

EG2-1C2 ELECTRIC GRIPPER OPERATION INSTRUCTIONS



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Instructions for EG2-1C2 Electric Gripper

EG2-1C2 Electric Gripper is a high-performance electric gripper integrated with the brushless servo system. It has many benefits such as precision and hybrid control over the force and positions, flexible gripping, compact structure, five-sided installation, integrated controller, fast and efficient layout of application scenarios.

The gripper has the following features:

- ① Grip force: EG2-1C2 can realize the grip force of 2-30N;
- ② Supply voltage: 24V±10%;
- (3) Positioning repeatability: ± 0.01 mm; force repeatability: ± 0.2 N;
- ④ Total stroke: 0-12mm;
- (5) Overheating and over-current protection;

(6) The RS485 serial port is used for communication and supports MODBUS RTU Protocol and the I/O mode.



Shipment Configuration of EG2-1C2 Electric Gripper

Instructions are provided below:

Connect the cable plug of the gripper to the supplied aviation plug cable. Connect the DC terminal of the aviation plug cable to the power adapter. Connect the USB port of the USB-RS485 module to the PC. Turn on power supply.

Note: "Automatically returning to the reference point after power-on" is the default function of the gripper after delivery.



2. Start "PC Software of Electric Gripper MCU". Select the corresponding COM port and baud rate. Click "Search" to successfully connect the PC software.

¥ Inspire robots-EG Gripper		-	- 🗆 ×
Connect device Language(语言)	Help Status frame format sett	ing Firmware update DebugTest	
A servo actuat	Parameter information ID1 - Baud rate	116200 - ******-2033.15.31-655358	日机器人
10-1	Operation data monitoring		
		15700 🛊 12000 🛊 🚺 🗁 🔯 X_axis length:2000ms 💠 Num of segments:5 💠 🗋 🗃 80	JO 🗘 30 🗘
	✓ Pos_Act(um): -4.4	00057	0030
Status and fault 20°C Clear	Speed_Act(RPM): 0.0	692 - 0006	0010
Drive fault Parameter missing Motor side sensor error	Current_Set(RFM): 23.7	Pres (mp) Pres (mp) 600	000 000 000 Force(11)
Abnormal current detection Encode fault Load side sensor error	🗹 Current(mÅ): 23.5	8 000E	-400 -015
Force sensor signal error Overvoltage Undervoltage	☐ Force(H): 0.0		<i>4:31−677</i> 800 € −30 €
Overcurrent	Normal TO		
Uvertemperature	Open	Clamp 3 Status Cycle test	
_ 0	POS:12.00mm	POS:0.00mm Force: 15.00N at the position Opening	
- 2	Speed:452.42mm/s	Speed:452.42mm/s Continue run Set Clamped to object Clamping jects when opening Object falls	
	4	5	

PC Software Diagram

① Position: A specific stroke can be set for gripper unclenching and grasping within the range of 0-12 mm;

(2) Speed: A speed can be set for gripper unclenching and grasping within the range of 0-90 mm/s;

③ Force control: The magnitude of grip force can be set within the range of 2-30 N;

④ Unclenching: Enter the position and speed properly, and then click "Setting"; the gripper will unclench and move to the set position;

(5) Gripping: Enter the position and speed properly, and then click "Setting"; the gripper will close and move to the set position.

3. Modify the ID and baud rate of the gripper.

For example, the gripper ID is 1 and its baud rate is 115200.

3.1 Perform modification with the debugging software in the PC.

① Connect the gripper as shown below.



Gripper Connection Diagram

(2) Start the PC software and select "Connect equipment" \rightarrow "Quick Connection" \rightarrow select the corresponding COM port and baud rate \rightarrow "Search". The gripper will be connected successfully.

¥ Inspire robots-EG Gripper Connect device Language(语言) Help Status frame format setting Firmware update DebugTest	- 🗆 X
A servo actuat	Parameter information ID0	因时机器人
	Operation data monitoring 30000(© 10000(© 10000(© 110000)) []] [] [] [] [] [] [] [] [] [] [] [] []	10000 🗢 200 🗢
	Pos_Act(un) Set Vuick search(Applies to only o ? ×	10000
Status and fault O'C	☑ Speed_Aot(RFM)	588
Parameter missing Motor side sensor error Abnormal current detection	Current_Set(878)	0000 Current (mA) 0000 ¥erce (N)
Encode fault Load side sensor error	Current (nA)	-100
Force sensor signal error Overvoltage Undervoltage	Porce(II) 35: 9-235 56: 9-235 56: 10-435 56: 10-835 -3000[‡] 0 [‡] 56: 10-835 56: 10-835	56:11-235 > -1000 \$ -200 \$
Overcurrent Overtemperature	Normal 10 Group 1 Group 2 Group 3 Group 4	
	Read Open I/O Mode POS:Onn Write POS:Onn Force:0.00N Speed:Onn/s Speed:	Write Test
-	Serial port is not open	No device connected!
	PC Software Connection Diagram ①	

nnect device Language(语言 servo actuat	Help Status frame format set Parameter information ID1 + Baud rate	ing Firmware update DebugTest 115200 ✓ ▼□ ######~2033.15.31-6655368 软件版本:2023-4-17 ■ ■ 医野	加器
0-1	Operation data monitoring		E-ROB
		15700 🛊 12000 🛊 📕 ▷ 💢 X_axis length:2000ms 🛊 Num of segments:5 🛊 🗋 🛱 800	\$ 30
	Pos_Act(um): -8.8	1510	0800
fatus and fault 6°C	Speed_Act(RFM): 0.0	0106	0400 0015
rive fault arameter missing otor side sensor error	Current_Set(RPM): 0.0	bend Ebrod	adaa urrent(a d) adaa
bnormal current detection ncode fault oad side sensor error	Current(mA): 13.1	- 1005 - 102	-400 -015
orce sensor signal error vervoltage	Force(N) : 0.0	201-127 2.41-227 2.41-	-030
ndervoltage		-1570 t 0 t <	-30
vercurrent	Name 1 TO	The current port connected to the gripper, baud rate, and ID are displayed	here.
vertemperature	Onen	Clann Status (vole test	
	P05:12.00m	PDS:0 00mm Force: 15 00N at the position Opening 0 pos	_
	Set Speed: 452. 42mm/s	Speed: 452. 42am/s Continue run Set Clamped to object Clamping Run jects when opening Object falls	STO

PC Software Connection Diagram ②

(3) Change ID to 2 and the communication baud rate to 57600, and click "Setting". Then select "Save".



PC Software Connection Diagram ③

(4) After power-off and restart, select "Connect equipment" \rightarrow "Quick Connection" \rightarrow select the corresponding COM port and baud rate \rightarrow "Search" in the PC software.

Inspire robots-EG Gripper			- 🗆 X
Connect device Language(语言	() Help Status frame format se	tting Firmware update DebugTest	
	Parameter information		
A servo actuat	ID2 🔹 Baud rate	s 57600 ✓ ↓ 🕞 ******-2033.15.31-65535N Firm*are:2023-4-17	
ID-2	Operation data monitoring		
		15700 🛊 12000 🛊 🔢 🗁 🎉 🛛 🗶 X_axis length:2000ms 🛊 Num of segments:5 🐳 🗋 📋	800 🗘 30 🗘
	✓ Pos_Act(um): ~4.4	20251	0880
Status and fault 22°C	Speed_Act(RPM): 0.0	0501	0012
Drive fault Parameter missing Motor side sensor error	Current_Set(RFM): 24.6	0000 (m) 200 (m) 200	0000 rent(ma) 0000 orce(m)
Abnormal current detection Encode fault Load side sensor error	🗹 Current (mÅ) : 24.0	48 0952-	-400 Cm -015 F
Force sensor signal error Overvoltage	Force(M) : 0.0	744-084 7:45-084 7:45-084 7:45-084 7:46-284	7:46-884
Undervoltage		-1570 ÷ 0 ÷ <	-600 💠 -30 🜲
Overcurrent	Normal TO	Now, the ID and baud rate of the gripper have been changed.	
Uvertemperature	Onen	Mann Status Curla tast	
-	opun		pos
-	POS: 12. 00mm Speed: 452. 42mm/s Set	POS:0.00mm Force:15.00M at the position upening Image: Compare to object Clamping Speed:452.42mm/s Continue run Set Compare to object Clamping	Run
-		01149.57600 TT	D=2.Connection OK
ATT		Control of	,

PC Software Connection Diagram (4)

3.2 Use the serial port debugging assistant software to modify the ID and baud rate.

① Start the serial port debugging assistant software. Select the corresponding port number and baud rate. Click "Open Serial Port".

DRT COM	Settings	Display	Send_Dat	ta Multi_Strings	Tools	Help	 	
earData 0	enFile Jse	rs\DELL\	Desktop\LA	_BCBF50-11D4A_12	1. bin S.	endFile Stop ClearSend OnTop Figst SaveConfig EXT -	 	
nNum COM14 1	SB-SERIAL	CH340	<u>-</u> и	XShow SaveData	T Rec	eivedToFile 🔽 SendHEX 🔽 SendEvery: 20 ms/Tim 🖉 AddCrLf		
) CloseCom	6	lore Sett	ings 🔽 Sl	now Time and Pack	e OverTi	me: 20 ms No 0 BytesTo 末尾 VerifyNone 🔽		
RTS 🔽 DT	BaudRat	115200	_			<u>^</u>		
了更好地发展 这注册嘉立创	SSCUM软件 B结尾客户	SEI	m			*		
[使用专业串	口调试工具	SSCOM !	作者: 习	小猛(丁丁),大虾电	子网版主	= 最新版本下载地址: http://www.daxia.com/ 欢迎提出您的建议! 请将建议发到2618058@qq.com		
v.daxia.con	n S:0	R:	0	COM14 Opened	11520	0bps,8,1,None,None CTS=0 DSR=0 RLSD=0		

Debugging Screen ① in the Serial Port Debugging Assistant Software

② Change the gripper ID from "1" to "2". Refer to the register instructions, and obtain the ID register address (0x06). Enter the instruction frame "55 AA 05 01 31 06 00 02 00 3F".

- 55 AA: frame header;
- 05: Length of data segment;
- 01: ID;
- 31: Instruction type;

06 00: ID register address;

20 00: The new ID is 2;

3F: Checksum

k SSCOM V5.13.1 Serial/Net data debugger,Author:Tintin,2618058@qq.com		×
[00:58:53 539] <u>017 → CF5 AA 05 01 31 06 00 02 00 37 [</u> [09:58:53 554 <mark>1]N+ ◆AA 55 0F 02 31 06 00 FA FF A5 01 0D 00 00 00 00 12 00 06</mark>		^
		~
Comen Comite OpenFile sersUBLL/Westrop LL_BERGUTINAL200. bin SendFile Stop [ClearSend] Uniop() English SaveGonfig EXT - ComMun Comite USE-SENIAL CH340 ▼ VEXShow SaveData		
▼ RTS ▼ DTR BaudRat 115200 ▼ 55 AA 05 01 31 06 00 02 00 3F 为了更好地发展SSCON的件 言你生用意力的学生需要合		
次迎使用考止集口側式工具SSCOM! 作者: 习小适(丁丁)、大虾电子网贩主 最新版本下载地址: http://www.daxia.com/ 次迎提出您的建议! 请将建议发到26180588qg.com www.daxia.com [S:10 [R:20 [COM14 Opened 115200bps,8,1,None,None [CTS=0 DSR=0 RLSD=0		

Debugging Screen (2) in the Serial Port Debugging Assistant Software

Response frame received: AA 55 0F 02 31 06 00 00 00 00 00 99 00 00 00 00 00 14 00

F5

- AA 55: frame header;
- 0F: Length of data segment;

02: ID;

- 31: Instruction type;
- 06 00: ID register address;
- 00 00: Actual position 0 (per-unit value, 16384: 100%);

- 00 00: Actual current 0 (per-unit value, 16384: 100%);
- 99 00: Actual force 153 (per-unit value, 16384: 100%);
- 00 00: Actual speed 0 (per-unit value, 16384: 100%);
- 00 00: Status code 0 (the gripper is grasping);
- 14 00: Temperature (20°C);
- F5: Checksum

③ Change the baud rate to "57600". Refer to the register address instructions, and obtain the baud rate register address "0x07". The number corresponding to "57600" is 1. Enter the instruction frame "55 AA 05 02 31 07 00 01 00 40".

- 55 AA: frame header;
- 05: Length of data segment;
- 02: ID;
- 31: Instruction type;
- 07 00: Baud rate register address;
- 01 00: Baud rate value, 1 = 57600;
- 40: Checksum

🔥 SSCOM V5.13.1 Serial/Net data debugger,Author:Tintin,2618058@qq.com		×
PORT COM_Settings Display Send_Data Multi_Strings Tools Help		
[09:58:53:539]0UT→ 555 AA 05 01 31 06 00 02 00 3F □ [09:58:53:554]IM← ♠AA 55 07 02 31 06 00 FA FF A5 01 0D 00 00 00 00 12 00 06 [10:00:33:374]0UT→ 555 AA 05 02 31 07 00 FA FF CC 01 0D 00 00 00 00 12 00 2E [10:00:33:374]IM← ♠AA 55 0F 02 31 07 00 FA FF CC 01 0D 00 00 00 00 12 00 2E		^
		>
ClearData OpenFile Sers\DELL\Desktop\LA_BCBF50-11D4A_1201. bin SendFile Stop ClearSend OnTop ClearSend OnTop English SereConfig EXT -		
ComHum COMH4 USB-SERIAL CH340 V HEXShow SaveData ReceivedToFile SendHEX SendHEX SendHEX AddCrLE		
OneseCon OneseCon		
为了更好地发展SSOUMACH SEA		
]頃怨注册聂立回[94]闰各// [] 欢迎使用专业串口调试工具SSCOM! 作者:习小猛(丁丁),大虾电子网版主 最新版本下载地址: http://www.daxia.com/ 欢迎提出您的建议! 请将建议发到201805080qq.com		
www.daxia.com S:20 R:40 COM14 Opened 115200bps.8.1.None.None CTS=0 DSR=0 RLSD=0		-

Debugging Screen (3) in the Serial Port Debugging Assistant Software

(4) Send the parameter saving command to the gripper. Enter the instruction frame "55 AA 05 02 31 0C 00 01 00 45". 55 AA: frame header;

- 05: Length of data segment;
- 02: ID;
- 31: Instruction type;
- 0C 00: Register address for parameter saving;
- 01 00: 1 = Hold-over command;
- 40: Checksum

They will be valid after power-off and reboot (the hold-over command should be executed for modifying the ID and baud rate; they will become valid after power-off and reboot).



4. I/O control

The I/O mode is a common control mode in the industry. Hardware wiring is performed to control grippers. When the I/O control mode is used, the gripper should be set to the I/O mode in advance, and its four groups of I/O running status should also be set properly.

Functions corresponding to the cable colors of the gripper are defined below.



Red	485_A
Brown	485_B
Blue	24V
White	GND
Yellow	DO_2
Green	DO_1
Orang	DI_2
Black	DI_1
l Gradi	

Note: In the following text, INTPUT1 is the black wire (DI_1); INTPUT2 is the orange wire (DI_2); OUTPUT1 is the green wire (DO_1); OUTPUT2 is the green wire (DO_2).

4.1 I/O configuration

Four statuses of the I/O mode can be configured with the serial port software. Alternatively, our debugging software can be used to configure the gripper parameters.

For specific wiring and configuration methods, refer to "1.3 Electrical interface". After four groups of parameters are configured, the pin statuses of INPUT 1 and INPUT 2 can be set to control the gripper. The output pins OUTPUT 1 and OUTPUT 2 can be detected to acquire the gripper status.

Configuration is shown below:

	•	Group 1	2	Group 2		Group 3		Group 4		
Read	Open I/O Mode	POS:Omm	Write	POS:Omm	Write	POS : Omm	Write	POS:Omm	Write	-
		Force: 0.00N		Force: 5.00N		Force: 0.00N		Force:0.00N		ST
Save	Enable Power-On find Home	Speed:Omm/s	Test	Speed:Omm/s	Test	Speed:Omm/s	Test	Speed:Omm/s	Test	

Procedure for shifting the I/O mode:

① Start the I/O mode: First of all, start the I/O mode.

(2) Configure four groups of I/O parameters: Set four groups of gripper parameters, including position, force and speed. After parameters are configured, click the "Write" button behind the corresponding data to write data.

③ Save: Click the "Save" button to write parameters to the internal Flash register. Then you can control the gripper after reboot.

(4) Reboot: After reboot, the mode will be successfully shifted to the I/O mode. You can control the gripper according to the INPUT signal. OUTPUT will reflect the running status.

The pin statuses (0 V and high-resistance (OFF) state) of INPUT 1 and INPUT 2 can be set to control the gripper. Each INPUT pin can identify two input states. So you can set four gripper statuses (00 10 01 11). Specific pins and corresponding statuses are listed below.

Note: "High-resistance" (the same below) is the state of extreme resistance and corresponds to the state of gripper connection failure.

INPUT 1 (black wire)	INPUT 2 (orange wire)	Pin status	I/O state	Action
High-resistance (OFF)	High-resistance (OFF)	0 0	1st group of status	Target position 1; target force 1; target speed 1
High-resistance (OFF)	0 V	01	2nd group of status	Target position 2; target force 2; target speed 2
0 V	High-resistance (OFF)	1 0	3rd group of status	Target position 3; target force 3; target speed 3
0 V	0 V	11	4th group of status	Target position 4; target force 4; target speed 4

The output pins OUTPUT 1 and OUTPUT 2 can be detected to acquire the current status of the gripper. In the gripper running process, four gripper statuses can be read. Details are shown below.

Note: The default digital I/O is NPN. Input and output are valid at 0 V (valid at a low level).

OUTPUT 1 (green wire)	OUTPUT 2 (yellow wire)	Pin status	I/O state	Action
High-resistance (OFF)	High-resistance (OFF)	0 0	1st group of status	The gripper has moved to the target position.
High-resistance	0 V	0 1	2nd group of	The gripper is grasping.

(OFF)			status	
0 V	High-resistance (OFF)	10	3rd group of status	The gripper is unclenching.
0 V	0 V	11	4th group of status	The gripper has grasped the object.

4.2 I/O Applications

After parameters are configured, hardware wiring is required, including 24 V, GND, INPUT 1, INPUT 2, OUTPUT 1, and OUTPUT 2. Connect INPUT and OUTPUT to corresponding devices. Reboot after correct wiring is confirmed. The gripper will perform automatic initialization. Next, control the gripper according to the INPUT signal. OUTPUT will reflect the running status.

4.3 Indicator lamps' meaning

Gripper status	Indicator lamp color
The gripper is running (grasping or unclenching).	Blinking in green
The gripper has grasped the object.	Blinking in orange
The gripper has moved to the target position.	Normally ON in green
Grasped object is being dropped	Blinking in red
An error occurs.	Normally ON in red

The indicator lamps of the gripper are defined below:

5. Loop test of gripper

After the gripper is connected to the communication interface successfully, click 1 "Start", and then the gripper will perform the reciprocating motion for testing. Click 2 "Stop".

¥ Inspire robots-EG Gripper				- 🗆 ×
Connect device Language(语言) Help Status frame format setting Firmware update DebugTest				
A servo actuat	Parameter information ID2 + Baud rate	e 57600 → ↓ . ******-2033	3. 15. 31-65535W Firmware: 2023-4-17	
ID-2	Operation data monitoring			
		15700 🛊 12000 🛊 🚺 ▷ 💢	X_axis length:2000ms 🔹 Num of segments:5 🔹	800 ÷ 30 ÷
	Pos_Act(um): 11995.6	13000		0030
Status and fault 22°C Lear Drive fault	Speed_Act(RFM): 0.0	<i>800</i>		0400
Parameter missing Motor side sensor error Abnormal current detection	Current_Set(RPM): 25.2	Speed (RPM) 0000 Postant		0000 0000 0000 10000
Encode fault Load side sensor error	🗹 Current(mÅ): 24.7	3000		-400
Force sensor signal error Overvoltage Undervoltage	Force(M) : 0.0	9:39-349 9:39-749	9:40-149 9:40-549 9:40-949	9:41-349
Overcurrent				
Övertemperature	Normal IO			
-	Open	Clamp	Status Cycle test	0 pos
-	POS:12.00mm Speed:452.42mm/s Set	POS:0.00mm Force:15.00M Speed:452.42mm/s Continue run	at the position Upening Clamped to object Clamping jects when opening Object falls 已运行7次	Run
-				
		1/5/		
	1	PC Software Connection	Diagram	