EFG-100

Product manual

Huiling-tech Robotic Co., Ltd

Phone：0755-36382405

Electric 2-Fingers Parallel Gripper

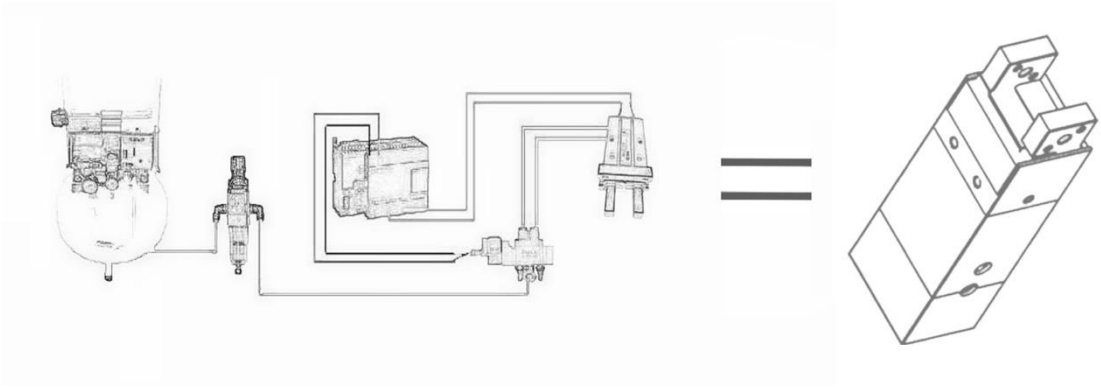
EFG-100

- ✓ Large Stroke
- ✓ EIA485 wire control
- ✓ Adapt to a variety of robotic arms

Promote a Revolution in Replacing

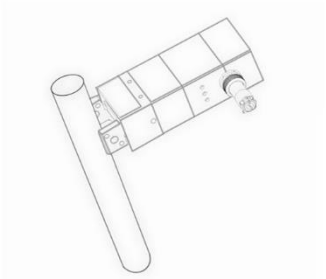
Pneumatics Products with Motor-Driven Ones

E-mail : hitbot@hitbot.cc

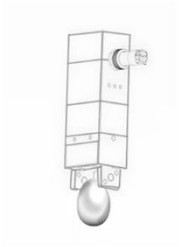


- The EFG series of motor-driven grippers which can be replaced the air compressor, filter, solenoid valve, throttle valve, and pneumatic gripper perfectly.
- With more than 7 million service life, it is in consistent with Japanese traditional cylinder.

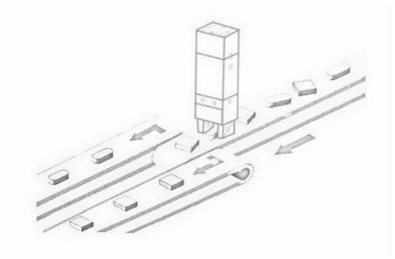
Application scenario



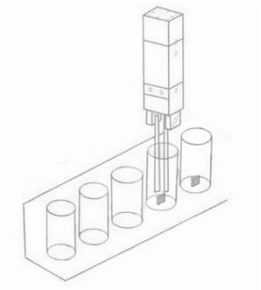
Fragile scenario 1(such as test tube)



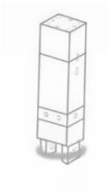
Fragile scenario 2(such as egg)



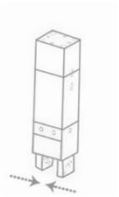
Disorder layout, spare parts arrangement and selection



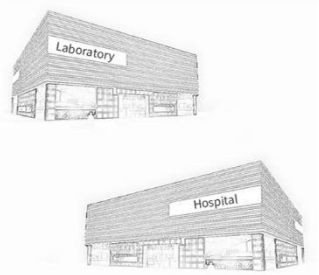
Clamping in narrow scenario



Easy to deform scenario (such as ring)



Soft contact high frequency scenario



Laboratory, medical treatment and other air free scenario

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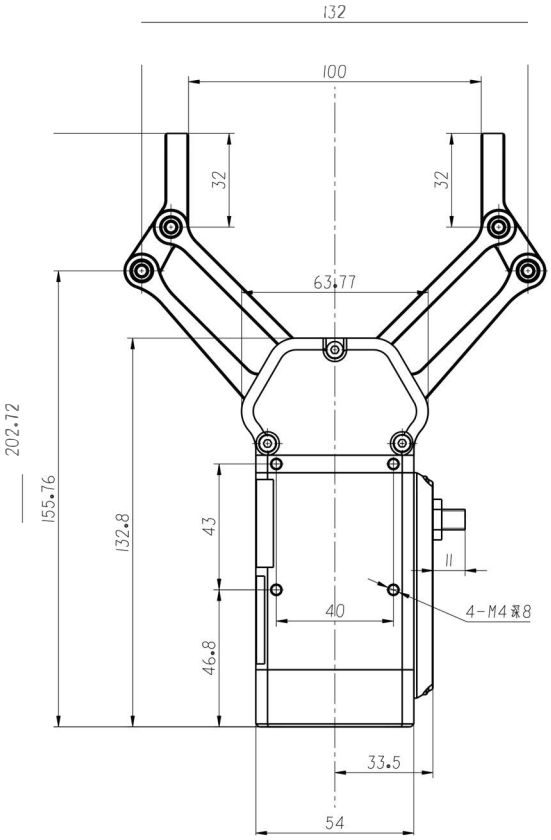
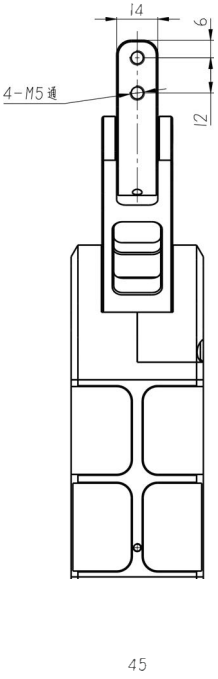
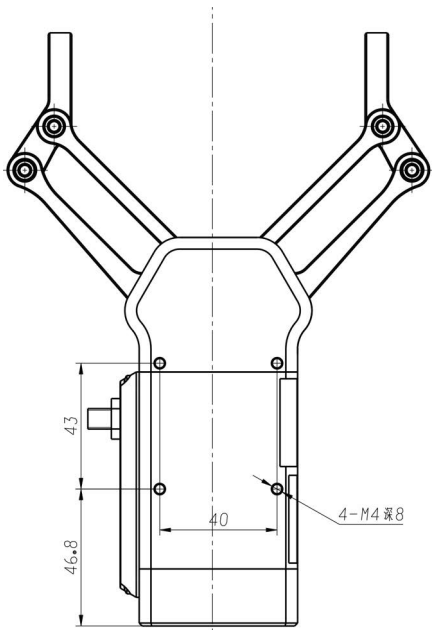
Detailed parameter table of electric gripper EFG-100

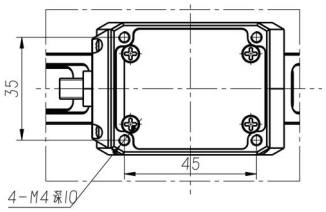
Item	EFG-100
Total stroke	90 mm
Clamping force	35-60 N
Max clamping weight	500 g
Repeated positioning accuracy	±0.02mm
Close or opening time	1s
Operating temperature range	5~55 °C
Adjustable stroke	adjustable
Adjustable Gripping force	adjustable
Weight	0.925 kg
Dimensions（L*W*H）	204*138.5*45 mm(Open)222*79*45mm(Close)
Controller location type	built-in
Power	30W
Rated voltage	24 V

Dimension installation diagram









Bottom threaded hole

Wiring

EFG-100 adopts four core M8 aviation plug for external wiring. 180°outlet wiring and 90°outlet wiring can be selected for matching wiring. The outlet wiring direction of 90° outlet wiring is the clamping jaw end (no clamping finger end).

The wire colors of the matching cables are defined as follows.

Brown	24V+
Blue	0V(24V-、GND)
White	TIA/EIA-485-
Black	TIA/EIA-485+

Warning:

1.Please make sure that the positive and negative electrode of the power supply cord are in wiring and 485 communication and the power supply cord are correct. Burnout caused by wiring error is not within the scope of the normal warranty.

2.EIA485 is not isolated from the external part of the 24Vclamping jaw. Customers need to isolate it with other equipment when necessary.

Communication protocol

The communication protocol adopts half-duplex mode. Namely, the host computer/PLC sends control command to the lower computer and the lower computer returns the command to the host computer after a period of time.

The communication supports bus control can configures different ID number for clamping jaw with the ID range 0x00~0xFE. 0xFF is radioed instruction. All clamping jaws will respond but will not return the command.

The host computer sends read-write command structure to the clamping jaw as follows:

Fixed length of data head 3byte			ID 1byte	Read/Write	start address 1byte	data len 1byte	data (len byte1)(write)	CRC8 1byte
0x48	0x49	0x74	0~0xFF	0x00 read/0x01write	(0x00~0xFF)	0x00 ~ 0xFF	0x00 ~ 0xFF	CRC-8

The clamping jaw returns the write command structure to the host computer as follows:

Fixed length of data head 3byte			ID 1byte	status	CRC8 1byte
0x46	0x4A	0x48	0~0xFF		CRC8 1byte

Among them, status is the register 0x6C status, which indicates the current err status.

The clamping jaw returns the read command structure to the host computer as follows:

数据头 固定长度3byte			ID 1byte	start address 1byte	data len 1byte	data (len byte)	CRC8 1byte
0x46	0x4A	0x48	0~0xFF	(0x00~0xFF)	(0x00~0xFF)	0x00 ~ 0xFF	CRC-8

CRC-8 is the whole section data verification, which starts from the data head. The host computer starts from 0x48. The return command of the clamping jaw starts from 0x46.
CRC-8 verification multinomial is x8 + x2 + x + 1, no reverse or
Reference code

```
#define CRC8_INIT 0
#define XOROUT 0
 /**
 * brief    CRC8_Calc
 * param    p_data* not change when run this fun
 *          len  <255
 * retval   CRC-8
 */
U8 CRC8_Calc(U8 *p_data, U8 len)
{
    U16 window;
    U8 i,j, *crc8_h, *crc8_l;
    crc8_h = (U8*)(&window)+1;
    crc8_l = (U8*)(&window);
    *crc8_h = CRC8_INIT;
    for(j=0; j<=len; j++)
    {
        if(j < len)
        {
            *crc8_l = *p_data;
        }
        p_data++;
        for(i=0; i<8 ;i++)
        {
            if((*crc8_h & 0x80) != 0)
            {
                //xor
                window <<= 1;
                *crc8_h ^= CRC8_POLY;
            }
            else
            {
                window <<= 1;
            }
        }
    }
    return ((*crc8_h)^XOROUT);
}
```

Register address and description

Address 0x00~address 0x55 are the backup address of EEPROM. EERPOM will read them into RAM with power on and modify these numerical values without affecting EEPROM. If the modified values are written into EEPROM through instructions, the modified values will be read

address	Name	R/W	Reset value	Description
0x00	ID	R/W	0x01	0x00~0xFE,0xFF re broadcast address
0x01	baudrate	R/W	BaudRate_1000000	0:BaudRate_1000000 1:BaudRate_500000 2:BaudRate_115200 3:BaudRate_57600 4:BaudRate_38400 5:BaudRate_9600 Other: BaudRate_9600
0x02	version_L	R	0	
0x03	version_H	R	0	
0x04	time delay_L	R/W	0x00	485 communication return delay “0” with maximum speed, unit is us
0x05	time delay_H	R/W		
0x06	mode1 positon_L	R/W	0x1F4(500)	(100-1000)set position
0x07	mode1 positon_H	R/W		
0x08	mode1 speed	R/W	0xFF	(0-0xFF) slowest to fastest
0x09	mode1 torque	R/W	0xFF	(0-0xFF)minimum to maximum
0x0A	mode1 feedback_positon_min_L	R/W	0x1C2(450)	(100-1000)detection small value when stop
0x0B	mode1 feedback_positon_min_H	R/W		
0x0C	mode1 feedback_positon_max_L	R/W	0x266(550)	(100-1000)detection big value when stop
0x0D	mode1 feedback_positon_max_H	R/W		
0x0E	mode2 positon_L	R/W	Repeat mode1	
0x0F	mode2 positon_H	R/W		
0x10	mode2 speed	R/W		
0x11	mode2 torque	R/W		
0x12	mode2 feedback_positon_min_L	R/W		
0x13	mode2 feedback_positon_min_H	R/W		
0x14	mode2 feedback_positon_max_L	R/W		
0x15	mode2 feedback_positon_max_H	R/W		
0x16	mode3 positon_L	R/W		
0x17	mode3 positon_H	R/W		
0x18	mode3 speed	R/W		
0x19	mode3 torque	R/W		
0x1A	mode3 feedback_positon_min_L	R/W		
0x1B	mode3 feedback_positon_min_H	R/W		
0x1C	mode3 feedback_positon_max_L	R/W		
0x1D	mode3 feedback_positon_max_H	R/W		
0x1E	mode4 positon_L	R/W		
0x1F	mode4 positon_H	R/W		
0x20	mode4 speed	R/W		
0x21	mode4 torque	R/W		

0x22	mode4 feedback_positon_min_L	R/W		
0x23	mode4 feedback_positon_min_H	R/W		
0x24	mode4 feedback_positon_max_L	R/W		
0x25	mode4 feedback_positon_max_H	R/W		
0x26	mode5 positon_L	R/W		
0x27	mode5 positon_H	R/W		
0x28	mode5 speed	R/W		
0x29	mode5 torque	R/W		
0x2A	mode5 feedback_positon_min_L	R/W		
0x2B	mode5 feedback_positon_min_H	R/W		
0x2C	mode5 feedback_positon_max_L	R/W		
0x2D	mode5 feedback_positon_max_H	R/W		
0x2E	mode6 positon_L	R/W		
0x2F	mode6 positon_H	R/W		
0x30	mode6 speed	R/W		
0x31	mode6 torque	R/W		
0x32	mode6 feedback_positon_min_L	R/W		
0x33	mode6 feedback_positon_min_H	R/W		
0x34	mode6 feedback_positon_max_L	R/W		
0x35	mode6 feedback_positon_max_H	R/W		
0x36	mode7 positon_L	R/W		
0x37	mode7 positon_H	R/W		
0x38	mode7 speed	R/W		
0x39	mode7 torque	R/W		
0x3A	mode7 feedback_positon_min_L	R/W		
0x3B	mode7 feedback_positon_min_H	R/W		
0x3C	mode7 feedback_positon_max_L	R/W		
0x3D	mode7 feedback_positon_max_H	R/W		
0x3E	mode8 positon_L	R/W		
0x3F	mode8 positon_H	R/W		
0x40	mode8 speed	R/W		
0x41	mode8 torque	R/W		
0x42	mode8 feedback_positon_min_L	R/W		
0x43	mode8 feedback_positon_min_H	R/W		
0x44	mode8 feedback_positon_max_L	R/W		
0x45	mode8 feedback_positon_max_H	R/W		
0x46	mode9 positon_L	R/W		
0x47	mode9 positon_H	R/W		
0x48	mode9 speed	R/W		
0x49	mode9 torque	R/W		
0x4A	mode9 feedback_positon_min_L	R/W		
0x4B	mode9 feedback_positon_min_H	R/W		
0x4C	mode9 feedback_positon_max_L	R/W		
0x4D	mode9 feedback_positon_max_H	R/W		
0x4E	mode10 positon_L	R/W		
0x4F	mode10 positon_H	R/W		
0x50	mode10 speed	R/W		
0x51	mode10 torque	R/W		
0x52	mode10 feedback_positon_min_L	R/W		
0x53	mode10 feedback_positon_min_H	R/W		
0x52	mode10 feedback_positon_max_L	R/W		
0x53	mode10 feedback_positon_max_H	R/W		
0x54	mode10 feedback_positon_max_L	R/W		
0x55	mode10 feedback_positon_max_H	R/W		

Address0x60~address 0xA3 operation register is stored in RAM losing power off

address	Name	R/W	Description	Remark
0x60	mode0 positon_L	R/W	Mode 0 is the current operation status format such as mode 1	
0x61	mode0 positon_H	R/W		
0x62	mode0 speed	R/W		
0x63	mode0 torque	R/W		
0x64	mode0 feedback_positon_min_L	R/W		
0x65	mode0 feedback_positon_min_H	R/W		
0x66	mode0 feedback_positon_max_L	R/W		
0x67	mode0 feedback_positon_max_H	R/W		
0x68	run mode x	R/W	Operation mode x, if x!=0 is loaded to mode 0	
0x69	feedback	R	0×FF feedback status, clamping jaw stops and position is not within the set feedback position 0×F0 feedback status, clamping jaw stops and position is not within the set feedback position 0×0F feedback status, clamping jaw acts and position is not within the set feedback position 0×0 feedback status, clamping jaw acts and position is within the set feedback position	
0x6A	now positon_L	R	Clamping jaw current position	
0x6B	now positon_H	R		
0x6C	error	R	Error status feedback	error:bit7 EEPORM ERR error:bit6 Voltage ERR error:bit1 Power on not calibrated error:bit0 is whether within the feedback range
0x6D	Voltage	R	Current voltage value	
0xA0	power on griper check	R/W	Power on not triggered. Assign 0*55 opening calibration with power on each time, 0*AA closing calibration. It is necessary to implement only one type for once.	Prevent error operation and only single register operation date len=1;
0xA1	EEPROM Rest	R/W	0×A5 continuous write three times EEPROM reset	Prevent error operation and only single register operation date len=1
0xA2	Write EEPROM	R/W	0×A5 continuous write three times 0*00-0*55 write EEPROM	Prevent error operation and only single register operation date len=1
0xA3	soft restart	R/W	0×A5 continuous write three times software rest	Prevent error operation and only single register operation date len=1

Note: The clamping jaw will operate normally after the operation of A0 register and calibration with power on each time. It is necessary to implement one type for once.
Clamping jaw command example
Query ID :0x48 0x49 0x74 0xff 0x00 0x00 0x01 (0x78)
Closing calibration 0x48 0x49 0x74 0x01 0x01 0xA0 0x01 0xAA (0x35)
Opening calibration 0x48 0x49 0x74 0x01 0x01 0xA0 0x01 0x55 (0xC6)
Query voltage 0x48 0x49 0x74 0x01 0x00 0x6D 0x01(0xA3)
Force high speed opening 0x48 0x49 0x74 0x01 0x01 0x60 0x09 0xE8 0x03 0xff 0xff 0x00 0x00 0xFF 0x00 0x00 (0x2A)
Force high speed closing 0x48 0x49 0x74 0x01 0x01 0x60 0x09 0x64 0x00 0xff 0xff 0x00 0x00 0xFF 0x00 0x00 (0x09)
Read current position 0x48 0x49 0x74 0x01 0x00 0x6A 0x02 (0xC1)
Inside the bracket checksum

Huiling-tech Robotic Co., Ltd

Phone 0755-36382405

E-mail hitbot@hitbot.cc

Website www.hitbot.cc

Address 1st. Bd. No. 7,CRIP.,Dayang Rd.90,Baoan Dist.,Shenzhen,PRC