



DOBOT

User Guide

PGC-50 Gripper

User Guide

Issue: V1.0.0

Date: 2021-8-16

Shenzhen Yuejiang Technology Co., Ltd.

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The user has the responsibility to make sure following the relevant practical laws and regulations of the country, in order that there is no significant danger in the use of the robot.

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Preface

Purpose

This manual introduces the parameters, installation and operation of PGC-50 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
2021-08-16	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

[*PGC-50 Short Manual*](#)

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1. Description on Gripper

PGC series are collaborative electric grippers. The number (PGC-number) represents the maximum gripping force of the gripper. The gripper is equipped with a pair of parallel fingertips, which runs symmetrically during the movement. The main structure of the gripper is a smooth circle, and the bottom is adapted to a standard flange. The gripper is equipped with an 8-core communication interface to connect the end of robot or other devices, as shown in Figure 1.1.



Figure 1.1 PGC-50 Gripper

PGC series have the following characteristics:

- Controllable force/position/speed: You can adjust the gripping position, gripping force and speed by programming.
- Multiple communication modes: The gripper supports Modbus RTU protocol and IO mode control. Other communication protocols such as USB and PROFINET can be transferred through protocol converter.
- Gripping detection: The combination of force control and position control is adopted in the gripping process.
- Gripping feedback: The state of the gripper can be read by programming, and can also be judged according to the indicator of the gripper.
- Fingertips can be customized: Fingertips can be replaced according to situation, which is suitable for precision machining, parts assembly and other fields.

1.1 Performance parameter

The specific parameters of PGC-50 electric gripper are listed in Table 1.1.

Table 1.1 Parameters of PGC-50 gripper

Parameters	Description
Gripper force (can be adjusted through programming)	15-50N
Finger opening stroke (can be adjusted through programming)	0-35mm
Opening/closing time	0.7s/0.7s
Weight	0.5kg
Position repeatability	$\pm 0.03\text{mm}$
Noise emission	<50 dB
Ingress protection rating	IP54
Communication protocol	Modbus RTU (RS485), I/O
Supply voltage	24V DC $\pm 10\%$
Nominal current	0.25 A
Peak current	0.5A

In the actual gripping, you should take the gripping angle and gripping position into account. The following right-angle coordinate system is established, and the corresponding directions of the X-axis, Y-axis, and Z-axis are shown in Figure 1.2. The force perpendicular to the gripped flat surface is defined as F_z ; the x-axis direction torque is M_x ; the y-axis direction torque is M_y ; and the z-axis direction torque is M_z . The PGC-50 finger load is shown in Table 1.2.

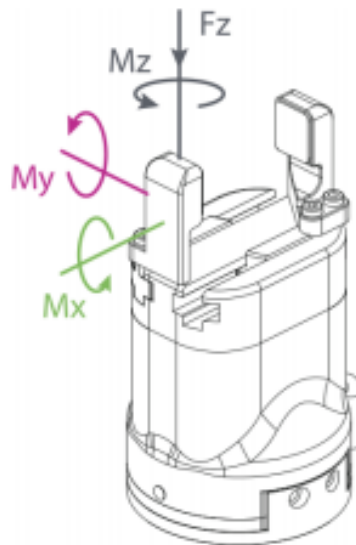


Figure 1.2 PGC-50 finger load

Table 1.2 PGC-50 Finger load.

Max allowable vertical load F_z (static)	150 N
Max allowable moment M_x (static)	2.5 N·m
Max allowable moment M_y (static)	2 N·m
Max allowable moment M_z (static)	2 N·m

1.2 Dimensions

Figure 1.3 shows the dimensions of the gripper.

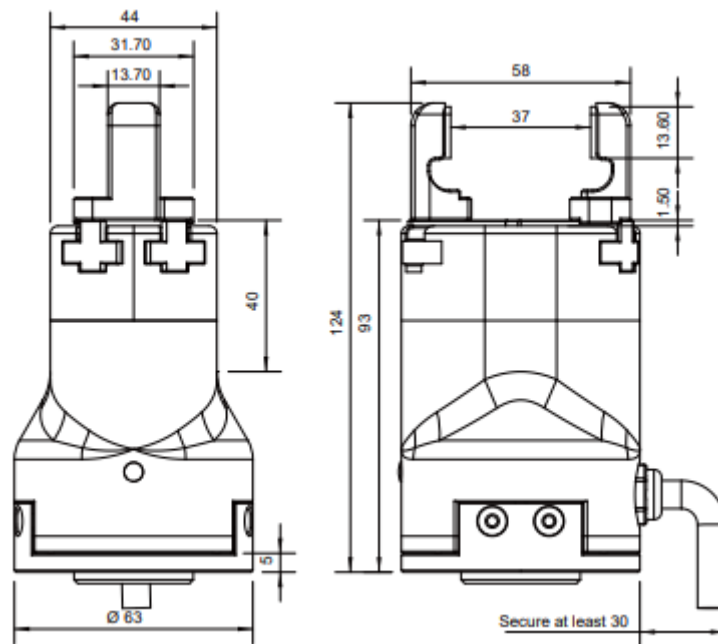


Figure 1.3 PGC-50 dimensions diagram

1.3 Color description of indicator lights

The gripper can feed back the state of the gripper in real time. You can get its state through commands or judge from the color of the indicator.

Color description of indicator:

- Uninitialized state: The red light blinks, while other lights are off.
- Initialized State: The blue light is always on, indicating that it is in the operable state.
- Received command state: The red light blinks once quickly (as the blue light is always on at the same time, the gripper indicator light will look like a purple light).
- Object Caught state: The green light is always on, while other lights are off.
- Object dropped state: The green light blinks.

2. Gripper Installation

2.1 Mechanical installation

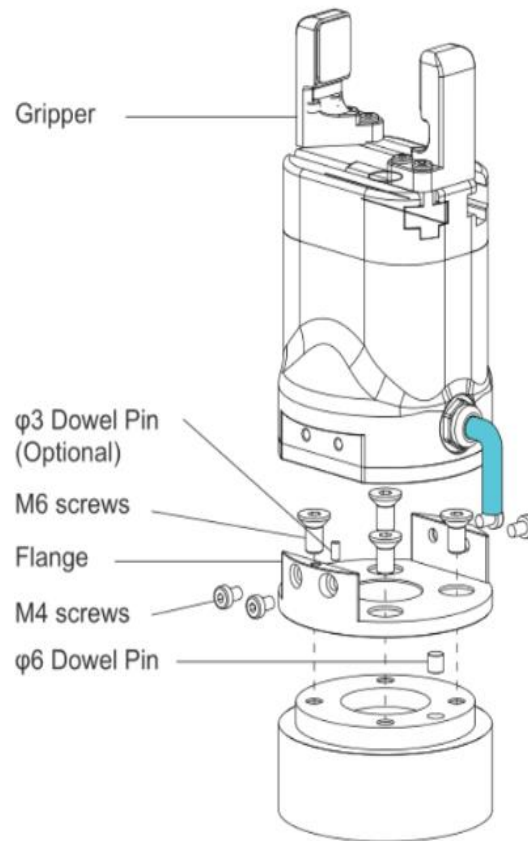


Figure 2.1 Install PGC-50 gripper

- Step 1** Install the $\Phi 6*10$ locating pin to accurately position the flange and the end of the robot arm.
- Step 2** Tighten the $M6*12$ screws to fix the flange.
- Step 3** Install $\Phi 3*6$ locating pins to provide positioning for PGC-50 gripper.
- Step 4** Tighten the $M4*6$ screws to fix the gripper.

2.2 Electrical connection

The PGC-50 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. Figure 2.2 shows the connection between CR robot and PGC-50 gripper.

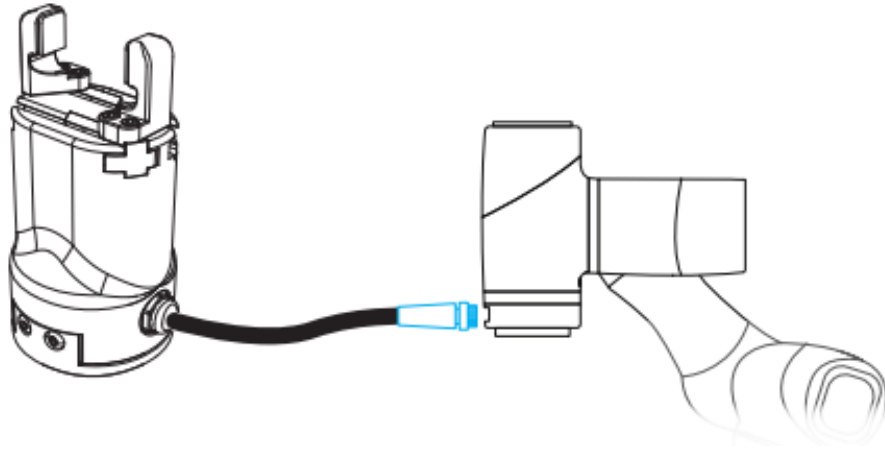


Figure 2.2 Electrical connection

3. Jogging 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.

Procedure

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

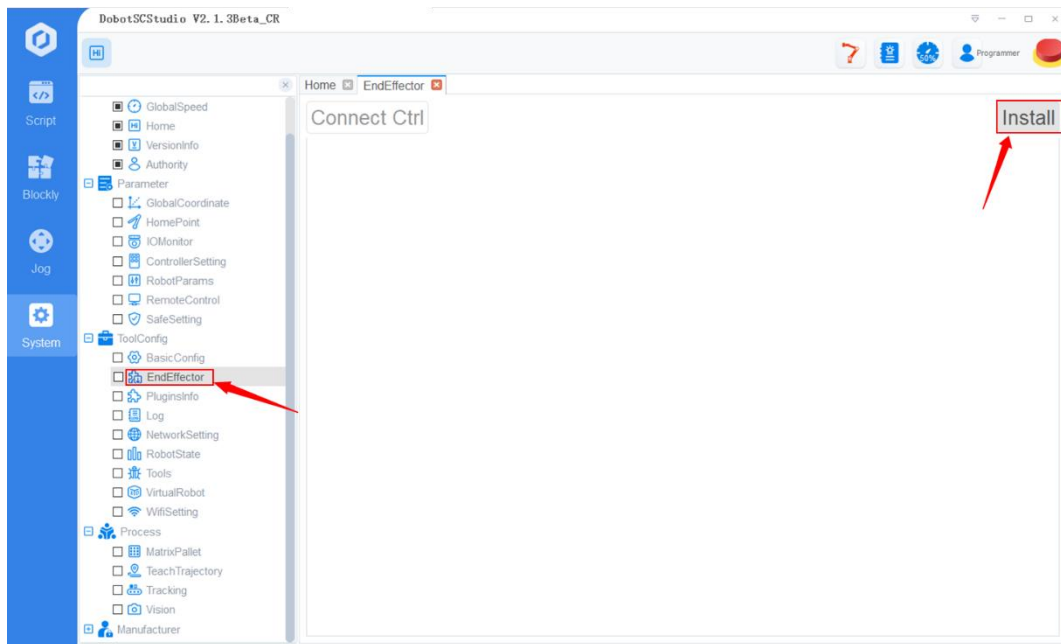


Figure 3.1 EndEffector Page

Step 2 Install DH.zip.

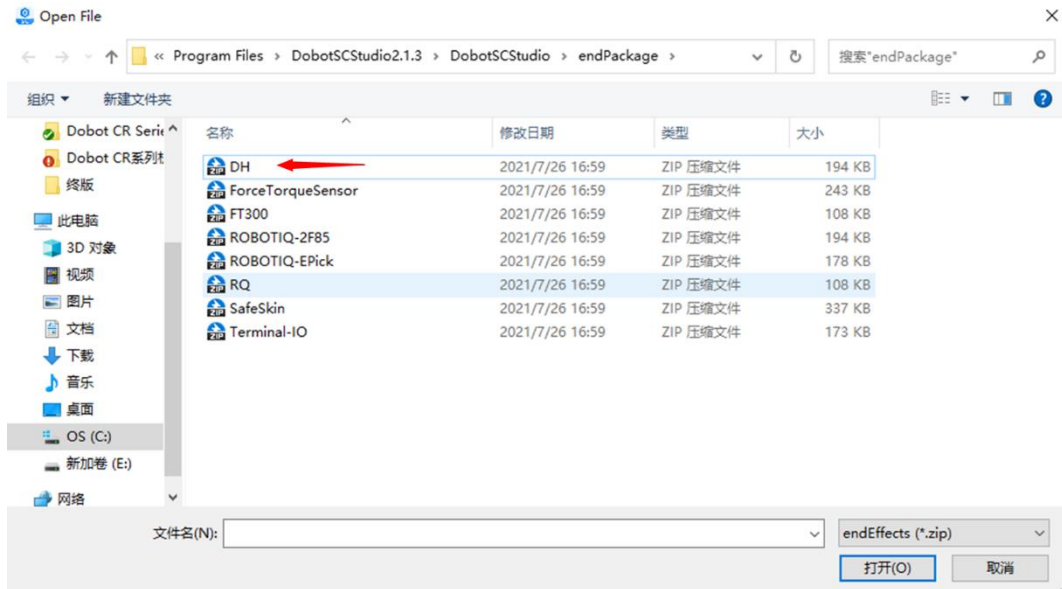


Figure 3.2 Install DH.zip

Step 3 Set the baud-rate as 115200. Set the ID as 1, and click **Confirm**.
Click **Init** to initialize the PGC-50 gripper.

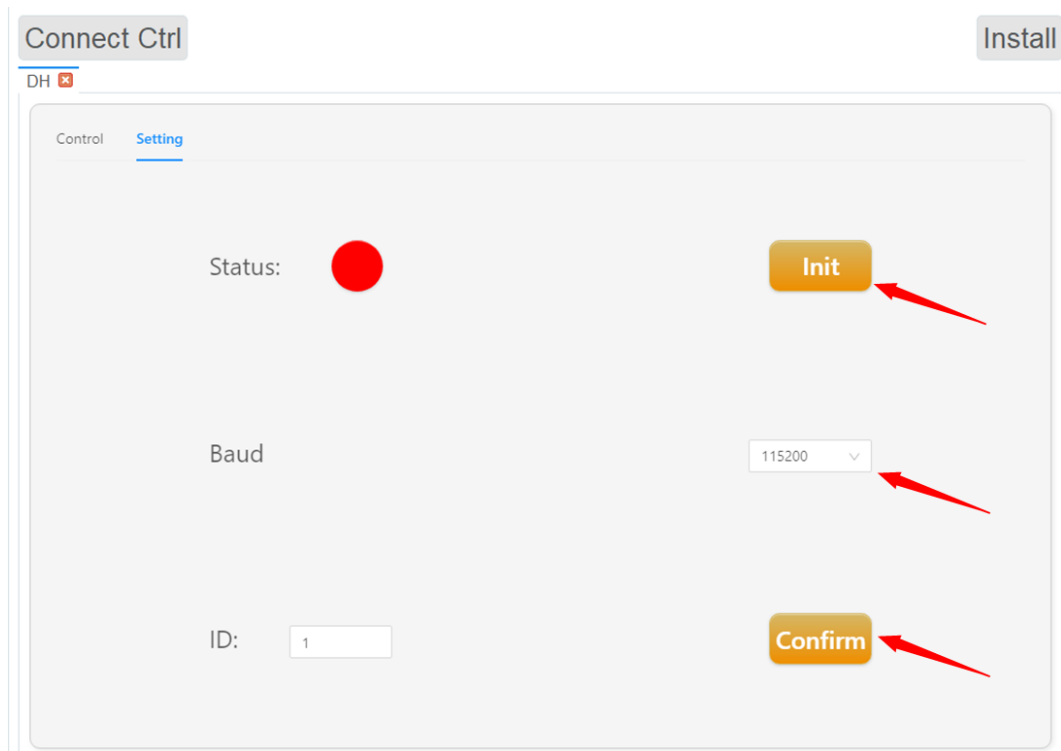


Figure 3.3 Initialize PGC-50

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

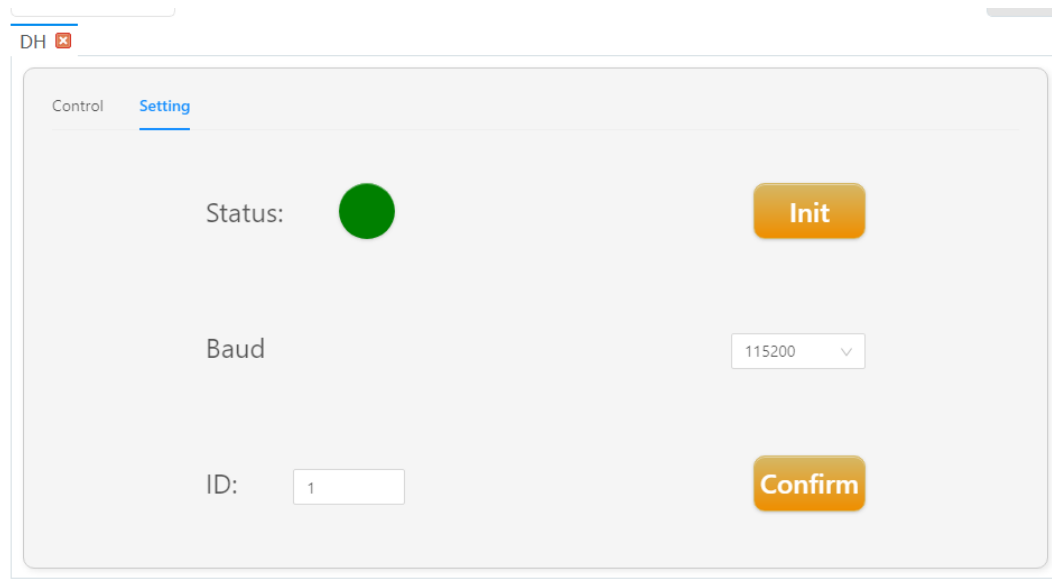


Figure 3.4 Initialization successful

Step 4 Jog the gripper through **Open**, **Close**, **MAX**, and **MIN** on the **Control** page, as described below.

- **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:** 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:** 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

- The relative position value refers to the maximum and minimum position that the gripper can move to during initialization.
- The minimum of relative force value does not mean the gripping force is zero, but means the minimum force that the gripper can be controlled and operated normally.

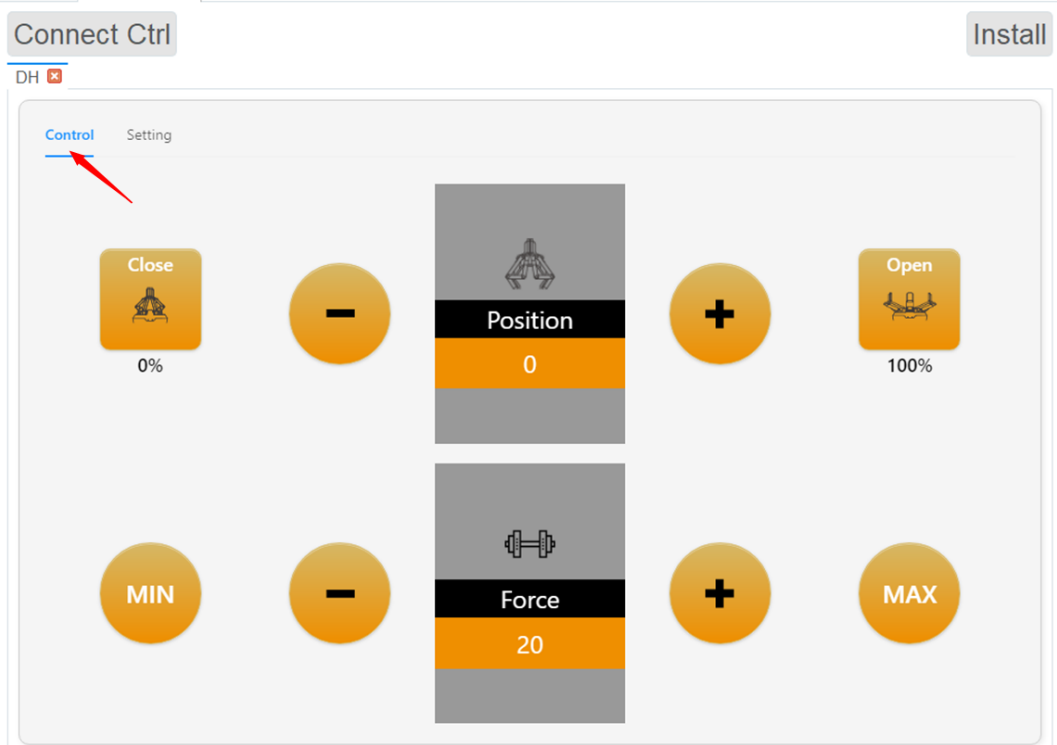


Figure 3.5 Jog the gripper

 NOTICE


Gripper may open or close during the initialization. Please ensure that there is enough space for the gripper.

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 3.6. Double click the **DH** plug-in to install it.

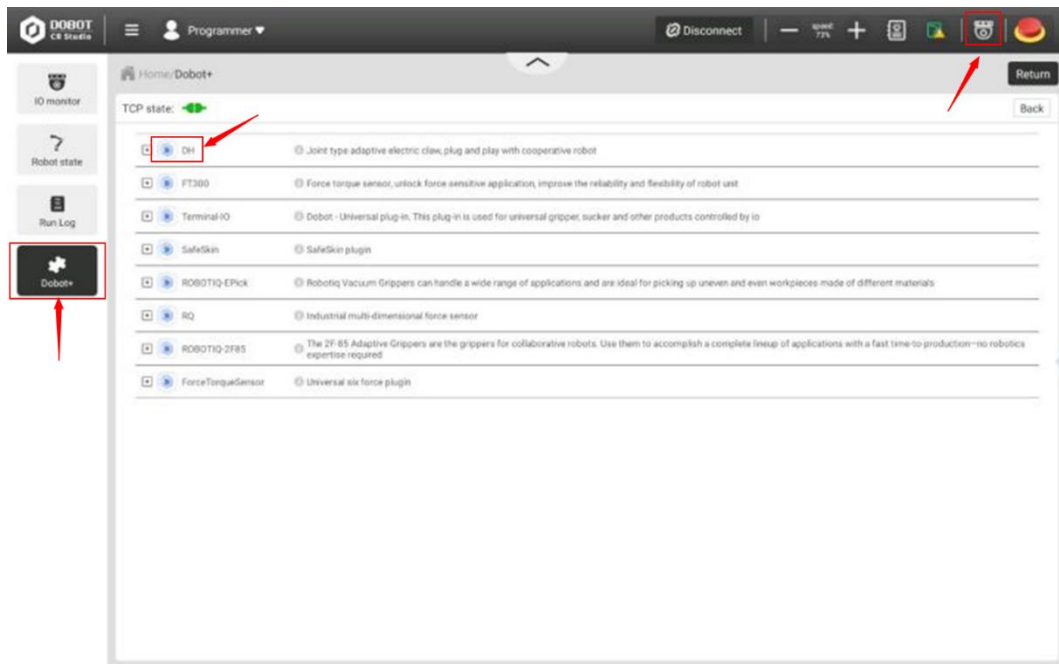


Figure 3.6 Install DH plug-in

- Step 2** Set the baud-rate as 115200. Set the ID as 1, and click **Confirm**.

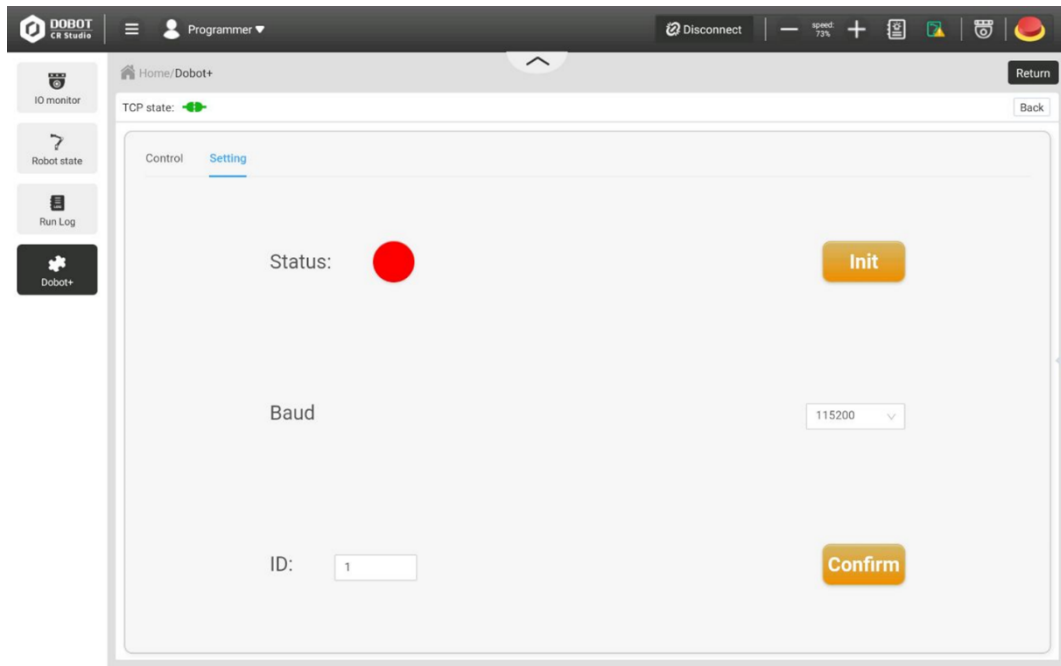


Figure 3.7 Initialize the gripper

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

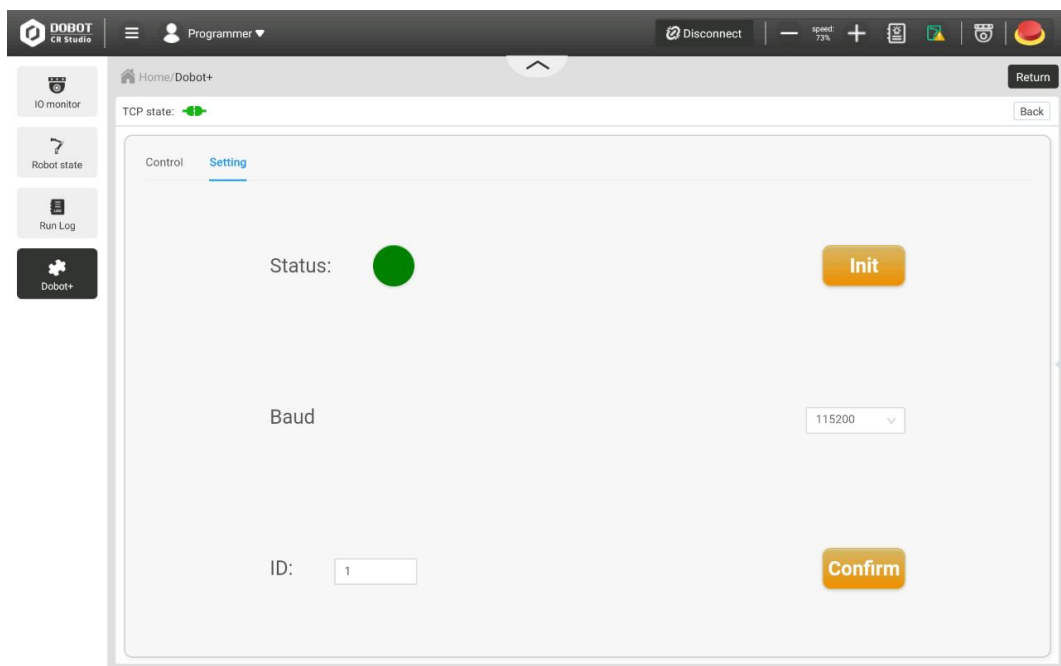


Figure 3.8 Initialization successful

Step 3 Click **“Open”** or **“Close”** to control the status of the gripper on the Control page. You can adjust the gripper force through **“MAX”**, **“MIN”**, **“+”** or **“-”**. Please refer to Step 4 in [错误! 未找到引用源。Jogging gripper in Windows](#) for specific description.

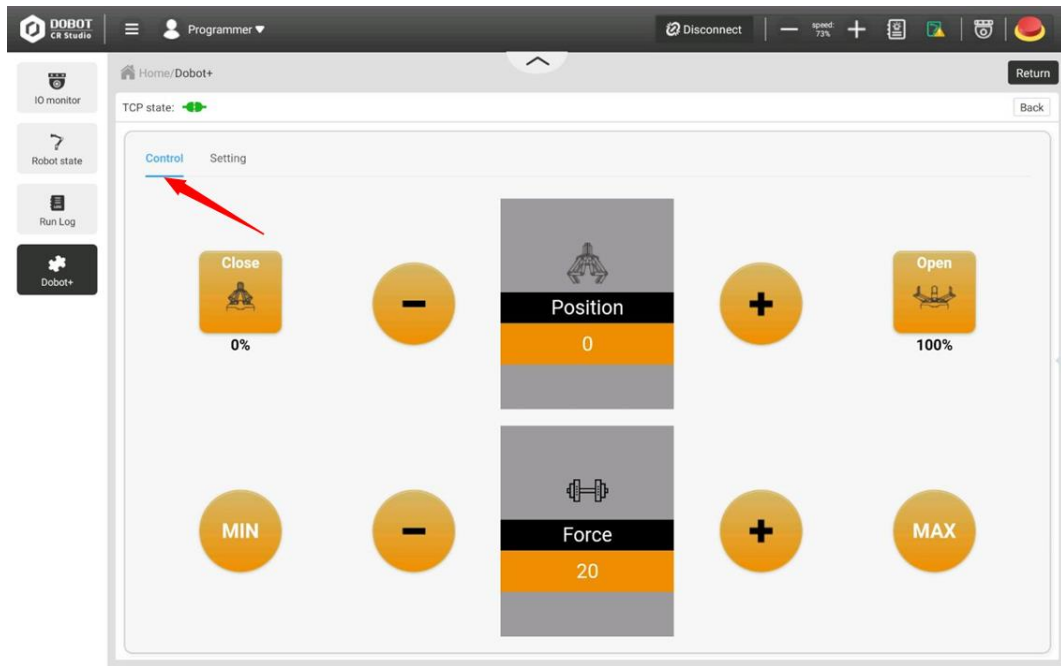


Figure 3.9 Jog the gripper

After installing the plug-in of the gripper, you can select APIs to operate the gripper.

Step 1 Enter the **Script** page, and click **Function**, as shown in Figure 3.10.

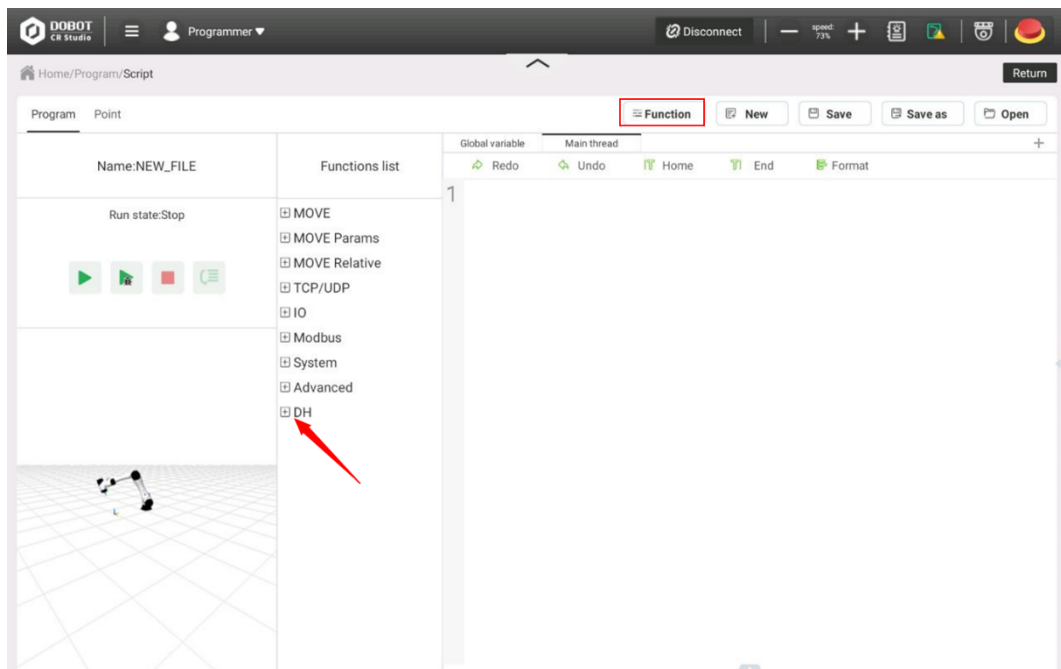


Figure 3.10 Select functions to operate the gripper

Step 2 Write programs by using the APIs that DH plug-in supports, as shown in Figure 3.11.

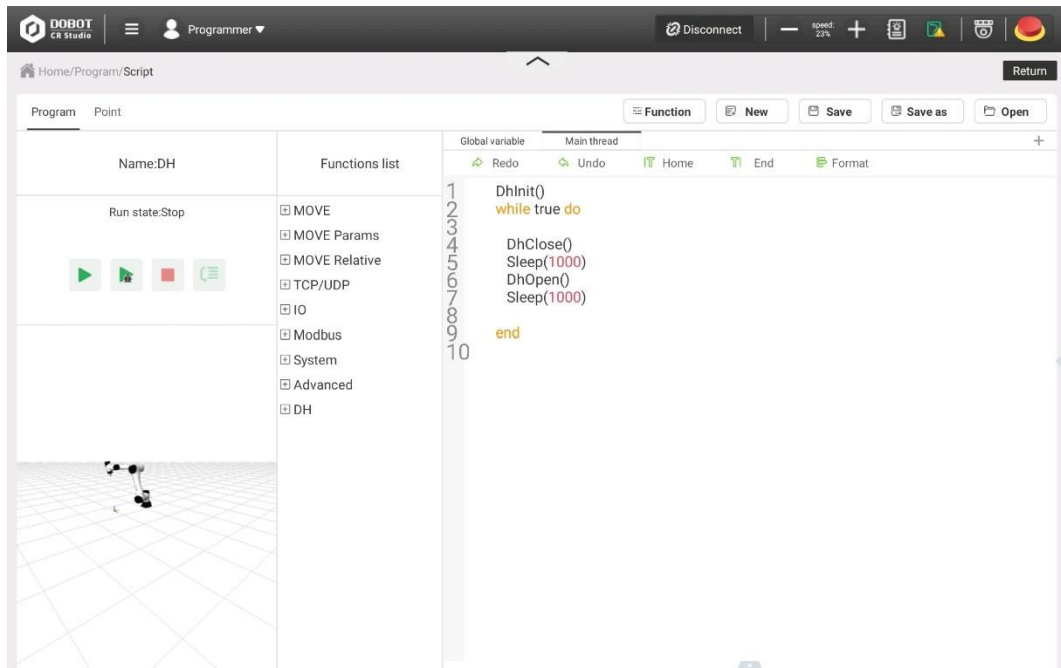


Figure 3.11 Write a program

3.3 Gripper APIs

This chapter mainly lists the description on APIs of PGC-50 gripper, as shown in Table 3.1.

Table 3.1 API description

Function	Parameters	Description
DhInit()	Parameter: null Return: null	Initialize the gripper
DhSetForce(force)	Parameter: force, the range is 20~100	Set the gripper's force
DhSetPosition(position)	Parameter: Position, the range is 0~1000	Set the gripper position
DhGetStatus()	Parameter: null Return: current gripper status	Get current gripper status
DhOpen(time)	Parameter: time. Delay time required for opening gripper. unit: ms Return: null	Open the gripper
DhClose(time)	Parameter: time. Delay time required for closing gripper. unit: ms Return: null	Close the gripper