

User Manual

iR-ETN Analog Module Startup Guide

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

UM018015E_20181213

Table of Contents

1. Overview.....	1
2. Module Connection	1
iR-ETN Coupler	1
Voltage/Current Module Registers	2
Temperature Module Registers.....	3
3. Wiring	5
Analog Output.....	5
Analog Input.....	5
Temperature Input	6
4. Analog Channel Configuration.....	7
iR-AI04-VI	7
iR-AQ04-VI.....	9
iR-AM06-VI.....	11
iR-AI04-TR	13

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1. Overview

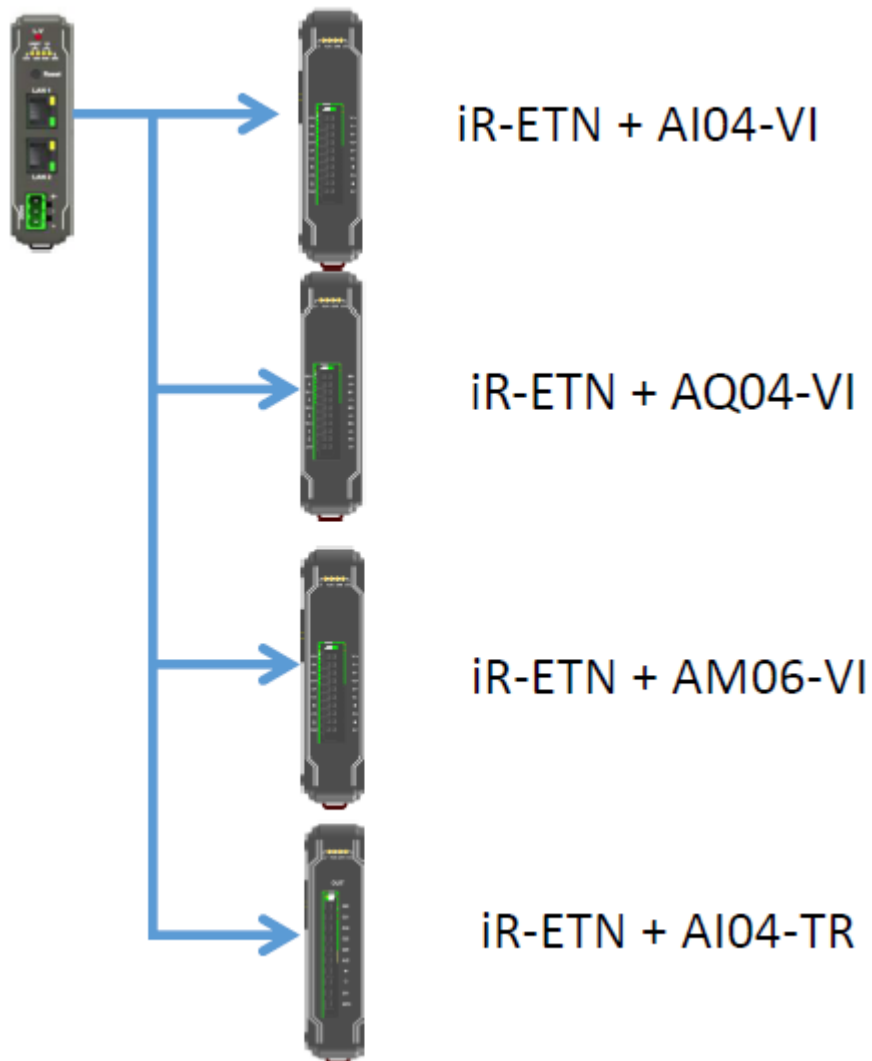
This manual aims to provide parameter configuration steps on iR Series Analog modules connected to an iR-ETN coupler, and explains how to read correct channel values using CODESYS.

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 t 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 1Filter 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

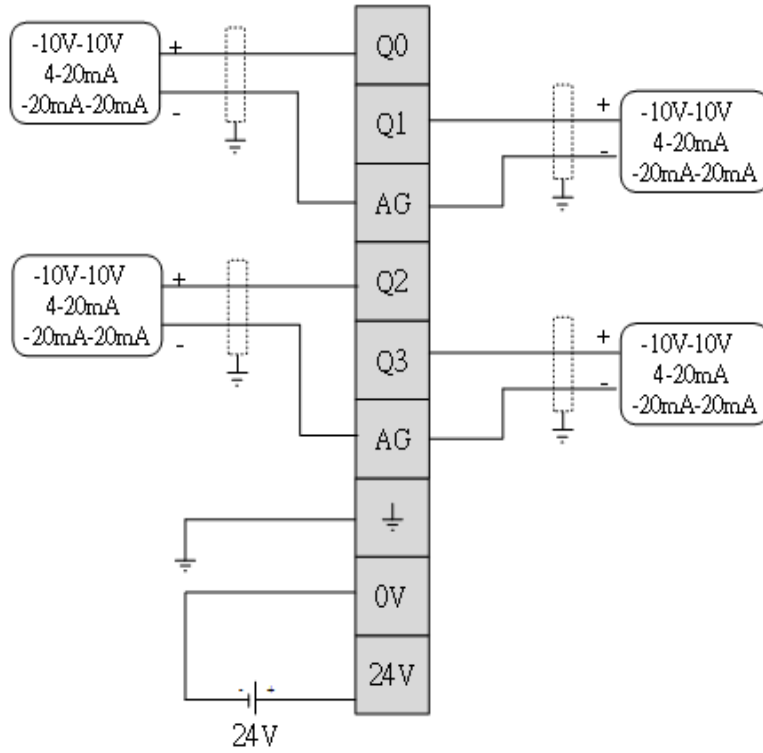
Temperature Module Registers

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

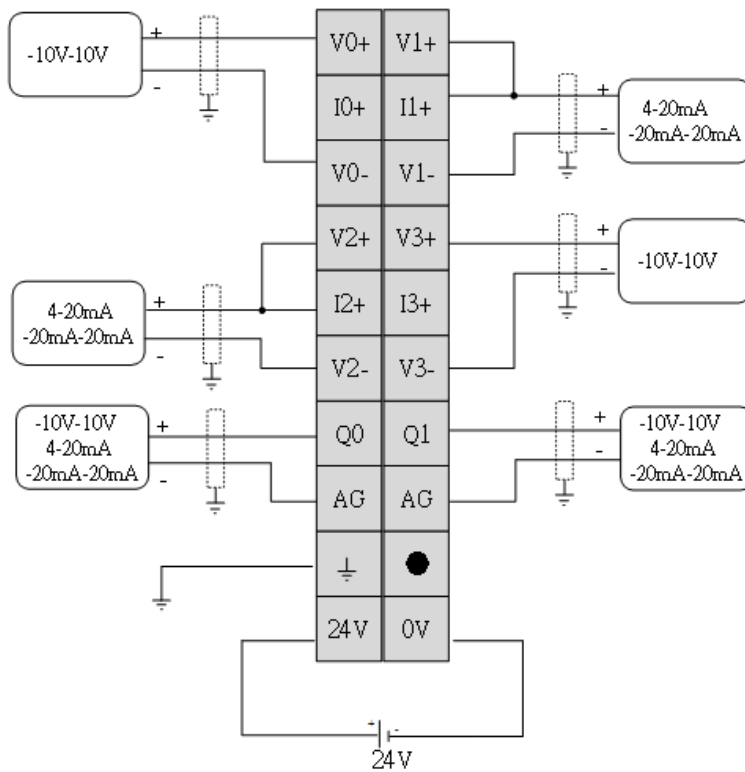
23	Channel 3 Temperature Offset	0	Read/Write
24	Channel 0 Maximum Value	0	Read Only
25	Channel 1 Maximum Value	0	Read Only
26	Channel 2 Maximum Value	0	Read Only
27	Channel 3 Maximum Value	0	Read Only
28	Channel 0 Minimum Value	0	Read Only
29	Channel 1 Minimum Value	0	Read Only
30	Channel 2 Minimum Value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

3. Wiring

Analog Output

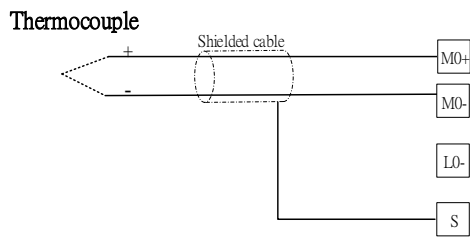
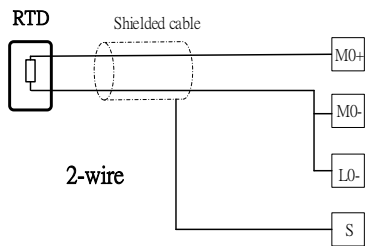
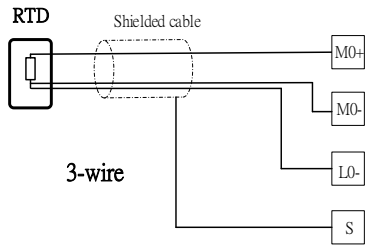
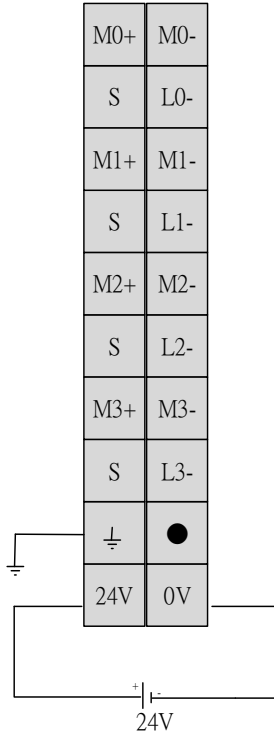


Analog Input



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
Value	-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	<input type="button" value="Command"/>	<input type="button" value="Write"/>	<input type="button" value="Value"/>	<input type="button" 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
Value	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
Mode	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
Sampling	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
Unit	<input type="text" value="0"/>				
Command	<input type="text" value="1"/>				
Offset	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	
Trigger	<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.