

SAI140 Modbus RTU Over RS485 to Analogy Input Quick Start Guide



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1.Introduction

SAI140 provides **4 analogy inputs selective from 4~20 mA and 0~10V by onboard jumper settings**. It's sample rate 5 times/second (4 inputs).

One RS485 Serial Port (Terminal Block interface) support Modbus RTU protocol.

Notes:

Word type : Unsigned Integer

Resolution : 16 bits

Wording order : High byte in the front, Low type in the back.

The correct value from analog input should be the obtained value divided by 1000.

1.1 Product Views



Figure 1 Product Views

1.2 Wiring Architecture

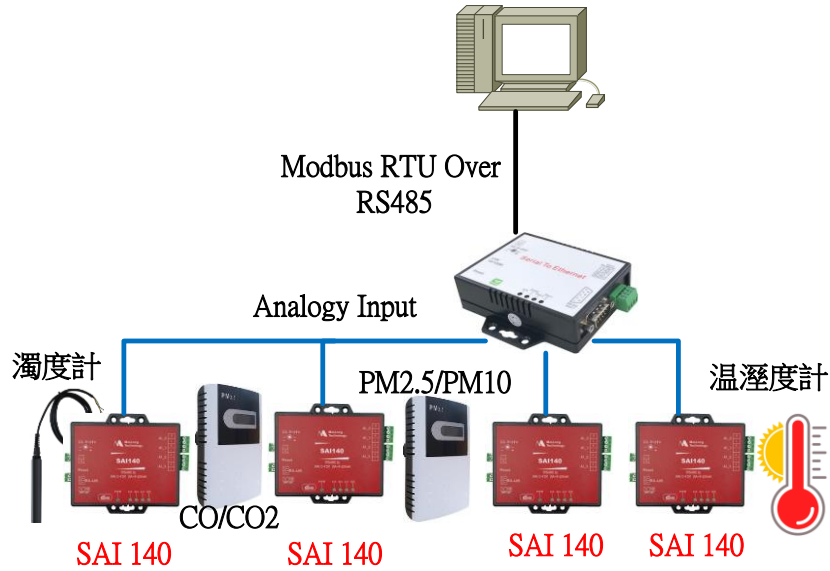
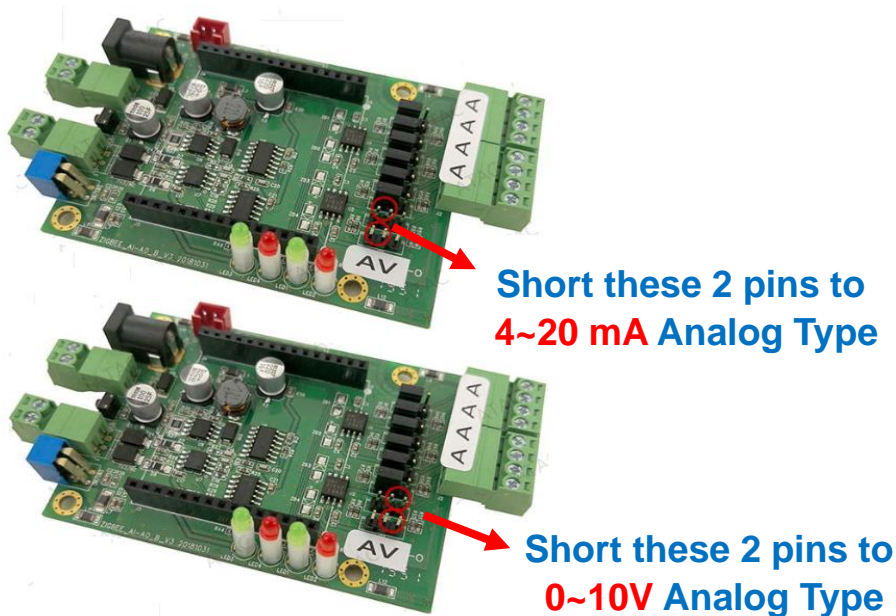


Figure 1 Wiring Architecture

2. Configuration

2.1 Analogy Type Settings



Note: Analog Inputs each selective of 4~20mA OR 0~10V by onboard jumper Settings.

2.2 Configuration Via Windows Utility

Step1 → Open and configure SAI140 via the “**SCAI4_TestTool**”

Step2 → Configure the test tool (as shown below)

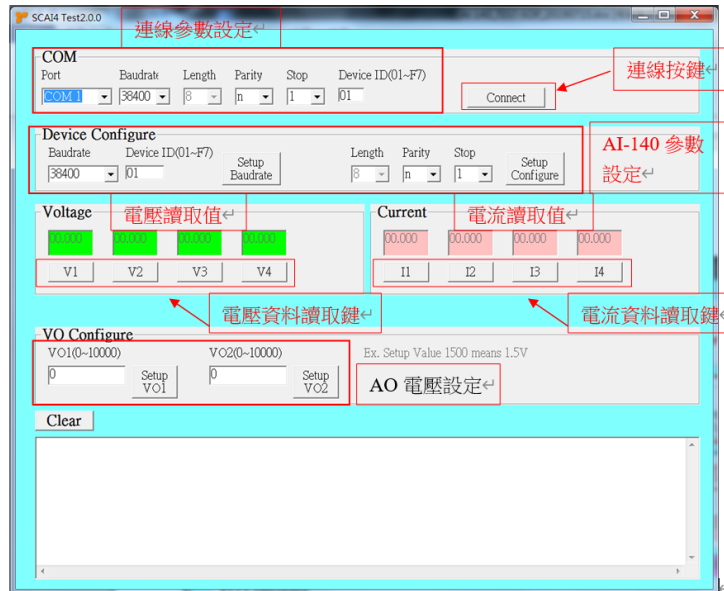
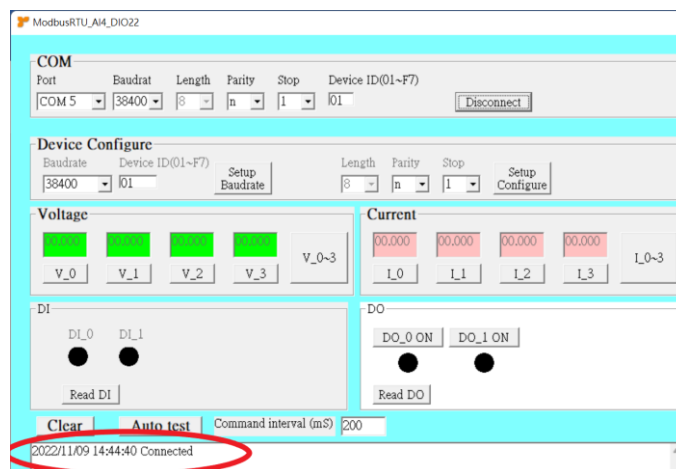


Figure 3 SCAI4 test tool configuration

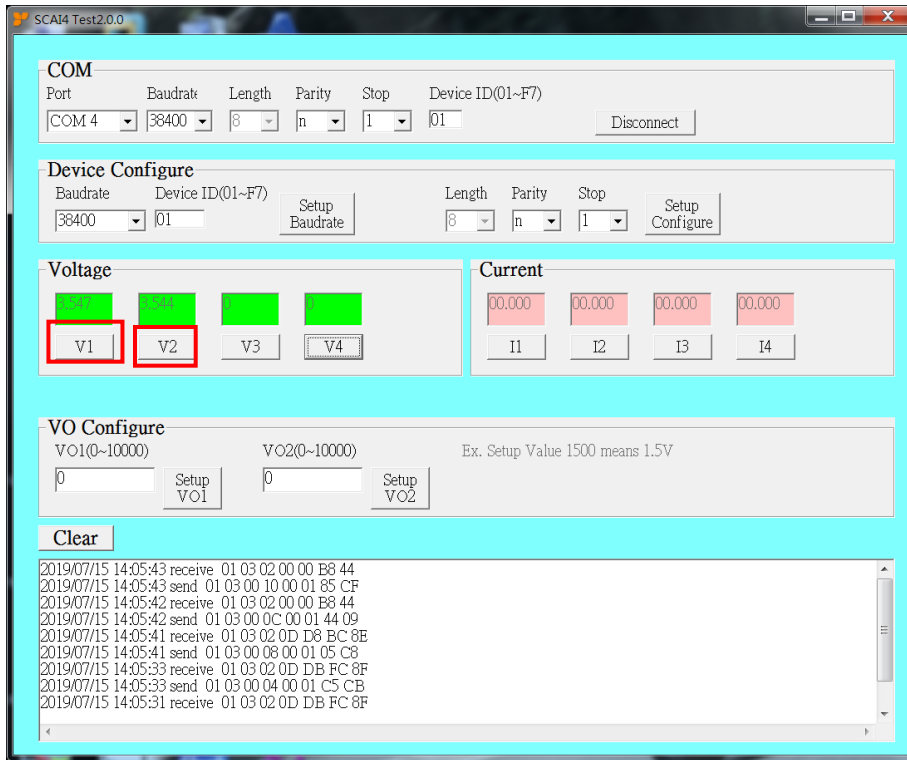
Step3 → After configure COM port parameters then Click “**Connect**”

Step4 → One should get ‘**Connected**’ from SAI140 And now you have successfully connected to SAI140.

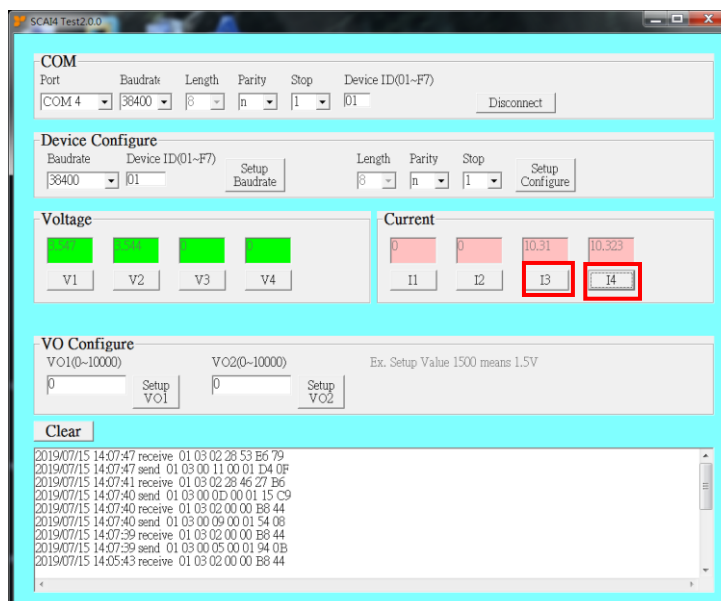


2.3 Function Test

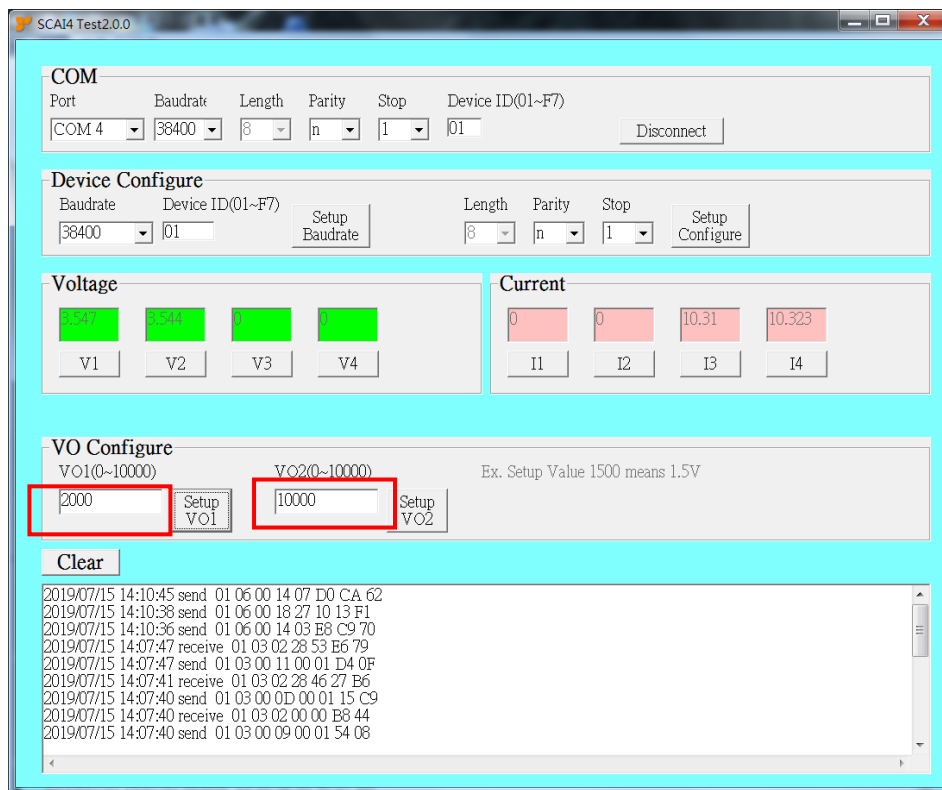
1. Voltage test



2. Current test



3. VO Settings



2.4 Modbus Command Set

A basic MODBUS command always takes two main parameters :

1. ID Address : Designated to receive this Command ID address ◦
2. Function Code : This Command function ◦

The reception to the Command element will return a Response inform the completion of action in response to the remote or the value returned by the read, Response Command format in the format is basically the same, but also have ID Address and Function code in order to master identification, the following table for common Function code order.

1. MODBUS RTU Protocol

The following MODBUS functions are supported.

Function code	Description
0x03	Read Holding Registers

0x06	Write Single Register
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MODBUS Protocol Address Map

MODBUS Register	HEX	Function	Description	Action
0000	0106	Read/Write Modbus device Address And Baud Rate Setting	High byte: Modbus device Address The rage is 1~247 Low byte: Baud Rate Setting 1: 2400 2: 4800 3: 9600 4: 14400 5: 19200 6: 38400 7: 115200	R/W
0001	0600	Data length , Parity, and stop bits Setting	High byte: Data length , Parity, and stop bits. Valid values are : SERIAL_7N1 0x04 SERIAL_8N1 0x06(default) SERIAL_7N2 0x0C SERIAL_8N2 0x0E SERIAL_7E1 0x24 SERIAL_8E1 0x26 SERIAL_7E2 0x2C SERIAL_8E2 0x2E SERIAL_7O1 0x34 SERIAL_8O1 0x36 SERIAL_7O2 0x3C SERIAL_8O2 0x3E	R/W

			Low byte: Reserved	
0004	0018	Read AI1 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
0005	0030	Read AI1 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R
0008	0018	Read AI2 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
0009	0030	Read AI2 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R
0014	2710	Read AO1 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R/W
0018	1388	Read AO2 voltage	Ex: 0x1388 = 5000 in decimal. It means 5.000V	R/W

Example for read Modbus Address and Baud Rate :

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	00	High Byte Data	01
Quantity of Outputs Hi	00	Low Byte Data	06
Quantity of Outputs Lo	01	High Byte CRC	39
High Byte CRC	84	Low Byte CRC	D6
Low Byte CRC	0A		

Ex: High Byte Data 0x01 means Modbus Address = 01. The available rage is 1~247.

Low Byte Data 0x06 means Baud Rate = 38400

For 1 means baud rate is 2400

2 means baud rate is 4800

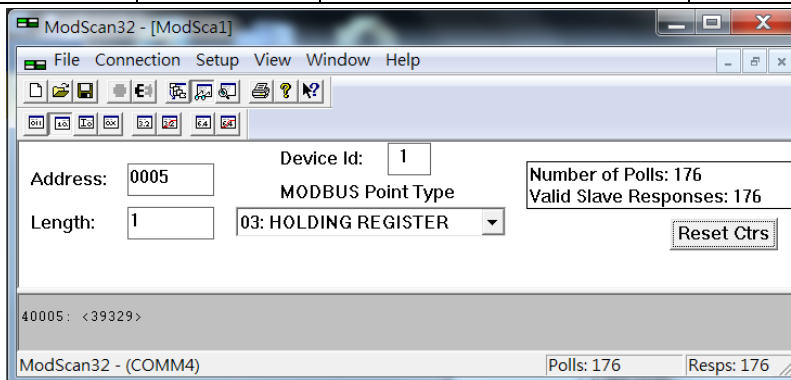
3 means baud rate is 9600

4 means baud rate is 14400

- 5 means baud rate is 19200
- 6 means baud rate is 38400
- 7 means baud rate is 115200

Example for read AI1 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	04	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	18
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	C5	Low Byte CRC	4E
Low Byte CRC	CB		



Ex: Data 0x0018 = 24 in decimal. It means 0.024V

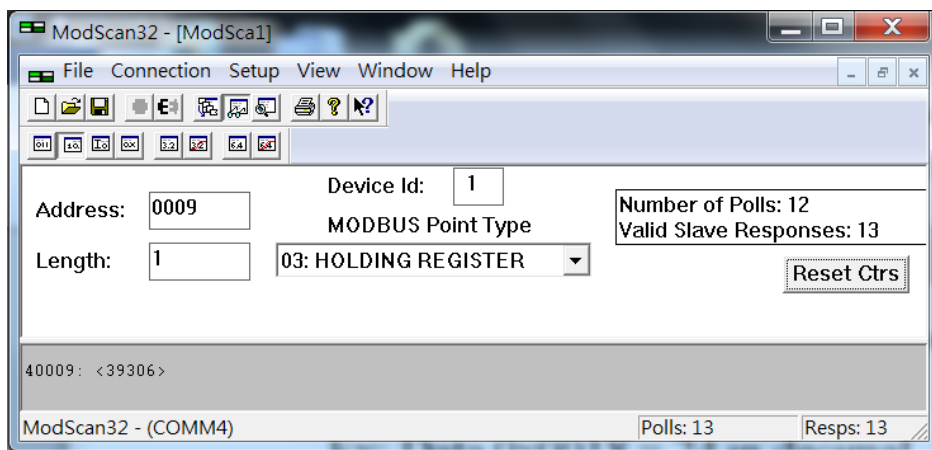
Example for read AI1 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	05	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	30
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	94	Low Byte CRC	50
Low Byte CRC	0B		

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for read AI2 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	08	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	18
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	05	Low Byte CRC	4E
Low Byte CRC	C8		



Ex: Data 0x0018 = 24 in decimal. It means 0.024V

Example for read AI2 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	09	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	30

Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	54	Low Byte CRC	50
Low Byte CRC	08		

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for set Modbus Address and Baud Rate :

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	06	Function	06
Data Address Hi	00	Data Address Hi	00
Address Lo	00	Data Address Lo	00
High Byte Data	02	High Byte Data	02
Low Byte Data	06	Low Byte Data	06
High Byte CRC	08	High Byte CRC	08
Low Byte CRC	A8	Low Byte CRC	A8

Ex: High Byte Data 0x02 set Modbus Address as 02. The available rage is 1~247.

Low Byte Data 0x06 set Baud Rate as 38400

For 1 set baud rate as 2400

2 set baud rate as 4800

3 set baud rate as 9600

4 set baud rate as 14400

5 set baud rate as 19200

6 set baud rate as 38400

7 set baud rate as 115200

Example for set AO1 :

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	06	Function	06
Data Address Hi	00	Data Address Hi	00
Address Lo	14	Data Address Lo	14
High Byte Data	27	High Byte Data	27
Low Byte Data	10	Low Byte Data	10
High Byte CRC	D3	High Byte CRC	D3
Low Byte CRC	F2	Low Byte CRC	F2

Ex: High Byte Data & Low Byte Data 0x2710 set AO1 10.000V output

Example for set AO2 :

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	06	Function	06
Data Address Hi	00	Data Address Hi	00
Address Lo	18	Data Address Lo	18
High Byte Data	13	High Byte Data	13
Low Byte Data	88	Low Byte Data	88
High Byte CRC	04	High Byte CRC	04
Low Byte CRC	9B	Low Byte CRC	9B

Ex: High Byte Data & Low Byte Data 0x1388 set AO2 5.000V output

2.5 Reset Button

If any chance you forgot the login password or have incorrect settings making this Device inoperable, upon the power is on and the “SYS” LED light on, use a point tip to press this button and hold it for more than 20 seconds the release the point tip. The Device will reboot and all the parameters will be reset to the factory default.