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AS Series Module Manual



AS Series Module Manual



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1.1 Overview

This manual introduces the usage of special modules. Analog input/output modules, temperature measurement modules, load cell modules, and network modules are special modules. They are described below.

Classification	Model Name	Description
		4-channel analog input module
	AS04AD-A	Hardware resolution: 16 bits
		0~10V, 0/1~5V, -5~+5V, -10~+10V, 0/4~20mA, -20~+20mA
		Conversion time: 2ms/channel
		4-channel analog input module
		Hardware resolution: 12 bits
	AS04DA-A	-10~+10V, 0~20mA, 4~20mA
Analog		Conversion time: 2ms/channel
module		4-channel analog input module
		Hardware resolution: 16 bits
		0~10V, 0/1~5V, -5~+5V, -10~+10V, 0/4~20mA, -20~+20mA
		Conversion time: 2 ms/channel
	ASU6XA-A	2-channel analog input module
		Hardware resolution: 12 bits
		-10~+10V, 0~20mA, 4~20mA
		Conversion time: 2ms/channel
		4-channe, 2-wire/3-wire RTD
	AS04RTD-A	Sensor type: Pt100 / Ni100 / Pt1000 / Ni1000 / JPt100 /
		LG-Ni1000 / Cu50 / Cu100 / 0~300 Ω / 0~3000 Ω input
		impedance
Temperature		Resolution: 0.1°C/0.1°F (16 bits)
measurement		Conversion time: 200ms/channel
module		4-channe thermocouple
		Sensor type: J, K, R, S, T, E, N, B and -100~+100 mV
	AS041C-A	Resolution: 0.1°C/0.1°F (24 bits)
		Conversion time: 200ms/channel
		2-channel, 4-wire/6-wire load cell sensor
	AS02LC-A	Eigenvalue applicable to a load cell: 1, 2, 4, 6, 20, 40, 80
module		mV/V

Classification	Model Name	Description
		Highest precision 1/10000 @ 50ms of the conversion time
		ADC Resolution : 24 bits
		Conversion time: 2.5 ~ 400ms (9 options to choose from)
Notwork		Serial communication module, 2x communication ports,
Network	AS00SCM-A	applicable to communication cards, supporting MODBUS
module		protocols
	AS00SCM-A	
Remote I/O	+	Applicable to AS-FCOPM function cards
module	AS-FCOPM	
	10 5000	Serial communication port, RS232, functioning as a master
	AS-F232	or slave
	AS-F422	Serial communication port, RS422, functioning as a master
		or slave
	AS-F485	Serial communication port, RS485, functioning as a master
		or slave
	AS-FCOPM	CANopen communication port, supporting DS301, AS
Function cards		series remote modules and Delta servo systems
		2-channel analog input
	AS-F2AD	0~10V (12 bits), 4~20mA (11 bits)
		Conversion time: 3ms/channel
		2-channel analog input
	AS-F2DA	0~10V, 4~20mA (12 bits)
		Conversion time: 2ms/channel

1.2 Specifications

1.2.1 General Specifications

Item	Specifications
Operating temperature	-20~60°C
Storage temperature	-40~80°C
Operating humidity	5~95%
	No condensation
Storago humidity	5~95%
Storage numbers	No condensation
Work environment	No corrosive gas exists.

ltem	Specifications
Installation location	In a control box
Pollution degree	2
EMC (electromagnetic compatibility)	Refer to chapter 7 for more information.
	Tested with:
	5 Hz \leq f \leq 8.4 Hz, constant amplitude 3.5 mm;
Vibration resistance	8.4 Hz \leq f \leq 150 Hz, constant acceleration 1g
	Duration of oscillation: 10 sweep cycles
	per axis on each direction of the 3 mutually perpendicular axes
	International Standard IEC 61131-2 & IEC 60068-2-6 (TEST Fc)
	Tested with:
	Half-sine wave:
Shock resistance	Strength of shock 15 g peak value, 11 ms duration;
Onook resistance	Shock direction: The shocks in each in direction per axis, on 3 mutually
	perpendicular axes (total of 18 shocks)
	International Standard IEC 61131-2 & IEC 60068-2-27 (TEST Ea)
Safety	Conforms to IEC 61131-2, UL508

1.2.2 EMS Standards

1.2.2.1 EMI

Port	Frequency range	Level (Normative)	Reference standard
Enclosure port	30-230 MHz	40 dB (μV/m) quasi-peak	
(radiated)			
(measured at a	230-1000 MHz	47 dB (µV/m) quasi-peak	
distance of 10 meters)			
		79 dB (μV) quasi-peak	IEC 61000-6-4
AC power port	0.15-0.5 MHz	66 dB (μV) average	
(conducted)		73 dB (μV) quasi-peak	
	0.5-30 MHZ	60 dB (μV) average	

1.2.2.2 EMS

Environmental phenomenon	Reference standard	Τι	est	Test level
Electrostatic		Co	ntact	±4 kV
discharge	IEC 61000-4-2	ŀ	Air	±8 kV
Radio frequency		80% AM	2.0-2.7 GHz	1 V/m
electromagnetic field	IEC 61000-4-3	1 kHz	1.4-2.0 GHz	3 V/m
Amplitude modulated		sinusoidal	80-1000 MHz	10 V/m
Power frequency		60) Hz	30 A/m
magnetic field	IEC 01000-4-8	50) Hz	30 A/m

1.2.2.3 Conducted Immunity Test

Environment	al phenomenon	Fast transient burst	High energy surge	Radio frequency interference
Referenc	e standard	IEC 61000-4-4	IEC 61000-4-5	IEC 61000-4-6
Interface/Port	Specific interface/port	Test level	Test level	Test level
Data	Shielded cable	1 kV	1 kV CM	10 V
communication	Unshielded cable	1 kV	1 kV CM	10 V
	AC I/O	2 13/	2 kV CM	40.1/
	(unshielded)	2 KV	1 kV DM	10 V
Digital and analog I/O	Analog or DC I/O(unshielded)	1 kV	1 kV CM	10 V
	All shielded lines (to the earth)	1 kV	1 kV CM	10 V
	AC power	2 kV	2 kV CM	10.1/
Equipment	AC power	2 KV	1 kV DM	10 V
power	DC power	2 kV	0.5 kV CM	10.1/
		2 KV	0.5 kV DM	10 V
I/O power and	AC I/O and AC	2 kV	2 kV CM	10.1/
auxiliary power	auxiliary power	2 K V	1 kV DM	

Environmenta	al phenomenon	Fast transient burst	High energy surge	Radio frequency interference
Reference standard		IEC 61000-4-4	IEC 61000-4-5	IEC 61000-4-6
Interface/Port	Specific interface/port	Test level	Test level	Test level
output	DC I/O and DC auxiliary power	2 kV	0.5 kV CM 0.5 kV DM	10 V

1.3 Installation

1.3.1 Installing a Module

- 1. Please install the PLC onto the power supply module, and then insert the module hooks into the DIN rail mounting slot.
- Link the I/O modules on the right side of the PLC and make sure they are hooked together, push the modules into the DIN rail until hearing a click. That means the module is on the DIN rail and is connected to the PLC as illustrated below.



3. When the installion is done, secure the module with screws.



4. If there is a vibration source in the installation site, it is suggested to installed anti-vibration baffles on the sides of the AS series for better stabilization as the gray baffles illustrated below.



Install the baffles:

1. Hook the baffles onto the DIN rail and press it down as the directional arrow indicated below.



2. Use screws to secure the baffle.



3. The baffles installation is complete as the image shown below.



1.3.2 Installing a Removable Terminal Block

Please install the removable terminal block on the module, as illustrated below.

Installation

1. Level the terminal block at the printed circuit board, and press it into the module.



Removal

1. Pull down the clip in the direction indicated by the arrow and then pull the terminal block up

as illustrated below.



1.3.3 Changing a Module

1. Take the removable terminal block out of the module and pull the clip out from the DIN rail as the image show below.



- 2. Remove the module to be changed out.
- 3. Slide the new module in as the image shown below.



1.3.4 Installing and Removing an Extension Card

Installation

Put the extension card into the extension card slot until hearing a click.



Removal

Press the PUSH to release the extension card and then take the extension card out.



1.3.5 Installing a Wiring Module

Put a communication cable in the port on a CPU module, and make sure that the connector of the cable is joined to the port properly.

Installation

- 1. One side of a wiring module has to be fixed first.
- 2. Press the driver board in the direction indicated by arrow 1, and make sure that the groove is combined with the DIN rail.



Removal

- 1. Push the wiring module in the direction indicated by arrow 1.
- 2. Pull the wiring module in the direction indicated by arrow 2.



MEMO



Chapter 2 Analog Input Module AS04AD

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2.1 Overview

The specifications for analog-to-digital modules, the operation, and the programming are described in this chapter. A/D module will be refer to AS04AD-A the analog-to-digital module in this chapter.

2.1.1 Characteristics

(1) A module is selected according to practical application.

AS04AD-A: There are four channels. Inputs received by a channel can be either voltages or currents.

(2) High-speed conversion

An analog signal is converted into a digital signal at a speed of 25 ms a channel.

(3) High accuracy

Conversion accuracy: The error is ±0.2% of an input voltage, and ±0.2% of an input current. (The ambient temperature is 25°C. The number of input voltages/currents which are averaged is 100.)

(4) A module can be set by means of utility software.

HWCONFIG is built-in utility software in ISPSoft. Users can set modes and parameters in HWCONFIG to complete hardware configuration without spending time writing a program to set registers corresponding to functions.

2.2 Specifications and Functions

2.2.1 Specifications

• Electrical specifications

Module name	AS04AD-A
Number of inputs	4
Analog-to-digital	Voltage input/Current input
conversion	
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)
Connector type	Removable terminal block
Conversion time	2ms/channel
	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an
Isolation	optocoupler, but the analog channels are not isolated from one another.
	Isolation between a digital circuit and a ground: 500 VDC

Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC

• Functional specifications

Analog-to-digital conversion			Voltage input		
Rated input range	-10 V~10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware input range	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Fiducial error (Room temperature)			±0.2%		
Fiducial error (Full temperature range)	±0. 5%				
Linearity error (Room temperature)	±0.02%				
Linearity error (Full temperature range)	±0.06%				
Hardware resolution	16 bits				
Input impedance	2ΜΩ				
Absolute input range	±15 V				

Analog-to-digital conversion		Current input	
Rated input range	±20 mA	0 mA~20 mA	4 mA~20 mA
Hardware input range	-20.2 mA~20.2 mA	-0.2 mA~20.2 mA	3.8 mA~20.2 mA
Fiducial error (Room temperature)		±0.2%	
Fiducial error (Full temperature range)		±0.5%	
Linearity error (Room temperature)	±0.04%		

2

Analog-to-digital conversion	Current input
(Full temperature range)	
Linearity error	±0.10%
Hardware resolution	16 bits
Input impedance	250 Ω
Absolute input range	±32 mA

2.2.2 Profile

• AS04AD-A



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
		Indicating the status of the power supply
	POWER LED indicator	ON: the power is on
2		OFF: no power
	ERROR LED indicator	Error status of the module
		ON: A serious error occurs in the module.
		OFF: The module is normal.
		Blinking: A slight error occurs in the module.
		Indicating the analog to digital conversion status
Analog to digital conversion indicate	Analog to digital	Blinking: conversion is taking place
		OFF: stop conversion

Number	Name	Description
2	Removable terminal	The inputs are connected to sensors.
3	block	The outputs are connected to loads which will be driven.
1	Arrangement of the	Arrangement of the terminals
4	input/output terminals	
5	Termainal block clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate

2.2.3 Arrangement of Terminals



2

2.2.4 Control Registers

CR#	Name	Description	Defaults
0	Formationtum	0: integer format	0
0		1: floating point format	0
		0: closed	
	Channel 1 mode setup	1: -10V~10V	
2	Channel 2 mode setup	2: 0~10V	
2		3: -5~5V	
2	Channel 3 mode setup	4: 0~5V	1
3		5: 1~5V	
	Channel 4 mode setup	6: 0mA~20mA	
4		7: 4mA~20mA	
		8: -20mA~20mA	
5	Channel 1 offset		0
6	Channel 2 offset	Setting range: -32768-32767	
7	Channel 3 offset	- Setting range52700~52707	
8	Channel 4 offset		
9	Channel 1 gain		1000
10	Channel 2 gain	Setting range: -32768, 32767	
11	Channel 3 gain	Setting range52700~52707	
12	Channel 4 gain		
13	Channel 1 average times		
14	Channel 2 average times	Cotting ranges 1, 100	
15	Channel 3 average times	Setting range. 1~100	10
16	Channel 4 average times		
47	Channel 1 filter average		
17	percentage		
10	Channel 2 filter average		
10	percentage	Setting range: 0~3, unit: ±10%	1
10	Channel 3 filter average		
19	percentage		
20	Channel 4 filter average		

CR#	Name	Description	Defaults
	percentage		
		0 : 2ms	
		1 : 4ms	
		2:10ms	
		3:15ms	
		4:20ms	
		5:30ms	
21	(sampling/integration time)	6:40ms	0
	(sampling/integration time)	7:50ms	
		8:60ms	
		9:70ms	
		10:80ms	
		11:90ms	
		12 : 100ms	
		0: open channel alarm	
		1: close channel alarm	
		bit0: Channel 1	
		bit1: Channel 2	
		bit2: Channel 3	
22	Channel alarm setun	bit3: Channel 4	0
			0
		0: warning	
		1: alarm	
		bit8: Error occurs in the module power	
		bit9: Error occurs in the module hardware	
		bit10: Error occurs in calbriation	
23	The minimum scale range	The analog input mode of a channel has a	-10
24	for channel 1	corresponding digital range; that is, an analog range	-10
25	The minimum scale range	corresponds to a digital range. For example, if the	10
26	for channel 2	analog range is -10 V~10 V and the digital range is	-10
27	The minimum scale range	-10.0~10.0, the analog values -10 V~10 V correspond to	10
28	for channel 3	the digital values -10.0~10.0. If the analog input mode of	-10

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CR#	Name	Description	Defaults
29	The minimum scale range	a channel is 4mA~20mA, it means the minumium scale	10
30	for channel 4	range is 4mA and the maximum scale range is 20mA.	-10
31	The maximum scale range	When the format is interger format, the scale range is	
32	for channel 1	invalid.	10
33	The maximum scale range		
34	for channel 2		10
35	The maximum scale range		
36	for channel 3		10
37	The maximum scale range		
38	for channel 4		10
		Instructions for peak values	
		16#0101: record the peark value again for channel 1	
		16#0102: record the peark value again for channel 2	
		16#0104: record the peark value again for channel 3	
		16#0108: record the peark value again for channel 4	
		16#010F: record the peark value again for channel 1~4	
		16#0201: enable to record for channel 1	
		16#0202: enable to record for channel 2	
201	Instruction set	16#0204: enable to record for channel 3	0
		16#0208: enable to record for channel 4	
		16#020F: enable to record for channels 1~4	
		16#0211: disable to record for channel 1	
		16#0212: disable to record for channel 2	
		16#0214: disable to record for channel 3	
		16#0218: disable to record for channel 4	
		16#021F: disable to record for channel 1~4	
		16#0502: restore to its default settings	
210	The maximum peak value		0
210	for channel 1		
211	The maximum peak value	Interger format; the maximum peak value for analog	0
	for channel 2	inputs	
212	The maximum peak value		0
	for channel 3		

CR#	Name	Description	Defaults
213	The maximum peak value		0
	The minimum peak value		
214	for channel 1		0
215	The minimum peak value		0
215	for channel 2	Interger format; the minimum peak value for analog	
216	The minimum peak value	inputs	0
	for channel 3	-	
217	The minimum peak value		0
	for channel 4		
222	The time to record for		1
	The time to record for	-	
223	chanel 2	Unit: 10ms, setting range 1~100	1
	The time to record for	 Setting the time to record the digital value for the channels 	
224	chanel 3		1
225	The time to record for		1
	chanel 4		·
240	The number of records for		0
	channel 1	-	
241	The number of records for		0
	The number of records for	Range: 0~500, display the current records	
242	channel 3		0
	The number of records for	-	
243	channel 4		0
4000~	Pacarda for channel 1	500 records for shapped 1	
4499	Records for charmer f		
4500~	Records for channel 2	500 records for channel 2	
4999			
5000~	Records for channel 3	500 records for channel 3	
5499			
5500~	Records for channel 4	500 records for channel 4	
5999			

2.2.5 Functions

ltem	Function	Description
1	Enabling/Disabling a	1. Users can enable or disable a channel.
I	channel	2. If a channel is disabled, the total conversion time is decreased.
2	Calibration	Users can calibrate a linear curve.
3	Average	Conversion values are averaged and filtered.
4	Disconnection	Only if the analog rang is 4 mA~20 mA or 1 V~5 V does the
detection	disconnection detection function.	
	Channel detec and	If an input signal exceeds a range of inputs which can be received by
5	alarm	hardware, the module will give an alarm or a warning. This function can
		be disabled.
6	The limit detections	Saving the maximum/minimum values for channles
0	for channels	Saving the maximum/minimum values for chainnes
7	Records for	Source the english out the for channels
1	channales	Saving the analog curves for channels
8	Scale range	When the format is floating-point numbers, the scale range can be set.

1. Enabling/Disabling a channel

An analog signal is converted into a digital signal at a speed of 2ms a channel. The total conversion time is 2ms X (the number of channels). If a channel is not used, users can disable it to decrease the total conversion time.

2. Calibration

• To make a curve meet actual needs, users can calibrate the curve by changing an offset and a gain. A calibration range depends on a range of inputs which can be received by hardware. The formula is as below.

$$Output = \frac{(Input \times Gain)}{1000} + Offset$$

Example:

The inputs received by a channel are voltages in the range of -10.0 V to +10.0 V. The gain is 1000, and the offset is 0. The corresponding value for the original signal -10.0 V to +10.0 V is -32000-32000. When using the offset -100, the calibrated vaule for the original signal -10.0 V to +10.0 V is -31900-32100.



3. Average

The average value can be set in the range of 1~100. It is a steady value obtained from the sum of the read values. However, due to unavoidable external factors, the read values may be an acute pulse, resulting in fierce changes in the average value. The filtering function thus exclude the read value that is an acute pulse from the sum-up and equalization, so the average value obtained will not be affected by the acute read value. The filter persontage is set in the range of 0~3, and the unit is 10%. Setting 0 in the filter range, the system will sum up all the read values and equalize to obtain the average value; setting 1 in the filter range, the system will exclue the 10% of the maximum and minimum value and then equalize to obtain the average value.



4. Disconnection detection

Only if the analog rang is 4 mA~20 mA or 1 V~5 V does the disconnection detection function. If a module which can receive inputs ranging from 4 mA to 20 mA or from1 V to 5V is disconnected, an input signal will exceed the range of inputs which can be received by the hardware, and the module will give an alarm or a warning.

5. Channel detection

If an input signal exceeds a range of inputs which can be received by hardware, an error message appears.

This function can be disabled and then the module will not send an alarm or warning when the input signal exceeding the range of inputs.

6. The limit detections for channels

Saving the maximum/minimum values for channles and users can know the peak to peak value from the maximum/minimum values



7. Records for channels

Record the input value of the cyclic sampling for each channel, up to 500 pieces can be recorded and the recording time is 10ms.



8. Scale range

When the format is floating-point numbers, the scale range can be set. The analog output mode of a channel has a corresponding digital range. Digital values correspond to analog outputs sent by a module. For example, if the analog range is $-10 V \sim 10 V$, the digital range is $-10.0 \sim 10.0$ and the scale HSP is $10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10 V \sim 10 V$ as the example shown below.



2.2.6 Wiring

Precautions

In order to make the functions of an analog-to-digital module perfect and ensure the reliability of a system at the same time, external wiring which prevents noise is necessary. Before installing cables, users need to follow the precautions below.

- To prevent a surge and induction, an AC cable and input signal cables which are connected to AS04AD must be separate cables.
- (2) A cable must not be installed near a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Besides, a cable must not be bound to a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Otherwise, effects that noise, induction, and a surge have will increase.
- (3) Please connect a shielded cable and a hermetically sealed cable with the ground separately.
- (4) Terminals with insulation sleeves can not be arranged as a terminal block. It is recommended that the terminals be covered with insulation tubes.
- (5) Please use single-core cables or twin-core cables in a diameter of 24 AWG~22 AWG and with less than 1mm pin-typed connectors. Only use copper conducting wires with a temperature of 60/75°C.



- (6) Two-wire connection/Three-wire connection/Four-wire connection:
 - Two-wire connection/Three-wire connection (Passive transducer): A transducer and an analog input module are connected to a power circuit collectively.
 - Four-wire connection (Active transducer): A transducer uses an independent power supply. It is

not connected to the power circuit which is connected to an analog input module.

• External wiring



- *1. Please use shielded cables to isolate the analog input signal cable from other power cables.
- *2. If the module is connected to a current signal, the terminals Vn and In+ (n=1~4) must be short-circuited.
- *3. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μ F to 0.47 μ F with a working voltage of 25 V.
- *4. Please connect the shielded cable to the terminal FE.
- *5. Please connect the terminal to the ground terminal.
- *6. Every channel can work with the wiring presented above.

Number	Name	Description
		Operating status of the module
1	RUN LED indicator	ON: The module is running.
		OFF: The module stops running.
		Error status of the module
	ERROR LED	ON: A serious error occurs in the module.
2	indicator	OFF: The module is normal.
		Blink: A slight error occurs in the module.
	Analog to digital	Indicating the analog to digital conversion status
3	conversion	Blinking: conversion is taking place
	indicator	OFF: stop conversion

2.2.7 LED Indicators

2.3 HWCONFIG in ISPSoft

2.3.1 Initial Setting

(1) Start ISPSoft, and then double-click HWCONFIG.



(2) Selecting a module.

Ele Edit	Option Help					
Product List						
 ⇒ AS300 ⇒ Digital I/O M ⇒ Analog I/O M ⇒ Analog I/O M → AS04DA → AS04DA → AS06XA Specification 4 channels 16 → 10~+10V, 0~ 0/1~5V, 0/4~2 	odule Aodule bits analog in 10V, -5-+5V, 20 mA ₂₂ -20m/	▲ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	*	+		
mA conversion 2ms/channel	n time =	•	t	~		
CPU Group						
CPU Group	Type	Module Name	DDEVersi	Input Device R	Output Device	Comment
CPU Group Extension No	Туре	Module Name	DDF Versi	Input Device R	Output Device	Comment
CPU Group Extension No Power Module CPU Module	Type CPU Module	Module Name	DDF Versi	Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	Module Name	DDF Versi	Input Device R	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce	Type CPU Module	AS332T	DDF Versi 01.00.00	Input Device R	Output Device Y0.0 ~ Y0.15	Comment

(3) Double-click the module to open the Device Setting page.

				_ _ _ _ _ _
		+		
		+		
		+		
_		v	1	
ule Name DDF'	Versi In	put Device R	Output Device	Comment
2T 01.00.	.00 X0	0.0 ~ X0.15	Y0.0 ~ Y0.15	
AD-A 00.50	00 10	28000 ~ 02801		
107.1 00.30.	00 12	20000 22001		
	4D-A 00.50	4D-A 00.50.00 D	AD-A 00.50.00 D28000 ~ D2801	AD-A 00.50.00 D28000 ~ D2801
E AS04AD-A	Device Informatio	n Normal Exchange Area		
--	-------------------	---	---	
- CH1"CH4 Mode setting	Device Name	AS04AD-A		
 CH1~CH4 Calibration average filter sampling time Channel Detect and Alarr 	Description	4 channels 16 bits analog input :-10"+10V, 0"10V, -5" +5V, 0/1"5V, 0/4"20 mA, -20mA"20 mA conversion time = 2ms/channel Module current consumption:(Internal)50mA (External)		
	Comment			
	DDF Version	0.50.00		
	Firmware Version	(off-line)		
	Hardware Version	(off-line)	1	
÷				

(4) Set the parameters, and then click \mathbf{OK} .

AS04AD-A	average filter								
	Parameter name	Valu	e	Unit	Default	Minimum	Maximum		
CH1~CH4 Calibration	CH1 average times	10			10		100		
<mark>average filter</mark>	CH2 average times	10			10	1	100		
- sampling time	CH3 average times	10			10	1	100		
taan Channel Detect	CH4 average times	10	-		10	1	100		
	CH1 filter Proportion	10%	*		10%	1.5.	7		
	CH2 filter Proportion	10%			10%	-			
	CH3 filter Proportion	10%	-		10%	1.5			
	CH4 filter Proportion	10%			10%	*	+		

2

(5) Click **Download** on the toolbar to download the parameters. (The parameters can not be downloaded when the CPU module runs.)

🚝 Eile Edit	<u>Option</u> Help		_	_	_	
	3 8 9 9	2 - 0				
Product List		Download (Ctrl+I	201			
 AS300 Digital I/O M Analog I/O I AS04AD AS04DA AS06XA 	fodule Module		+	14 A0		
4 channels 16 -10~+10V, 0~ 0/1~5V, 0/4~2 mA conversio 2ms/channel	bits analog inpu 10V, -5~+5V, 20 mA,, -20mA~ n time =	ut : •				
		× 1				
CPII Group		<u> </u>	1	~)	
CPU Group Extension No	Type	Module Name	DDF Versi	Input Device B	Output Device	Comment
CPU Group Extension No Power Module	Туре	Module Name	DDF Versi	Input Device R	Output Device	Comment
CPU Group Extension No Power Madule CPU Madule	Type CPU Module	Module Name	DDF Versi	Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ca	Type CPU Module	Module Name	DDF Versi 01.00.00	V Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ca Function Ca	Type CPU Module	Module Name	DDF Versi	Input Device R	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ca Function Ca Module Inform	Type CPU Module Analog I/O Modu	Module Name AS332T AS04AD-A	DDF Versi 01.00.00 00.50.00	Input Device R ×0.0 ~ ×0.15 D28000 ~ D2801	Output Device Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Ce Function Ce Module Inform	Type CPU Module Analog I/O Modu	AS332T AS04AD-A	DDF Versi 01.00,00 00.50.00	Input Device R X0.0 ~ X0.15	Output Device Y0.0 ~ Y0.15	Comment

2.3.2 Checking the Version of a Module

(1) Online Mode. On the Option menu, click Online Mode.

HWCONFIG	
File Edit Option Help	
Product List Download Ctrl+F9 Product List Download Ctrl+F8 AS300 IO Scan Ctrl+F8 Digital I/O I Onime Mode Ctrl+F4 Analog I/O PO List AS04DA AS04DA PO List AS04TC AS04TC AS02LC Network Module Power Module Power Module Ctrl+F4	
Specification	
4 channels 16 bits analog input : - 10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA,, -20mA~20 mA conversion time = 2ms/channel	

(2) Double-click the module to see the Device Setting page. The version of the firmware and that of the hardware are displayed.



AS04AD-A	Device Information	Normal Exchange Area	
format CH1~CH4 Mode setting	Device Name	A504AD-A	
- CH1~CH4 Calibration			_
 average filter sampling time Channel Detect and Alarr 	Description	4 channels 16 bits analog input: -10*+10V, 0*10V, -5* +5V, 0/1*5V, 0/4*20 mA, -20mA*20 mA conversion time = 2ms/channel Module current consumption:(Internal)50mA,(External)	
	Comment		
	DDFVersion	00,50.00	4
	Firmware Version	01.00.00	
	Hardware Version	00.00.00	
	-		

2.3.3 Online Mode

(1) Click **Online Mode** on the toolbar.

🖀 Untitled7 - I	HWCONFIG					
🚝 Eile Edit	Option Help					- 8 ×
	3 8 9 9	調査の				
Product List	Online	Mode (Ctrl+F4)	-			
 ⇒ AS300 ⊕ Digital I/O M ⇒ Analog I/O M → AS04AD → AS04AD → AS04AD → AS06XA Specification 4 channels 16 -10→+10V, 0~: 0/1~5V, 0/4~2 mA conversion 2ms/channel 	odule odule bits analog inpu 10V, -5~+5V, 0 mA,, -20mA- n time =	▲ ↓ ↓ ↓ ↓	+	₩		
CPU Group		24	1	*		
Extension No	Type	Module Name	DDF Versi	Input Device B	Output Device	Comment
Power Module						
E CPU Module	CPU Module	AS332T	01.00.00	×0.0 ~ ×0.15	Y0.0 ~ Y0.15	
Function Ce				1		
Function Ce						
Module Inform	Analog I/O Modu	AS04AD-A	00.50.00	D28000 ~ D2801		

(2) Right-click the module.



(3) The module status can be shown.

AS04AD-A		×
Channel	Value (32 bits)	Data Type
Error code	6145	DECIMAL
CH1 Input	0	DECIMAL
CH2 Input	0	DECIMAL
CH3 Input	0	DECIMAL
CH4 Input	0	DECIMAL

2.3.4 Importing/Exporting a Parameter File

(1) After **Export** is clicked, the parameters will be saved as a CSV file (.csv).





(2) Click Import, and then select the CSV file.

Default	Import N	Export

Open	2 🛛
Look in: 🔲 My Documents	
My Music My Pictures WinCHM Projects	

2.3.5 Parameters

(1) The input modes of the channels

Device Setting				
Options				
⊡- AS04AD-A	format			
	Parameter name	Value	Unit Default Minim	um Maximum
	format	Integer format 💌	Integer format -	-
- average litter - sampling time - Channel Detect and Alarr				
Default Import	Export Update			OK

2

(2) The CH1~CH4 Mode settings

Device Setting Options					
⊡-AS04AD-A	CH1~CH4 Mode setting				
	Parameter name	Value	Unit Default	Minimum	Maximum
CH1~CH4 Calibration	CH1 mode setting	-10V~+10V 🗾	-10V~+10V	-	-
average filter	CH2 mode setting	-10V~+10V 💌	-10\~+10\	-	
- Sampling time	CH3 mode setting	-10V~+10V 💌	-10\~+10\	-	-
Circliner Detect and Alan	CH4 mode setting	-10V~+10V 💌	-10V~+10V	-	-
Default Import	Export Update				ОК

(3) The CH1~CH4 calibration settings

Options	CH1~CH4 Calibration					
- format - CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum
	CH1 Cal. Offset (V/mA)	0		0	-32768	32767
- average filter	CH2 Cal. Offset (V/mA)	0		0	-32768	32767
- sampling time	CH3 Cal. Offset (V/mA)	0		0	-32768	32767
- Channel Detect and Alarr	- CH4 Cal. Offset (V/mA)	0		0	-32768	32767
	CH1 Cal. Gain	1000		1000	-32768	32767
	CH2 Cal. Gain	1000		1000	-32768	32767
	CH3 Cal. Gain	1000		1000	-32768	32767
	CH4 Cal. Gain	1000		1000	-32768	32767
Default Import	Export Update					OK

(4) The average filter settings

AS04AD-A	average filter						
- CH1~CH4 Mode setting	Parameter name Value Unit Default		Minimum	Maximum			
	CH1 average times	10			10		100
average filter	CH2 average times	10			10	1	100
- sampling time	CH3 average times	10			10	1	100
- Channel Detect and Alarr	- CH4 average times	10			10	1	100
	CH1 filter Proportion	10%	•		10%	-	-
	CH2 filter Proportion	10%	•		10%	-	-
	- CH3 filter Proportion	10%	•		10%	-	-
	CH4 filter Proportion	10%	•		10%	-	-

(5) The sampling time settings

Device Setting Options				
- AS04AD-A - format - CH1~CH4 Mode setting - CH1~CH4 Calibration - average filter - <u>sampling tme</u> - Channel Detect and Alarr	sampling time Parameter name Sampling time	Value 2ms	Unit Default 2ms	Minimum Maximum
Default Import	Export Update			OK

(6) The channel detect settings

□ AS04AD-A	Channel Detect and Alarm settings					
- CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum
- CH1~CH4 Calibration	CH1 overrage Detect	📃 Disable		📃 Disable		-
- average filter	CH2 overrage Detect	📃 Disable		🗌 Disable	-	-
- sampling time	CH3 overrage Detect	📃 Disable		📃 Disable	-	-
Channel Delect and Alam	CH4 overrage Detect	📃 Disable		📃 Disable	-	-
	External power supply error	📃 Alarm		🗌 Alarm	-	-
	Hardware error	📃 Alarm		📃 Alarm	-	-
	adjustment error	📃 Alarm		📃 Alarm	-	-
Default Import	Export Update					ок

2.4 Troubleshooting

2.4.1 Error Codes

Error	Description	$A \rightarrow D LED$	ERROR LED
Code		indicator	indicator
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1608	The factory calibration is abnormal.	OFF	ON
16#1801	The external voltage is abnormal.	OFF	Blinking
16#1802	Hardware failure	OFF	Blinking
16#1804	The factory calibration is abnormal.	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of inputs		
10#1000	which can be received by the hardware.		
16#1900	The signal received by channel 2 exceeds the range of inputs		
10#1009	which can be received by the hardware.	Run: blinking	Dliabias
16#190.0	The signal received by channel 3 exceeds the range of inputs	Stop: OFF	Blinking
10#100A	which can be received by the hardware.		
16#180P	The signal received by channel 4 exceeds the range of inputs		
10#100D	which can be received by the hardware.		

Description	Procedure
The external voltage is abnormal.	Check whether the external 24 V power supply to the
-	module is normal.
Hardware failure	Return the module to the factory for repair.
Internal error	Plagas contact the factory
The factory correction is abnormal.	Flease contact the factory.
The signal received by channel 1 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 1
hardware.	
The signal received by channel 2 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 2.
hardware.	
The signal received by channel 3 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 3.
hardware.	
The signal received by channel 4 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 4.
hardware.	

2.4.2 Troubleshooting Procedure

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MEMO



Chapter 3 Analog Output Module AS04DA

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3.1 Overview

An analog output module receives four groups of 12-bit digital data from a CPU module. The digital data is converted into analog signals (voltages or currents).

3.1.1 Characteristics

(1) A module is selected according to practical application.

AS04DA-A: There are four channels. Outputs sent by a channel can be either voltages or currents.

(2) High-speed conversion

A digital signal is converted into an analog signal at a speed of 2ms a channel.

(3) High accuracy

Conversion accuracy: The error is $\pm 0.2\%$ of an output voltage, and $\pm 0.2\%$ of an output current. (The ambient temperature is 25°C.)

(4) A module can be set by means of utility software.

HWCONFIG is built-in utility software in ISPSoft. Users can set modes and parameters in HWCONFIG to complete hardware configuration without spending time writing a program to set registers corresponding to functions.

3.2 Specifications and Functions

3.2.1 Specifications

• Electrical specifications

Module name	AS04DA-A
Number of inputs	4
Analog-to-digital conversion	Voltage input/Current input
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)
Connector type	Removable terminal block
Conversion time	2ms/channel
Isolation	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, but the analog channels are not isolated from one another. Isolation between a digital circuit and a ground: 500 VDC Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC

Analog-to-digital conversion			Voltage input			
Rated input range	±10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V	
Hardware input range	-10.1V~10.1V	-0.1V~10.1V	-5.05V~5.05V	-0.05V~5.05V	0.95V~5.05V	
Fiducial error (Room temperature)		±0.2%				
Fiducial error (Full temperature range)	±0. 5%					
Linearity error (Room temperature)	±0.05%					
Linearity error (Full temperature range)	±0.05%					
Hardware resolution	12 bits					
Input impedance		$1k\Omega{\sim}2M\Omega$ at ±10V and 0V~10V				
Absolute input range			≧500Ω at 1V~5	V		

• Functional specifications

Analog-to-digital conversion	Current input				
Rated input range	0 mA~20 mA	4 mA~20 mA			
Hardware input range	-0.2 mA~20.2 mA	3.8 mA~20.2 mA			
Fiducial error (Room temperature)		±0.2%			
Fiducial error (Full temperature range)	±0.5%				
Linearity error (Room temperature) (Full temperature range)		±0.03%			
Linearity error		±0.03%			
Hardware resolution		12 bits			
Input impedance		≦550 Ω			

3.2.2 Profile



Number	Name	Description
1	Model name	Model name of the module
	POWER LED indicator	Indicating the status of the power supply ON: the power is on OFF: no power
2	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blinking: A slight error occurs in the module.
	Analog to digital conversion indicator	Indicating the analog to digital conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Termainal block clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate



3.2.3 Arrangement of Terminals

3.2.4 Control Registers

CR#	Name	Description	Defaults
0	Format setup	0: integer format	0
		1: floating point format	0
1	Channel 1 mode setun	0: closed	
		1: -10V~10V (default)	
2	Channel 2 mode setup	2: 0~10V	
		3: -5~5V	1
2	Channel 3 mode setup	4: 0~5V	
3		5: 1~5V	
	Channel 4 mode setup	6: 0mA~20mA	
4		7: 4mA~20mA	
5	Channel 1 offset		
6	Channel 2 offset		0
7	Channel 3 offset	Setting range: -32768~32767	0
8	Channel 4 offset		
9	Channel 1 gain	Setting range: -32768~32767	1000

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CR#	Name	Description	Defaults
10	Channel 2 gain		
11	Channel 3 gain		
12	Channel 4 gain		
13	Retaining an output sent by channel 1		
14	Retaining an output sent by channel 2	0: when the PLC stops, the vaule of the analog output will be reset to 0.	0
15	Retaining an output sent by channel 3	1: when the PLC stops, the value of the analog output will be retained.	
16	Retaining an output sent by channel 4		
17	Refreshing the time for an output sent by channel 1		
18	Refreshing the time for an output sent by channel 2	Setting range: 10~3200 (100ms~32s); unit: 10ms For a value less than 10, it will be seen as 0. For a value	0
19	Refreshing the time for an output sent by channel 3	bigger than 3200, the value will be seen as 3200. When the value is 0, this function is disabled.	U
20	Refreshing the time for an output sent by channel 4		
21 22	The minimum scale range for channel 1		-10
23	The minimum scale range		
24	for channel 2	The analog input mode of a channel has a	-10
25	The minimum scale range	corresponding digital range; that is, an analog range	
26	for channel 3	analog range is $-10 \text{ V} \sim 10 \text{ V}$ and the digital range is	-10
27	The minimum scale range	-10.0~10.0, the analog values -10 V~10 V correspond to	
28	for channel 4	the digital values -10.0~10.0. If the analog input mode of	-10
29	The maximum scale range	a channel is 4mA~20mA, it means the minumium scale	40
30	for channel 1	range is 4mA and the maximum scale range is 20mA.	10
31	The maximum scale range	When the format is interger format, the scale range is	40
32	for channel 2		10
33 34	The maximum scale range for channel 3		10

CR#	Name	Description	Defaults
35	The maximum scale range		10
36	for channel 4		10
		0: warning	
		1: alarm	
37	Channel alarm setup	bit0: Error occurs in the module power	0
		bit1: Error occurs in the module hardware	
		bit2: Error occurs in calbriation	

3.2.5 Functions

ltem	Function	Description
1	Enabling/Disabling a	1. Users can enable or disable a channel.
	channel	2. If a channel is disabled, the total conversion time is decreased.
2	Calibration	Users can calibrate a linear curve.
3	Retaining an output	When a module stops running, a signal sent by the module is retained.
4	Refreshing time for	Refreshing the analog output value according to the value of the fixed
4	an output	slope
5	Scale range	When the format is floating-point numbers, the scale range can be set.

1. Enabling/Disabling a channel

An analog signal is converted into a digital signal at a speed of 2ms a channel. The total conversion time is 2ms X (the number of channels). If a channel is not used, users can disable it to decrease the total conversion time.

2. Calibration

• To make a curve meet actual needs, users can calibrate the curve by changing an offset and a gain. A calibration range depends on a range of inputs which can be received by hardware. The formula is as below.

$$Output = \frac{(Input \times Gain)}{1000} + Offset$$

Example:

The inputs received by a channel are voltages in the range of -10.0 V to +10.0 V. The gain is 1000, and the offset is 0. The corresponding value for the original signal -10.0 V to +10.0 V is -32000-32000. When using the offset -100, the calibrated vaule for the original signal -10.0 V to +10.0 V is -31900-32100.

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3. Retaining an output

When a module stops running, a signal sent by the module is retained.

The output is not retained:



3. Refreshing time for an output

Users set the refreshing time for an output and the value of the slope (m) will be updated accordingly.



When the analog output signal changes, the value of the analog output will be updated according to the value set in the slope as the image shown below.



4. Scale range

When the format is floating-point numbers, the scale range can be set. The analog output mode of a channel has a corresponding digital range. Digital values correspond to analog outputs sent by a module. For example, if the analog range is $-10 V \sim 10 V$, the digital range is $-10.0 \sim 10.0$ and the scale HSP is $10.0 \sim 10.0 \sim 10.0$ and the scale LSP is $-10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10 V$ as the example shown below.



3.2.6 Wiring

Precautions

In order to make the functions of a digital-to-analog module perfect and ensure the reliability of a system at the same time, external wiring which prevents noise is necessary. Before installing cables, users need to follow the precautions below.

 To prevent a surge and induction, an AC cable and the output signal cables which are connected to AS04DA-A must be separate cables. 3

- (2) A cable must not be installed near a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Besides, a cable must not be bound to a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Otherwise, effects that noise, induction, and a surge have will increase.
- (3) Please connect a shielded cable and a hermetically sealed cable with the ground separately.
- (4) Terminals with insulation sleeves can not be arranged as a terminal block. It is recommended that the terminals be covered with insulation tubes.
- (5) Please connect 24 to 22 AWG (1 mm) wires to the input/output terminals. The lengths of the plastic jackets which are removed from the cables used should be in the range of 8 mm to 10 mm. The specifications for the terminals and the wiring of the terminals are shown below. Only copper leads which can resist the heat above 60/75°C can be used.



• External wiring



- *1. Please use shielded cables to isolate the analog input signal cable from other power cables.
- *2. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μ F to 0.47 μ F with a working voltage of 25 V.
- *3. Please connect the SLD to FE and the FE and the terminal 🕒 should be connected to earth ground.
- *4. Every channel can work with the wiring presented above.

Number	Name	Description
		Operating status of the module
1	RUN LED indicator	ON: The module is running.
		OFF: The module stops running.
		Error status of the module
2	ERROR LED	ON: A serious error occurs in the module.
2	indicator	OFF: The module is normal.
		Blink: A slight error occurs in the module.
	Digital to analog	Indicating the digital to analog conversion status
3	conversion	Blinking: conversion is taking place
	indicator	OFF: stop conversion

3.2.7 LED Indicators

3.3 HWCONFIG in ISPSoft

3.3.1 Initial Setting

(1) Start ISPSoft, and then double-click **HWCONFIG**.



(2) Selecting a module.

Product List AS300 Digital I/O Module AS300 Digital I/O Module AS304DA AS06XA Specification: 4 channels 16 bits analog input: -10-+10V, 0-10V, -5-+5V, 0/1~5V, 0/4~20 mA, -20mA~20 mA conversion time = 2ms/channel CPU Group Extension No Type Module Name DDF Versi Input Device R Output Device Comment Power Module CPU Module AS332T 01.00.00 X0.0~X0.15 Y0.0~Y0.15 Function Ce Function	Product List	339	9 % ° ¢				- <u>F</u>
Bolgital I/O Module Analog I/O Module Asolo XAD ASOBADA ASOBAA ASOBAAA ASOBAAA ASOBAAA ASOBAAAA ASOBAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	E AS300	_	*				
Power Module Power	🗉 Digital I/O M	odule	-				
AS04AD AS06XA Specification 4 channels 16 bits analog input: -10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA, -20mA~20 mA conversion time = 2ms/channel CPU Group Extension No Type Module Name DDF Versi Input Device R Output Device CPU Group Extension No Type Module Name DDF Versi Input Device R Output Device Comment Comment Power Module CPU Module Power Module CPU Module AS332T 01.00.00 X0.0 ~ X0.15 Y0.0 ~ Y0.15 Input Device R Function Cc Input Device R Input Device R	🗏 Analog I/O M	lodule 🛛		₽ -	+		
AS06XA AS06XA Specification 4 channels 16 bits analog input: -10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA, -20mA~20 mA conversion time = 2ms/channel CPU Group Extension No Type Module Name DDF Versi Input Device R Output Device Comment Power Module CPU Module CPU Module AS332T 01.00.00 X0.0 ~ X0.15 Y0.0 ~ Y0.15 Function Cc Function Cc	AS04AD						
ASUBXA ASUBXA Specification A 4 channels 16 bits analog input : - -10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA, -20mA~20 mA conversion time = 2ms/channel - Extension No Type Module Name DDF Versi Input Device R Output Device Power Module AS332T O1.00.00 X0.0~X0.15 Y0.0~Y0.15 - Function Cc -	AS04DA						
Specification 4 channels 16 bits analog input : -10~+10V, 0~10V, -5~+5V, 01~5V, 0/4~20 mA,, -20mA~20 mA conversion time = 2ms/channel Extension No Type Module Name DDF Versi Input Device R Output Device Power Module AS332T 01.00.00 X0.0 ~ X0.15 Y0.0 ~ Y0.15 Function Cc Function Cc	ASU6XA						
4 channels 16 bits analog input : -10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA,, -20mA~20 mA conversion time = 2ms/channel CPU Group Extension No Type Module Name DDF Versi Input Device R., Output Device Power Module Power Module CPU Module AS332T 01.00.00 X0.0~X0.15 Y0.0~Y0.15	Specification						
CPU Group Extension No Type Module Name DDF Versi Input Device R Output Device Comment Power Module CPU Module AS32T 01.00.00 X0.0~X0.15 Y0.0~Y0.15 Function Cc Function Cc Image: CPU Module	mA conversion 2ms/channel	n time =			*		
Extension No Type Module Name DDF Versi Input Device R Output Device Comment Power Module Power Module CPU Module AS332T 01.00.00 X0.0 ~ X0.15 Y0.0 ~ Y0.15 Function Cc Function Cc Function Cc Function Cc Function Cc Function Cc	CPU Group						
Power Module CPU Module CPU Module AS332T 01.00.00 X0.0 ~ X0.15 Y0.0 ~ Y0.15 Function C: Function C	Extension No	Туре	Module Name	DDF Versi	Input Device R	Output Device	Comment
CPU Module CPU Module AS332T 01.00.00 X0.0 ~ X0.15 Y0.0 ~ Y0.15 Function C:	Power Module		1 1				
Function Ce Function Ce	E CPU Module	CPU Module	AS332T	01.00.00	×0.0 ~ ×0.15	Y0.0 ~ Y0.15	
	Ter excesses						
	Function Ce						
	Function Ce Function Ce						
	Function Ce Function Ce						
	Function Ce Function Ce						
	Function Ca Function Ca						
	Function Ce Function Ce						

(3) Double-click the module to open the Device Setting page.

😤 Untitled0 - HWCONFIG	
🚰 File Edit Option Help	
8 X 0 0 9 5 9	9 K 17 ¢
Product List	
 A\$300 Digital I/O Module Analog I/O Module A\$04AD A\$04DA A\$06XA A\$06XA A\$04RTD A\$04RTC A\$02LC Network Module Power Module 	
Specification	
4 channels 12 bits analog output : -10~+10V, 0~10V, -5~+5V, $0/1$ ~5V, $0/4$ ~20 mA, conversion time = 2ms/channel	
	<u>×</u>

(4) Set the parameters, and then click **OK**.

Device Setting						
Options						
⊡-AS04DA-A	CH1 ^{**} CH4 Mode setting					
-CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum
CH1~CH4 Calibration	CH1 Output mode setting	-10V~+10V	·	-10V~+10V	-	-
- OutPut Setting	CH2 Output mode setting	-10V~+10V	•	-10V~+10V	-	-
Alamiseungs	CH3 Output mode setting	-10V~+10V	•	-10V~+10V	-	-
	- CH4 Output mode setting	-107.*+107	·	-107.*+107	-	-
Default Import	Export Update					OK

(5) Click **Download** on the toolbar to download the parameters. (The parameters can not be downloaded when the CPU module runs.)



3.3.2 Checking the Version of a Module

(1) On the Option menu, click Online Mode.



(2) Double-click the module to see the Device Setting page. The version of the firmware and that of the hardware are displayed.



AS04DA-A	Device Information	Normal Exchange Area	
- CH1 [~] CH4 Mode setting	Device Name	AS04DA-A	
OutPut Setting Alarm settings	Description	4 channels 12 bits analog output :-10 [~] +10 ^V , 1 ⁰ 10 ^V , 5 [~] +5 ^V , 0/1 [~] 5 ^V , 0/4 [~] 20 mA, conversion time = 2ms/channel Module current consumption:(Internal)50mA,(External) 110mA	
	Comment		
	DDFVersion	01.00.00	
	Firmware Version	01.00.00	
	Hardware Version	00.00.00.00	
1 1		and a	

3.3.3 Online Mode

(1) Click **Online Mode** on the toolbar.

HWCONFIG	
🚰 File Edit Option Help	
Image: Product List Image: Download Ctrl+F9 Image: Product List Image: Download Ctrl+F8 Image: Product List Image: Download Ctrl+F8	. 0
Digital I/O h Online Mode Crr+F4 Analog I/O 1 A \$04A1 PO List	+ 04 +
AS04DA AS06XA AS04RTD AS04TC AS02LC Potwork Module Power Module	
Specification	
4 channels 12 bits analog output : -10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA, conversion time = 2ms/channel	

(2) Right-click the module.



(3) The module status can be shown.

AS04DA-A		×
Channel	Value (32 bits)	Data Type
Error code	6145	DECIMAL
CH1 Output	0	DECIMAL
CH2 Output	0	DECIMAL
CH3 Output	0	DECIMAL
CH4 Output	0	DECIMAL

3.3.4 Importing/Exporting a Parameter File

(1) After **Export** is clicked, the parameters will be saved as a CSV file (.csv).

Default

ave As		?
Save in: 📋 My Documents	🗾 = 🖻 💣 🔳	*
My Music My Pictures		
WINCHM Projects		
File name:	Sa	ive .
		h

Import

Export N



(2) Click Import, and then select the CSV file.

Default Import	Export
----------------	--------

Open	2 🔀
Look in: Hy Documents	
Wy Pictures	

3.3.5 Parameters

(1) The input modes of the channels

Device Setting				
Options				
E-AS04DA-A	format			
	Parameter name	Value	Unit Default Minimum	Maximum
	format	Integer format 💌	Integer format -	-
– OutPut Setting				
Default Import	Export Update			ОК

(2) The CH1~CH4 Mode settings

Device Setting Options						
	CH1~CH4 Mode setting Parameter name CH1 Output mode setting CH2 Output mode setting CH3 Output mode setting CH4 Output mode setting	Value -10V~+10V -10V~+10V -10V~+10V -10V~+10V	Unit	Default -10V**10V -10V**10V -10V**10V -10V**10V	Minimum - - -	Meximum
Default Import	Export Update					OK

(3) The CH1~CH4 calibration settings

Options	CH1~CH4 Calibration				
- CH1~CH4 Mode setting	Parameter name	Value	Unit D	efault Minimum	Maximum
	CH1 Cal. Offset (V/mA)	0	0	-32768	32767
- OutPut Setting	CH2 Cal. Offset (V/mA)	0	0	-32768	32767
- Alarm settings	CH3 Cal. Offset (V/mA)	0	0	-32768	32767
	CH4 Cal. Offset (V/mA)	0	0	-32768	32767
	- CH1 Cal. Gain	1000	1000	-32768	32767
	- CH2 Cal. Gain	1000	1000	-32768	32767
	CH3 Cal. Gain	1000	1000	-32768	32767
	CH4 Cal. Gain	1000	1000	-32768	32767
Default Import	Export Update				ОК

(4) The output settings

AS04DA-A	OutPut Setting					
- CH1~CH4 Mode setting	Parameter name	Value		Unit Defau	ilt Minimum	Maximum
	CH1 output Hold	Clear	-	Clear	-	-
OutPut Setting	- CH2 output Hold	Clear	-	Clear	-	-
- Alarm settings	- CH3 output Hold	Clear	-	Clear	-	-
	- CH4 output Hold	Clear	-	Clear	-	-
	 CH1 output Setting time(10ms) 	0		0	0	3200
	CH2 output Setting time(10ms)	0		0	0	3200
	 CH3 output Setting time(10ms) 	0		0	0	3200
	CH4 output Setting time(10ms)	0		0	0	3200

(5) The alarm settings

Options					
⊡-AS04DA-A	Alarm settings				
- CH1~CH4 Mode setting	Parameter name	Value	Unit Default	Minimum	Maximum
CH1~CH4 Calibration	External power supply error	Alarm	📃 Alarm		-
- OutPut Setting	Hardware error	📃 Alarm	🗌 Alarm	-	-
Alarm settings	adjustment error	📃 Alarm	🗌 Alarm	-	-
Default Import	Export Update				OK

3.4 Troubleshooting

3.4.1 Error Codes

Error Code	Description	$D \rightarrow A LED$ indicator	ERROR LED indicator
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1608	The factory calibration is abnormal.	OFF	ON
16#1801	The external voltage is abnormal.	OFF	Blinking

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Error Code	Description	D → A LED indicator	ERROR LED indicator
16#1802	Hardware failure	OFF	Blinking
16#1804	The factory calibration is abnormal.	OFF	Blinking

3.4.2 Troubleshooting Procedure

Description	Procedure
The external voltage is abnormal.	Check whether the external 24 V power supply to the
	module is normal.
Hardware failure	Return the module to the factory for repair.
Internal error	Diagon contact the factory
The factory correction is abnormal.	



Chapter 4 Analog Input/Output Module AS06XA

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4.1 Overview

The specifications for an analog input/output module, the operation, and the programming are described in this chapter. Analog signals (voltages or currents) are received by four channels on an analog input/output module, and are converted into 16-bit digital signals. Besides, the analog input/output module receives two pieces of 16-bit digital data from a CPU module. The digital data is converted into analog signals (voltages or currents). The analog signals are sent by two channels on the analog input/output module.

4.1.1 Characteristics

(1) AS06XA-A, an analog input/output module, is used according to practical application.

CH1~CH4: Inputs received by a channel can be either voltages or currents.

CH5~CH6: Outputs sent by a channel can be either voltages or currents.

(2) High-speed conversion

The conversion speed is 2ms a channel.

(3) High accuracy

Conversion accuracy: The ambient temperature is 25°C.

Input: The error is ±0.2% of an input voltage, and ±0.2% of an input current.

Output: The error is ±0.02% of an output voltage, and ±0.2% of an output current.

(4) A module can be set by means of utility software.

HWCONFIG is built-in utility software in ISPSoft. Users can set modes and parameters in HWCONFIG to complete hardware configuration without spending time writing a program to set registers corresponding to functions.

4.2 Specifications and Functions

4.2.1 Specifications

• Electrical specifications

Module name	AS06XA-A
Number of analog inputs/outputs	4 inputs 2 outputs
Analog-to-digital conversion	Voltage input/Current input/Voltage output/Current output
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)

Module name	AS06XA-A	
Connector type Removable terminal block		
Conversion time	2ms/channel	
	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, but the analog channels are not isolated from one another.	
Isolation	Isolation between a digital circuit and the ground: 500 V DC	
	Isolation between an analog circuit and the ground: 500 V DC	
	Isolation between an analog circuit and a digital circuit: 500 V DC	
	Isolation between the 24 V DC and the ground: 500 V DC	

• Functional specifications for the analog-to-digital conversion

Analog-to-digital conversion	Voltage input				
Rated input range	-10 V~10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware input range	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Fiducial error (Room temperature)	±0.2%				
Fiducial error (Full temperature range)	±0.5%				
Linearity error (Room temperature)	±0.02%				
Linearity error (Full temperature range)	±0.06%				
Hardware resolution	16 bits				
Input impedance	2ΜΩ				
Absolute input range	±15 V				

Analog-to-digital conversion	Current input		
Rated input range	±20 mA	0 mA~20 mA	4 mA~20 mA
Hardware input range	-20.2 mA~20.2 mA	-0.2 mA~20.2 mA	3.8 mA~20.2 mA
Fiducial error (Room temperature)	±0.2%		
Fiducial error (Full temperature range)	±0.5%		

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Linearity error (Room temperature)	±0.04%
Linearity error (Full temperature range)	±0.10%
Hardware resolution	16 bits
Input impedance	250 Ω
Absolute input range	±32 mA

• Functional specifications for the digital-to-analog conversion

Digital-to-analog conversion	Voltage output				
Rated output range	±10 V	0V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware output range	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Fiducial error (Room temperature)	±0.2%				
Fiducial error (Full temperature range)	±0.5%				
Linearity error (Room temperature)	±0.05%				
Linearity error (Full temperature range)	±0.05%				
Hardware resolution	16 bits				
Permissible load	1 kΩ~2 MΩ: ±10 V and 0 V~10 V				
impedance	≧500 Ω: 1 V~5 V				

Digital-to-analog conversion	Current output		
Rated output range	0 mA~20 mA	4 mA~20 mA	
Hardware output range	-0.2 mA~20.2 mA	3.8 mA~20.2 mA	
Fiducial error (Room temperature)	±0.2%		
Fiducial error (Full temperature range)	±0.5%		

Linearity error (Room temperature)	±0.03%
Linearity error (Full temperature range)	±0.10%
Hardware resolution	12 bits
Permissible load impedance	≦550 Ω

4.2.2 Profile



Ur	nit:	mm	
	me.		

Number	Name	Description
1	Model name	Model name of the module
2 RUN LED indicator 2 ERROR LED indicator Digital to analog conversion indicator	Operating status of the module ON: The module is running. OFF: The module stops running.	
	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blink: A slight error occurs in the module.	
	Digital to analog conversion indicator	Indicating the digital to analog conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to transducers. The outputs are connected to loads which will be driven.

4-5

AS Series Module Manual

Number	Name	Description
	Arrangement of the	
4	input/output	Arrangement of the terminals
	terminals	
5	Clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting	Connecting the modules
1	set	
8	Ground clip	
9	Label	Nameplate

4.2.3 Arrangement of Terminals


CR#	Name	Description	Defaults
0		0: integer format	_
0	Format setup	1: floating point format	0
4	Input channel 1 mode	0: closed	
	setup	1: -10V~10V (default)	
	Input channel 2 mode	2: 0~10V	
2	setup	3: -5~5V	
	Input channel 3 mode	4: 0~5V	1
3	setup	5: 1~5V	
	Input channel 4 mode	6: 0mA~20mA	
4	setup	7: 4mA~20mA	
		8: -20mA~20mA	
5	Input channel 1 offset		
6	Input channel 2 offset	Sotting range: 20769 20767	0
7	Input channel 3 offset	Setting range32700~32707	
8	Input channel 4 offset		
9	Input channel 1 gain		
10	Input channel 2 gain	Setting range: -32768-32767	1000
11	Input channel 3 gain	Setting range52700~52707	1000
12	Input channel 4 gain		
13	Input channel 1 average		
	times		
14	Input channel 2 average		
	times	Setting range: 1~100	10
15	Input channel 3 average		
	times		
16	Input channel 4 average		
	times		
17	Input channel 1 filter		
	average percentage	Setting range: 0~3, unit: ±10%	1
18	Input channel 2 filter		
	average percentage		

4.2.4 Control Registers

AS Series Module Manual

CR#	Name	Description	Defaults
10	Input channel 3 filter		
	average percentage		
20	Input channel 4 filter		
	average percentage		
		0 : 2ms	
		1 : 4ms	
		2 : 10ms	
		3 : 15ms	
		4 : 20ms	
	Input channel sampling	5 : 30ms	
21	cycle	6:40ms	0
	(sampling/integration time)	7 : 50ms	
		8:60ms	
		9 : 70ms	
		10 : 80ms	
		11 : 90ms	
		12 : 100ms	
		0: open channel alarm	
		1: close channel alarm	
		bit0: Channel 1	
		bit1: Channel 2	
		bit2: Channel 3	
22	Input channel clarm actur	bit3: Channel 4	
22			
		0: warning	
		1: alarm	
		bit8: Error occurs in the module power	
		bit9: Error occurs in the module hardware	
		bit10: Error occurs in calbriation	
22	Output channel 1 mode	0: closed	
23	setup	1: -10V~10V (default)	4
	Output channel 2 mode	2: 0~10V	
24	setup	3: -5~5V	

4

CR#	Name	Description	Defaults
		4: 0~5V	
		5: 1~5V	
		6: 0mA~20mA	
		7: 4mA~20mA	
25	Output channel 1 offset	Setting range: -32768~32767	0
26	Output channel 2 offset		Ū
27	Output channel 1 gain	Setting range: -32768~32767	1000
28	Output channel 2 gain		1000
20	Retaining an output sent	0: when the PLC stops, the vaule of the analog output	
23	by channel 1	will be reset to 0.	0
30	Retaining an output sent	1: when the PLC stops, the value of the analog output	Ŭ
	by channel 2	will be retained.	
31	Refreshing the time for an	Setting range: 10~3200 (100ms~32s); unit: 10ms	
	output sent by channel 1	For a value less than 10, it will be seen as 0. For a value	0
32	Refreshing the time for an	bigger than 3200, the value will be seen as 3200.	_
	output sent by channel 2	When the value is 0, this function is disabled.	
33	The minimum scale range		-10
34	for input channel 1		
35	The minimum scale range		-10
36	for input channel 2		-10
37	The minimum scale range	The analog input mode of a channel has a corresponding	10
38	for input channel 3	digital range; that is, an analog range corresponds to a	-10
39	The minimum scale range	digital range. For example, if the analog range is -10	
40	for input channel 4	V~10 V and the digital range is -10.0~10.0, the analog	-10
41	The minimum scale range	values -10 V~10 V correspond to the digital values	
42	for output channel 1	$-10.0-10.0$. If the analog input mode of a channel is $4mA_{-}20mA_{-}$ it means the minumium scale range is $4mA_{-}$	-10
43	The minimum scale range	and the maximum scale range is 20mA. When the format	
44	for output channel 2	is interger format, the scale range is invalid.	-10
45	The maximum scale range		
46	for input channel 1		10
47	The maximum scale range		
48	for input channel 2		10

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CR#	Name	Description	Defaults
49	The maximum scale range		40
50	for input channel 3		10
51	The maximum scale range		
52	for input channel 4		10
53	The maximum scale range		
54	for output channel 1		10
55	The maximum scale range		
56	for output channel 2		10
		Instructions for peak values	
		16#0101: record the peark value again for channel 1	
		16#0102: record the peark value again for channel 2	
		16#0104: record the peark value again for channel 3	
		16#0108: record the peark value again for channel 4	
		16#010F: record the peark value again for channel 1~4	
		16#0201: enable to record for channel 1	
		16#0202: enable to record for channel 2	
201	Instruction set	16#0204: enable to record for channel 3	0
		16#0208: enable to record for channel 4	
		16#020F: enable to record for channels 1~4	
		16#0211: disable to record for channel 1	
		16#0212: disable to record for channel 2	
		16#0214: disable to record for channel 3	
		16#0218: disable to record for channel 4	
		16#021F: disable to record for channel 1~4	
		16#0502: restore to its default settings	
210	The maximum peak value		-
	for channel 1		
211	The maximum peak value		-
	for channel 2	Interger format; the maximum peak value for analog	
212	The maximum peak value	Inputs	-
	The maximum results		
213	for channel 4		-

CR#	Name	Description	Defaults
214	The minimum peak value		0
	The minimum neak value		
215	for channel 2	Interger format; the minimum peak value for analog	0
216	The minimum peak value for channel 3	inputs	0
217	The minimum peak value for channel 4		0
222	The time to record for chanel 1		1
223	The time to record for chanel 2	Unit: 10ms, setting range 1~100	1
224	The time to record for chanel 3	channels	1
225	The time to record for chanel 4		1
240	The number of records for channel 1		0
241	The number of records for channel 2	Range: 0, 500, display the surrent records	0
242	The number of records for channel 3	Kange. 0~300, display the current records	0
243	The number of records for channel 4		0
4000~ 4499	Records for channel 1	500 records for channel 1	
4500~ 4999	Records for channel 2 500 records for channel 2		
5000~ 5499	Records for channel 3	3 500 records for channel 3	
5500~ 5999	Records for channel 4	500 records for channel 4	

4.2.5 Functions

HWCONFIG, built-in utility software in ISPSoft, can be used to set a module. Users can set modes and parameters by means of HWCONFIG.

• Analog input

Item	Function	Description
1	Enabling/Disabling a	1. Users can enable or disable a channel.
I	channel	2. If a channel is disabled, the total conversion time is decreased.
2	Calibration	Users can calibrate a linear curve.
3	Average	Conversion values are averaged and filtered.
Disconnection		Only if the analog rang is 4 mA~20 mA or 1 V~5 V does the
4	detection	disconnection detection function.
	Channel detec and	If an input signal exceeds a range of inputs which can be received by
5	alarm	hardware, the module will give an alarm or a warning. This function can
		be disabled.
6	The limit detections	Saving the maximum/minimum values for channles
0	for channels	
7	Records for	Sources the english out on for shorpeds
	channales	Saving the analog curves for channels
8	Scale range	When the format is floating-point numbers, the scale range can be set.

1. Enabling/Disabling a channel

An analog signal is converted into a digital signal at a speed of 2ms a channel. The total conversion time is 2ms X (the number of channels). If a channel is not used, users can disable it to decrease the total conversion time.

2. Calibration

• To make a curve meet actual needs, users can calibrate the curve by changing an offset and a gain. A calibration range depends on a range of inputs which can be received by hardware. The formula is as below.

$$Output = \frac{(Input \times Gain)}{1000} + Offset$$

Example:

The inputs received by a channel are voltages in the range of -10.0 V to +10.0 V. The gain is 1000, and the offset is 0. The corresponding value for the original signal -10.0 V to +10.0 V is -32000~32000. When using the offset -100, the calibrated value for the original signal -10.0 V to +10.0 V is -31900~32100. When the input voltage is 0 V, the digital value will be -100. When the input voltage is 10.0 V, the digital value is 32100.

Gain = 1000, Offset = -100



3. Average

The average value can be set in the range of 1~100. It is a steady value obtained from the sum of the read values. However, due to unavoidable external factors, the read values may be an acute pulse, resulting in fierce changes in the average value. The filtering function thus exclude the read value that is an acute pulse from the sum-up and equalization, so the average value obtained will not be affected by the acute read value. The filter persontage is set in the range of 0~3, and the unit is 10%. Setting 0 in the filter range, the system will sum up all the read values and equalize to obtain the average value; setting 1 in the filter range, the system will exclue the 10% of the maximum and minimum value and then equalize to obtain the average value.



4. Disconnection detection

Only if the analog rang is 4 mA~20 mA or 1 V~5 V does the disconnection detection function. If a module which can receive inputs ranging from 4 mA to 20 mA or from1 V to 5V is disconnected, an input signal will exceed the range of inputs which can be received by the hardware, and the module will give an alarm or a warning.

5. Channel detection

If an input signal exceeds a range of inputs which can be received by hardware, an error message appears. This function can be disabled and then the module will not send an alarm or warning when the input signal exceeding the range of inputs.

6. The limit detections for channels

Saving the maximum/minimum values for channles and users can know the peak to peak value from the maximum/minimum values



7. Records for channels

Record the input value of the cyclic sampling for each channel, up to 500 pieces can be recorded and the recording time is 10ms.



8. Scale range

When the format is floating-point numbers, the scale range can be set. The analog output mode of a channel has a corresponding digital range. Digital values correspond to analog outputs sent by a module. For example, if the analog range is $-10 V \sim 10 V$, the digital range is $-10.0 \sim 10.0$ and the scale HSP is $10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10 V$ as the example shown below.



Item	Function	Description
1	Enabling/Disabling a	1. Users can enable or disable a channel.
	channel	2. If a channel is disabled, the total conversion time is decreased.
2	Calibration	Users can calibrate a linear curve.
3	Retaining an output	When a module stops running, a signal sent by the module is retained.
1	Refreshing time for	Refreshing the analog output value according to the value of the fixed
4	an output	slope
5	Scale range	When the format is floating-point numbers, the scale range can be set.

Analog output

1. Enabling/Disabling a channel

An analog signal is converted into a digital signal at a speed of 2ms a channel. The total conversion time is 2ms X (the number of channels). If a channel is not used, users can disable it to decrease the total conversion time.

2. Calibration

• To make a curve meet actual needs, users can calibrate the curve by changing an offset and a gain. A calibration range depends on a range of inputs which can be received by hardware. The formula is as below.

$$Output = \frac{(Input \times Gain)}{1000} + Offset$$

Example:

The inputs received by a channel are voltages in the range of -10.0 V to +10.0 V. The gain is 1000, and the offset is 0. The corresponding value for the original signal -10.0 V to +10.0 V is -32000-32000. When using the offset 200 and the gain 1000, the calibrated value for the original signal -10.0 V to +10.0 V to +10.0 V is -31800-32200.



3. Retaining an output

When a module stops running, a signal sent by the module is retained.



The output is not retained:

3. Refreshing time for an output

Users set the refreshing time for an output and the value of the slope (m) will be updated accordingly.



When the analog output signal changes, the value of the analog output will be updated according to the value set in the slope as the image shown below.



*The output conversion time and the input channel sampling cycle are the same.

4. Scale range

When the format is floating-point numbers, the scale range can be set. The analog output mode of a channel has a corresponding digital range. Digital values correspond to analog outputs sent by a module. For example, if the analog range is $-10 V \sim 10 V$, the digital range is $-10.0 \sim 10.0$ and the scale HSP is $10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10.0 \sim 10 V$ as the example shown below.



4.2.6 Wiring

Precautions

In order to make the functions of an analog-to-digital module perfect and ensure the reliability of a system at the same time, external wiring which prevents noise is necessary. Before installing cables, users need to follow the precautions below.

- To prevent a surge and induction, an AC cable and input signal cables which are connected to AS06XA-A must be separate cables.
- (2) A cable must not be installed near a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Besides, a cable must not be bound to a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Otherwise, effects that noise, induction, and a surge have will increase.
- (3) Please connect a shielded cable and a hermetically sealed cable with the ground separately.
- (4) Terminals with insulation sleeves can not be arranged as a terminal block. It is recommended that the terminals be covered with insulation tubes.
- (5) Please use single-core cables or twin-core cables in a diameter of 24 AWG~22 AWG and with less than 1mm pin-typed connectors. Only use copper conducting wires with a temperature of 60/75°C.



- (6) Two-wire connection/Three-wire connection/Four-wire connection:
 - Two-wire connection/Three-wire connection (Passive transducer): A transducer and an analog input module are connected to a power circuit collectively.
 - Four-wire connection (Active transducer): A transducer uses an independent power supply. It is not connected to the power circuit which is connected to an analog input module.

External wiring

(1) AS06XA-A



- *1. Please use shielded cables to isolate the analog input signal cable from other power cables.
- *2. If the module is connected to a current signal, the terminals Vn and In+ (n=1~4) must be short-circuited.
- *3. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μ F to 0.47 μ F with a working voltage of 25 V.

- *4. Please connect the shielded cable to the terminal FE.
- *5. If the ripple voltage of the input terminal of the load connected is large, and results in interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μ F to 0.47 μ F with a working voltage of 25 V.
- *6. Please connect the shielded cable to the terminal FE and to the ground terminal.
- *7. Please connect the terminal to the ground terminal.
- *8. The wording "CHX-I" indicates that the 5 wiring methods listed above can be used for every input channel.
 The wording "CHX-O" indicates that the 2 wiring methods listed above can be used of every output channel.

4.2.7 LED Indicators

Number	Name	Description	
		Operating status of the module	
1	RUN LED indicator	ON: The module is running.	
		OFF: The module stops running.	
		Error status of the module	
2	ERROR LED	ON: A serious error occurs in the module.	
2	indicator	OFF: The module is normal.	
		Blink: A slight error occurs in the module.	
3	Digital to analog	Indicating the digital to analog conversion status	
	conversion	Blinking: conversion is taking place	
	indicator	OFF: stop conversion	

4.3 HWCONFIG in ISPSoft

4.3.1 Initial Setting

(1) Start ISPSoft, and then double-click **HWCONFIG**.

🙀 Untitled0 - Delta ISPSoft - [Pi	rog0]					
File Edit View Compile	e <u>P</u> LC <u>T</u> ools Wiza	d <u>W</u> indow <u>H</u> elp				_ 8 × -
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Project 🛛 🗘 🗙			Local Symbols			Delta Library, Preview 🏾 🗛 🗙
E Project [C.\ProgramData\I	Class	Identifiers Address	Туре	Initial Value (A	Identifier Comment	Delta Library
HWCONFIG CARD Utility AS332P (UntitledO)						🗄 🌍 Delta Library
E O Tasks		*		*		
🕀 🍎 Global Symbols	Network 1					ð .
Programs						4
Function Blocks						
E → T APIs						-
						Delta Library User Defi 🚽 🕨
						Pratian
						Lieview
Project	4					Preview
Insert Network: 1		0/131040 Steps	Offline	AS300, [USB: COM2	A\$332P	e e

(2) Selecting a module.

<u>File Edit Option Help</u>	
EX 00355	9 A 17. 0
Product List	a la filia de la companya de la comp
 A\$300 Digital I/O Module Analog I/O Module A\$04AD A\$04DA A\$04DA A\$04RTD A\$04RTD A\$04TC A\$02LC Metwork Module Fower Module 	
Specification	1
4 channels 16 bits analog input ,2 channels 12 bits analog output :- 10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA,, -20mA~20 mA conversion time = 2ms/channel	

(3) Double-click the module to open the Device Setting page.



(4) Set the parameters, and then click **OK**.

Device Setting Options							
⊟- AS06XA-A — format	Input CH1~CH4 Mode setting						
Input CH1~CH4 Mode set	Parameter name	Value	Uni	t Default	Minimum	Maximum	
Input CH1~CH4 Calibratic	Input CH1 mode setting	-10V~+10V	-	-10V~+10V	-	-	
Input average filter	Input CH2 mode setting	-10V~+10V	-	-10V~+10V	-	-	
- Input Sampling time	Input CH3 mode setting	-10V~+10V	–	-10V~+10V	-	-	
- Output CH1~CH2 Mode s	Input CH4 mode setting	-10V~+10V	•	-10V~+10V	-	-	
- Output CH1~CH2 Calibra							
- OutPut Setting							
•							
DefaultImport	Export Update						
						ОК	
						-45-	

(5) Click **Download** on the toolbar to download the parameters. (The parameters can not be downloaded when the CPU module runs.)

HWCONFIG	
🚰 File Edit Option Help	
E X D D 3 5 5	9 K 1 *
Product List	
 AS300 Digital I/O Module Analog I/O Module AS04AD AS04DA AS04DA AS06XA AS04RTD AS04TC AS02LC Network Module Power Module 	
Specification	1
4 channels 16 bits analog input ,2 channels 12 bits analog output :- 10~+10V, 0~10V, -5~+5V, 0/1~5V, 0/4~20 mA,, -20mA~20 mA conversion time = 2ms/channel	

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4.3.2 Checking the Version of a Module

(1) On the **Option** menu, click **Online Mode**.



(2) Double-click the module to see the Device Setting page. The version of the firmware and that of the hardware are displayed.



a AS06XA-A	Device Informatio	n Normal Exchange Area	
 format Input CH1[~]CH4 Mode se Input CH1[~]CH4 Calibratic Input average filter Input sampling time 	Device Name Description	AS06XA-A 4 channels 16 bits analog input .2 channels 12 bits analog autput10*+10V, 0*10V, -5*+5V, 0/1*5V, 0/4*20 mA, -	
 Input Channel Detect and Output CH1 ~CH2 Mode s Output CH1 ~CH2 Calibra OutPut Setting 	Comment	Module current consumption (Internal)50mA (External)	
	DDF Version	00.40.00	1 1
	Firmware Version	01.00.00	
	Hardware Version	00.00.00.00	-
Delaut Ingot	Espor L	Jpdate	
			ок

4.3.3 Online Mode

(1) Click **Online Mode** on the toolbar.



(2) Right-click the module.



(3) The module status can be shown.

AS06XA-A		×
Channel	Value (32 bits)	Data Type
Error code	6145	DECIMAL
CH1 Input	0	DECIMAL
CH2 Input	0	DECIMAL
CH3 Input	0	DECIMAL
CH4 Input	0	DECIMAL
CH1 Output	0	DECIMAL
CH2 Output	0	DECIMAL

4.3.4 Importing/Exporting a Parameter File

(1) After **Export** is clicked, the parameters will be saved as a CSV file (.csv).

De	fault	Import	E	xport 💦	
Save As				?	×
Save in: 🛅 M	y Documents		- E) 💣 📰 •	
My Music My Pictures WinCHM Proj	ects				
		*			
File name:			_	Save]
Save as type:	CSV File (*.csv)			K Cancel	I,



(2) Click Import, and then select the CSV file.

Default	Import N	Export	
Open			? 🗙
Look in: 🔲 My Documents	-		.
My Music My Pictures			
File name:			Open
Files of type: CSV File (*.csv	Í.	<u>.</u>	Cancel 5

4.3.5 Parameters

(1) The input modes of the channels

Device Setting					
Options					
⊡- AS06XA-A	format				
- Input CH1~CH4 Mode se	Parameter name	Value	Unit Default	Minimum Maximum	
- Input CH1 ~CH4 Calibratic - Input average filter - Input sampling time - Input Channel Detect and - Output CH1 ~CH2 Mode s - Output CH1 ~CH2 Calibra - OutPut Setting	format	Integer format 💌	Integer format		
Default Import	Export Update			OK]

(2) Input CH1~CH4 Mode settings

Options - AS06XA-A	Input CH1~CH4 Mode setting						
format linput CH1~CH4 Mode set	Parameter name	Value		Unit E)efault	Minimum	Maximum
- Input CH1~CH4 Calibratic	Input CH1 mode setting	-10V~+10V	-	-10V	~+10V	-	-
Input average filter	Input CH2 mode setting	-10V~+10V	-	-10∨	~+10V	-	-
Input sampling time	Input CH3 mode setting	-10V~+10V	•	-10V	~+10∨	-	-
 Input Channel Detect and Output CH1°CH2 Mode s 	Input CH4 mode setting	-10V~+10V	•	-10V	~+10V	-	-
- Output CH1~CH2 Calibra - OutPut Setting							
Default Import	Export Update						OK

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(3) Input CH1~CH4 calibration

Device Setting Options					
AS06XA-A format Input CH1~CH4 Mode se Input CH1~CH4 Calibratic Input average filter Input sampling time Input Channel Detect and Output CH1~CH2 Mode s Output CH1~CH2 Mode s Output CH1~CH2 Calibrat Output Setting	Input CH1~CH4 Calibration Parameter name Input CH1 Cal. Offset (V/mA) Input CH2 Cal. Offset (V/mA) Input CH3 Cal. Offset (V/mA) Input CH4 Cal. Offset (V/mA) Input CH1 Cal. Gain Input CH2 Cal. Gain Input CH3 Cal. Gain Input CH4 Cal. Gain	Value 0 0 0 0 0 1000 1000 1000 1000 1000	Unit Defau 0 0 0 0 1000 1000 1000 1000	It Minimum -32768 -32768 -32768 -32768 -32768 -32768 -32768 -32768 -32768	Maximum 32767 32767 32767 32767 32767 32767 32767 32767 32767
, Default Import	Export Update				ОК

(4) Input average filter

Device Setting						
Options						
⊡- AS06XA-A	Input average filter					
- Input CH1~CH4 Mode se	Parameter name	Value	Unit	Default	Minimum	Maximum
	Input CH1 average times	10		10		100
- <mark>Input average filter</mark>	Input CH2 average times	10		10	1	100
Input Sampling time	Input CH3 average times	10		10	1	100
- Input Channel Detect and	Input CH4 average times	10		10	1	100
- Output CH1~CH2 Calibra	Input CH1 filter Proportion	10% 💌		10%	-	-
- OutPut Setting	Input CH2 filter Proportion	10% 💌		10%	-	-
	Input CH3 filter Proportion	10% 💌		10%	-	-
	Input CH4 filter Proportion	10% 💌		10%	-	-
Default Import	Export Update					ОК

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(5) Input sampling time

Device Setting Options				
 B-AS06XA-A format Input CH1[∞]CH4 Mode set Input CH1[∞]CH4 Calibratic Input average filter Input sempling time Input Channel Detect and Output CH1[∞]CH2 Mode s Output CH1[∞]CH2 Mode s Output CH1[∞]CH2 Calibrat OutPut Setting 	Input sampling time Parameter name Input sampling time	Vālue 2ms 💌	Unit Default Mini 2ms -	mum Maximum
Default Import	Export Update			OK

(6) Input channel detect and alarm settings

Device Setting					
Options					
- AS06XA-A	Input Channel Detect and Alarm se	ttings			
- Input CH1~CH4 Mode se	Parameter name	Value	Unit Default	Minimum	Maximum
Input CH1~CH4 Calibratic	Input CH1 overrage Detect	📃 Disable	📃 Disable	-	-
- Input average filter	Input CH2 overrage Detect	📃 Disable	🗌 Disable	-	-
Input sampling time	Input CH3 overrage Detect	📃 Disable	📃 Disable	-	-
- Output CH1~CH2 Mode s	Input CH4 overrage Detect	📃 Disable	📃 Disable	-	-
Output CH1~CH2 Calibra	External power supply error	Alarm	Alarm	-	-
- OutPut Setting	Hardware error	Alarm	Alarm	-	-
	adjustment error	Alarm	Alarm	-	-
Default Import	Export Update				
					ОК
				_	

(7) Output CH1~CH2 mode settings

Device Setting							
Options Options AS06XA-A format Input CH1~CH4 Mode set Input CH1~CH4 Calibratic Input varage filter Input varage filter Input channel Detect and Output CH1~CH2 Mode set Output CH1~CH2 Calibrat Output CH1~CH2 Calibrat OutPut Setting	Output CH1 [~] CH2 Mode setting Parameter name Output CH1 mode setting Output CH2 mode setting	Value -10V ^{~+} 10V -10V ^{~+} 10V	•	Unit	Default -10**+10\ -10**+10\	Minimum -	Maximum -
Default Import	Export Update						OK

(8) Output CH1~2 calibration

Devi	ce Setting					
E	B-AS06XA-A format Input CH1~CH4 Mode set Input CH1~CH4 Calibratic Input average filter Input sampling time Input channel Detect and Output CH1~CH2 Mode s Output CH1~CH2 Calibra Output CH1~CH2 Calibra	Output CH1 [~] CH2 Calibration Parameter name Output CH1 Cal. Offset (V/mA) Output CH2 Cal. Offset (V/mA) Output CH1 Cal. Gain Output CH2 Cal. Gain	Value 0 1000 1000	Unit Default 0 1000 1000	Minimum -32768 -32768 -32768 -32768	Maximum 32767 32767 32767 32767
	Default Import	Export Update				OK

(9) Output Setting

Options	OutPut Setting						
- format - Input CH1 ~ CH4 Mode set	Parameter name	Value		Unit	Default	Minimum	Maximum
Input CH1~CH4 Calibratic	Output CH1 output Hold	Clear	-		Clear	-	-
- Input average filter	Output CH2 output Hold	Clear	-		Clear	-	-
- Input sampling time	Output CH1 Setting time(10ms)	0			0	0	3200
- Input Charmer Detect and Output CH1~CH2 Mode s	Output CH2 Setting time(10ms)	0			0	0	3200
Default Import	Export Update					1	ОК

4.4 Troubleshooting

4.4.1 Error Codes

Error Code	Description	A↔ D LED indicator	ERROR LED indicator
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1608	The factory calibration is abnormal.	OFF	ON
16#1801	The external voltage is abnormal.	OFF	Blinking
16#1802	Hardware failure	OFF	Blinking
16#1804	The factory calibration is abnormal.	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of inputs which can be received by the hardware.		
16#1809	The signal received by channel 2 exceeds the range of inputs which can be received by the hardware.	Run: blinking	Diaking
16#180A	The signal received by channel 3 exceeds the range of inputs which can be received by the hardware.	Stop: OFF	Blinking
16#180B	The signal received by channel 4 exceeds the range of inputs which can be received by the hardware.		

4.4.2 Troubleshooting Procedure

Description	Procedure
The external voltage is abnormal.	Check whether the external 24 V power supply to the module is normal.
Hardware failure	Return the module to the factory for repair.
Internal error The factory correction is abnormal.	Please contact the factory.
The signal received by channel 1 exceeds the range of inputs which can be received by the hardware.	Check the signal received by channel 1
The signal received by channel 2 exceeds the range of inputs which can be received by the hardware.	Check the signal received by channel 2.
The signal received by channel 3 exceeds the range of inputs which can be received by the hardware.	Check the signal received by channel 3.
The signal received by channel 4 exceeds the range of inputs which can be received by the hardware.	Check the signal received by channel 4.



Chapter 5 Temperature Measurement Module AS04RTD

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5.1 Overview

5.1.1 Characteristics

The specifications for a temperature measurement module, the operation, and the programming are described in this section. AS04RTD is a temperature measurement module. It converts the temperatures received from its four thermocouples into digital signals. Users can select the degree Celsius or the degree Fahrenheit as a unit of measurement for temperature.

5.1.2 Characteristics

(1) A sensor is selected according to practical application.

Pt100/Ni100/Pt1000/Ni1000/JPt100/LG-Ni1000/Cu50/Cu100/0~300Ω/0~3000Ω sensor

(2) High-speed conversion

Two-wire/Three-wire configuration: 200 ms/channel

(3) High accuracy

Conversion accuracy: The error is ±0.1% of an input. (The ambient temperature is 25±5°C.)

(4) Disconnection detection

When a sensor is disconnected, AS04RTD gives an alarm or a warning.

(5) PID control

An object can be maintained at a desired temperature through a PID control action.

(6) A module can be set by means of utility software.

HWCONFIG is built-in utility software in ISPSoft. Users can set modes and parameters in HWCONFIG to complete hardware configuration without spending time writing a program to set registers corresponding to functions.

5.2 Specifications and Functions

5.2.1 Specifications

• Electrical specifications

Number of analog inputs	4		
	2-WIRE & 3-WIRE Pt100/Ni100/Pt1000/Ni1000/		
	JPt100/LG-Ni1000/Cu50/Cu100/0~300Ω/0~3000Ω		
	Pt100 : DIN 43760-1980 JIS C1604-1989 ; 100Ω 3850 PPM/°C		
	Pt1000:DIN EN60751;1 kΩ 3850 PPM/°C		
Applicable sensor	Ni100/Ni1000 : DIN 43760		
	JPt100 : JIS C1604-1989		
	LG-Ni1000		
	Cu50/Cu100		
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%	o∼+20%)	
Connector type	Removable terminal block		
	Pt100/Ni100/Pt1000/Ni1000/JPt100	25°C/77°F: The error allowed is ±0.1% of	
		full scale.	
		-20~60°C/-4~140°F: The error allowed is	
		±0.5% of full scale.	
Overall accuracy	L G-Ni1000	25°C/77°F: The error allowed is $\pm 0.1\%$ of	
		full scale.	
	Cu50	25°C/77°F: The error allowed is $\pm 4\%$ of	
		full scale.	
	Cu100	25°C/77°F: The error allowed is $\pm 2\%$ of	
		full scale.	
Conversion time	Two-wire/Three-wire configuration: 200	ms/channel	
	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an		
	optocoupler, and the analog channels are isolated from one another by		
	optocouplers.		
Isolation	Isolation between a digital circuit and th	e ground: 500 V DC	
	Isolation between an analog circuit and	the ground: 500 V DC	
	Isolation between an analog circuit and	the digital circuit: 500 V DC	
	Isolation between the 24 V DC and the ground: 500 V DC		

• Functional specifications

Analog-to-digital conversion	Centigrade (°C)	Fahrenheit (°F)	Input impedance
Rated input range	Pt100 : -180°C~800°C Ni100 : -80°C~170°C Pt1000 : -180°C~800°C Ni1000 : -80°C~170°C JPt100 : -180°C~500°C LG-Ni100 : -50°C~180°C Cu50 : -50°C~150°C Cu100 : -50°C~150°C	Pt100 : -292°F~1,472°F Ni100 : -112°F~338°F Pt1000 : -292°F~1,472°F Ni1000 : -112°F~338°F JPt100 : -112°F~338°F LG-Ni100 : -58°F~356°F Cu50 : -58°F~302°F Cu100 : -58°F~302°F	0~300Ω 0~3000Ω
Average function	Range: 1~100		
Self-diagnosis	Disconnection detection		

5.2.2 Profile



Number	Name	Description
1	Model name	Model name of the module
		Operating status of the module
	RUN LED indicator	ON: The module is running.
		OFF: The module stops running.
2		Error status of the module
	ERROR LED	ON: A serious error occurs in the module.
	indicator	OFF: The module is normal.
		Blink: A slight error occurs in the module.

Number	Name	Description
	Digital to analog conversion indicator	Indicating the digital to analog conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to transducers. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	

5.2.3 Arrangement of Terminals



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5.2.4 Control Registers

CR#	Name	Description	Defaults	
0	Formationation	0: integer format	0	
0	Format setup	1: floating point format	0	
1	Channel 1 mode setur	0: closed		
		1:0~300Ω (default)		
2		2 : 0~3000Ω		
	Channel 2 mode setup	3 : Pt100		
2		4 : JPt100		
3	Channel 3 mode setup	5 : Pt1000	1	
		6 : Ni100		
		7 : Ni1000		
4	Channel 4 mode setup	8:LG-Ni1000		
		9 : Cu50		
		10 : Cu100		
5	Channel 1 offset	-		
6	Channel 2 offset	Setting range: -32768~32767	0	
7	Channel 3 offset	Ū		
8	Channel 4 offset			
9	Channel 1 gain			
10	Channel 2 gain	Sotting range: 22769, 22767	1000	
11	Cannel 3 gain	Setting range32706~32707	1000	
12	Cannel 4 gain			
13	Channel 1 average times			
14	Channel 2 average times	0-11-0	10	
15	Channel 3 average times	Setting range: 1~100	10	
16	Channel 4 average times			
17	Channel 1 filter average percentage			
18	Channel 2 filter average percentage			
19	Channel 3 filter average percentage	Setting range: 0~3, unit: ±10%	1	
20	Channel 4 filter average percentage			

CR#	Name	Description	Defaults
04		0: Fahrenheit	0
21		1: Celsius	0
		0: open channel alarm	
		1: close channel alarm	
		bit0: Channel 1	
		bit1: Channel 2	
		bit2: Channel 3	
22	Channel alarm actur	bit3: Channel 4	0
22			0
		0: warning	
		1: alarm	
		bit8: Error occurs in the module power	
		bit9: Error occurs in the module hardware	
		bit10: Error occurs in calbriation	
		16#0101: record the peark value again for	
		channel 1	
		16#0102: record the peark value again for	
		channel 2	
		16#0104: record the peark value again for	
		channel 3	
		16#0108: record the peark value again for	
		channel 4	
		16#010F: record the peark value again for	
201	Instruction set	16#0201: opplie to record for channel 1	0
		16#0202: enable to record for channel 2	
		16#0204: enable to record for channel 3	
		16#0208: enable to record for channel 4	
		16#020E: enable to record for channels 1~4	
		16#0211: disable to record for channel 1	
		16#0212: disable to record for channel 2	
		16#0214: disable to record for channel 3	
		16#0218: disable to record for channel 4	

CR#	Name	Description	Defaults
		16#021F: disable to record for channel 1~4	
		16#0502: restore to its default settings	
210	The maximum peak value for channel 1		-
211	The maximum peak value for channel 2	Interger format; the maximum peak value	-
212	The maximum peak value for channel 3	for analog inputs	-
213	The maximum peak value for channel 4		-
214	The minimum peak value for channel 1		-
215	The minimum peak value for channel 2	Interger format; the minimum peak value for	-
216	The minimum peak value for channel 3	analog inputs	-
217	The minimum peak value for channel 4		-
222	The time to record for chanel 1		1
223	The time to record for chanel 2	Unit: 10ms, setting range 1~100	1
224	The time to record for chanel 3 for the channels	1	
225	The time to record for chanel 4	for the channels	1
240	The number of records for channel 1		0
241	The number of records for channel 2		0
242	The number of records for channel 3	Range: 0~500, display the current records	0
243	The number of records for channel 4		0
4000~			
4499	Records for channel 1	500 records for channel 1	
4500~			
4999	Records for channel 2	500 records for channel 2	
5000~	Departs for shannel 2	E00 records for share -1.2	
5499	Records for channel 3	SUU RECORDS FOR CHANNEL 3	
5500~	Decerda for channel 4	F00 records for shore -1.4	
5999	Records for channel 4	500 records for channel 4	

5.2.5 Functions

HWCONFIG, built-in utility software in ISPSoft, can be used to set a module. Users can set modes and parameters by means of HWCONFIG.

Analog input

Item	Function	Description
1	Enabling/Disabling a	1. Users can enable or disable a channel.
1	channel	2. If a channel is disabled, the total conversion time is decreased.
2	Units of temperature	Users can select the unitof temperature, Fahrenheit or Celsius.
3	Calibration	Users can calibrate a linear curve.
4	Average	Conversion values are averaged and filtered.
5	Disconnection detection	If the channel is open, the module can detect if it is disconnected. If the input is open-circuited, the module will give an alarm or a warning.
6	Channel detec and alarm	If an input signal exceeds a range of inputs which can be received by hardware, the module will give an alarm or a warning. This function can be disabled.
7	The limit detections for channels	Saving the maximum/minimum values for channles
8	Records for channales	Saving the analog curves for channels
9	PID algorithm	PID control modes

1. Enabling/Disabling a channel

An analog signal is converted into a digital signal at a speed of 200ms a channel. If a channel is not used, users can disable it to decrease the total conversion time.

2. Units of temperature

Users can select unit of temperature, Fahrenheit or Celsius according to their needs.

3. Calibration

• To make a curve meet actual needs, users can calibrate the curve by changing an offset and a gain. A calibration range depends on a range of inputs which can be received by hardware. The formula is as below.

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$$Output = \frac{(Input \times Gain)}{1000} + Offset$$

Example:

The gain is 1000, and the offset is 0. The corresponding value for the original signal 0°C to +100°C is 0~1000. When using the offset 100, the calibrated value for the original signal 0°C to +100°C is 100~1100.

Gain = 1000, Offset = 0



Input analog value (Y)

4. Average

The average value can be set in the range of 1~100. It is a steady value obtained from the sum of the read values. However, due to unavoidable external factors, the read values may be an acute pulse, resulting in fierce changes in the average value. The filtering function thus exclude the read value that is an acute pulse from the sum-up and equalization, so the average value obtained will not be affected by the acute read value. The filter persontage is set in the range of 0~3, and the unit is 10%. Setting 0 in the filter range, the system will sum up all the read values and equalize to obtain the average value; setting 1 in the filter range, the system will exclue the 10% of the maximum and minimum value and then equalize to obtain the average value.


5. Disconnection detection

If the channel is open, the module can detect if it is disconnected. If the input is open-circuited, the module will give an alarm or a warning.

6. Channel detection

If an input signal exceeds a range of inputs which can be received by hardware, an error message appears. This function can be disabled and then the module will not send an alarm or warning when the input signal exceeding the range of inputs.

7. The limit detections for channels

Saving the maximum/minimum values for channles and users can know the peak to peak value from the maximum/minimum values



8. Records for channels

Record the input value of the cyclic sampling for each channel, up to 500 pieces can be recorded and the recording time is 10ms.



9. PID control

When the PV is in the range of ERR_DBW, the PLC will run the PID operation according to the E value. When the PV is over the SV, the cross status will be established and the E value will be seen as 0 while running the PID operation until the PV goes over the range of ERR_DBW. If PID_DE is True, the PLC will run the derivative of PV. When the cross status is established, the Delta PV will be seen as 0 while running the derivative of PID operation. As the example shown below, the PLC will run the PID operation in the section A and will see the values of E and Delta PV as 0 while running the PID operation.



PID formula:

- 1. When the PID_MODE is set to 0, the mode is set to auto:
 - Independent Formula & Derivative of E (PID_EQ=False & PID_DE=False)

$$CV = K_p E + K_i \int_{0}^{1} E dt + K_d \frac{dE}{dt} + BIAS$$
$$E = SV - PV \quad or \quad E = PV - SV$$

• Independent Formula & Derivative of PV (PID_EQ=False & PID_DE=Ture)

$$CV = K_p E + K_i \int_{0}^{t} Edt - K_d \frac{dPV}{dt} + BIAS$$
$$E = SV - PV$$
$$or$$
$$CV = K_p E + K_i \int_{0}^{t} Edt + K_d \frac{dPV}{dt} + BIAS$$

E = PV - SV

• Dependent Formula & Derivative of E (PID_EQ=True & PID_DE=False)

$$CV = K_c \left[E + \frac{1}{T_i} \int_{0}^{T} E dt + T_d \frac{dE}{dt} \right] + BIAS$$
$$E = SV - PV \quad or \quad E = PV - SV$$

• Dependent Formula & Derivative of PV (PID_EQ=True & PID_DE=True)

$$CV = K_c \left[E + \frac{1}{T_i} \int_{0}^{T} Edt - T_d \frac{dPV}{dt} \right] + BIAS$$
$$E = SV - PV$$
$$or$$
$$CV = K_c \left[E + \frac{1}{T_i} \int_{0}^{t} Edt + T_d \frac{dPV}{dt} \right] + BIAS$$
$$E = PV - SV$$

- ※ All the CVs stated above are the MVs in the formula.
- 2. When the PID_MODE is set to 1, it is the auto tuning mode. When auto tuning is done, the value will become 0 and switch to the auto tuning mode automatically.

PID Control Block Diagram:



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PID Block Diagram (Dependent)

Note:

- 1. When tuning these 3 parameters, Kc_Kp, Ti_Ki and Td_Kd (PID_MODE=0), set the Kc_Kp value first (according to their experiences), and set the Ti_Ki and Td_Kd value to 0. When it can be controlled, users can increase the values of Ti_Ki and Td_Kd. When the value of Kc_Kp is 1, it means that the proportional gain is 100%. That is, the error is increased by a factor of one. When the proportional gain is less than 100%, the error is decreased. When th proportional gain is greater than 100%, the error is increased.
- The parameters which have been tuned automatically are not necessarily suitable for every controlled environment. Therefore, users can further modify the automatically-tuned parameters. However, it is suggested to modify the values of Ti_Ki or Td_Kd only.

5.2.6 Control Mode

Users can set the output cycle according to the surroundings. (If the temperature is steady, the output cycle can be longer.)

Formula of the output cycle:

Output cycle width = MV (%) x output cycle

Users can execute the instruction GPWN to set output cycle width and output cycle (sampling time) to do cycle control by.

Example:

If the output cycle is 200ms, after the PID algorithm is implemented, the output value is 50%.

Output cycle width = 50 %×2000ms = 1000ms

Thus the instruction General pulse width modulation (GPWM) can be set as output cycle width is 1000 and output cycle is 2000.



CR#			-		Setting		
CH1	CH2	СНЗ	CH4	Operand	Function	Description	range
#600	#630	#660	#690	PID_RUN	Enabling the PID algorithm	 The PID algorithm is implemented. The output value (MV) is reset to 0, and the PID algorithm is not implemented. 	0
#601	#631	#661	#691	sv	SV	Target value	0
#602	#632	#662	#692	PID_MODE	PID control mode	 0: Automatic control When PID_MAN is switched from True to False, the output value (MV) then is involved in the automatic algorithm. 1: The parameters are tuned automatically for the temperature control. When the tuning of the parameters is complete, the device is automatically set to 0, and is filled in with appropriate parameters Kc_Kp, Ti_Ki, Td_Kd and Tf. 	0
#603	#633	#663	#693	PID_MAN	PID A/M mode	 0: Auto; the MV is output according to the PID algorithm. 1: Manual; the MV is output according to the MOUT. When PID_MODE is 	0

CR#		Operand	Function	Description	Setting		
CH1	CH2	СНЗ	CH4	Operand	Tunction	Description	range
						set to 1, the setting is ineffective.	
#604	#634	#664	#694	MOUT_AUTO	MOUT automatic change mode	0: Normal ; the MOUT deos not vary with the MV.1 : Auto; the MOUT varies with the MV.	0
#605	#635	#665	#695	Auto tuning dead band	Auto tuning non-action zone	Setting range: 0~32000, used when SV±dead band in the auto tuning mode.	0
#606 #607	#636 #637	#666 #667	#696 #697	Кс_Кр	Calculated proportional coefficient (Kc or Kp)	Kc_Kp are floating-point numbers. If the P coefficient is less than 0, the Kc_Kp will be 0. Independently, if Kc_Kp is 0, it will not be controlled by P.	3.846
#608 #609	#638 #639	#668 #669	#698 #699	Ti_Ki	Integral coefficient (Ti or Ki)	Ti_Ki are floating-point numbers. If the calculated coefficient I is less than 0, Ti_Ki will be 0. If Ti_Ki is 0, it will not be controlled by I.	0.013
#610 #611	#640 #641	#670 #671	#700 #701	Td_Kd	Derivative coefficient (Td or K _d)	Td_Kd are floating-point numbers. If the calculated coefficient D is less than 0, Td_Kd will be 0. If Ti_Ki is 0, it will not be controlled by D.	190.0 78
#612 #613	#642 #643	#672 #673	#702 #703	Tf	Derivate-action time constant	If the derivate-action time constant is less than 0, Tf will be 0 and it will not be controlled by the derivate-action time constant. (Derivative Smoothing)	4.941
#614	#644	#674	#704	PID_EQ	PID formula types	0: Independent Formula 1: Dependent Formula	0
#615	#645	#675	#705	PID_DE	The calculation of the PID derivative error	 0: Using the variations in the error (E) to calculate the control value of the derivative (Derivative of E). 1: Using the variations in the PV to calculate the control value of the derivative (Derivative of PV). 	0

CR#		Onerend	Function	Description	Setting		
CH1	CH2	СНЗ	CH4	Operand	Function	Description	range
#616	#646	#676	#706	PID_DIR	PID forward/ reverse direction	0: heating action (E=SV-PV) 1: cooling action (E=PV-SV)	0
#617	#647	#677	#707	ERR_DBW	Range within which the error value is counted as 0.	The error value (E) is the difference between the SV and the PV. When the setting value is 0, the function is not enabled; otherwise the CPU module will check whether the present error is less than the absolute value of ERR_DBW, and check whether the present error meets the cross status condition. If the present error is less than the absolute value of ERR_DBW, and meets the cross status condition, the present error will be counted as 0, and the PID algorithm will be implemented, otherwise the present error will be brought into the PID algorithm according to the normal processing.	0
#618	#648	#678	#708	α value	Integral sum		31
#619	#649 #	#679	#709	β value	Integral sum	Setting range: 0~100, unit: 0.01	0
#620	#650	#680	#710	MOUT	Manual output value (MOUT)	When set to PID Manual, the MV value will be outputted as the manually set MOUNT value, between MV_MAX and MV_MIN. Setting range: 0~1000 (0~100%)	0
#621	#651	#681	#711	BIAS	Feedforward output value	Feedforward output value, used for the PID feedforward.	0
#622 #623	#652 #653	#682 #683	#712 #713	MV	Output value (MV)	The floating- point format; setting range: 0~100; unit: %	

CR#		Onerend	Function	Deceription	Setting		
CH1	CH2	СНЗ	CH4	Operand	Function	Description	range
#624 #625	#654 #655	#684 #685	#714 #715	I_MV	Accumulated integral value	The floating- point format. Accumulated integral value temporarily stored is usually for reference. When the MV is out of the range 0~100%, the accumulated integral value in I_MV is unchanged.	
#626	#656	#686	#716	CYCLE	Sampling time (T _S)	When the instruction is scanned, the PID algorithm is implmented according to the sampling time, and the MV is refreshed. If T_S is less than 1, it will be counted as 1. If T_S is larger than 1,000, it will be counted as 1,000. Unit: 100ms	1

5.2.7 Wiring

Precautions

In order to make the functions of an analog-to-digital module perfect and ensure the reliability of a system at the same time, external wiring which prevents noise is necessary. Before installing cables, users need to follow the precautions below.

- To prevent a surge and induction, an AC cable and input signal cables which are connected to AS04RTD must be separate cables.
- (2) A cable must not be installed near a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Besides, a cable must not be bound to a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Otherwise, effects that noise, induction, and a surge have will increase.
- (3) Please connect a shielded cable and a hermetically sealed cable with the ground separately.
- (4) Terminals with insulation sleeves can not be arranged as a terminal block. It is recommended that the terminals be covered with insulation tubes.

External wiring

(1) AS04RTD



- *1. The cables or the shielded twisted pair cables for Ni100/Ni1000, Pt100/Pt1000, Cu50/Cu100, JPt100, LG-Ni1000 temperature sensors are used, and should be kept separate from other power cables and cables which generate noise. Please use a three-wire temperature sensor. If users want to use a two-wire temperature sensor, Ln+ and ln+ have to be short-circuited, and Ln- and ln- have to be short-circuited. (n is in the range of 1 to 4.)
- *2. If users want to measure the resistance in the range of 0 Ω to 300 Ω , they can use a two-wire or three-wire sensor instead of a four-wire sensor.
- *3. User need to select an appropriate sensor. If a Ni100 temperature sensor, a Pt100 sensor, a JPt100, Cu50/Cu100 or a resistance sensor is used, the internal excitation current is 1.53 mA. If a Ni1000 temperature sensor, a Pt1000 temperature sensor or LG-Ni1000 sensor is used, the internal excitation current is 204.8 μA.

5.2.8 LED Indicators

Number	Name	Description		
		Operating status of the module		
1	RUN LED indicator	ON: The module is running.		
		OFF: The module stops running.		
		Error status of the module		
2	ERROR LED	ON: A serious error occurs in the module.		
2	indicator	OFF: The module is normal.		
		Blink: A slight error occurs in the module.		
	Digital to analog	Indicating the digital to analog conversion status		
3	conversion	Blinking: conversion is taking place		
	indicator	OFF: stop conversion		

5.2 HWCONFIG in ISPSoft

5.3.1 Initial Setting

(1) Start ISPSoft, and then double-click HWCONFIG.



(2) Selecting a module.



5

(3) Double-click the module to open the Device Setting page.





(4) Set the parameters, and then click **OK**.

Options Device Setting Device Setting Device Setting	CH1 [~] CH4 Mode setting						
- CH1~CH4 Mode setting	Parameter name	Value		Unit	Default	Minimum	Maximum
- CH1~CH4 Calibration	CH1 mode setting	0~300ohm	-		0~300ohm	-	-
- average filter	CH2 mode setting	0~300ohm	•		0~300ohm	-	-
- Lemperature measureme	CH3 mode setting	0~300ohm	•		0~300ohm	-	-
Chamer Detect and Alan	CH4 mode setting	0~300ohm	•		0~300ohm	-	-
< .							
Default Import	Export Update						ОК

(5) Click **Download** on the toolbar to download the parameters. (The parameters can not be downloaded when the CPU module runs.)

HWCONFIG	
🚰 File Edit Option Help	
EX00355	國憲 ** *
Product List	Download (Ctrl+E8)
 A\$300 Digital I/O Module Analog I/O Module A\$04AD A\$04DA A\$04DA A\$06XA A\$04TC A\$02LC Network Module Power Module 	
Specification 4 channels RTD analog intput : 0~300ohm, 0~3000ohm, Pt100, JPt100, Pt1000,Ni100, Ni1000,LGNi1000 conversion time = 200ms/channel	
	2

5.3.2 Checking the Version of a Module

(1) On the **Option** menu, click **Online Mode**.



(2) Double-click the module to see the Device Setting page. The version of the firmware and that of the hardware are displayed.



AS04RTD-A	Device Informatio	n Normal Exchange Area	
– format – CH1~CH4 Mode setting – CH1~CH4 Calibration	Device Name	AS04RTD-A	
- average filter Temperature measurems Channel Detect and Alarr	Description	4 channels RTD analog intput : 0~300ohm, 0~3000ohm, Pt100, JPt100, Pt1000, Ni100, Ni1000, LGNi1000 conversion time = 200ms/channel Module current consumption:(Internal)50mA (External)	
	Comment		
	DDFVersion	00.40.00	
	Firmware Version	01.00.00	
	Hardware Version	00.00.00.00	-
Delaut I mand I	Esant L L	Indate	
			ок

5.3.3 Online Mode

(1) Click **Online Mode** on the toolbar.



(2) Right-click the module.



(3) The module status can be shown.

AS04RTD-A		X
Channel	Value (32 bits)	Data Type
Error code	6145	DECIMAL
CH1 Input	0	DECIMAL
CH2 Input	0	DECIMAL
CH3 Input	0	DECIMAL
CH4 Input	0	DECIMAL

5.3.4 Importing/Exporting a Parameter File

(1) After **Export** is clicked, the parameters will be saved as a CSV file (.csv).

Default

Save in: 🛅 My Documents	
My Music My Pictures WinCHM Projects	
File name:	Save Cancel

(2) Click **Import**, and then select the CSV file.

Open	2
Look in: 🔁 My Documents	- E 🗳 🖬 -
ൽ My Music 괱 My Pictures 쥰 WinCHM Projects	
File name:	Open

Export

N

Import

5.3.5 Parameters

(1) The input modes of the channels

Device Setting						
Options						
⊡-AS04RTD-A	format					
<mark>format</mark> CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum
	format	Integer format 💌		Integer format	-	-
average filter Temperature measureme						
Channel Detect and Alarr						
Default Import	Export Update					
						ОК

(2) Input CH1~CH4 Mode settings

Device Setting						
B-AS04RTD-A	CH1~CH4 Mode setting					
	Parameter name	Value	Uni	t Default	Minimum	Maximum
	CH1 mode setting	0~300ohm	-	0~300ohm	-	-
average filter	CH2 mode setting	0~300ohm	-	0~300ohm	-	-
Channel Detect and Alerr	- CH3 mode setting	0~300ohm	•	0~300ohm	-	-
Channel Delect and Alan	CH4 mode setting	0~300ohm	-	0~300ohm	-	-
4						
Default Import	Export Update					ОК

(3) Input CH1~CH4 calibration

⊡-AS04RTD-A	CH1~CH4 Calibration					
- CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum
	CH1 Cal. Offset (V/mA)	0		0	-32768	32767
- average filter	- CH2 Cal. Offset (V/mA)	0		0	-32768	32767
- Temperature measureme		0		0	-32768	32767
- Channel Detect and Alarr	CH4 Cal. Offset (V/mA)	0		0	-32768	32767
	CH1 Cal. Gain	1000		1000	-32768	32767
	CH2 Cal. Gain	1000		1000	-32768	32767
	CH3 Cal. Gain	1000		1000	-32768	32767
	CH4 Cal. Gain	1000		1000	-32768	32767
٩						
Default Import	Export Update				1	OK

(4) Input average filter

Device Setting						
E-AS04RTD-A	average filter					
- CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum
<u>CH1~CH4 Ca</u> libration	CH1 average times	10		10		100
average filter	CH2 average times	10		10	1	100
	CH3 average times	10		10	1	100
Channel Detect and Alarr	CH4 average times	10		10	1	100
	CH1 filter Proportion	10% 🔻		10%	-	-
	- CH2 filter Proportion	10% 🔻		10%	-	-
	- CH3 filter Proportion	10% 🔻		10%	-	-
	CH4 filter Proportion	10% 🔻		10%	-	-
۲						
Default Import	Export Update				[OK

(5) Temperature measurement

Device Setting Options							
- AS04RTD-A	Temperature measurement units						
- CH1~CH4 Mode setting	Parameter name	Value	Unit Default	Minimum Maximum			
CH1°CH4 Mode setting CH1°CH4 Calibration average filter Femperature measureme Channel Detect and Alarr	Temperature measurement units	•	°C				
Default Import	Export			OK			

(6) Input channel detect and alarm settings

Options	Channel Detect and Alarm settings	6			
- format 	Parameter name	Value	Unit Default	Minimum	Maximum
- CH1~CH4 Calibration	CH1 overrage Detect	Disable	📃 Disable	-	-
- a∨erage filter	- CH2 overrage Detect	📃 Disable	📃 Disable	-	-
- Temperature measureme	CH3 overrage Detect	📃 Disable	📃 Disable	-	-
	CH4 overrage Detect	📃 Disable	📃 Disable	-	-
	External power supply error	📃 Alarm	🗌 Alarm	-	-
	Hardware error	📃 Alarm	🗌 Alarm	-	-
	adjustment error	📃 Alarm	🗌 Alarm	-	-
4 Þ					
Default Import	Export Update				ОК

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5.4 Troubleshooting

5.4.1 Error Codes

Error Code	Description	A↔ D LED indicator	ERROR LED indicator
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1608	The factory calibration is abnormal.	OFF	ON
16#1801	The external voltage is abnormal.	OFF	Blinking
16#1802	Hardware failure	OFF	Blinking
16#1804	The factory calibration is abnormal.	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of inputs which can be received by the hardware.		
16#1809	The signal received by channel 2 exceeds the range of inputs which can be received by the hardware. Run: blinkin		
16#180A	The signal received by channel 3 exceeds the range of inputs which can be received by the hardware.	ignal received by channel 3 exceeds the range of inputs Stop: OFF can be received by the hardware. Stop: OFF	
16#180B	The signal received by channel 4 exceeds the range of inputs which can be received by the hardware.		

5.4.2 Troubleshooting Procedure

Description	Procedure
The external voltage is abnormal.	Check whether the external 24 V power supply to the
-	module is normal.
Hardware failure	Return the module to the factory for repair.
Internal error	Please contact the factory
The factory correction is abnormal.	riease contact the factory.
The signal received by channel 1 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 1
hardware.	
The signal received by channel 2 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 2.
hardware.	
The signal received by channel 3 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 3.
hardware.	
The signal received by channel 4 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 4.
hardware.	

5.4.3 State of the Conneciton

State of connection		ion	Channel velue	
L+	L-	I-	Channel value	
•	•	•	The maximum value for the channel	
•	•		The maximum value for the channel	
•		•	The maximum value for the channel	
•			The maximum value for the channel	
	•	•	The maximum value for the channel	
	•		The maximum value for the channel	
		•	The minimum value for the channel	
•: Disconnection				

MEMO

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Chapter 6 Temperature Measurement Module AS04TC

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6.1 Overview

The specifications for AS04TC-A, the operation, and the programming are described in this chapter. AS04TC-A are temperature measurement modules. They convert temperatures received from thermocouples (type J, K, R, S, T, E, N, B, ±100mV voltage inputs) into digital signals. Users can select the degree Celsius (resolution: 0.1°C) or the degree Fahrenheit (resolution: 0.1°F) as a unit of measurement for temperature.

An introduction of thermocouples

The Seebeck effect is used in a thermocouple to measure a temperature difference. Generally speaking, a thermocouple consists of two conductors of different materials that produce a voltage in the vicinity of the point where the two conductors are in contact. The voltage produced is dependent on the difference of temperature of the junction to other parts of those conductors, and is in the range of several ten microvolts to several thousand microvolts. Therefore, the voltage produced needs to be amplified.

A thermocouple creates a voltage when there is a temperature difference. When a differential operation is performed on two pieces of data, external noise is eliminated. The stability of thermocouples is better than thermistors, resistance thermometers, and thermal resistors. Therefore, thermocouples are widely used in industry.

A thermocouple consists of a circuit having two wires of different metals or metal alloys welded together or joined at both ends. One of the junctions—normally the cold junction—is maintained at a known reference temperature, and the other junction is at the temperature to be sensed. A temperature gradient across the junction of the wires gives rise to an electric potential by the Seebeck effect. The voltage produced is proportional to the difference of temperature of the junction to other parts of those conductors.

The voltage can be derived from:

$$V = \int_{T_1}^{T_2} (Q_A - Q_B) dT \tag{A}$$

where Q_A and Q_B are the thermopowers (Seebeck coefficient) of the metals A and B, and T₁ and T₂ are the temperatures of the two junctions.



Principle of operation

In fact, Q_A and Q_B are almost unrelated to temperature. Therefore, formula (A) above can be approximated as (B) below.

 $V=\alpha(T_2-T_1)\square \qquad (B)$

There are two types of thermocouple thermometers. They are wrapped thermocouples and bare thermocouples. A wrapped thermocouple is wrapped in protective metal, and is similar to an electric spoon in appearance. Wrapped thermocouples are used to measure temperature of liquid, and bare thermocouples are used to measure temperature of liquid, and bare thermocouples are used to measure temperature of liquid.

6.1.1 Characteristics

(1) A sensor is selected according to practical application.

Type J thermocouples, type K thermocouples, type R thermocouples, type S thermocouples, type T thermocouples, type E thermocouples, type N thermocouples, and ±100 mV voltage inputs.

(2) A module is selected according to practical application.

AS04TC-A: There are four channels. Inputs received by a channel are temperatures.

(3) High-speed conversion

A temperature is converted into a digital signal at a speed of 200 ms a channel.

(4) High accuracy

Conversion accuracy: The error is ±0.1% of an input. (The ambient temperature is 25±5°C.)

(5) **Disconnection detection**

When a sensor is disconnected, the module gives an alarm or a warning.

(6) **PID control**

An object can be maintained at a desired temperature through a PID control action.

(7) A module can be set by means of utility software.

HWCONFIG is built-in utility software in ISPSoft. Users can set modes and parameters in HWCONFIG to complete hardware configuration without spending time writing a program to set registers corresponding to functions.

6.2 Specifications and Functions

6.2.1 Specifications

• Electrical specifications

Module name	AH04TC-A				
Number of analog inputs	4				
Applicable sensor	Гуре J, type K, type R, type S, type T, type E, type N, and type B hermocouples; ±100 mV voltage inputs				
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)				
Connector type	Removable terminal block				
Overall accuracy	25° C/77°F: The error allowed is ±0.5% of full scale. -20~60°C/-4~140°F: The error allowed is ±1% of full scale.				
Conversion time	200 ms/channel				
la clation	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, and the analog channels are isolated from one another by optocouplers. Isolation between a digital circuit and the ground: 500 VDC				
Isolation	Isolation between an analog circuit and the ground: 500 VDC				
	Isolation between an analog circuit and a digital circuit: 500 VDC				
	Isolation between the 24 V DC and the ground: 500 VDC				
	Isolation between analog channels: 120 VAC				

• Functional specifications

Analog-to-digital conversion	Centigrade (°C)	Fahrenheit (°F)	Voltage input		
Rated input range	Type J: -100°C~1,150°C Type K: -100°C~1,350°C Type R: 0°C~1,750°C Type S: 0°C~1,750°C Type T: -150°C~390°C Type E: -150°C~980°C Type N: -150°C~1,280°C Type B: 200°C~1,800°C	Type J: -148°F~2,102°F Type K: -148°F~2,462°F Type R: 32°F~3,182°F Type S: 32°F~3,182°F Type T: -238°F~734°F Type E: -238°F~1,796°F Type N: -238°F~2,336°F Type B: 32°F~3,182°F	±100 mV		
Average function	Range: 1~100				
Self-diagnosis	Disconnection detection				

6.2.2 Profile



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
		Operating status of the module
	RUN LED indicator	ON: The module is running.
		OFF: The module stops running.
		Error status of the module
2	ERROR LED indicator	ON: A serious error occurs in the module.
2		OFF: The module is normal.
		Blink: A slight error occurs in the module.
		Indicating the digital to analog conversion status
Digital to a		Blinking: conversion is taking place
	conversion indicator	OFF: stop conversion
2	Romovable terminal block	The inputs are connected to transducers.
3	Removable terminal block	The outputs are connected to loads which will be driven.
1	Arrangement of the	Arrangement of the terminals
	input/output terminals	
5	Clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	

6.2.3 Arrangement of Terminals



6.2.4 Control Registers

CR#	Name	Description	Defaults
0	Format setup	0: integer format	0
		1: floating point format	
1	Channel 1 mode setup	0: closed	
		1 : -100mV~100mV	
	Channel 2 mode setup	2 : J-Type	
2		3 : К-Туре	
		4 : R-Type	1
3	Channel 3 mode setup	5 : S-Type	
		6 : Т-Туре	
4	Channel 4 mode setup	7 : E-Type	
		8 : N-Type	
		9 : B-Type	
5	Channel 1 offset		0
6	Channel 2 offset	Setting range: -32768~32767	
7	Channel 3 offset		
8	Channel 4 offset		
9	Channel 1 gain	- Setting range: -32768~32767	1000
10	Channel 2 gain		

CR#	Name	Description	Defaults
11	Cannel 3 gain		
12	Cannel 4 gain		
13	Channel 1 average times	Setting range: 1~100	10
14	Channel 2 average times		
15	Channel 3 average times		
16	Channel 4 average times		
17	Channel 1 filter average percentage	Setting range: 0~3, unit: ±10%	
18	Channel 2 filter average percentage		
19	Channel 3 filter average percentage		I
20	Channel 4 filter average percentage		
21	Units of temperature	0: Fahrenheit 1: Celsius	0
	Channel alarm setup	0: open channel alarm	
		1: close channel alarm	
		bit0: Channel 1	
		bit1: Channel 2	
		bit2: Channel 3	0
		bit3: Channel 4	
22			
		0: warning	
		1: alarm	
		bit8: Error occurs in the module power	
		bit9: Error occurs in the module hardware	
		bit10: Error occurs in calbriation	
		bit11: Error occurs in CJC temperature	
	Instruction set	16#0101: record the peark value again for	
201		channel 1	0
		16#0102: record the peark value again for	

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CR#	Name	Description	Defaults
		channel 2	
		16#0104: record the peark value again for	
		channel 3	
		16#0108: record the peark value again for	
		channel 4	
		16#010F: record the peark value again for	
		channel 1~4	
		16#0201: enable to record for channel 1	
		16#0202: enable to record for channel 2	
		16#0204: enable to record for channel 3	
		16#0208: enable to record for channel 4	
		16#020F: enable to record for channels 1~4	
		16#0211: disable to record for channel 1	
		16#0212: disable to record for channel 2	
		16#0214: disable to record for channel 3	
		16#0218: disable to record for channel 4	
		16#021F: disable to record for channel 1~4	
		16#0502: restore to its default settings	
210	The maximum peak value		
210	for channel 1		-
211	The maximum peak value	Interger format; the maximum peak value for analog inputs	-
	for channel 2		
212	The maximum peak value		-
	for channel 3		
213	The maximum peak value		-
	for channel 4		
214	The minimum peak value for		-
	channel 1		
215	The minimum peak value for		-
	channel 2	Interger format; the minimum peak value for	
216	The minimum peak value for	analog inputs	-
	cnannel 3		
217	The minimum peak value for		-
	channel 4		

CR#	Name	Description	Defaults
222	The time to record for chanel 1	Unit: 100ms, setting range 1~100 Setting the time to record the digital value for the channels	1
223	The time to record for chanel 2		1
224	The time to record for chanel 3		1
225	The time to record for chanel 4		1
240	The number of records for channel 1	Range: 0~500, display the current records	0
241	The number of records for channel 2		0
242	The number of records for channel 3		0
243	The number of records for channel 4		0
4000~ 4499	Records for channel 1	500 records for channel 1	
4500~ 4999	Records for channel 2	500 records for channel 2	
5000~ 5499	Records for channel 3	500 records for channel 3	
5500~ 5999	Records for channel 4	500 records for channel 4	

6.2.5 Functions

Item	Function	Description
1	Enabling/Disabling a	1. Users can enable or disable a channel.
	channel	2. If a channel is disabled, the total conversion time is decreased.
2	Units of temperature	Users can select the unitof temperature, Fahrenheit or Celsius.
3	Calibration	Users can calibrate a linear curve.
4	Average	Conversion values are averaged and filtered.
5	Disconnection detection	If the channel is open, the module can detect if it is disconnected. If the input is open-circuited, the module will give an alarm or a warning.
6	Channel detec and alarm	If an input signal exceeds a range of inputs which can be received by hardware, the module will give an alarm or a warning. This function can be disabled.
7	The limit detections for channels	Saving the maximum/minimum values for channles
8	Records for channales	Saving the analog curves for channels
9	PID algorithm	PID control modes

1. Enabling/Disabling a channel

An analog signal is converted into a digital signal at a speed of 200ms a channel. If a channel is not used, users can disable it to decrease the total conversion time.

2. Units of temperature

Users can select unit of temperature, Fahrenheit or Celsius according to their needs.

3. Calibration

• To make a curve meet actual needs, users can calibrate the curve by changing an offset and a gain. A calibration range depends on a range of inputs which can be received by hardware. The formula is as below.

$$Output = \frac{(Input \times Gain)}{1000} + Offset$$

Example:

The gain is 1000, and the offset is 0. The corresponding value for the original signal 0°C to +100°C is 0~1000. When using the offset 100, the calibrated value for the original signal 0°C to +100°C is 100~1100.

Gain = 1000, Offset = 0



4. Average

The average value can be set in the range of 1~100. It is a steady value obtained from the sum of the read values. However, due to unavoidable external factors, the read values may be an acute pulse, resulting in fierce changes in the average value. The filtering function thus exclude the read value that is an acute pulse from the sum-up and equalization, so the average value obtained will not be affected by the acute read value. The filter persontage is set in the range of 0~3, and the unit is 10%. Setting 0 in the filter range, the system will sum up all the read values and equalize to obtain the average value; setting 1 in the filter range, the system will exclue the 10% of the maximum and minimum value and then equalize to obtain the average value.



5. Disconnection detection

If the channel is open, the module can detect if it is disconnected. If the input is open-circuited, the module will give an alarm or a warning.

6

6. Channel detection

If an input signal exceeds a range of inputs which can be received by hardware, an error message will appear and the Error LED will blink. This function can be disabled and then the module will not send an alarm or warning, the Error LED will not blink either, when the input signal exceeding the range of inputs.

7. The limit detections for channels

Saving the maximum/minimum values for channles and users can know the peak to peak value from the maximum/minimum values



8. Records for channels

Record the input value of the cyclic sampling for each channel, up to 500 pieces can be recorded and the recording time is 10ms. If the conversion time is 2ms, and 4 channels are open, the recording time will be 8ms*500 pieces (4 seconds in total).



9. PID control

When the PV is in the range of ERR_DBW, the PLC will run the PID operation according to the E value. When the PV is over the SV, the cross status will be established and the E value will be seen as 0 while running the PID operation until the PV goes over the range of ERR_DBW. If PID_DE is True, the PLC will run the derivative of PV. When the cross status is established, the Delta PV will be seen as 0 while running the derivative of PID operation. As the example shown below, the PLC will run the PID operation in the section A and will see the values of E and Delta PV as 0 while running the PID operation.



PID formula:

1. When the PID_MODE is set to 0, the mode is set to auto:

+

• Independent Formula & Derivative of E (PID_EQ=False & PID_DE=False)

$$CV = K_p E + K_i \int_{0}^{1} E dt + K_d \frac{dE}{dt} + BIAS$$
$$E = SV - PV \quad or \quad E = PV - SV$$

• Independent Formula & Derivative of PV (PID_EQ=False & PID_DE=Ture)

$$CV = K_p E + K_i \int_{0}^{t} Edt - K_d \frac{dPV}{dt} + BIAS$$
$$E = SV - PV$$
or
$$CV = K_p E + K_i \int_{0}^{t} Edt + K_d \frac{dPV}{dt} + BIAS$$
$$E = PV - SV$$

• Dependent Formula & Derivative of E (PID_EQ=True & PID_DE=False)

$$CV = K_c \left[E + \frac{1}{T_i} \int_{0}^{t} Edt + T_d \frac{dE}{dt} \right] + BIAS$$
$$E = SV - PV \quad or \quad E = PV - SV$$

6_

• Dependent Formula & Derivative of PV (PID_EQ=True & PID_DE=True)

$$CV = K_c \left[E + \frac{1}{T_i} \int_{0}^{t} Edt - T_d \frac{dPV}{dt} \right] + BIAS$$
$$E = SV - PV$$
$$or$$
$$CV = K_c \left[E + \frac{1}{T_i} \int_{0}^{t} Edt + T_d \frac{dPV}{dt} \right] + BIAS$$
$$E = PV - SV$$

- % All the CVs stated above are the MVs in the formula.
- 2. When the PID_MODE is set to 1, it is the auto tuning mode. When auto tuning is done, the value will become 0 and switch to the auto tuning mode automatically.

PID Control Block Diagram:




Note:

- 1. When tuning these 3 parameters, Kc_Kp, Ti_Ki and Td_Kd (PID_MODE=0), set the Kc_Kp value first (according to their experiences), and set the Ti_Ki and Td_Kd value to 0. When it can be controlled, users can increase the values of Ti_Ki and Td_Kd. When the value of Kc_Kp is 1, it means that the proportional gain is 100%. That is, the error is increased by a factor of one. When the proportional gain is less than 100%, the error is decreased. When th proportional gain is greater than 100%, the error is increased.
- The parameters which have been tuned automatically are not necessarily suitable for every controlled environment. Therefore, users can further modify the automatically-tuned parameters. However, it is suggested to modify the values of Ti_Ki or Td_Kd only.

6.2.6 Control Mode

Users can set the output cycle according to the surroundings. (If the temperature is steady, the output cycle can be longer.)

Formula of the output cycle:

Output cycle width = MV (%) x output cycle

Users can execute the instruction GPWN to set output cycle width and output cycle (sampling time) to do cycle control by.

Example:

If the output cycle is 200ms, after the PID algorithm is implemented, the output value is 50%.

Output cycle width = 50 %×2000ms = 1000ms

Thus the instruction General pulse width modulation (GPWM) can be set as output cycle width is 1000 and output cycle is 2000.



CR#		Operand	Function	Description	Setting		
CH1	CH2	СНЗ	CH4	Operand	Function	Description	range
						according to the MOUT. When PID_MODE is set to 1, the setting is ineffective. 0: Normal ; the MOUT deos not vary	
#604	#634	#664	#694	MOUT_AUTO	MOUT automatic change mode	with the MV. 1 : Auto; the MOUT varies with the MV.	0
#605	#635	#665	#695	Auto tuning dead band	Auto tuning non-action zone	Setting range: 0~32000, used when SV±dead band in the auto tuning mode.	0
#606 #607	#636 #637	#666 #667	#696 #697	Кс_Кр	Calculated proportional coefficient (Kc or Kp)	Kc_Kp are floating-point numbers. If the P coefficient is less than 0, the Kc_Kp will be 0. Independently, if Kc_Kp is 0, it will not be controlled by P.	3.846
#608 #609	#638 #639	#668 #669	#698 #699	Ti_Ki	Integral coefficient (Ti or Ki)	Ti_Ki are floating-point numbers. If the calculated coefficient I is less than 0, Ti_Ki will be 0. If Ti_Ki is 0, it will not be controlled by I.	0.013
#610 #611	#640 #641	#670 #671	#700 #701	Td_Kd	Derivative coefficient (Td or K _d)	Td_Kd are floating-point numbers. If the calculated coefficient D is less than 0, Td_Kd will be 0. If Ti_Ki is 0, it will not be controlled by D.	
#612 #613	#642 #643	#672 #673	#702 #703	Tf	Derivate-action time constant	If the derivate-action time constant is less than 0, Tf will be 0 and it will not be controlled by the derivate-action time constant. (Derivative Smoothing)	4.941
#614	#644	#674	#704	PID_EQ	PID formula types	0: Independent Formula 1: Dependent Formula	0
#615	#645	#675	#705	PID_DE	The calculation0: Using the variations in the errorof the PID(E) to calculate the control valuederivative errorof the derivative (Derivative of E).		0

	CR#		Operand	Function	Description	Setting	
CH1	CH2	СНЗ	CH4	Operand	Tunction	Description	range
						1: Using the variations in the PV to calculate the control value of the derivative (Derivative of PV).	
#616	#646	#676	#706	PID_DIR	PID forward/ reverse direction	0: heating action (E=SV-PV) 1: cooling action (E=PV-SV)	0
#617	#647	#677	#707	ERR_DBW	Range within which the error value is counted as 0.	The error value (E) is the difference between the SV and the PV. When the setting value is 0, the function is not enabled; otherwise the CPU module will check whether the present error is less than the absolute value of ERR_DBW, and check whether the present error meets the cross status condition. If the present error is less than the absolute value of ERR_DBW, and meets the cross status condition, the present error will be counted as 0, and the PID algorithm will be implemented, otherwise the present error will be brought into the PID algorithm according to the normal processing.	0
#618	#648	#678	#708	α value	Integral sum		31
#619	#649 #	#679	#709	β value	Integral sum	Setting range: 0~100, unit: 0.01	0
#620	#650	#680	#710	MOUT	Manual output value (MOUT)	When set to PID Manual, the MV value will be outputted as the manually set MOUNT value, between MV_MAX and MV_MIN. Setting range: 0~1000 (0~100%)	0
#621	#651	#681	#711	BIAS	Feedforward output value	Feedforward output value, used for the PID feedforward.	0

CR#		Onevend	Function	Description	Setting		
CH1	CH2	СНЗ	CH4	Operand	Function	Description	range
#622 #623	#652 #653	#682 #683	#712 #713	MV	Output value (MV)	The floating- point format; setting range: 0~100; unit: %	
#624 #625	#654 #655	#684 #685	#714 #715	I_MV	Accumulated integral value	The floating- point format. Accumulated integral value temporarily stored is usually for reference. When the MV is out of the range 0~100%, the accumulated integral value in I_MV is unchanged.	
#626	#656	#686	#716	CYCLE	Sampling time (Ts)	When the instruction is scanned, the PID algorithm is implmented according to the sampling time, and the MV is refreshed. If T_S is less than 1, it will be counted as 1. If T_S is larger than 1,000, it will be counted as 1,000. Unit: 100ms	1

6.2.7 Wiring

Precautions

In order to make the functions of an analog-to-digital module perfect and ensure the reliability of a system at the same time, external wiring which prevents noise is necessary. Before installing cables, users need to follow the precautions below.

- To prevent a surge and induction, an AC cable and input signal cables which are connected to AS04TC-A must be separate cables.
- (2) A cable must not be installed near a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Besides, a cable must not be bound to a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Otherwise, effects that noise, induction, and a surge have will increase.
- (3) Please connect a shielded cable and a hermetically sealed cable with the ground separately.
- (4) Terminals with insulation sleeves can not be arranged as a terminal block. It is recommended that the terminals be covered with insulation tubes.

• External wiring



*1. The cables or the shielded twisted pair cables for Type J, type K, type R, type S, type T, type E, type N and type B thermocouples are used, and should be kept separate from other power cables and cables which generate noise.

6.2.8 LED Indicators

Number	Name	Description
		Operating status of the module
1	RUN LED indicator	ON: The module is running.
		OFF: The module stops running.
		Error status of the module
C	ERROR LED	ON: A serious error occurs in the module.
Z	indicator	OFF: The module is normal.
		Blink: A slight error occurs in the module.
	Digital to analog	Indicating the digital to analog conversion status
3	conversion	Blinking: conversion is taking place
	indicator	OFF: stop conversion

6.3 HWCONFIG in ISPSoft

6.3.1 Initial Setting

(1) Start ISPSoft, and then double-click HWCONFIG.



(2) Selecting a module.



(3) Double-click the module to open the Device Setting page.

File Edit Ontion Haln	
om The Fan Obtion Werb	
	國 潭 🏂 🛷
Product List	
⊟ A\$300	
😐 Digital I/O Module	R
😑 Analog I/O Module	1 (da
AS04AD	+ tc +
A \$04D A	
A \$06XA	
A SO4RTD	1
A SO4TC	
ASO2LC	
🖻 Network Module	<
🛨 Power Module	
Specification	
AS04TC-A	-
4 channels thermocouple input : - 100mV~100mV;H,K,R,S,T,E,N,B conversion time = 200ms/channel	

Device Setting Options			
 ⇒ ASD4TC-A format ⇒ CH1"°CH4 Mode setting ⇒ CH1"°CH4 Calibration ⇒ average filter ⇒ Temperature measureme ⇒ Channel Detect and Alarr 	Device Informatio Device Name Description Comment DDF Version Firmware Version Hardware Version	n Normal Exchange Area AS04TC-A. 4 channels thermocouple input :- 100mV~100mV/HK,R,S,T,E,N,B conversion time = 200ms/channel Module current consumption:(Internal)50mA.(External) 00.40.00 (off-line) (off-line)	
Default Import	Export	lotione	ОК

(4) Set the parameters, and then click **OK**.

Device Setting Options - AS04TC-A	CH1 [~] CH4 Mode setting					
	Parameter name	Value	Unit	Default	Minimum	Maximum
- CH1~CH4 Calibration	CH1 mode setting	-100mV~100m'		-100mV~100m	-	-
average filter	CH2 mode setting	-100mV~100m' ▼		-100mV~100m	-	-
Chennel Dotoct and Alerr	CH3 mode setting	-100mV~100m' 💌		-100mV~100m	-	-
	CH4 mode setting	-100mV~100m' 💌		-100mV~100m	-	-
Default Import	Export Update					ОК

(5) Click **Download** on the toolbar to download the parameters. (The parameters can not be downloaded when the CPU module runs.)

HWCONFIG	
Eile Edit Option Help	
E X D D J J J	
Product List	Download (Ctrl+F8)
 A Sout Digital I/O Module Analog I/O Module A S04AD A S04DA A S06XA A S06XA A S04RTD A S04RTC A S02LC Network Module Power Module 	
Specification	ч 1
AS04TC-A	-
4 channels thermocouple input : - 100mV~100mV,H,K,R,S,T,E,N,B conversion time = 200ms/channel	

6.3.2 Checking the Version of a Module

(1) On the **Option** menu, click **Online Mode**.



(2) Double-click the module to see the Device Setting page. The version of the firmware and that of the hardware are displayed.



- Provide Contraction of Contractio			
E ASB4TC-A	Device Information	Normal Exchange Area	
- CH1~CH4 Mode setting 	Device Name	AS04TC-A	
- average filter - Temperature measureme - Channel Detect and Alarr	Description	4 channels thermocouple input :- 100mV~100mV,H,K,R,S,T,E,N,B conversion time = 200ms/channel Module current consumption:(Internal)50mA,(External)	
	Comment		
	DDF Version	00.40.00	
	Firmware Version	01.00.00	
	Hardware Version	00.00.00.00	
<u>.</u>			
Default Import	Esport U	pdate	
			ок

6.3.3 Online Mode

(1) Click **Online Mode** on the toolbar.



(2) Right-click the module.



(3) The module status can be shown.

AS04TC-A		—
Channel	Value (32 bits)	Data Type
Error code	6145	DECIMAL
CH1 Input	0	DECIMAL
CH2 Input	0	DECIMAL
CH3 Input	0	DECIMAL
CH4 Input	0	DECIMAL

6.3.4 Importing/Exporting a Parameter File

(1) After **Export** is clicked, the parameters will be saved as a CSV file (.csv).

	Default	Import		Ехро	ort 💦	
Save As					?	×
Save in: [My Documents		1 -		•	
My Music My Picture	s rojects					
File name: Save as type:	CSV File (".csv)				Save Cancel	



(2) Click Import, and then select the CSV file.

Default	Import	Export

Open	? 🛛
Look in: 🔲 My Documents	- E 🖀 💷 -
My Music My Pictures WinCHM Projects	
File name: Files of type: CSV File (*.csv)	Open Cancel

6.3.5 Parameters

(1) The input modes of the channels

Device Setting				
- AS04TC-A - CH1°CH4 Mode setting - CH1°CH4 Calibration - cH1°CH4 Calibration	format Parameter name format	Value	Unit Default Integer format	Minimum Maximum
- Temperature measureme - Temperature measureme - Channel Detect and Alarr				
Default Import	Export Update			OK

(2) Input CH1~CH4 Mode settings

Device Setting						
Options						
⊡-AS04TC-A	CH1~CH4 Mode setting					
- format	Parameter name	Value	Unit	Default	Minimum	Maximum
CH1~CH4 Calibration	r CH1 mode setting	-100mV~100m' 🔻	-11	00mV~100m	-	-
- average filter	- CH2 mode setting	-100mV~100m' 💌	-11	00mV~100m	ı -	-
- Temperature measureme Channel Dotoct and Alarr	─ CH3 mode setting	-100mV~100m'▼	-1	00mV~100m	ı -	-
Chamer Detect and Alan	CH4 mode setting	-100mV~100m' 💌	-11	00mV~100m	-	-
Default Import	Export Update					ОК

(3) Input CH1~CH4 calibration

Device Setting Options - AS04TC-A - format - CH1~CH4 Mode setting - CH1~CH4 Colibration - average filter - Temperature measureme - Channel Detect and Alarr	CH1 [~] CH4 Calibration Parameter name CH1 Cal. Offset (V/mA) CH2 Cal. Offset (V/mA) CH3 Cal. Offset (V/mA) CH4 Cal. Offset (V/mA) CH1 Cal. Gain	Value 0 0 0 0 1000	Unit De 0 0 0 0	fault Minimum -32768 -32768 -32768 -32768 -32768	Meximum 32767 32767 32767 32767 32767
	CH1 Cal. Gain CH2 Cal. Gain CH3 Cal. Gain CH4 Cal. Gain	1000 1000 1000 1000	1000 1000 1000	-32768 -32768 -32768 -32768	32767 32767 32767 32767
Default Import	Export Update				OK

(4) Input average filter

Options AS04TC-A	average filter						
- format 	Parameter name	Value		Unit	Default	Minimum	Maximum
	CH1 average times	10			10	1	100
<mark>average filter</mark>	CH2 average times	10			10	1	100
- Temperature measureme	CH3 average times	10			10	1	100
- Channel Detect and Alarr	CH4 average times	10			10	1	100
	CH1 filter Proportion	10%	-		10%	-	-
	- CH2 filter Proportion	10%	-		10%	-	-
	- CH3 filter Proportion	10%	-		10%	-	-
	CH4 filter Proportion	10%	-		10%	-	-
Default Import	Export Update						OK

(5) Temperature measurement

Device Setting Options				
- AS04TC-A - format - CH1~CH4 Mode setting - CH1~CH4 Calibration - average filter - Temperature measureme - Channel Detect and Alarr	Temperature measurement units Parameter name Temperature measurement units	C ▼	Unit Default °C	Minimum Maximum
Default Import	Export Update			ОК

(6) Input channel detect and alarm settings

∃- AS04TC-A	Channel Detect and Alarm settings						
- CH1~CH4 Mode setting	Parameter name	Value	Unit	Default	Minimum	Maximum	
	CH1 overrage Detect	📃 Disable		📃 Disable		-	
average filter	CH2 overrage Detect	📃 Disable		Disable	-	-	
- Temperature measureme		📃 Disable		📃 Disable	-	-	
Channel Detect and Alam	CH4 overrage Detect	📃 Disable		📃 Disable	-	-	
	External power supply error	📃 Alarm		🗌 Alarm	-	-	
	Hardware error	📃 Alarm		🗌 Alarm	-	-	
	adjustment error	📃 Alarm		🗌 Alarm	-	-	
	Cold junction compensation Error	📃 Alarm		🗌 Alarm	-	-	
Default Import	Export					OK	

6.4 Troubleshooting

6.4.1 Error Codes

Error Code	Description	A↔ D LED indicator	ERROR LED indicator
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1608	The factory calibration is abnormal.	OFF	ON
16#1801	The external voltage is abnormal.	OFF	Blinking
16#1802	Hardware failure	OFF	Blinking
16#1804	The factory calibration is abnormal.	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of inputs which can be received by the hardware.		
16#1809	The signal received by channel 2 exceeds the range of inputs which can be received by the hardware.	Run: blinking	Dlinking
16#180A	The signal received by channel 3 exceeds the range of inputs which can be received by the hardware.	Stop: OFF	ыпкіпд
16#180B	The signal received by channel 4 exceeds the range of inputs which can be received by the hardware.		

6.4.2 Troubleshooting Procedure

Description	Procedure
The external voltage is abnormal.	Check whether the external 24 V power supply to the
····	module is normal.
Hardware failure	Return the module to the factory for repair.
Internal error	Please contact the factory
The factory correction is abnormal.	
The signal received by channel 1 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 1
hardware.	
The signal received by channel 2 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 2.
hardware.	
The signal received by channel 3 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 3.
hardware.	
The signal received by channel 4 exceeds the	
range of inputs which can be received by the	Check the signal received by channel 4.
hardware.	

MEMO

7

Chapter 7 Load Cell Module AS02LC

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7.1 Overview

The specifications for a load cell module, the operation, and the programming are described in this chapter. A load cell module AS02LC is applicable to 4-wire or 6-wire load cells with various eigenvalues. Therefore, its response time can be adjusted according to users' requirements. On this basis, the requirements of load application markets can be easily met. Moreover AS02LC-A can read and write data via AS series PLC by means of the instruction FROM/TO. To ensure that the product is correctly installed and operated, users need to read the manual carefully before they use. This manual only provides functional specifications, and introduces installation, basic operation and setting. User can refer to load cell related literature for more details on the principle of operation of a load cell.

7.2 Specifications

7.2.1 Specifications

Load cell module	Voltage output
Rated supply voltage/Power consumption	24 VDC (-15 to +20%)/5 W
Minimum/maximum voltage	18~31.2VDC
Maximum current consumption	150 mA
Input signal range	±40mVDC
Sensibility	+5 VDC +/-10%
Highest precision	0.04%
Communication interface	RS-232, RS-485
Applicable sensor type	4-wire or 6-wire load cell
Expanding a temperature coefficient	≤±50 ppm/K v. E
Reducing a temperature coefficient to zero	≤ ± 0.4 µV/K
Linearity error	≤ 0.02%
Response time	2.5, 10, 16, 20, 50, 60, 100, 200, and 400ms
Eigenvalue applicable to a load cell	0~1, 0~2, 0~4, 0~6, 0~20, 0~40 and 0~80 mV/V
Maximum distance for connecting a load cell	100 meters
Maximum output current	5 VDC * 160 mA
Allowable load	40~4,010 Ω
Common-mode rejection ratio (CMRR @50/60 Hz)	≥100 dB
Dyanmic filter	K1~K5
Average weights	K1~K100
	Between a digital circuit and the ground: 500 V AC
Isolation	Between an analog circuit and the ground: 500 V AC
	Between an analog circuit and a digital circuit: 500 V AC

7.2.2 Profile



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
	RUN LED indicator	Operating status of the module ON: The module is running. OFF: The module stops running.
2	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blink: A slight error occurs in the module.
	Digital to analog conversion indicator	Indicating the digital to analog conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to transducers. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	

7_

7.2.3 Arrangement of Terminals



7.2.4 Control Registers

CR#	Name	Description	Defaults
	Display of the pw/gw for	0: disabled	
0	channel 1	1: net weight	1
		2: gross weight	
		0 : 1 mV/V	
		1 : 2 mV/V	
		2 : 4 mV/V	
1	channel 1	3 : 6 mV/V	1
		4 : 20 mV/V	
		5:40 mV/V	
		6:80 mV/V	
2	Sampling cycle setup for	0 : 2.5ms	1
2	channel 1	1 : 10ms	4

CR#	Name	Description	Defaults	
		2 : 16ms		
		3:20ms		
		4:50ms		
		5 : 60ms		
		6:100ms		
		7:200ms		
		8:400ms		
	Weight measured times in			
3	a stability range setup for	Setting range: K1 ~ K500	5	
	channel 1			
4	Stability range setup for	Floating-point number format; setting range	10	
5	channel 1	K1~K10000	10	
6		Floating-point number format; setting the maximum		
	Maximum weight setup for	measuring weight; when the weight measured	100.000	
7	channel 1	exceeds the limit, an alarm will be triggered. The	100,000	
		setting value should be greater than 1.		
	Filter mode setup for	0: no filter(default)		
8	channel 1	1: maximum filter mode	0	
		2: average filter mode		
٩	Maximum filter setup for	Setting range: 0~8, the bigger the number the	1	
	channel 1	stronger the filter.		
10	Average weight measured	Setting range: 1~100	10	
	times for channel 1			
11	Upper limit of the zero	Floating-point number format; determining the	10	
12	return for channel 1	current weight as the zero point in the upper/lower		
13	Lower limit of the zero	range; when the lower range is bigger than the upper		
14	return for channel 1	range, the lower range will be seen as the upper	-10	
15	Zero point tracking time for channel 1	Setting range: 1~500; unit: 100ms	10	
16	Zero point tracking range	Floating-point number format; setting range: 0 ~		
17	for channel 1	10000; 0: disabled	0	
18	Calibration points for channel 1	Setting range: 2~20	2	

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CR#	Name	Description	Defaults		
10 59	Calibrated weight for	Floating-point number format; calibrated weight of			
19~56	channel 1	the calibration points 1~20	-		
		0: disabled			
59	Display of the nw/gw for	1: net weight	1		
		2: gross weight			
		0 : 1 mV/V			
		1 : 2 mV/V			
		2 : 4 mV/V			
60	Eigenvalue setup for	3 : 6 mV/V	1		
		4:20 mV/V			
		5:40 mV/V			
		6:80 mV/V			
	Sampling cycle setup for channel 2	0 : 2.5ms			
		1 : 10ms			
		2:16ms			
		3 : 20ms	4		
61		4 : 50ms			
		5:60ms			
		6:100ms			
		7 : 200ms			
		8:400ms			
	Weight measured times in				
62	a stability range setup for	Setting range: K1 ~ K500	5		
	channel 2				
63	Stability range setup for	Floating-point number format; setting range	10		
64	channel 2	K1~K10000			
65		Floating-point number format; setting the maximum			
	Maximum weight setup for	measuring weight; when the weight measured	100.000		
66	channel 2	exceeds the limit, an alarm will be triggered. The			
		setting value should be greater than 1.			
	Filter mode setup for	0: no filter(default)			
67	channel 2	1: maximum filter mode			
		2: average filter mode			

CR#	Name	Description	Defaults
68	Maximum filter setup for channel 2	Setting range: 0~8, the bigger the number the stronger the filter.	1
69	Average weight measured times for channel 2	Setting range: 1~100	10
70	Upper limit of the zero	Floating-point number format; determining the	10
71	return for channel 2	current weight as the zero point in the upper/lower	
72	Lower limit of the zero	range; when the lower range is bigger than the upper	
73	return for channel 2	range, the lower range will be seen as the upper range and vice versa.	-10
74	Zero point tracking time for channel 2	Setting range: 1~500; unit: 100ms	10
75	Zero point tracking range	Floating-point number format; setting range: 0 ~	0
76	for channel 2	10000; 0: disabled	0
77	Calibration points for channel 2	Setting range: 2~20	2
79 117	Calibrated weight for	Floating-point number format; calibrated weight of	
70~117	channel 2	the calibration points 1~20	-
118	Decimal place setup for channel 1	Setting range: 0~4	1
119	Decimal place setup for channel 2	Setting range: 0~4	1
		0: warning	
		1: alarm	
120	Alarm setup	Bit1: Error occurs in the module power	0
		Bit2: Error occurs in the module hardware	
		Bit3: Error occurs in driver board	
200	State register	Refer to the explanation below	-
201	Instruction set	Refer to the explanation below	0
210	The maximum peak value	Floating-number point format; the maximum peak	-
211	for channel 1	value for channel 1	-
212	The maximum peak value	Floating-number point format; the maximum peak	-
213	for channel 2	value for channel 2	-
214	The minimum peak value	Floating-number point format; the minimum peak	-

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CR#	Name	Description	Defaults
215	for channel 1	value for channel 1	-
216	The minimum peak value	Floating-number point format; the minimum peak	-
217	for channel 2	value for channel 2	-
222	The time to record for chanel 1	Unit: 1ms, setting range 1~100 (1ms~1s)	50
223	The time to record for chanel 2	channels	50
240	The number of records for channel 1	Pange: 0, 500, display the current records	-
241	The number of records for channel 2		-
604	Tare measured by channel	Display the tare measured by channel 1	-
605	1	Display the tale measured by channel 1	-
606	Tare measured by channel	Display the tare measured by channel 2	-
607	2	Display the tale measured by channel 2	-
700~	Theoretical calibration for	Floating-number point format: output voltage unit: mV	0
739	channel 1		
740~	Theoretical calibration for	Floating-number point format: output voltage unit: mV	0
779	channel 2		
4000 ~4999	Records for channel 1	Floating-number point format; 500 records for channel 1	-
5000 ~5999	Records for channel 2	Floating-number point format; 500 records for channel 2	-

Normal Exchange Area

[Explanation]

Users can learn the error code, channel value, state code and the data registers which correspond to their instrucitons in Normal Exchange Area sheet of the Device Setting in HWCONFIG of ISPSoft.

Device Setting			
Options			
AS02LC-A CH1 Setting CH1 Adjustment Setting	Device Information Normal Exchange Area	Address]
- CH2 Setting - CH2 Adjustment Setting - Alarm Setting	Error code CH1 Input CH2 Input Status Code Command	D28000 ~ D28001 D28002 ~ D28003 D28004 ~ D28005 D28006 D28007	
Default Import	Export Update	ОК	

CR#200: Codes for the state register

[Explanation]

Bit	Code	Definition	Bit	Code	Definition
b0	16#0001	Error occurs in the module power	b1	16#0002	Error occurs in the module hardware
b2	16#0004	Error occurs in driver board	b3	16#0008	Calibration disabled
b4	16#0010	Reserved	b5	16#0020	Reserved
b6	16#0040	The weight measured by CH1 exceeds the maximum weight which can be measured, or the voltage of SEN is incorrect.	b7	16#0080	The weight measured by CH2 exceeds the maximum weight which can be measured, or the voltage of SEN is incorrect.
b8	16#0100	The weight measured by CH1 exceeds the maximum weight which can be measured.	b9	16#0200	The weight measured by CH2 exceeds the maximum weight which

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Bit	Code	Definition	Bit	Code	Definition
					can be measured.
b10	16#0400	CH1 is adjusted incorrectly.	b11	16#0800	CH2 is adjusted incorrectly.
b12	16#1000	No weight is measured by CH1.	b13	16#2000	No weight is measured by CH2.
b14	16#4000	A weight measured by CH1 is in the stability range specified.	b15	16#8000	A weight measured by CH2 is in the stability range specified.
Note: The	Note: The state shown is determined by the corresponding bit and it is possible to have more than 2 states at				

the same time.

CR#201: Instruciton set

[Explanation]

Input value	Description	Input value	Description
0	No action	16#0101	Start a new recording of the peak value for channel 1
1~20	Instucitons for calibrating the calibration points1~20 in channel 1	16#0102	Start a new recording of the peak value for channel 1
21~40	Instucitons for calibrating the calibration points1~20 in channel 1	16#010F	Start a new recording of the peak value for channel 1~2
98	Activate the weight calibration	16#0201	Start a new recording for channel 1
99	Inactivate the weight calibration	16#0202	Start a new recording for channel 2
100	Subtracting the tare measured by CH1	16#020F	Start a new recording for channel 1~2
101	Not subtracting the tare measured by CH1	16#0211	Stop recording for channel 1
102	Restoring the weight measured by CH1 to zero	16#0212	Stop recording for channel 1
103	Subtracting the tare measured by CH2	16#021F	Stop recording for channel 1~2
104	Not subtracting the tare measured by CH2	16#0301	Start a theoretical calibration for channels

Input value	Description	Input value	Description
105	Restoring the weight measured by CH2 to zero	16#0302	Start a theoretical calibration for channels 2
16#030F	Start a theoretical calibration for channels 1~2	16#0502	Restore to default settings

7.2.5 Functions

ltem	Function	Description
1	Measuring a net weight	Various measuring modes for users to choose from.
2	Stability check	When an object is put on a load cell, users can check whether the present weight of the object is in a stability range specified.
3	Determining zero	If an object is removed from the load cell used, no weight is measured.
4	Filtering out weights	Filtering out the maximum/minimum weight measured or using a averaging weight for a more accurate value
5	Multi-point adjustment	Up to 20 points adjustment
6	Theoretical calibration	Calibration according to the output value of the sensor instead of the real weight calibration
7	Zero point tracking	Zero point tracking
8	The limit detections for channels	Saving the maximum/minimum values for channels
9	Records for channels	Saving the analog curves for channels

1. Measuring a net weight

Users can choose to measure the net weight or the gross weight of an object. A net weight is the weight of a product, that is, the actual weight of a product without its package. The weight of a package is a tare. A gross weight is a total weight, namely a net weight plus a tare.

- Tare: A tare is the weight of a package
- Net weight: A net weight is the weight of a product, that is, the actual weight of a product without its package.

- Gross weight: A gross weight is a total weight, namely the weight of a product itself (a net weight) plus the weight of a package (a tare).
- Gross weight=Net weight+Tare

Example: A product weighs 10 kilograms, and the carton in which the product is packed weighs 0.2 kilograms. The total weight gotten is 10 kilograms.

Net weight=10 kg

Tare=0.2 kg

Gross weight=10.2 kg

2. Stability check

When an object is put on a load cell, users can check whether the present weight of the object is in a stability range specified.

- If a weight measured is in a stability range specified by users, the corresponding bit will be set to 1.
- If a weight measured exceeds a range specified by users, the corresponding bit will be set to 0 until the number of weights measured in a stability range reaches the value set.

Example: The measurement time set is 10 milliseconds, the number of weights measured in a stability range is 10, and the stability range set is 1000 grams. If a variation exceeds 1000 grams, the corresponding bit will be set to 0. If the variations in 100 milliseconds (10×10 ms) are within 1000 grams, the corresponding bit will be set to 1. (Users should judge whether the present weight measured is in the stability range set before they perform control.)



3. Determining zero point

If an object is removed from the load cell used, the corresponding bit will be set to 1, the corresponding bit will be set to 1, and users can perform the next control. (If a weight measured is in the zero range specified, the corresponding bit will be set to 1.)



4. Filtering out weights

There are two ways to filter out weights.

- Filtering out the maximum/minimum weight measured: If there is a maximum weight or a minimum weight, users can filter out the maximum weight or the minimum weight. If the value set is bigger, more weights will be filtered out. Setting range: K0~K8
- Averaging weights: The values read are averaged so that a steady value is obtained. There may be peak values due to unavoidable external factors, and the average value obtained changes accordingly. The maximum number of values which can be averaged are 100.

5. Multi-point adjustment

The purpose of making adjustment is to make the weight measured by a cell correspond to the digital value displayed in a load cell module. Generally, two points are adjusted. After a system is set up, users can put no load on the scale. The weight measured is 0 grams when no load is put on the scale. The users can put a given weight on the scale, and set a digital value corresponding to the weight. The two points are adjusted. For example, if a load cell sensor which can measure a maximum weight of 10 kg is used, and 1 kg corresponds to K1000, the curve presented will be like the one shown below.



Adjusting two points

In addition to the adjustment of two points, a load cell supports the adjustment of multiple points (20 points at most). A characteristic curve is shown below.



6. Theoretical calibration

Theoretical calibration is done according to the sensor specification to input the voltage value to correspond to weights. The registers for storing the voltage value are CR#700~739 for channel 1 and CR740~779 for channel 2. After the voltage values are inputted in the registers, users can use the instruction set 16#301~302 to execute the calibration.

Example: The sensor specification is 10Kg and its eigenvalue is 2mV/V. When the sensor is loaded with a 10Kg weight, the output is 10mV. The theoretical calibration steps are as below:

Step 1: Set up the eigenvalue.

Device Setting						
Options						
B-AS02LC-A	CH1 Setting					
- CH1 Adjustment Setting	Parameter name	Value		Unit Default	Minimum	Maximum 📥
- CH2 Setting	CH1 gross/net setting	gross	-	gross	-	-
CH2 Adjustment Setting	- CH1 Characteristic value	2mV/V	-	2mV/V		-
- Alarm Setting	CH1 sampling time	50ms	-	50ms	-	-

Step 2: Set up 2-point adjustment; when the sensor is loaded with a 10Kg weight, set up the value to 10.

Device Setting							
Options							
	AS02LC-A	CH1 Adjustment Setting					
	- CH1 Adjustment Setting	Parameter name	Value	Unit	Default	Minimum	Maximum
	- CH2 Setting	CH1 Adjustment number					20
	- CH2 Adjustment Setting	- CH1 weight of Adjustment point 1(Zero)	0		0	0	0
	- Alarm Setting	CH1 weight of Adjustment point 2	1000		1000	-	-

Step 3: Set up the voltage calibraiton for the zero point to 0 (0mV) in the CR#700/701, and to 10.0 (10mV) in the CR702/703.

Step 4: Write 16#0301 into the instruction set CR#201 to execute a theoretical calibration for channels 1.

Step 5: Do not put any load on the sensor and write 16#102 into the instruction set CR#201 to reset the value to 0 for channel 1.

7. Zero-point tracking

Zero-point tracking means resetting the current value to 0. Users can reset the value to 0 within certain duration or weight. This is especially useful when the senso is not as accurated as before.

8. The limit detections for channels

Saving the maximum/minimum values for channles and users can know the peak to peak value from the maximum/minimum values



9. Records for channels

Record the input value of the cyclic sampling for each channel, up to 500 pieces can be recorded and the recording time is 10ms.



7.2.6 Wiring

• External wiring



• Multiple load cells connected in parallel are connected to a single load cell module.



Note 1: Please connect () on a power supply module and () on the load cell module to a system ground, and then ground the system ground or connect the system ground to a distribution box.

Note 2: If multiple load cells are connected in parallel, the total impedance should be greater than 40 Ω .

7.3 Adjustment

The purpose of making adjustment is to make the weight measured by a cell correspond to the digital value displayed in a load cell module. The adjustment can be done via the instructions related or via the theoretical calibration (refer to section 7.2.5 for more details). The adjustment steps are shown as below.

7.3.1 Steps in adjusting points


7.3.2 Adjustment settings / LC Wizard

- AS02LC-A	CH1 Setting						
- CH1 Adjustment Setting	Parameter name	Value	Value Ur		Minimum	Maximum	n 🔺
- CH2 Setting	CH1 gross/net setting	gross	-	gross	-	-	
- CH2 Adjustment Setting - Alarm Setting	- CH1 Characteristic value	2mV/V	-	2mV/V	-	-	
	- CH1 sampling time	50ms	-	50ms			
	- CH1 standstill times	5		5	1	500	
	CH1 standstill Range	10		10	1	10000	
	- Ch1 Max weight	100000		100000	1	-	
	CH1 Filter mode setting	Disable	-	Disable	-	-	
	- CH1 Filter ratio	1	-	1	-	-	
	CH1 Filter average times			10	1	100	
	Ch1 Zero upper range			10	0	100000	
	Ch1 Zero lower range	-10		-10	-100000	0	
	CH1 Zero tranking timer	10		10	1	500	-
	▲					>	

Step 2: Set up the number of adjustment and its corresponding value; the example is a 2-point adjustment, point 1 is 0 and the value for point 2 is 1000, corresponding to 1Kg.

Device Setting						
Options						
B- AS02LC-A CH1 Setting	CH1 Adjustment Setting					
- CH1 Adjustment Setting	Parameter name	Value	Unit	Default	Minimum	Maximum
- CH2 Setting	CH1 Adjustment number	2		2	2	20
- CH2 Adjustment Setting	CH1 weight of Adjustment point 1(Zero)	0		0	0	0
- Alarm Setting	CH1 weight of Adjustment point 2	1000		1000	-	-
Default Import	Export Update					ок

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AS30 Di Ar Ne Po	K The second sec	9 3 9 9	Download (Ctri+F8)	10 22 10 22	+			
Specificat	ion		<					
Exter Powe CPU	nsion No er Module Module Inction Card	Type CPU Module	Module Name AS332T	DDF Version	Input Device Range	Output Device Ra Y0.0 ~ Y0.15	Comment	
FL	unction Card			1.				
Modu	ule Informatic	Analog I/O Module	AS02LC-A	01.00.00	D28000 ~ D28006	D28007 ~ D28019		

Step 3: After the configuration is done, download the parameterts to the module

Step 4: Right click on the module to see the option LC Wizard and double-click to open the LC Wizard.



LC Wizard			×
Setting			
Message	Please make su adjusted Points.	ire that you have chose th	ne channel and the
Channel	СН1 💌	Subtracting Tare	
Points	2 🔻	Clear Subtracting Tare	Next
		Reset to Zero	Close

Step 5: Make sure the channel and adjusted points shown are the same as you have set.

Step 6: Put no load on the load cell (adjustment point 1). And click "Next" to proceed.

Message	Please click "Next" to proceed. Adjusted Channel: 1 Adjusted Points: 1	
	E.E.	Back
11/		Next

7_

Step 7: Put a load on the load cell (adjustment point 2). For multi-point adjustment, repeat this step. This example uses a 1Kg.

Message	Please click "Next" to proceed. Adjusted Channel: 1 Adjusted Points: 2
25	Back
	Next

Step 8: The calibration is done.

Message	Correction Finish.	
71		Back
		Finish

A characteristic curve is shown below.



7.3.3 Adjustment settings / Instructional calibration

Options AS02LC-A	CH1 Setting					
CH1 Setting	Parameter name	Value	Unit	Default	Minimum	Maximum 🔺
- CH2 Setting	CH1 gross/net setting	gross	-	gross	-	-
- CH2 Adjustment Setting Alarm Setting	CH1 Characteristic value	2mV/V	•	2mV/V	-	-
	CH1 sampling time	50ms	-	50ms	-	-
	CH1 standstill times	5		5	1	500
	CH1 standstill Range	10		10 1	10000	
	Ch1 Max weight	100000		100000	1	-
	CH1 Filter mode setting	Disable	-	Disable	-	-
	CH1 Filter ratio		-	1	-	-
	CH1 Filter average times	10		10	1	100
	Ch1 Zero upper range	10		10	0	100000
	Ch1 Zero lower range	-10		-10	-100000	0
	- CH1 Zero tranking timer	10		10	1	500 🗾
	•					
Default Import	Export Update					

Step 2: Set up the number of adjustment and its corresponding value; the example is a 2-point adjustment, point 1 is 0 and the value for point 2 is 1000, corresponding to 1Kg.

Device Setting						
Options						
B- AS02LC-A CH1 Setting	CH1 Adjustment Setting					
- CH1 Adjustment Setting	Parameter name	Value	Unit	Default	Minimum	Maximum
- CH2 Setting	CH1 Adjustment number	2		2	2	20
- CH2 Adjustment Setting	CH1 weight of Adjustment point 1(Zero)	0		0	0	0
- Alarm Setting	CH1 weight of Adjustment point 2	1000		1000	-	-
Default Import	Export Update					ок

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Elle Edit Or Edit Or Assoo Digital I/O Modu Analog I/O Modu Network Module Power Module	ittori Heip 3 3 9 0 le ule b	Download (Ctrl+F8)		+			
	-	41	-	~			
Extension No	Туре	Module Name	DDF Version	Input Device Range	Output Device Ra	Comment	
Extension No	Туре	Module Name	DDF Version	Input Device Range	Output Device Ra	Comment	;
Extension No Power Module CPU Module	Type CPU Module	Module Name AS332T	DDF Version 01.00.00	Input Device Range	Output Device Ra Y0.0 ~ Y0.15	Comment	
Extension No Power Module CPU Module Function Card	Type CPU Module	Module Name AS332T	DDF Version 01.00.00	Input Device Range	Output Device Ra Y0.0 ~ Y0.15	Comment	
Extension No Power Module CPU Module Function Card Function Card	Type CPU Module	Module Name AS332T	DDF Version 01.00.00	Input Device Range X0.0 ~ X0.15	Output Device Ra Y0.0 ~ Y0.15	Comment	

Step 3: After the configuration is done, download the parameterts to the module

Step 4: Users can see the corresponding address for instruction is D28007 in the Normal Exchange Area.

AS02LC-A - CH1 Setting - CH1 Adjustment Setting	Device Informatio [®] Normal Exchange Area	Address	1
- CH2 Setting - CH2 Adjustment Setting - Alarm Setting	Error code CH1 Input CH2 Input Status Code Command	D28000 ~ D28001 D28002 ~ D28003 D28004 ~ D28005 D28006 D28007	
Default Import	Export	ОК	

Step 5: Write the instruction of activating the weight calibration 98 into D28007.

Step 6: Put no load on the load cell (adjustment point 1) and write 1 into D28007. (1 represents channel 1 and 2 represents channel 2)



Step 7: Put a load on the load cell (adjustment point 2). For multi-point adjustment, repeat this step. This example uses a 1Kg.

	J	Ī.		-		
Plays on L	Load	Cell		1	C	
PLC Tools V	Nizard Window	7 S R P S	192		484.	n Q.
Object	Identifiers	Device Name	Status	Data Type	Value (16bits)	Value (32bits)
		D28007			2	2

Step 8: Write the instruction of inactivating the weight calibration 99 into D28007 and the adjustment is done.

A characteristic curve is shown below.



7.3.4 LED Indicators

Number	Name	Description
		Operating status of the module
1	RUN LED indicator	ON: The module is running.
		OFF: The module stops running.
		Error status of the module
2	ERROR LED	ON: A serious error occurs in the module.
2	indicator	OFF: The module is normal.
		Blink: A slight error occurs in the module.
	Digital to analog	Indicating the digital to analog conversion status
3	conversion	Blinking: conversion is taking place
	indicator	OFF: stop conversion

7.4 HWCONFIG in ISPSoft

7.4.1 Initial Setting

(1) Start ISPSoft, and then double-click **HWCONFIG**.

🙀 Untitled0 - Delta ISPSoft - [P	Prog0]					- • •
File Edit View Compil	le PLC Tools Wizard	<u>W</u> indow <u>H</u> elp				_ 8 × ,
	00 55	및 및 / 기 🔮 🔳 🔍)	1 9 C	B. 999.	1.0	
00110000	R * 100%	- appe 🛅 🕎 I	🖹 🔔 🐿 🐿 🗎	11 11 11 11 11	1111 2 • 末十 •	Ð
Project 4 ×			Local Symbols			Delta Library, Preview 4 ×
🖃 🤷 Project [C:\ProgramData\I	Class	Identifiers Address	Туре	Initial Value (A	Identifier Comment	Delta Library
CARD Utility CARD Utility CARD Utility						🖅 🥡 Delta Library
E DUT		*		*		
Global Symbols	Network 1					
Finction Blocks						
	+			-		
						Delta Library User Defi 4
						Preview
4 <u>m</u> +						
Project	4					Preview
Insert Network: 1		0/131040 Steps	Offline	AS300, [USB: COM2	AS332P	4

(2) Selecting a module.

Aloadcell - HWCONFIG	
Eile Edit Option Help	
II X 🖻 🖬 🥑 🎜 🛱 🛱 🕄	1 · · · · ·
 AS300 Digital I/O Module Analog I/O Module AS04AD AS04DA AS06XA AS04RTD AS04TC AS04TC AS02LC Power Module Power Module 	

(3) Double-click the module to open the Device Setting page.

AS02LC-A	Device Information	Normal Exchange Area	
- CH1 Adjustment Setting	Device Name	AS02LC-A	
- CH2 Setting - CH2 Adjustment Setting - Alarm Setting	Description	2 channels Load cell input Module current consumption:(Internal)50mA.(External) 0mA Module total witch:35mm	
	Comment		
	DDF Version	ν 01.00.00	1 5 5 1
	Firmware Version	(off-line)	
	Hardware Version	(off-line)	· · ·

(4) Set the parameters, and then click **OK**.

E-AS02LC-A CH1 Satting	CH1 Setting							
- CH1 Adjustment Setting	Parameter name	Value		Unit	Default	Minimum	Maximum	•
- CH2 Setting	CH1 gross/net setting	gross	-		gross	-	-	
- CH2 Adjustment Setting	- CH1 Characteristic value	2mV/V	•		2mV/V	-	-	
- Alarm Setting	CH1 sampling time	50ms	-		50ms	-	-	
	- CH1 standstill times	5			5	1	500	
	CH1 standstill Range	10			10	1	10000	
	- Ch1 Max weight	100000			100000	1	-	
	CH1 Filter mode setting	Disable	-		Disable	-	-	
	- CH1 Filter ratio	1	•		1	-	-	
	- CH1 Filter average times	10			10	1	100	
	- Ch1 Zero upper range	10			10	0	100000	
	Ch1 Zero lower range	-10			-10	-100000	0	
	- CH1 Zero tranking timer	10			10	1	500	-
	•						•	

(5) Click **Download** on the toolbar to download the parameters. (The parameters can not be downloaded when the CPU module runs.)



7.4.2 Checking the Version of a Module

(1) On the **Option** menu, click **Online Mode**.

👍 loadcell - HWCONFIG		
Eile Edit Option Help		
Image: State	Ctrl+F9 Ctrl+F8 Ctrl+N	
Analog I/O : Online Mode Aso4AI ASO4DI ASO6XA ASO6XA ASO4TC ASO2LC Network Module Power Module	Ctrl+F4	

(2) Double-click the module to see the Device Setting page. The version of the firmware and that of the hardware are displayed.



OUT O W	Device Information	Normal Exchange Area	
- CH1 Setting - CH1 Adjustment Setting	Device Name	AS02LC-A	
– CH2 Setting – CH2 Adjustment Setting – Alarm Setting	Description	2 channels Load cell input Module current consumption:(Internal)50mA (External) 0mA Module total witdh:35mm	
	Comment	×	=
	DDF Version	01.00.00	i –
	Firmware Version	01.00.02	
	Hardware Version	00.00.00.00	-

7.4.3 Online Mode

(1) Click **Online Mode** on the toolbar.



(2) Right-click the module.



(3) The module status can be shown.

AS02LC-A		×
Channel	Value (32 bits)	Data Type
Error code	0	DECIMAL
CH1 Input	1128654438	DECIMAL
CH2 Input	1128746189	DECIMAL
Status Code	49160	DECIMAL
Command	0	DECIMAL

7.4.4 Importing/Exporting a Parameter File

(1) After **Export** is clicked, the parameters will be saved as a CSV file (.csv).

Default Import	Export D
Save As	2 🛛
Save in: C My Documents My Music My Pictures: WinCHM Projects	
File name: Save as type: CSV File (*.csv)	Save Cancel



(2) Click Import, and then select the CSV file.

Default Import	Export
----------------	--------

Open	? 🛛
Look in: My Documents My Music My Pictures WinCHM Projects	
File name: Files of type: CSV File (*.csv)	Open Cancel

7.4.5 Parameters

(1) The settings for channel 1

CH1 Adjustment Setting	Parameter name	Value		Unit Def	ault Minimum	n Maximum
- CH2 Setting	CH1 gross/net setting	gross	•	gross		-
- CH2 Adjustment Setting	- CH1 Characteristic value	2mV/V	-	2mV/V	-	-
- Alarm Setting	- CH1 sampling time	50ms	•	50ms	-	-
	- CH1 standstill times	5		5	1	500
	- CH1 standstill Range	10		10	1	10000
	- Ch1 Max weight	100000		100000	1	-
	CH1 Filter mode setting	Disable	-	Disable	9 -	-
	- CH1 Filter ratio	1	-	1	-	-
	- CH1 Filter average times	10		10	1	100
	- Ch1 Zero upper range	10	_	10	0	100000
	Ch1 Zero lower range	-10	_	-10	-100000	0
	CH1 Zero tranking timer	10	_	10	1	500
	•					•

(2) The adjustment for channel 1

evice Setting Options					
	CH1 Adjustment Setting				
CH1 Adjustment Setting	Parameter name	Value	Unit Default	Minimum	Maximum
- CH2 Adjustment Setting	CH1 Adjustment number CH1 weight of Adjustment point 1(Zero)	0	0	0	0
Alarm Setting	CH1 weight of Adjustment point 2	1000	1000	-	-
Default Import	Export Update			L	ОК

(3) The settings for channel 2

- CH1 Setting - CH1 Adjustment Setting	Parameter name	Value		Unit	Default	Minimum	Maximum	
CH2 Setting	CH2 gross/net setting	gross	•		gross	-	-	
- CH2 Adjustment Setting	- CH2 Characteristic value	2mV/V	•		2mV/V	-	-	
- Alarm Setting	- CH2 sampling time	50ms	•		50ms	-	-	I
	- CH2 standstill times	5			5	1	500	I
	CH2 standstill Range	10			10	1	10000	I
	- Ch2 Max weight	100000			100000	1	-	i
	CH2 Filter mode setting	Disable	-		Disable	-	-	
	- CH2 Filter ratio	1	-		1	-	-	
		10			10	1	100	
	Ch2 Zero upper range	10			10	0	100000	
	Ch2 Zero lower range	-10			-10	-100000	0	
	CH2 Zero tranking timer	10			10	1	500	-
	•						• •	

7_

(4) The adjustment for channel 1

Device Setting						
Options						
AS02LC-A CH1 Setting	CH2 Adjustment Setting					
CH1 Adjustment Setting	Parameter name	Value	Unit	Default	Minimum	Maximum
CH2 Setting	CH2 Adjustment number	2		2	2	20
CH2 Adjustment Setting	CH2 weight of Adjustment point 1(Zero)	0		0	0	0
- Alarm Setting	CH2 weight of Adjustment point 2	2000		1000	-	-
Default Import	Export Update				1	ОК

(5) Alarm settings

evice Setting				
Options				
⊡-AS02LC-A CH1 Setting	Alarm Setting			
CH1 Adjustment Setting	Parameter name	Value	Unit Default	Minimum Maximum
- CH2 Setting	External power supply error	✓ Disable	Disable -	-
Alerm Setting	Hardware error	Alarm	Alarm -	-
Admiseding	···· Driver borad error	📃 Alarm	Alarm -	-
Default Import	Export Update			ОК

7.5 Troubleshooting

7.5.1 Error Codes

Error Code	Description	A↔ D LED indicator	ERROR LED	
16#1605	Hardware failure	OFF	ON	
16#1607	The external voltage is abnormal.	OFF	ON	
16#1801	The external voltage is abnormal.	OFF	Blinking	
16#1802	Hardware failure	OFF	Blinking	
16#1807	The driver board is abnormal.	OFF	Blinking	
16#1808	The weight measured by CH1 exceeds the maximum weight which can be measured, or the voltage of SEN is incorrect.			
16#1809	The weight measured by CH1 exceeds the maximum weight which can be measured.			
16#180A	CH1 is adjusted incorrectly.	Run: blinking	Dlinking	
16#180B	The weight measured by CH2 exceeds the maximum weight which can be measured, or the voltage of SEN is incorrect.	Stop: OFF	Biinking	
16#180C	The weight measured by CH2 exceeds the maximum weight which can be measured.			
16#180D	CH2 is adjusted incorrectly.			

7.5.2 Troubleshooting Procedure

Description	Procedure
The external voltage is abnormal.	Check power supply
Hardware failure	Return the module to the factory for repair.
The driver board is abnormal.	Return the module to the factory for repair.
The weight measured by CH1 exceeds the maximum weight which can be measured, or the voltage of SEN is incorrect.	Check the signal received by channel 1 and its wiring.
The weight measured by CH1 exceeds the maximum weight which can be measured.	Check the parameters of the related weight values for channel 1.
CH1 is adjusted incorrectly.	Check the adjusted weight value and the adjustment steps for channel 1.

Description	Procedure
The weight measured by CH2 exceeds the maximum weight which can be measured, or the voltage of SEN is incorrect.	Check the signal received by channel 2 and its wiring.
The weight measured by CH2 exceeds the maximum weight which can be measured.	Check the parameters of the related weight values for channel 2.
CH2 is adjusted incorrectly.	Check the adjusted weight value and the adjustment steps for channel 2.



Chapter 8 Serial Communication Module AS00SCM

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8.1 Introduction

Thanks for using AS00SCM, a serial communication module. To ensure that AS00SCM is installed and operated correctly, please read this manual carefully before using the module.

AS00SCM is a serial communication module, supporting the communication cards AS-F232, AS-F422, AS-F485 as well as AS-FCOPM (COM2). It supports the protocols such as Modbus and UD Link (user-defined format). AS00SCM is set by means of ISPSoft. Please download ISPSoft V3.0 or later version in Delta's official website. As for UD Link, this is set by means of SCMSoft in DCISoft. Please download DCISoft V1.16 or later version in Delta's official website.

Functions:

- It is equipped with two function card slot, supporting the communication cards AS-F232, AS-F422, AS-F485 as well as AS-FCOPM (COM2).
- It supports serial extension mode and RTU mode (needs to work with AS-FCOPM via COM2).
- The serial extension mode supports Modbus communication protocol (needs to work with the communication cards AS-F232, AS-F422 and AS-F485) and UD Link, a user-defined communication protocol (needs to work with the communication cards AS-F422 and AS-F485)

8.2 Specification, Function and Wiring

8.2.1 The functional specifications

■ RS-485/RS-422 communication interface

ltem	Specifications
Connector type	European-style terminal block, spring-clip connector
Transmission speed	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800 115200 and 230400 bps
Communication format	Stop bit: 1 bit and 2 bits Parity bit: none, an odd parity bit, and an even parity bit Data bit: 7 bits and 8 bits
Communication protocol	Modbus ASCII/RTU UD Link

Electrical specifications

ltem	Specifications
Supply voltage	24VDC
Electric energy consumption	0.6W
Weight	Approximately 169g



8.2.2 Dimensions and Profile

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
	RUN LED indicator (blue)	Operating status of the module ON: The module is running. OFF: The module is with low voltage or no power
2	ERROR LED indicator (red)	Error status of the module ON: There is a hardware error. OFF: The module is normal. Blink: 1. The setting of the module is incorrect, or there is a communication error. (blinking every 1 second) 2. Hardware/low voltage error (blinking every 0.2 second)
	Function Card 1 indicator (orange)	Blink: The data is being transmitted via function card 1. OFF: No transmission via function card 1.
	Function Card 2 indicator (orange)	Blink: The data is being transmitted via function card 2. OFF: No transmission via function card 2.
3	Switch of the communication ID and the format setting	2 sets, one for function card 1 and one for function card 2 respectively
	Function card 1 slot	For AS-F232, AS-F422, AS-F485
4	Funciton card 2 slot	For AS-F232, AS-F422, AS-F485, AS-FCOPM
5	Switch of work mode setting	COM is for communication mode and RTU is fo remote control mode
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate
10	Power input for RTU module	For supplying power to RTU module

• Communication ID and the format setup switch

When the setting value is 0, this setup is via ISPSoft. The setting range for the communication ID via the switch is 0x01~0x0F.

COM. Mode: If users need to use the communication ID 0x10~0xF7, users need to set the setting here to 0 and then configure this setting via ISPSoft.

RTU Mode: when the module is in RTU mode, the communication ID can only be set via the switch and it cannot be set by means of ISPSoft.

	ID	Setup	
ID1/ID2	ID Setup	ID1/ID2	ID Setup
0	Via ISPSoft	1-F	Via the switch

Switch of work mode setting

When the setting value is 0, this setup is via ISPSoft.

COM. Mode: If users need to set differnt communication format, users need to set the setting here to 0 and then configure this setting via ISPSoft.

RTU Mode: when the module is in RTU mode, the communication baud rate can only be set via the switch and it cannot be set by means of ISPSoft.

					CON	Mode	CM. RTU				
Format 1/ Format 2	Baud rate (bps)	Data (bits)	Parity	Stop (bits)	ASCII/ RTU	Format 1/ Format 2	Baud rate (bps)	Data (bits)	Parity	Stop (bits)	ASCII/ RTU
0		Sof	tware set	ting		8	38400	8	None	2	RTU
1	9600	7	Even	1	ASCII	9	38400	8	None	1	RTU
2	9600	8	Even	1	RTU	А	38400	7	Even	1	ASCII
3	9600	7	None	2	ASCII	В	57600	8	None	1	ASCII
4	9600	8	None	1	RTU	С	76800	8	None	1	RTU
5	19200	7	Even	1	ASCII	D	115200	7	None	1	ASCII
6	19200	8	None	1	RTU	E	115200	8	Even	1	RTU
7	19200	8	Odd	2	RTU	F	115200	7	None	2	ASCII

			RT	U Mode	OM. RTU			
Format 2	1	2	3	4	5	6	7	8-F
Bit rates (bps)	10K	20K	50K	125K	250K	500K	1000K	NA
Distance (m)	5000	2500	1000	500	250	100	25	NA

8.2.3 Wiring

8.2.3.1 ASOOSCM Wiring

• COM mode:

Switch the work mode to COM. Install the module on the right side of the AS series CPU. Do not use external power supply for this module to avoid problems.

• RTU mode:

Switch the work mode to RTU. This module is equipped with an independent DC power connecter.

In order to make the functions of a serial communication module perfect and ensure the reliability of a system at the same time, external wiring which prevents noise is necessary. Before installing cables, users need to follow the precautions below.

(1) To prevent a surge and induction, a DC cable and other power cables which are connected to AS00SCM-A must be separate cables. AS00SCM is suggested to have an independent power supply.





- (2) 24 VDC cable should be twisted. And the shorter end should be connected to the module.
- (3) A cable (110 VAC, 220 VAC and 24 VDC) must not be installed near a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Besides, a cable must not be bound to a main circuit, a high-voltage cable, or a cable connected to a load which is not a PLC. Otherwise, effects that noise, induction, and a surge have will increase. It is suggested to have all the cables should be wired at least 100 mm apart.
- (4) For the power supply of AS00SCM-A, please connect a 14AWG wire to the ground.
- (5) Please connect 20 to 14 AWG (1 mm) wires to the input/output terminals. Only copper leads which can resist the heat above 60/75°C can be used.

8.3 COM mode

This section introduces AS00SCM in the COM mode.

8.3.1 Modbus

AS00SCM supports standard communication protocols such as Modbus RS232, RS422, and RS485. Once the data exchange table is created, users can exchange data with the slaves.

Creation of Modbus communication: set up the communication protocol -> create data exchange table -> download HWCONFIG -> enable this function.

Please refer to section 8.3 data exchange in AS operation manual for more information on the data exchange setup.

8.3.2 UD Link

This section introduces AS00SCM using UD Link communication in COM mode. The setup can be done in SCMSoft. Please refer to section 8.3.2.1 for more details on UD Link and refer to section 8.5 for operation in the software.

The UD Link provides non-Modbus RS485 and RS422 communication. A packet can be edited according to a communication format. The steps of creating an UD Link are as follows.

Creating a group \rightarrow Editing TX packets and RX packets \rightarrow Creating commands \rightarrow Downloading the group, and then triggering the sending/receiving of the packets



First, create TX packets and RX packets in a group. Then, set the sequence of sending/receiving the packets, and the number of times the packets are sent/received through commands. Finally, the sending/receiving of the packets in the group is triggered. Besides, if several different types of packets are required in a larger system, users can arrange several groups in sequence, and set the sequence of sending/receiving the packets in the groups.

8.3.2.1 TX Packets and RX Packets

Several TX packets and RX packets can be created in a group. A TX packet/RX packet is composed of messages, an address, a length, and a checksum.

Packet Edit				
Packet N: Packet View	ame			
Packet Seg	ment Edit			>
No.	Class	Format	Segment View	Up Down Delete
Messag	ge onstant	Variable	Address Constant	Variable
	Add	Checksum	No. 0 🗘 ~	No. 0
			ОК	Cancel

- Packet name: Users can edit a packet name.
- Packet view: The contents of a packet are displayed.
- Packet segment edit: Users can adjust the sequence of segments, and add/delete segments.

No.: A segment number is displayed. Users can edit 64 segments at most.

Class: A segment class is displayed. A message, an address, a length, and a checksum are classes.

Format: The data format of a segment is displayed. A hexadecimal value, an ASCII code, and a code are data formats.

Segment view: The contents of a segment are displayed.

- Message: Users can edit "constant" messages and "variable" messages. Messages can be applied to a header segment, a start bit segment, an end bit segment, and a data segment. There can be several messages in a packet.
- Address: Users can edit a "constant" address, and a "variable" address. There is only one address segment in a packet.
- Length: Users can edit the length of a packet. There is only one length segment in a packet.
- Checksum: Users can edit a checksum. There is only one checksum segment in a packet.

Format	Hex 🐱	
Value	Hex ASCII	
	Code	

• Constant: Data is a constant.

Format: Users can select Hex, ASCII, or Code in the Format box. If Code is selected, data used is a control code.

Value: User can enter a constant.

Message Variable E	dit			
Format Variable Value	Null (R(D ([0]), 1) Variable	,	Length)
Variable Property		Read R()	~	
Mapping Regist	er	D Register	~	0
Length Property-				
Function		Constant	~	
Mapping Regist	er	Base + Off	'set 🔽	0
Constant		1		
		ОК		Cancel

- Variable: Data is a variable. Users can specify an internal register in AH10SCM-5A, or a register in a CPU module.
- Format: Users can set the format of data
- Null: Data is not processed.
 - Hex: ASCII data is converted into hexadecimal data. ASCII data which can not be converted into hexadecimal data will be converted into 0.
 - ASCII: Hexadecimal data is converted into ASCII data. Hexadecimal data which can not be converted into ASCII data will be converted into 0.
- Variable property
 - Function: For a TX packet, users can select Read R () in the **Function** box. For a RX packet, the users can select **Read R ()**, **Write W ()**, or * in the **Function** box.
 - Mapping register: Registers in PLC
- Length

Class: Users can select **1 Byte** or **2 Bytes** in the **Class** box. Format: Users can select **Hex** or **ASCII** in the **Format** box.

Value: Users can enter a length.

Checksum

Class: Users can select a class.

Format: Users can select the format of a checksum

Initial value: Users can set an initial value.

Reverse: The high byte of a one-word checksum which is calculated, and the low byte of the checksum are reversed.

8.3.2.2 Command

After several TX packets and RX packets are created, users can select packets which will be sent and packets which will be received by creating commands. Besides, the users can set the sequence of executing the commands.

Command No.	01	
Command Type	Send & Receive	. P
Send Packet	TX Packet1	Y
Recy Packet	RX Packet2	~
Success	Goto 😽	2
Fail	Goto 😽	5
Retry	0	(0 - 255)
Repeat	0	(0 - 255)
Send Wait	0	(0 - 65535 ms)
Timeout	50	(50 - 65535 ms)

Command number: Every command is numbered. Command numbers indicate execution sequence.

Command type: Users can select Send, Receive, or Send & Receive in the Command Type box.

Send packet: Users can select a packet which has been created.

Receive packet: Users can select a packet which has been created.

Success: Users can specify an action which follows the execution of a command. They can select Next, Goto, or End.

Next: The next command is executed. If the command which is being executed is command 1, the next command which will be executed is command 2.

Goto: Users can specify a command which should be executed much later.

End: Coming to and end

Fail: Users can specify an action which follows the execution of a command. They can select Next, Goto, or Abort.

Next: The next command is executed. If the command which is being executed is command 1, the next command which will be executed is command 2.

Go to: Users can specify a command which should be executed much later.

- Abort: Coming to and end
- Retry: The sending of a command can be retried after the sending of the command fails. Users can set the number of times the sending of a command is retried.
- Repeat: After a command is executed successfully, it can be executed repeatedly. Users can set the number of times the execution of a command is repeated.
- Send wait: Users can set an interval between commands. The default is 0 milliseconds, that is, the next command is sent after a reply is received.
- Timeout: If no reply is received after a specific period of time, there is communication timeout. The default is 50 milliseconds.

8.4 RTU Mode

 To set up the PLC in the RTU mode, users should set the function card 2 to AS-FCOPM and set up number of the AS remote module: double click AS series PLC->Device setting->function card 2 setting

Parameter name	Value		Unit	Default		Minimum	Maximum 🔺
Card 2 Detect mode	Manual •	•		Auto Detect	-		-
Manual Select Card	AS-FCOPM Ca	•		None	-		-
Card 2 ID No.	1			1	1		254
Protocol Setup Opportunity	Stop -> Run	•		Stop -> Run	-		-
Baud Rate	9600 •	•	bps	9600	-		-
- Data bit	7 •	•	bit	7	-		-
Parity bit	Even •	•		Even	-		-
Stop bit	1 •	•	bit	1	-		-
MODBUS mode	ASCII	•		ASCII	-		-
Delay time to Reply	0		ms	0	0		3000
Received Data Timeout	200		ms	200	0		3000
F2AD Analog Input mode	0~10V ·	•		0~10∨	-		- 🔻
F2DA Analog Output mode	0~10∨	•		0~10V	-		-
F2AD Sampling Time	3		ms	3	3		15
F2AD Average Times	10			10	1		15
AS-FCOPM Working mode	AS Remote Co	•		AS Remote Co	-		-
AS-FCOPM node ID	1			1	1		254
AS Remote module No.	1		unit	1	1		15
Select Run mode after detect remote mc	Run connectec	•		Run connected	-		-

• To set up the remote module in the RTU mode, users should set the function card 2 to AS-FCOPM (exclusive): double click the remote module ->AS Serial Remote Module->Device setting

Device Setting						
Options AS00SCM-A	AS Serial Remote Module Setting					
AS Serial Remote Modul	Parameter name	Value	Unit	Default	Minimum	Maximum
	Function Card Type	AS-FCOPM		AS-FCOPM	-	-
	Master Reconnected Handling	IO Module STOP 🔻		IO Module STOP	-	-
	- IO Module Error Handling	IO Module STOP 🔻		IO Module STOP	-	-
	IO Module timeout Handling	IO Module STOP 🔻		IO Module STOP	-	-
	Setting delay time to detect IO module	15	0.1sec	15	15	200
	×					Þ
Default Import	Export Update					OK

- 1) The procedure of a PLC connection lost:
 - I/O module stops: all I/O modules stop running
 - I/O module keeps running: all I/O modules keep the same state

- 2) The procedure of an error occurs in I/O module
 - I/O module stops: all I/O modules stop running
 - I/O module keeps running: all I/O modules keep the same state
- 3) The procedure of an I/O connection lost:
 - I/O module stops: all I/O modules stop running
 - I/O module keeps running: all I/O modules keep the same state

Procedure	Settings (RTU)	Settings (RTU) Digital & analog Digital output input modules modules		Analog output module (I/O module settings)			
		input modules	modules	Clear	Keep		
PLC	I/O module stops running	Cannot update data	No change on the	Output value = 0	No change on the output value		
lost	VO module keeps the same state	to the master station	output value	No change on the output value	No change on the output value		
An error occurs in	I/O module stops running			Output value = 0	No change on the output value		
(Ex. Module is broken)	broken) VO module keeps the same state Other functional modulos: keeps		Other functional modules:	No change on the output value	No change on the output value		
I/O connection lost	I/O module stops running	updating data to the master station	Output value = output value of the master station	Output value = 0	No change on the output value		
(Ex. Unstable connection)	VO module keeps the same state			No change on the output value	No change on the output value		

Module configuration: please refer to section 8.1.2 in the AS series operation manual.

8.5 Normal Exchange Area

1) COM mode

- COM1 Setting		Addross
	 Description Module Status Error Code Card 1 Data Exchange State (item 1~32) (0:none/fail, 1:success) Card 2 Data Exchange State (item 1~32) (0:none/fail, 1:success) Card 1 Data Exchange Mode Control (0:none, 1:once, 2:always) Card 2 Data Exchange Mode Control (0:none, 1:once, 2:always) Card 1 Data Exchange Trigger (item1~32) (0:no trigger, 1:trigger) Card 2 Data Exchange Trigger (itme1~32) (0:no trigger, 1:trigger) Card 1 UD Link Group ID Trigger Card 2 UD Link Group ID Trigger 	D28000 D28001 D28002 ~ D28005 D28006 ~ D28009 D28020 D28022 ~ D28025 D28026 ~ D28029 D28030 D28031
Default Import	Export Update	OK

evice	Setting								
Op	ntion C)ata Excha	inge -COM1 Data Exchang	e -COM2					
□ A □Da	Automatio ta Exchar	cally scan s nge Setup-	laves, when the first time			Мо	ode Progra	m Control 💌	
	Item	Enable	Remote Station Address	Local Address		Remote Address	Quantity	Add	
	1	0	1	D26000	~~	D0	1		
				D26100	>>	D0	1	MoveUn	
			1	D26000		D0		More op	
				D26100		D0		Move Down	
								Delete	
								Copy	
									OK
	- manea	on caran an		HIONC II		20000 1020100 02010	J		

From the above examples, users can see that the corresponding data registers of the module and PLC will be shown automatically in the Normal Exchange area.

- Module Status: 0 = stop, 1 = run
- Error Code: refer to section 8.7 for more information
- Card 1 & Card 2 Exchange State: it occupies 4 data registers (32-bit data); 1~32-bit represent the states of the items 1~32 to be exchanged: 0 = none/fail, 1 = success.
- Card 1 & Card 2 Exchange Mode Control: the data register can be set as 0: none, 1: once, 2: always.
- Card 1 & Card 2 Exchange Trigger: it occupies 4 data registers; 1~32-bit represent the states of the items 1~32 to be exchanged: 0 = no trigger, 1 = trigger.
- Card 1 & Card 2 UD Link Group ID Trigger: input the group ID to be triggered

2) RTU Mode:

Device Setting			
Options AS00SCM-A AS Serial Remote Module	Device Information Normal Exchange Area		
	Description	Address	
	Module Status	D29000	
	Module Error Code	D29001	
	IO Module Error Code	D29002 ~ D29009	
Default Import	Export Update	ОК	

- Module Status: 0 = stop, 1 = run
- Module Error Code: refer to section 8.7 for more information
- I/O Module Error Code: refer to I/O module manual for more information.

8.6 Application

8.6.1 Modbus

This section introduces the how AS00SCM is connected to other Delta industrial products such as a human-machine interface, a temperature controller, a programmable logic controllers, an AC motor drive, and a servo motor through Modbus.

The structure:

Example of a slave structure: HMI (master station) -> AS-F485 + AS00SCM COM1 (slave station)

Example of a master structure: AS-F485 + AS00SCM COM2 (master station) -> VFD, ASDA, and DVP series PLC

Product	Slave ID	Communication protocol	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
HMI	5	9600, RTU, 8, E, 1	16#0100	D26100	16#0000	D26000
VFD	10	38400, ASCII, 7, E, 1	16#2103	D26200	16#2000 16#2001	D26300~ D26301
ASDA	11	38400, ASCII, 7, E, 1	16#0101 16#020A	D200, D201	16#0101 16#020A	D250, D251
PLC	12	38400, ASCII, 7, E, 1	D100~D109	D300~D309	D200~D204	D350~D354

8.6.1.1 Modbus Slave-Connection with Delta Products

The slave station supports the following function code and the corresponding addresses:

Function code	Attribute	Addresses supported
		16#0000~16#0063
0x03	Deed	16#0100~16#0163
0x04	Reau	16#0200~16#0263
		16#0300~16#0363
0x06	\A/rito	16#0000~16#0063
0x10	vvnie	16#0200~16#0263
		16#0000~16#0063
	Deed	16#0100~16#0163
0.47	Reau	16#0200~16#0263
0x17		16#0300~16#0363
	10/11:40	16#0000~16#0063
	vvrite	16#0200~16#0263

If AS00SCM functions as a Modbus slave, users only need to set a slave ID and a transmission speed.

1) Drag AS00SCM to the system configuration area.



2) Click I/O Scan and the system will scan module current configurations. The PLC will assign input and output device range.

File Edit Of	ption <u>H</u> elp				
E X D C	339	D 🕱 🐔 🛷			
Product List					
AS300 Digital I/O Modt Analog I/O Mod Network Modul AS00S CM-4 Power Module	ile ule s	+		+	
Specification Serial communicat MODBUS, UD Lin (COM. mode), Ren (RTU mode)	ion module, k protocol note IO control				
CPU Group					
Extension No	Туре	Module Name	DDF Version	Input Device Range	Output Device Ra
Power Module					
				- A -	
CPU Module	CPU Module	AS332P	01.00.00	×0.0 ~×0.15	Y0.0 ~ Y0.15
E CPU Module Function Card	CPU Module	AS332P	01.00.00	X0.0~X0.15	Y0.0 ~ Y0.15
 CPU Module Function Card Function Card 	CPU Module	AS332P	01.00.00	×0.0 ~×0.15	Y0.0 ~ Y0.15
 CPU Module Function Card Function Card Module Informatic 	CPU Module Network Module	AS332P AS00SCM-A	01.00.00	X0.0 ~ X0.15 D28000 ~ D28019	Y0.0 ~ Y0.15 D28020 ~ D28039
 CPU Module Function Card Function Card Module Informatic Function Card 	CPU Module Network Module Function Card	AS332P AS00SCM-A AS-F485	01.00.00 00.33.00 None	×0.0 ~ ×0.15 D28000 ~ D28019 D26000 ~ D26099	Y0.0 ~ Y0.15 D28020 ~ D28039 D26100 ~ D26199

Function card	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
Function card 1	16#0000	D26000	16#0100	D26100
Function card 2	16#0200	D26200	16#0300	D26300

3) Double-click the SCM module to open the device setting for configurations.

Eile Edit Option Help			_[B]
Product List	and the second s		
A 5300 Digital I/O Module Analog I/O Module Network Module A5005 CM-A Power Module		11	
evice Setting			
Options Data Exchange -COM	ND - A product a Data	11	
COM1 Setting COM2 Setting COM2 Setting	Device Informatio	Normal Exchange Area	_
	Device Name	ASUSCIMA	
	Description	Serial communication module, MODBUS, UD Link protocol (COM. mode), Remote IO control(RTU mode) Current consumption:22mA	
	Comment		ě
	DDF Version	00,33.00	0
	Firmware Version	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
	Hardware version	[mmmm	-
Default Import	Export	ladete	
			OK

COM1 Setting	COMITISetting		<u> </u>			
COM2 Setting	Parameter name	Value	Unit	Default	It Minimum Maximum - - - - - - 0 247 - - 0 10000 0 10 0 60000	
	Function Card Type	AS-F485	-	None	-	um Meximur - - 247 - 10000 10 60000
	Protocol	MODBUS RTU	-	None		
	- Data Exchange Enable				-	-
	- ID	1		1	0	247
	Baud Rate	9600	▼ pps	9600	-	-
	Format	7E1	-	7E1	-	-
	Delay time to Reply	0	ms	0	0	10000
	Retry times	0		0	0	10
	Received Data Timeout	3000	ms	3000	0	60000
	4					

4) Set up the protocol for COM1 to be the same as the format of HMI in the Options page.

Product	Slave ID	Communication protocol	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
HMI	5	9600, RTU, 8, E, 1	0x0100	D26100	0x0000	D26000

5) Download the parameters to AS00SCM.

借 Untitled0	HWCON	FIG				
	0 9	89	9	R,	10	\$
Eile Edi	<u>Option</u>	Help	-			

NOTE: Users can double-clink the module to open the device setting page to configure the parameters.

8.6.1.2 Modbus Master-Connection with Delta Products

This section introduces the how AS00SCM is connected to other Delta industrial products such as a programmable logic controllers, an AC motor drive, and a servo motor via COM2.

Product	Slave ID	Communication protocol	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
VFD	10	38400, ASCII, 7, E, 1	16#2103	D26200	16#2000 16#2001	D26300~ D26301
ASDA	11	38400, ASCII, 7, E, 1	16#0101	D26210	16#0101	D26310
PLC	12	38400, ASCII, 7, E, 1	D100~D109	D26220~ D26229	D200~D204	D26320~ D26324

If AS00SCM functions as a Modbus master, users only need to set a master ID and a transmission speed.

- File Edit Option Help
- 1) Drag AS00SCM to the system configuration area.

🖻 Power Module

Specification

2) Double-click the COM2 Setting and select the card as AS-F485.

B AS00SCM-A	COM2 Setting								
COM2 Setting	Parameter name	Value	Unit Default	Minimum Maximu	Maximum				
	Function Card Type	None ▼ None AS-F232 AS-F422 AS-F425	Noria -						

3) Click I/O Scan and the system will scan module current configurations. The PLC will assign input and output device range.



None

D26200 ~ D26299

D26300 ~ D26399

4) Double-click the SCM module to open the device setting for configurations.

AS-F485

Function Card Function Card

Product List	K					
A 5300 Digital I/O Module Analog I/O Module Network Module ASOUSCM-A Power Module	+					
Device Setting	-					
Options Data Exchange -COM1	Data Exchange -COM	12				
AS00SCM-A COM1 Setting COM2 Setting	Device Informatio Device Name Description Comment DDF Version Firmware Version Hardware Version	n Normal Exchange Area AS00SCM-A Serial communication module, MODBUS, UD Link protocol (COM. mode), Remote IO control(RTU mode) Current consumption:22mA 00.33.00				
Default Import	Export	Update	OK			
COM1 Setting		1				
----------------	-----------------------	------------	--------	---------	---------	---------
COM2 Setting	Parameter name	Value	Unit	Default	Minimum	Maximum
	Function Card Type	AS-F485	*	None		-
	Protocol	MODBUS ASC	-	None	-	-
	Data Exchange Enable				2	-
	ID	1	1.	1	0	247
	Baud Rate	38400	🕶 laps	\$600		÷ 1
	Format	7E1	-	7E1	10	-
	Delay time to Reply	0	ms	0	0	10000
	Retry times	0		0	0	10
	Received Data Timeout	8000	ms	3000	0	60000
Defeat loosest	- Emer - Laborard					

5) Set up the protocol for COM2:

6) Set up the data exchange table: select Data Exchange – COM2 and click Add to create a new data exchange table.

a Exchan	ige Setup				144	oue [ruway	s Endoic	1
Item	Enable	Remote Station Address	Local Address		Remote Address	Quantity	Add	
		1	D26200		D0			
			D26300	~~	D0	1	Move Up	
							Move Down	
							(HOTE DOTA)	
							Delete	
							Copy	

7) Settings in the data exchange: double-click the item to open the editing page.

- Enable The Shortest Update Cycle (ms) 10 for Apply to all	Slave Address I
Connection Timeout (ms) 50 Jor Apply to all - Support Read/write synchronization (Function Code: 0x17)	Remote Device Type AS300 series
Local Start Address D26200 ~ D26299 D Register	Remote Start Address D0 ~ D29999 Quantity (word) D Register 0 1
Local Start Address D26300 ~ D26399	Remote Start Address D0 ~ D29999 Quantity (word)

• Select Standard Modbus Device in the Remote Device Type and input the parameters and then select Enable.

Product	Slave ID	Communication protocol	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
VFD	10	38400, ASCII, 7, E, 1	16#2103	D26200	16#2000 16#2001	D26300~ D26301

The Shortest Update Cycle (ms) 10 F Apply to all		Slave Address 10
Connection Timeout (ms) 50 7 Apply to all Support Read/write synchronization (Function Code: 0x17)		Remote Device Type Standard Modbus Device
Local Start Address D26200 ~ D26299 D Register	+	Remote Start Address (Hex) 0 ~ FFFF Quantity (word) MODBUS Register Hex 2103 0 1

 Select Standard Modbus Device in the Remote Device Type and input the ASDA parameters and then select Enable.

Product	Slave ID	Communication protocol	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
ASDA	11	38400, ASCII, 7, E, 1	16#0101	D26210	16#0101	D26310

12		
✓ Enable The Shortest Update Cycle (ms) 10 IV: Apply to all		Slave Address 11
Connection Timeout (ms) 50 Image: Apply to all Support Read/write synchronization (Function Code: 0x17)		Remote Device Type Standard Modbus Device
Local Start Address D26200 ~ D26299 D Register	•	Remote Start Address (Hex) 0 ~ FFFF Quantity (word) MODBUS Register Hex Image: Constraint of the start
Local Start Address D26300 ~ D26399 D Register		Remote Start Address (Hex) 0 ~ FFFF Quantity (word) MODBUS Register Hex 101 1

• Select PLC devices in the Remote Device Type and input the PLC parameters and then select Enable.

Product	Slave ID	Communication protocol	Device from which data is read	Register in the CPU module	Device into which data is written	Register in the CPU module
PLC	12	38400, ASCII, 7, E, 1	D100~D109	D26220~ D26229	D200~D204	D26320~ D26324

Item3	
🔽 Enable	Slave Address 12
The Shortest Update Cycle (ms) 10 🔽 Apply to all	,
Connection Timeout (ms) 50 🕅 Apply to all	
□ Support Read/write synchronization (Function Code: 0x17)	Remote Device Type DVP EH3/SV2/SE
Local Start Address D26200 ~ D26299	Remote Start Address D0 ~ D11999 Quantity (word)
D Register 26220 . 0	D 100 . 0 10
Local Start Address D26300 ~ D26399	Remote Start Address D0 ~ D11999 Quantity (word)
D Register 20320 0	
	OK Cancel

8) Select the Mode to "Always Enable"

vice S	ce Setting									
Options Data Exchange -COM ^{1/*} Data Exchange -COM2										
Au	Auto Scan Mode Always Enable 💌									
Data	a Exchar	nge Setup								
	Item	Enable	Remote Station Address	Local Address		Remote Address	Quantity	Add		
	1	O	10	D26200	~<	2103	1			
				D26300	>>	2000	2	Move Up		
	2	O	11	D26210	~<	101	1			
				D26310	>>	101	1	Move Down		
		<u>.</u>		D26220		D100				
				D26320	\rightarrow	D200	5	Delete		
								Dente		
								Copy		
_										
									ОК	
									2.11	

NOTE: If the Data Exchange Mode Control is set by the program, users can check and control the register address in the Normal Exchange Area page.

- ASUUSCM-A COM1 Setting	Device Informatior Normal Exchange Area	
COM2 Setting	Description Address	
	Module Status D28000	
	Error Code D28001	
	Card 1 Data Exchange State (item 1~32) (0:none/fail, 1:success) D28002 ~ D28005	
	Card 2 Data Exchange State (item 1~32) (0:none/fail, 1:success) D28006 ~ D28009	
	Card 1 Data Exchange Mode Control (0:none, 1:once, 2:always) D28020	
	Card 2 Data Exchange Mode Control (0:none, 1:once, 2:always) D28021	
	Card 1 Data Exchange Trigger (item1~32) (0:no trigger, 1:trigger) D28022 ~ D28025	
	Card 2 Data Exchange Trigger (itme1~32) (0:no trigger, 1:trigger) D28026 ~ D28029	
	Card 1 UD Link Group ID Trigger D28030	
	Card 2 UD Link Group ID Trigger D28031	

9) Download the parameters to AS00SCM.

H Untitled	0 - HWCON	FIG				
. X.	ð 🖬 🥑	85	9	1	16	\$
🚰 File E	dit Option	Help				

If the Mode is set to Always Enable, after downloading the parameters, the data exchange will be started right away.

If the Mode is set to Program Control, after downloading the parameters, the data exchange will be started by the program.



8.6.2 UD Link

This section introduces how AS00SCM is connected to other industrial products through a non-Modbus RS485 communication port on AS00SCM.



RS485

Communication of a Slave

Packet to send (→)	Packet to receive (←)	Description
POS, xxx, yyy	POS, ACT	Xxx and yyy are coordinates (0~999)

1) Drag AS00SCM to the system configuration area.



2) Double-click the SCM module to open the device setting for configurations.

Eile Edit Option. Help			_ B N
8 X 0 0 9 8 9 9 5	2 7 8		
Product List	-		
A5300 Digital I/O Module Digital I/O Module Network Module A5005 CM-A Power Module	- [1]	IT.	
levice Setting			
Options Data Exchange -COM1	Data Enchangé -COM	11	
AS00SCM-A COMI Setting COM2 Setting	Device Informatio Device Name Description Comment DDF Version Firmware Version Hardware Version	n Normal Exchange Area AS00SCM-A Serial communication module, MODBUS, UD Link protocol (COM. mode), Remote IO control(RTU mode) Current consumption.22mA D0.33.00	
Default Import	Export	Ipidet:	ОК

3) Select AS-F485 in the function card type for COM1. And its corresponding parameters will appear.

				and the second se	
Options D: Concernent Concernent	Normal Color				
E AS00SCM-A COM	11 Setting				
COM1 Setting	Parameter name	Value	Unit	Default Minim	um Maximum
Fun	don Card Type	None None AS-F232 AS-F422 ZS-F492	***	002	
Default Import Ex	port		<u> </u>		
Detault Import Ex	port	Unit	Default	Minimum	OK
Default Import Ex Parameter name Function Card Type	port Value AS-F485	Unit	Default	Minimum	OK Maximur
Detault Import Ex Parameter name Function Card Type Protocol	Value AS-F485 MODBUS ASC	Unit	Default None None	Minimum -	OK Maximut -
Default Import Ex Parameter name Function Card Type Protocol Data Exchange Enable	Value AS-F485 MODBUS ASC	Unit	Default None None	Minimum -	OK Maximur - -
Default Import Ex Parameter name Function Card Type Protocol Data Exchange Enable D	value AS-F485 MODBUS ASC	Unit ▼	Default None None	Minimum - - - 0	 Maximur - - 247
Default Import Ex Parameter name Function Card Type Protocol Data Exchange Enable D Baud Rate	port Value AS-F485 MODBUS ASC 1 9600	Vnit ▼ ▼ ▼ bps	Default None None 1 9600	Minimum - - 0	 Махітин - - 247 -
Default Import Ex Parameter name Function Card Type Protocol Data Exchange Enable D Baud Rate Format	port Value AS-F485 MODBUS ASC 1 9600 7E1	Unit ▼ ▼ ▼ ■	Default None None 1 9600 7E1	- Minimum 	OK Maximur - - 247 -
Detault Import Ex Parameter name Function Card Type Protocol Data Exchange Enable D Baud Rate Format Delay time to Reply	port Value AS-F485 MODBUS ASC 1 9600 7E1 0	Unit Unit	Default None None 1 9600 7E1 0	- Minimum 	ок Махітин - - 247 - 10000
Detault Import Ex Parameter name Function Card Type Protocol Data Exchange Enable D Baud Rate Format Delay time to Reply Retry times	Port Value AS-F485 MODBUS ASC 1 9600 7E1 0 0	Unit Unit	Default None None 1 9600 7E1 0 0	- Minimum 	ок Махітин - - 247 - 10000 10

4) Select UD LINK in the protocol. Set up the baud rate and format. Click OK.

	Parameter name	Value		Unit		Default		Minimum		Maximum
1	Function Card Type	AS-F485	▼		No	ine	-		-	
	Protocol	UD LINK	•		No	ine				
	Baud Rate	9600	•	bps	96	00	-		-	
	Format	7E1	•		7E	1	-		-	

5) Right-click AS00SCM module and then see and select the option Communication Software->SCMSoft.

+	+		
	Open(O)	Enter	1
	Replace(<u>R</u>)	Ctrl+R	
	X Cut(I)	Ctrl+X	
	Copy(C)	Ctrl+C	
	Paste(P)	Ctrl+V	
	Delete(D)	Del	

SCMSoft - [Untitled0]				
Eile Edit View Tools Windo	w <u>H</u> elp			X
) 🗋 😂 📰 🗣 🧊 🛐 🔹	*** 0			
	× Slot	COM PORT Setting	Group List	
Project	2 1	SCM Device1	Not Set	
Pead			COM12 [USP-COM12]	ASC DU200 Ser
Ready			COM12 ,[USB: COM12]	ASCPU300 Ser

8_

6) Click Group List to create a group list.



Give the group list a name (this example uses Slave_Simulation) and select 1 (COM 1) as the slot number.

Group List Name	Slave_Simulation	
Slot		
	1	
	OK	Cancel

Great a group and name it as Master Send.

_		1 ×	1
🖃 🤷 Unti	tled0		г
- 3 C	OM PORT S	etting	н
E-GUU	D Link		
6-F	Group List	t	
	Q Slave	- • • • • • • • • • • • • • • • • • • •	1
E Cac	OM PORT	Create Gro	oup
	COM1	70-1	T
	CCM2-D-	_	
~			н
			н
1			
Project			

	*	Group ID	Group Name
⊡	<mark>-</mark>	1	Master Send
COM PORT Setting			
UD Link			
📄 🕂 🧮 Group List			
E Slave_Simulation			
TX Packet			
RX Packet			
	1		

7) Edit the TX Packet and name it as TX POS Send. Double-click TX POS Send to open the Packet Edit window.



Edit the TX packet, "POS, xxx, yyy" (the example below uses POS, 123, 123)

Click Constant and input POS	

Packet Name acket View	TX POS Send		
4			Ŧ
acket Segment Edit			
No. Class	Format	Segment View	Up
			Down
			Down
	-		Down
Message		Address	Delet
Message Constant	Variable	Address Constant	Delet
Message Constant	Variable	Address Constant	Delet
Message Constant Length	Variable	Address Constant	Down Delet

AS Series Module Manual

Format	ASCII 🔹	
Value	POS,	
	*	

Click OK and then the packet contents can be seen in the packet view.

Packet Name	TX POS Send	
acket View		

[xxx] is variables. Click Variables to edit. The value is obtained from the value in data register (D26100~D26199) via ISPSoft. The example here uses D26100: 16#3132 and D26101: 16#3300 and the value obtained is 123.

Packet Nan	ne	TX POS Send		
Packet View	-			
3				,
acket Segm	ent Edit			
No.	Class	Format	Segment View	Up
				Down
Message			Address	Delet
Message	nstant	Variable	Address Constant	Delet
Message Con Length	nstant	Variable Checksum	Address Constant	Delet
Message Con Length	Add	Variable Checksum Add	Address Constant	Delet Variable

Format	Nu	11 🔫		
Variable Value	(R(D Register [26100]),	3)	
	(Variable •	Length	2
Reverse				
Variable Propert	y			
Function		Read R()	•	
Mapping Regi	ster	D Register	▼ 26100	
Length Property	,			
Function		Constant	•	
Mapping Regi	ster	D Register	- 0	
Constant		3		

Input the data registers that contain the values you'd like to obtain. The example here uses D26100 and the obtained value length is 3 byte.

Click OK to see the values ("POS,"+ (R (D Register [26100], 3)) in the Packet View.

Pa	acket View	
	"POS," + (R(D Register [26100]), 3)	
	<	Þ

 $[\ \cdot\]$: use constant to edit and the format is ASCII.

Format	ASCII 👻	
Value	,	
	4	+

Click OK to see the values ("POS,"+ (R (D Register [26100], 3)) in the Packet View.

P	acket View	
	"POS," + (R(D Register [26100]), 3) + ","	
	4	

[yyy] is variables. Click Variables to edit. The value is obtained from the value in data register (D26100~D26199) via ISPSoft. The example here uses D26102: 16#3132 and D26103: 16#3300 and the value obtained is 123.

Format	Nul	1 🔻		
Variable Value	(R.(D Register [26102]),	3)	
	¢	Variable •	Lengt	h
Reverse				
Variable Propert	y			
Function		Read R()	-	
Mapping Regi	ster	D Register	▼ 2610	2
Length Property	,			
Function		Constant	•	
Mapping Regi	ster	D Register	- 0	
Constant		3		

Input the data registers that contain the values you'd like to obtain. The example here uses D26102 and the obtained value length is 3 byte.

Format	Nul	1 🔻			
Variable Value	(R.(D Register [26102]), 3)		
	C	Variable •		Length	
Reverse					
Variable Property	y				
Function		Read R()	•		
Mapping Regi	ster	D Register	+	26102	
Length Property	-				
Function		Constant	•		
Mapping Regi	ster	D Register	-	0	
Constant		3			-

Click OK to see the values ("POS,"+ (R (D Register [26102], 3)) in the Packet View.

r	acket view	
	"POS," + (R(D Register [26100]), 3) + "," + (R(D Register [26102]), 3)	
	<	Þ

8) Edit the packet: create a packet and name it as "RX Result". Double-click it to open the editing window.

	*	Packet No.	RX Packet Name
⊡	\bigcirc	1	RX Result
COM PORT Setting			
D Link			
Group List			
Burger Slave_Simulation			
RX Packet			

Write the sending packet into D26000 of the AS300 CPU. "*" means the length is not specified.

Format	Null				
Variable Value	(W(D	Register [20	5000]), *)		
(Variable		Length)
Reverse					
Variable Property					
Function		Write W() 🔹		
Mapping Registe	r	D Registe	er 🔹	26000	
Length Property					
Function		*	+		
Mapping Registe	r	Base + Ot	ffset =	Ó	
Constant		1			

The packet view will be as below.



9) Create a command: right-click the Master Send to see and select the option Create Command. And a new command will be shown on the list.



• Double-click the new command on the list to open the Command Edit window.

		D \$	1	Send
Setting				
				\cup
ist Cinculation				
aster Send				
TX Packet				
🕽 RX Packet		L		
		-		
6	-			
1				
Send		•		
		•		
		+		
End	•			
Abort	•			
0	(0 - 255)			
0	(0 - 255)			
0	(0 - 65535 n	ns)		
50	(0 - 65535 n	ns)		
20	(0-0000 m	ns)		
	Setting ist Simulation iaster Send TX Packet RX Packet RX Packet End End Abort 0 0 0 50 OK	Setting ist =_Simulation iaster Send TX Packet RX Packet I End — 0 (0 - 255) 0 (0 - 255) 0 (0 - 65535 m 50 (0 - 65535 m	Setting ist =_Simulation laster Send TX Packet RX Packet RX Packet End (0 - 255) 0 (0 - 255) 0 (0 - 65535 ms) 50 (0 - 65535 ms) 50 (0 - 65535 ms)	Setting ist =_Simulation ister Send TX Packet RX Packet RX Packet = End (0 - 255) 0 (0 - 255) 0 (0 - 65535 ms) 50 (0 - 65535 ms) 50 (0 - 65535 ms)

 Set up to send the packet of TX POS SEND and put the received contents in the devices assigned by RX Result.

Command No.	1	
Command Type	Send & Rec	ceive
Send Packet	TX POS Ser	nd
Recv Packet	RX Result	
Success	End	+
Fail	Abort	+
Retry	0	(0 - 255)
Repeat	0	(0 - 255)
Send Wait	0	(0 - 65535 ms)
Timeout	50	(0 - 65535 ms)

• Make sure the Group is in slot 1 (COM1).

SCMSoft - [Untitled0]					
II <u>File Edit View T</u> ools <u>W</u> indow <u>H</u> elp					_181 ×
🗋 🚅 🔜 🕼 👰 🖳 🛊 4 7 ±	5/1				
크포	*	Slot	COM PORT Setting	Group List	
COM PORT Setting COM PORT Setting COM PORT Setting Group List Composition Comp		1	SUM Device1	Slave_Simulation	
Project					
			C	OM12 [USB: COM12]	ASCPU300 Ser

10) Download the parameters to AS00SCM.

🐣 Untitled	0 - HWCON	IFIG				
	🖻 🗖 🥑	18 5	9	R	16	\$
Eile E	dit Option	Help				



11) Set up the devices for UD Link Group ID Trigger in HWCONFIG. Once the AS00SCM module is created, the system will assign the corresponding addresses automatically.



Double-click AS00SCM to open the device setting page. Users can see the Card 1 UD Linkd Group ID Trigger is in D28030. Write 1 into D28030 via ISPSoft to trigger and start data exchange.

ASUUSCM-A 	Device Information Normal Exchange Area		
COM2 Setting	Description	Addres	ss
	Module Status	D28000	
	Error Code	D28001	
	Card 1 Data Exchange State (item 1~32) (0:none/fail, 1:success)	D28002 ~ D28005	
	Card 2 Data Exchange State (item 1~32) (0:none/fail, 1:success) D28006 ~ D28009		
	Card 1 Data Exchange Mode Control (0:none, 1:once, 2:always) D28020		
	Card 2 Data Exchange Mode Control (0:none, 1:once, 2:always)	D28021	
	Card 1 Data Exchange Trigger (item1~32) (0:no trigger, 1:trigger)	D28022 ~ D28025	
	Card 2 Data Exchange Trigger (itme1 ^{~32}) (0:no trigger, 1:trigger)	D28026 ~ D28029	
	Card TOD Link Group ID Trigger	D26030	
	Card 2 OD Link Group ID Trigger	D26031	

Users can use the monitor function in ISPSoft to see if the transmission works correctly.

D26100			12	123*	0.000	ASCII 🔻
D26101	C	-	3*	3*12	0.000	ASCII 👻
D26102	Sen	a	12	123*	0.000	ASCII 👻
D26103			3*	3***	0.000	ASCII 👻
D26000			PO	POS,	740081729536.000	ASCII 👻
D26001	Pocoi	VO	S,	S,AC	12.207	ASCII 👻
D26002	Recei	ve	AC	ACT*	2203402895360.000	ASCII 👻
D26003			T*	T***	0.000	ASCII 🔻

8_

8.7 Error Code

The error flags and the UD Link statuses are stored in data registers. Users can modify the input device range by themselves.





8.7.1 Troubleshooting for Module AS00SCM as a Communication Module

8.7.1.1 ERROR LED Indicator's Being ON

The following error codes are for users to identify possible errors occurred when the AS00SCM module is installed on the right side of the CPU module and acts as a communication module.

Error Code	Description	Solution
16#1605	Hardware failure	 Check if the module is securely installed. Change and install a new AS00SCM or contact the factory.
40#4000		 Check if the function card is securely installed. Change and install a new function card or contact the factory.
16#1606 The setting of the function card is in	The setting of the function card is incorrect.	 Check if the setting in HWCONFIG is consistent with the actual setting in the function card. Change and install a new AS00SCM or contact the factory.

8.7.1.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following error codes are for users to identify possible errors occurred when the AS00SCM module is installed on the right side of the CPU module and acts as a communication module.

Error Code	Description	Solution
16#1802	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#1803 Communic		1. Check whether the communication cable is connected well.
	Communication timeout	2. Check if the station number and the communication format are correctly set.
		3. Check if the connection with the function card is working fine.
16#180/	The setting of the LID Link is incorrect	1. Check the settings of the UD Link.
10#1804	LINK IS INCORPECT.	2. Check the settings to trigger warnings in the PLC.

The following error codes can only be viewed via SCMSoft; when the following errors occurred, they will not be shown on the LED indicators and the system will not send the error messages to the CPU module.

Error Code	Description	Solution
16#0107	The settings in HWCONFIG and actual manual settings are not consistent for the function card 1.	Check the settings in HWCONFIG and actual manual settings for the function card 1.
16#0108	The settings in HWCONFIG and actual manual settings are not consistent for the function card 2.	Check the settings in HWCONFIG and actual manual settings for the function card 2.
16#0201	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.

Error Code	Description	Solution
16#0201	Function card 1 communication timeout	1. Check if the station number and the communication format are correctly set.
16#0301		2. Check if the connection with the function card is working fine.
16#0302	Function card 2 communication timeout	1. Check if the station number and the communication format are correctly set.
		2. Check if the connection with the function card is working fine.
16#0400	Invalid UD Link Group ID for the function	1. Check the settings of the UD Link.
	card 1	2. Check the settings to trigger warnings in the PLC.
16#0401	Invalid UD Link Group ID for the function	1. Check the settings of the UD Link.
10#0401	card 2	2. Check the settings to trigger warnings in the PLC.
16#0402	Invalid UD Link Command for the function	1. Check the settings of the UD Link.
	card 1	2. Check the settings to trigger warnings in the PLC.
16#0402	Invalid UD Link Command for the function	1. Check the settings of the UD Link.
10#0403	card 1	2. Check the settings to trigger warnings in the PLC.

8.7.2 Troubleshooting for Module AS00SCM as a Remote Module

Errors from the remote modules are regarded as warnings for AS CPU modules. The LED indicator of the CPU module will blink and the CPU module can still operate. Users can use the flag SM30 to work with the programs in the PLC to manage the ways to present the errors from the remote modules.

8.7.2.1 Error LED Indicator's Being ON

Error codes for the error type

Error Code	Description	Solution
16#1301	Hardware failure	 Check if the module is securely installed. Change and install a new AS00SCM or contact the factory.
16#1302	The setting of the function card is incorrect.	 Check if the function card is securely installed with the AS-FCOPM card. Change and install a new function card or contact the factory. Check if the setting in HWCONFIG is consistent with the actual setting in the function card. Change and install a new AS00SCM or contact the factory.

8.7.2.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

Error codes for the warning type

Error Code	Description	Solution
16#1502	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.

Error Code	Description	Solution
16#1503	Extension module communication timeout	Make sure the module is well-connected to the CPU module and turn-on the modules again.

8.7.2.3 ERROR LED Indicator's Blinking Every 0.2 Seconds

This happens when the power supply of 24VDC for the remote module is not sufficient. Please check the power supply. If the power supply is normal, remove the extension module from the CPU module and then check if the SCM remote module is out of order. The error codes below are of the warning types.

Error Code	Description	Solution
16#1303	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.	Check whether the 24 V power supply to the module is normal.

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Chapter 9 Function Cards

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9.1 Introduction

Function cards are the extension cards such as analog input/output (AI/AO) and communication cards for AS series PLC.

9.2 Specification and Function

9.2.1 AS-F232

AS series PLC is built with COM1 (RS-485), and COM2 (RS-485). Users can use this extension card for communication via different interface such as RS-232, PC and so on. Other than the different communication interface, the communication functions including are the same as the built-in ones; the communication port can be set as a Slave or a Master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

Wiring example







DB9 male to DB9 female (standard cable)

9.2.2 AS-F422

Users can use this extension card for communication with Delta HMI series or other devices via RS-422

communication port. Other than the different communication interface, the communication functions including

are the same as the built-in ones; the communication port can be set as a Slave or a Master node. After

installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

■ Wiring example of the communication with Delta HMI DOPA series via COM2



9.2.3 AS-F485

With its own standalone communication port, it can work independently and can be set as a Slave or a Master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

■ Wiring example



9.2.4 AS-F2AD

2 analog signal input channels:

ltem		Voltage Input	Current input
Analog Signal		DC 0~+10V	DC 4~20mA
Resolution		12-bit	11-bit
Input impedance		2ΜΩ	250Ω
Conversion time		3ms /	/ СН
Characteristic curve		Didital Value Output 100 Voltage input	Digital Value Output Digital Value Output d 4 2000 20mA Current input
Digital value	Card1	SR168 (CH1)	SR169 (CH2)
output	Card2	SR170 (CH1)	SR171 (CH2)

Users can use the program to read the values in SR to obtain the corresponding A/D conversion value for the channel.

9.2.5 AS-F2DA

2 analog signal output channels:

ltem		Voltage output	Current output
Analog Signal		DC 0~+10V	DC 4~20mA
Resolution		12-bit	12-bit
Input impedance		≥1kΩ	≤500Ω
Conversion time		2ms /	/ CH
Characteristic curve		thomogeneous and the second se	20mA 20mA 4 4000 Digital Value Input
	Card1	SR172(CH1)	SR173 (CH2)
	Card2	SR174 (CH1)	SR175 (CH2)

Users can use the instruction MOV to move the value to the SR to obtain the corresponding voltage output value.

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9.2.6 AS-FCOPM

With its own standalone communication port, it can work independently and can be set as a Slave or a Master

node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

■ Wiring example



9.3 Profiles and Dimensions

9.3.1 AS-F232



9.3.2 AS-F422/AS-F485/AS-F2AD/AS-F2DA



9.3.3 AS-FCOPM



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9.4 Wiring 9.4.1 AS-F2AD



- *1. Please use shielded cables to isolate the analog input signal cable from other power cables.
- *2. If the module is connected to a current signal, the terminals Vn and In+ (n=1~2) must be short-circuited.
- *3. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μ F to 0.47 μ F with a working voltage of 25 V.
- 9
- *4. Please connect the shielded cable to the terminal FE.
- *5. The wording "CHX" indicates that the 5 wiring methods listed above can be used for every input channel.

9.4.2 AS-F2DA



- *1. Please use shielded cables to isolate the analog input signal cable from other power cables.
- *2. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μ F to 0.47 μ F with a working voltage of 25 V.
- *3. Please connect the shielded cable to the terminal FE.
- *4. The wording "CHX" indicates that the 2 wiring methods listed above can be used for every input channel.

9.5 HWCONFIG in ISPSoft

9.5.1 Initial Setting

(1) Start ISPSoft, and then double-click HWCONFIG.

Untitled0 - Delta ISPSoft	1 949 3444
<u>File Edit View Compile PLC Tools Wizard Window Help</u>	
E 😂 🗄 🎒 🔲 🗢 🤣 😋 🔄 🗣 🛼 🗜 😫 🍠 😅 💷 🖤 🖳 🤎 堂	「国本な会信を定
Project 🛛 🔍	
🖃 🗠 🚰 Project [D:\Software\ISP	
Device Comment & 1 Acceleration CARD Utility AS300 (Untitled0) Motion Module Tasks DUT Global Symbols Programs Function Blocks Device Monitor Tabl APIs	

(2) Selecting a function card on the module.

HWCONFIG						
Eile Edit Opt	tion <u>H</u> elp					- <u>8</u> ×
	00					
Product List						
AS300 Digital I/O Modu Analog I/O Modu Network Module Power Module	le Jle	if a	+			
Specification						1
CPU Group			v			
Extension No.	Type	Name	Input Device Ba	Output Device B	Comm	ent
Power Module		110000		Cuput Device I t		
E CPU Module	CPU Module	AS332T	×0.0 ~ ×0.15	Y0.0 ~ Y0.15		
Function Card1						
Function Card2						

(3) Double-click the function card to open the device setting page.

Card1 Detect mode: auto detect or select the function card model.

options = com i = com z = Ett	lemen								
AS332T System Information COM1 Port Setting COM2 Port Setting	Function Card 1 Setting								
	Parameter name	Value		Unit	Default	Min	Max	-	
	Card 1 Detect mode	Auto Detec			Auto Dete	ci -	-		
- Ethernet Port Basic Setting	Manual Select Card	None	•	-	None	-			
Ethernet Port Advance Set	Card 1 ID No.	1			1	1	254		
-Function Card 1 Setting	Protocol Setup Opportunity	Stop -> Ru			Stop -> R	ur -	-		
-Function Card 2 Setting	Baud Rate	9600	🔻 bp	DS .	9600	-	-		
	- Data bit	7	▼ bř	t	7	-	-		
	Parity bit	Even	•		Even	-	-		
	Stop bit	1	▼ bi	t	1	-	-		
	- MODBUS mode	ASCII	•		ASCII	÷	-		
	Delay time to Reply	0	m	S	0	0	3000		
	Received Data Timeout	200	m	s	200	0	3000		
	F2AD Analog Input mode	0~10V	•		0~10V	-	-		
	- F2DA Analog Output mode	0~10∨	•		0~10V	+	-		

(a) When the function card is AS-F232, AS-F422 or AS-F485. Users can set up the communication related settings in the area within the red box.

Options - COM 1 - COM 2 - Ett	nernet											
B AS332T	Function Card 1 Setting	Function Card 1 Setting										
-COM1 Port Setting	Parameter name	Value	Unit	Default	Min	Max						
COM2 Port Setting	Card 1 Detect mode	Auto Detect		Auto Deter	ct-	-						
- Ethernet Port Basic Setting	Manual Select Card	AS-F232 C0	-	None	-	-						
Ethernet Port Advance Set Function Card 1 Setting	Card 1 ID No.	1		1	1	254						
	Protocol Setup Opportunity	Stop -> Rur	-	Stop -> R	ur	~						
Function Card 2 Setting	Baud Rate	9600	bps	9600	-	-						
	Data bit	7	r bit	7	-	-						
	Parity bit	Even	-	Even	+	~						
	Stop bit	1	bit	Ť	-	-						
	MODBUS mode	ASCII		ASCII	-	-						
	Delay time to Reply	0	ms	0	0	3000						
	Received Data Timeout	200	ms	200	Ò	3000						
	F2AD Analog Input mode	0~10V	•	0~10V	-	-						
	F2DA Analog Output mode	0~10V ·		0~10V	-	~						

(b) Function card AS-FCOM can only be installed in function card slot 2.

E AS332T	Function Card 2 Setting									
COM1 Port Setting	Parameter name	Value	Unit	Default	t Min	Max	0			
-COM2 Port Setting	Card 2 Detect mode	Auto Detec	1-	Auto Dete	ect -	~				
- Ethernet Port Basic Setting	Manual Select Card	AS-FOOPN	-	None	-	-				
E Ethernet Port Advance Set	Card 2 ID No.	1	1	1	1	254				
- Function Card 1 Setting	Protocol Setup Opportunity	Stop -> Ru	i 👻	Stop -> F	- IUF	14				
Function Cardiz Setting	Baud Rate	9600	- bps	9600	-	-				
	Data bit	7	▼ bit	7	-	~				
	Parity bit	Even	-	Even	-	-				
	Stop bit	1	▼ bit	1	-	-				
	MODBUS mode	ASCII	-	ASCII	-	~				
	Delay time to Reply	0	ms	0	0	3000				
	Received Data Timeout	200	ms	200	.0	3000				
	F2AD Analog Input mode	0~10V	*	0~10V	-	-				
	F2DA Analog Output mode	0~10V	*	0~10V	-	-				

Set up the communication related settings in the area within the red box.

	and a second s									
E AS332T	Function Card 2 Setting									
B System Information COM1 Port Setting	Parameter name	Value	Unit	Default	Min	Max				
COM2 Port Setting Ethernet Port Basic Setting	F2AD Analog Input mode	0~10V ·		0~10V	~	~				
	F2DA Analog Output mode	0~10V		0~10V	-	-				
	F2AD Sampling Time	3	ms	8	3	15				
Function Card 1 Setting	F2AD Average Times	10		10	1	15				
Function Card 2 Setting	AS-FCOPM Working mode	AS Remote	-	AS Remote	9 -	· +				
	AS-FCOPM node ID	1		1	1	254				
	AS Remote module No.	1	unit	1	1	15				
	Select Run mode after detect ren	Run connec *	-	Run conne	C -	-				
	AS MPU keep or Stop when slave	Only Show I	-	Only Show E-		14				
	Remote Communication time out	100	ms	100	0	3000				
	Re-connected Retry number after	60		60	0.	255				
	Auto Retry connection after Disco	60	sec	60	0	255				
	AS-FCOPM Bit Rate	125k *	bps	125k	-	*				

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(c) When the function card is AS-F2AD or AS-F2DA. Users can set up the communication related settings in the area within the red box.

= AS332T	Function Card 1 Setting										
B System Information COM1 Port Setting COM2 Port Setting Ethernet Port Basic Settinc Ethernet Port Advance Set Function Card L Setting											
	Parameter name	Value	Unit	Default	Min	Max					
	Card 1 ID No.	1		1	Ť	254					
	Protocol Setup Opportunity	Stop -> Rur	-	Stop -> Ru	u -	-					
	Baud Rate	9600	• bps	9600	-	-					
	Data bit	7	• bit	7	-	-					
Function Card 2 Setting	Parity bit	Even	•	Even	~	-					
	Stop bit	1	• bit	1	(¥C	-					
	MODBUS mode	ASCII	-	ASCI	~	-					
	Delay time to Reply	0	ms	0	0	3000					
	Received Data Timeout	200	ms	200	0	3000					
	F2AD Analog Input mode	0~10∨	-	0~10V	-	-					
	F2DA Analog Output mode	0~10	-	0~10V	~	-					
	F2AD Sampling Time	3	ms	3	3	15					
	F2AD Average Times	10		10	Ť	15					

(d) Click OK to confirm the settings.

AS332T System Information COM1 Port Setting COM2 Port Setting Ethernet Port Basic Settinc Ethernet Port Advance Set Function Card 1 Setting Function Card 2 Setting	Function Card 1 Setting									
	Parameter name	Value	Unit	Default	Min	Max	-			
	Card 1 Detect mode	Auto Detect	-	Auto Deteo	:t-	-				
	Manual Select Card	AS-F232 CC		None	+1	-				
	Card 1 ID No	1		1	đ	254				
	Protocol Setup Opportunity	Stop -> Rui		Stop -> Ru	11 -	-				
	Baud Rate	9600	- bps	9600	~	-				
	Data bit	7	• bit	7	~	-				
	Parity bit	Even		Even	+1	-				
	Stop bit	1	• bit	1	~	-				
	MODBUS mode	ASCII		ASCII	*	-				
	Delay time to Reply	0	ms	0	0	3000				
	Received Data Timeout	200	ms	200	0	3000				
	F2AD Analog Input mode	0~10∨	•	0~10V	+1	-				
	F2DA Analog Output mode	0~10∨	•	0~10V	~	-				

(4) Click **Download** on the toolbar to download the parameters. (The parameters cannot be downloaded when the CPU module runs.)

Eile Edit Opt	ion Help				- 8
	12 9 5 -				
Product List ← AS300 ← Digital I/O Modul ← Analog I/O Modu ← Network Module ← Decore Medule	e le	doad (Ctrl+F8)	-		
Specification					
Specification CPU Group		*	~		
Specification CPU Group Extension No	Туре	Name	Input Device Ra.	Output Device R	Comment
Specification CPU Group Extension No Power Module	Туре	Name	Input Device Ra	Output Device R.,	Comment
CPU Group Extension No Power Module	Type	Name AS332T	Input Device Ra X0.0 ~ X0.15	Output Device R.,. Y0.0 ~ Y0.15	Comment
CPU Group Extension No Power Module CPU Module Function Card1	Type CPU Module Function Card	Name AS332T AS-F232	Input Device Ra X0.0 ~ X0.15	Output Device R.,. Y0.0 ~ Y0.15	Comment

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