

Instructions for DH Gripper Function Software Package



Instructions for DH Gripper Function Software Package

V1.1

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1 HARDWARE INSTALLATION

1.1 DH GRIPPER WIRING

GBT Robotics uses USR-TCP232-306 serial server for Modbus RTU communication control with DH Gripper. The wiring is shown in the figure.

Color	Code	Connect a wire	instructions
Green	485_A	Line to the serial	A+
Blue	485_B	access to control cabinet in-cabinet network port	B-
Red	24 V	Wire to control cabinet	24V
Black	GND	power output or external power supply	0V





1.2 SERIAL SERVER WIRING

🚹 Caution

The USR-TCP232-306 serial port server has completed the wiring of the Ethernet port inside the cabinet and the DC power supply before leaving the factory.

USR-TCP232-306 Serial Server has RS485 serial port and RJ45 crystal header interface, Link light indicates the current connection status.

- Power Indicator: After the module is powered on normally, the power indicator (PWR) is red and stays on constantly, indicating that the power supply for the module is normal.
- Working Indicator: After the module is powered on, in the normal working state, the "work" light blinks once per second. If it enters the upgrade state, the "work" light blinks once every 200 milliseconds (i.e., flashes rapidly).

• L Link Indicator: It is used in conjunction with the link function of the 306. The Link function is used to indicate the TCP connection status and can only work in the TCP Client/Server mode. When the 306 establishes a TCP connection, the indicator lights up. When the connection is disconnected normally, the indicator goes out instantly. In case of an abnormal disconnection, the indicator will go out after a delay of about 40 seconds. After the Link function is enabled in the UDP mode, the indicator stays on constantly.

• Transmit/Receive Indicator: When there is data being transmitted through the serial port, the TX light blinks. When there is data being received through the serial port, the RX light blinks.



1.3 SERIAL SERVER CONFIGURATION

The serial server has been configured to communicate with the robot before it is shipped from the factory and does not need to be configured by the user. The following steps are for reconfiguring the serial server.

1.3.1 MODIFY USR-TCP232-306 SERIAL SERVER IP

1. the device will be through the network cable and the computer for direct connection, open the computer 's network sharing centre - network adapters, only to retain the Ethernet network adapters and the rest of all the disabled.



2. Click on the Ethernet adapter and select Properties.

Yetwork Connections		- 0	×
\leftarrow \rightarrow \checkmark \uparrow \blacktriangleright \checkmark Network and In	ternet > Network Connections	\sim $$ $$ Search Network Connection	s 🔎
Organise • Disable this network device	Diagnose this connection Rename this	connection »	8
WLAN Disabled Disabled Intel(R) Wireless-AC 9560 160MHz	以太网 Disabled VirtualBox Host-Only Ethernet Ad	以太网 2 未识別的网络 Realtek USB GbE Family Controller Disable Status Diagnose Bridge Connections Create Shortcut Delete Rename Properties]
4 items 1 item selected			$\equiv \Box$

3. Double click the Internet Protocol version 4 (TCP/IPv4) to enter the IP configuration interface, the IP should be changed to the same network segment IP with the serial server, the default IP 192.168.0.7 of the serial server.

Network Connections		-	- 🗆	×
\leftarrow \rightarrow \checkmark \uparrow is a variable with the set of the set	ork Connections >	✓ C Search Network	Connections	Q
Organica T Disable this natwork davisa Disance this	Rename this	connection »	- •	?
Networking Connect using:	Host-Only Ethernet Ad	以太网 2 未识别的网络 Realtek USB GbE Family	Controller	
Realtek USB GbE Family Controller				
This connection uses the following items:				
Install Uninstall Properties Description 传输控制协议/Internet 协议。该协议是默认的广域网络 协议,用于在不同的相互连接的网络上通信。				
OK Cance	el			
4 items 1 item selected			1	

etwork Connections					—	
→ × ↑ 💆 « Netwo	ork and Internet > Network Connections >	\sim	С	Search Netwo	rk Conne	ections
anico 🔻 Dicabla thic natwork	davica Diagnosa this connection Rena	me this connection	ר »		8: •	
nternet 协议版本 4 (TCP/IPv4) Prop	erties ×		以太区	X 2		
General			▶ 未识别	间的网络		
You can get IP settings assigned au this capability. Otherwise, you need for the appropriate IP settings.	omatically if your network supports to ask your network administrator	net Ad	Kealte	k USB GDE Fam	ily Contr	oller
Use the following IP address:	.cmy					
IP address:	192 . 168 . 0 . 200					
Subnet mask:	255 . 255 . 255 . 0					
Default gateway:						
Obtain DNS server address aut	omatically					
OUse the following DNS server a	ddresses:					
Preferred DNS server:	· · ·					
Alternative DNS server:						
🗌 Validate settings upon exit	Ad <u>v</u> anced					
	OK Cancel					
						1

4. In your browser, enter the URL: 192.168.0.7 (the module's default IP), enter the Username: admin Password: admin, and click Login.

	Ô		o) 19	92.168.0.7	× +	-		×
\leftarrow	С	â	i	192.168.0.7	A 🗘 🗘 다 ta 🖨	~	•••	→
					Sign in to access this site			Q
					Authorisation required by http://192.168.0.7 Your connection to this site is not secure			-
					Username admin			•
					Password •••••			<u>2</u>
					Sign in Cancel			0
				_				•
								-
								-
								8
								+
								ŝ

5、Click Network Parameters, modify the Native IP to 10.27.1.80, subnet mask:255.255.255.0, gateway:10.27.1.1, click Save.

Firmware Version: V4	1302	中文
	USR -IOT Experts-	Be Honest, Do Best!
Current Status	Parameter	Help
Network parameters	IP Type: Static IP 🗸	• IP type:
Port Parameter	Native IP: 10 · 27 · 1 · 80	StaticIP or DHCP.
General Function	Submask: 255 · 255 · 255 · 0	StaticIP: Module's static ip.
Modbus	Gateway: 10 . 27 . 1 . 1	• Submask:
System Parameters	DNS Server: 208 . 67 . 222 . 222	255.255.255.0.
Module Management	Save Cancel	 Gateway: Usually router's ip address. DNS IP: DNS gateway or Router's IP.
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6. Click Restart Module, Confirm reboot.

	中文
R Be Hone	est, Do Best!
Module management	Help
Restart Module	• Restart Module
Restore User Parameters	After restoring User parameters
Restore Factory Parameters	and factory parameters, the
· · · · · · · · · · · · · · · · · · ·	device will restart
	immediately.
	· · · · · · · · · · · · · · · · · · ·
chnology Limited. All Rights Reserved	website: <u>www.pusr.com</u>
192.168.0.7 显示	中文
R fine device Will reboot, please conline: Ex	nest, Do Best!
Module management	Help
Module management Restart Module	Help • Restart Module
Module management Restart Module Restore User Parameters	Help • Restart Module • After restoring user parameters
Module management Restart Module Restore User Parameters Restore Factory Parameters	Help • Restart Module • After restoring user parameters and factory parameters, the
Module management Restart Module Restore User Parameters Restore Factory Parameters	Help • Restart Module • After restoring user parameters and factory parameters, the device will restart
Module management Restart Module Restore User Parameters Restore Factory Parameters	Help Restart Module After restoring user parameters and factory parameters, the device will restart immediately.
	Module management Restart Module Restore User Parameters Restore Factory Parameters Restore Factory Parameters

1.3.2 CONFIGURING USR-TCP232-306 SERIAL SERVER PORT PARAMETERS

1. Again modify the computer IP, double-click the Internet Protocol version 4 (TCP/IPv4) to enter the IP configuration interface, the computer IP change to 10.27.1.110.

		网 2		蓝牙网络连接 Not connected
Realtek USB GbE Family Controller	Virtu	alBox Host-Only Ethernet Ad	× 🚯	Bluetooth Device (Personal Are
🔋 以太网 Properties	_	×		
Networking Sharing	In	ternet 协议版本 4 (TCP/IPv4) Pro	perties	×
Connect using:	G	General		
🛃 Realtek USB GbE Family Controller	Confi	You can get IP settings assigned at this capability. Otherwise, you need for the appropriate IP settings.	utomatically i d to ask you	if your network supports r network administrator
This connection uses the following items:		Obtain an IP address automat	ically	
☑ Microsoft 网络客户端		Use the following IP address:		
✓ ¹ Wicrosoft 网络的文件和打印机共 ✓ ¹ VirtualBox NDIS6 Bridged Network	享 ng Driver	IP address:	10 .	27 . 1 .110
🗹 💭 QoS 数据句计划程序		Subnet mask:	255 .	255.255.0
✓ _ Internet 协议版本 4 (TCP/IPv4) □ _ Microsoft 网络道町器多路传送器	协议	Default gateway:		• •
Microsoft LLDP 协议驱动程序		Obtain DNS server address au	itomatically	
	Prope	O Use the following DNS server	addresses:-	
	Prope	Preferred DNS server:		
传输控制协议/Internet 协议。该协议员 协议,用于在不同的相互连接的网络	≧默认的广域 上通信∘	Alternative DNS server:		
		🗌 Validate settings upon exit		Ad <u>v</u> anced
	ок		C	OK Cancel

2. In your browser, enter the URL: 10.27.1.80, enter the Username: admin Password: admin, and click Login.

	Ô		6) 10.	27.1.80	×] -	+									-	×
\leftarrow	С	â	i	10.27.1.80						A»	☆	¢	C 2	£≡	Ē	~~	 →
					Sign in to	acce	ess thi	s site									Q
					Authorisatio Your connec	n req	quired by to this si	y http:// site is no	10.27.1.8 t secure	30							-
					Username	adn	min										-
					Password	••••	••										<u>±</u> ľ
								Sig	n in	Cance	el						0
						_	_			_			J				Ō
																	-
																	4
																	8
sti																	
																	+
0																	
21																	ŝ

3. Click the Port Parameters, set the Local Port Number to 502, Work mode for TCP Server mode, modify the completion of the click to save.

Firmware Version: V4	302	中文
	USR -IOT Experts-	Be Honest, Do Best!
Current Status	Parameter	Help
Network parameters	Baud Rate: 115200 bps(600~230400)	Client Overrun
Port Parameter	Data Size: 8 🗸 bit	Mechanism:
General Function	Parity: NONE 🗸	oldest connection
Modbus	Stop Bits: 1 v bit	to the new
System Darameters	Local Port Number: 502 (0~65535)	connection. KEEP: When a new
	Remote Port Number: 8234 (1~65535)	connection comes in, the handshake
Module Management	Work Mode: TCP Server V	is not processed
	Remote Server Addr: [192.168.0.201]	is returned.
	UDP Data Filtering: Close V	 Client Access Ouantity:
	Short Connection Enable: Close 🗸	When the module
	Short Connection Timeout: 3 (2~255)	Server, the
	Client Overrun Mechanism: KICK 🗸	the Client allowed
	Client Access Quantity: 4 (1~16)	to connect.
	Save Cancel	
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4、 Click Restart Module, Confirm reboot.

Firmware Version: V4	302	中文
ر م	USR Be Ho -IOT Experts-	nest, Do Best!
Current Status	Module management	Help
Network parameters	Restart Module	• Restart Module
Port Parameter	Restore User Parameters	After restoring user parameters
General Function	Restore Factory Parameters	and factory parameters, the
Modbus	· · · · · · · · · · · · · · · · · · ·	device will restart
System Parameters		immediately.
Module Management		
		· · · · · · · · · · · · · · · · · · ·
Copyright ©Jinan USR	IOT Technology Limited. All Rights Reserved	website: <u>www.pusr.com</u>
Firmware Version: V4	302 10.27.1.80 says The device will reboot, please confirm! -IOT Ex OK Cancel	+± nest, Do Best!
Current Status		Help 🔺
Network parameters	Module management	A Restart Medule
Port Parameter	Restart Noulle	After restoring
General Function	Postore Eactory Parameters	user parameters and factory
Modbus		device will restart
System Parameters		immediately.
Module Management		
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2 OPERATING INSTRUCTIONS FOR DH GRIPPERS



Before the robot is configured with a gripper, the gripper needs to be preconfigured with a Modbus ID address using the DH PC commissioning software.

2.1 ABOUT DH GRIPPERS

The DHGripper expansion package supports DAHUAN electric grippers. For more details, please contact our company.

DH GRIPPERS	Applicable Models
Industrial Rotary Electric Grippers	RGI Series
Industrial Slim - Parallel Electric Grippers	PGE Series
Articulated Self - Adaptive Electric Grippers	AG Series
Economical - type Electric Grippers	PGSE Series

2.2 DH GRIPPERS CONFIGURATION

 Click Menu→Application→AddOn→DHGripper to enter the electric claw configuration page, as shown in the following figure.

 0 admin V 0 Manual (O Manual On	2024-02-22 15:57:36	SERVO_OFF	Continue	Group:1			Joint Coordina		ΜΑΝΠΑΙ	10%	
 A dumin	~		System-0099		aaa	Group. I	UF.0 ~	TF.0 V	Joint Coordina	le v	MANUAL	Limited
					DHGripper							
		Scan								Add G	ripper	
	Grip	oper Number	Gripper Status	Mount Devi	ce							
	1		Activated	Modbus	ID: 1			Initialize	Operation	Dele	te	
	2		Activated	Modbus	ID: 2			Initialize	Operation	Dele	te	

Setup page description

	Function Type	Description
--	---------------	-------------

Scan	Button	Clicking this button automatically searches for the gripper to be configured.				
Cancel	Button	Click this button to cancel the search.				
Add Gripper	Button	Click this button to add a gripper manually.				
Initialization Button		Click this button to initialize the gripper.				
Operation	Button	Click this button to enter the manual operation				
operación	BULLON	interface of the gripper.				
Delete	Button	Click this button to delete the configured gripper.				
Grippor Number	Display	Displays the number of the current gripper				
dripper Number	Display	configuration.				
		Displays the current status of the gripper, with the				
Gripper Status	Display	status "Activated, Not Activated, Not Found" at the				
		bottom of the column.				
		Displays the currently configured Modbus ID channel				
Mount Device	Display	of the electric claw, and the drop-down can switch				
		the Modbus ID channel.				

2. Add Gr i pper \rightarrow Scan \rightarrow select the Mount Device , the gripper configuration is complete, as shown.

::	은 admin	~ 오 手动	操作 2024-02-22 14:45:55 Operation-002	SERVO_OFF	连续运行 aaa	组别:1	UF:0 \sim	TF:0 \sim	关节坐标系 ~	MANUAL	10% 限速
					DHGrippe	r			А	dd Gripper	
		扫描							1 3	而加夹爪	
		夹爪编号	夹爪状态	挂载设备							
					暂无数据						
	⁰ admin	∨ ♀ 重행	2024-02-22 15:56:22	SERVO_OFF	连续运行	(相又山-1	LIE:0 V	TE:0 V	关节坐标玄 🗤	ΜΑΝΠΑΙ	10%
		and 9 - 1.	System-009	9 🔳	aaa				X Palina -		限速
	2	Scan 扫描 夹爪编号	Scanning (6/1 正在扫描(6/127),已发现 Cance加状态	27) and found 2 2个手爪设备 取消 挂载设备	2 grippers	;			Ŧ	而一天	
		1	未激活	Modbus ID: 1	1			初始化	操作	删除	
			2024-02-22 15:56:16	SERVO OFF	连续运行						10%
	우 admin	~ 오 手动	操作 2024-02-22 15:56:16 System-009	SERVO_OFF	连续运行 aaa	组别:1	UF:0 \sim	TF:0 \checkmark	关节坐标系 ~	MANUAL	10% 限速
	옷 admin	~ 오 手动	操作 2024-02-22 15:56:16 System-009	SERVO_OFF	连续运行 aaa DHGrippe	组别:1 T	UF:0 \vee	TF:0 ~	关节坐标系 >	MANUAL	10% 限速
	으 admin	 오 手动 扫描 	操作 2024-02-22 15:56:16 System-009	SERVO_OFF 9	连续运行 aaa DHGrippe	组别:1	UF:0 \vee	TF:0 ~	关节坐标系 >	MANUAL ^系 加夹爪	10% 限速
	오 admin	오 手动 扫描 夹爪编号	操作 2024-02-22 15:56:16 System-009 実爪状态	SERVO_OFF 9 ■ 挂载设备 MC	连续运行 aaa DHGripper	- 組别:1 r ;e	UF:0 V	TF:0 ~	关节坐标系 ~	MANUAL	10% 限速

3. Click the "Initialization", wait for the completion of the initialization of the claw, the claw status is displayed as "Activated", as shown in the figure.

		DHG	ripper			
Scan						Add Gripper
Gripper Number	Gripper Status	Mount Device				
1	Activated	Modbus ID: 1	\sim	Initialize	Operation	Delete
2	Activated	Modbus ID: 2	\sim	Initialize	Operation	Delete



Description of RGI Series Indicator Lights:

- Inactivate: The red light blink;
- Activated: Blue light constant;
- **Read:** The red light blink quickly;
- Detect object: green light constant;
- Dropped: The green light blink.

Please refer to the relevant product operation manuals for instructions on

other series of DH Gripper.

2.3 DHGRIPPER OPERATION

Click "Operation" to enter the manual operation interface of the gripper, as shown in the figure.

Scan								Add Gripper	
ooun								Add onpper	
Gripper Num	ber Grij	pper Status	Mount Device						
	A	Activated	Modbus ID: 1	~		Initialize	Operation	Delete	
	A	Activated	Modbus ID: 2			Initialize	Operation	Delete	
으 adm	nin 🗸 🙎 Manual C	0p. 2024-02-22 15:57:40 System-0099	SERVO_OFF	Continue aaa Group	:1 UF:0 ~	TF:0 ~ Joir	nt Coordinate $$		
				DHGripper					
	Scan						Add G	ripper	
	Gripper Number	DHGripper Operation					×		
	1	Position					Dele	te	
	2	MIN		1000	+	MAX	Dele	te	
		Force							
		MIN		100		MAX			
		Speed							
		MIN	-	100		MAX			
		Rotate							
		-360	-	0	+	360			

Setup Instructions:

Parameter	Unit	Range of values
Position	per - mille (‰)	0 ~ 1000
Force	percent (%)	0 ~ 100
Speed	percent (%)	0 ~ 100
Rotate	o	-32767~32767

1. The gripper will perform this action immediately after clicking the position or rotation angle button.

2. The gripper performs this action immediately after entering the value of the position or rotation angle button.

3 PROGRAM INSTRUCTIONS

3.1 DHGRIPPERACTIVATE INSTRUCTION

Used to activate the gripper.

Instruction format: DHGripperActivate gripper ID

e.g.: DHGripperActivate 1 Activate the gripper ID1.

3.2 DHGRIPPERMOVE INSTRUCTION

Used to control the position of the gripper movement.

Instruction format:

DHGripperMove gripper ID, position, force, speed, Additional Information: WAIT_COMPLETED

e.g.: DHGripperMove 1, 1000, 100, 100, WAIT_COMPLETED

With 100% of the force and 100% of the speed, the gripper ID1 moves to position 1000‰ and waits for the movement to complete before executing the next program.

3.3 DHGRIPPERROTATE INSTRUCTION

Used to control the angle of rotation of the gripper.

Instruction format:

DHGripperMove gripper ID, rotate, force, speed, Additional Information: WAIT_COMPLETED

e.g.: DHGripperRotate 1, 180, 100, 100

With 100% of the force and 100% of the speed, the gripper ID1 is rotated to a position of 180°.

3.4 DHGRIPPERCHECKED INSTRUCTION

The fault code used to detect the gripper is stored in the specified R register..

Instruction format: DHGripperChecked gripper ID, R[i]

e.g.: DHGripperChecked 1, R[1:]

Detects the fault code for the gripper ID1 and the result is stored in the R1 register.

4 EXAMPLE OF PROGRAM

DHGripperActivate 1	Activate the gripper ID1.
WAIT 5 sec	WAIT 5 sec
DHGripperMove 1, 0, 100, 100	With 100% of the force and 100% of the speed, the gripper ID1 moves to position 0‰
DHGripperMove 1, 1000, 100, 100	With 100% of the force and 100% of the speed, the gripper ID1 moves to position 1000‰
DHGripperActivate 2	Activate the gripper ID2.
WAIT 5 sec	WAIT 5 sec
DHGripperMove 2,0, 100, 100, WAIT_COMPLETED	With 100% of the force and 100% of the speed, the gripper ID2 moves to position 0‰ and waits for the movement to complete before executing the next program.
DHGripperMove 2, 1000, 100, 100	With 100% of the force and 100% of the speed, the gripper ID2 moves to position 1000‰

5 GRIPPER FAULT CODES

The R register feedback value in the DHGripperChecked instruction is the fault code of the electric

claw, and the fault code is based on the DH Gripper's product operation manual.

Product Series	Fault Codes		
	0 No questions asked		
PCI Series	04 Overheating		
Itol belies	08 Overload		
	11 Excessive speed		
PGE Series	/		
AG Series	/		
PGSE Series	/		

Contact us

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