



# MODBUS RTU CONVERTER INSTRUCTIONS



# Instructions for Modbus RTU Converter

## Product: Modbus RTU Converter

## Model: AED-LA-92-12

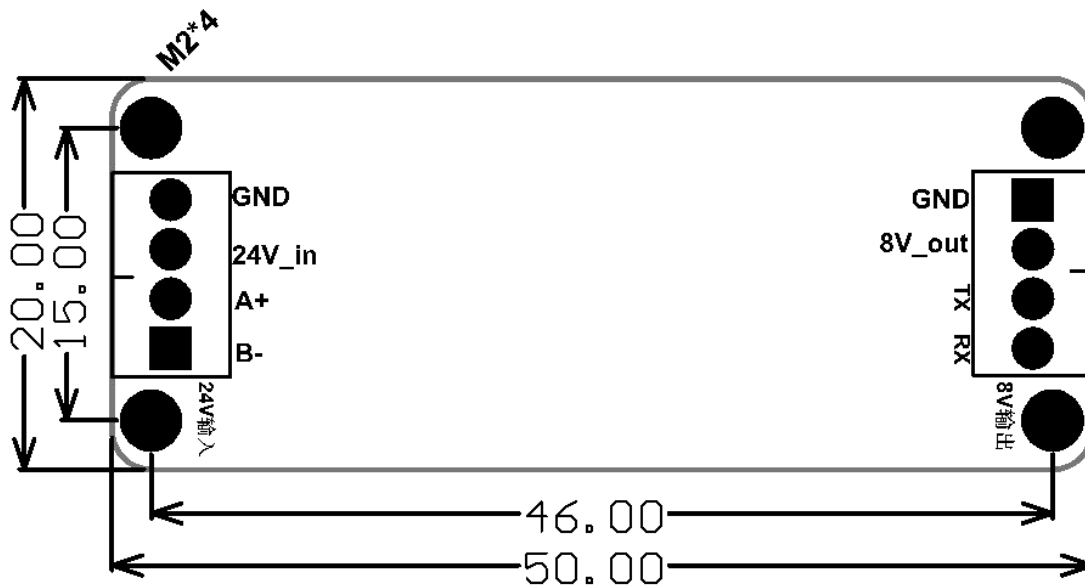
### Function description:

1. The built-in MCU can convert the control instruction of RS485 in the Modbus RTU format to the instruction for motion control with LVTTTL 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 board left signal (connected to the main control terminal)			Circuit board right signal (connected to the actuator)			
Ground	GND	Input	Ground	GND	Output	push-rod black cable
Power	24V_in	Input (24V1A)	Power	8V_out	Output (8V2A)	push-rod red cable
485 positive terminal	A+	differential input positive	485 positive terminal	TX	3.3V serial port transmissi	push-rod yellow cable

					on	
485 negative terminal	B-	differential input negative	485 negative terminal	RX	3.3V serial port reception	push-rod blue 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.

①Read hold register function code: 0x03

The master station asking frame format	Slave address	function code	Start register (high)	Start register (low)	Number of registers (high)	Number of registers (low)	CRC
	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 format	Slave address	function code	byte count	0x006B register (high)	0x006B register (low)	0x006C register (high)	0x006C register (low)	CRC
	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.

②Preset single register function code: 0x06

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

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

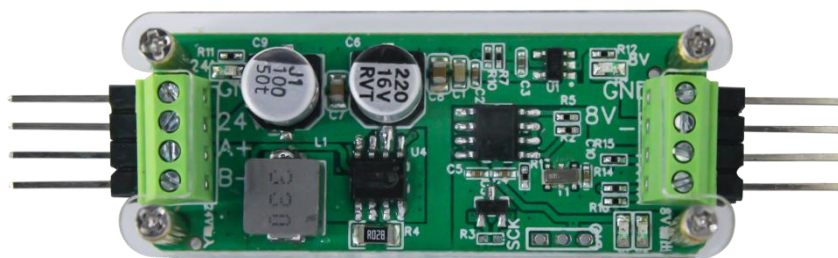
Read and write register values using modbus RTU command codes 03(read) and 06 (write) to implement function command execution. The communication data is as follows:

Modbus Address	Name	Range	Description		
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H0001	CMD-ID	H0001~H00FE	Device address of linear servo (ID)	read-wr ite	immedi ate effect
H0002	CMD-BAU D	H0001--1200 H0002--2400 H0003--4800 H0004--9600 (def) H0005--14400 H0006--19200 H0007--38400 H0008--56000 H0009--57600 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- ON	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-SETFORCE	-15000~+15000 (decimal) HC568~H3A98 unit g	Setting of force control parameters (special for force closed loop products)	read-write	immediate effect
H0020	CMD-SETPOS	0~2000 step(2000 steps correspond to full travel) (decimal) H0000~H07D0	Set the drive motion position	read-write	immediate effect
H0021	CMD_CURPOS	-100~2100 (decimal) HFF9C~H0834	Drive current location	read	immediate effect
H0022	CMD_CURTEMP	-20~100 (decimal) HFFEC~H0064	Drive current temperature (° C)	read	immediate effect
H0023	CMD_CURCUR	0~2000 (decimal) H0000~H07D0	Driver Current (mA)	read	immediate effect
H0024	CMD_CURERR	H0001—Locked-rotor protection H0002—Over-temperature protection H0004—Over-current protection H0008—Motor anomaly	Driver fault code	read	immediate effect
H0025	CMD_FORCE	-15000~+15000 (decimal) HC568~H3A98 unit g	Actual stress value	read	

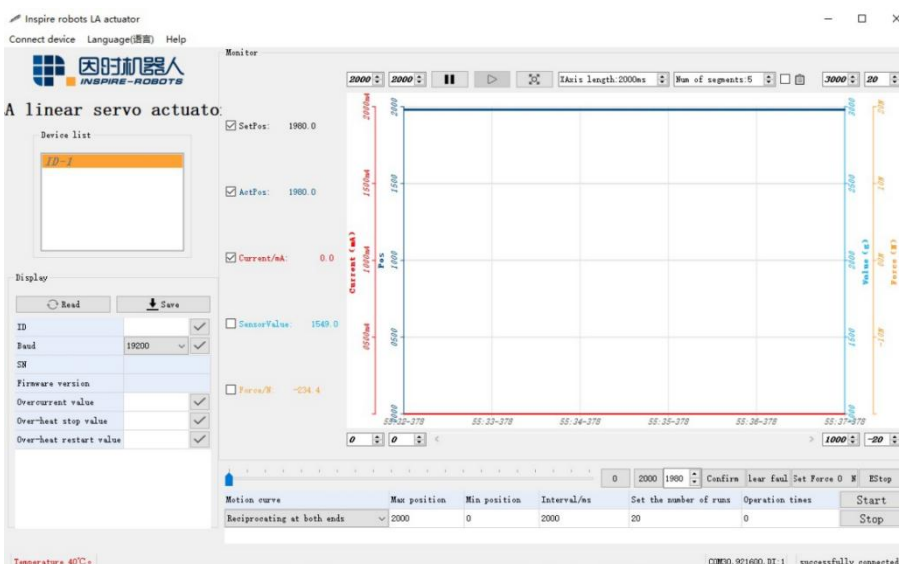
Instructions are provided below:



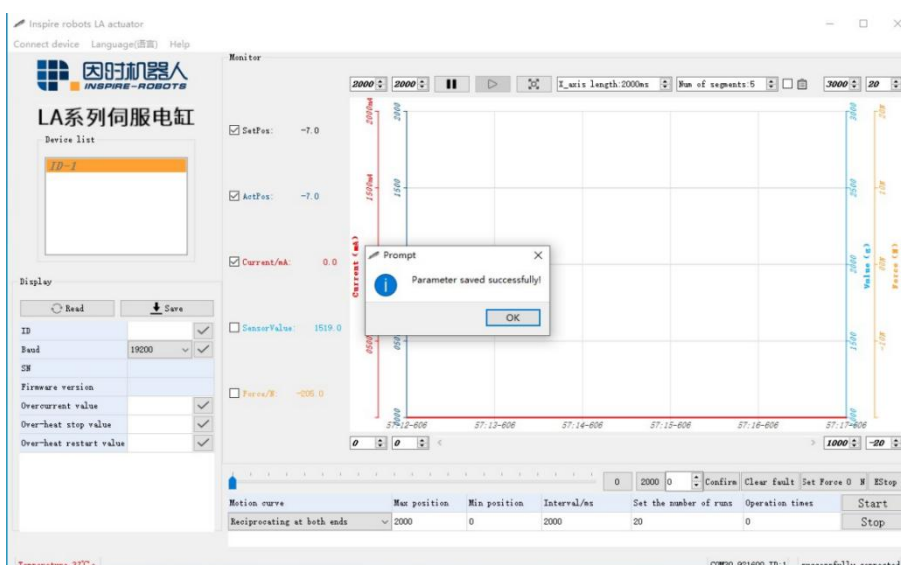
Exterior View of Modbus RTU Converter

1. 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" → "Connect" → select the corresponding COM port → "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 successfully changed, reconnect 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

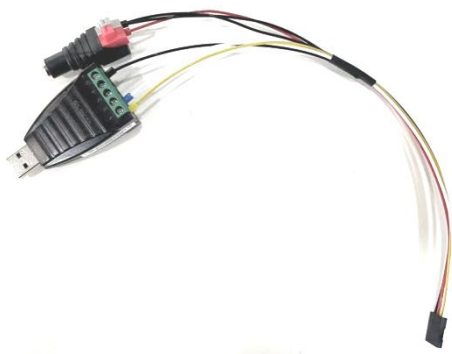


Baud Rate Modification of PC Software ②



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

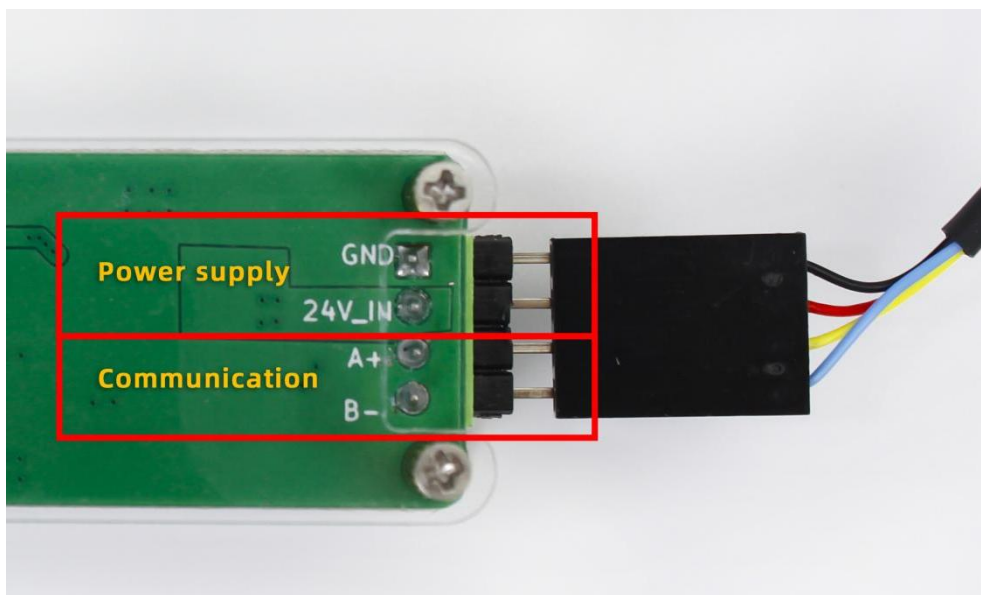


Connection Diagram of Modbus Converter, Test Cable, and Actuator

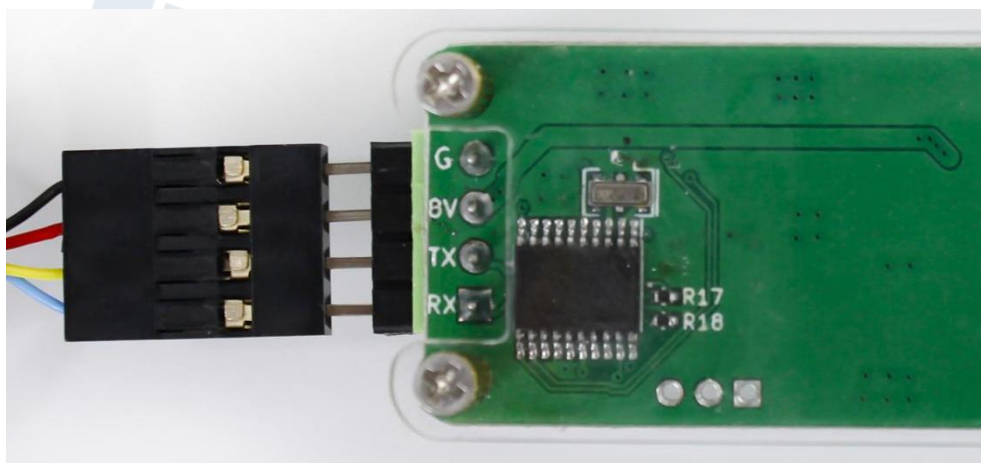








Correct Connection Diagram of PLC



Correct Connection Diagram of Actuator