

User Manual

## ***iR-ETN Analog Module Startup Guide***

This document explains how to start using Analog modules connected to iR-ETN coupler.

UM018015E\_20181213

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## 1. Overview

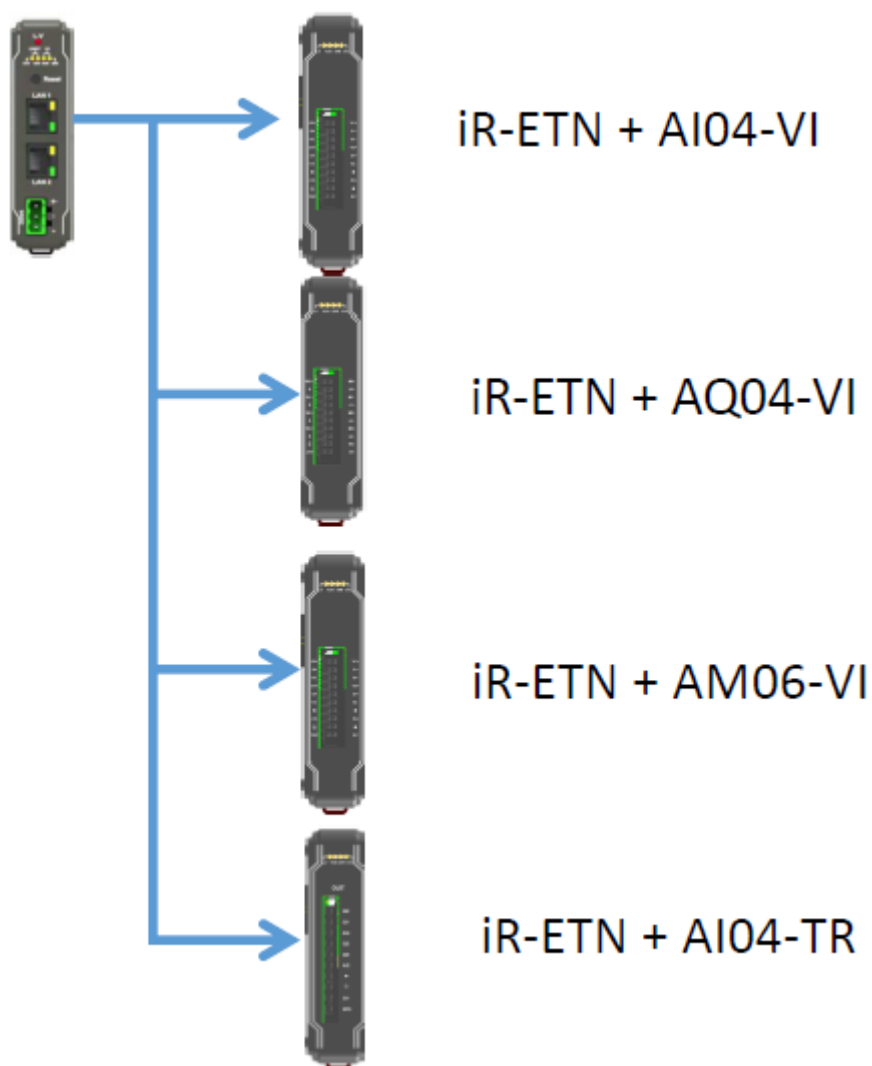
This manual aims to provide parameter configuration steps on iR Series Analog modules connected to an iR-ETN coupler, and explains how to read correct channel values using CODESYS.

## 2. Module Connection

For the following examples, the used start address of Modbus is 20000.

Analog modules after the first module will start from address  $20000 + \text{module number} * 500$ .

### *iR-ETN Coupler*



### Voltage/Current Module Registers

Address	Description	Default	Read/Write	
0	Analog Output	Channel 0 Output Mode	1	Read/Write
1		Channel 1 Output Mode	1	Read/Write
2		Channel 2 Output Mode	1	Read/Write
3		Channel 3 Output Mode	1	Read/Write
4		Channel 0 Scale Range Upper Limit	32000	Read/Write
5		Channel 1 Scale Range Upper Limit	32000	Read/Write
6		Channel 2 Scale Range Upper Limit	32000	Read/Write
7		Channel 3 Scale Range Upper Limit	32000	Read/Write
8		Channel 0 Scale Range Lower Limit	-32000	Read/Write
9		Channel 1 Scale Range Lower Limit	-32000	Read/Write
10		Channel 2 Scale Range Lower Limit	-32000	Read/Write
11		Channel 3 Scale Range Lower Limit	-32000	Read/Write
12		Channel 0 Update Time	0	Read/Write
13		Channel 1 Update Time	0	Read/Write
14		Channel 2 Update Time	0	Read/Write
15		Channel 3 Update Time	0	Read/Write
16	Error Code	0	Read	
17	Command	0	Read/Write	
18	Channel Detection	FFh	Read/Write	
19	Analog Input	Conversion Time	0	Read/Write
20		Channel 0 Input Mode	1	Read/Write
21		Channel 1 Input Mode	1	Read/Write
22		Channel 2 Input Mode	1	Read/Write
23		Channel 3 Input Mode	1	Read/Write
24		Channel 0 Scale Range Upper Limit	32000	Read/Write
25		Channel 1 Scale Range Upper Limit	32000	Read/Write
26		Channel 2 Scale Range Upper Limit	32000	Read/Write
27		Channel 3 Scale Range Upper Limit	32000	Read/Write
28		Channel 0 Scale Range Lower Limit	-32000	Read/Write
29		Channel 1 Scale Range Lower Limit	-32000	Read/Write
30		Channel 2 Scale Range Lower Limit	-32000	Read/Write
31		Channel 3 Scale Range Lower Limit	-32000	Read/Write
32		Channel 0 Filter Frame Size	5	Read/Write
33		Channel 1 Filter Frame Size	5	Read/Write

34		Channel 2 Filter Frame Size	5	Read/Write
35		Channel 3 Filter Frame Size	5	Read/Write
36		Channel 0 Maximum Value	0	Read
37		Channel 1 Maximum Value	0	Read
38		Channel 2 Maximum Value	0	Read
39		Channel 3 Maximum Value	0	Read
40		Channel 0 Minimum Value	0	Read
41		Channel 1 Minimum Value	0	Read
42		Channel 2 Minimum Value	0	Read
43		Channel 3 Minimum Value	0	Read

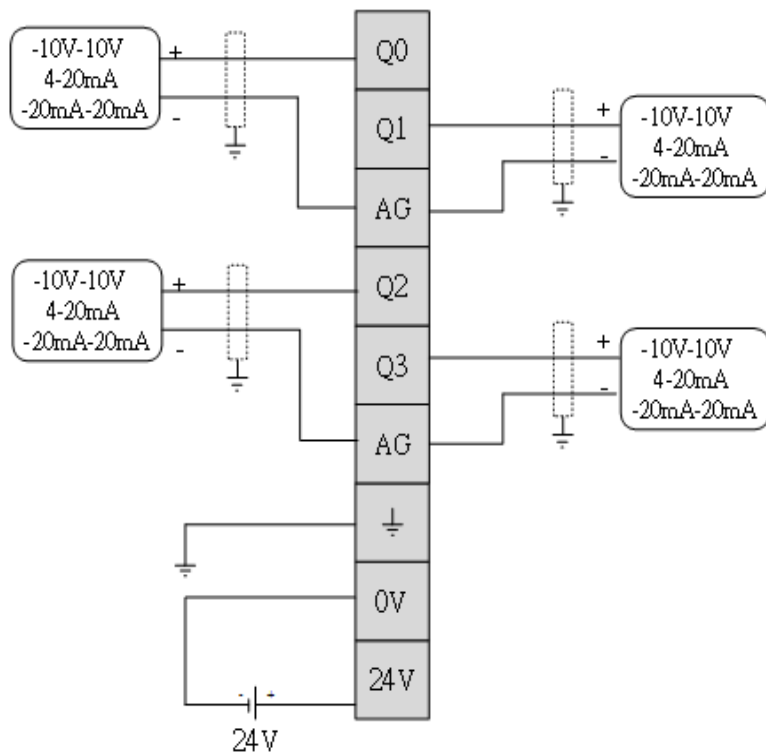
### Temperature Module Registers

No.	Description	Default	Read/Write
0	Channel 0 Mode	1	Read/Write
1	Channel 1 Mode	1	Read/Write
2	Channel 2 Mode	1	Read/Write
3	Channel 3 Mode	1	Read/Write
4	Channel 0 Scale Range Upper Limit	32000	Read/Write
5	Channel 1 Scale Range Upper Limit	32000	Read/Write
6	Channel 2 Scale Range Upper Limit	32000	Read/Write
7	Channel 3 Scale Range Upper Limit	32000	Read/Write
8	Channel 0 Scale Range Lower Limit	-32000	Read/Write
9	Channel 1 Scale Range Lower Limit	-32000	Read/Write
10	Channel 2 Scale Range Lower Limit	-32000	Read/Write
11	Channel 3 Scale Range Lower Limit	-32000	Read/Write
12	Channel 0 Filter Frame Size	5	Read/Write
13	Channel 1 Filter Frame Size	5	Read/Write
14	Channel 2 Filter Frame Size	5	Read/Write
15	Channel 3 Filter Frame Size	5	Read/Write
16	Error Code	0	Read Only
17	Command	0	Read/Write
18	Channel Detection	FFh	Read/Write
19	Celsius / Fahrenheit Setting	0	Read/Write
20	Channel 0 Temperature Offset	0	Read/Write
21	Channel 1 Temperature Offset	0	Read/Write
22	Channel 2 Temperature Offset	0	Read/Write

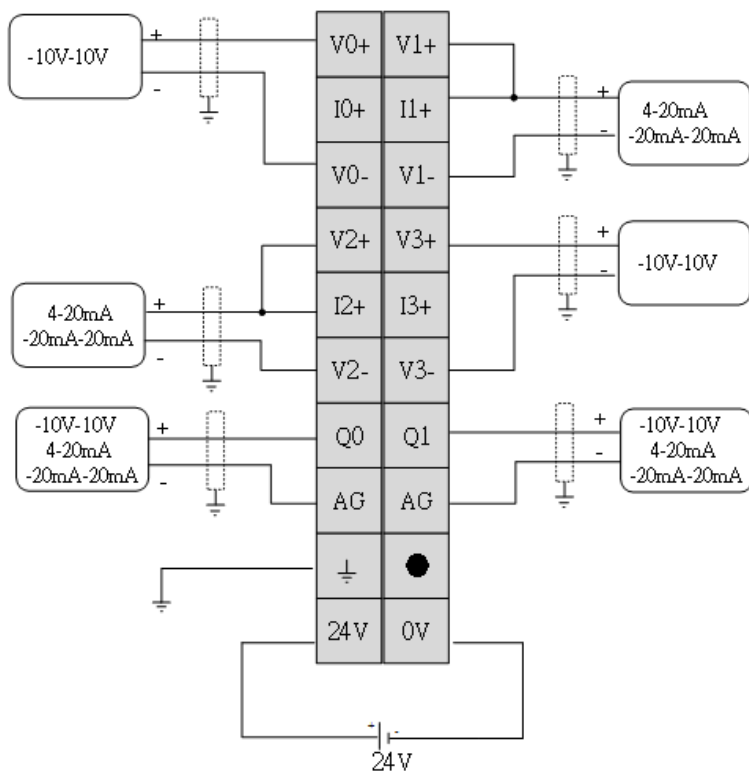
23	Channel 3 Temperature Offset	0	Read/Write
24	Channel 0 Maximum Value	0	Read Only
25	Channel 1 Maximum Value	0	Read Only
26	Channel 2 Maximum Value	0	Read Only
27	Channel 3 Maximum Value	0	Read Only
28	Channel 0 Minimum Value	0	Read Only
29	Channel 1 Minimum Value	0	Read Only
30	Channel 2 Minimum Value	0	Read Only
31	Channel 3 Minimum Value	0	Read Only

### 3. Wiring

#### Analog Output

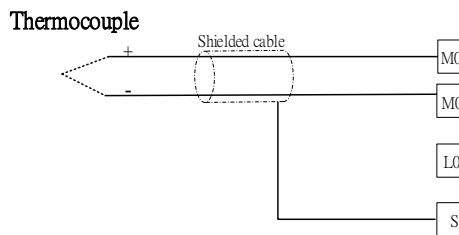
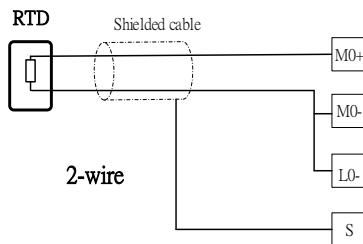
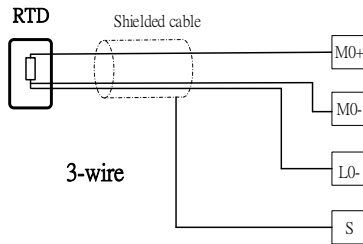
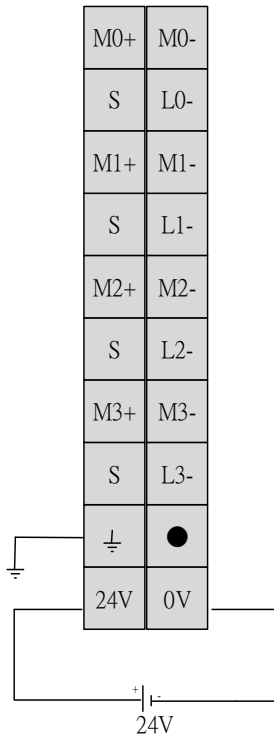


#### Analog Input



*Temperature Input*

**iR-AI04-TR**



\*Only one wire is connected to the positive end when using a 4-wired RTD.



### 4. Analog Channel Configuration

Please download to HMI the EasyBuilder Pro project and CODESYS project that suit the modules used before configuring channels.

#### iR-AI04-VI

#### Configuring Ethernet channels in CODESYS

General	Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length
Modbus Slave Channel	0 Analog channel	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#0000	4	Set to ZERO		
Modbus Slave Init	1 Read Module	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#4E33	25	Set to ZERO		
ModbusTCPSlave Parameters	2 Write Module	Write Multiple Registers (Function Code 16)	Rising edge				16#4E33	17
	3 Error code	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#4E30	3	Set to ZERO		
	4 Command	Write Multiple Registers (Function Code 16)	Rising edge				16#4E31	1

- Analog Channel: Read analog input value
- Read Module: Read all analog input parameters
- Write Module: Write analog input channel parameters
- Error code: Read error code
- Command: Give command to analog input module

#### Read Page:

Read page shows all channel parameters of iR-AI04-VI. To change the parameters, please go to Write page.

	Ch.0	Ch.1	Ch.2	Ch.3	AI04-VI-Read
Value	-1	1	0	0	
Mode	1	1	1	1	
Max scale	32000	32000	32000	32000	
Min scale	-32000	-32000	-32000	-32000	
Sampling	5	5	5	5	
Max peak	4	7	2	7	
Min peak	-8	-5	-9	-7	
Conversion	1				
Err code	0				
Detector	0				

**Write**

Write Page:

	Ch.0	Ch.1	Ch.2	Ch.3	AI04-VI-Write
<b>Value</b>	-2	2	1	0	
Mode	0	0	0	0	
Max scale	0	0	0	0	
Min scale	0	0	0	0	
Sampling	0	0	0	0	
Conversion	1				
Command	1				
Trigger	<input type="button" value="Command"/>	<input type="button" value="Write"/>			<input type="button" value="Read"/>

Write page shows all writable parameters. After changing the parameters, press Write button to write input channel parameters to iR-AI04-VI. Press Command button to restore factory default.

*iR-AQ04-VI*

Configuring Ethernet channels in CODESYS

General	Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length
Modbus Slave Channel	0 Read Channel	Read Holding Registers (Function Code 03)	Cyclic, t#100ms	16#0100	4	Set to ZERO		
	1 Write Channel	Write Multiple Registers (Function Code 16)	Rising edge				16#0100	4
Modbus Slave Init	2 Read Module	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#4E20	19	Set to ZERO		
	3 Write Module	Write Multiple Registers (Function Code 16)	Rising edge				16#4E20	16
ModbusTCP Slave Parameters	4 Write Command	Write Multiple Registers (Function Code 16)	Rising edge				16#4E31	1

Read Channel: Read analog output channel values

Write Channel: Write analog output channel values

Read Module: Read analog output module parameters

Write Module: Write analog output module parameters

Write Command: Give command to analog output module

Read Page:

Read page shows all channel parameters of iR-AQ04-VI. To change the parameters, please go to Write page.

	Ch.0	Ch.1	Ch.2	Ch.3	AQ04-VI-Read
Value	1	2	3	4	
Mode	1	1	1	1	
Max scale	32000	32000	32000	32000	
Min scale	-32000	-32000	-32000	-32000	
Up_time	0	0	0	0	
Err code	0				
Detector	0				

**Write**

Write Page:

	Ch.0	Ch.1	Ch.2	Ch.3	AQ04-VI-Write
Value	1	2	3	4	
Mode	0	0	0	0	
Max scale	0	0	0	0	
Min scale	0	0	0	0	
Up_time	0	0	0	0	
Command	1				
Trigger	Command	Write	Value	Read	

Write page shows all writable parameters. After changing the parameters, press Write button to write output channel parameters to iR-AQ04-VI. Press Value button to write output channel value to iR-AQ04-VI. Press Command button to restore factory default.

*iR-AM06-VI*

## Configuring Ethernet channels in CODESYS

General	Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length
Modbus Slave Channel	0 Read AI	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#0000	4	Set to ZERO		
	1 Read AO	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#0100	2	Set to ZERO		
Modbus Slave Init	2 Write AO	Write Multiple Registers (Function Code 16)	Rising edge				16#0100	2
	3 Read Module	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#4E20	44	Set to ZERO		
ModbusTCP Slave Parameters	4 Write AO parameter	Write Multiple Registers (Function Code 16)	Rising edge				16#4E20	16
	5 Write AI parameter	Write Multiple Registers (Function Code 16)	Rising edge				16#4E33	17
ModbusTCP Slave I/O Mapping	6 Write Command	Write Multiple Registers (Function Code 16)	Rising edge				16#4E31	1

Read AI: Read analog input value

Read AO: Read analog output value

Write AO: Write analog output value

Read Module: Read all analog module parameters

Write AO parameter: Write output channel parameters

Write AI parameter: Write input channel parameters

Write Command: Give command to analog output module

Read Page:

Read page shows all channel parameters of iR-AM06-VI. To change the parameters, please go to Write page.

	Ch.0	Ch.1	Ch.2	Ch.3	Ch.0	Ch.1
Value	-3	1	-10	0	0	0
Mode	0	0	0	0	1	1
Max scale	0	0	0	0	32000	32000
Min scale	0	0	0	0	-32000	-32000
Sampling	1	1	1	1		
Max peak	48	1	76	3		
Min peak	-48	-480	-41	-480		
Conversion	0					
Err code	0					
Detector	0					
Up_time					0	0

AM06-VI-Read

Write

Write Page:

	Ch.0	Ch.1	Ch.2	Ch.3	Ch.0	Ch.1
Value	-3	1	-10	0	0	0
Mode	0	0	0	0	0	0
Max scale	0	0	0	0	0	0
Min scale	0	0	0	0	0	0
Sampling	0	0	0	0		
Conversion	0					
Command	1					
Up_time					0	0

**AM06-VI-Write**

	Command	AI	AO	Value			Read
Trigger	<input type="button" value=""/>	<input type="button" value=""/>	<input type="button" value=""/>	<input type="button" value=""/>			<input type="button" value=""/>

Write page shows all writable parameters.

Press AI button to write input channel parameter to iR-AM06-VI.

Press AO button to write output channel parameter to iR-AM06-VI.

Press Value button to write output channel value to iR-AM06-VI.

Press Command button to restore factory default.

*iR-AI04-TR*

Configuring Ethernet channels in CODESYS

General	Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length
Modbus Slave Channel	0 Read Channel	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#0000	4	Set to ZERO		
	1 Read Module	Read Holding Registers (Function Code 03)	Cyclic, t#10ms	16#4E20	32	Set to ZERO		
Modbus Slave Init	2 Write Mode	Write Multiple Registers (Function Code 16)	Rising edge				16#4E20	4
	3 Write Sampling	Write Multiple Registers (Function Code 16)	Rising edge				16#4E2C	4
ModbusTCPSlave Parameters	4 Write offset	Write Multiple Registers (Function Code 16)	Rising edge				16#4E33	5
	5 Write Command	Write Multiple Registers (Function Code 16)	Rising edge				16#4E31	1

Read Channel: Read temperature value

Read Module: Read all temperature module parameters

Write Mode: Write mode of each channel

Write Sampling: Write sampling time of each channel

Write Offset: Write temperature unit and offset

Write Command: Restore factory default

Read Page:

Read page shows all channel parameters of iR-AI04-TR. To change the parameters, please go to Write page.

	Ch.0	Ch.1	Ch.2	Ch.3	AI04-TR-Read
Value	0	0	0	0	
Mode	0	0	0	0	
Sampling	1	1	1	1	
Max peak	338	636	12000	14914	
Min peak	0	0	0	0	
Unit	0				
Err code	0				
Detector	0				
Offset	0	0	0	0	

**Write**

Write Page:

	Ch.0	Ch.1	Ch.2	Ch.3	AI04-TR-Write
<b>Value</b>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
<b>Mode</b>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
<b>Sampling</b>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
<b>Unit</b>	<input type="text" value="0"/>				
<b>Command</b>	<input type="text" value="1"/>				
<b>Offset</b>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
<b>Trigger</b>	<input type="button" value="Command"/>	<input type="button" value="Mode"/>	<input type="button" value="Sampling"/>	<input type="button" value="offset"/>	<input type="button" value="Read"/>

Write page shows all writable parameters.

Press Mode button to write channel mode to iR-AI04-TR.

Press Sampling button to write the number of input samplings to iR-AI04-TR.

Press Offset to write temperature unit and temperature offset to iR-AI04-TR.

Press Command button to restore factory default.