

# AG-95 Gripper

## User Guide

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## Preface

### Purpose

This manual introduces the parameters, installation and operation of AG-95 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
2021-8-10	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

[\*AG-95 Short Manual\*](#)

## Contents

<b>1. Description on Gripper.....</b>	<b>1</b>
1.1 Performance parameter .....	1
1.2 Dimensions .....	3
1.3 Color description of indicator lights .....	4
<b>2. Gripper Installation .....</b>	<b>6</b>
2.1 Mechanical installation .....	6
2.2 Electrical connection.....	6
<b>3. Jogging Gripper .....</b>	<b>9</b>
3.1 Jogging gripper in Windows .....	9
3.2 Jogging gripper in Android & iOS.....	13
3.3 Gripper APIs .....	17

## 1. Description on Gripper

AG series are adaptive electric gripper. The number (AG-number) represents the maximum gripping stroke 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 rectangle. It is equipped with an 8-core communication interface, as shown in Figure 1.1.



Figure 1.1 AG-95 Gripper

AG series have the following characteristics:

- **Controllable force/position:** You can adjust the gripping position and gripping force by programming. In the process of gripper movement, the running speed is related to the gripping force. The greater the gripping force is, the higher the running speed is.
- **Multiple communication modes:** The gripper supports Modbus RTU protocol and IO mode control. Other communication protocols such as USB and ETHERNET 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 AG-95 electric gripper are listed in Table 1.1.

Table 1.1 Parameters of AG-95 gripper

Parameters	Description
Maximum recommended load	3kg
Finger opening stroke (can be adjusted through programming)	0-95mm
Gripper force (can be adjusted through programming)	45-160N
Maximum finger opening and closing speed	136mm/s
Weight	1kg
Position repeatability	0.03mm
Communication protocol	TCP/IP, USB2.0, RS485, I/O, CAN2.0A, EtherCAT (optional)
Supply voltage	24V DC±10%
Working temperature range	0~50℃

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 below. 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 AG-95 finger load is shown in Table 1.2:

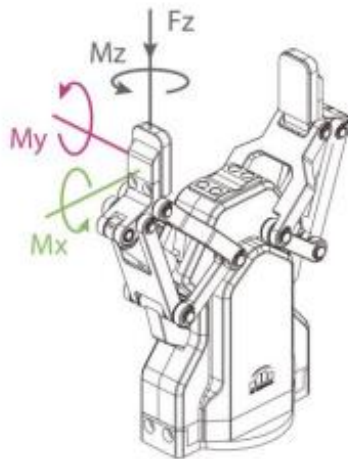


Figure 1.2 Finger load diagram

Table 1.2 AG-95 Finger load.

Max allowable vertical load $F_z$ (static)	300N
Max allowable moment $M_x$ (static)	4.75 N·m
Max allowable moment $M_y$ (static)	4.75 N·m

Max allowable moment $M_z$ (static)	4.75 N·m
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## 1.2 Dimensions

Figure 1.1 shows the dimensions of the gripper.

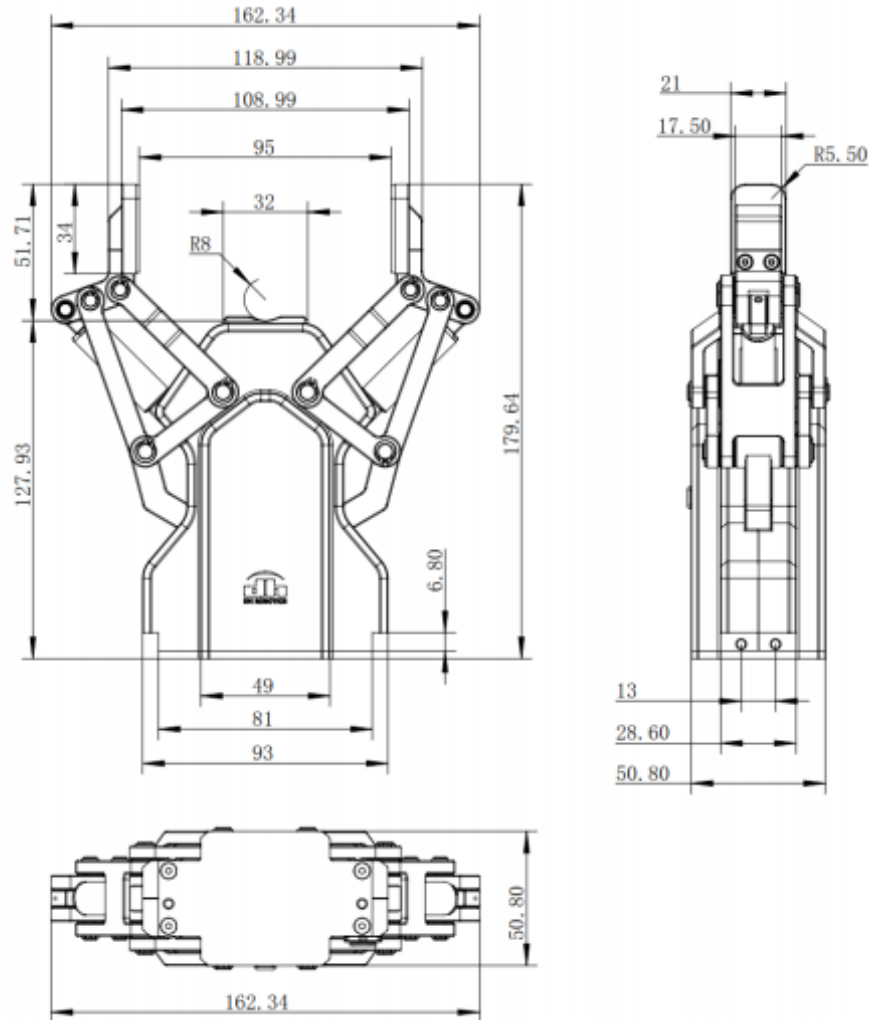


Figure 1.3 AG-95 dimensions diagram

Figure 1.4 and Figure 1.5 show the opening and closing dimensions of AG-95.

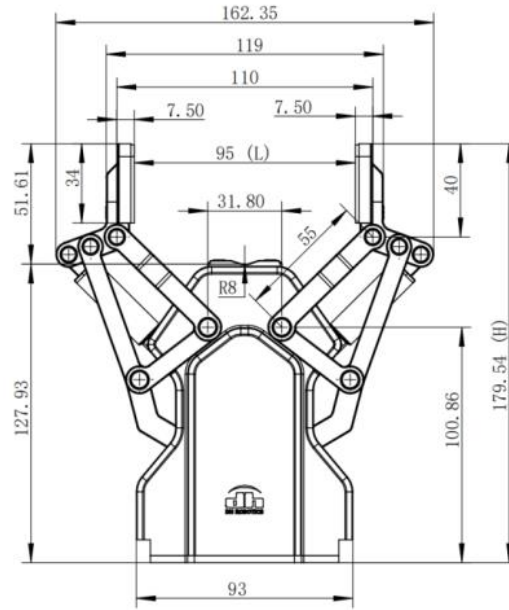


Figure 1.4 Opening size of AG-95 Gripper

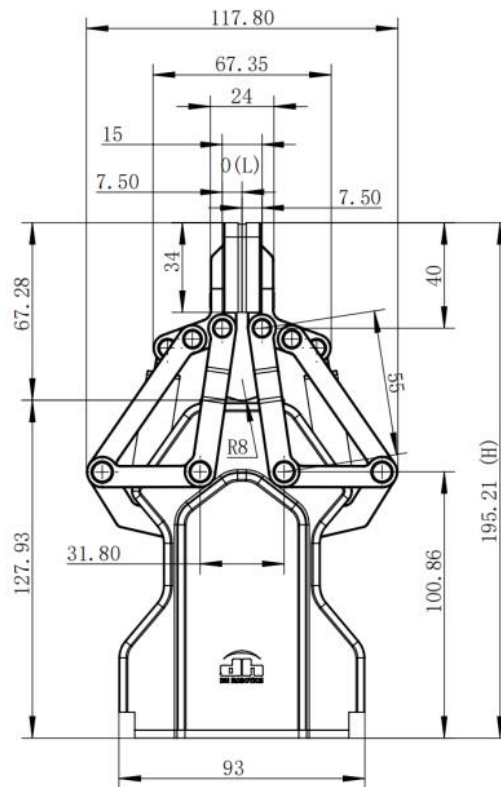


Figure 1.5 Closing size of AG-95 Gripper

### 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: 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: Green light is always on, while other lights are off.
- Object dropped state: Green light blinks.

## 2. Gripper Installation

### 2.1 Mechanical installation

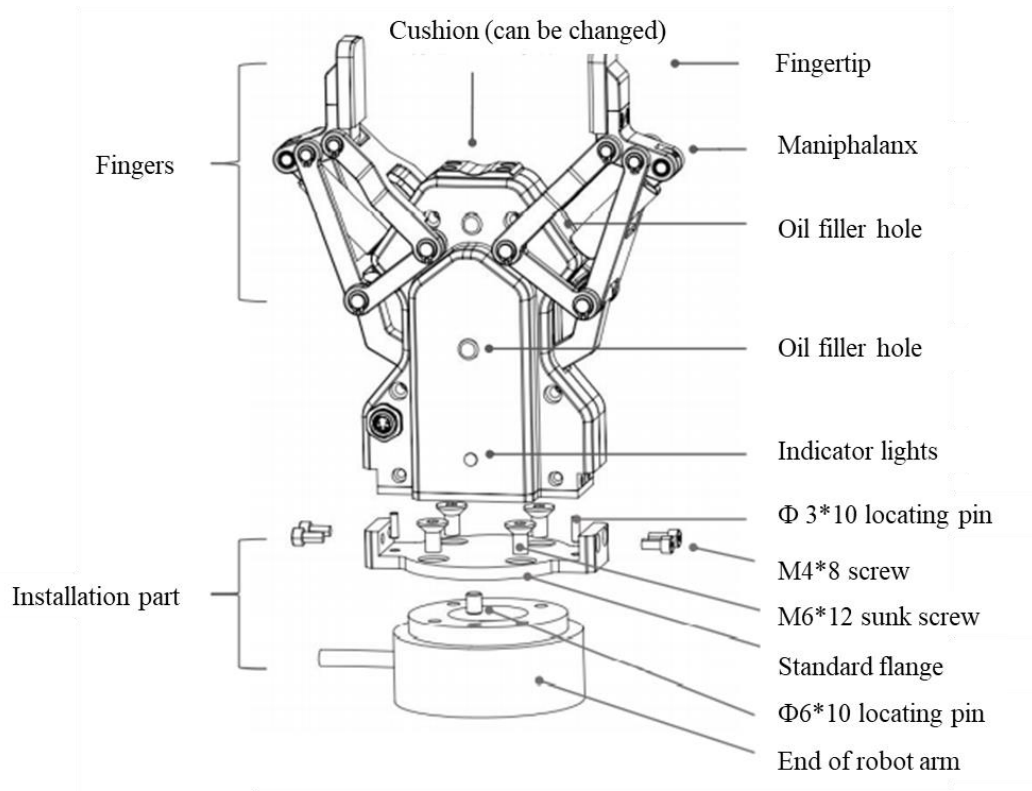


Figure 2.1 AG-95 installation diagram

- 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 sunk screws to fix the flange.
- Step 3** Install  $\Phi 3*10$  locating pins to provide positioning for AG-95 gripper.
- Step 4** Install AG-95 gripper to the flange, and tighten the screws on both sides.

### 2.2 Electrical connection

Figure 2.2 shows the connection between CR robot and AG-95 gripper. You should plug the AG-95 cable to CR I/O port following the right cable sequence.

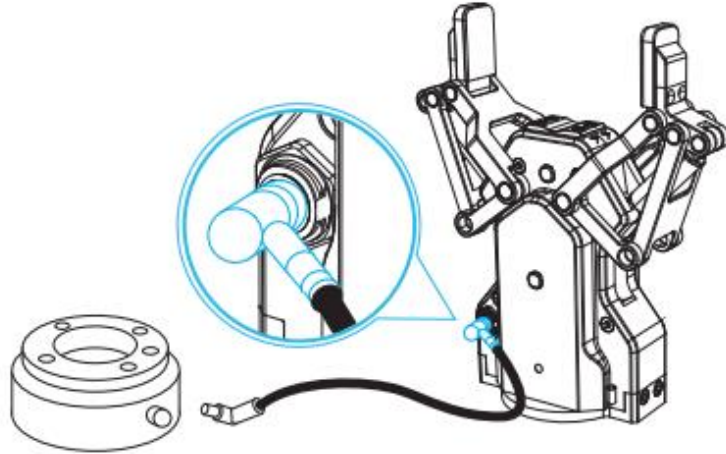


Figure 2.2 Electrical connection

**NOTE**

- If you select other types of grippers, please select the gripper supporting modbus RTU and connect it to robot correctly.

Figure 2.3 and Table 2.1 show the pinout of the gripper.

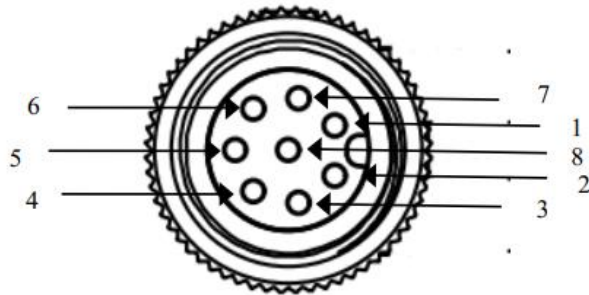


Figure 2.3 Pinout of the gripper

Table 2.1 Pinout assignment

Pin	Wire color	Description
1	white	485_A
2	brown	485_A
3	green	OUTPUT 1
4	yellow	OUTPUT 2
5	grey	24 V
6	pink	INPUT 2
7	blue	INPUT 1

8	red	GND
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Figure 2.4 and Table 2.2 show the end effector pins of CR5.

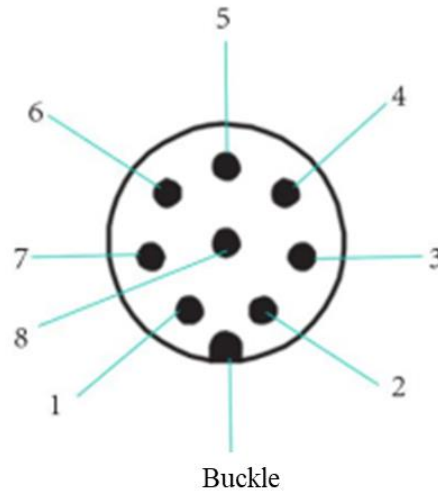


Figure 2.4 I/O interface

Table 2.2 Pin description

Pin	Name	Description
1	AI_1/485A	Analog input 1/485A
2	AI_2/485B	Analog input 2/485B
3	DI_2	Digital input 2
4	DI_1	Digital input 1
5	24V	24V output
6	DO_2	Digital output 2
7	DO_1	Digital output 1
8	GND	GND

### 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.

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

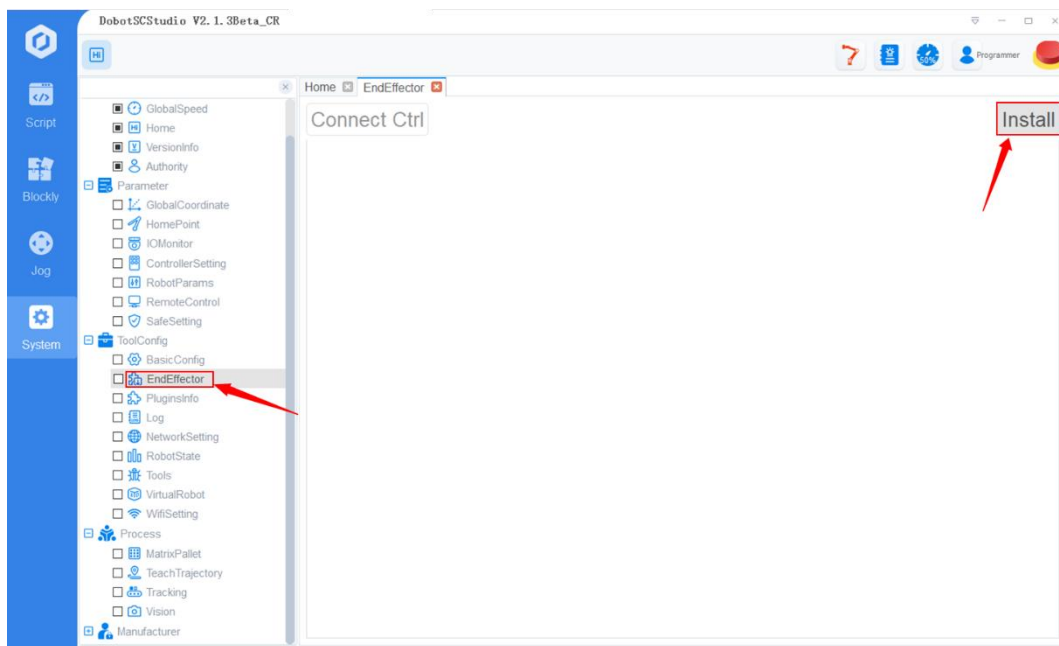


Figure 3.1 EndEffector Page

**Step 2** Install DH.zip.

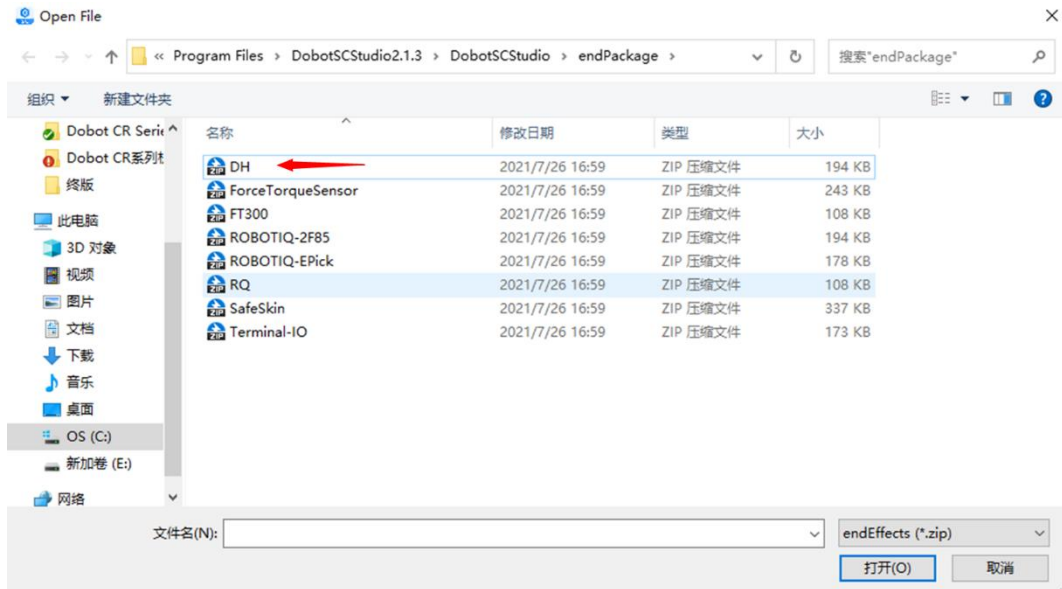


Figure 3.2 Install DH.zip

**Step 3** Set the baud-rate as 115200. Set the ID as 1, and click **Confirm**.  
Click **Init** to initialize the AG-95 gripper.

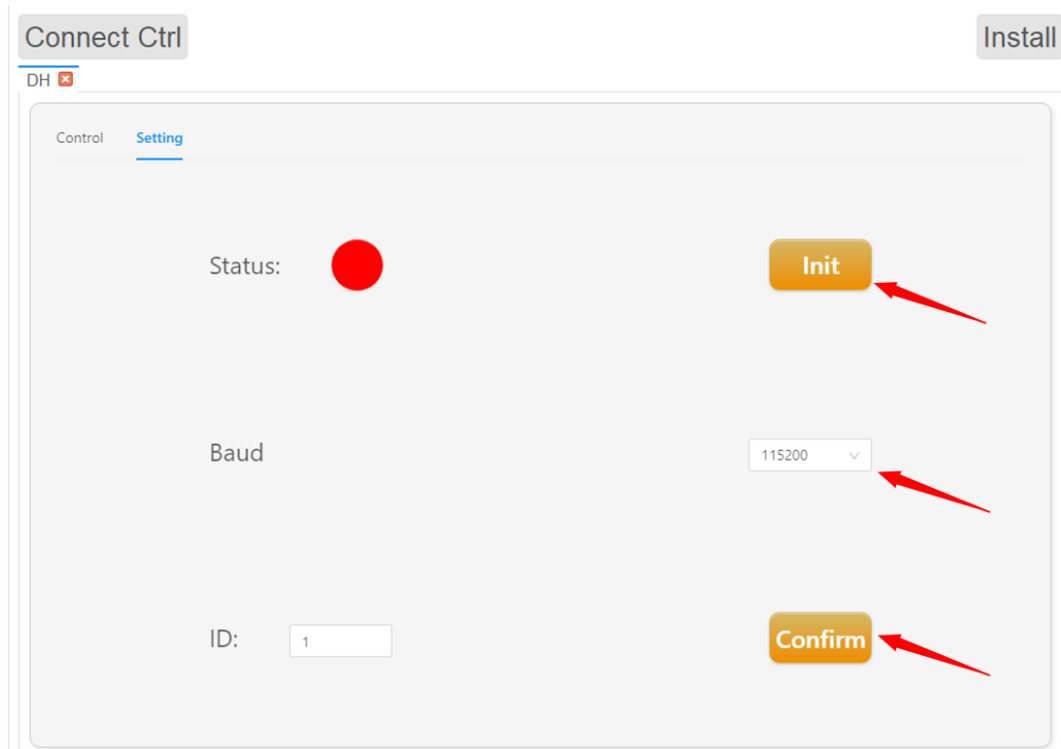


Figure 3.3 Initialize AG-95

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

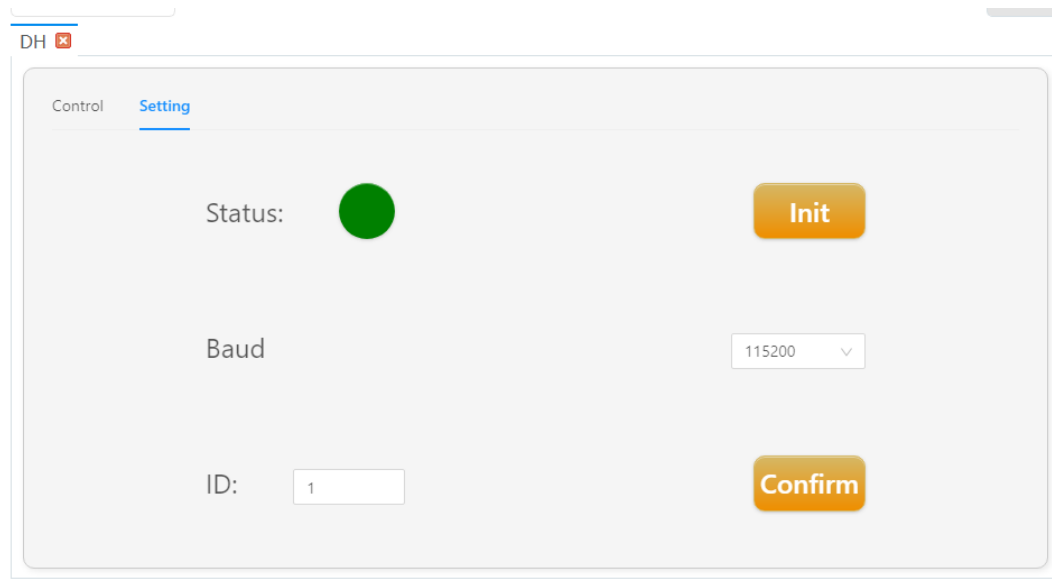


Figure 3.4 Initialization successful

**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.

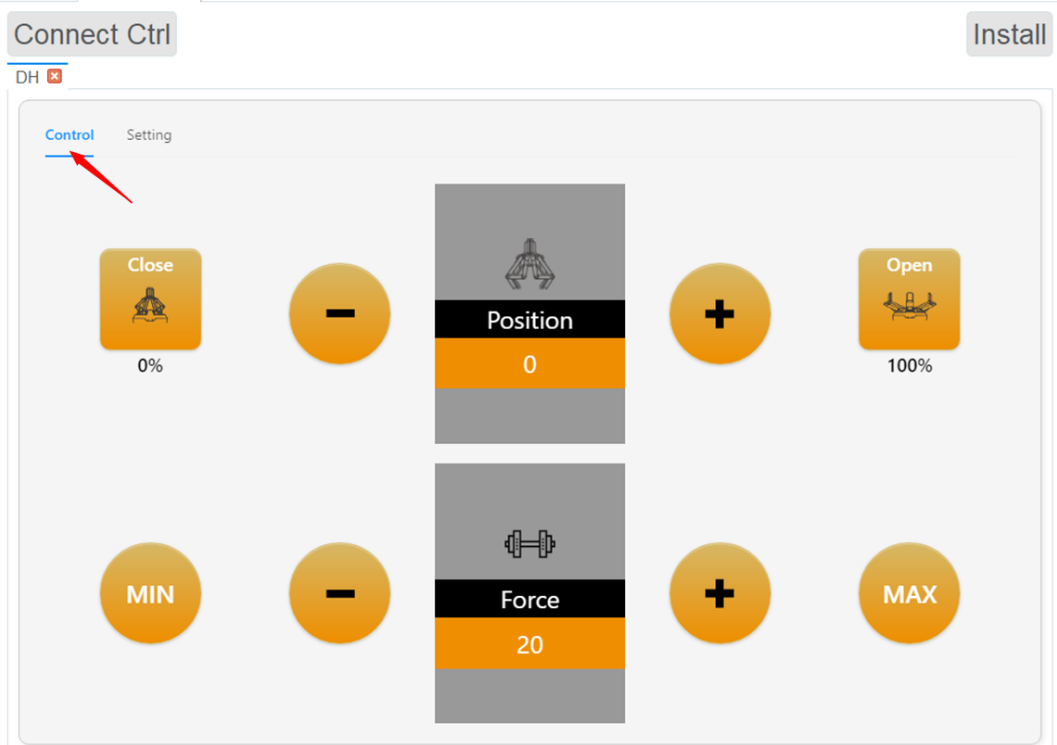


Figure 3.5 Jog the gripper

### 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.

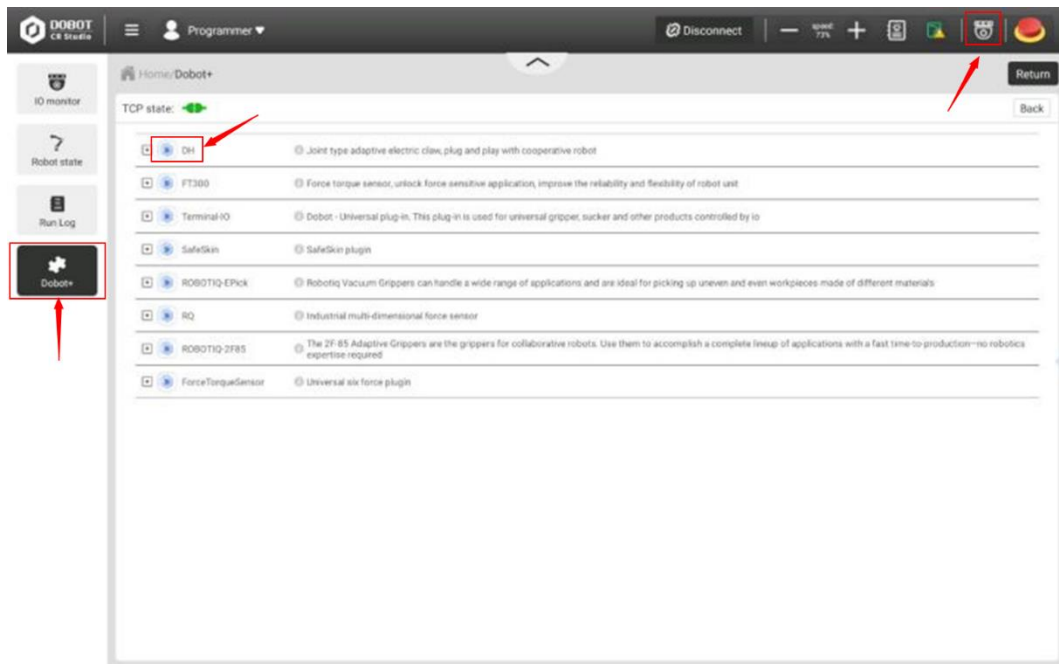


Figure 3.6 Install DH plug-in

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

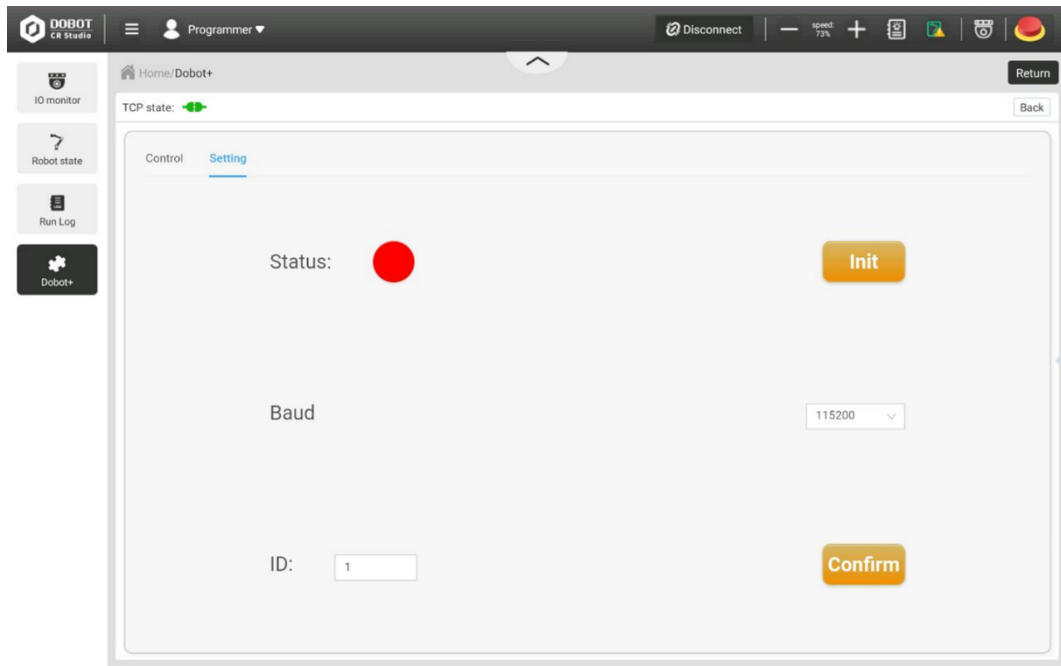


Figure 3.7 Initialize the gripper

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

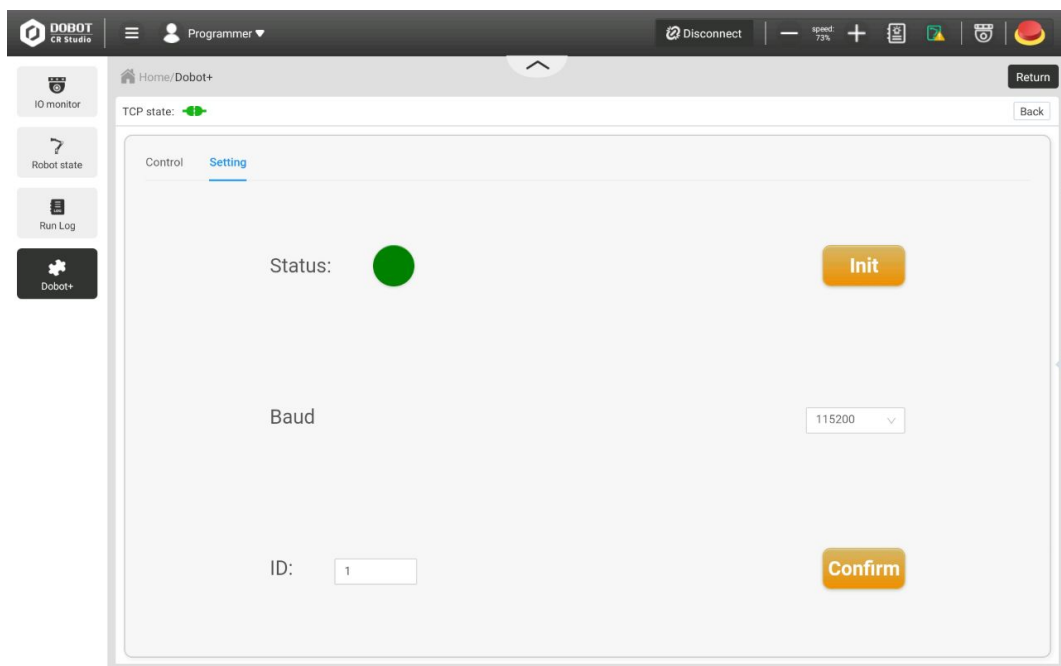


Figure 3.8 Initialization successful

**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 3.1 *Jogging gripper in Windows* for specific description.

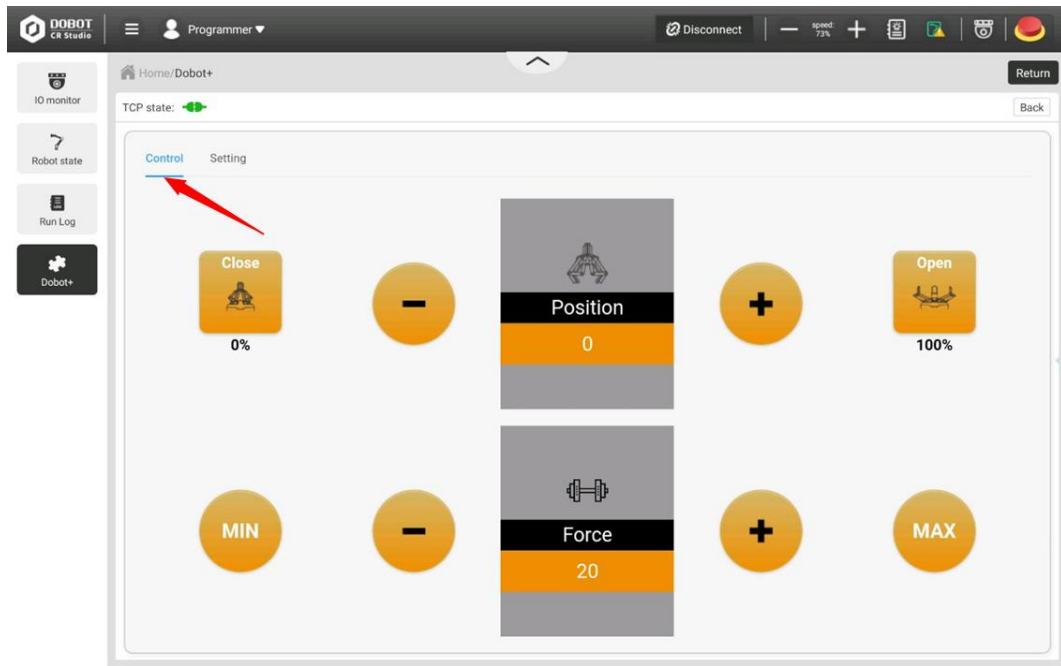


Figure 3.9 Jog the gripper

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.

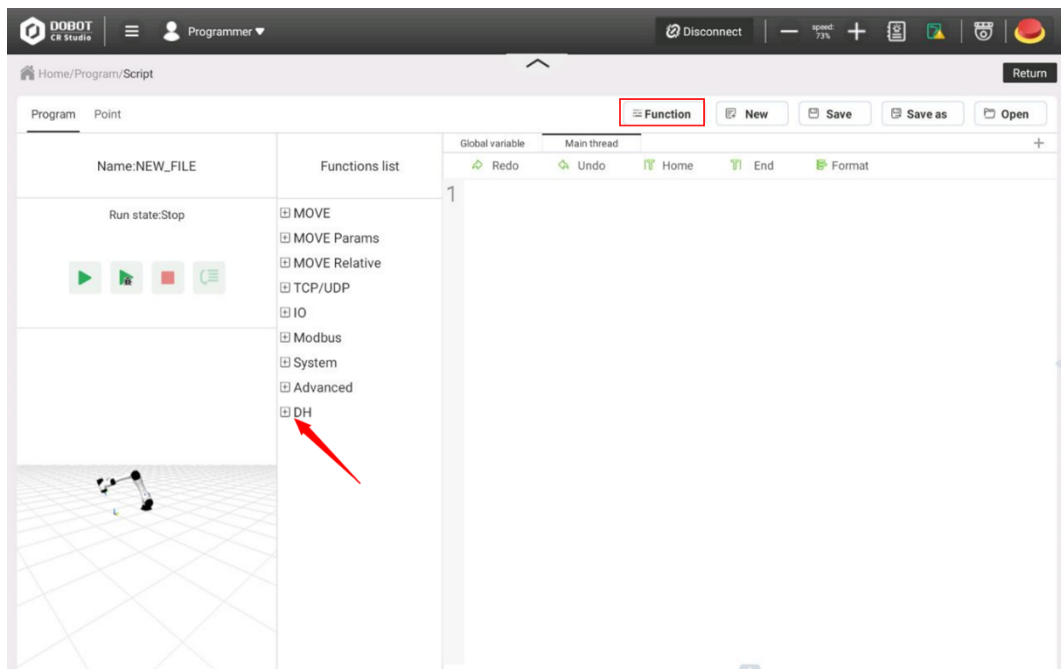


Figure 3.10 Select functions to operate the gripper

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

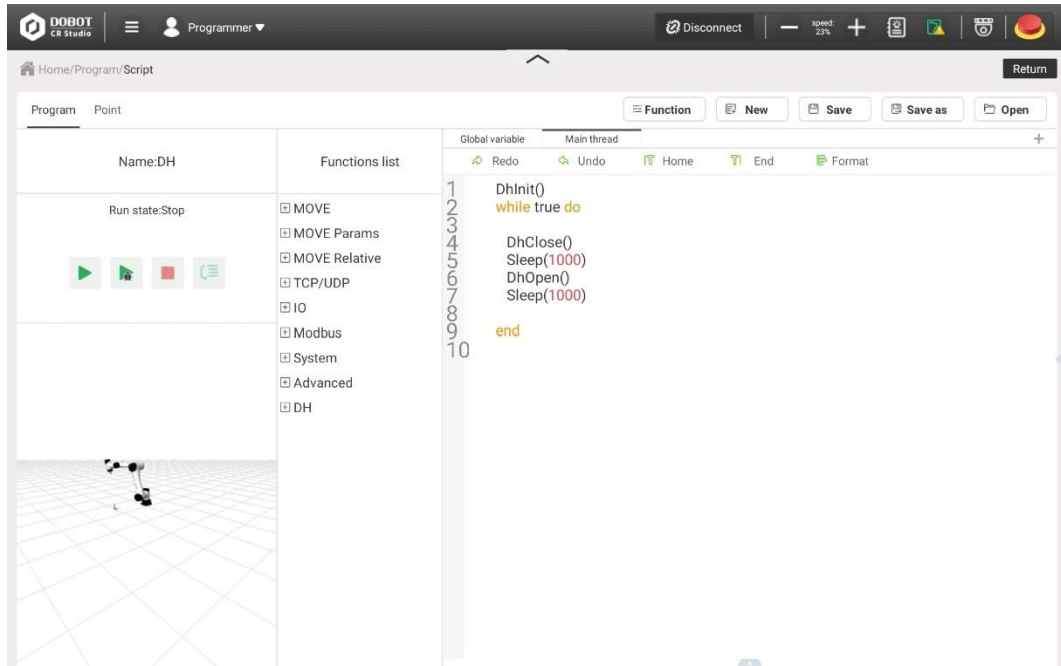


Figure 3.11 Write a program

### 3.3 Gripper APIs

This chapter mainly lists the description on APIs of AG-95 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