



DOBOT

User Guide

2F-85 Gripper

User Guide

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Shenzhen Yuejiang Technology Co., Ltd.

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Preface

Purpose

This manual introduces the parameters, installation and operation of 2F-85 gripper, which is convenient for users to understand and use the grippers.

Intended Audience

This document is intended for:





- Customer
- Sales Engineer
- Installation and Commissioning Engineer
- Technical Support Engineer

Change History

Date	Change Description
2021-8-23	The first release

Symbol Conventions

The symbols that may be founded in this document are defined as follows.

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, could result in death or serious injury
 WARNING	Indicates a hazard with a medium level or low level of risk which, if not avoided, could result in minor or moderate injury, robot damage
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, can result in equipment damage, data loss, or unanticipated result
 NOTE	Provides additional information to emphasize or supplement important points in the main text

Reference Documents

[*2F-85 Gripper Instruction Manual*](#)

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1. Description on Gripper

The 2-Finger Gripper has two articulated fingers that each have two joints (two phalanxes per finger), as shown in the figure below. The grasp-type gripper can engage up to five points of contact with an object (two on each of the phalanxes plus the palm). The fingers are under-actuated, meaning they have fewer motors than the total number of joints. This configuration allows the fingers to automatically adapt to the shape of the object they grasp which simplifies the control of the gripper.



Figure 1.1 2F-85 gripper

1.1 Specifications

The specifications of 2F-85 gripper are listed in Table 1.1.

Table 1.1 Specifications of the 2F-85

Specification	Description
Stroke (adjustable)	85 mm
Weight	925 g
Grasp Force (adjustable)	20 to 235 N
Closing speed	20 to 150 mm/s
Position repeatability	0.05 mm
Position resolution	0.4 mm
Ingress protection	IP 40
Communication protocol	Modbus RTU (RS-485)
Operating supply voltage	24 V DC $\pm 10\%$
Absolute maximum supply voltage	28 V DC

Quiescent power (minimum power consumption)	< 1 W
Peak current	1 A

1.2 Dimensions

Figure 1.2 represents the 2F-85 Gripper's opening dimensions with axis X, Y, Z and origin referenced for finger motion. Figure 1.3 shows the closing dimensions of 2F-85.

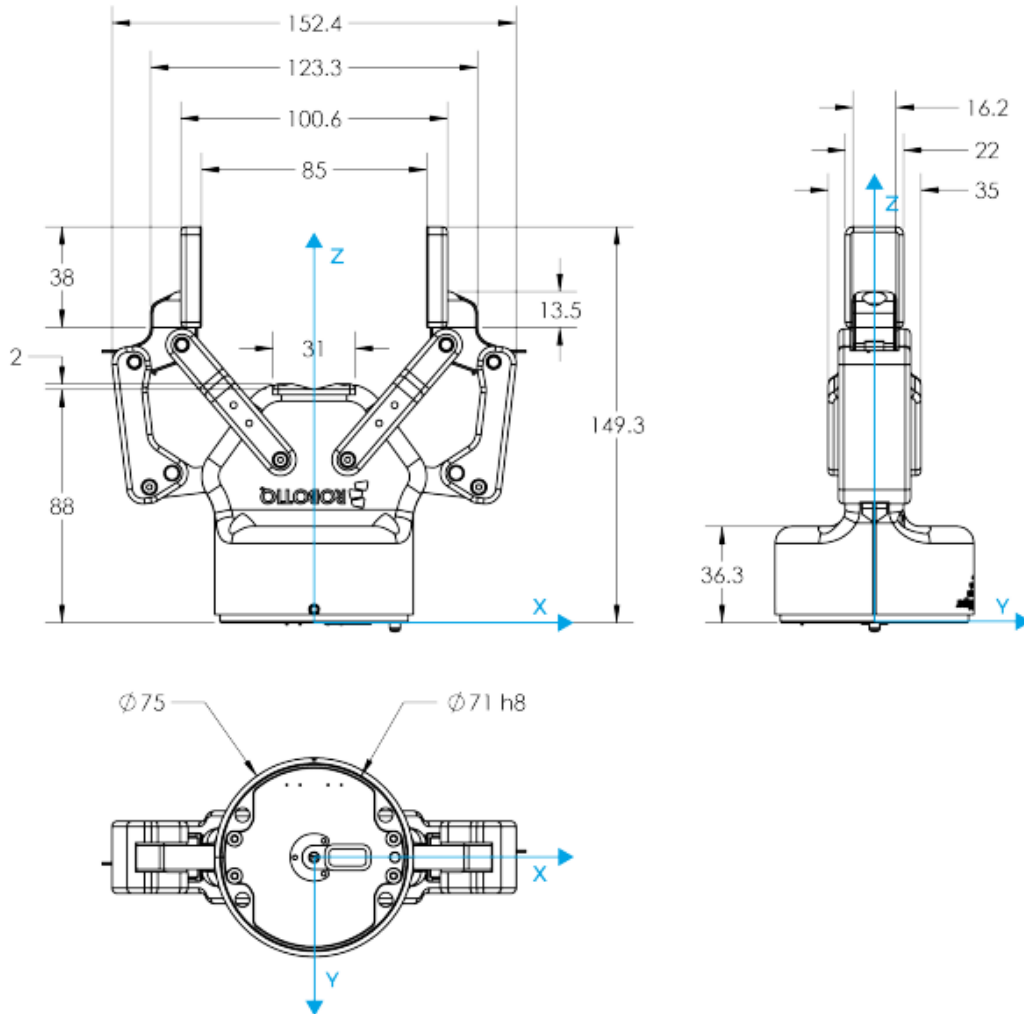


Figure 1.2 General dimensions of 2F-85 (opened)

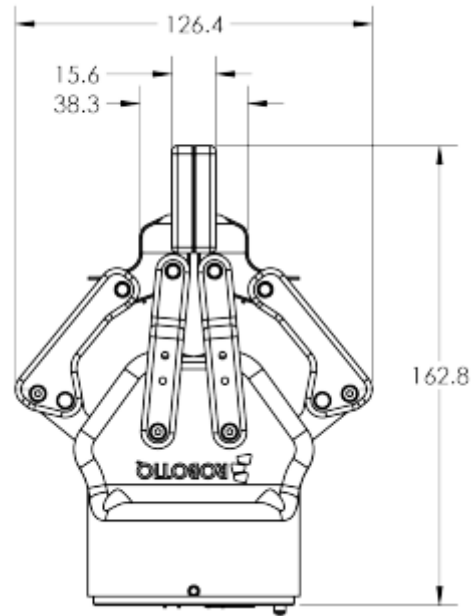


Figure 1.3 2F-85 dimensions (closed)

1.3 Description on indicator lights

The status LED of the gripper will be:

- solid blue/red when booting
- solid blue when powered with no errors (while communication is active)
- solid red if minor fault occurs
- blinking red/blue if major fault occurs

2. Gripper Installation

2.1 Mechanical installation

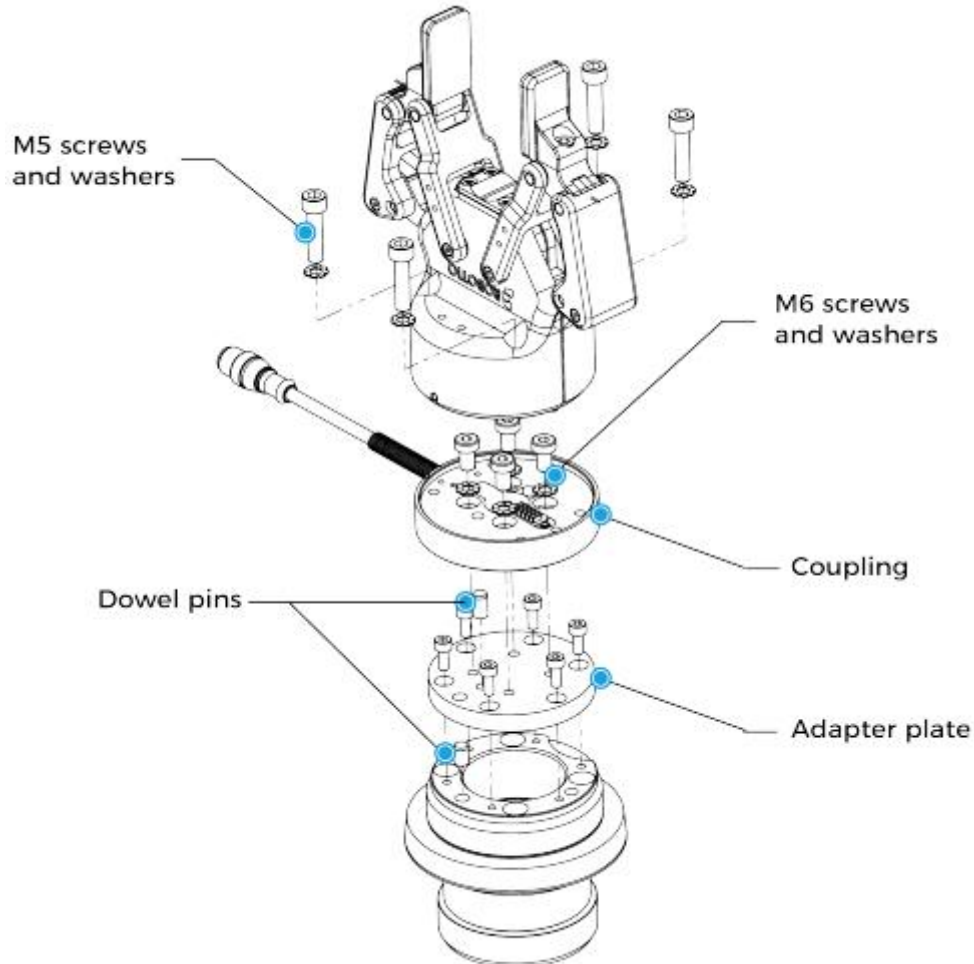


Figure 2.1 2F-85 installation diagram

- Step 1** Screw the adapter plate (if adapter plate is required).
- Step 2** Screw the coupling to the adapter plate (if applicable) or on the robot.
- Step 3** Screw the gripper onto its coupling.

2.2 Electrical connection

The gripper interfaces with its coupling via a 10-spring pin connector located on its outer surface.

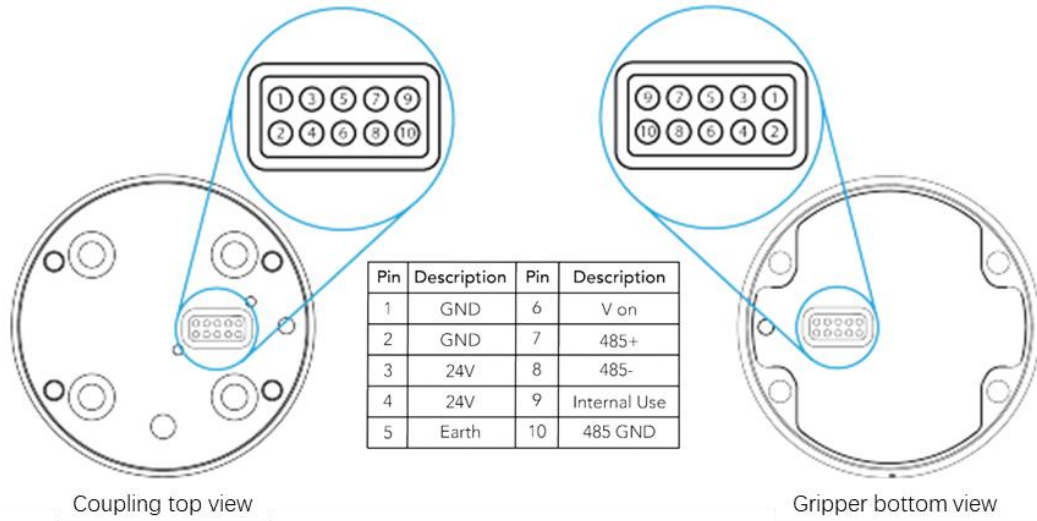


Figure 2.2 Pinout of the 2F-85

The cable which connects the gripper and robot arm adopts RS485 communication and Modbus protocol. 2F-85 outlet cable can be directly connected to the end of robot arm. You need to plug the cable to CR I/O port following the right cable sequence. The connection between CR robot and 2F-85 gripper are shown below.

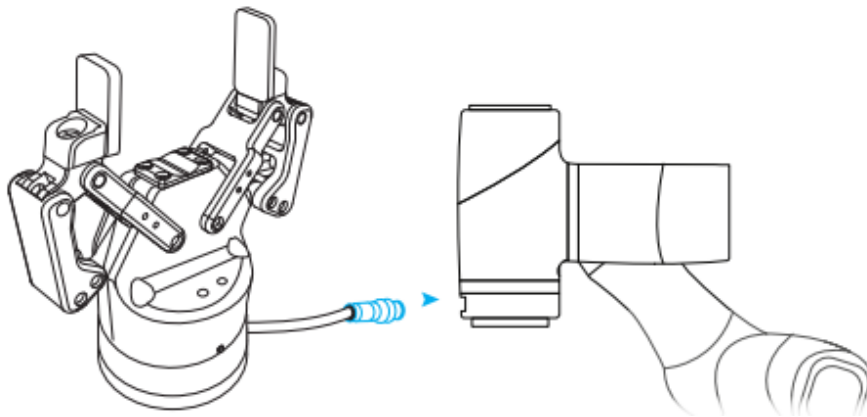


Figure 2.3 Electrical connection

3. Jogging Gripper

Before using the gripper for real applications, you need to check the connection of the cables by jogging the gripper.

The parameter setting and jogging of the gripper need to be operated through CR software. For Windows, please use DobotSCStudio V2.0.6Beta or later versions; For Android, please use Android CRStudioV4.0.0.6 or later versions. For iOS, please use iOS CRStudio V2.1.0 or later versions.

3.1 Jogging gripper in Windows

This chapter mainly introduces how to use DobotSCStudio software in Windows to operate the gripper.

Step 1 Click **Install** on the **EndEffector** page of DobotSCStudio.

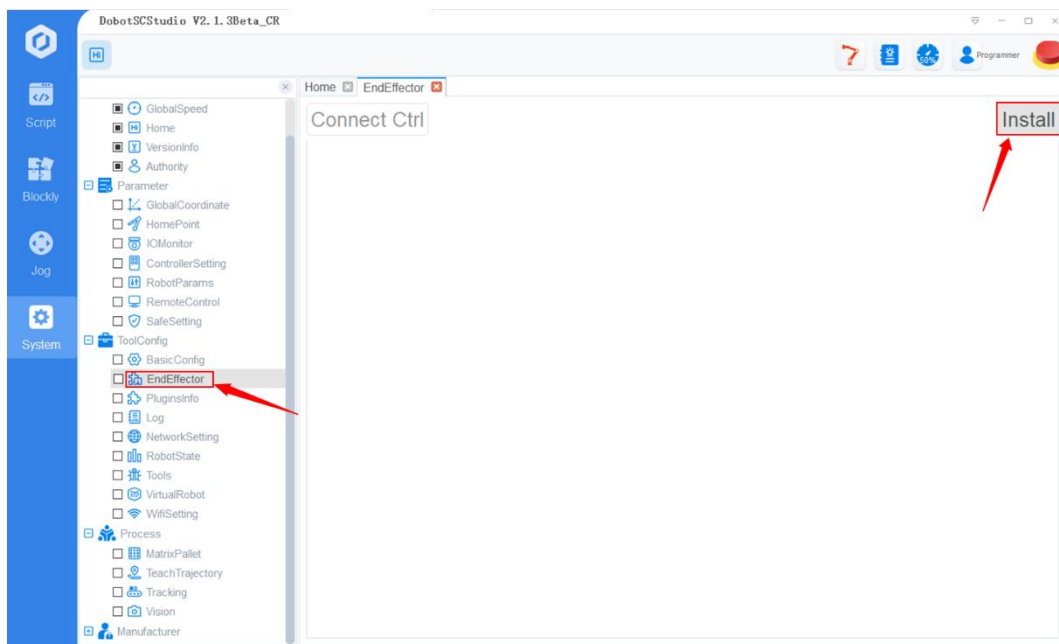


Figure 3.1 EndEffector Page

Step 2 Install **ROBOTIQ-2F85.zip**.

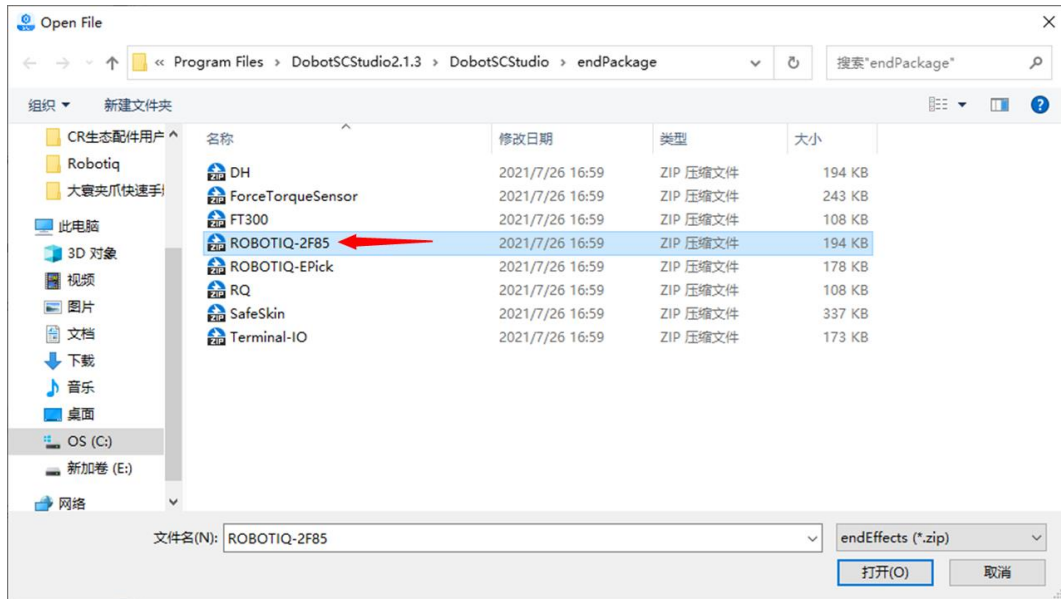


Figure 3.2 Install ROBOTIQ-2F85.zip

Step 3 Select the correct baud rate and ID (Baud is 115200 and ID is 9 by default), and click **Confirm**.

The robot arm will attempt to connect with the gripper. If the connection is successful, the LED on the gripper will turn blue from red and then turn red again.

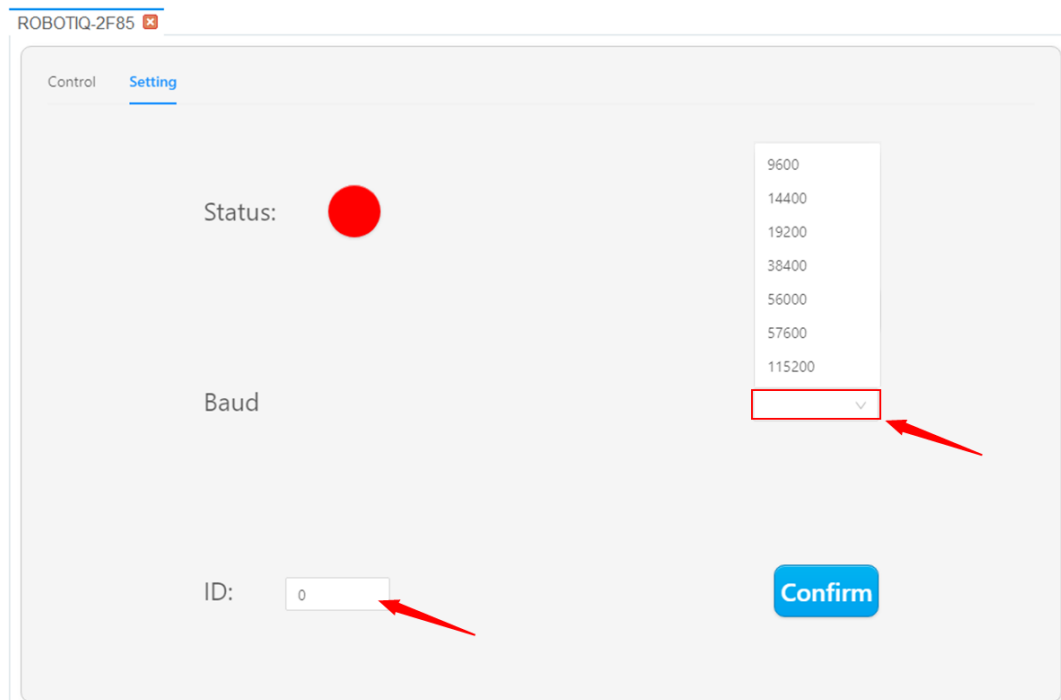


Figure 3.3 Set Baud and ID

Step 4 Click **Init** to initialize the 2F-85 gripper.

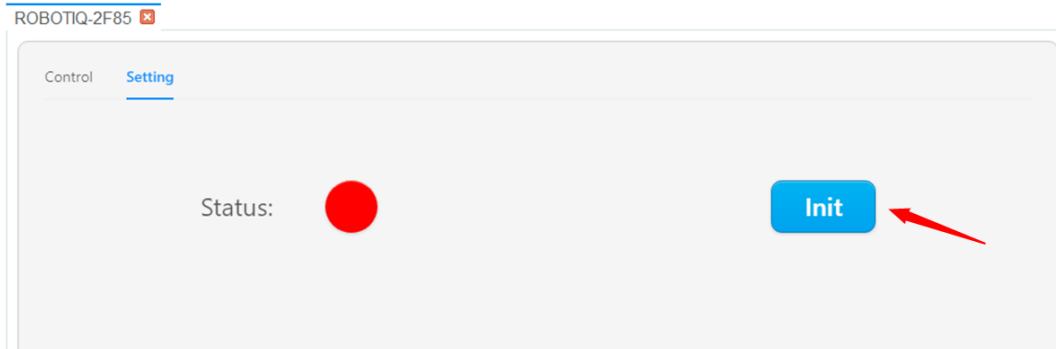


Figure 3.4 Initialize 2F-85

The color of **Status** will become green after the initialization is finished.

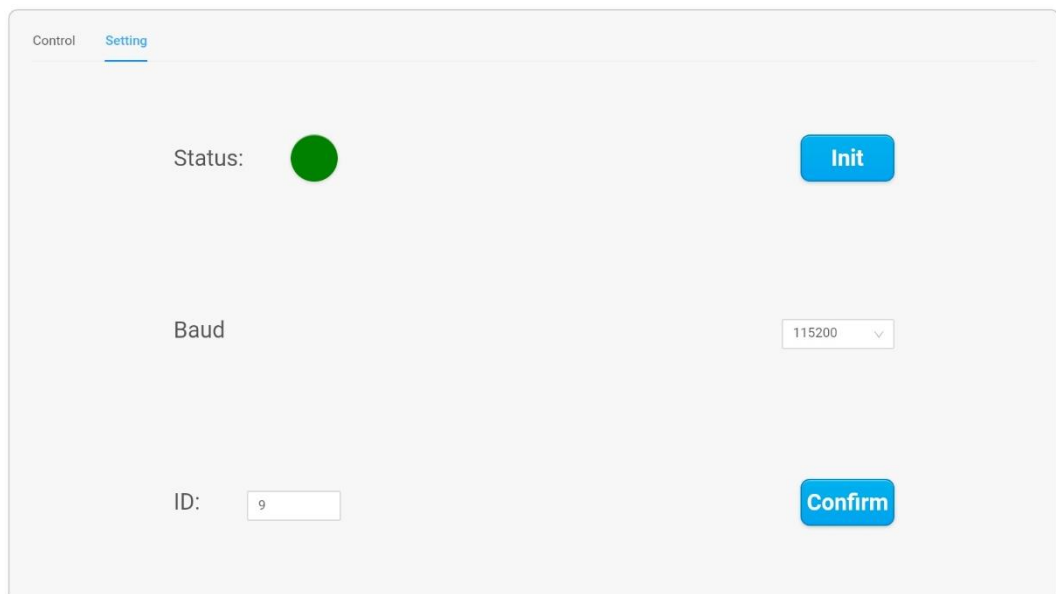


Figure 3.5 Initialization successful

NOTICE

Before initialization, please make sure the gripper can open and close normally with enough space.

Step 5 Jog the gripper through **Open**, **Close**, **MAX**, and **MIN** on the **Control** page, as described below. Or you can also input specific value to adjust the position, speed and force.

- **Open**: Open the gripper completely, equivalent to clicking “+” to the left of “Open” to make it reach 100% of relative position value.
- **Close**: Close the gripper completely, equivalent to clicking “-” to the right of “Close” to make it reach 0% of relative position value.
- **MAX (Speed)**: Set the gripper to a maximum speed (100% relative speed), equivalent to clicking “+” to the left of “MAX” to make it reach 100% speed.

- MIN (Speed): Set the gripper to a minimum speed (0% relative speed), equivalent to clicking “-” to the right of “MIN” to make it reach 0% speed.
- MAX (Force): Set the gripper to a maximum force (100% relative force), equivalent to clicking “+” to the left of “MAX” to make it reach 100% force.
- MIN (Force): Set the gripper to a minimum force (0% relative force), equivalent to clicking “-” to the right of “MIN” to make it reach 0% force.

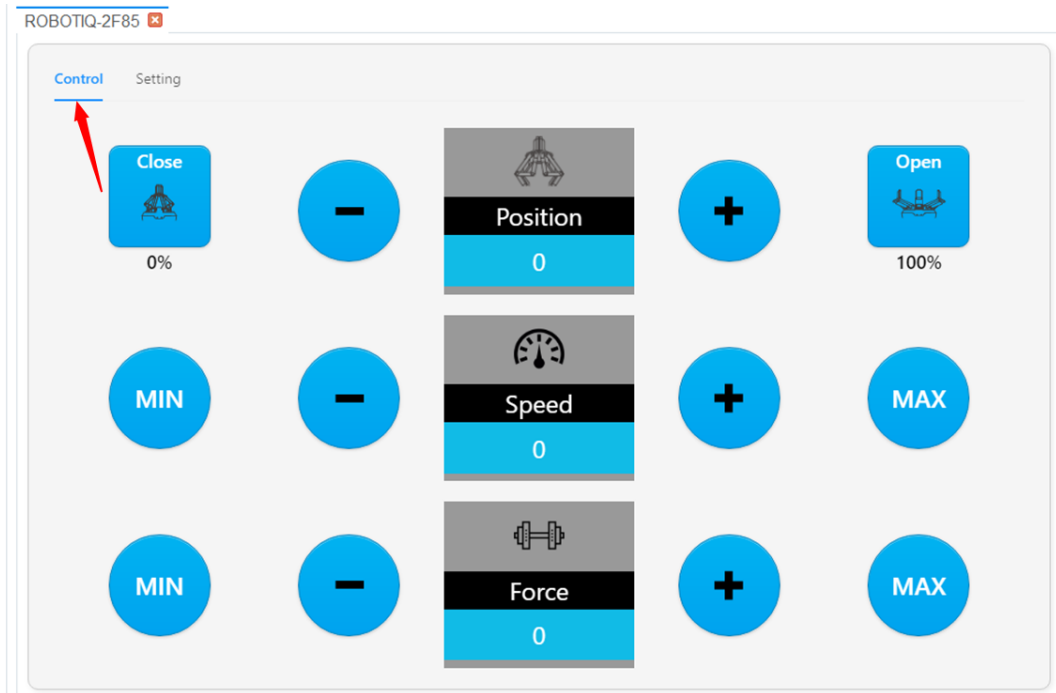


Figure 3.6 Jog the gripper

NOTICE


Every time the gripper is powered on, it needs to be reconfigured. Therefore, please repeat Step1 to Step5 to initialize the gripper after the robot is restarted.

3.2 Jogging gripper in Android & iOS

Prerequisites

Select the right WiFi of the robot and connect it. The default WiFi name of CR robots is Dobot_WIFI_xxx and the default password is 1234567890.

Procedure

Step 1 Click **Monitor** or  to enter the monitor page. Select **Dobot+** in the left-side menu, as shown in Figure 3.7. Double click **ROBOTIQ-2F85** plug-in to install it.

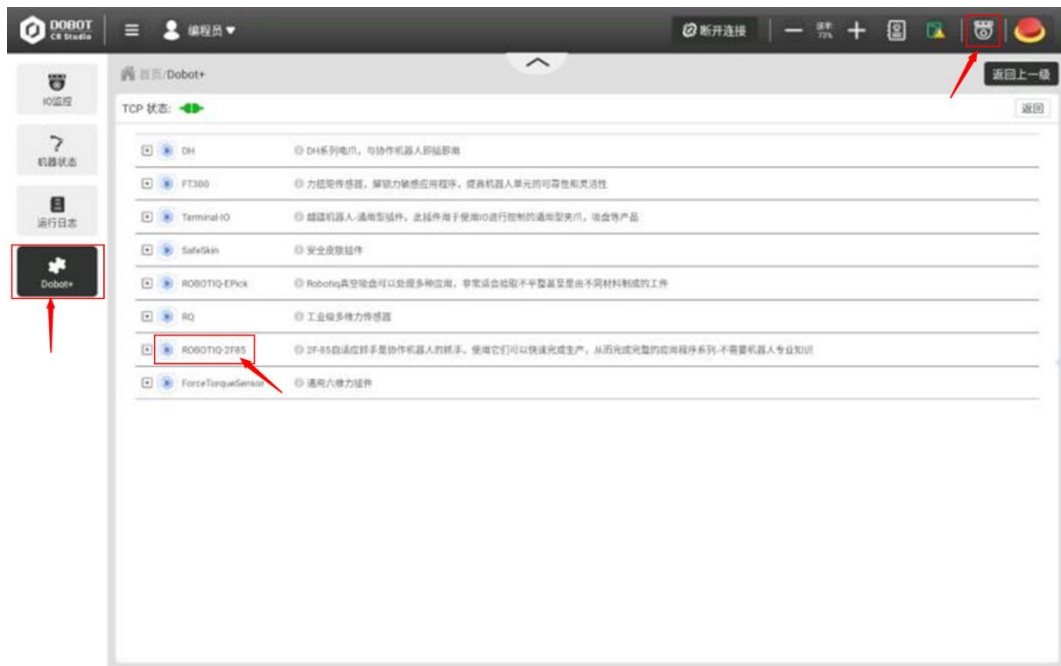


Figure 3.7 Install ROBOTIQ-2F85 plug-in

Step 2 Select the correct baud rate and ID (Baud is 115200 and ID is 9 by default), and click **Confirm**.

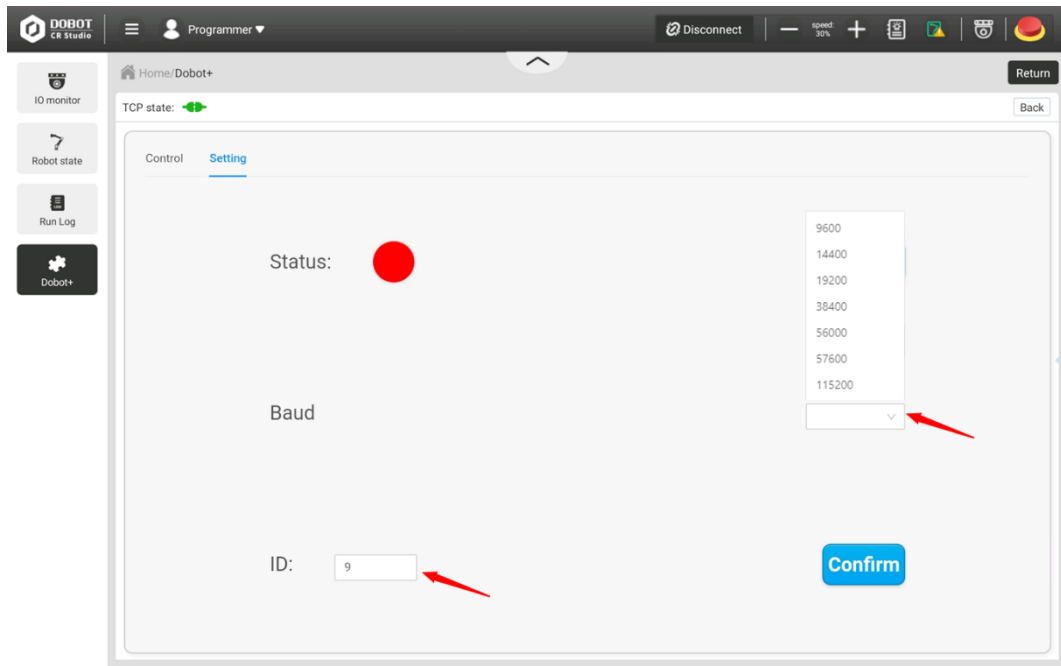


Figure 3.8 Initialize the gripper

Step 3 Click Init. The color of Status will become green after the initialization is finished.

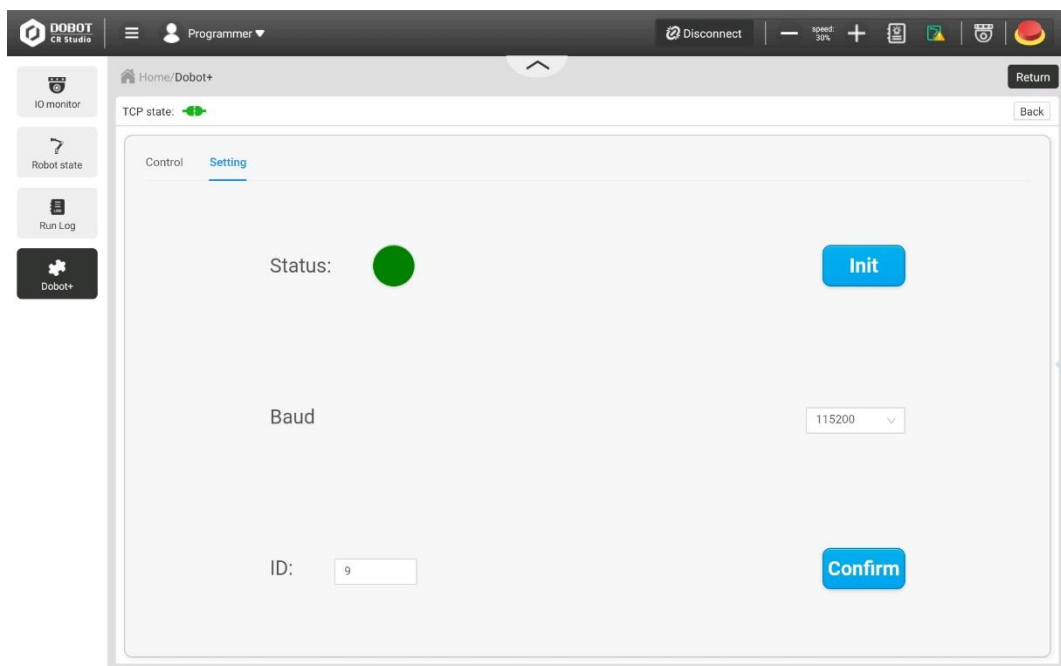


Figure 3.9 Initialization successful

Step 4 Click “Open” or “Close” to control the status of the gripper on the Control page. You can adjust the gripper force and speed through “MAX”, “MIN”, “+” or “-”, as described below. Or you can also input specific value to adjust the position, speed and force.

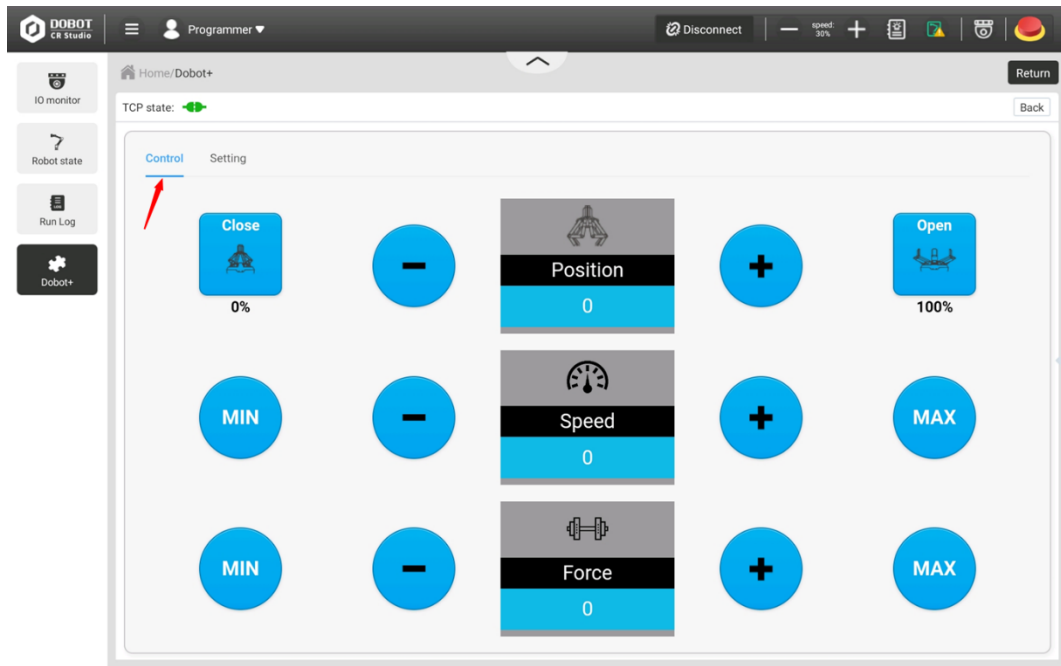


Figure 3.10 Jog the gripper

- Open: Open the gripper completely, equivalent to clicking “+” to the left of “Open” to make it reach 100% of relative position value.
- Close: Close the gripper completely, equivalent to clicking “-” to the right of “Close” to make it reach 0% of relative position value.
- MAX (Speed): Set the gripper to a maximum speed (100% relative speed), equivalent to clicking “+” to the left of “MAX” to make it reach 100% speed.
- MIN (Speed): Set the gripper to a minimum speed (0% relative speed), equivalent to clicking “-” to the right of “MIN” to make it reach 0% speed.
- MAX (Force): Set the gripper to a maximum force (100% relative force), equivalent to clicking “+” to the left of “MAX” to make it reach 100% force.
- MIN (Force): Set the gripper to a minimum force (0% relative force), equivalent to clicking “-” to the right of “MIN” to make it reach 0% force.

NOTICE

Every time the gripper is powered on, it needs to be reconfigured. Therefore, please repeat Step 1 to Step 5 to initialize the gripper after the robot is restarted.

3.3 Gripper programming

After setting the position, speed and force, you can write a program to control the gripper for real application. The description on APIs of 2F-85 gripper is shown in Table 3.1.

Table 3.1 API description

Function	Parameters	Description
RiqInit()	null	Initialize the gripper
RiqOpen(time)	time: delay time required for opening gripper (range: 0~6000ms)	Open the gripper
RiqClose(time)	time: delay time required for closing gripper (range: 0~6000ms)	Close the gripper
RiqSet(position,speed,force,time)	position, speed, force and time: delay time required for closing gripper (range: 0~6000ms)	The gripper moves to the set position with the set speed and grip force

NOTE

- The Riqopen(time) is equivalent to Riqset (id ,0x00,0xff ,0xff); Riqclose (time) is equivalent to Riqset (id ,0xff ,0xff ,0xff).

Now take Android & iOS operation as an example to illustrate the steps of script programming.

Step 1 Enter the **Script** page, and click **Function**, as shown in Figure 3.11.

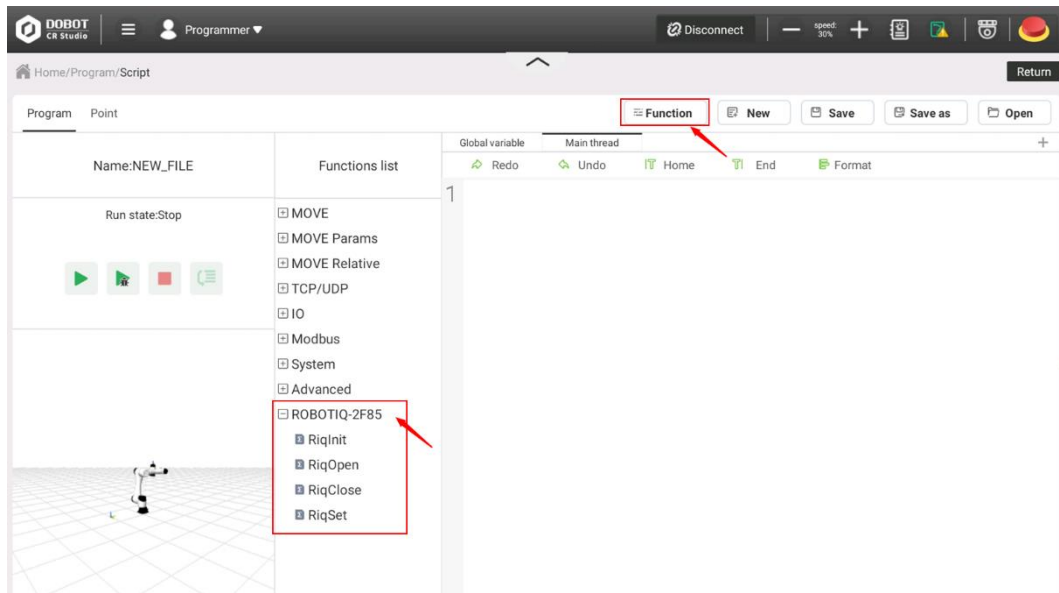


Figure 3.11 Select functions to operate the gripper

Step 2 Write programs by using the APIs that ROBOTIQ 2F85 plug-in supports, as shown

in Figure 3.12.

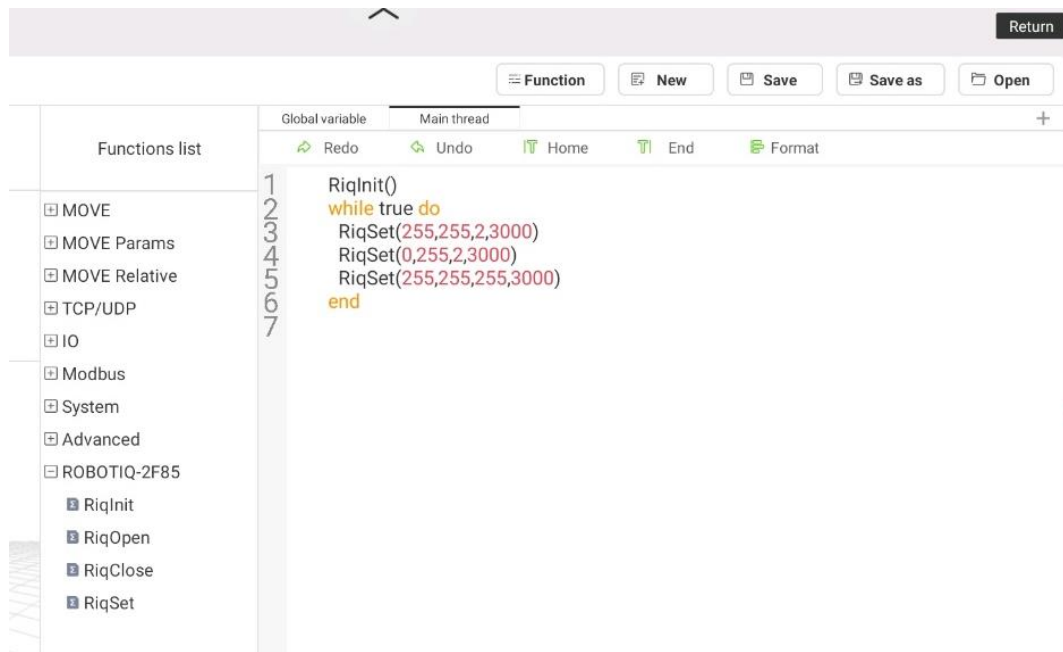


Figure 3.12 Write a program