeric):** The digital display of "Position" shows the position of the associated finger as designated on a scale of 0 to 255 (see Section 4.6 for details of the 3-Finger Instruction Manual).
- Position (graphic):** The visual display of "Position" shows the real-time position of each finger graphically.
- Each axis has an associated color.
- Current (graphic):** The "Current" graph shows the amount of current going through each motor. Each axis has an associated color (see Figure 5.1.5.2).

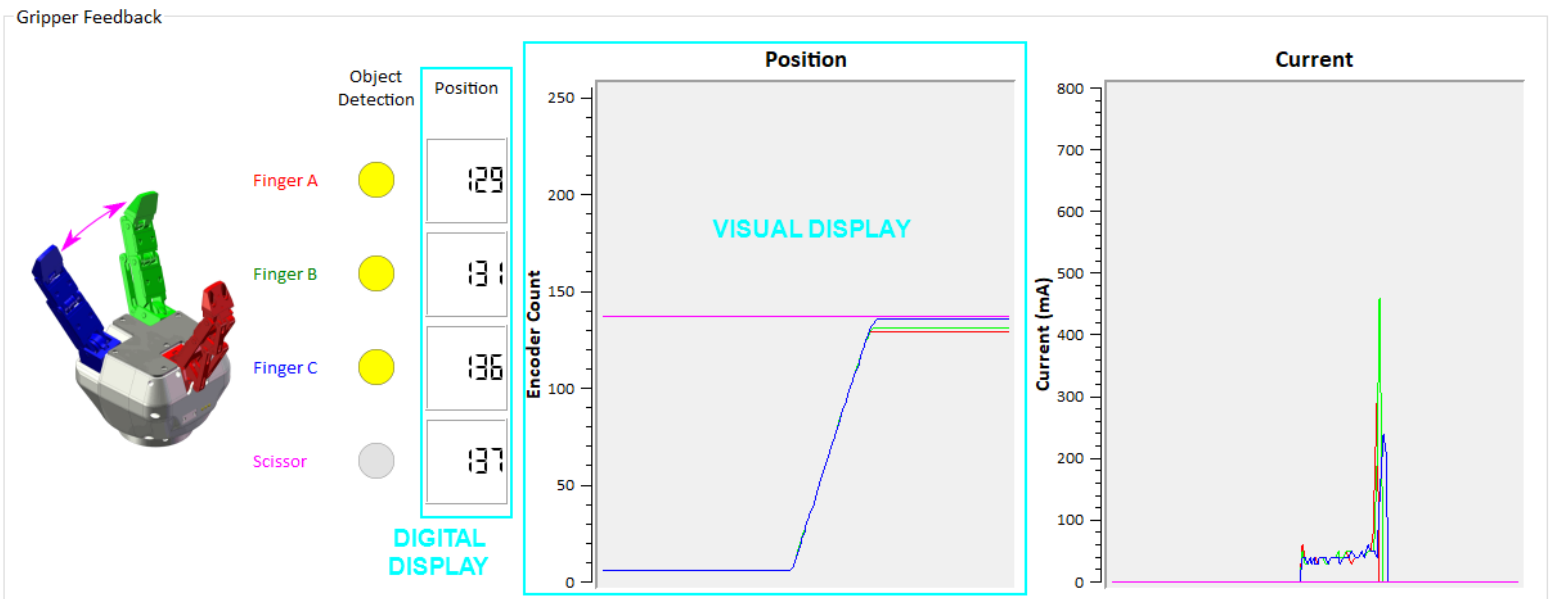


Figure 5.1.5.2 : Digital and visual displays of the finger positions and electrical current usage.

5.1.6 Advanced Control Tab

The Advanced Control tab allows additional Gripper Options (Figure 5.1.6.1). When first selected the Advanced Control tab works exactly like the Simple Control described in section 5.1.3. However, the Gripper Options section differs from Simple Control :

- Glove Mode (product in development, do not click if you are not using the Robotiq Glove).
- Individual Control of fingers A, B and C.
- Individual Control of Scissor motion.

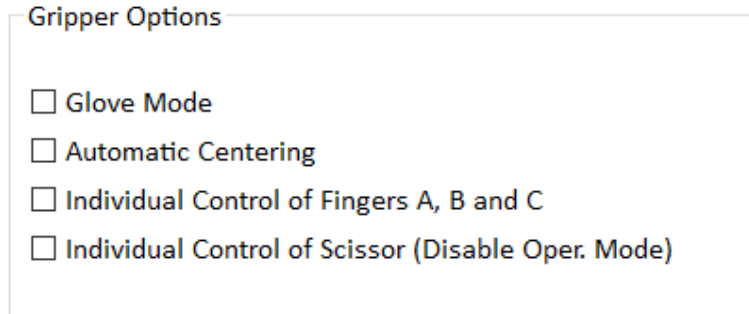


Figure 5.1.6.1 : Options available in Advanced Control mode.

The **Individual Control of Fingers** will allow you to control Force, Speed and Position Request of each finger individually. Figure 5.1.6.2 shows each finger control panel. Please refer to section 5.1.4 for more information about the Control Parameters.

Simple Control
Advanced Control
Modbus TCP
Device Information

Initialization and Gripper Fault Status

Activate Go to req. pos. Auto-release

Operation Mode

Basic
 Pinch
 Wide
 Scissor

Gripper Options

Glove Mode
 Automatic Centering
 Individual Control of Fingers A, B and C
 Individual Control of Scissor (Disable Oper. Mode)

Gripper Feedback

Detection	Position
Finger A	0
Finger B	0
Finger C	0
Scissor	137

Pos/Speed/Force (Finger A)

FINGER A CONTROL

Finger A Pos. Req. /255

Finger A Speed /255

Finger A Force /255

Finger B

FINGER B CONTROL

Finger B Pos. Req. /255

Finger B Speed /255

Finger B Force /255

Finger C

FINGER C CONTROL

Finger C Pos. Req. /255

Finger C Speed /255

Finger C Force /255

Scissor

Scissor Pos. Req. /255

Scissor Speed /255

Scissor Force /255

Position

Current

Connected to COM4.
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Figure 5.1.6.2 : Individual Control of Fingers on the 3-Finger Adaptive Robot Gripper User Interface.

The **Individual Control of Scissor** mode will allow the control of the Scissor axis in the same way as the fingers, following the Control Parameters described in section 5.1.4. Note that this control overrides the Operation Mode selection. The Operation Mode group box becomes disabled when the Individual Control of Scissor option is selected to reflect this behavior, as shown in figure 5.1.6.3.

Simple Control
Advanced Control
Modbus TCP
Device Information

Initialization and Gripper Fault Status

Activate Go to req. pos. Auto-release

Operation Mode

Basic Pinch Wide Scissor

Gripper Options

Glove Mode

Automatic Centering

Individual Control of Fingers A, B and C

Individual Control of Scissor (Disable Oper. Mode)

Gripper Feedback

	Detection	Position
Finger A	<input type="checkbox"/>	07
Finger B	<input type="checkbox"/>	07
Finger C	<input type="checkbox"/>	07
Scissor	<input type="checkbox"/>	13

Pos/Speed/Force (Finger A)

Finger A Pos. Req. /255

Finger A Speed /255

Finger A Force /255

Finger B

Finger B Pos. Req. /255

Finger B Speed /255

Finger B Force /255

Finger C

Finger C Pos. Req. /255

Finger C Speed /255

Finger C Force /255

SCISSOR CONTROL

Scissor Pos. Req. /255

Scissor Speed /255

Scissor Force /255

Position

Current

Connected to COM4.
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Figure 5.1.6.3 : Individual Control of Scissor on the 3-Finger Adaptive Robot Gripper User Interface.

Individual Control of Finger and Individual Control of Scissor can both be activated at the same time, all individual control sections will become activated, Operation Mode will be disabled.

5.2 Control of the Adaptive Gripper Series

This section guides you through the control of the Adaptive Robot Gripper via the Simple Control tab.

Once you are connected to your Gripper, the first tab becomes activated (see Figure 5.2.1).

Your Gripper model will be displayed in the Model Display box with related image and Current graphic.

Info

Selecting a different Gripper model will not change the control settings, but it will adjust the current scale on the Current graph.

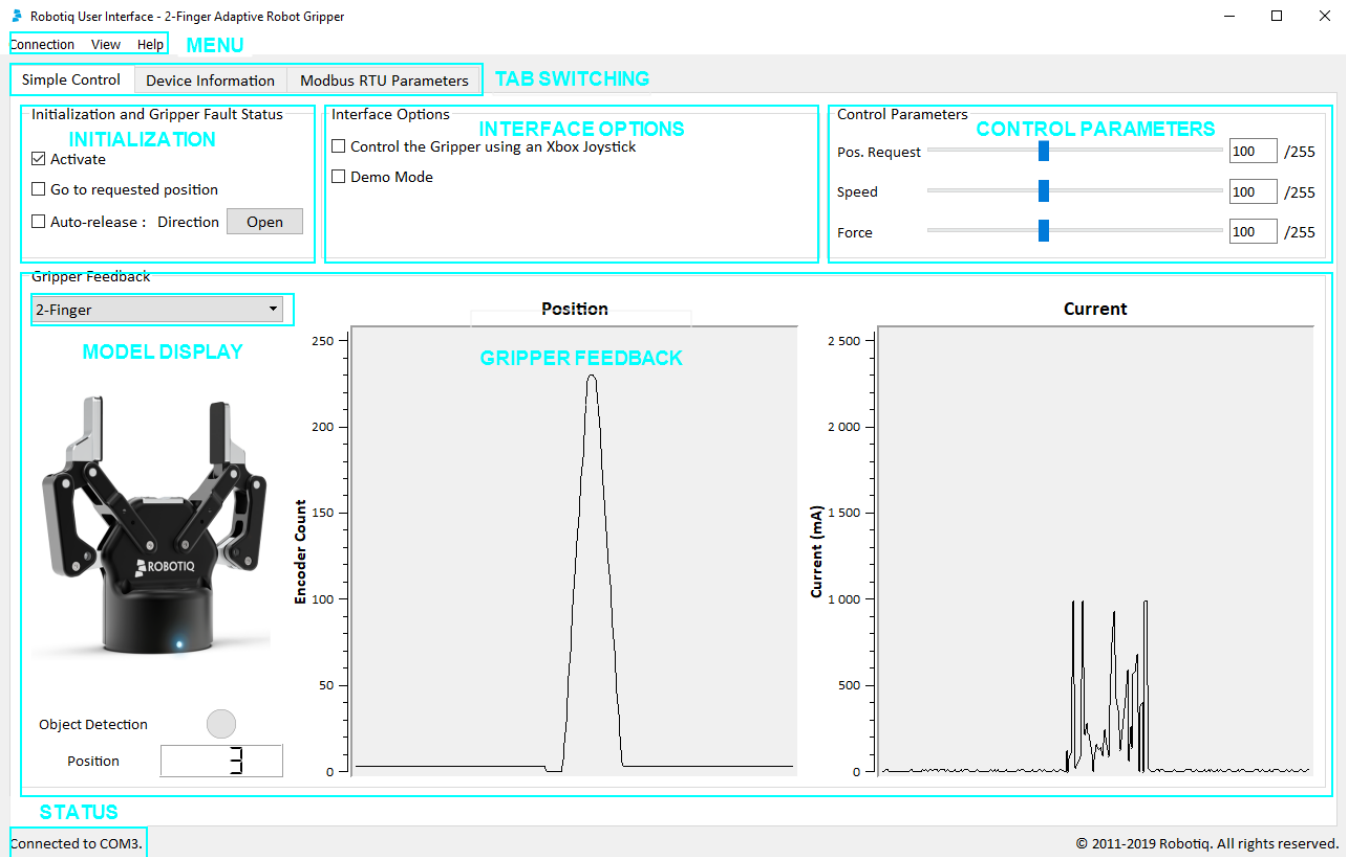


Figure 5.2.1 : The Simple Control tab for the Robotiq User Interface for 2-FingerGripper and Hand-E Gripper.

The first tab is the **Simple Control** tab, it can be split into the following:

- Initialization and Gripper Fault Status
- Interface Options
- Control Parameters
- Gripper Feedback
- Menus: Connection, View and Help

5.2.1 Initialization & Gripper Status

Activate

Once on the Simple Control tab page, the Adaptive Gripper needs to be activated before being used. Simply click the "Activate" button in the Initialization and Gripper Fault Status section. The Gripper will start its initialization procedure and once completed the Gripper status text box located under the "Activate" button will display "No Fault".

Warning

Do not interfere with the Gripper during the initialization process.

After the initialization process is completed the Gripper is ready to be used.

Info

The Activate button must stay checked while using the Gripper.

Go to requested position

Commands the Gripper to go to the selected "Position Request" as designated by the slider in the Control Parameters section.

Auto-release

Commands Gripper to slowly open or close depending on the direction selection, overriding all previous commands. After Auto-release is completed the Gripper must be reactivated, the "Activate" button must be unchecked and rechecked.

Caution

Auto-release is only meant for emergency procedures, use the "Go to requested position" command for normal use.

5.2.2 Interface Options

"Interface Options" allows you to choose between two options:

- **Xbox Joystick control** allows control of the Gripper using a remote Xbox controller (see Figure 5.2.2.1 for a summary of the available controls).
- **Demo Mode** commands the Gripper to constantly open and close the Gripper at different speeds.

To disable any of the options simply uncheck the corresponding box.

You can view the Joystick Controls from the **View** menu by clicking **Xbox Controls**

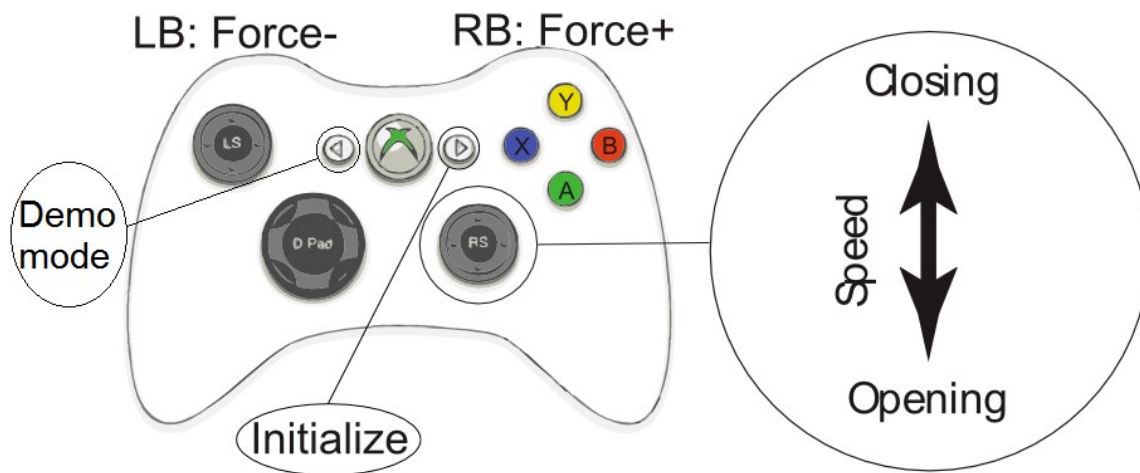


Figure 5.2.2.1 : Xbox Controls for the Adaptive Robot Gripper series.

5.2.3 Control Parameters

The "Control Parameters" section of the User Interface can customize all the parameters for the Gripper (see Figure 5.2.3.1):

- **Pos. Request** slider sets the reach position of the Gripper when the "Go to requested position" button of the Initialization and Gripper Fault Status sections are filled with a numeric value. The value can be set anywhere between 0 (fully open) and 255 (fully close).

Hint

You can set the desired position with the slider or numeric values.

- **Force** slider will control the gripping force limit of the Gripper. The value can be set anywhere between 0 and 255 with 255 being the maximum strength.
- **Speed** slider will control the closing or opening speed of the Gripper. The value can be set anywhere between 0 and 255 with 255 being the maximum speed.

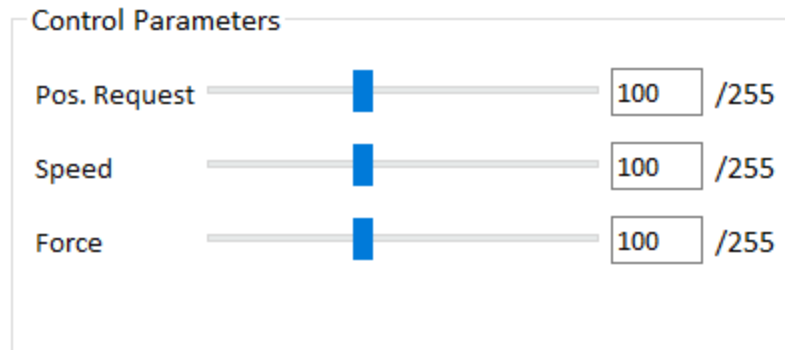


Figure 5.2.3.1 : Changing the Control Parameters of the Gripper

5.2.4 Gripper Feedback

The "Gripper Feedback" section provides you with information concerning the current status of the Gripper.

- **Object Detection:** If the Gripper detects contact with an object when closing, the "Object Detection" display turns yellow (Figure 5.2.4.1).

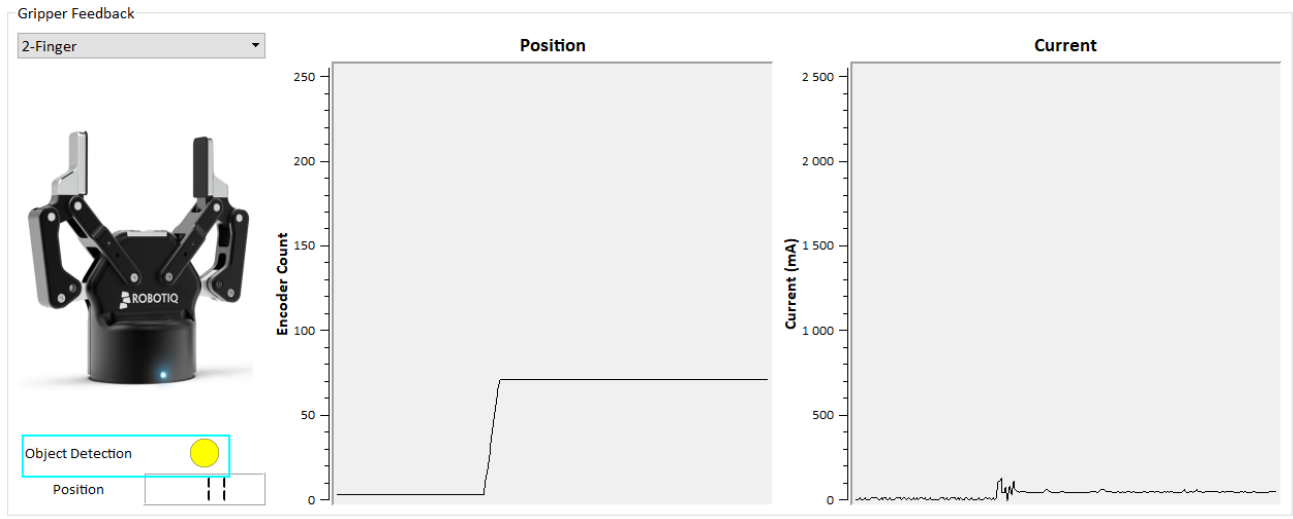


Figure 5.2.4.1 : Positive object detection is registered when the object detection dot turns yellow.

- **Position** (numeric): The digital display of "Position" shows the position of the fingers as designated on a scale of 0 to 255 (see Figure 5.2.4.2 and your Gripper Instruction Manual for details).
- **Position** (graphic): The visual display of "Position" shows the real-time position of the fingers graphically (Figure 5.2.4.2).
- **Current** (graphic): The "Current" graph shows the amount of current going through the motor (See Figure 5.2.4.2).

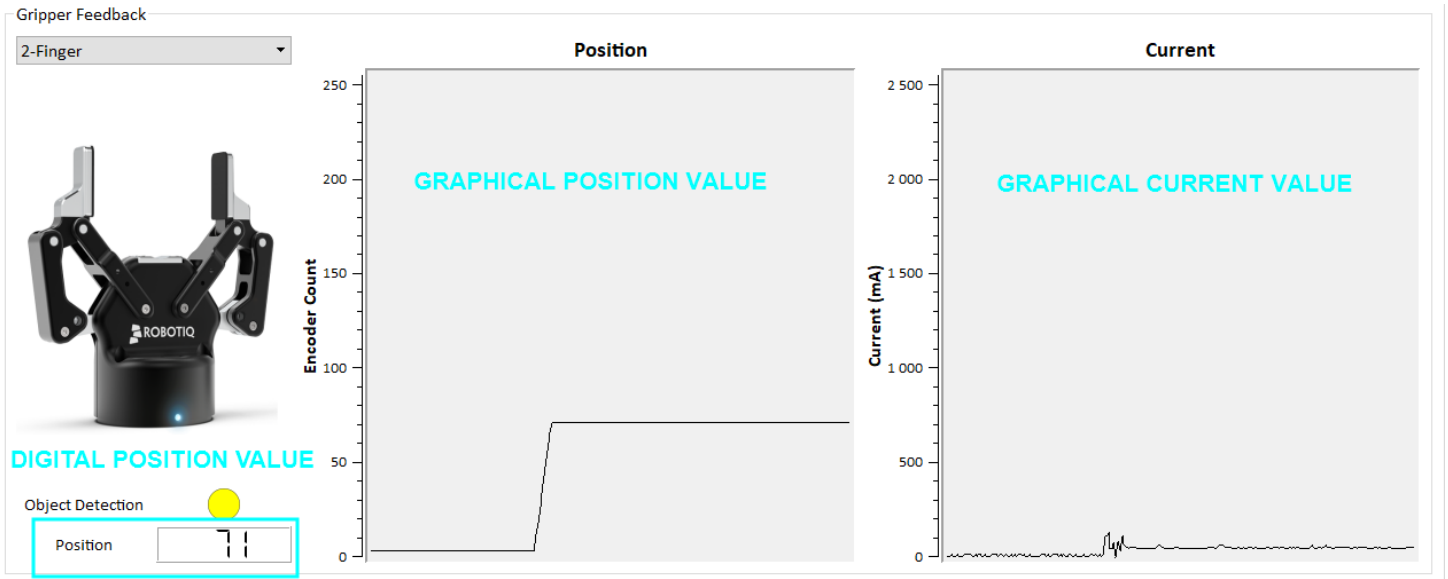


Figure 5.2.4.2 : Digital and visual displays of the fingers' position and electrical current usage.

5.3 Control of the Vacuum Gripper Series

This section guides you through the control of the Vacuum Gripper via the Simple Control tab.

Once you are connected to your Gripper, the first tab becomes activated (see Figure 5.3.1).

Your Gripper model will be displayed in the Model Display box with related image and Vacuum graphic.



Figure 5.3.1 : The Simple Control tab for the Robotiq User Interface for AirPick Gripper and EPick Gripper.

The first tab is the **Simple Control** tab, it can be split into the following:

- Initialization and Gripper Fault Status
- Vacuum Mode
- Advanced Mode Controls
- Vacuum Feedback
- Menus: Connection, View and Help

5.3.1 Initialization & Gripper Status

Activate

Once on the Simple Control tab page, the Vacuum Gripper needs to be activated before being used. Simply click the "Activate" button in the Initialization and Gripper Fault Status section. The Gripper will start its initialization procedure and once completed the Gripper status text box located under the "Activate" button will display "No Fault".

Warning

Do not interfere with the Gripper during the initialization process.

After the initialization process is completed the Gripper is ready to be used.

Info

The Activate button must stay checked while using the Gripper.

Go to requested

Commands the Gripper to go to the selected vacuum as designated by the standard value or by the slider in the Advanced Mode Controls section.

Auto-release

Commands Gripper to slowly release, overriding all previous commands. After Auto-release is completed the Gripper must be reactivated, the "Activate" button must be unchecked and rechecked.

Caution

Auto-release is only meant for emergency procedures, use the "Go to requested" command for normal use.

5.3.2 Advanced Mode Controls

The "Advanced Mode Controls" section of the User Interface can customize all the parameters for the Gripper (see Figure 5.3.2.1):

- **Vacuum Level Max** : when this value is reached, the vacuum gripper stops the suction. Once the vacuum level reaches the minimum value, the suction will start again.

Hint

You can set the desired vacuum level with the slider or numeric values.

- **Vacuum Level Min**: the vacuum gripper will start the suction once the vacuum level reaches this value, which is the one considered by the program to detect the object or not.
- **Grip Timeout** is the Period after which a gripper error is generated. A 0 means that there is no timeout.

Warning

The Release feature (as shown in the following screenshot) has been included in the user interface, but has yet to be supported by the RUI. This should be addressed in future releases.

Advanced Mode Controls

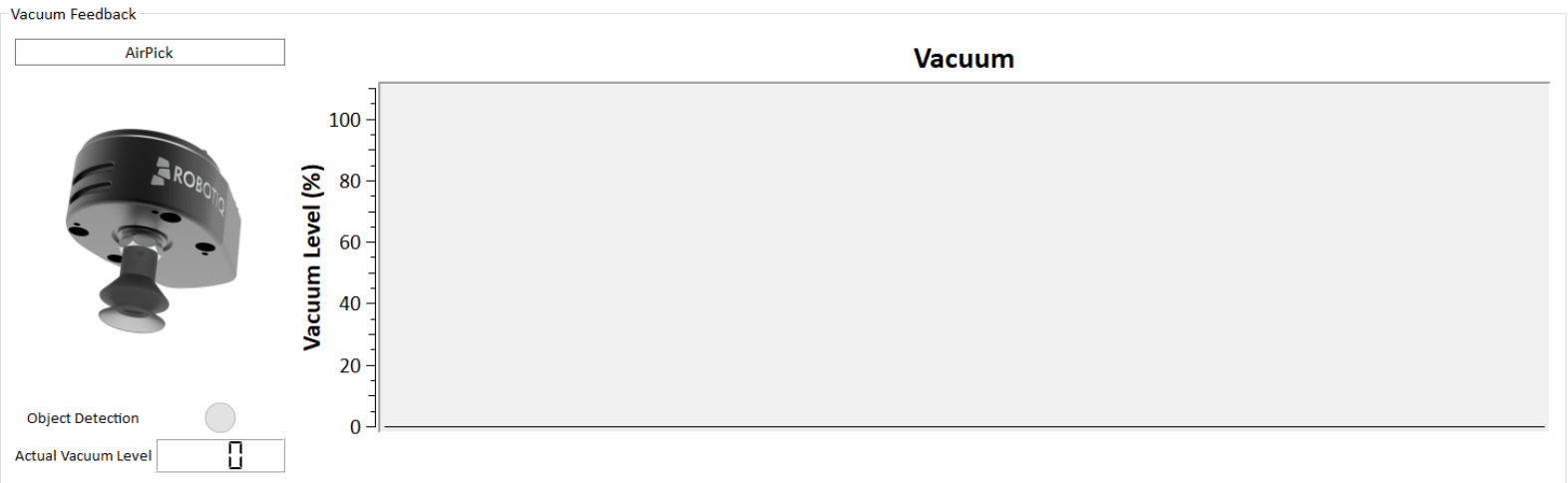
<p>Grip</p> <p>Vacuum Level Max (%) <input type="range" value="50"/> 50 /100</p> <p>Vacuum Level Min (%) <input type="range" value="10"/> 10 /100</p> <p>Grip Timeout <input type="text" value="1,0"/> second(s)</p>	<p>Release</p> <p>Pressure (KPa) <input type="range" value="100"/> 100 /255</p> <p>Release Time <input type="text" value="1,0"/> second(s)</p>
---	---

Figure 5.3.2.1 : Changing the Control Parameters of the Gripper

5.3.3 Gripper Feedback

The "Gripper Feedback" section provides you with information concerning the current status of the Gripper.

- **Object Detection:** If the Gripper detects an object, the "Object Detection" display turns yellow (Figure 5.3.3.1).
- **Actual Vacuum Level (numeric):** The digital display of "Vacuum" shows the level of vacuum as designated on a scale of 0 to 255 (see Figure 5.3.3.1 and your Gripper Instruction Manual for details).
- **Vacuum (graphic):** The visual display of "Vacuum" shows the real-time level of vacuum graphically (Figure 5.3.3.1).



No Fault

Figure 5.3.3.1 : Digital and visual displays of the vacuum.

5.4 Control and set up of the I/O Coupling

This section guides you through the control and the set u of the I/O Coupling via the **Presets Configuration** Tab.

5.4.1 Vacuum Grippers

Figure 5.4.1.1 shows the first tab activated when the Coupling is connected.

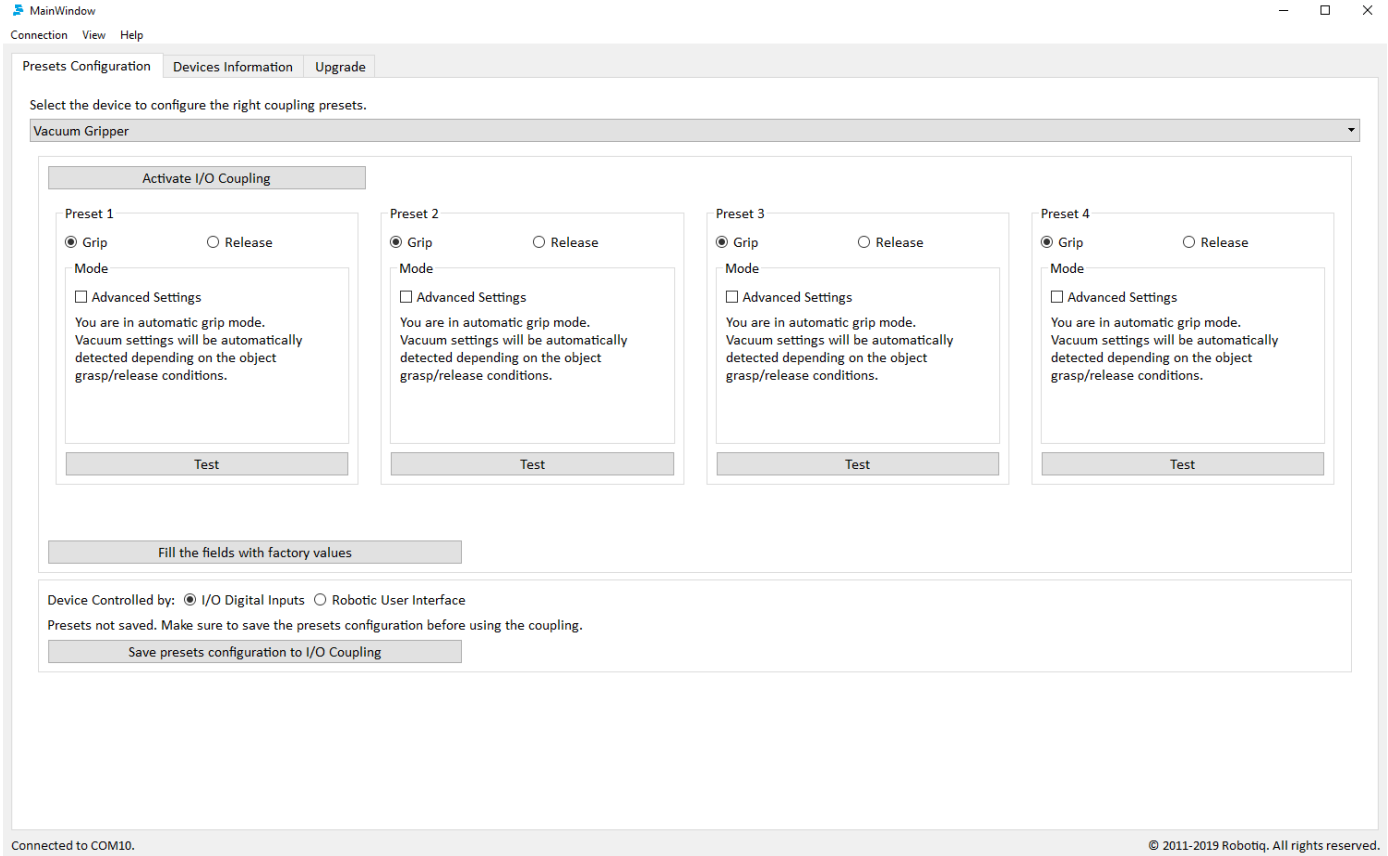


Figure 5.4.1.1 : Presets Configuration of Vacuum Gripper with the I/O Coupling.

For each preset configuration, it is possible to choose to grip or to release.

Grip

In the grip option, four advanced settings are accessible:

- **Maximum Vacuum Level [20 to 100%]** : When this value is reached, the vacuum gripper stops the suction. Once the vacuum level reaches the minimum value, the suction will start again.
- **Minimum Vacuum Level [10 to 100%]** : The vacuum gripper will start the suction once the vacuum level reaches this value, which is the one considered by the program to detect the object or not.
- **Timeout [0 to 25500]** : Period after which a gripper error is generated. A 0 means that there is no timeout.
- **Continuous Grip** : Allows the vacuum gripper to perform suction while it moves an object from one place to an other.

Release

In the release option, the only advanced option is the **Timeout [100 to 25500 ms]** : Period after which a gripper error is generated.

Activate IO Coupling

The Activate button enable the corresponding Gripper.

Test

Each Preset can be tested with the Test button if the coupling is connected to a robot.

Save presets configuration to I/O Coupling

Save the presets configuration into the coupling. A message is displayed above the saving button.

Device Controlled by

When the Coupling is connected to the robot, it is possible to test the presets by using the Robotiq User Interface or the teach pendant of the robot.

Fill the fields with factory values

Reset all the presets to the default values, as displayed on the Figure 5.4.1.1.

The factory Presets are:

1. Smart Grip
2. Continuous Grip
3. Minimum Grip
4. Release

5.4.2 Adaptative Grippers

Figure 5.4.2.1 shows the first tab activated when the Coupling is connected.

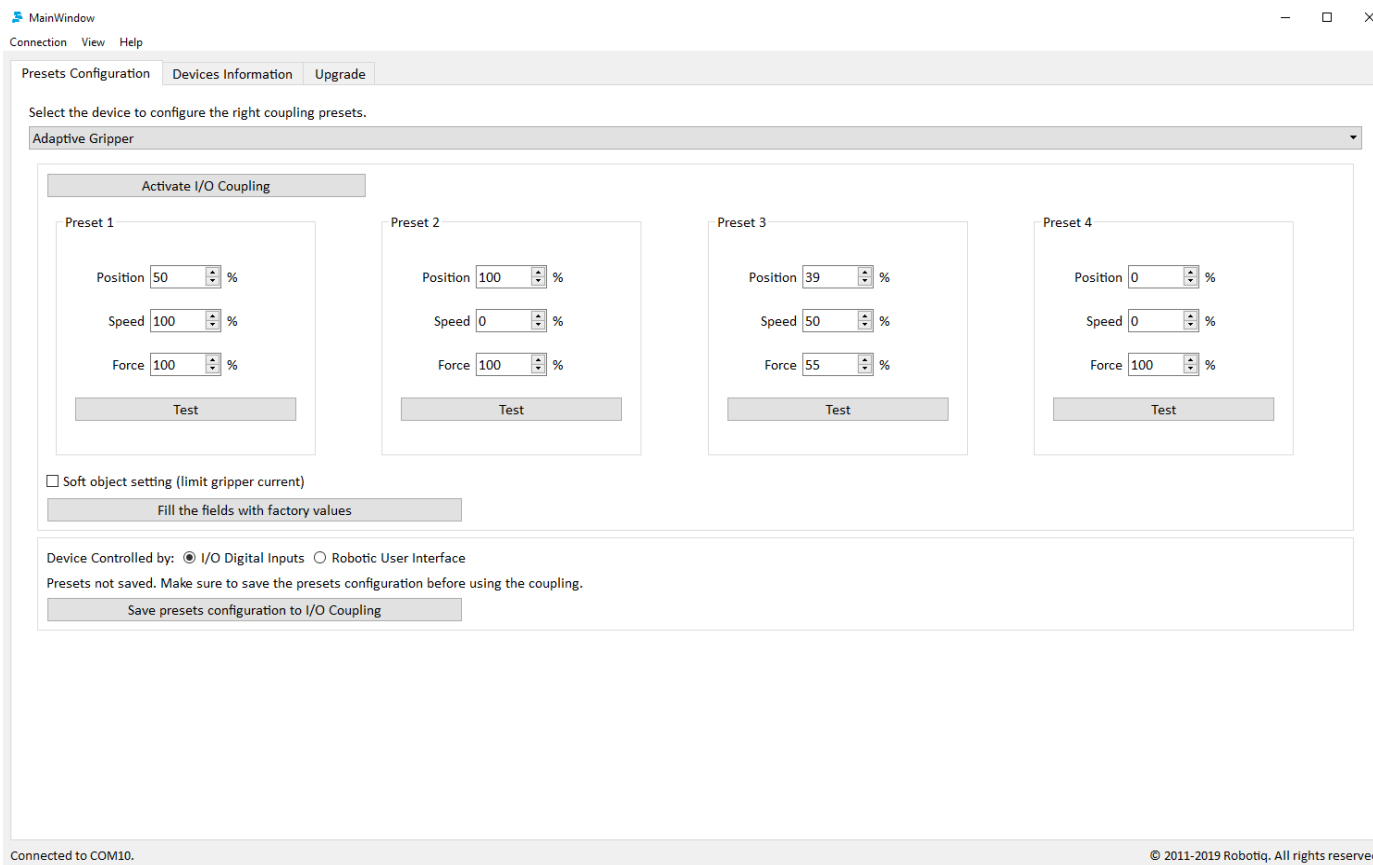


Figure 5.4.2.1 : Presets Configuration for Adaptative Gripper with the I/O Coupling.

Position [0 to 100%]

Move the fingers of the gripper, where 100% is fully close and 0% is fully open

Speed [0 to 100%]

Move the fingers at a specific speed, where 0% is the slowest and 100% is the fastest.

Force [0 to 100%]

Specify the force apply during the motion. 0% is the minimum and 100% is the maximum.

In order to use the regrasp feature, a minimum force of 1% is required.

Activate IO Coupling

The Activate button enable the corresponding Gripper.

Test

Each Preset can be tested with the Test button if the coupling is connected to a robot.

Soft object setting (limit gripper current)

For softer objects, this option limited the current in the gripper, resulting in a lower force.

Save presets configuration to I/O Coupling

Save the presets configuration into the coupling. A message is displayed above the saving button.

Device Controlled by

When the Coupling is connected to the robot, it is possible to test the presets by using the Robotiq User Interface or the teach pendant of the robot.

Fill the fields with factory values

Reset all the presets to the default values, as displayed on the Figure 5.4.2.1.

The factory Presets are:

1. Close with high speed and high force
2. Open with high speed and high force
3. Close with low speed and low force
4. Open with low speed and low force

5.4.3 Update firmware with the Robotiq User Interface

It is possible to update the firmware for the IO Coupling or the Robotiq Grippers directly from the RUI using the IO Coupling. The **Update** Tab shows if a device need to be updated, as indicated with the red square over the IO Coupling in Figure 5.4.3.1.

To update the IO Coupling, select the device and click update. Follow the instructions on the screen to update the device.

To update Robotiq Grippers, connect them to the IO Coupling and to the robot wrist. Select the device and click update. Follow the instructions on the screen to update the device.

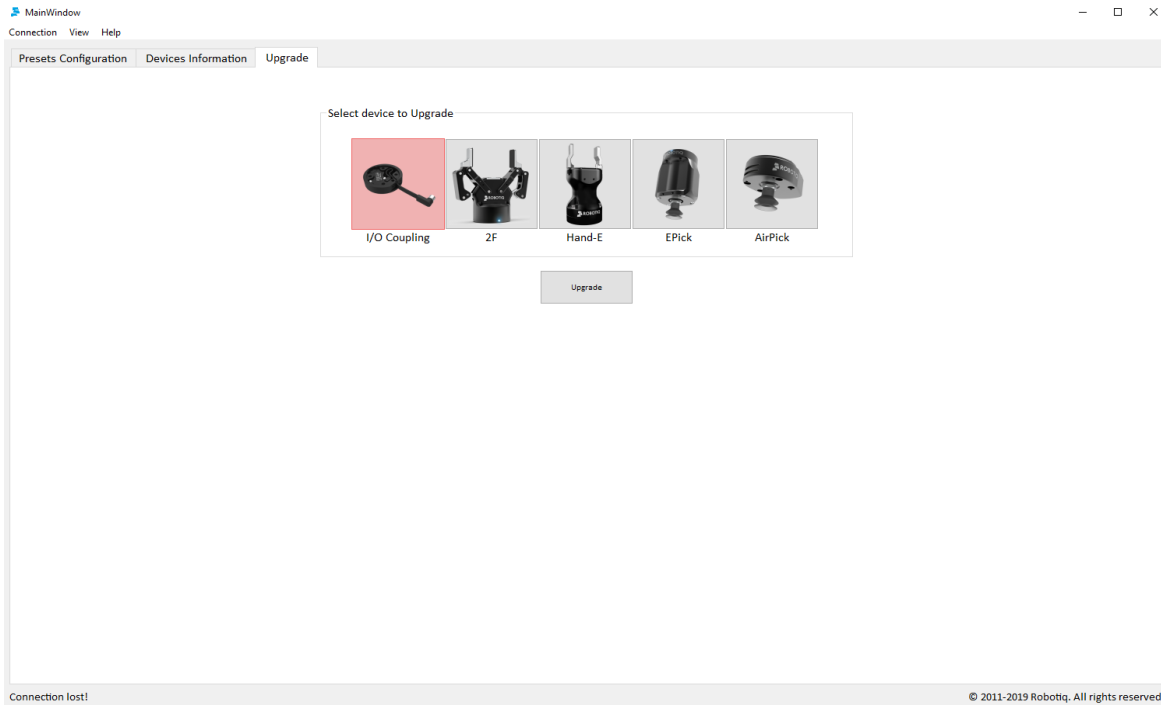


Figure 5.4.3.1 : Update devices with the RUI

6. Communication Protocol Configuration

The **Protocol Configuration Tab** allows access to the configuration information of the Gripper, it can only be accessed via Modbus RTU. To access the **Protocol Configuration Tab** click this tab in the main Robotiq User Interface screen as shown in figure 6.1. The tab will be named according to your communication protocol option.

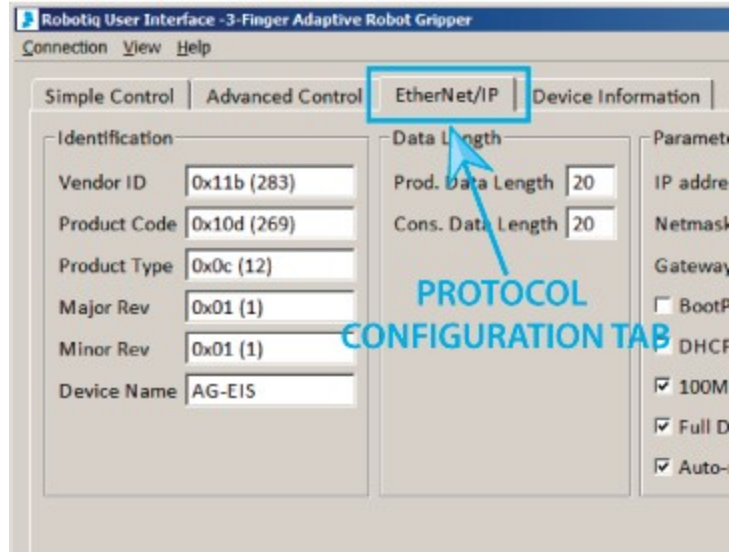


Figure 6.1 : The configuration tab of the Robotiq User Interface.

The configuration tab display depends on the communication protocol option of your Gripper, each communication protocol will be displayed in one of the following sections:

- Ethernet/IP section
- Modbus TCP section
- EtherCAT section
- DeviceNet section
- CANopen section
- ProfiBUS DP section
- ProfiNET section

Whatever the communication protocol you are using, to apply changes made to the editable section of the communication protocol, follow the procedure described in figure 6.2.

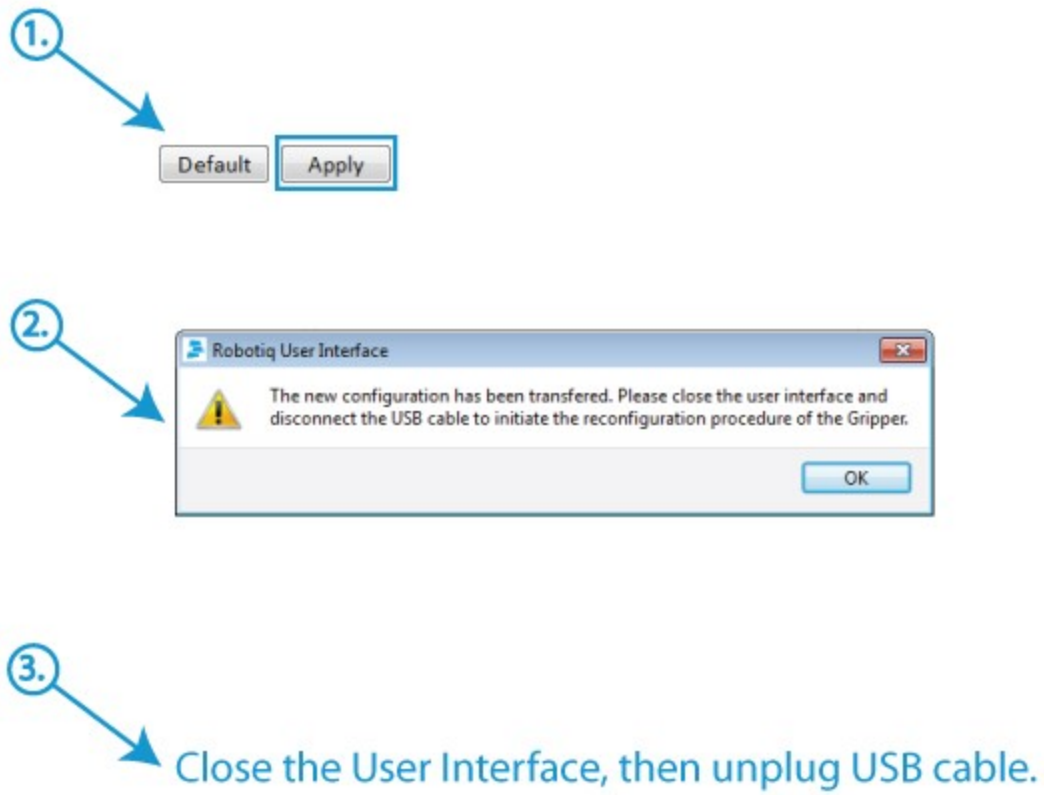


Figure 6.2 : Applying changes to the communication protocol settings.

6.1 EtherNet IP

If your Gripper has the **Ethernet/IP** communication protocol option, you should see the screen shown in figure 6.1.1, when a connection is established with the Gripper.

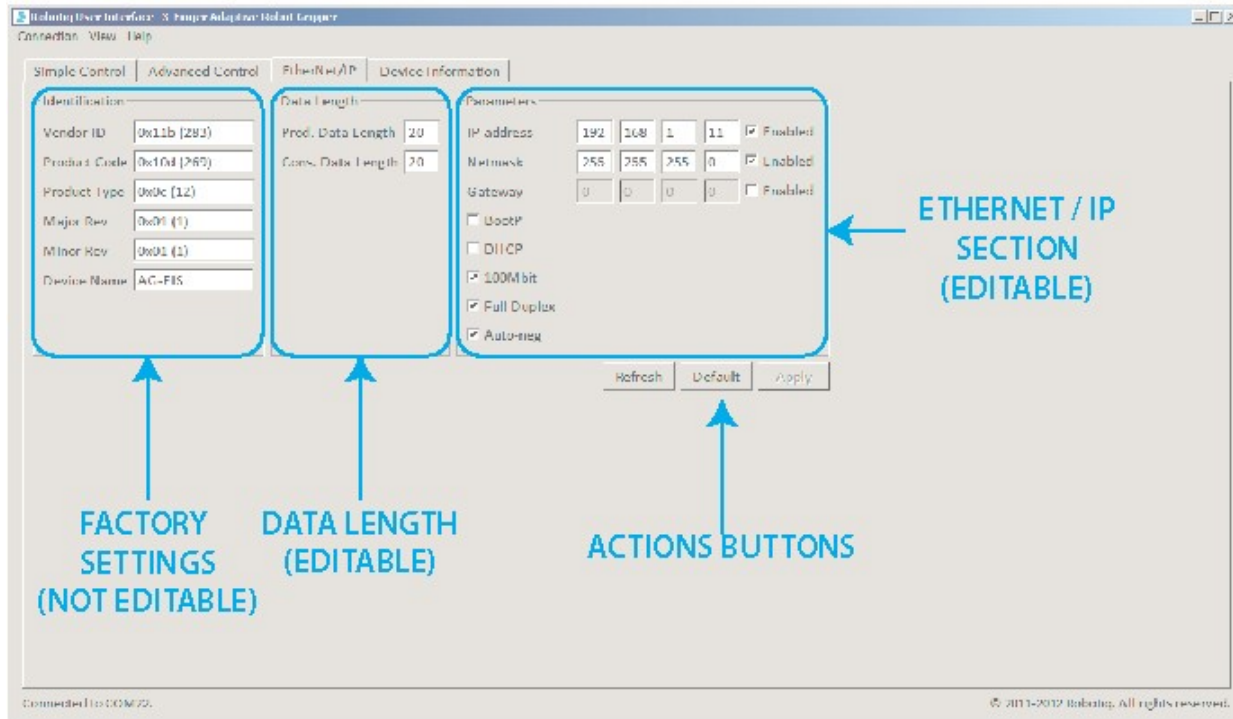


Figure 6.1.1 : Default screen of the Configuration Tool with Ethernet/IP

The Configuration Tool with Ethernet/IP screen is described below:

- **Identification** section shows the factory settings for your Gripper, these settings are fixed.
- **Data Length** section shows the current data length used for input and output during communication.
 - **Input Data Length** sets the number of bytes allocated to input data communication.
 - **Output Data Length** sets the number of bytes allocated to output data communication.

Hint

You should match the Input and Output data length to the robot I/O on which the Gripper is mounted.

- **Parameters** section shows the current address and options for your Gripper. You can change any option by enabling or disabling it and changing the values indicated in the fields.
 - **IP address** is the networking address used for communication with your Gripper. (IPv4 protocol)
 - **Netmask** is the networking subnet address used for communication with your Gripper.
 - **Gateway** is the gateway address used within your network. By default this option is disabled.
 - **Extras:**
 - **BootP** option for Bootstrap Protocol, a network protocol used to obtain an IP address from a configuration server. By default BootP is disabled.
 - **DHCP** option for Dynamic Host Configuration Protocol is an automatic configuration protocol used on IP networks. By default DHCP is disabled.
 - **100Mbits** option for the standard speed of Fast Ethernet (100 Mbit/s). By default it is enabled. If disabled the standard speed goes to 10 Mbit/s.
 - **Full Duplex** option allows full duplex communication (simultaneous two way communication); by default the Full Duplex is enabled. If disabled it goes to half duplex (not simultaneous two way communication).
 - **Auto-Neg** option allows the two connected devices to choose common transmission parameters such as: speed, duplex mode, and flow control. The highest performance parameters will be chosen. By default the Auto-Neg is enabled.

The action buttons function in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

6.2 Modbus TCP

If your Gripper has the **Modbus TCP** communication protocol option, you should see the screen shown in figure 6.2.1, when the connection is established with the Gripper.

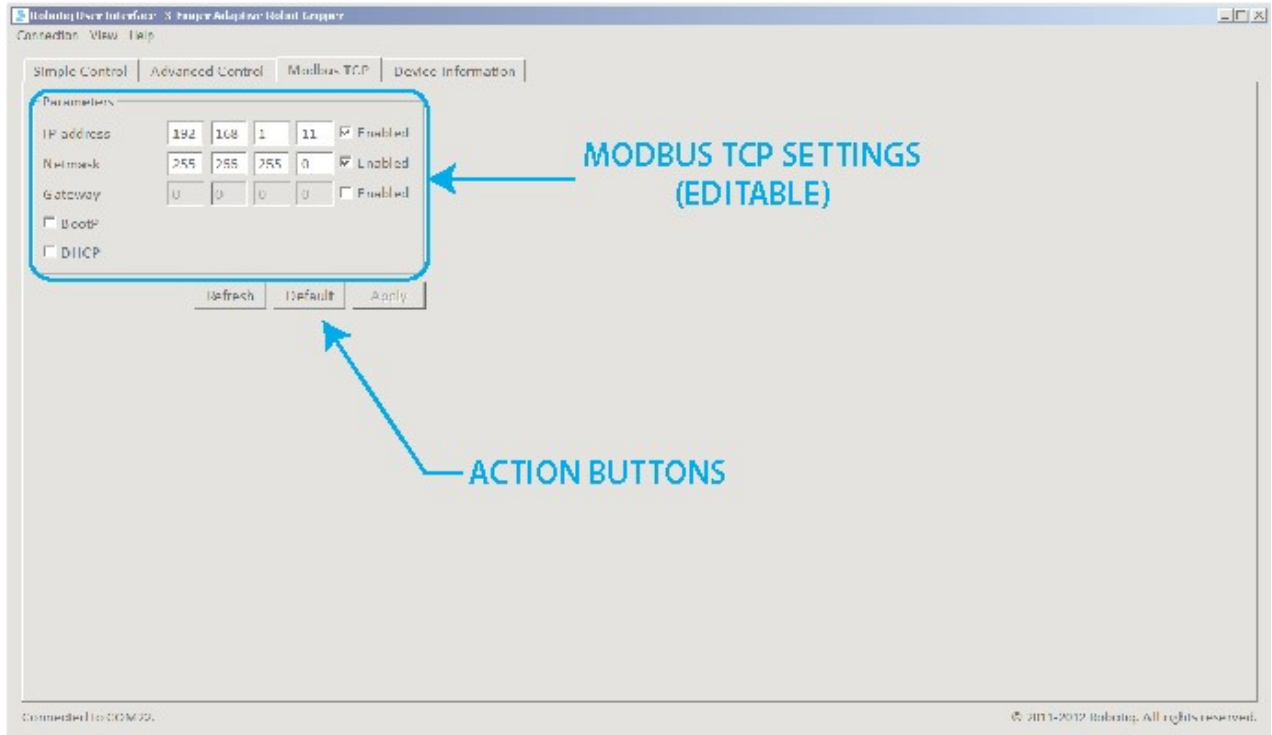


Figure 6.2.1 : Default screen for the Configuration Tool with Modbus TCP

The Configuration Tool with Modbus TCP screen is described below:

- **Parameters** section shows the current address and options for your Gripper. You can change any option by enabling or disabling it or changing the values indicated in the fields.
 - **IP address** is the networking address used for communication with your Gripper. (IPv4 protocol)
 - **Netmask** is the networking subnet address used for communication with your Gripper.
 - **Gateway** is the gateway address used within your network. By default this option is disabled.
 - **Extras:**
 - **BootP** option for Bootstrap Protocol, a network protocol used to obtain an IP address from a configuration server. By default BootP is disabled.
 - **DHCP** option for Dynamic Host Configuration Protocol is an automatic configuration protocol used on IP networks. By default DHCP is disabled.

The action buttons are used in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

6.3 EtherCAT

If your Gripper has the **EtherCAT** communication protocol option, you should see the screen shown in figure 6.3.1, when a connection is established with the Gripper.

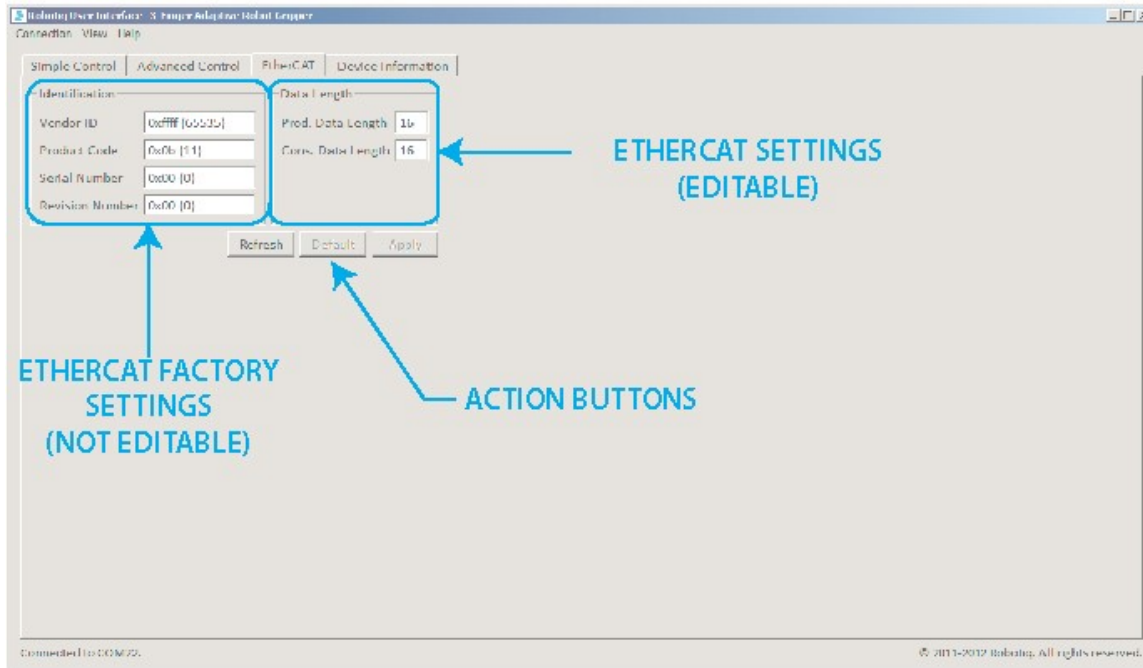


Figure 6.3.1 : Default screen of the Configuration Tool with EtherCAT

The Configuration Tool with EtherCAT screen is described below:

- **Identification** section shows the factory settings for your Gripper, these settings are fixed.
- **Data Length** section shows the current data length used for input and output during communication.
 - **Input Data Length** sets the number of bytes allocated to input data communication.
 - **Output Data Length** sets the number of bytes allocated to output data communication.

Hint

You should match the Input and Output data length to the robot I/O on which the Gripper is mounted.

The action buttons function in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

6.4 DeviceNet

If your Gripper has the **DeviceNet** communication protocol option, you should see the screen shown in figure 6.4.1, when a connection is established with the Gripper.

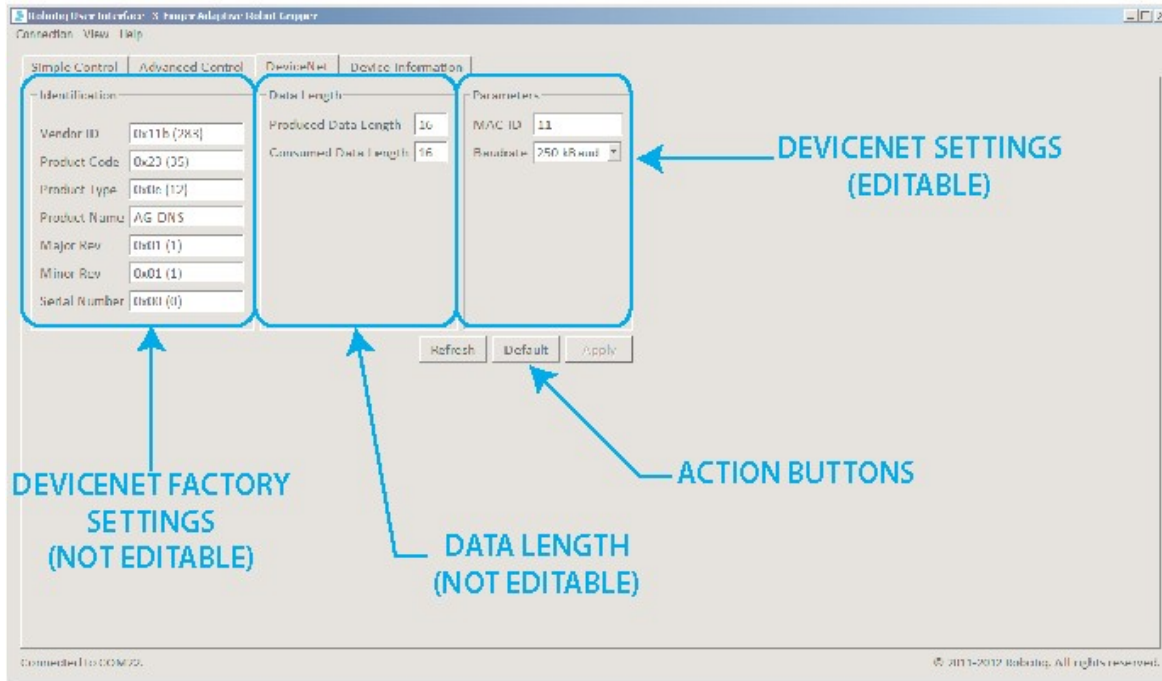


Figure 6.4.1 : Default screen of the Configuration Tool with DeviceNet

The Configuration Tool with the DeviceNet screen is described below:

- **Identification** section shows the factory settings for your Gripper, these settings are fixed.
- **Data Length** section shows the current data length used for input and output during communication.
 - **Input Data Length** sets the number of bytes allocated to input data communication.
 - **Output Data Length** sets the number of bytes allocated to output data communication.
- Parameters section shows the current address and options for your Gripper. You can change any option by enabling or disabling it and by changing the values indicated in the fields.
 - **MAC ID** is the physical address used for communication with the Gripper. Default is set to 11.
 - **Baudrate** is the number of pulse/seconds for communications. The default is set to 250 Kbaud, you can adjust this to 125 Kbaud or 500 Kbaud.

The action buttons are used in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

6.5 CANopen

If your Gripper has the **CANopen** communication protocol option, you should see the screen shown in figure 6.5.1, when a connection is established with the Controller.

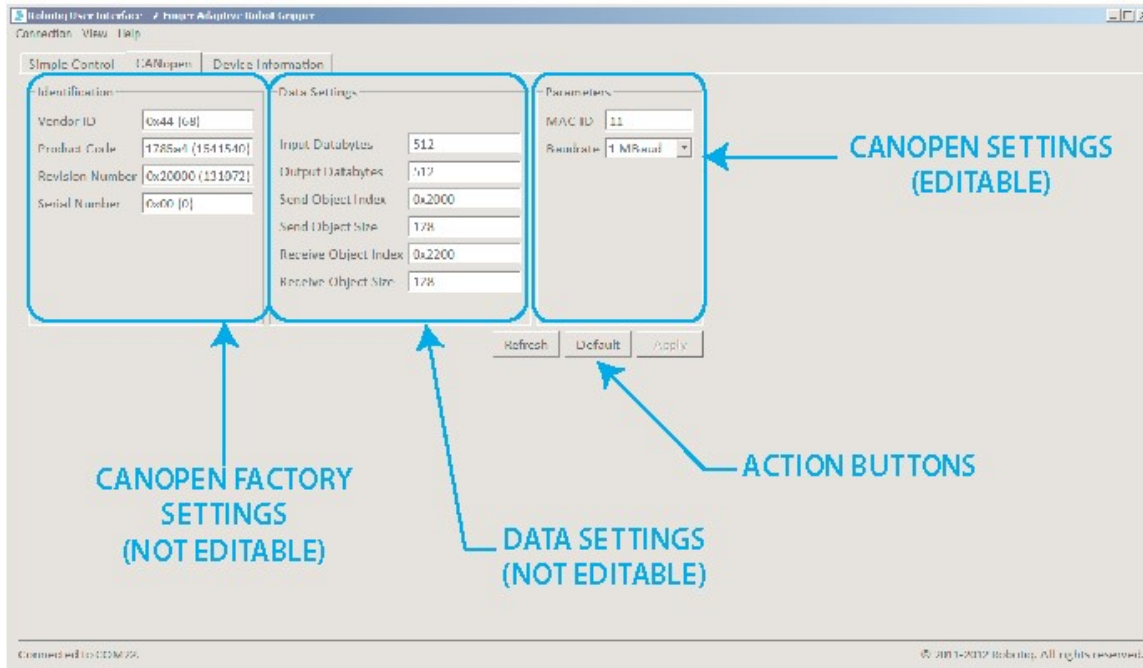


Figure 6.5.1 : Default screen of the Configuration Tool with CANopen

The Configuration Tool with the CANopen screen is described below:

- **Identification** section shows the factory settings for your Gripper, these settings are fixed.
- **Data Length** section shows the current data length used for input and output during communication.
 - **Input Data Length** sets the number of bytes allocated to input data communication.
 - **Output Data Length** sets the number of bytes allocated to output data communication.
- **Parameters** section shows the current address and options for your Gripper. You can change any option by enabling or disabling it or by changing the values indicated in the fields.
 - **MAC ID** is the physical address used for communication with the Gripper. Default is set to 11.
 - **Baudrate** is the number of pulse/seconds for communications. The default is set to 250 Kbaud, you can adjust this to 125 Kbaud or 500 Kbaud.

The action buttons are used in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

6.6 PROFIBUS DP

If your Gripper has the **PROFIBUS DP** communication protocol option, you should see the screen shown in figure 6.6.1, when a connection is established with the Controller.

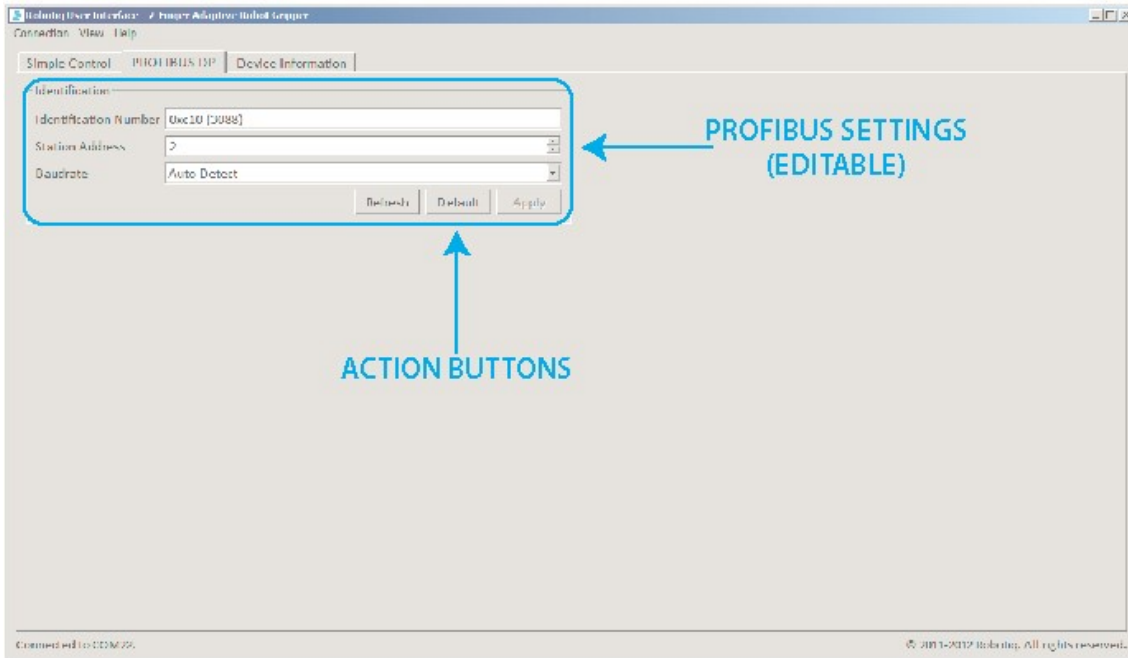


Figure 6.6.1 : Default screen of the Configuration Tool with PROFIBUS DP.

The Configuration Tool with the PROFIBUS DP screen is described below:

- **Identification** section shows the factory settings for your Gripper, these settings are fixed.
 - **Identification Number**, PROFIBUS DP has a specific factory setting, which is not editable.
 - **Station Address** for PROFIBUS DP, the address of the device can be set anywhere between 0 and 126.
 - **Baudrate** for the PROFIBUS DP connection, auto-detect is recommended.

The action buttons are used in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

6.7 PROFINET

If your Gripper has the **PROFINET** communication protocol option, you should see the screen shown in figure 6.7.1, when a connection is established with the Controller.

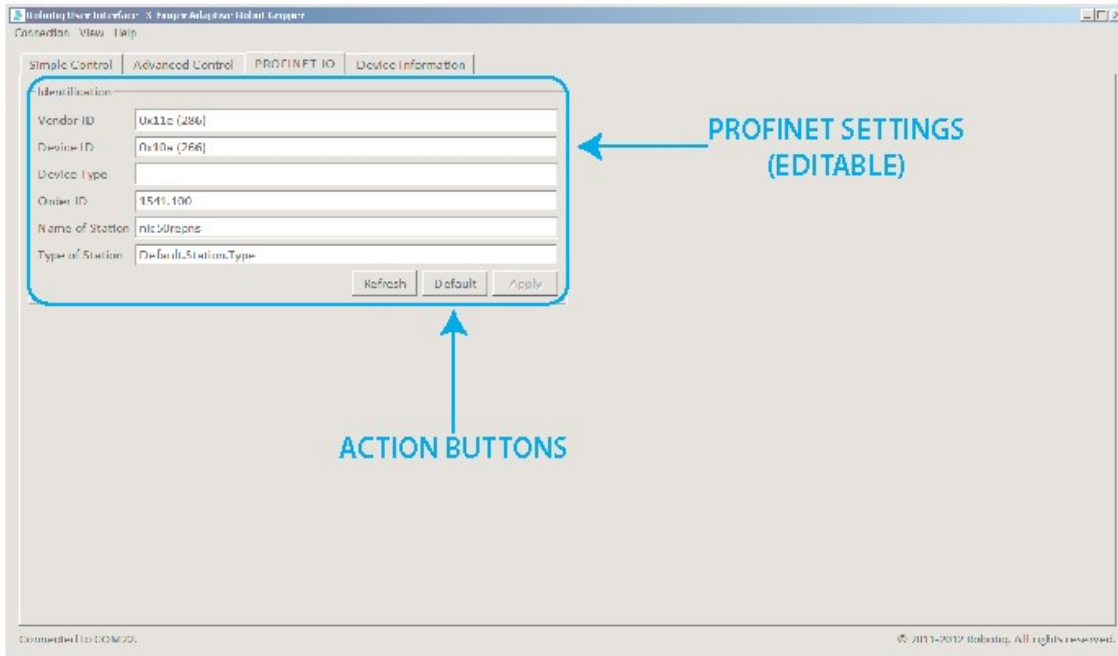


Figure 6.7.1 : Default screen of the Configuration Tool with PROFINET.

The Configuration Tool with the PROFINET screen is described below:

- **Identification** section shows the factory settings for your Gripper, these settings are fixed.
 - **Vendor ID:** Identification number of the manufacturer. All Hilscher products use the value 286 (0x011E) and cannot be edited.
 - **Device ID:** Identification number of the device, determined by the manufacturer and fixed for every device. NIC 50-RE/PNS uses the value 266 (0x0010A).
 - **Device Type:** Description of the device type, editable character string of up to 25 characters.
 - **Order ID:** Hilscher device number (e. g. 1541 000) or order description of your device, editable character string of up to 25 characters.
 - **Name of station:** Station name of the PROFINET IO-Device station. It has to match the station name configured in the PROFINET IO-Controller for this device.
 - **Type of Station:** Type name of the PROFINET station. Name can be assigned freely using character string of up to 240 characters.

The action buttons are used in the following manner:

- To apply the changes made in the editable section, click on the **Apply** button.
- To apply the default settings, click on the **Default** button and then click on the **Apply** button.

7. Device Information

Device Information Tab will provide you with :

- Firmware version for your Adaptive Robot Gripper.
- Unique ID, an ID number linked to the Gripper electronics, not the actual serial number present on the Gripper.
- Cycle count, the total cycles number your Gripper realized to date.
- Odometer, an indication of the movement done by the Gripper motor(s).

Figure 7.1. shows the information you will obtain when directly connected to a Gripper, while Figure 7.2 shows the information you get when connecting to a Gripper through a Controller. When connecting to a Controller first, you will get the Controller firmware version on top and the Gripper firmware version second.

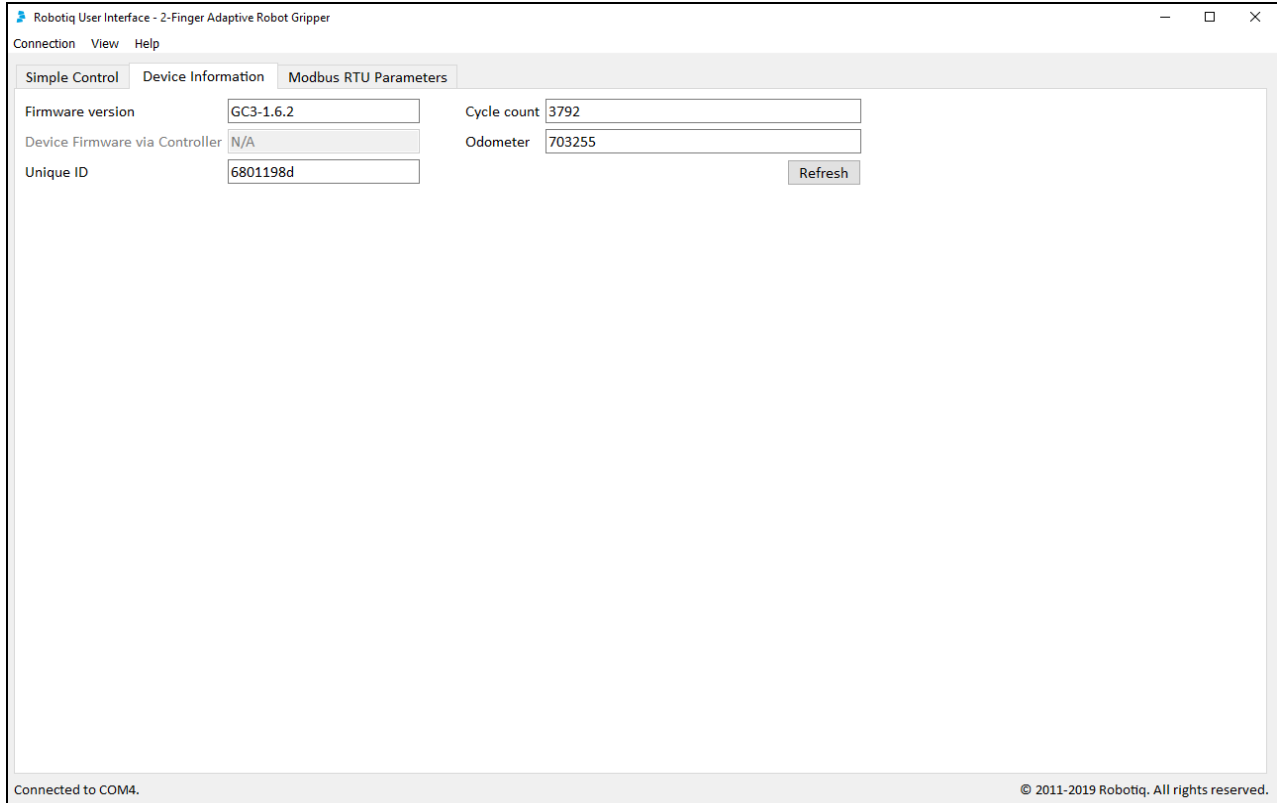


Figure 7.1 : Firmware version when connected directly to a Gripper.

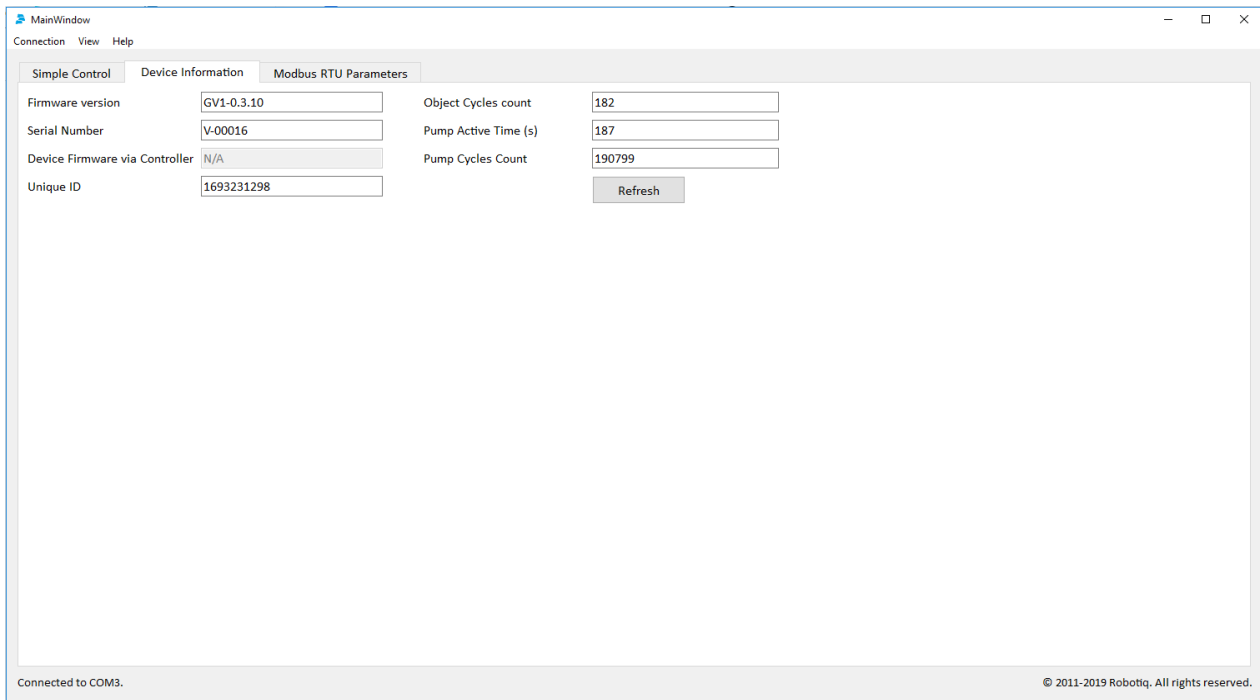


Figure 7.2 : Firmware version when connected to a Gripper via a Controller.

8. Modbus RTU Parameters

Modbus RTU Parameters Tab allows you to modify the communication parameters of the gripper's Modbus RTU protocol. This is useful if you need to connect the gripper directly to a controller's serial port that does not support the gripper's default configuration. For instance for a direct integration on a Motoman DX100 controller, you will need to set the baud-rate to 19200. See Figure 8.1 to have an overview of the tab.

Caution

If your Robotiq Device is not compatible with Modbus RTU Parameters configuration, the Modbus RTU parameter tab will not be visible.

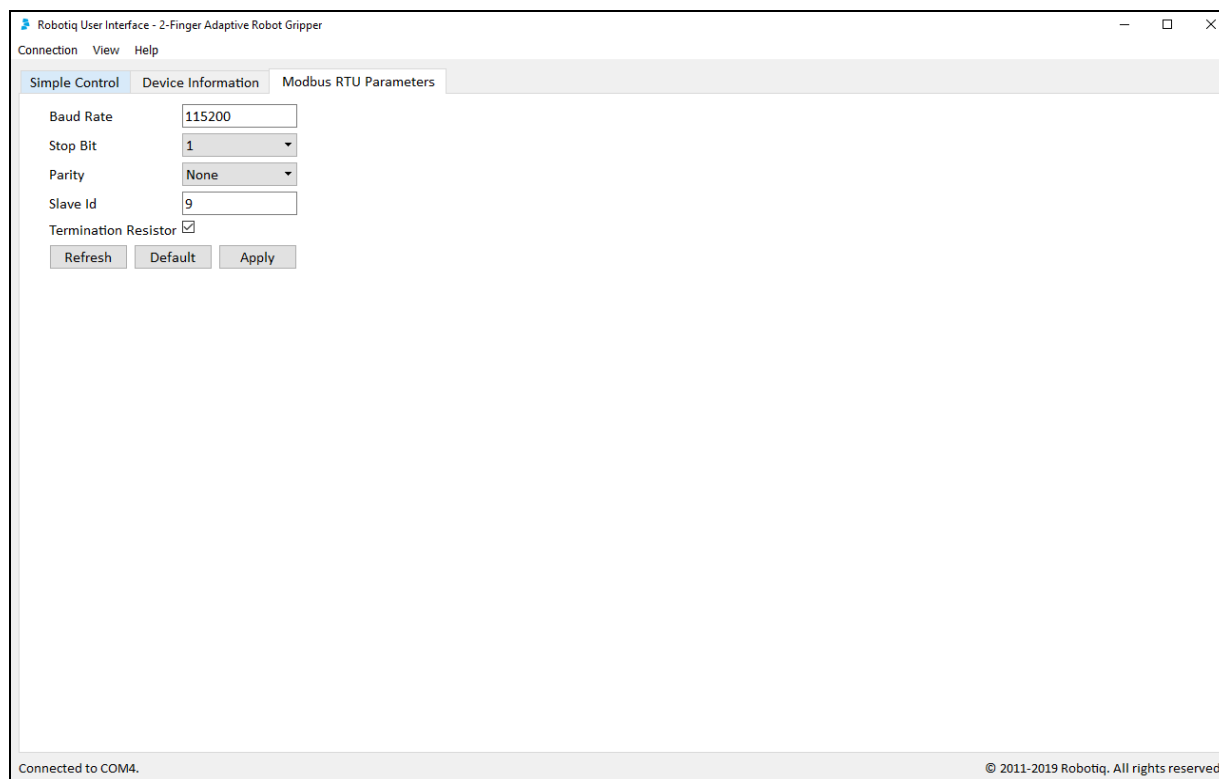


Figure 8.1 : Modbus RTU Parameters tab.

The fields are described below:

- Baud Rate: a value indicating the speed of the communication that ranges from 1 to 7500000
- Stop Bit: The length of the stop signal that ends a one byte communication. Can be set to 0.5, 1, 1.5 or 2.
- Parity: Simple error detection mechanism. Can be set to None, Even or Odd.
- Slave ID: The unique ID of the device on a Modbus RTU network. The device will only reply to Modbus functions that are addressed to its Slave ID.
- Termination Resistor: Used to enable or disable the resistor at the end of the RS485 wires in the gripper.

The action buttons are used in the following manner:

First, if you are connected to the User Interface the device is communicating with its default parameters which are enumerated in the table 8.1. Values displayed represent the parameters that are stored in the device's memory, not the currently used parameters. Parameters stored in memory are automatically used when the device is powered on unless you use the "Recover Device" feature (see section 4).

To modify the communication parameters, just set the values you want and press the button Apply. If the operation succeeds, the parameters are written to the device and a yellow box tells you to reboot the device to use the new parameters (Figure 8.2). Otherwise, an error box will tell you that an error occurred. If you entered out of range parameters, their field will turn red until you enter a valid value.

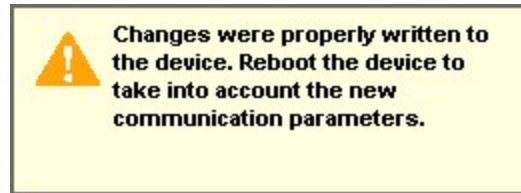


Figure 8.2 : Applying changes to Modbus RTU parameters.

To fill in fields with the default parameters (Table 8.1), press the button Default. They won't be automatically applied. If you are unsure if the parameters displayed are synchronized with the device's memory, press the Refresh button. The fields will be updated with the current configuration.

PARAMETER	DEFAULT VALUE
Baud Rate	115200
Stop Bit	1
Parity	None
Slave ID	9
Termination Resistor	No

Table 8.1 : Default communication parameters for the Modbus RTU protocol.

9. Menu Options

Connection menu:

- **Disconnect:** Will disconnect the connection to the Gripper without leaving the program.
- **Quit:** Will disconnect the connection to the Gripper and close the program.

View menu:

- **Xbox controls:** Will pop-up the Xbox Joystick Control diagram.
- **Input registers:** Will pop-up the Input register table, you can refer to section 4 of your Adaptive Robot Gripper Instruction Manual for details.
- **Output registers:** Will pop-up the Output register table, you can refer to section 4 of your Adaptive Robot Gripper Instruction Manual for details.

Info

Input and Output register tables display live status information while manipulating the Gripper through the Robotiq User Interface. The I/O tables can be monitored to establish the required registers needed to reproduce a movement made via the User Interface. I/O tables can also be monitored for troubleshooting and fault analysis.

You can close the pop-up "view" menu at anytime, the Robotiq User Interface will stay open.

Help menu:

- **Support:** Will link you to Robotiq support services.
- **About Robotiq User Interface:** Will display the Robotiq User Interface version you are using.

10. FAQ

- What is the Robotiq User Interface?
 - The Robotiq User Interface is a software meant for testing, debugging and configuration of Robotiq Adaptive Gripper products.
- How does the Robotiq User Interface connect to a Robotiq Adaptive Gripper or a Vacuum Gripper?
 - By using a PC via Modbus RTU, or using the USB port present on the Gripper or Controller. A Modbus TCP connection is also possible, if the option is available on your Gripper or Controller.
- Do I need to install any drivers?
 - Yes, USB drivers for Robotiq products are included in the Robotiq User Interface Installation program.
- How can I test Robotiq products?
 - Connect to your Gripper via Modbus RTU using the USB port (not possible via Modbus TCP), test control is available via the Simple Control Tab.
- How can I debug Robotiq products?
 - When connected to the Gripper, go to the "view" menu of the User Interface and select "Robot input registers" and "Robot output registers". The two menus allow you to see all the data sent and receive by your Robotiq Gripper.
- How can I configure Robotiq products?
 - When connected to the Gripper, go to the tab associated with your communication protocol, there you can customize your communication parameters.

11. Contact

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