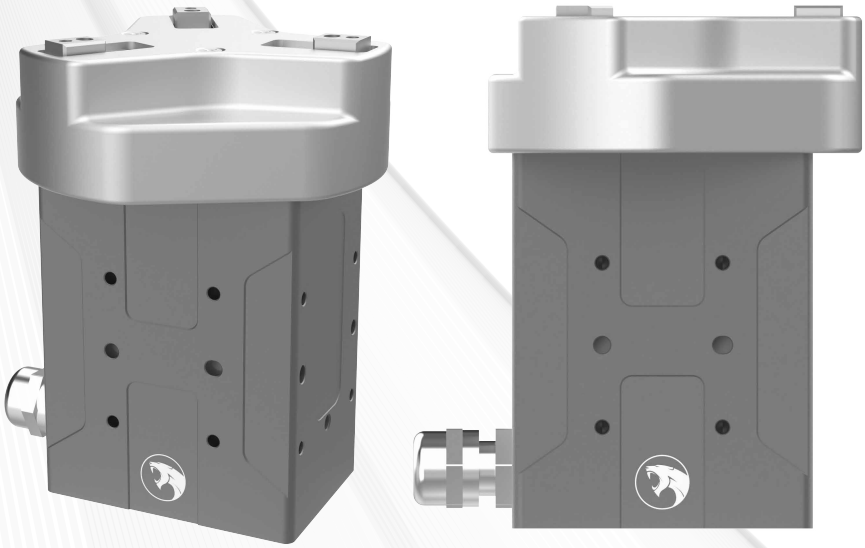
Z-ECG-10
Pruduct Manual

Industrial Robot / Collaborative Robot / Electric Gripper/
Intelligent Actuator / Automation Solution



Hitbot Technology (Shenzhen) Co., Ltd

Three-Finger Electric Gripper Z-ECG-10

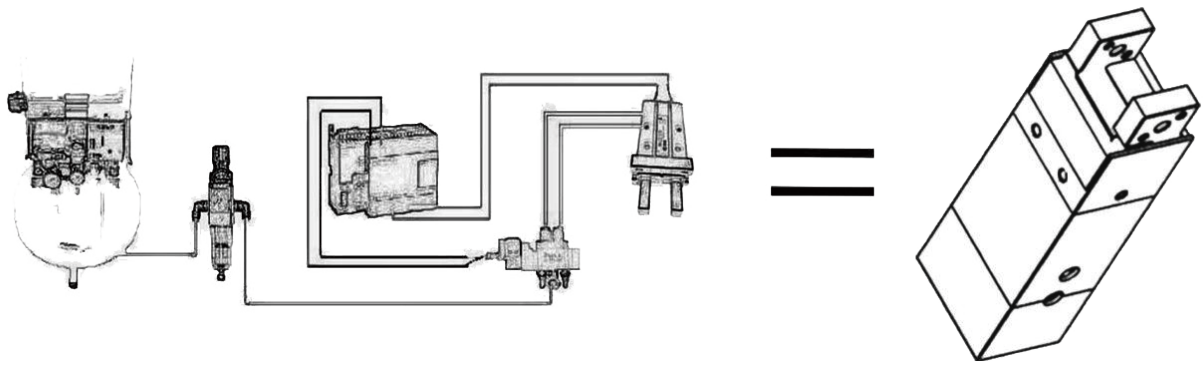
Promoting a revolution in the replacement of pneumatic grippers by electric grippers
First electric gripper with integrated servo system in China



Product Feature

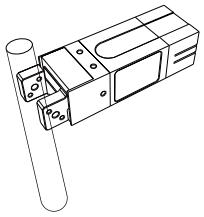
- Gripping drop detection, area output function
- Force, position, and speed controllable, precise control via Modbus
- Three-fingered gripper
- Built-in controller: occupies small space, easy integration
- Multiple control methods: 485 (Modbus RTU), I/O

Highly Integrated

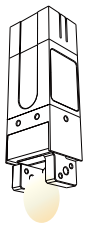


- Perfect replacement for air compressor + filter + solenoid valve + throttle valve + pneumatic gripper
- Multiple cycles service life, consistent with the traditional Japanese cylinder

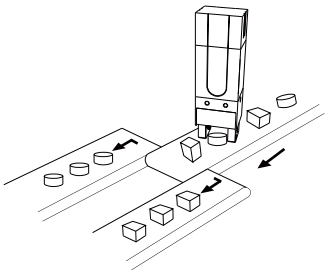
Application Scenes



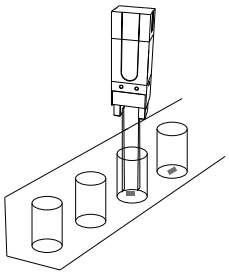
Fragile scene (e.g.test tube)



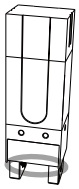
Fragile scene (e.g.eggs)



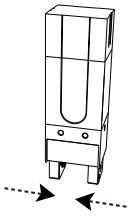
Sorting out things that are arranged in a mess



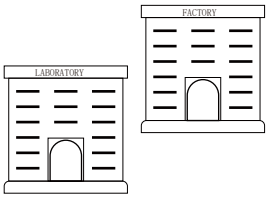
Gripping in narrow scene



Deformable scene (e.g.rings)



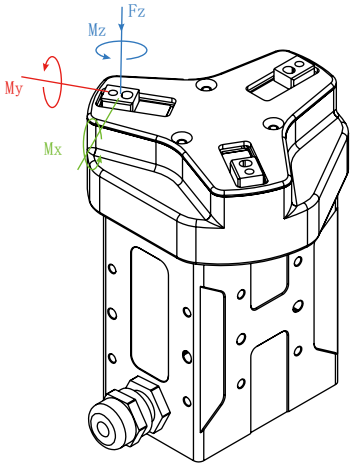
Gripping fragile items at high frequency



Medical, new retail, 3C industry, etc.

Specification Parameters

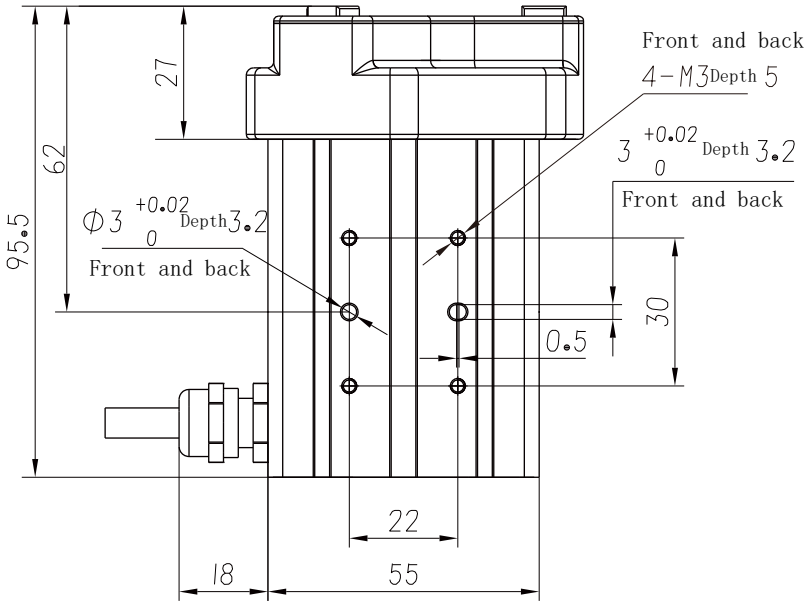
Model No. Z-ECG-10	Parameter
Total stroke	10mm adjustable
Gripping force	3~10N adjustable
Repeatability	±0.03mm
Recommended gripping weight	≤0.2kg
Transmission mode	Precise plenary reducer+ball guide
Grease replenishment of moving components	Every six months or 1 million movements / time
One-way stroke motion time	0.3s
Movement mode	Three finger parallel movement
Weight	0.5kg
Dimensions (L*W*H)	73*73*95.5mm
Operating voltage	24V±10%
Rated current	0.3A
Peak current	0.6A
Power	10W
Protection class	IP40
Motor type	Servo motor
Operating temperature range	5-55℃
Operating humidity range	RH35-80 (No frost)

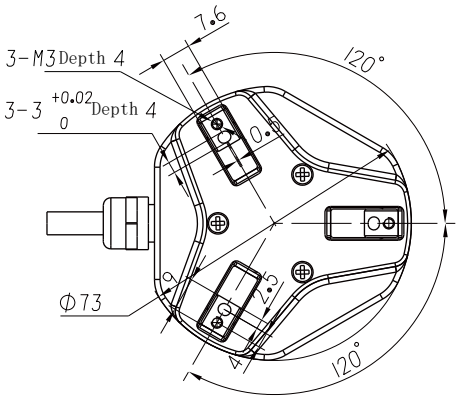


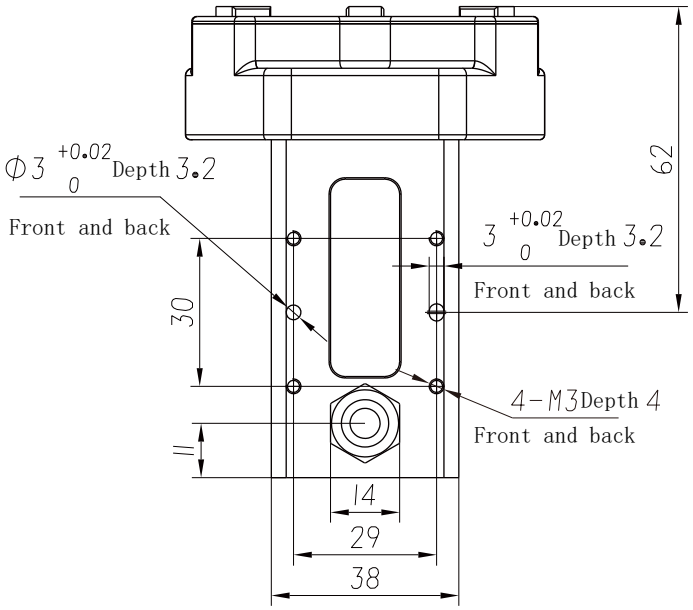
Permissible static load in vertical direction	
Fz:	70 N

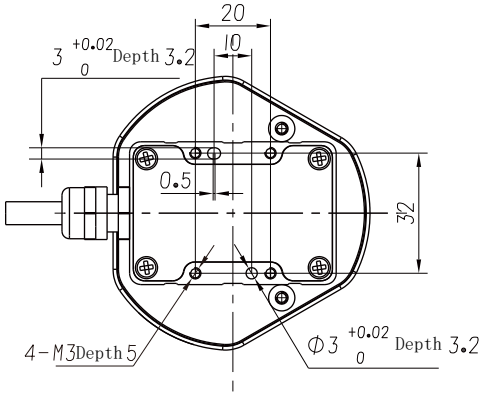
Permissible torque	
Mx:	0.64 N·m
My:	0.4 N·m
Mz:	0.48 N·m

Dimensional Installation Drawing









Wire Sequence Description

Red	24V+
Black	GND
Yellow-white	485-
Yellow	485+
Blue	IN1
Blue and white	IN2
Purple	OUT1
Purple white	OUT2

Notice:

1. Please make sure the positive and negative poles of the power cable is correct and the 485 communication line and I/O line is correct when wiring, as the burning due to incorrect wiring is not covered by the normal warranty.
2. 485 and 24V gripper are not isolated internally, if isolation is needed, customers will need to use other equipment for isolation.

RS485 Communication

The RS485 communication of Z-ECG-10 uses Modbus RTU protocol and the supports function codes including: 0x03, 0x06 0x10, the default communication parameters are as follows.

Baud Rate	115200
ID	1
Data bits	8
Stop bits	1
Checksum	No

Communication Protocols

Function category	Address	Function	Read-write property	Default value (Data type)	Description
Control	0x0000	Initialization	R/W	0 (int)	1. Single direction calibration (calibration direction can be set)
	0x0001	(Reserved)	R/W	0 (int)	
	0x0002	Gripping position	R/W	Maximum value (float)	Unit: mm, Value range:0~10
	0x0004	Gripping speed	R/W	Maximum value (float)	Unit: mm/s, Value range:0~100
	0x0006	Gripping current	R/W	4 (float)	Unit: A,Value range:0.1~0.5
	0x0016	Enable motor	R/W	1 (int)	Write 0 to turn off the motor output, write 1 to enable the motor
	0x0017	Gripping point control point	R/W	0 (int)	Gripping point position mode control parameter, select the communication trigger point, the range of values: 0 ~ 7
State Feedback	0X0040	Initialization state feedback	R	0 (int)	0: Uninitialized, 5: Initialization completed
	0X0041	Gripping state feedback	R	0 (int)	0: in place, 1: operating 2: grip, 3: drop
	0X0042	Gripping position feedback	R	Maximum value (float)	Unit: mm
	0X0044	Gripping speed feedback	R	(float)	Unit: mm/s
	0X0046	Gripping current feedback	R	0 (float)	Unit: A
	0x0050	Error warning not-ification (reserved)	R	0 (int32)	
Parameter Configuration	0x0080	ID	R/W	1 (int)	Value range: 1~247 Valid for restart after saving parameters
	0x0081	Baud rate	R/W	4 (115200) (int)	0~8: baud9600, baud19200, baud38400, baud57600, baud115200, baud153600, baud256000, baud460800, baud921600 saving parameters
	0x0082	Initialization direction	R/W	0 (int)	Set position calibration direction. 0: open calibration,1: Close calibration.
	0x0083	Automatic initia-lization setting	R/W	0 (int)	Set position calibration mode. 0: automatic calibration after power-on, 1: manual control calibration Valid for restart after saving parameters
	0x0084	Save parameters	R/W	0 (int)	Write 1 to save the parameters. Note: Do not use this command during real-time control. Use only for configuration parameters before actual use
	0x0085	Restore default parameters	R/W	0 (int)	Write 1 to restore default parameters
	0x0089	Big and small endian settings(reserve)	R/W	0 (int)	Set endianness. 1: Little endian mode; 0: Big endian mode. Valid after saving parameters and restarting
	0x008A	Restore default parameters	R/W	0 (int)	Automatically set endianness. After writing 999.999 to this register, the gripper will automatically Set to the same endianness mode as the host.
	0x0090	I/O mode switch	R/W	0 (int)	0: close I/O mode, 1: open I/O mode

Indicator light meaning

The gripper has two indicator lights, indicating the gripping status respectively

Red light steady	Not initialized
Green light steady	Initialization completed
Green light flashing	In motion
Blue light steady	Object gripped
Blue light flashing	Object dropped

Work Process

1. The gripper will automatically initialize when it is powered on. After the gripper opens outward, the gripper will complete the initialization process.

Manual initialization instructions:

Device address	Function code	Register start address	Register content	CRC check code
01	06 (HEX)	00 00	00 01 (One-way initialization)	48 0A

2. At this time, the clamping gripper can be controlled through commands

Closing gripper:

Device address	Function code	Register start address	Register length	Number of bytes	Register content	CRC check code
01	10 (HEX)	00 02	00 02	04	00 00 00 00 (Close)	72 76

Setting gripping speed to200:

Device address	Device address	Register s tart address	Register length	Number of bytes	Register content	CRC check code
01	10 (HEX)	00 04	00 02	04	43 48 00 00 (200 (float))	67 CE

Reply: 01 10 00 04 00 02 00 09

Setting gripping current to 0.2:

Device address	Function code	Register start address	Register length	Number of bytes	Register content	CRC check code
01	10 (HEX)	00 06	00 02	04	3E 4C CC CD (0.2 (float))	2B 2F

Reply: 01 10 00 06 00 02 A1 C9

Reading gripping status:

Device address	Function code	Register start address	Register content	CRC check code
01	03 (HEX)	00 41	00 01	D4 1E

Reply: 01 03 02 00 00 B8 44 (00 00 indicates in place, 0: in place, 1: in motion, 2: gripping, 3: dropped)

I/O Function

The input status and control points are shown in the table below:
NPN type is effectively 0V, PNP type is effectively 24V

IN1	IN2	Control clamping point
Invalid	Invalid	1
Efficient	Invalid	2
Invalid	Efficient	3
Efficient	Efficient	4

The state of the gripper indicated by the output state is shown in the table below:
NPN type is effectively 0V, PNP type is effectively 24V

OUT1	OUT2	Clamping state
Invalid	Invalid	In place
Efficient	Invalid	In motion
Invalid	Efficient	Holding
Efficient	Efficient	Drop

Making Automation Easier

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