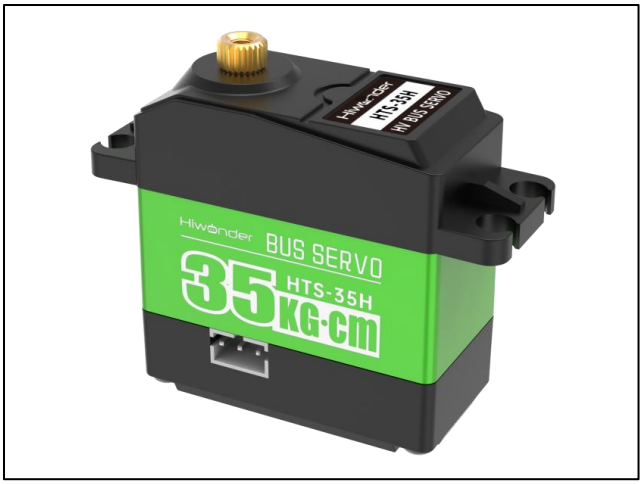
Lesson 1 About Servo

MaxArm uses three HTS-35HV and one LFD-01M digital servos in total.

1. HTS-35H Bus Servo

1.1 Servo Introduction



HTS-35H bus servo is controlled by serial port commands. The serial port baud rate is 115200. Servo parameters and ID are required to be set before controlling.

The interface of this servo is a half-duplex UART asynchronous serial interface so that the signal terminal can send and receive signals. It is widely applicable to different robotic arm joints.

1.2 The Reason for Using HTS-35H Servo

MaxArm is linkage mechanism in machine construction so it needs to use strong torque and single shaft servo with high precision positioning capability. HTS-35H high voltage servo can totally meet these requirements and reduce the current by 60% to increase the battery lift and insist on environmental friendly principle.

1.3 Port Instruction

The port uses anti-reverse plug so do not insert it violently. The pin instruction is shown in the following list:

PIN	PIN Instruction
GND	GND
VIN	Power input
SIG	Signal terminal, half-duplex UART asynchronous serial interface

1.4 Parameter Instruction

Working voltage	DC 9-12.6V
Rotation speed	0.18sec/60°(DC 11.1V)
Torque	35kg.cm (DC 11.1V)
Maximum static torque	35kg.cm (DC 11.1V)
Rotation range	0~ 240°
No-load current	100mA
Stall current	3A
Servo accuracy	0.2°
Angle control range	0-1000 corresponds to 0~ 240°

Control method	UARTUART serial port command
Communication baud rate	115200
Storage	Servo settings are automatically saved when power off
Servo ID	0-253 can be set by user. It defaults to ID1.
Readback function	Support angle readback
Protection	Avoid stalling and overheat
Parameter feedback	Temperature, voltage and position
Working mode	Servo mode and gear motor mode
Gear type	Metal gear
Servo Wire	20cm, other lengths can be selected
Plug-in model	PH2.0-3P
Weight	64g
Size	54.38mm*20.14mm*45.5mm
Application	All kinds of bionic robot joints

1.5 Communication Protocol

Servo uses asynchronous serial bus communication method. Theoretically, up to 253 robot servos can be connected into chain through the bus and they can be you can be uniformly controlled through the UART asynchronous serial interfaces. Each servo can be set as a different node address so multiple

servos can be unified or controlled independently.

Communicating with user's host computer software(controller or PC) through the asynchronous serial interface, you can set parameters and control function. Sending instructions to servo through the asynchronous serial interface, the servo can be set to the motor control mode or position control mode. In the motor control mode, servo can be used as a DC geared motor with adjustable speed; In the position control mode, servo can rotates between 0 and 240 degrees with Plus ± 30 ° deviation adjustable range. Within this range, servo has precise position control performance and adjustable speed.

2. LFD-01M Servo

2.1 Servo Introduction

Compared with other 9g servos on the market, Hiwonder LFD-01M 9g servo has a built-in anti-blocking protection algorithm to prevent burning out caused by locked-rotor or collision, which significantly extends the service life. All metal gears of this servo are optimized to be smooth and durable.

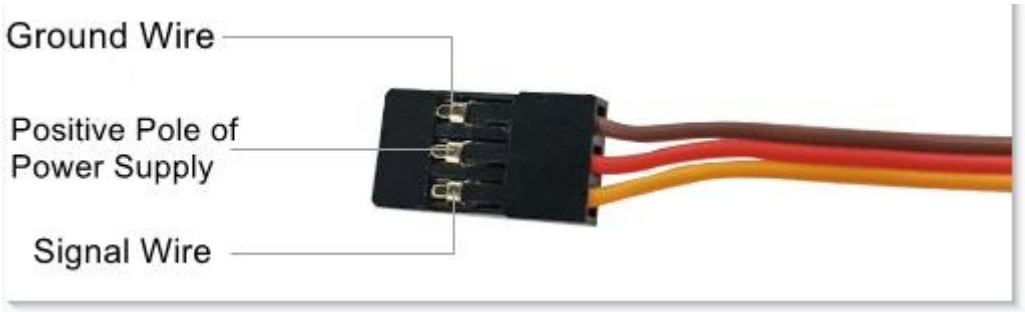
It is widely applicable in DIY design for smart car, robot and robotic arm.

2.2 The Reason for Using LFD-01M Servo

When controlling the position of nozzle suction, MaxArm should be stable and smooth. All gears of LFD-01M servo are optimized to be smooth and durable, which can get better user experience.

2.3 Port Instruction

PIN	Instruction
Brown cable	Ground cable
Red cable	Positive pole of power supply
Orange cable	Signal cable



2.4 Parameter Instruction

Working Voltage	DC 4.8-6V
No-load Current	50mA
Stall Current	700mA
Control Method	PWM pulse width control
PWM Pulse Width	500~2500μs corresponds to 0~180°

Rotation Speed	0.12sec/60° 4.8V 0.10sec/60° 6V
Stall Torque	1.5KG.cm 4.8V 1.8KG.cm 6V
Rotation Range	0~180°
Gear Material	Metal Gear
Servo Wire	26cm
Size	32.5mm*12mm*29.85mm
Weight	14g
Applicable to	All kinds of bionic robot joints