

MODBUS RTU CONVERTER INSTRUCTIONS



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Instructions for Modbus RTU Converter

Product: Modbus RTU Converter

Model: AED-LA-92-12

Function description:

1. The built-in MCU can convert the control instruction of RS485 in the Modbus RTU format to the instruction for motion control with LVTTL 3.3 V level that is suitable for the Micro Linear Servo Actuator;

2. 24 V to 8 V step-down module

"Micro Linear Servo Actuator" is hereinafter referred to as "Actuator".

Instructions are provided below:



Circuit boa	Circuit board left signal (connected to the				Circuit board right signal (connected to			
main control terminal)				the actuator)				
Ground	GND	Input	Gro	und	GND	Output	push-rod black cable	
Power	24V_in	Input (24V1A)	Pov	wer	8V_out	Output (8V2A)	push-rod red cable	
485 positive terminal	A+	differentia l input positive	48 posi term	35 itive ninal	TX	3.3V serial port transmissi	push-rod yellow cable	

					on	
485		differentia	485		3.3V serial	nuch rod
negative	В-	l input	negative	RX	port	blue coble
terminal		negative	terminal		reception	Ditte cable

Note: This module is a protocol conversion module. The main control terminal converts modbus protocol commands to meet the motion control of the electric cylinder through RS485 interface, and sends them to the electric cylinder through TX. The feedback data of the electric cylinder is received through RX and then converted into modbus protocol and transmitted to the main control terminal through RS485 interface. The maximum baud rate on the modbus terminal is 115200bps. One module with an electric cylinder.

ModbusRTU protocol uses the communication mode of master/slave request response. The protocol frame includes function code, data field, and CRC check. The series of cylinders support read hold register (function code 0x03), preset single register (function code 0x06), preset multiple register (function code 0x10) operation.

When the Modbus protocol transmits 16-bit integer data, it adopts the big-endian mode, that is, when the length of data is greater than 1 byte, the high bit comes first and the low bit comes last.

(1)Read hold register function code: 0x03

The master station asking	Slave address	function code	Start register (high)	Start register (low)	Number of registers (high)	Number of registers (low)	CRC
frame format	0x11	0x03	0x6B	0x00	0x00	0x02	XXXX

Description: Read No. 17 (0x11) slave hold register, starting address =0x006B; Number of registers =0x0002, end address =0x006B+2-1=0x006C, that is, read 17 slave station hold register 0x006B-0x006c, a total of two registers.

Slave reply frame	Slave address	function code	byte count	0x006B register (high)	0x006B register (low)	0x006C register (high)	0x006C register (low)	CRC
format	0x01	0x03	0x04	0x00	0x01	0x00	0x02	XXXX

Description:Return 17 (0x11) slave hold register 0x006B-0x006c, a total of two registers, 0x006B register value is 0x0001, 0x0062 register value is 0x0002.

The master station asking frame	Slave address	function code	Start register (high)	Start register (low)	data content (high)	amount of data content (low)	CRC
format	0x11	0x06	0x00	0x6B	0x10	0x00	XXXX

⁽²⁾Preset single register function code: 0x06

Description:Set No. 17 (0x11) slave hold register, register address 0x006B, data content is 0x1000.

Slave reply frame format	Slave address	function code	Start register (high)	Start register (low)	data content (high)	amount of data content (low)	CRC
	0x11	0x06	0x00	0x00	0x00	0x00	XXXX

③ Preset multi-register function code: 0x10

The master	Slave address	function code	Start register (high)	Start register (low)	Number of registers (high)	Number of registers (low)
asking	0x11	0x10	0x00	0x01	0x00	0x02
frame format	byte count	Data (high))	Data (low)	Data (high)	Data (low)	CRC
	0x04	0x00	0x0A	0x01	0x02	XXXX

Description: Set No. 17 (0x11) slave hold register, register start address is 0x0001, register number is 0x0002, data content byte count is 0x04, data content is 0x000A, 0x0102.

Slave reply frame	Slave address	function code	Start register (high)	Start register (low)	Number of registers (high)	Number of registers (low)	CRC
format	0x11	0x10	0x00	0x01	0x00	0x02	XXXX

Read and write register values using modbus RTU command codes 03(read) and 06 (write) to implement function command execution. The communication data is as follows:

H0001	CMD-ID	H0001~H00FE	Device address of linear servo (ID)	read-wr ite	immedi ate effect
H0002	CMD-BAU D	H00011200 H00022400 H00034800 H00049600 (def) H000514400 H000619200 H000738400 H000856000 H000957600 H000A—115200	Communica tion baud rate Settings	read-wr ite	effect after being powere d on again
H0003	CMD-SAV E	H0000 H0001(valid)	Parameter saving	read-wr ite	effect after being powere d on again
H0004	CMD-SET- 0N	H0000 H0001(valid)	Set the current state to the force reference value	read-wr ite	immedi ate effect
H0010	CMD-STOP	H0000 H0001(valid)	Emergency stop	read-wr ite	immedi ate effect
H0011	CMD-REST ART	H0000 H0001(valid)	resume work	read-wr ite	immedi ate effect
H0012	CMD-FAU LTACK	H0000 H0001(valid)	clearing of fault	read-wr ite	immedi ate effect
H0014	CMD-SETV EL	1-Vmax or 5000, unit step /s. Vmax is the driver's no-load operating speed, for example, the maximum speed of LA10-02 is 17mm/s,Vmax=17*2000/ 10=3400 steps /s; When this register is set to 1-Vmax, the drive will run to the target position at the set speed. When this register is set to 5000, the drive will run at maximum capacity motion (full motor voltage operation) to the target	Speed control parameter setting	read-wr ite	immedi ate effect

		position.			
H001F	CMD-SETF ORCE	-15000~+15000 (decimal) HC568~H3A98 unit g	Setting of force control parameters (special for force closed loop products)	read-wr ite	immedi ate effect
H0020	CMD-SETP OS	0~2000 step(2000 steps correspond to full travel) (decimal) H0000~H07D0	Set the drive motion position	read-wr ite	immedi ate effect
H0021	CMD_CUR POS	-100~2100 (decimal) HFF9C~H0834	Drive current location	read	immedi ate effect
H0022	CMD_CUR TEMP	-20~100 (decimal) HFFEC~H0064	Drive current temperature (° C)	read	immedi ate effect
H0023	CMD_CUR CUR	0~2000 (decimal) H0000~H07D0	Driver Current (mA)	read	immedi ate effect
H0024	CMD_CUR ERR	H0001—Locked-rotor protection H0002—Over-temperatur e protection H0004— Over-current protection H0008—Motor anomaly	Driver fault code	read	immedi ate effect
H0025	CMD_FOR CE	-15000~+15000 (decimal) HC568~H3A98 unit g	Actual stress value	read	

Instructions are provided below:



Exterior View of Modbus RTU Converter

 The default communication baud rate of the PLC in the Modbus RTU converter is 9600bps. The communication baud rate of the push rod motor terminal is 921600bps (consistent with the factory default baud rate of the push rod motor). If the communication baud rate of the actuator is modified, before using it, confirm that such value is 921600bps. If it is not 921600bps, start the PC software and select "Connect equipment" \rightarrow "Connect" \rightarrow select the corresponding COM port \rightarrow "Search". The push rod motor can be connected successfully. Next, select the left communication baud rate of the PC. Select "921600" in the pull-down list. Click the "Setting" button on the right, and then click the "Save Parameter" button. The software will give a prompt indicating that parameters are successfully saved. Subsequently, turn off power and restart the equipment; then the baud rate will be successfully modified. (To confirm whether a parameter is successful connect the PC software after power-off and re-power on. After successful connection, observe whether the baud rate in the lower right corner is 921600.)



Baud Rate Modification of PC Software (1)



Baud Rate Modification of PC Software ②



Baud Rate Modification of PC Software ③

2. Connect one end of the test cable to the USB port, and the other end to the RS485 module (the black wire corresponds to GND; the red wire corresponds to 24 V; the yellow wire corresponds to A+; the blue/white wire corresponds to B-). Connect the other end of the RS485 module to the actuator (the black wire corresponds to GND; the red wire corresponds to 8 V; the yellow wire corresponds to TX; the blue/white wire corresponds to RX). Finally, turn on power.



Exterior View of Test Cable

Connection Diagram of Modbus Converter, Test Cable, and Actuator

 Start the "MODBUS Debugging Assistant" software, and select "Set Serial Port". For the serial port, select the corresponding COM port; the baud rate is 9600. For parity, select "Even" and click "OK". Select "Enable serial port", and complete connection successfully.

Read and write the register values through Command Code 03 (read) and Command Code 06 (write) of Modbus RTU to execute function commands. For example, in Command 06H, you can input values in the numeric fields of a register (range: 0-2000; 0 indicates the position of the shortest stroke; 2000 indicates the position of the longest stroke); you can observe the actuator motion; or in the actuator motion process, select "Read" in Command 03H to directly read the position command.



Connection Diagram of MODBUS Debugging Assistant Software

PORT COM_Settings Display Send_Data Multi_Strings Tools Help			
	Send Multi Char	stm32/GD32 ISP STC/IAF	P15 ISP
	<-Drag split 🗖	RoundSend <u>help</u> Imp	ort order delay 📥
		to write notes	
	01 03 00 20	00 01 85 00	
	▼ 01 06 00 20	01 DO 8B AC	0 1
			0 1
			0 1
	<u> </u>		0 1
			2 1
			3 1
			4 1
			0 1
			0 1
			0 1
			0 2000
	v		0 1
			0 1
			0 1
			0 1
			0 1
			0 1
			0 1
			0 1
			0 1
			0 100
	v		0 100
			0 10
			0 10
			0 10
			0 10
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earData OpenFile Isers\DELL\Desktop\LA_BCBF50-11D4A_1201.bin SendFile Stop ClearSend	OnTop 🔽 English SaveCon	fig Hide —	
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了更好地发展SSCON的文件 多注册嘉立创作结尾答户 SEND		~	
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2	618058@qq. com
w.daxia.com S:0 R:0 COM43 Opened 115200bps,8,1,None,None		CTS=1 DSR=1 F	RLSD=1

Application Diagram of MODBUS Debugging Assistant Software



Operation Diagram of Modbus RTU Converter

Note: Incorrect or reserve connection of the Modbus RTU converter is not allowed; otherwise, the module will be damaged. (The correct connection diagram is enclosed herein.)



Correct Connection Diagram of PLC



Correct Connection Diagram of Actuator