ET-2200 Series Ethernet I/O Modules User Manual

Ethernet I/O Module Ver. 1.9, Jun. 2025

WARRANTY

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

WARNING

ICP DAS assumes no liability for damages consequent to the use of this product. ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, nor for any infringements of patents or other rights of third parties resulting from its use.

COPYRIGHT

Copyright © 2023 by ICP DAS. All rights are reserved.

TRADEMARK

Names are used for identification only and may be registered trademarks of their respective companies.

CONTACT US

If you have any questions, please feel free to contact us via email at: service@icpdas.com



REVISION HISTORY

The table below shows the revision history.

Revision	Date	Description			
	June. 2025	Add A.3 How to Perform Batch Setup for ET-2200 Module?			
1.9	May. 2025	Add Modbus Register for (P)ET-2218H S -16 in Section 6.4.5 and Related information in Section 2.1, 2.2, 2.5, 4.4.4			
	Oct. 2024	Add the feature - "TCP Streaming" in Section 1.2			
	Aug. 2024	Add Section 6.4.6, 6.4.7 Modbus Register for (P)ET-2224CIS/2228CIS/2224CI/2228CI			
	Jul. 2024	Add product models: (P)ET-2224P/2228P			
1.8	May. 2024	 Add product models: (P)ET-2215H, (P)ET-2215H-16, (P)ET-2218H/S1, (P)ET-2218H-16/S1, (P)ET-2224CI/2228CI, (P)ET-2224CIS/2228CIS, (P)ET-2242U-32. 1. Revise Section 2.1 Appearance, 2.2 Specification, 2.5 Dimensions 2. Add Section 4.4.3 AI Configuration- (B) RTD Input, (C) Thermocouple Input 3. Add Section 4.4.4 AI Calibration- (B) RTD Input, (C) Thermocouple Input 4. Add Section 4.16.5 –AI Example 5. Add Modbus Register Table Section 6.4.1 for (P)ET-2215H, (P)ET-2215H-16 Section 6.4.4 for (P)ET-2218H/S1, (P)ET-2218H-16/S1 6. Add Type Code Table Section 6.6 RTD Section 6.7 Thermocouple 			
	Mar. 2024	♦ Section 6.4.1, (P)ET-2217 Modbus Register - (Addr. 00833)			
1.7	Sep. 2023	 Revise Section 3.2, 3.3 Add Section 4.4.4 AI - Calibration Add Section 4.4.8 AO - Calibration Add Section 4.16.2 ~ 4.16.4, MQTTX and DI/DO Examples Revise Chapter 5 I/O Pair Connection Applications Add Section 5.5.3 Example of Using Memory AIO Revise Appendix A.1 How Can I Factory Reset the Module? 			

-2 -

Revision	Date	Description
	Mar. 2023	 Revise Section 6.4.1. The sampling rate of PET-2217 in fast mode is 200 Hz, and in normal mode is 20 Hz. Revise Section 2.2. Modify the URL of the data sheet Revise Section 6.4.2. The address 31000-31109 and 41000- 41109 has been modified to 34097-34206 and 44097-44206
	Jan. 2023	♦ Revise the hardware information in Chapter 2
	Dec. 2022	 Revise Sections 4.7, 5.1 to 5.4 Add Section 5.5 Shared Memory
	Nov. 2022	♦ Add Section 4.17 SNMP
1.6.0	Sep. 2022	♦ Add the model ET-2217 (The AI module)
	Jun. 2022	♦ Add the model ET-2224/ ET-2228 (The AO module)
	Apr. 2002	♦ Revise Sections 2.2, 2.3, 2.4, and 2.6, add new models
	lan 2022	1. Add Modbus addresses in Section 6.4
	Jan. 2022	2. Add Section 6.5 Analog Input Type and Data Format Table
	Nov. 2021	♦ Support MQTT protocol
	Oct. 2021	♦ Add Section 1.3 Application
	Sep. 2021	1. Add the information about ET-2217CI/ 2217CI-4
		2. Add Chapter 6.4 Modbus Register (AIO)
		3. Add Appendix A.2 ~ A.4
1.5.0	Jun. 2020	Modify the official website-related links.
1.4.0	Sep. 2019	♦ Add the information on the MQTT function.
1.3.0	Jun. 2018	\diamond Add the hardware information about the ET-2261-16.
1.2.0	Jul. 2017	 Add the software and hardware information about the ET-2242U and ET-2255U. Updated the information about the Firmware Version v1.4.6
		[Jun.16, 2017] in Chapter 4 Web Configuration.3. Add Appendix A: Troubleshooting and Revision History.
1.1.3	Feb. 2016	 Add the software and hardware information about the ET-2254P, ET-2261 and ET-2268. Revise the information about the Firmware Version v1.3.9 [Jan.20, 2016] in Chapter 4 Web Configuration.
1.1.0	Nov. 2015	 ♦ Add the software and hardware information about the ET-2242, ET-2251 and ET-2255.
1.0.0	Sep. 2015	♦ Initial issue

TABLE OF CONTENTS

1.	INTR	RODUCTION8					
	1.1	Packing	List	8			
	1.2	Features	5	9			
	1.3	Applicat	ion1	5			
2.	HAR	DWARE I	NFORMATION1	6			
	2.1	Appeara	nce10	6			
	2.2	Specifica	ation20	0			
	2.3	Wiring C	Connections	2			
	2.4	Wiring t	o the Connector	3			
	2.5	Dimensi	ons24	4			
3.	GETT	ING STA	RTED	1			
	3.1	Configu	ring the Operating Mode	1			
	3.2	Connect	ing to the Network and the PC	2			
	3.3	Configu	ring the Network Settings	3			
	3.4	Modbus	TCP Testing	5			
			-				
4.	WEB	CONFIG	URATION	7			
4.	WEB 4.1	CONFIG Logging	URATION	7 7			
4.	WEB 4.1 4.2	CONFIG Logging Home	URATION	7 7			
4.	WEB 4.1 4.2	CONFIG Logging Home 4.2.1	URATION	7 7 0			
4.	WEB 4.1 4.2	CONFIG Logging Home 4.2.1 4.2.2	URATION 3' into the Web Server 3' 40 40 Home – DI/DO 40 Home – AI 40	7 7 0 1			
4.	WEB 4.1 4.2	CONFIG Logging Home 4.2.1 4.2.2 4.2.3	URATION 3 into the Web Server 3 40 40 Home – DI/DO 40 Home – AI 40 Home – AO 40	7 7 0 1 2			
4.	WEB 4.1 4.2	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4	URATION	7 7 0 1 2 3			
4.	WEB 4.1 4.2	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network	URATION	7 0 1 2 3			
4.	WEB 4.1 4.2 4.3	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1	URATION	7 0 1 2 5 5			
4.	WEB4.14.24.3	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2	URATION	7 7 0 0 1 2 3 5 5 9			
4.	WEB4.14.24.3	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2 4.3.3	URATION 3 into the Web Server 3 4 4 Home – DI/DO 4 Home – AI 4 Home – AO 4 OVP (Over-value Protection) Mechanism 4 IP Address Configuration 4 General Settings 4 Restore Factory Defaults/Firmware Update 50	7 0 0 1 2 3 5 9 0			
4.	 WEB 4.1 4.2 4.3 4.4 	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2 4.3.3 I/O Setti	URATION 3 into the Web Server 3 40 40 Home – DI/DO 40 Home – AI 4 Home – AO 4 OVP (Over-value Protection) Mechanism 4 IP Address Configuration 4 General Settings 4 Restore Factory Defaults/Firmware Update 50 ngs 50	7 0 0 1 2 3 5 9 0 3			
4.	 WEB 4.1 4.2 4.3 4.4 	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2 4.3.3 I/O Setti 4.4.1	URATION	7 00123559033			
4.	 WEB 4.1 4.2 4.3 4.4 	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2 4.3.3 I/O Setti 4.4.1 4.4.2	URATION	7 7 0 0 1 2 3 5 5 9 0 3 3 4			
4.	 WEB 4.1 4.2 4.3 4.4 	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2 4.3.3 I/O Setti 4.4.1 4.4.2 4.4.3	URATION	7 0 0 1 2 3 5 5 9 0 3 3 4 7			
4.	 WEB 4.1 4.2 4.3 4.4 	CONFIG Logging Home 4.2.1 4.2.2 4.2.3 4.2.4 Network 4.3.1 4.3.2 4.3.3 I/O Setti 4.4.1 4.4.2 4.4.3 (A)	URATION	7 7 0 0 1 2 3 5 5 9 0 3 3 4 7 7			

	(C)	Thermocouple Input	59
	4.4.4	AI - Calibration	60
	(A)	Voltage/Current Input	60
	(B)	RTD Input	62
	(C)	Thermocouple Input	64
	4.4.5	AI - RTC	66
	4.4.6	AI - Data Logger	66
	4.4.7	Analog Output Configuration	68
	4.4.8	AO - Calibration	69
4.5	Sync		72
	4.5.1	DIO Synchronization	72
4.6	PWM		74
	4.6.1	PWM Configuration	74
4.7	Pair Con	nection	75
	4.7.1	I/O Pair-Connection Settings	75
4.8	Filter		78
	4.8.1	Filter Settings	78
4.9	Monitor		79
4.10	Change I	Password	80
4.11	Logout		81
4.12	MQTT		82
	4.12.1	Connectivity Settings	83
	4.12.2	Publication Settings	85
	4.12.3	Restore Factory Defaults	86
4.13	MQTT-D	0	87
	4.13.1	MQTT – Digital Outputs	88
	4.13.2	Readbacks of the Digital Outputs	89
4.14	MQTT-D	Ι	90
	4.14.1	MQTT – Digital Inputs	91
4.15	MQTT-A	Ι	92
4.16	MQTT R	ealization	93
	4.16.1	Set up Mosquitto	93
	4.16.2	MQTTX Instructions	99
	4.16.3	MQTT - DO Example	.101
	(A)	MQTT DO – Subscribe	.101
	(B)	MQTT DO – Power on Publish	.103
	(C)	MQTT DO – State Change Publish	.106

		(D)	MQTT DO – Periodic Publish	
		4.16.4	MQTT - DI Example	110
		(A)	MQTT DI – State Change Publish	110
		(B)	MQTT DI – Periodic Publish	113
		4.16.5	MQTT - AI Example	116
		(A)	MQTT AI – Periodic Publish	117
	4.17	SNMP		120
		4.17.1	SNMP Agent Configuration	121
		4.17.2	SNMP Specific Trap	
		4.17.3	SNMP I/O Example	124
		4.17.4	SNMP Trap Example	129
		4.17.5	SNMP Problem Solving	131
5.	I/O F	PAIR CON	INECTION APPLICATIONS	133
	5.1	Set a Sin	ngle Module to Pull/Push Mode (DI/DO)	133
		5.1.1	Pull Mode	135
		5.1.2	Push Mode	136
	5.2	Set Two	Modules to Push Mode (Local DI to Remote DO)	137
	5.3	Set Two	Modules to Pull Mode (Remote DI to 2-Local DO)	140
	5.4	Set Two	Modules to Push Mode (2-Local DI to Remote DO)	143
	5.5	Shared I	Memory	146
		5.5.1	Address Mapping for Shared Memory	147
		5.5.2	Application of spreading the load (DIO)	148
		5.5.3	Example of Using Memory AIO	150
		5.5.4	Master/Slave/MTCP/MUDP Data Exchange	152
		5.5.5	Bits / Registers Data Exchange	153
6.	MO	DBUS INF	ORMATION	154
	6.1	What is	Modbus TCP/IP?	154
	6.2	Modbus	Message Structure	155
		6.2.1	01(0x01) Read the Status of the Coils (Read DO Readback values)	158
		6.2.2	02(0x02) Read the Status of the Input (Read DI values)	160
		6.2.3	03(0x03) Read the Holding Registers (Read AO Readback values)	162
		6.2.4	04(0x04) Read the Input Registers (Read AI values)	164
		6.2.5	05(0x05) Force a Single Coil (Write DO value)	166
		6.2.6	06(0x06) Set a Single Register (Write AO value)	168
		6.2.7	15(0x0F) Force Multiple Coils (Write DO values)	170
		6.2.8	16(0x10) Set Multiple Registers (Write AO values)	172
	6.3	Modbus	Register Table (For DIO Module)	174

	6.3.1	Common Functions	174
	6.3.2	Specific Functions	176
6.4	Modbu	s Register Table (For AIO Module)	
	6.4.1	Modbus Register Table for (P)ET-2215H, (P)ET-2215H-16	
	6.4.2	Modbus Register Table for (P)ET-2217	
	6.4.3	Modbus Register Table for ET-2217CI	185
	6.4.4	Modbus Register Table for (P)ET-2218H/S1, (P)ET-2218H-16/S1	
	6.4.5	Modbus Register Table for (P)ET-2218HS-16	190
	6.4.6	Modbus Register Table for (P)ET-2224CIS/(P)ET-2228CIS	192
	6.4.7	Modbus Register Table for (P)ET-2224CI/(P)ET-2228CI	195
	6.4.8	Modbus Register Table for (P)ET-2224/2228	198
6.5	Analog	Input Type and Data Format Table	201
6.6	RTD Typ	pe Code Table	202
6.7	7 Thermo	ocouple Type Code Table	203
APPEN	DIX A: TRO	DUBLESHOOTING	204
A.1	L How ca	n I Factory Reset the Module (Password: Admin)?	204
A.2	2 How to	update the firmware via Ethernet?	206
A.3	B How to	Perform Batch Setup for ET-2200 DIO module?	209
	(A)	Tab – Device Setting	210
	(B)	Tab – Mass Network Setting	211
	(C)	Tab – Mass Device Setting	213
A.4	Why is	the Host computer unable to ping or search for the ET-2200 modul	e?217
A.5	5 What is	Digital-Input Filter (DI Filter)?	

-7 -

1. Introduction



The ET-2200 series modules, an IP-based Ethernet I/O module, feature a built-in web server that allows configuration, I/O monitoring, and I/O control by simply using a regular web browser. In addition, the ET-2200 also supports Modbus TCP/UDP protocol that makes perfect integration to SCADA software.

1.1 Packing List

The shipping package includes the following items:







If any of these items are missing or damaged, please contact the local distributor for more information. Save the shipping materials and cartons in case you need to ship the module in the future.

ET-2200 Module x 1

Quick Start x 1

1.2 Features

Built-in Web Server

The ET-2200 series module has a built-in web server that allows users to easily configure, monitor, and control the module from a remote location using a web browser.

≸ E1-22XX	×			A - 0 X
← → C 🗋 10	0.0.8.100			¶☆ 💺 ≡
CAS.	ET-22XX Home Network I/O Settin	ngs PWM Pair Connection Filte	r Monitor Change Pass	word Logout
DI/DO				
ALL DI	Value	Counter / Frequency	High Latched	Low Latched
DI 0.	OFF	-		
DI 1:	OFF	-		
DI 2.	OFF	-		
DI 3.	OFF	-		
DI 4:	OFF	-		
DI 5:	OFF	-		
DI 6.		-		
DI 7:	-	-		
DI 8		-		
DI 9.				
DI 10:	-	-		
DI 11:		-		
DO7 -	D06 - D05 OFF	DO4 OFF DO3 OFF	DO2 OFF DO1	OFF DOD OFF
Set DO Value	bit 7~4() bit 3~0(Update Settings

Modbus TCP/UDP, MQTT, or SNMP Protocols

The Modbus TCP and Modbus UDP slave functions on

the Ethernet port can be used to provide data to remote SCADA software. All DI/DO modules and some AI/AO modules support MQTT and SNMP V2c protocols.

TCP Streaming

The sampling rate of **ET-2217H** is 8 KHz for all channels, and it utilizes TCP streaming continuous transmission mode to record voltage and current values.

Data Transmission Mode

• Continuous Transmission (Maximum sampling rate of 8 kHz per channel)

After starting A/D acquisition, data is continuously transmitted to the Host PC And you can specify the required channels for collection.

Total simultaneous sampling channels	Maximum sampling rate per channel
8	1 KHz
4	2 KHz
2	4 KHz
1	8 KHz



The continuous collection mode uses TCP streaming to transmit the collected data back to the PC. The streaming method of this module is that the firmware of the module uses polling scanning to sample data, and the data sampling rate is fixed. The firmware polling scanning places the data in the module buffer. When the data reaches a certain amount, it is automatically sent to the host. The host sends a start collection command, and the module uses large data packets according to the above method, sending each packet to the host until the host sends a stop collection command to stop collecting data.



• Modbus/TCP (Command Response Mode)

This mode of the Modbus/TCP protocol is a commonly used communication method for acquisition modules. The firmware of the acquisition module will collect data at a fixed sampling rate and temporarily store it in the module memory (Modbus Register table). When the host sends a command to the module, the module will send the temporarily stored relevant data back to the host as needed.



● PC 軟體規格

PC 軟體				
Support OS	Windows 7/8/10/11 and Linux			
Utility	Configuration, graphically display and data logging			
SDK	Windows• Microsoft VC, C#, VB.NET SDK API and Demo• Python Demo• NI LabVIEW Toolkit and DemoLinux• C/C++ library and Demo• .NET library and Demo• Python Demo			

I/O Pair Connection (Push and Pull)

This function is used to create a DI to DO pair through the Ethernet. Once the configuration is completed, the ET-2200 module can continuously pull the status of the remote DI device using the Modbus TCP protocol and then write to local DO channels in the background.



Slim-Type Housing

The ET-2200 modules are slim-type housing with about 3.3 cm in width. Compared with the palm-size module that has about 7 cm in width, more slim-type ET-2200 modules can be installed on the same DIN-Rail space.



Built-in Multi-function I/O

The **DO** modules support these functions:

- **Power-on Value:** On boot up, the DO value will be set to the Power-on value.
- Safe Value:

If Modbus TCP communication is lost for a specific period, the DO value will be set to the userdefined safe value.

• A PWM (Pulse-Width Modulation) Function:

Each of DO channel can be set to a different frequency (100 Hz Max.) and duty cycle, also work either independently or simultaneously. The term "High Duty Cycle" describes the duration of 'ON' time in proportion to the regular interval or 'period' of time. Similarly, the term "Low Duty Cycle" corresponds to the duration of the 'OFF' time. Consequently, it is not necessary to keep switching from ON to OFF from remote a controller. In this way, the module reduces the complexity required for the control system and enhances timing accuracy.

<u>Note:</u> Because of the characteristics of the relay functions, it is recommended that the PWM on modules with relay functions is not used for extended periods.

The **DI** modules support these functions:

- Can be Used as a 32-bit High Speed Counter
- High/Low Latched Status Commands:

The modules provide commands to read the status of any digital input channels that are latched high or latched low. The following is an example that shows the usefulness of the latched digital input. If we wish to read a key stroke from a key switch connected to the digital input channel of a module, the input signal of the key stroke is a pulse signal as shown in the figure.



If we just use the read digital input status command to read the signal and we cannot send the command during the B period due to some reasons, then we will lose the key stroke information. However, with the read latched digital input command, we can still get the key stroke information even we are not able to send command in B period.

• Frequency Measurement:

This function can be used to retrieve the digital input counter value at specific times and calculates the frequency. Rather than polling via a remote host, the module can determine the frequency directly, reducing the communication delay caused by two ends and also improves the accuracy of the frequency measurement. In order to applying for more applications, this module provides 3 scan modes and 4 moving average methods for user to select the best way in their applications.

> DIO Synchronization (Mirror Local DI to DO):

The module also provides a DIO synchronization function. The DIO synchronization is divided into three modes: **Level Sync**, **Rising Active**, and **Falling Active**.

Level Sync (DO = DI) Mode:

The synchronization operation in DI and DO.



Rising Active (DO = ON) Mode:

When the specified DI state is from OFF to ON, the corresponding DO will be set to ON.



Falling Active (DO = ON) Mode:

When the specified DI state is from ON to OFF, the corresponding DO will be set to ON.



Built-in Dual Watchdog

The Dual Watchdog consists of a CPU Watchdog (for hardware functions) and a Host Watchdog (for software functions).

<u>CPU Watchdog</u> automatically resets itself when the built-in firmware runs abnormally.

Host Watchdog set the digital output with a predefined safe value when there is no communication between the module and host (PC or PLC) over a while (Watchdog timeout).



Daisy-chain Ethernet Cabling

The ET-2200 has a built-in two-port Ethernet switch to implement daisy-chain topology. The cabling is much easier and the total costs of cable and switch are significantly reduced.



> LAN Bypass

LAN Bypass feature guarantees Ethernet communication. It will automatically be active to continue the network traffic when the ET-2200 loses its power.



> Highly Reliable Under Harsh Environment

- Wide Operating Temperature Range: -25 ~ +75°C
- Storage Temperature: -40 ~ +80°C
- Humidity 10 ~ 90% RH (Non-condensing)



1.3 Application



Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-15 -

2. Hardware Information

2.1 Appearance

The components of the ET-2200 module include LED indicators, pluggable terminal blocks for I/O or power input, an operating mode switch, and Ethernet ports.



Al or AO



- 1 PWR / PoE LED Indicator
- 2 I/O Indicator
- 3 I/O Connector
- 4 DIP Switch
- 5 Rotary Switch

1) PWR or PoE LED Indicator

Once power is supplied to the ET-2200 series module, the PWR LED indicator will illuminate.

Note: PoE (Power-over-Ethernet) indicator is only available for the PET-2000 series modules

2) I/O Indicator

Some modules provide I/O indicators, which light up when the status is ON. For (P)ET-2218H/S1, (P)ET-2218H-16/S1, (P)ET-2218HS-16 series, the "H/A" LED lights up when the measured temperature exceeds the maximum value of the specified range or if the channel is disconnected. If the temperature is lower than the minimum value, the "L/A" LED lights up. For example, Type M, -200 to 100 °C.

For (P)ET-2224CI/2228CI and (P)ET-2224CIS/2228CIS, the "O/C" indicator is used for open wire detection. The LED will light up if the current output channel is disconnected.

For (P)ET-2224CIS/(P)ET-2228CIS series, the "OVP" LED lights up when the over-value protection is triggered. Refer to Section 4.2.4 OVP (Over-value Protection) Mechanism

3) I/O Connector

The pin assignments for the I/O connector on the ET-2200 series module differ based on the model. For more information about pin assignments, refer to Section 2.3 "Pin Assignments".

4) DIP Switch

The DIP switch of the (P)ET-2217 and (P)ET-2217H can be used to set I/O channels as voltage or current inputs.

5) Rotary Switch

The rotary switch of the (P)ET-2215H, (P)ET-2215H-16, (P)ET-2218H/S1, (P)ET-2218H-16/S1, (P)ET-2218HS-16, (P)ET-2224CI, (P)ET-2228CI, (P)ET-2224P, and (P)ET-2228P can be used to set the operating mode. It is located at the front/top of the module.

Run Mode:

0 : User specified IP or DHCP 1-E : Default IP, 192.168.255.1 ~ 14 <u>Init Mode:</u>



F : Factory default, Firmware Update



6) DC Power Input Connector

The power input connector on the ET-2200 series module differs in pin assignments base on the model. For more information about pin assignments, refer to Section 2.3 "Pin Assignments"

DC Power Input:

All ET-2200 series modules include "(**R**)+Vs" and "(**B**)**GND**" pins and are powered by a DC power supply. The valid power voltage range is from +10 to +30 VDC or +10 to +48 VDC. (Refer to Section 2.2.1)

Frame Ground (F.G.):

In continental climate zones, electronic circuits are susceptible to electrostatic discharge (ESD). The ET-2200 series modules adopt a new frame grounding design to provide an ESD discharge path, thus preventing static electricity and environmental interference from directly affecting the hardware. This improvement ensures enhanced protection against ESD (Electrostatic Discharge), making the module more reliable.

7) Operating Mode Switch

Init mode:

For firmware update or troubleshooting. The factory presets will be loaded.

<u>Run mode</u>:

For normal operation. The user-defined configuration will be loaded. The factory default is set to "Run". Refer to Section 3.1 "Configuring the Boot Mode" for more information.

8) 2-Port Ethernet Switch

The (P)ET-2200 series modules are equipped with two RJ-45 10/100 Base-TX Ethernet switch ports. When an Ethernet link is detected and an Ethernet packet is received, the **Green LED** indicator will be illuminated. While the **Yellow LED** indicator is used for the PoE module.

9) Ethernet Cable Locking Hole

The (P)ET-2215H and (P)ET-2215H-16 series include the locking holes for the Ethernet cable to prevent accidental loosening.



2.2 Specification

Product Page

The user can enter the model in the search bar on the website (https://www.icpdas.com/) to find out the product page.

← → C 😁 https://www.i	icpdas.com/?Lang=US	* 🔕 🗅 🔍
(ICP DAS	ET-2217 Q Tag Module: ET-2217 Info: Ethernet I/O Module with 2-port Ethernet Switch, 8/16-ch AI (RoHS)	CORPORATE CONTACT US

ET-2200 Selection Guide:

https://www.icpdas.com/en/product/guide+Remote_I_O_Module_and_Unit+Ethernet_I_O __Modules+ET-2200#2724

HOME > PRODUCTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200							
Introduction			Selection Guide		Ethernet I/O Comparison Table		
				Available soon	n 🕨 Will be phased ou	it 🕨 Pha	sed out
odules							
		IA			Protocol		
el	Channels	Sampling Rate	Voltage & Current Input	Sensor Input	Channel to Channel Isolation	MQTT	SNMP V2c
-	4	10/200Hz,	±1 V, ±2.5 V, ±5 V,		Ves	Vos	_
-	8	for each channel	±10 V,±20 mA,		165	ies	
<u>PET-2217</u> ►	8/16	20/200Hz	± 150 mV, ± 500 mV, ± 1 V, ± 2.5 V, ± 5 V, ± 10 V, ± 20 mA, 0 ~ +20 mA, +4 ~ +20 mA	-	_	Ye	es
	CTS > Remote I/ Introduction odules et PET-2217 >	CTS > Remote I/O Module and Unit > E Introduction Odules Channels - 4 - 8 PET-2217 88/16	CTS > Remote I/O Module and Unit > Ethernet I/O Modules > Introduction Channels Channels Channels Channel Channel PET-2217 8/16 20/200Hz	CTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200 Introduction Selection Guide Al Al Channels Sampling Rate Voltage & Current Input - Al - Al Channels Sampling Rate Voltage & Current Input - 4 10/200Hz, for each channel ±11 V, ±2.5 V, ±5 V, ±10 V, ±20 mA, ±10 V, ±20 mA, ±150 mV, ±500 mV, ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±150 mV, ±500 mV, ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +20 mA, +4 ~+20 mA ±10 V, ±20 mA, 0~ +	CTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200 Introduction Guide E Introduction Guide E Autiliable soor Odules Al Channels Sampling Rate Voltage & Current Input Sensor Input - AI Channels Sampling Rate Voltage & Current Input Sensor Input - - AI Channels Sampling Rate Voltage & Current Input Sensor Input - AI - AI </td <td>CTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200 Introduction Ethernet I/O Compariso Introduction Guide Ethernet I/O Compariso Available soon > Will be phased ou Odules Al Channels Sampling Rate Voltage & Current Input Channel to Channel to Channel Isolation - 4 10/200Hz, for each channel $\pm 1 V, \pm 2.5 V, \pm 5 V, \pm 10 V, \pm 20 mA, -$ Yes PET-2217 8/16 20/200Hz $\pm 150 mV, \pm 500 mV, \pm 10 V, -20 mA, 0 ~$ - - -</td> <td>CTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200 Ethernet I/O Comparison Table Introduction Ethernet I/O Comparison Table Introduction Guide Ethernet I/O Comparison Table Introduction Guide Ethernet I/O Comparison Table Introduction Will be phased out > Pha Al Prot Channels Sampling Rate Voitage & Current input Sensor Input Channel to Channel to Channel Isolation MQTT - Yes - Yes #10/200Hz, for each channel ±11V, ±2.5 V, ±5 V, ±10V, ±20 mA, - Yes PET-2217 8/16 20/200Hz ±150 mV, ±500 mV, ±10V, ±20 mA, 0~ +20 mA, 4~ +20 mA</td>	CTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200 Introduction Ethernet I/O Compariso Introduction Guide Ethernet I/O Compariso Available soon > Will be phased ou Odules Al Channels Sampling Rate Voltage & Current Input Channel to Channel to Channel Isolation - 4 10/200Hz, for each channel $\pm 1 V, \pm 2.5 V, \pm 5 V, \pm 10 V, \pm 20 mA, -$ Yes PET-2217 8/16 20/200Hz $\pm 150 mV, \pm 500 mV, \pm 10 V, -20 mA, 0 ~$ - - -	CTS > Remote I/O Module and Unit > Ethernet I/O Modules > ET-2200 Ethernet I/O Comparison Table Introduction Ethernet I/O Comparison Table Introduction Guide Ethernet I/O Comparison Table Introduction Guide Ethernet I/O Comparison Table Introduction Will be phased out > Pha Al Prot Channels Sampling Rate Voitage & Current input Sensor Input Channel to Channel to Channel Isolation MQTT - Yes - Yes #10/200Hz, for each channel ±11V, ±2.5 V, ±5 V, ±10V, ±20 mA, - Yes PET-2217 8/16 20/200Hz ±150 mV, ±500 mV, ±10V, ±20 mA, 0~ +20 mA, 4~ +20 mA

Also, click the "Data Sheet" icon on the product page to find out the information on Dimensions, Pin Assignments, and Wire Connections.



Data Sheet:

The following table lists the URL of the data sheet for the relevant models.

Model	File Name				
www.icpdas.com/web/product/download/io_and_unit/ethernet/et2200/document/data_sheet/					
Analog Input Modules					
ET-2217, PET-2217	(P)ET-2217_en.pdf				
ЕТ-2217Н, РЕТ-2217Н	(P)ET-2217H_en.pdf				
ET-2217CI-4, ET-2217CI	ET-2217CI-4_ET-2217CI_en.pdf				
ET-2215H, PET-2215H, ET-2215H-16, PET-2215H-16	(P)ET-2215H_(P)ET-2215H-16_en.pdf				
ET-2218H/S1, PET-2218H/S1,	(P)ET-2218H(-16) S1 en.pdf				
ET-2218H-16/S1, PET-2218H-16/S1	(,,,,,,,,,,,,,,,,_				
ET-2218HS-16, PET-2218HS-16	(P)ET-2218HS-16_en.pdf				
Analog Output Modules					
ET-2224, PET-2224, ET-2228, PET-2228	(P)ET-2224_(P)ET-2228_en.pdf				
ET-2224P, PET-2224P, ET-2228P, PET-2228P	(P)ET-2224P_(P)ET-2228P_en.pdf				
ET-2224CI, PET-2224CI, ET-2228CI, PET-2228CI	(P)ET-2224CI_(P)ET-2228CI_en.pdf				
ET-2224CIS, PET-2224CIS, ET-2228CIS, PET-2228CIS	(P)ET-2224CIS_(P)ET-2228CIS_en.pdf				
Digital I/O Modules					
ET-2242, PET-2242	(P)ET-2242_en.pdf				
ET-2242U, ET-2242U-32, PET-2242U-32	ET-2242U_(P)ET-2242U-32_en.pdf				
ET-2251, PET-2251, ET-2251-32, PET-2251-32	(P)ET-2251_(P)ET-2251-32_en.pdf				
ET-2254, PET-2254, ET-2254P, PET-2254P	(P)ET-2254_(P)ET-2254P_en.pdf				
ET-2255, PET-2255, ET-2255-32, PET-2255-32	(P)ET-2255_(P)ET-2255-32_en.pdf				
ET-2255U, PET-2255U	(P)ET-2255U_en.pdf				
Relay Output/Digital Input Modules					
ET-2260, PET-2260	(P)ET-2260_en.pdf				
ET-2261, PET-2261	(P)ET-2261_en.pdf				
ET-2261-16	ET-2261-16_en.pdf				
ET-2268	ET-2268_en.pdf				

2.3 **Wiring Connections**

The user can find out the Wire Connections diagram for each model in the data sheet on the website.

Wire Connections

Relay Output	ON State Readback as 1	OFF State Readback as 0
Form A Relay in NO1, NO3, NO4, NO7		$\begin{array}{c c} \hline Load \\ \hline AC/DC \times \\ \hline \Box \end{array} \end{array} \begin{array}{c c} \hline D \\ \hline \Box \\ \hline \Box \\ \hline \Box \\ \hline \end{array} \end{array} \begin{array}{c} NOx \\ COMx \end{array}$
Form C Relay in NO0, NO2, NO4, NO6	× Load1 COMx COMx Load2 COMx NOx	← Load1 AC/DC × Load2 B COMx NOx



Note for the ET-2260/2261/2261-16/2268:

When inductive loads are connected to the relays, a large counter-electromotive force may occur when the relay actuates because of the energy stored in the load. These flyback voltages can severely damage the relay contacts and greatly shorten the relay life. To achieve circuit protection and control flyback voltages in your inductive load, install a flyback diode for DC loads or a metal oxide varistor for AC loads.



Varistor Selection:

Operating Voltage	Varistor Voltage	Max. Peak Current
100 ~ 120 V _{AC}	240 ~ 270 V _{AC}	> 1000 A
200 ~ 240 V _{AC}	440 ~ 470 V _{AC}	> 1000 A

-22 -

2.4 Wiring to the Connector

 \triangleright Insulated Terminals Dimensions (Unit: mm):



- A tip for connecting or removing the wire to the connector: \triangleright
 - 1. Use the blade of the flat-head screwdriver to push down the wire clamp.



2.5 Dimensions

The following diagrams provide the dimensions of the ET-2200 series module and can be used as a reference when defining the specifications for any custom enclosures. All dimensions are in millimeters.

➢ (P)ET-2215H



> (P)ET-2215H-16:

Note: the top view and rear view are the same with the (P)ET-2215H.



(P)ET-2218H/S1 = (P)ET-2218H + CN-1825M



(P)ET-2218H-16/S1 = (P)ET-2218H-16 + CN-1826M

Note: the top view and rear view are the same with the (P)ET-2218H/S1.



> (P)ET-2218HS-16



-26 -

(P)ET-2217, (P)ET-2217H:



(P)ET-2224, (P)ET-2228, (P)ET-2224P, (P)ET-2228P

Note: the left side view and rear view are the same with the (P)ET-2217.



Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-27 -

ET-2217CI, ET-2217CI-4, (P)ET-2224CI, (P)ET-2228CI, (P)ET-2224CIS, (P)ET-2228CIS:



ET-2217CI, ET-2217CI-4

(P)ET-2224CI, (P)ET-2228CI
 (P)ET-2224CIS, (P)ET-2228CIS





(P)ET-2242, ET-2242U, (P)ET-2254, (P)ET-2255, (P)ET-2255U,
 (P)ET-2260, (P)ET-2261, ET-2268:

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-29 -

(P)ET-2242U-32, (P)ET-2251-32, (P)ET-2255-32, ET-2261-16:



➢ (P)ET-2242U-32



((P)ET-2251-32, (P)ET-2255-32, ET-2261-16



Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

Top View

3. Getting Started

This chapter provides a basic overview of how to configure and operate your ET-2200 series module.

3.1 Configuring the Operating Mode

All ET-2200 series modules feature two operating modes, which can be selected by adjusting the switch on the module. **Note that it is necessary to reboot the module after modifying the operating mode.**

Init Mode

The Init Mode should be chosen when updating the firmware or conducting troubleshooting. In this mode, the configurations of the module will be forced to the default factory settings.

Run Mode

Run Mode is the default operating mode and should be used in most cases.



- 1. After updating the firmware, be sure to set the switch back to the "Run" position and reboot the module.
- 2. If the user cannot log in to the module's web server or forget the password, please refer to Appendix A to restore the factory default settings.



3.2 Connecting to the Network and the PC

All ET/PET-2200 series module are equipped with an RJ-45 Ethernet port to allow connecting to an Ethernet switch/hub or a PC.

Uses Non-PoE Switch



Uses PoE Switch (for PET-2200 only)



Note:

- 1) Before configuring the network, make sure that the ET-2200 and the PC are on the same subnetwork.
- 2) The valid range of power input for ET-2200 series modules will be different based on the model. For example, 10-30 VDC or 10-48 VDC.
- 3) Confirm that the PWR LED indicator on the front panel of the module is flashing.

3.3 Configuring the Network Settings

The **eSearch Utility** is a useful tool that provides a quick and easy method of configuring the Ethernet settings for the module from a PC.

Step1. Get the eSearch Utility

The eSearch Utility can be obtained from the ICP DAS website at:

Research_Utility_setup_Windows_v

https://www.icpdas.com/tw/download/show.php?num=6710

Step2. Install the eSearch Utility

Follow the setup wizard's instructions to complete the installation.



Once the installation is finished, a desktop shortcut for the eSearch Utility will appear.



Double-click the icon to run eSearch Utility.

Step3. Click the "Search Server" button to search for your module double-click the module name to start network settings

The factory settings of the module are as follows:

IP Address	192.168.255.1	Subnet Mask	255.255.0.0	Gateway	192.168.0.1	

🥩 eSearch Utility [v1.2.	.6, Dec.09, 2020]		- 0	×
File Server Tools					
Name	Alias	IP Address	Sub-net Mask	Gateway	^
ET-2217Cl	EtherIO	192.168.255.1	255.255.0.0	192.168.0.1	ו
ET-2260 (")	EtherIO	192.168.255.1	255.255.0.0	192.168.0.1	J
DL-302	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	
DL-302	EtherIO	192.168.101.15	255.255.0.0	192.168.1.1	\checkmark
<					>
Search Server	Configuratio	n (UDP) 🛛 😽	'eb	Exit	
Status					1

Step4. Configure the network settings and click the "OK" button.

Contact your Network Administrator to obtain the correct network configuration information. Modify the network settings and click the "**OK**" button to save the changes.

Note: Make sure that the IP addresses of the PC and the module are on the same sub-network.

Configure Server (UD)P)				×
Server Name :	ET-2217CI				
DHCP:	0: OFF 🔹	Sub-net Mask : 255.255.0.0	Alias:	8-ch Al	
IP Address :	192.168.79.1	Gateway : 192.168.1.1	MAC:	00:0d:e0:ff:ff:ff	_
Warning!! Contact your Ne	etwork Administrator to ge	t correct configuration before any changing!		OK Cancel	

Step 5: Search the module again and check the settings

Click the "Search Server" button to search the module again and check the settings are correct.

ø eSearch Utilit	ty [v1.2.6, Dec.0	9, 2020]			>	×
File Server To	ols					
Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	^
ET-2260	6-ch DI_DO	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0:65:e9:85	
ET-2217CI	8-ch Al	192.168.79.1	255.255.0.0	192.168.1.1	00:0d:e0:ff:ff:ff	
DL-302	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	00:0d:e0:92:06:69	
DL-302	EtherIO	192.168.101.15	255.255.0.0	192.168.1.1	00:0D:E0:92:00:A1	\sim
<					>	÷
Status	Server 0	Configuration (UDP)	We	:b	Exit	

3.4 Modbus TCP Testing

Step1. In the eSearch Utility, Select the "Modbus TCP Master" item from the "Tools" menu to open the Modbus TCP Master Utility.

🥩 eSearch l	Jtility [v1.2.6, Dec.09, 2020]			– 🗆 ×	<
File Server	Tools				
Name	Modbus RTU Master	Sub-net Mask	Gateway	MAC Address	^
ET-2260 ET-2217Cl DL-302 DL-302	Modbus TCP Master System Information 2 EtherIO 192.168.101.15	255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0	192.168.1.1 192.168.1.1 192.168.0.1 192.168.1.1	00:0d:e0:65:e9:85 00:0d:e0:ff:ff:ff 00:0d:e0:92:06:69 00:0D:E0:92:00:A1	
AUS-II-MF	ACS-11-MF 192.168.1.242	255.255.0.0	192.168.1.1	UU:UU:EU:CU:U4:T/	Ť
Status					

Step2. Enter the IP address and TCP Port for the ET-2200 module in the "Modbus TCP" section, and then click the "Connect" button to connect to the ET-2200.

Ę	, MBTC	P Ver. 1.1.5		×
6	Mod	busTCP	Protocol Description	
	IP	192.168.79.1	FC1 Read multiple coils status (0xxxx) for D0	<u> </u>
I	Port	502	Byte 0: Transaction identifier - copied by server - usually 0	Â
l		Disconnect	Byte 1: Transaction identifier - copied by server - usually 0 Byte 2: Protocol identifier=0 Byte 3: Protocol identifier=0 Byte 4: Field Length (upper byte)=0	~
[- Polling I	Mode (No Waiting) Start Stop	Statistic Difference Commands in Packet Total Packet Size (Bytes) 0 Packet Quantity Sent 0 0 0	Clear Statistic
	Interv	al 100 ms Set	Polling or Timer Mode (Date/Time) Polling Mode Timing (ms) Start Time Start Time Stop Time Stop Time	Average 000

Step3. Refer to the "Protocol Description" field in the top right-hand section of the Modbus Utility windows. You can send a request command and confirm that the response is correct.

Example:

The Modbus NetID for the ET-2200 is **1** (refer to Section 4.3.1). Please send the command "1 2 0 0 0 6 1 3 1 3 01" and the response will be "1 2 0 0 0 5 1 3 2 **22 17**" which indicates the model is 2217.

MBTCP Ver. 1.1.5	>
- ModbusTCP	Protocol Description
IP 192,168,79,1	FC1 Read multiple coils status (0xxxx) for D0
Post 502	[Prefixed 6 bytes for Modbus/TCP protocol] Byte 0: Transaction identifier - copied by server - usually 0
Pur Jose	Byte 1: Transaction identifier - copied by server - usually 0
Connect Disconnect	Byte 2: Protocol identifier=0 Byte 3: Protocol identifier=0
🔲 Data Log	Byte 4: Field Length (upper byte)=0
Polling Mode (No Waiting)	Statistic Clear Statistic
Start Stop	Commands in Packet Responses
	Total Packet Size (Bytes) 12 Uuantity Total Packet Size (Bytes) 11
Timer Mode (Fixed Period)	Packet Quantity Sent 1 Packet Quantity Received 1
Interval 100 ms Set	Polling or Timer Mode (Date/Time) Polling Mode Timing (ms)
	Start Time Max 0 Average
Start Stop	Stop Time Stop Time 000
[Byte0] [Byte1] [Byte2] [Byte3] [Byte4] [I	3yte5]
120006 1313001	Send Compand
[Byte0] [Byte1] [Byte2] [Byte3] [Byte4] [I	Syte5] [Byte1] [Byte1] [Byte2] [Byte3]
U	4
Defer to the every plai	n Section (2.2 and Section (2 Medbus Message Structure
Refer to the example i	n Section 6.2.3 and Section 6.2 Modbus Message Structure.
	Leading Request
1. Command	01 02 00 00 00 06 01 03 01 03 00 01
2. Doctoor	Leading Response
2. Response	01 02 00 00 00 05 01 03 02 22 17
	· · · · · · · · · · · · · · · · · · ·
4. Web Configuration

The Ethernet I/O module has a built-in Web Server to provide an intuitive web management interface, allowing users to modify the module's settings by using a web browser.

4.1 Logging into the Web Server

After completing the network settings, users can access the module's built-in web server from any computer that's connected to the same network. Follow these steps:

Step1. Open a web browser

Open a standard web browser. For example, Mozilla Firefox, Google Chrome, Internet Explorer, and so on.



Explorer

-37 -



Note that if you intend to use Internet Explorer, ensure that the cache function is disabled to avoid browser access errors.

Step2. Enter the IP address of the module into the address bar

Ensure that you have correctly configured the network settings for the I/O module, or refer to Section 3.3 "Configuring the Network Settings".



- **Note1:** The function tab will be different depending on the I/O type of the module.
- **Note2:** The "Sync" and "PWM" functions are only suitable for the DIO module.
- Note3: The "SNMP" function is unavailable for ET-2217CI /2217CI-4 (AI) and ET-2224CI/2228CI (AO) modules.

Step3. Enter the password

For the first time to log into the web interface, the default password must be changed. Enter the factory preset password "**Admin**" and give a new password. Then, click the "**Submit**" button.

ICP	Ethernet I/O Module Home Network I/O Settings MQTT (Topics: DO DI) SNMP	Sync PWM Pair Filter Monitor Password Logout
Change Passwor The length of the	d password is 12 characters maximum.	
Current pass	word:	The default password is "Admin"
New pass	word:	Submit
Committee pass		

Enter the new password in the "**Login password**" field and click the "**Submit**" button to log into the web server. Also, refer the Section 4.10 "Change Password".

ICP	Ethernet I/O Module Home Network I/O Settings Sync PWM Pair Filter Monitor Password Logout MQTT (Topics: DO DI) SNMP					
The system is lo To enter the wel	ogged out. b configuration, please type password in the following field					
Login password	Enter the new password					
Google Chrome:	Google Menu / Settings / Show advanced settings / Privacy / Content settings / Javascript / Allow all sites to run JavaScript (recommended).					
Microsoft IE:	Microsoft IE: Menu / Tools / Internet Options / Security / Internet / Custom level / Scripting / Enable.					
Firetox:	about:config / I'll be careful, I promise! / Preference Name / Javascript.enabled / True.					
When using IE, please disable its cache as follows. Menu items: Tools / Internet Options / General / Temporary Internet Files / Settings / Every visit to the page						

Step 4: Login to the web server

After logging into the module's web server, the Home page will be displayed. The function tabs will be different depending on the I/O type of the module. Please refer to the following screens.

-38 -

Analog Input, Analog Output

TCD	Ethernet I/O I	Module								
DAS	DAS Home Network I/O Settings MQTT Pair Filter Monitor Password Logout									
	Model Name ET-2217Cl Alias Name EtherIO									
	Firmware Version v2.0.2 [Jan.28, 2021] MAC Address 00-0D-E0-FF-FF									
	IP Address 102 168 70 117									
	TCP Port Timoout									
(Sock	et Watchdog, Seconds	180	(Netwo	rk Watchdog, Seconds)						
		-								
Analog Input Rea	dings									
Analo	g Input Channel	Range (40096)	Value (30000)	Low Latched (30544)	High Latched (30512)					
	AlO	08: +/-10 V	-00.085 fee8h	-00.086 fee5h	-00.085 feeah					
	Al1	08: +/-10 V	+00.013 002bh	+00.012 0027h	+00.013 002ch					
	AI2	08: +/-10 V	+00.024 0050h	+00.024 004eh	+00.025 0052h					
	AI3	08: +/-10 V	+00.038 007fh	+00.037 007ch	+00.039 0080h					
	Al4	08: +/-10 V	+00.002 0007h	+00.000 0001h	+00.002 0008h					
	AI5	08: +/-10 V	-00.005 fff0h	-00.005 fff0h	+00.000 fffeh					
	Al6	08: +/-10 V	+00.010 0021h	+00.000 0002h	+00.010 0022h					
	AI7	08: +/-10 V	+00.000 fffeh	+00.000 fffeh	+00.000 0000h					
				Clear Low Latched	Clear High Latched					
RTC										
					-					
	Date	e 2023-09-22		Time <mark>11:55:1</mark>	3					
Current Port Setti	Current Port Settings									
Pai	ir-Connection Setting	S		Port 1						
	Server Mod	e		Server						
	Remote Server I	C		Disabled						
	Remote TCP Po	t		Disabled						
Note: The abov	o Modbus addresses a	re all 0 based								

Digital Input, Digital Output

Ethernet I/O Module Home Network I/O Settings Sync PWM Pair Filter Monitor Password Logout MQTT (Topics: DO DI) SNMP								
	Model Name	ET-2260			Alias Name D	OIO		
	Firmware Version v	/2.4.0 [Sep.06 2	2022]		MAC Address 0	0-0d-e0-65-e9-85		
	IP Address 1	192.168.79.60			Initial Switch O)FF		
TCP Timeout (Socket Watchdog, Seconds) 180 System Timeout (Network Watchdog, Seconds) 0								
Digital I/O (M	odbus Address: D	00= 00000 to	00015, DI=10000) to 10015.)				
DO7	DO6	DO5	DO4	DO3 🕐	DO2	D01 🕐 D00	\bigcirc	
DI Channel	Value (1000	0)	/ (30016) (30064)	Frequency	High Latched (10032	2) Low Latched (100	064)	
D10			-		-	-		
DI1			-		-	-		
DI2			-		-	-		
DI3			-		-	-		

4.2 Home

The Home page provides users with information about the I/O module, as detailed below.

4.2.1 Home – DI/DO

The first section offers information about the module, including the model, alias, firmware version, MAC address, the module's IP address, the operating mode switch (Init = OFF), and Watchdog timeouts.

Note: After updating the firmware, the user can check the version number on this page.



The second section - Digital I/O provides information related to the current DIO status and DO control. Note: The user can click on the DO image to change the output status.

DO7	DO6 DO5	OO4 OO DO3 C	DO2 🕐 DO1	D00
DI Channel	Value (10000)	Counter (30016) / Frequency (30064)	High Latched (10032)	Low Latched (10064)
DI0:		-	-	-
DI1:		-	-	-
DI2:		-	-	-
DI3:		• -		-
DI4:		• -		-
DI5:		-	-	-
DI6:		-	-	-
DI7:		-	-	-
Note: Above	Modbus addresses are all 0	based		

Digital I/O (Modbus Address: DO=00000 to 00015, DI=10000 to 10015.)

4.2.2 Home – Al

This page will display different items depending on the model:

The first section offers information about the module, including the model, alias, firmware version, MAC address, the module's IP address, the operating mode switch (Init = OFF), and Watchdog timeouts.

Ethernet I/O Module	air Filter Monitor Password	l Logout
Model Name ET-2217Cl	Alias Name	EtherIO
Firmware Version v2.0.2 [Jan.28, 2021]	MAC Address	00-0D-E0-FF-FF-FF
IP Address 192.168.255.1	Initial Switch	OFF
TCP Port Timeout (Socket Watchdog, Seconds) 180	System Timeout (Network Watchdog, Seconds)	0

The second section - **Analog Input Readings**, provides information related to the AI data range, values, and latched values. In addition, the **Current Port Setting** can display information about the Pair-Connection function.



Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

indicates open wiring.

4.2.3 Home – AO

The first section offers information about the module, including the model, alias, firmware version, MAC address, the module's IP address, the operating mode switch (Init = OFF), and Watchdog timeouts.



The second section - Analog Output, provides information related to the AO data type, read value, open wire detection, power-on value, safe value, and slew rate. Also, the AO value can be set. **Note:** The OVP (Over-value Protection) settings are available for (P)ET-2224CIS/(P)ET-2228CIS.

Analog	Output	(Modbus	Address:	AO=40000	to 40007.)
		····			

AO Channel	Type (40459~466)	AO Read (40000~007)	AO Write (40000~007)	Submit Value	OVP Read Back (30000~007)	Wire Break (10290~297)
AO0:	0x32:0~+10V	0.000	0.000	Set Value	0.00	-
AO1:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO2:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO3:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO4:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO5:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO6:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO7:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO Channel	Power On Value (40360~367)	Safe Value (40392~399)	Slew Rate (40523~530)	OVP Alarm Status/Clear	OVP Alarm Value	OVP Alarm Enable
AO Channel AO0:	Power On Value (40360~367) 0.000	Safe Value (40392~399) 0.000	Slew Rate (40523~530) 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value	OVP Alarm Enable Disable
AO Channel AO0: AO1:	Power On Value (40360~367) 0.000 0.000	Safe Value (40392~399) 0.000 0.000	Slew Rate (40523~530) 0x00:Immediate 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value 0.00 0.00	OVP Alarm Enable Disable Disable
AO Channel AO0: AO1: AO2:	Power On Value (40360~367) 0.000 0.000 0.000	Safe Value (40392~399) 0.000 0.000 0.000	Slew Rate (40523~530) 0x00:Immediate 0x00:Immediate 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value 0.00 0.00 0.00	OVP Alarm Enable Disable Disable Disable
AO Channel AO0: AO1: AO2: AO3:	Power On Value (40360~367) 0.000 0.000 0.000 0.000	Safe Value (40392~399) 0.000 0.000 0.000 0.000	Slew Rate (40523~530) 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value 0.00 0.00 0.00 0.00	OVP Alarm Enable Disable Disable Disable Disable
AO Channel AO0: AO1: AO2: AO3: AO4:	Power On Value (40360~367) 0.000 0.000 0.000 0.000 0.000	Safe Value (40392~399) 0.000 0.000 0.000 0.000 0.000	Slew Rate (40523~530) 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value 0.00 0.00 0.00 0.00 0.00 0.00	OVP Alarm Enable Disable Disable Disable Disable Disable
AO Channel AO0: AO1: AO2: AO3: AO4: AO5:	Power On Value (40360~367) 0.000 0.000 0.000 0.000 0.000 0.000	Safe Value (40392~399) 0.000 0.000 0.000 0.000 0.000 0.000	Slew Rate (40523~530) 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value 0.00 0.00 0.00 0.00 0.00 0.00 0.00	OVP Alarm Enable Disable Disable Disable Disable Disable Disable
AO Channel AO0: AO1: AO2: AO3: AO4: AO5: AO6:	Power On Value (40360~367) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Safe Value (40392~399) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Slew Rate (40523~530) 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate 0x00:Immediate	OVP Alarm Status/Clear	OVP Alarm Value 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	OVP Alarm Enable Disable Disable Disable Disable Disable Disable Disable

Current port settings:

Pair-Connection Settings	Port 1
Server Mode	Server
Remote Server IP	Disabled
Remote TCP Port	Disabled

Note: Above Modbus addresses are all 0 based.

4.2.4 OVP (Over-value Protection) Mechanism

The (P)ET-2224CIS/(P)ET-2228CIS provides the OVP (Over-value Protection) function. The module will stop outputting when a voltage or current exceeds the OVP alarm value. In addition, the "OVP" indicator on the module's front panel will light up.

Users can enable the OVP function on the "I/O Settings" page and set the "OVP Alarm Value", then click the "Update Settings" button.



After completing the settings, the OVP status and the alarm value are displayed on the "Home" page.

Analog Output (Modbus Address: AO=40000 to 40007.)								
AO Channel	Type (40459~466)	AO Read (40000~007)	AO Write (40000~007)	Submit Value	OVP Read Back (30000~007)	Wire Break (10290~297)		
AO0:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO1:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO2:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO3:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO4:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO5:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO6:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO7:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-		
AO Channel	Power On Value (40360~367)	Safe Value (40392~399)	Slew Rate (40523~530)	OVP Alarm Status/Clear	OVP Alarm Value	OVP Alarm Enable		
AO0:	0.000	0.000	0x00:Immediate	Normal	9.00	Enable		
AO1:	0.000	0.000	0x00:Immediate	-	0.00	Disable		
AO2:	0.000	0.000	0x00:Immediate	-	0.00	Disable		

When the AO value is greater than or equal to the OVP alarm value, the screen will display the OVP readback value and the "Alarm" status.

Analog Output (Modbus Addu	Module VO Settings MQTT ress: AO=40000	" SNMP Pair Filte to 40007.)	er Monitor Passw	ord Logout	(1
AO Channel	Type (40459~466)	AO Read (40000~007)	AO Write (40000~007)	Submit Value	OVP Read Back (30000~007)	Wire Break (10290~297)
AO0:	0x32:0~+10V	9.499	9.5	Set Value	9.50	-
AO1:	0x32:0 ~ +10V	0.000	0.000	Set value	0.00	-
AO2:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO3:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.02	
AO4:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.0	
AO5:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.0 9.5	$5 V \ge 9 V$
AO6:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.0	
AO7:	0x32:0~+10V	0.000	0.000	Set Value	2 0.00	-
AO Channel	Power On Value (40360~367)	Safe Value (40392~399)	Slew Rate (40523~530)	OVP Alarm Status/Clear	OVP Alarm Value	OVP Alarm Enable
AO0:	0.000	0.000	0x00:Immediate	Alarm	9.00	Enable
AO1:	0.000	0.000	0x00:Immediate		0.00	Disable
AO2:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO3:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO4:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO5:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO6:	0.000	0.000	0x00:Immediate	-	0.00	Disable
A07:	0.000	0.000	0x00:Immediate	-	0.00	Disable

If the AO value later falls below the OVP alarm value, the user can click the "Alarm" button to clear the "Alarm" status.

Analog Output (Modbus Add	ress: AO=40000	to 40007.)			——(1)
AO Channel	Type (40459~466)	AO Read (40000~007)	AO Write (40000~007)	Submit Value	OVP Read Back (30000~007)	Wire Break (10290~297)
AO0:	0x32:0 ~ +10V	5.001	5	Set Value	5.00	-
AO1:	0x32:0 ~ +10V	0.000	0.000	Set value	0.00	-
AO2:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	-
AO3:	0x32:0~+10V	0.000	0.000	Set Value	0.	
AO4:	0x32:0~+10V	0.000	0.000	Set Value	^{0.} 5	V<9V
AO5:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.	
AO6:	0x32:0 ~ +10V	0.000	0.000	Set Value	0.00	
A07:	0x32:0~+10V	0.000	0.000	Set Value	2 0.00	-
		0 () ()				
AO Channel	Power On Value (40360~367)	Safe Value (40392~399)	Slew Rate (40523~530)	Status/Clear	OVP Alarm Value	OVP Alarm Enable
AO0:	0.000	0.000	0x00:Immediate	Normal	9.00	Enable
AO1:	0.000	0.000	0x00:Immediate	- 13	0.00	Disable
AO2:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO3:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO4:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO5:	0.000	0.000	0x00:Immediate	-	0.00	Disable
AO6:	0.000	0.000	0x00:Immediate	-	0.00	Disable
A07:	0.000	0.000	0x00:Immediate	-	0.00	Disable

4.3 Network



The *Network* page provides four sections, each of which will be described in more detail below.

1. IP Address:

It can be used to configure the Ethernet settings for ET-2200, e.g., the IPv4 address, the IPv6 address, DNS settings, and Modbus TCP Slave settings.

2. General Settings:

It can be used to configure the Ethernet speed, system timeout, TCP timeout, UDP heartbeat settings, and web auto-logout for ET-2200.

3. Other Operations:

It can be used to reset the ET-2200 to factory defaults or reboot, or remotely upgrade its firmware.

4.3.1 IP Address Configuration

IP Address

IPv4 Address				
Address Type	Static IP 🗸			
Static IPv4 Address	192 . 168 . 255 . 2			
Subnet Mask	255 . 0 . 0			
Default Gateway	192 . 168 . 0 . 1			
MAC Address	00-0d-e0-ff-ff-33 (Format: FF-FF-FF-FF-FF)			
IPv6 Address				
Link Local Address	fe80:0:0:0:20d:e0ff.feff.ff33			
SLAAC Address	0:0:0:0:0:0:0			
SLAAC Timeout (SLAAC Watchdog)	0 (30 ~ 65000 seconds, 0 = Default Disabled)			
User-defined Address	fc00:0:0:0:0:0:1			
DNS Settings	Client Mode Only			
Auto DNS Configuration	Enable (Auto DNS Server Configuration by IPv4 DHCP. Default = Enable)			
Preferred DNS Server IP	208.67.222.222 IPv4 example: 208.67.222.222, IPv6 example: 2620:119:35::35			
Alternate DNS Server IP	208.67.220.220 IPv4 example: 208.67.220.220, IPv6 example: 2620:119:53::53			
Modbus TCP Slave				
Local Modbus TCP port	502 (Default= 502)			
Local Modbus NetID	1 (Default= 1)			
Check Modbus NetID	Enable (Process messages with correct NetID only. Default = Enable)			
	Update Settings			

Note: The IPv6 Address and DNS settings are not supported for some models.

The table describes the parameters contained in the "IP Address Configuration" section.

Item	Description		
IPv4 Address			
	Static IP: If there is no DHCP server installed in your network, you can configure the network settings manually. Refer to Section"Manual Configuration" for more details.		
Address Type	DHCP: Dynamic Host Configuration Protocol (DHCP) is a network application protocol that automatically assigns an IP address to each device. Refer to the Section "Dynamic Configuration" for more details.		
Static IPv4 Address	This parameter is used to assign a specific IP address. Each ET-2200 module connected to the network must have its unique IP address.		
Subnet Mask	This parameter is used to assign the subnet mask for the ET-2200 module. The subnet mask indicates which portion of the IP address is used to identify the local network or subnet.		
Default Gateway	This parameter is used to assign the IP Address of the Gateway to be used by the ET-2200 module. A Gateway (or router) is a device that is used to connect an individual network to one or more additional networks.		
MAC Address	This parameter is used to set the User-defined MAC address, which must be in the format FF-FF-FF-FF-FF.		
IPv6 Address			
Link Local Address	Each IPv6 device connected to the network must have a link-local address. The address is auto-configured by (P)ET-2200 and is always effective in the same link layer.		
SLAAC Address	The (P)ET-2200 supports stateless address auto-configuration (SLAAC), which is automatically configured by the router. The default router is the link-local address of the router.		
SLAAC Timeout (SLAAC Watchdog)	This parameter is used to set the Timeout value of SLAAC. If the SLAAC address is not assigned within the specified time, the system will reboot and configure the SLAAC address again.		
User-defined Address	This parameter is used to set the IP address of the module. Each (P)ET-2200 connected to the network must have a unique IP address.		

-46 -

DNS Settings			
	Enable:		
Auto DNS Configuration	The IP address of the DNS Server is automatically set by IPv4 DHCP.		
	Disable:		
	Automatically set to the preferred IP address of the DNS Server.		
Droforrod DNS Sorver ID	This parameter is used to set the preferred IP address of the DNS		
Preierreu Divs server iP	Server.		
Alternate DNS Server IP	This parameter is used to set the alternate IP address of the DNS		
	Server.		
Modbus TCP Slave			
Local Modbus TCP port	This parameter is used to set the local port to be used by the Modbus slave device. The default value is 502.		
Local Modbus NetID This parameter is used to set the Network ID to be used Modbus slave device. The default value is 1.			
Update Settings	Click this button to save the changes.		

Dynamic Configuration

If your network is connected to a DHCP server, you can simply configure a dynamic IP address as follows.

Step 1: Select "**DHCP**" from the Address Type drop-down menu.

Step 2: Click the **"Update Settings"** button to complete the configuration.

IPv4 Address			
Address Type			
Static IPv4 Address	192 . 168 . 79 . 2		
Subnet Mask	255 . 255 . 0 . 0		
Default Gateway	192 . 168 . 1 . 1		
MAC Address	00-0d-e0-65-cf-d3 (Format: FF-FF-FF-FF-FF)		
Modbus TCP Slave			
Local Modbus TCP port	502 (Default= 502)		
Local Modbus NetID	1 (Default= 1)		
Check Modbus NetID	Enable (Process messages with correct NetID only. Default = Enable)		
Update Settings			

Manual Configuration

Follow the steps below to manually configure the IP address.

- **Step 1:** Select **"Static IP"** from the **Address Type** drop-down menu.
- **Step 2:** Enter the network settings of the module.

(The user can modify the network settings in Section 3.3)

Step 3: Click the **"Update Settings"** button to complete the configuration.

IPv4 Address			
Address Type	Static IP V		
Static IPv4 Address	192 . 168 . 79 . 2		
Subnet Mask	255 . 255 . 0 . 0		
Default Gateway	192 . 168 . 1 . 1		
MAC Address	00-0d-e0-65-cf-d3 (Format: FF-FF-FF-FF-FF)		
Modbus TCP Slave			
Local Modbus TCP port	502 (Default= 502)		
Local Modbus NetID	1 (Default= 1)		
Check Modbus NetID	Enable (Process messages with correct NetID only. Default = Enable)		
Update Settings			

4.3.2 General Settings

General Settings

Ethernet Speed	Auto • (Auto=10/100 Mbps Auto-negotiation)	
System Timeout (Network Watchdog)	0 (30 ~ 65535 s, Default= 0, Disable= 0) Action:Reboot	
TCP Timeout	180 (5 ~ 65535 s, Default= 180, Disable= 0) Action:Cut-off	
UDP Configuration	Enable (Enable/Disable the UDP Configuration, Enable=default.) 	
Web Auto-logout	10 (1 ~ 65535 minutes, Default= 10, Disable= 0)	
HTTP port	80 (Default= 80)	
Alias Name	EtherIO (Max. 18 chars)	
Update Settings		

The table describes the parameters contained in the "General Settings" section.

Item	Description		
Ethernet Speed	This parameter is used to set the Ethernet speed. The default value is Auto (Auto = 10/100 Mbps Auto-negotiation).		
System Timeout (Network Watchdog)	This parameter is used to configure the system timeout value. If there is no activity on the network for a specific time, the system will be rebooted based on the configured system timeout value.		
TCP Timeout (Seconds)	This parameter is used to configure the TCP timeout value. If Modbus TCP communication is idle for a specific time, the system will cut off the connection.		
UDP Configuration	This parameter is used to enable or disable the UDP configuration function.		
Web Auto-logout	This parameter is used to configure the automatic logout value. If there is no activity on the web server for a specific time, the current user account will automatically be logged out.		
Alias Name	This parameter is used to assign an alias name for each ET-2200 module to assist with easy identification.		
HTTP Port	This parameter is used to assign specific a HTTP port to the ET-2200 module. The ET-2200 needs to be restarted when the HTTP port is changed. You need manually type the new HTTP port in the address bar of the browser. The default is 80. For example, if the HTTP port is set to 81, then enter the "IP address: HTTP port" (10.0.8.123:81).		
Update Settings	Click this button to save the changes.		

-49 -

4.3.3 Restore Factory Defaults/Firmware Update

Other Operations

Restore all options to their factory default states	Restore Defaults
Reboot the module	Reboot
Firmware update via Ethernet If the remote firmware update is failed, then on-site firmware update is required to make the module working again. Step 1: Refer to firmware update manual first. Step 2: Run eSearch Utility to prepare and wait for update. Step 3: Click the [Update] button to reboot the module and start update. Step 4: Configure the module again.	Update

Note: This setup page may be different for some modules, but the functions are the same.

Restore all options to their factory default states

To reset all parameters to their original factory default settings, use the following procedure:

- **Step 1:** Click the **"Restore Defaults"** button to factory reset the module.
- **Step 2:** Click the **"OK"** button in the message dialog box.
- **Step 3:** Check whether the module has been reset to the original factory default settings for use with the **eSearch Utility.** Refer to Section 3.3 "Configuring the Network Settings".

Restor	e all option	is to thei	r factory default	states	Res	store Defaults
	1 c	92.168.79.1	says firm the restore, or Cance	I to retain existing s	ettings.	
	end a Source III			ок	Cancel	
	File Server	Tools Fact	tory Defaults			
	Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Addr ^
	ET-2217CI DL-302	EtherIO EtherIO	192.168.255.1 192.168.84.62	255.255.0.0 255.255.0.0	192.168.0.1 192.168.0.1	00:0d:e0:1 00:0d:e0:! v
	<					>
	Search	Server	onfiguration (UDP)	Web		Exit
	Status					1.

Reboot the module

The **Reboot the module** function can be used to remotely force the ET-2200 module to reboot. After that, enter the password to log into the main page.

Other Operations



Firmware Update

When updating the firmware, the module requires initialization on the LAN. In the case of earlier firmware updates, users had to manually set the operating switch to "Init" and reboot the module to complete the initialization. However, with the new firmware update, users can now initiate the initialization process by clicking the "**Update**" button on the module's web interface.



Visit the website to download the latest firmware of the ET-2200 module. Also, refer to the "ET-2200 Firmware Update Manual" for instructions.

https://www.icpdas.com/en/download/show.php?num=2632

When the module is installed remotely, you can also use remote control software (such as TeamViewer) to connect to the remote PC. This allows you to initialize the module and complete the firmware update through the web interface.



🚺 <u>Note:</u>

If the **remote firmware update** fails, it may result in the module not functioning properly. In such cases, execute the "Firmware Update" using the eSearch Utility and **manually** initiate the initialization. This should restore the module to its normal state.

-52 -

4.4 I/O Settings

The **I/O Settings** page allows you to configure the Digital Input, Digital Output, and Analog Input parameters for the ET-2200 series module.

4.4.1 DO Control



Digital Output	Modbus Address	Setting
Value	00007 - 00000	0x0 (CH 7 - 0:
		Update Settings

The table describes the parameters contained in the "**DO Control**" section.

Item	Description	
Set DO value	This parameter is used to manually assign a specific value for the DO.	
Update Settings	Click this button to save the changes.	

4.4.2 DI/DO Configuration

DI/DO Configuration:

Digital Output	Modbus Address	Setting		
Host/Slave Watchdog	40257	0 (10 ~ 65000 Seconds, Default= 0, Disable= 0)		
Enable Safe Value (Enable Watchdog)	00339 - 00332	<u>Охо</u> (СН 7 - 0: С С С . С С . С С . С . С С		
Safe Value	00274 - 00267	Охо (CH 7 - 0: С С С . С С С . С С С . С С С . С С . С С . С С . С С . С С С . С .		
Power-On Value	00242 - 00235	Бхо (CH 7 - 0: С С С , С С С , С С С , С С С , С С С , С С С , С С С , С С С , С С С С , С С С С С , С		
Digital Input	Modbus Address	Setting		
Enable Latched DI	00150	(Enable All = Checked)		
Clear Latched Status (High)	00032	Clear High = Checked)		
Clear Latched Status (Low)	00033	Clear Low = Checked)		
DI Filter Level	40201	0 (1 ~ 6000 ms, Default= 0, Disable= 0)		
Digital Counter	Modbus Address	Setting (Based on DI)		
Enable Digital Counter	00158 - 00151	Охо (СН 7 - 0: ССН 7 - 0: ССП СС)		
Clear Digital Counter	00041 - 00034	0x0 (CH7 - 0: 0 0 0 . 0 0 0)		
Preset Counter Value	40065 - 40050	Ch 07: 0 Ch 06: 0 Ch 05: 0 Ch 04: 0 Ch 03: 0 Ch 02: 0 Ch 01: 0 Ch 00: 0		
Frequency Measurement	Modbus Address	Setting (Based on DI)		
Enable Frequency Measurement	00197 - 00190	Охо (СН 7 - 0: С С С . С С С . С С С .)		
Scan Mode	40150	Single pulse ▼ 1000 ms: 1 Hz ~ 3 kHz (+/- 1 Hz error). 100 ms: 100 Hz to 3 kHz (+/- 10 Hz error). Single-pulse: 0.01 Hz ~ 1 Hz (+/- 0.01 Hz error), for stable signal only. Note: ET-2254P supports counter/frequency up-to 2.5 kHz.		
Moving Average	40200	1		
Universal DIO	Modbus Address	Setting (for ET-2254/P Only)		
Configuration Mode	00299	Dynamic V Static: By "Force DI/DO Mode" configuration. Dynamic: Depends on DO requests.		
Force DI/DO Mode	00307 - 00300	0x0 (CH 7 - 0:		
	Update Settings			

The table describes the parameters contained in the "**DI/DO Configuration**" section.

Item	Description				
Digital Output					
Host/Slave Watchdog Timeout	This parameter is used to configure the Host Watchdog timeout value. If there is no Modbus TCP communication activity for the specified period (the timeout), then the Host Watchdog will activate an alarm.				
Enable Safe Value (Enable Watchdog)	This parameter is used to enable the watchdog on each DO channel.				

Item	Description
Safe Value	This parameter is used to define the DO safe value for the ET-2200 module. If the Host Watchdog alarm is activated, the DO will be set to the user-defined safe value.
Power-On Value	This parameter is used to define the DO Power-on value. On boot-up, the DO is set to the user-defined Power-on value.
Digital Input	
Enable Latched DI	This parameter is used to enable the latch function on all DI channels. The status of the DI will be recorded if it has been flagged as either high or low. 0 = Disable All; 1 = Enable All
Clear Latched Status (High)	This parameter is used to clear the status of all high-latched D/I. 0 = No Operation; 1 = Clear All
Clear Latched Status (Low)	This parameter is used to clear the status of all low-latched D/I. 0 = No Operation; 1= Clear All
DI Filter Level	The DI filter eliminates high-frequency noise from the input and can be adjusted in a range of 1 to 6500 (ms). Refer to Appendix A.4 "What is Digital-Input Filter (DI Filter)" for more details.
Digital Counter	
Enable Digital Counter	This parameter is used to enable the digital counter on each DI channel.
Clear Digital Counter	This parameter is used to clear the values of each DI counter.
Preset Counter Value	This parameter is used to set the default value for each DI counter.
Frequency Measurement	t (DI)
Enable Frequency Measurement	This parameter is used to enable the frequency measurement function on each DI channel.

Item	Description				
	 This parameter is used to define the scan mode for the frequency measurement. 1000 ms: This mode provides a normal update rate and normal accuracy. The acceptable frequency range for the input signal is 1 Hz to 3 kHz (± 1 Hz error). This mode can be used when the pulse width (signal source) contains small errors since the measurement is based on the pulse count. 				
Scan Mode	100 ms: This mode provides a fast update rate, but the accuracy is low. The acceptable frequency range for the input signal is 100 Hz to 3 kHz (± 10 Hz error). This mode can be used when the pulse width (signal source) contains small errors since the measurement is based on the pulse count .				
	 Single-pulse: This mode provides the highest accuracy but can only be used for a stable signal. The data update rate depends on the signal frequency and the acceptable signal frequency range for the input signal is 0.01 Hz to 3.5 kHz (± 0.01 Hz error). This mode can only be used when the pulse width (signal source) is stable since the measurement is based on the width of a single pulse. 				
Moving Average	1 ==> No Average is used 2 ==> Uses the average of 2 continuous sample values 4 ==> Uses the average of 4 continuous sample values 8 ==> Uses the average of 8 continuous sample values				
Universal DIO					
Force DI/DO Mode For ET-2254(P) only	Dynamic: Dynamic I/O type based on DO requests. Static: Static I/O type by configuration (web or Modbus). Image: Ox0 (CH 7 - 0: Image: Ox0 (CH				
Update Settings	1 ==> DI; 0 ==> DO Click this button to save the changes.				

4.4.3 Analog Input Configuration



(A) Voltage/Current Input

Al Channel	Type (40427~434)	Channel Enable (00595~602)	Hi Alarm Enable (00636~643)	Hi Alarm Mode (00700~707)	Hi Alarm Value (40296~303)	Low Alarm Enable (00668~675)	Low Alarm Mode (00732~739)	Low Alarm Value (40328~335)
AI0:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
Al1:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
Al2:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
Al3:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
Al4:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
AI5:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
Al6:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
AI7:	0x07:4~20mA 🗸	Disabled ~	Disabled ~	Momentary ~	0.000	Disabled ~	Momentary ~	0.000
Modbus Format	Hexadecimal ~	Action: Modbi Engineering	Action: Modbus Read/Write Format Hexadecimal or Engineering					
Sampling Rate	Normal ~	Action: AI Sampling Rate setting support the alarm function.						
Analog Input Mode	Differential ~	Action: Analog Input Mode Differential or Single End						
	Update Settings							

The table describes the parameters contained in the "Analog Input Configuration" section.

Item	Description				
Analog Input Channel					
AI0 ~ AI7	Set the data range for each channel and whether to enable or disable it. If the alarm is enabled and the alarm mode is set to "Momentary" which means the alarm status will automatically be cleared if the alarm occurred and the AI value is back to normal. If the mode is set to "Latch", the alarm status can only be cleared by using the Clear command.				
Analog Input					
Data Format	Set the data format, e.g., Hex or Engineering.				
Sampling Rates	Set the sampling rate, Fast or Normal mode.				
Analog Input Mode	Set the wiring mode, e.g., Differential or Single End.				
Update Settings	Click this button to save the changes.				

(B) <u>RTD Input</u>

DAS Home Network I/O Settings QTT (Topics: AI) SNMP Filter Monitor Password Logout nalog Input Configuration:						
Analog Input		Settings				
Sampling Rates (00141)	Fast 🗸					
Moving Average (40497)	1 (1 ~ 128, Default = 1)					
Analog Input Channel	Range (40212) 🗌 All as Al0	Temperature Offset (40288)	Resistance Offset (40384)			
AIO	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
Al1	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
Al2	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI3	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
Al4	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI5	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
Al6	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI7	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
Al8	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
Al9	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI10	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI11	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI12	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI13	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI14	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
AI15	86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00			
	Update Set	tings				

The table describes the parameters contained in the **Analog Input Configuration** section.

Item	Description				
Analog Input					
Sampling Rates	Set the sampling rate, Fast or Normal mode.				
Moving Average	Set the moving average value of temperature.				
Analog Input Channel	Analog Input Channel				
AI0 ~ AI15	Set the temperature range, temperature offset, and resistance offset for each channel.				
Update Settings	Click this button to save the changes.				

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-58 -

(C) <u>Thermocouple Input</u>

nalog Input Configuration:							
Analog Input	t Settings						
Sampling Rates (00141)	Fast V						
Moving Average (40497)	1 (1 ~ 128, Default = 1)						
CJC, Cold Junction Compensation (00267)	Enable 🗸						
Module CJC Offset (40490)	0.0						
Analog Input Channel	Range (40212) 🗌 All as Al0	Temperature Offset (40288)	Channel CJC Offset (40384)				
AI0	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
Al1	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
AI2	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
AI3	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
Al4	0F Type K Thermocouple, -270 ~ 1372°C 🗸 🗸	0.0	0.0				
AI5	0F Type K Thermocouple, -270 ~ 1372°C 🗸 🗸	0.0	0.0				
Al6	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
AI7	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
AI8	0F Type K Thermocouple, -270 ~ 1372°C 🔹	0.0	0.0				
AI9	0F Type K Thermocouple, -270 ~ 1372°C 🔹	0.0	0.0				
AI10	0F Type K Thermocouple, -270 ~ 1372°C 🔹	0.0	0.0				
Al11	0F Type K Thermocouple, -270 ~ 1372°C 🔹	0.0	0.0				
AI12	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
AI13	0F Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0				
Al14	0F Type K Thermocouple, -270 ~ 1372°C 🔹	0.0	0.0				
	0 E Type K Thermocouple -270 ~ 1372°C ▼ 0.0						

The table describes the parameters contained in the Analog Input Configuration section.

Item	Description			
Analog Input				
Sampling Rates	Set the sampling rate, Fast or Normal mode.			
Moving Average	Set the moving average value of temperature.			
CJC, Cold Junction Compensation	Enable/Disable the cold junction compensation. (Accuracy is 0.1°C)			
Module CJC Offset	Set the CJC offset of the module. (Accuracy is 0.1°C)			
Analog Input Channel				
AI0 ~ AI15	Set the temperature range, temperature offset, and CJC offset for each channel.			
Update Settings	Click this button to save the changes.			

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-59 -

4.4.4 AI - Calibration

(A) Voltage/Current Input

Calibration					
Now Mode	C	Change Mode			
Run	C	alibration Mode			
Channel	Item	Set Calibration			
0 ~	Zero 🗸	Calibration Apply			
Warning: Incorrect manual calibration will cause your device's input imprecise. 1.Use "Calibration Mode" button to enter Calibration mode. 2 Select which Channel & Type going to manual calibration, then press "Update Settings" on top					
2.Select which Channel & Type g	oing to manual calibration, then p	ress "Update Settings" on top.			

3.Apply the full scale source to the channel's Type(0x08,0x09,0x05,0x0A,0x0B,0x1A).

4.DMM(Digit Multimeter) is needed to measure the input as close as the full scale value.

5. Press "Calibration Apply" will calculate & store the value.

Note: Use "Restore Defaults" on Network page, can recover your calibration value from factory default.

The following table provides parameter notes for the **Calibration** section:

Item	Description				
Calibration					
Now Mode	Used to display the current mode				
Change Mode	Click the Calibration Mode (or Run Mode) button to change the mode				
Channel	Choose the AI channel for calibration				
Item	Choose to use either zero calibration or span calibration				
Set Calibration	Click the Calibration Apply button to perform calibration				

Step1: In the Analog Input Configuration section of the I/O Settings page, enable the AI channel and select the Type and Modbus Format, then click the Update Settings button to save the changes.

Analog Input Configuration								
Al Channel	Al Channel Type Channel Enable Hi Alarm Enable (00595~602) Hi Alarm Enable (00636~643) Hi Alarm Mode (40296~303)							
AI0:	0x08:0~+10V 🗸	Enabled Disabled Momentary 0.000						
Al1:	0x08:0~+10V 🗸	Enabled V Disabled V Momentary V 0.000						
Modbus Format	Engineering Action: Modbus Read/Write Format Hexadecimal or Engineering							
Sampling Rate	Sampling Rate Normal V Action: AI Sampling Rate setting							
				Update S	Settings			

Step2: In the **Calibration** section of the **I/O Settings** page, click the **Calibration Mode** button to get into the calibration mode.



Step3: Choose a channel for calibration and link the module to a voltage source (or current source) and a multimeter.

Voltage Calibration:

Current Calibration:

The module, voltage sources, and meter are linked in **series**.

The module, current sources, and meter are linked in **parallel**.





Step4: Choose the **Zero** calibration, input voltage (or current) via a digital multimeter, and check the input value using a multimeter. Click the **Calibration Apply** button to perform the calibration.

Note: The input voltage (or current) must be as close as the min/max value. For example,

Туре	08: 0 ~ +10V	1A: 0 ~ +20mA
Zero Input Value	0V	0mA
Span Input Value	10V	20mA

Step5: Follow the same way to perform **Span** calibration.

- **Step6:** After completing the Zero and Span calibration, click the "**Run Mode**" button to back to the Run mode.
 - **Note:** The user can click the **Restore Defaults** button on the **Network** page to restore the settings to the factory defaults.

(B) <u>RTD Input</u>

Analog Input Calibration

Analog Input Channel	Range	Zero Calibration Resistance	Span Calibration Resistance
AIO	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al1	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI2	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI3	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al4	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI5	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al6	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI7	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI8	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI9	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al10	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al11	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al12	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI13	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al14	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
AI15	86: Pt100, 0.00385, -100 ~ 300 °C	0 Ω	300 Ω
Al Channel	A10 V	Calibration Type	Zero 🗸
	Calit	prate	
lotes: . It is recommended to set moving	average to 128 during calibration for	r fast mode.	

Reload

Reload Factory Calibration Parameters

Follow these steps to perform calibration:

Step1: In the Analog Input Configuration as noted in section 4.4.3, choose the "Fast" mode in the Sampling Rates field and enter "128" in the Moving Average field, then click the Update Settings button.

A	Analog Input Configuration:				
	Analog Input				Settings
	Sampling Rates (00141)	Fast	*		
	Moving Average (40497)	128		(1 ~ 128, Default = 1)	

AI15 86 Pt100, α=0.00385, -100 ~ 300°C 🗸	0.00	0.00
Update Set	ttings	

Note:

- 4) It's recommended to set the **Moving Average** to "**128**" while calibrating in fast mode.
- 5) When calibrating each I/O channel, the user must perform the Zero calibration before the Span calibration.

Step2: In the Analog Input Calibration section, specify the AI channel to be calibrated (e.g.,

"AI15") and connect a resistance with 0 Ω . Next, choose "Zero" in the **Calibration Type**

field and click the Calibration button.



Step3: Connect a resistance with 300 Ω to the specified channel (e.g., AI15) and choose "Span"

in the **Calibration Type** field, and then click the **Calibration** button.

AI15 86: Pt100, 0.00385, -100 ~ 300 °C	(20		300 Ω
Al Channel Al15 V		Calibration Type	Span 🗸	
Calit	orate			

Now, the user has done the Zero/Span calibration. If it's necessary, the user can click the **Reload** button to restore the factory reset.

Reload Factory Calibration Parameters	Reload	

(C) <u>Thermocouple Input</u>

ICP Ethernet			
DAS Home Netwo	ori I/O Settings MQTT (Topics: AI) SNMP	Filter Monitor Password I	Logout
Analog Input Configurati	on:		
Analan Innut		0 attin a a	
Sampling Rates (00141)	Fast V	Settings	
Moving Average (40497)	128 (1 ~ 128 Default = 1)		
C.IC. Cold Junction	120		
Compensation (00267)	Enable V		
Module CJC Offset (40490)	0.0		
Analog Input Channel	Range (40212) 🗆 All as Al0	Temperature Offset (40288)	Channel CJC Offset (40384)
AIO	OF Type K Thermocouple, -270 ~ 1372°C 🗸 🗸	0.0	0.0
Al1	OF Type 5 Thermocouple, -210 ~ 760 C	0.0	0.0
Al2	10 Type T Thermocouple, -270 ~ 400°C	0.0	0.0
AI3	11 Type E Thermocouple, -270 ~ 1000°C 12 Type R Thermocouple, 0 ~ 1768°C	0.0	0.0
Al4	13 Type S Thermocouple, 0 ~ 1768°C	0.0	0.0
AI5	14 Type B Thermocouple, 0 ~ 1820°C 15 Type N Thermocouple, -270 ~ 1300°C	0.0	0.0
Al6	16 Type C Thermocouple, 0 ~ 2320°C	0.0	0.0
AI7	17 Type L Thermocouple, -200 ~ 800°C 18 Type M Thermocouple, -200 ~ 100°C	0.0	0.0
Al8	19 Type LDIN43710 Thermocouple, -200 ~ 900°C	0.0	0.0
Al9	OF Type K Thermocouple, -270 ~ 1372°C 🗸 🗸	0.0	0.0
AI10	OF Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0
AI11	OF Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0
AI12	OF Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0
AI13	OF Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0
AI14	OF Type K Thermocouple, -270 ~ 1372°C 🗸	0.0	0.0
AI15	OF Type K Thermocouple, -270 ~ 1372°C 🗸 🗸	0.0	0.0
Update.Settings			

Follow these steps to perform calibration:

- **Step1:** In the **Analog Input Configuration** section, choose the "Fast" mode in the **Sampling Rates** field and enter "128" in the **Moving Average** field.
- **Step2:** Set the type for the channel that you want to calibrate (e.g., AIO, Type K), and click the **Update Settings** button.
- Step3: In the Analog Input Calibration section, select the AI channel (e.g., "AIO") to be calibrated, choose "Zero" in the Calibration Type field, apply 0 mV of input voltage, and click the Calibration button.

Analog Input Calibration

Analo	og input Channel	Range	Zero Calibration Voltage	Span Calibration Voltage
	AI0	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	Al1	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	Al2	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI3	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	Al4	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI5	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI6	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI7	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI8	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	Al9	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI10	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI11	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI12	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI13	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	AI14	0F: Type K Thermocouple, -270 ~ 1372 °C	0 mV	75 mV
	A115	OF: Type K Thermocouple, 270 1072 °C	0 mW	75 m V
	Al Channel	Alo V	Calibration Type	Zero 🗸
		Calibrat	ie	Span v
too:				
. It is recommended to set moving average to 128 during calibration for fast mode. For each range of each channel, the zero calibration must be performed first then the span calibration				

Step4: Choose "**Span**" in the **Calibration Type** field, apply **75 mV** of input voltage to the specified channel, and then click the **Calibration** button.

Al Channel Al0 🗸		Calibration Type Span	✓
Са	ibrate		

For now, the user has completed the calibration. If it's necessary, the user can click the **Reload** button to restore the factory reset.

Reload Factory Calibration Parameters	Reload]
	×	

4.4.5 AI - RTC

The function is used to set the system time and click the "**Update Settings**" button to save the revised settings to the ET-2200 module.

RTC	
Year	2022 (2000 to 2159)
Month	6 (1 to 12)
Date	13 (1 to 31)
Hour	11 (0 to 23)
Minute	5 (0 to 59)
Second	50 (0 to 59)
	Update Settings

4.4.6 AI - Data Logger

Data Logger

Status	Running
Change Logging	Run 🗸
Overwrite on Full	No 🗸
Sampling Interval - Second	1 (0 to 65535)
Sampling Interval - Millisecond	0 (0 to 1000, in 5 ms step)
Period Start - Year	2021 (2000 to 2159)
Period Start - Month	9 (1 to 12)
Period Start - Date	6 (1 to 31)
Period Start - Hour	11 (0 to 23)
Period Start - Minute	30 (0 to 59)
Period Start - Second	0 (0 to 59)
Period End - Year	2021 (2000 to 2159)
Period End - Month	9 (1 to 12)
Period End - Date	6 (1 to 31)
Period End - Hour	17 (0 to 23)
Period End - Minute	0 (0 to 59)
Period End - Second	0 (0 to 59)
	Update Settings
Reset data logger to empty	Reset Data Logger

The table describes the parameters contained in the "Data Logger" section.

Item	Description
Status	Display the current status of data logging.
Change Logging	Set the status of data logging. It can be set to Stop, Run, Period, Pause, and Continue.
Overwrite on Full	Whether to overwrite data when it is full. It can be set to Yes or No.
Sampling Interval - Second	The time interval for logging data. (Range: 0-65535, Unit: second)
Sampling Interval - Millisecond	The time interval for logging data. (Range: 0-1000, in 5 ms step)
Period Start- Year, Month, Date, Hour, Minute, Second	The start time for logging data. (Year/Month/Date/Hour/Minute/ Second).
Period End- Year, Month, Date, Hour, Minute, Second	The end time for logging data. (Year/Month/Date/Hour/Minute/ Second).

Reset data logger to empty

Click the "Reset Data Logger" button to remove data.

4.4.7 Analog Output Configuration

Analog Output Configuration								
AO Channel	Type (40459~466)	Power On Value (40360~367)	Safe Value (40392~399)	Slew Rate (40523~530)	OVP Alarm Value (40580~587)	OVP Enable (00340~347)	Retained Enable (00769~776)	
AO0:	0x32: 0 ~ +10V 🗙	0.000	0.000	0x00:Immediate V	0.00	Disabled \checkmark	Disabled \checkmark	
AO1:	0x30: 0 ~ 20mA	0.000	0.000	0x00:Immediate 🗸	0.00	Disabled V	Disabled \checkmark	
AO2:	0x32: 0 ~ +10V	0.000	0.000	0x00:Immediate V	0.00	Disabled V	Disabled \checkmark	
AO3:	0x34: 0 ~ +5V	0.000	0.000	0x00:Immediate 🗸	0.00	Disabled V	Disabled \checkmark	
AO4:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate 🗸	0.00	Disabled V	Disabled \checkmark	
AO5:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate 🗸	0.00	Disabled V	Disabled \checkmark	
AO6:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate 🗸	0.00	Disabled 🗸	Disabled \checkmark	
AO7:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate 🗸	0.00	Disabled 🗸	Disabled \checkmark	
Modbus Format Hexadecimal V Action: Modbus Read/Write Format Hexadecimal or Engineering								
Host Timeout (Safe Value/Enable, Seconds) 0 (5 ~ 65535 s, <5 = Default Disabled) Action:AO Output Safe Value								
			Up	odate Settings				

The table describes the parameters contained in the "Analog Output Calibration" section.

Item	Description			
AO Channel				
	Set the data type, Power-on value, Safe value, and Slew Rate for each channel.			
AO0 ~ AO7	Note that the "OVP Alarm Value", "OVP Enable", "Retained Enable" settings are only available for (P)ET-2224CIS, (P)ET-2228CIS.			
	"OVP" stands for "Over-value Protection" which means when the AO value exceeds the set "OVP Alarm Value", the module will stop outputting values.			
Modbus Format	Set the data format. It can be Hexadecimal or Engineering			
Host Timeout	This parameter is used to configure the Host Watchdog timeout value. If there is no Modbus TCP communication activity for the specified period (the timeout), the AO will be set to the user-defined safe value.			
Update Settings	Click this button to save the changes.			

4.4.8 AO - Calibration

Calibration					
Now Mode	Change Mod	le			
Run	Calibration Mod	de			
Channel	Set Output	Set Calibration			
0 🗸	0 Set	Calibration Apply			
 Warning: Incorrect manual calibration will cause your device's output imprecise. 1.Use "Calibration Mode" button to enter Calibration mode. 2.Select Channel & Type(0x30,0x31,0x32,0x33,0x34,0x35) for manual calibration, then press "Update Settings" on top. 3.Calibration Type 0x30(20mA) before Type 0x31(4mA). 4.Try the Engineering value(18800~18900[20mA], 6900~7100[4mA], 9900~9990[10V], 4900~4990[5V]), to get the full scale value. 5 Press "Set" to make the output change 					
6.DMM(Digit Multimeter) is needed to measure the output as close as the full scale value.					
7.Press "Calibration Apply" will calculate & store the value.					
Note: Use "Restore Defaults" on Network page, can recover your calibration value from factory default.					

The following table provides parameter notes for the **Calibration** section:

Item	Description		
Calibration			
Now Mode	Used to display the current mode		
Change Mode	Click the Calibration Mode (or Run Mode) button to change the mode		
Channel	Choose the AO channel for calibration		
Set Output	Enter the voltage/current output value		
Set Calibration	Click the Calibration Apply button to perform calibration		

Step1: In the Analog Output Configuration section of the I/O Settings page, Select the Type and Modbus Format, then click the Update Settings button to save the changes.

Analog Output Configuration						
AO Channel	Туре	Power On Value	Safe Value	Slew Rate		
	(40459~466)	(40360~367)	(40392~399)	(40523~530)		
AO0:	0x32: 0 ~ +10V 🛛 🗙	0.000	0.000	0x00:Immediate 🗸		
AO1:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate 🗸		
AO2:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate V		
AO3:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate 🗸		
AO4:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate V		
AO5:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate V		
AO6:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate V		
A07:	0x32: 0 ~ +10V 🗸	0.000	0.000	0x00:Immediate V		
Modbus Format	Engineering 🗸	Action: Modbus Read/Write For	mat Hexadecimal or Enginee	ring		
Host Timeout (Safe Value/Enable, Seconds)	0	(10 ~ 65000 s, 0 = Default Disa	bled) Action:AO Output Safe	Value		
		Update	Settings			

Step2: In the **Calibration** section of the **I/O Settings** page, click the **Calibration Mode** button to get into the calibration mode.



Step3: Choose a channel for calibration and link the module to the digital multimeter.







Step4: In the **Set Output** field, enter a maximum voltage (or current) value in Engineering format and click the **Set** button. Also, check the output value using a digital multimeter. Click the **Calibration Apply** button to perform the calibration.

Туре	+10V	+5V	4mA	20mA
Full-scale Range	9900 ~ 9990	4900 ~ 4990	6900 ~ 7100	18800 ~ 18900

<u>Note</u>: The output voltage (or current) must be very close to the full-scale value.

For example, when calibrating a 10 V output, the output should be between 9900 and 9990. If the digital multimeter displays "10.0315V" while the output is set to 9900, the user can lower the output to the value (9960) that is closest to the 10 V shown on the digital multimeter. Afterward, click the **Calibration Apply** button.

Now Mode	Change Mo	de 3
Calibration	Run Mode	
Channel	1 Set Output	Set Calibration 2
0 🗸	9960 Set	Calibration Apply

Step5: After completing the calibration, click the "**Run Mode**" button to back to the Run mode.

Note: The user can click the **Restore Defaults** button on the **Network** page to restore the settings to the factory defaults.

4.5 Sync

<u>Note:</u> The function is available for **DIO** modules.



The **DIO Synchronization** section on the **Sync** page allows you to configure the Synchronous DIO, Min-switching time of DO, and Auto-off Time of DO for the ET-2200 series module, each of which will be described in more detail below.

4.5.1 DIO Synchronization

DIO Synchronization

Synchronous DIO (Local Mirror)	Modbus Address	Setting					
Level Sync (DO=DI)	00403 - 00396	0x0 (CH 7 Set the DO state to th	Dx0 (CH 7 - 0: CH 7 - 0: C				
Rising Active (DO=ON)	00419 - 00412	0x0 (CH 7 Turn ON DO when D	Dx0 (CH 7 - 0:				
Falling Active (DO=ON)	00435 - 00428	0x0 (CH Turn ON DO when D	0x0 (CH 7 - 0:				
Additional Controls	Modbus Address	Setting					
Min-Switching Time of DO (0 to 65000 Seconds)	40283 - 40268	DO 15:0 DO 11:0 DO 07:0 DO 03:0	DO 14:0 DO 10:0 DO 06:0 DO 02:0	DO 13: 0 DO 09: 0 DO 05: 0 DO 01: 0	DO 12: 0 DO 08: 0 DO 04: 0 DO 00: 0		
Auto-off Time of DO (0 to 65000 Seconds)	40299 - 40284	DO 15:0 DO 11:0 DO 07:0 DO 03:0	DO 14:0 DO 10:0 DO 06:0 DO 02:0	DO 13:0 DO 09:0 DO 05:0 DO 01:0	DO 12:0 DO 08:0 DO 04:0 DO 00:0		
Update Settings							
The table describes the parameters contained in the "**DIO Synchronization**" section.

Item	Description							
Synchronous DIO (Local Mirror)								
Note:	Note:							
ET-2254 supports these func	tions when low 8-bit is DI0 to DI7 and high 8-bit is DO8 to DO15.							
Level Sync (DO = DI)	This parameter is used to enable the synchronization operation in Digital Input/Output function.							
Rising Active (DO = ON)	This parameter is used to enable rising activation in the Digital Input function. When the specified DI state changes from OFF to ON, the corresponding DO will be set to ON.							
Falling Active (DO = ON)	This parameter is used to enable falling activation in the Digital Input function. When the specified DI state changes from ON to OFF, the corresponding DO will be set to ON.							
Additional Controls								
Min-Switch Time of DO (0 to 65535 Seconds)	This parameter is used to set the minimum switching time between the ON and OFF states of the Digital Output. This protects some machines from being damaged by too many ON/OFF switches in a short time.							
Auto-off Time of DO (0 to 65535 Seconds)	This parameter is used to set the auto-off time of the Digital Output. If the Digital Output is ON, the Digital Output will be auto-off based on the configured time value.							
Update Settings	Click this button to save the changes							

4.6 PWM

<u>Note:</u> The function is available for **DIO** modules.



The **PWM Configuration** section on the **PWM** page allows you to enable and configure the PWM parameters for the ET-2200 series module, including the PWM Alarm and duty cycle, etc., each of which will be described in more detail below.

Note: Because of the characteristics of the relay functions, it is recommended that the PWM on the ET-2260/2261/2268 module (i.e., modules with relay functions) is not used for extended periods.

4.6.1 PWM Configuration

PWM Configuration:

PWM Functions	Modbus Address	Setting				
Enable PWM	00107 - 00100	(СН 7 - 0: ССН 7 - 0: СССССССССССССССССССССССССССССССССС				
Enable PWM Alarm	00371 - 00364	Activates the PWM/DO outputs when Host/Slave Watchdog Timeout)				
Duty Cycle	40115 - 40100	DO 07: (0 , 0) DO 06: (0 , 0) DO 05: (1000 , 1000) DO 04: (1000 , 1000) DO 03: (1000 , 1000) DO 02: (1000 , 1000) DO 01: (1000 , 1000) DO 00: (1000 , 1000) (High, Low: 10 ~ 65000 ms, 0= Disable)				
Update Settings						

The table describes the parameters contained in the "PWM Configuration" section.

Item	Description	Defaults
Enable PWM	This parameter is used to enable the PWM output function.	0
Enable PWM Alarm	This parameter is used to enable the PWM output alarm function when the Host/Slave watchdog timeout.	0
Duty Cycle	This parameter is used to set the duty cycle for the DO channels. Two values are required for each DO channel. The first value is the high pulse width, while the second is the low pulse width. The duty cycle is in 1 ms units, and the resolution is approximately 5 ms. (10 to 65535 ms). A value of 0 will disable the duty cycle functions for that channel.	1000 (ms)
Update Settings	Click this button to save the changes.	

Pair Connection 4.7



On the Pair page, within the Pair Connection Settings section, users can enable and configure the I/O pair-connection function of the module using Modbus TCP. This allows for the establishment of logic connections between Local and remote I/O, as explained below.

I/O Pair-Connection Settings 4.7.1

Pair-Connection Settings:							E.g.,	ET-2217	'CI		
PULL Mode: (PULL Mode: (Remote AI -> Local AO)										
PUSH Mode:	(Local AI -> I	Remote AO)	J								
1~5 6~10	11~12										
# Mode	Remote IP			Remote Po	ort Net ID	Scan Time	AI Count	Al Addr	AO Addr	TCP/UDP	Update
01 Disable 🗸	0.0	. 0	. 0	502	1	1000 ms	0	0	0	TCP 🗸	Submit
02 Disable 🗸	0.0	. 0	. 0	502	1	1000 ms	0	0	0	TCP 🗸	Submit
03 Disable 🗸	0.0	. 0	. 0	502	1	1000 ms	0	0	0	TCP 🗸	Submit
04 Disable 🗸	0.0	. 0	. 0	502	1	1000 ms	0	0	0	TCP 🗸	Submit
05 Disable 🗸	0.0	. 0	. 0	502	1	1000 ms	0	0	0	TCP 🗸	Submit

Note: The configuration page varies based on the I/O type.

The analog input (AI) modules only support the **Push** mode (Local AI to Remote AO).

Pair-Connection Settings:					ET-2224/	/28
Submit 1-4 5-8						
# Enable Mode Remote IPv4 / IPv6 / Host Name (Max. 127 chars)	Remote Port	Net ID	Scan Time (ms)	Al Address	AO Address	Network Protocol
01 PULL V 0.0.0	502	1	1000	0	0	TCPv4 🗸
02 PULL V 0.0.0	502	1	1000	0	0	TCPv4 🗸
03 PULL V 0.0.0	502	1	1000	0	0	TCPv4 🗸
04 PULL V 0.0.0	502	1	1000	0	0	TCPv4 🗸
Note: Data Support TCP PLUL Mode = Remote ALto Local AO, Data Format must be Engine	pering					

PULL Mode = Remote AI to Local AO. Data Format must be Engineerin

The analog output (AO) modules only support the **Pull** mode (Remote AI to Local AO).



Ethernet I/O Module

Home | Network | I/O Settings | Sync | PWM | Pair | Filter | Monitor | Password | Logout MQTT (Topics: DO | DI) | SNMP

	DI/DO Module					
Pair-Connection Settings: Submit 1-8 9-16						
# Enable Mode Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port	Net ID	Scan Time (ms)	IO Coun	Local IO Address	Remote IO Address	Network Protocol
01 PUSH V 502	1	1000	1	0x:Coil O ♥ 0	0x:Coil O ♥ 0	TCPv4 🗸
02 PULL V 502	1	1000	1	0x:Coil O ✔ 0	0x:Coil O ❤ 0	TCPv4 🗸
03 PULL V 502	1	1000	1	0x:Coil O ❤ 0	0x:Coil O ➤ 0	TCPv4 🗸
04 PULL ✔ 502	1	1000	1	0x:Coil O ➤ 0	0x:Coil O ∨ 0	TCPv4 🗸
05 PULL - 502	1	1000	1	0x:Coil O ✔ 0	0x:Coil O ❤ 0	TCPv4 🗸
06 PULL - 502	1	1000	1	0x:Coil O ✔ 0	0x:Coil O ❤ 0	TCPv4 🗸
07 PULL V 502	1	1000	1	0x:Coil O ❤ 0	0x:Coil O ∨ 0	TCPv4 🗸
08 PULL - 502	1	1000	1	0x:Coil O ✔ 0	0x:Coil O ❤ 0	TCPv4 🗸
Note: PULL Mode = Remote to Local PUSH Mode = Local to Remote Pair-connection is disabled if the IO Count is 0 (no data) IO Address (base 0): 0 - 65535, no leading 0x/1x/3x/4x.						

The table describes the parameters contained in the "I/O Pair-Connection Settings" section.

Item	Description	Defaults
Enable Mode	Used to enable or disable the Client (Master) function and select either PULL or PUSH mode. PULL Mode : To read the remote AI (or DI) and write to the local AO (or DO). PUSH Mode : To read the local AI (or DI) and write to the remote AO (or DO).	Disable
Remote IP	Used to set the IP address or the hostname of the remote module. Before entering the Host Name, ensure that the correct DNS has been set on the Network page.	0
Remote Port	Used to set the TCP port number of the remote device. The valid range is 0 - 65535.	502
Net ID	Used to set the Modbus Net ID of the remote device. The valid range is 1 - 247.	1

Item		Description	Defaults
Scan Time		In " PULL " mode, the module will update its I/O data based on the specified scan time. In "PUSH" mode, If the local DI/AI changes, the module will immediately update the remote DO/AO. Furthermore, even if the local DI/AI remains unchanged throughout the scan time, the module will still update the remote DO/AO.	1000 ms
	Al Count	Lised to specify how many AI/AO channels are manned	0
AIO		Used to specify the start address of the analog input	0
	AO Address	Used to specify the start address of the analog output	0
	IO Count	Used to specify how many DI/DQ channels are manned	0
DIO	Local IO Address	Used to select the DI or DO type for the Local site and to enter the starting address. <u>Shared memory is only available for DIO series modules</u> : The DIO (Bit) address ranges from 3000 to 7094 The AIO (Register) address ranges from 3000 to 3254 DI, DO, AI, and AO data share a common memory block. If different types of I/O data are written to the same address, all data will overwrite each other. For more information, refer to Section 5.5 Shared Memory.	0
	Remote IO Address	Used to select the DI or DO type for the Remote site and to enter the starting address.	0
Netw (TCP/	vork Protocol /UDP)	Used to set the type of Modbus protocol to be used and can be TCPv4/TCPv6 or UDPv4/ UDPv6	TCPv4
Subn	nit	Click this button to save the changes.	

4.8 Filter



The **Filter Settings** section on the **Filter** page allows you to configure the IP Filter list for the ET-2200 series module, which will be described in more detail below.

4.8.1 Filter Settings

The *Filter Settings* function is used to query or set the IP Filter List (Available IP) for the ET-2200 series module. Only Clients whose IP address is specified in the list will be able to access the ET-2200 series module. Note that some of the modules do not support the IPv6 setting.

Filter Setting:
Accessible IP IPv4/v6 Address (example: 10.0.8.123, fe80:0:0:0:a8ee:dc07:1cda:5678)
IP1
IP2
IP3
IP4
IP5
Enable IP Filter Check to enable. (Default disabled)
Update Setting
Note: Remember to include the IP address of your configuration computer.

The table describes the parameters contained in the "IP Address Configuration" section.

ltem	Description
IP1 ~ IP5	Enter the accessible IP address (IPv4 or IPv6). Note that remember to enter the IP address of the PC used to configure the module.
Enable IP Filter	Check the item to enable the function (Defaults: Disabled).
Update Settings	Click this button to save the changes.

4.9 Monitor



After clicking the **Monitor** tab, the user can check the connection status of the ET-2200 series module in the **Current Connection Status** section. Note that some of the modules only display IP addresses for the Server mode.

Current	Connec	tion Statu	s:		
Se	rver Mode C	onnected IP Se	rver Mode Cor	nnected IP	
	IP1	-	IP2	-	
	IP3	-	IP4	-	
	IP5	-	IP6	-	
	IP7	-	IP8	-	
	IP9	-	IP10	-	
	IP11	-	IP12	-	
Available Co	onnections	32			
Client Mode	Remote IP	Connection Stat	e Query State	Last Query Tim	e Host Name
IP1	-	-	-	-	-
IP2	-	-	-	-	-
IP3	-	-	-	-	-
IP4	-	-	-	-	-
IP5	-	-	-	-	-
IP6	-	-	-	-	-
Client Mode	Remote IP	Connection Stat	e Query State	Last Query Tim	e Host Name
IP7	-	-	-	-	-
IP8	-	-	-	-	-
IP9	-	-	-	-	-
IP10	-	-	-	-	-
IP11	-	-	-	-	-
IP12	-	-	-	-	-

Item	Description
Server Mode (IP1 to IP12)	Display the connected IP address.
Available Connection	When used as a slave device, a maximum of 32 connections is allowed
Client Mode (IP1 to IP12)	Display the remote IP address, the connection state, the request state, the last query time, and the login hostname.

4.10 Change Password



Ethernet I/O Module Home | Network | I/O Settings | Sync | PWM | Pair | Filter | Monito Password Logout MQTT (Topics: DO | DI) | SNMP

The **Password** page allows you to change the password that used to log in to ET-2200, follow the steps.

- Step 1: Enter the old password in the **"Current password"** field. The first time you change the password, enter the default password "**Admin**".
- Step 2: Enter a new password in the **"New password"** field. (please enter 1 to 12 digits of numbers or characters).
- Step 3: Re-enter the new password in the "Confirm new password" field.
- Step 4: Click the "Submit" button to update the password.

Change Password

The length of the password is 12 characters maximum.

Current password:	•••••	
New password:		
Confirm new password:	••••	Submit



<u>Note:</u> If you forgot the password, refer to Appendix A1. How do I restore the web password for the module to the factory default password?

4.11 Logout



Ethernet I/O Module Home | Network | I/O Settings | Sync | PWM | Pair | Filter | Monitor | Passwork | Log MQTT (Topics: DO | DI) | SNMP

Clicking the *Logout* tab will immediately log out from the system and return to the login page.

The system is logged out. To enter the web configuration, please type password in the following field. Login password: Google Menu / Settings / Show advanced settings / Privacy / Content settings / Javascript / Allow all sites to run JavaScript Chrome: (recommended). Microsoft IE: Menu / Tools / Internet Options / Security / Internet / Custom level... / Scripting / Enable. Firefox: about:config / I'll be careful, I promise! / Preference Name / javascript.enabled / True. When using IE, please disable its cache as follows. Menu items: Tools / Internet Options... / General / Temporary Internet Files / Settings... / Every visit to the page

4.12 MQTT



The MQTT architecture mainly consists of a server (Broker) and clients (Clients). Each MQTT Client requires a unique identifier, and the MQTT Broker identifies users based on these identifiers and records their status, such as subscribed topics and communication quality. Clicking on the **MQTT** tab opens the MQTT settings page.



MQTT is a protocol consisting of a Publish/Subscribe mechanism where the Client only needs to know the IP address of the Broker. The Publisher is responsible for sending topic messages, while the Subscriber is responsible for receiving new messages from the Broker. The Broker then acts as a central location to handle the sending and receiving of all messages between a Publisher and a Subscriber.

When the Publisher updates a message related to a specific topic, it is transmitted to the Broker, which will then send the message to all Subscribers that have subscribed to that particular topic. Neither the Publisher nor the Subscriber needs to know the status of the other.

4.12.1 Connectivity Settings

Connectivity Settings

MQTT	Disable -		
Broker	IPv4 / Host Name (Max. 127 chars) 10.0.8.1		
Broker Port	1883 (De	əfault= 1883)	
Client Identifier	ET-2260_65E985		
User Name			(Max. 63 chars)
Password			(Max. 63 chars)
Reconnection Interval	10 (5 ~	~ 65000 s, Default= 10)	
Keep Alive Interval	20 (5 ~	~ 65000 s, Default= 20)	
Main Topic Name	N/A		
	(Max. 126 chars)		
	Update	e Settings	

The table describes the parameters contained in the "Connectivity Settings" section.

ltem	Description	Defaults	
MQTT	nables or Disables the MQTT connection function. Disable		
Broker	Set the IP address or Hostname of the PC where the MQTT broker		
	is installed. (E.g., broker.emqx.io or broker.hivemq.com)		
Broker Port	The port number for the MQTT broker.	1883	
	The client identifier uniquely identifies the MQTT client to the		
Client Identifier	MQTT broker, and consists of the "module name"+ "_"		
	(underscore character) + "the last 6 digits of the MAC address"		
	and cannot be changed.		
Liser Name	This parameter is used when the MQTT broker requires	N/A	
User Marile	authentication. The length should be no more than 63 characters.		
Password	This parameter is used when the MQTT broker requires	N/A	
	authentication. The length should be no more than 63 characters.		
Reconnection	The time interval between attempts by the ET-2200 module to		
Interval	connect to the broker if a connection failure occurs. The valid range	ge 10(s)	

-83 -

	The keep-alive mechanism is provided to ensure that both the client and the broker are alive and the connection is still open.	
Keep Alive Interval	If a Client doesn't send any messages during the Keep Alive period, it must send a PINGREQ packet to the broker to confirm its availability. The broker must reply with a PINGRESP packet to also indicate its availability. The broker will disconnect a client, which doesn't send a PINGREQ packet or any other message within one and a half times of the Keep Alive Interval. The valid range is 5 to 65000 seconds.	20(s)
Main Topic Name	The Topic Name is a combination of the Main Topic Name and the Sub Topic Name. The Main Topic Name can be empty. The same part of the Topic Names can be entered in the Main Topic Name field to improve the processing efficiency of all Topic Names. A shorter Topic Name also improves processing efficiency.	N/A
Update Settings	Click this button to save the changes.	

4.12.2 Publication Settings

Publication Settings

Publication		
Retain		
Cycle	9000 (100 ~ 2147483000 ms, in 10 ms step, Default= 9000)	
All Information		
Enable	Disable 🗸	
Sub Topic Name	info (Max. 63 chars)	
Last Will and Testament		
Enable		
Retain		
QoS	0 - At most once 🗸	
Торіс	N/A (Max. 63 chars)	
Message	N/A (Max. 63 chars)	
Update Settings		

The table describes the parameters contained in the "Publication Settings" section.

ltem	Description Defaults		
Publication			
Retain	Check this option to ensure that the message is retained once it is published.	Disabled	
	The time interval that the ET-2200 module periodically		
Cycle	publishes data. The valid range is 100 to 2147483000	9000(ms)	
	milliseconds in intervals of 10 milliseconds.		
All Information			
	This option is used to enable or disable the All Information		
Enablo	function. All Information adopts Periodic Publish, which	Disabled	
LIIADIC	includes the Module Name, the MAC address, DI, and DO		
	states. The publishing period depends on the Cycle setting.		
	The Topic Name is a combination of the Main Topic Name		
Sub Topic Name	and the Sub Topic Name. A shorter Topic Name improves		
	processing efficiency.		

-85 -

ltem	Description Defaults	
Last Will and Testa	ment	
Enable	Check this option to enable the Last Will and Testament function.	Disabled
Retain	Check this option to ensure that the Last Will and Testament message is retained once it is published.	Disabled
QoS	The QoS for the Last Will and Testament message.	0 - At most once
Торіс	The Topic Name for the last will and Testament message. The length should be no more than 63 characters	N/A
Message	The Last Will and Testament message. The length should be no more than 63 characters.	N/A
Update Setting	Click this button to save the changes	

4.12.3 Restore Factory Defaults

Restore Factory Defaults

Restore MQTT factory settings	Restore Defaults	
Restart MQTT service	Restart Service	

The table describes the parameters contained in the "**Restore Factory Defaults**" section.

ltem	Description
Restore MQTT factory settings	Click this button to reset all MQTT settings to the default factory settings.
Restart MQTT	Click this button to restart the MQTT service. This function should be used to
service	reconnect with the Broker after adjusting the MQTT settings.

4.13 MQTT-DO



The DO page is where you can set a full Topic Name, which is a combination of the Sub Topic Name and the Main Topic name. The Publish and Subscribe functions for each DO channel can be enabled or disabled on this page. You can use either a single-channel (DO0...) or multiple channels (ALL) to process the Topic operations. Multi-channel operation is recommended because it can help reduce the amount of network traffic.

In single-channel operation, the values 0 and 1 correspond to the OFF and ON settings, respectively. In multi-channel operation, a hexadecimal value represents the settings for all channels. For example, the value 0xFF00 indicates that channels 0 to 7 are OFF and channels 8 to 15 are ON. Please turn off unused Topics to reduce unnecessary processing, as it will affect operational efficiency.

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-87 -

4.13.1 MQTT – Digital Outputs

Digital Output	Power-on Publish	Subscribe	Sub Topic Name (Max. 63 chars)
ALL			do_all
Digital Output	□ Power-on Publish	Subscribe	Sub Topic Name (Max. 63 chars)
DO0			do00
DO1			do01
DO2			do02
DO3			do03
DO4			do04
DO5			do05
DO6			do06
DO7			do07
Update			

MQTT - Digital Outputs Show Hide

The table describes the parameters contained in the "MQTT – Digital Outputs" section.

ltem	Description	Defaults
	The DO status will be published when the module is	
Power-on Publish	Powered-on. Check the box to enable and uncheck it to	Disabled
	disable the function	
	The DO states depend on the updating message of the	
Subscribe	corresponding Topic. Check the box to enable and uncheck it	Disabled
	to disable the function	
	The Topic Name is a combination of the Main Topic Name	Corresponding
Sub Topic Name	and the Sub Topic Name. A shorter Topic Name improves	
	processing efficiency.	DO
Update	Click this button to save the changes.	

4.13.2 Readbacks of the Digital Outputs

Readbacks	s of the Digital Ou	Itputs Show	Hide	
Readback	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)	
ALL			rb_all	
Readback	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)	
DO0			rb00	
DO1			rb01	
DO2			rb02	
DO3			rb03	
DO4			rb04	
DO5			rb05	
DO6			rb06	
DO7			rb07	
	Update			

The table describes the parameters contained in the "Readbacks of the Digital Outputs" section.

ltem	Description	Default Value
State-Change Publish	Publish the message when DO status changes. Please select the box to enable this function or unselect to disable it.	Disabled
Periodic Publish	Publish the DO status periodically according to the Cycle settings. Please select the box to enable this function or unselect to disable it.	Disabled
Sub Topic Name	The Topic Name is a combination of the Main Topic Name and the Sub Topic Name. A shorter Topic Name improves processing efficiency.	Corresponding DO
Update	Click this button to save the changes.	

4.14 MQTT-DI



The DI page is where you can set the Topic Name, which is a combination of the Sub Topic Name and the Main Topic name. The Publish function for each DI channel can also be either enabled or disabled on this page. You can use either a single-channel (DI0...) or multiple-channels (ALL) to process the Topic operations. Multi-channel operation is recommended because it can help reduce the amount of network traffic.

In single-channel operation, the values 0 and 1 correspond to the OFF and ON settings, respectively. In multi-channel operation, a hexadecimal value represents the settings for all channels. For example, the value 0xFF00 indicates that channels 0 to 7 are OFF, and channels 8 to 15 are ON. Please turn off (uncheck the checkbox) unused Topics to reduce unnecessary processing, as it will affect operational efficiency.

4.14.1 MQTT – Digital Inputs

MQTT - Digital Inputs

Digital Input	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)
ALL			di_all
Digital Input	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)
D10			di00
DI1			di01
DI2			di02
DI3			di03
DI4			di04
DI5			di05
DI6			N/A
DI7			N/A
			Update

The table describes the parameters contained in the "MQTT – Digital Inputs" section.

ltem	Description	Default Value
State-Change	Publish the message when DI status changes. Please select	Disabled
	the box to enable this function or unselect to disable it.	
	Publish the DI status periodically according to the Cycle	
Periodic Publish	settings. Please select the box to enable this function or	Disabled
	unselect to disable it.	
	The Topic Name is a combination of the Main Topic Name	Corresponding
Sub Topic Name	and the Sub Topic Name. A shorter Topic Name improves	Corresponding
	processing efficiency.	וס
Update	Click this button to save the changes.	

-91 -

4.15 MQTT-AI



Analog Inputs

Analog Input	Periodic Publish	Sub Topic Name (Max. 63 chars)
Al0		ai00
Al1		ai01
Al2		ai02
Al3		ai03
Al4		ai04
AI5		ai05
Al6		ai06
Al7		ai07
		Update

The table describes the parameters contained in the "MQTT – Analog Inputs" section.

ltem	Description	Defaults
Periodic Publish	To publish AI values regularly based on the Cycle value (see MQTT – Publication Settings). Click the box on the top side to select all channels; click again to deselect all channels.	Disabled
Sub Topic Name	The Topic Name is a combination of the Main Topic Name and the Sub Topic Name. A shorter Topic Name improves processing efficiency.	Corresponding AI
Update	Click this button to save the changes.	

-92 -

4.16 MQTT Realization

This section described how to use the open-source software Mosquitto and MQTTX to demonstrate the usage of MQTT protocol in conjunction with the ET-2200 series module.

4.16.1 Set up Mosquitto

Mosquitto is an open-source software application that allows users to create an MQTT Broker and can be installed on Windows, Mac OS, Linux, etc. Alternatively, the user can use an online broker such as broker.emqx.io or broker.hivemq.com.

Step1. Download the Installer (V1.6.4) from the official Mosquitto website and install the application.



Step2. Locate the "mosquitto.exe" file in the default installation path and double-click it to enable the Mosquitto server.

← → ヾ ↑ <mark>C:\Program Files\Mosquitto</mark> ∨ ひ	
🚳 mosquitto.dll 🔤 C.\Program Files\Mosquitto\mosquitto.exe —	×
mosquitto.exe	^
mosquitto_ctrl.	
When this window is executing,	
the Broker is enabled. Closing this	
window will disable the Broker.	

Why can't I open "mosquitto.exe" or why does it crash?

Once Mosquitto installation is done, the Broker server is automatically activated upon computer boot-up. Thus, if you try to click on the 'mosquitto.exe' file again, it's akin to attempting to enable an already active broker server, which would result in the action being prevented.

To prevent the broker from automatically opening, you can change the settings in the Windows Services application. If it is not necessary to set it, go to Step 3.

Open the Services application by searching for "Services".

All	Apps	Documents	Settings	Web	More 👻	Feedback	
Best n	natch						
Q,	Services App				<u></u>		
Settin 🔂 C	gs Configure	proxy ser ver		>	Services App		

In the **Services** window, locate the "Mosquitto Broker" item and double-click the name to open the **Properties** dialog. Click the **Stop** button and set the **Startup type** to **Manual**. Click **OK** to save your changes.

🔍 Services					—		×
File Action View	Help						
) 🗟 🛛 🚮 🖬 🕨 🔲 II IV						
🔍 Services (Local)	Services (Local)						
	Mosquitto Broker	Name	Description	Status	Startup Type	Log On As	^
		🖓 Mosquitto Broker 👔	MQTT v3.1.1 broker		Automatic	Local Syste	em
	Start the service	Wahimic service	Nahimic service	Running	Automatic	Local Syste	em
		🎑 Natural Authenticat 💶	Signal aggregator	Running	Manual (Trigger Start)	Local Syste	em 🛛
	Description:	🎇 Net Driver HPZ12			Automatic	Local Servi	ce
	MQTT v3.1.1 broker	🌼 Net.Tcp Port Sharing Service	Provides ability to		Manual	Local Servi	ce
		🎑 Netlogon	Maintains a secur		Manual	Local Syste	em 🛛
		🌼 Network Connected Devices Auto-Setup	Network Connect		Manual (Trigger Start)	Local Servi	ce
		🎑 Network Connection Broker	Brokers connectio	Running	Manual (Trigger Start)	Local Syste	em 🛛
		🌼 Network Connections	Manages objects i	Running	Manual	Local Syste	em 🛛
		🌼 Network Connectivity Assistant	Provides DirectAc		Manual (Trigger Start)	Local Syste	em 🗸
		<.					>
	Extended Standard						_

Mosquitt	o Broker	Properties (Local Comp	outer)			×
General	Log On	Recovery	Dependenci	es			
Service	name:	mosquitto					
Display	name:	Mosquitto	Broker				
Descrip	tion:	MQTT v3.	1.1 broker			$\hat{}$	
Path to C:\Prog	executabl gram Files	le: vnosquitto \m	osquitto.exe i	un			
Startup	type: 🌔	Manual	2)		~	
Service	status:	Stopped					
You ca from he	n specify t re.	he start para	meters that ap	Pause	start the s	me ervice	
Start pa	arameters:						
			ок	3 Cance	el	Apply	

Step3. Open Windows Port 1883 (the default Port for the MQTT)

3.1 Open the Advanced Settings section of the Windows Firewall.



3.2 Add a new rule. Click **Inbound Rules** and **New Rule**, and then select the **Port** option. Click the **Next** button to continue.

Pindows Defender Firewall	with Advanced Security				- 🗆 X
File Action View Help					
🗢 🍬 🖄 🖬 🗟 🖬					
Windows Defender nav	und Rules			Actions	
Outbound Rules	1	Group	Profile ^	Inbound Rules	-
🔩 Connection Security R	lash		Private	🗽 New Rule	2
> 🅾 Monitoring	eflash		Public	Filter by Profile	· ·
	🔮 eflash		Private	Filter by State	•
	Rew Inbound Rule Wizard	I			× •
	Rule Type				•
	Select the type of firewall rule to c	reate.			
	Steps:				
	a Rule Type	What type of rule would you like	to create?		
	Protocol and Ports				
	 Action 	Program Rule that controls	for a program.		
	 Profile 	Port			
	 Name 	Rule that come 3	a TCP or UDP port.		
		O Predefined:			
		AllJoyn Router		\sim	
		Rule that controls connections	s for a Windows experience.		
		Custom Custom			
				\frown	
				4	
			< Back	Next > Cancel	
•			7]	

3.3 Select the **TCP** option and then select **Specific local ports** and enter the value **1883**.

Click the **Next** button to continue.

💣 New Inbound Rule Wiza	ard	×
Protocol and Ports		
Specify the protocols and ports	to which this rule applies.	
Steps:		
Rule Type	Does this rule apply to TCP or UDP?	
Protocol and Ports	(© ТСР)	
 Action 	O ODP	
Profile		
Name	Does this rule apply to all local ports or specific local ports?	
	◯ All local ports	
	Specific local ports: 1883 Example: 80, 443, 5000-5010	
	< Back (Next >) Cancel	

3.4 Select the **Allow the connection** option and then click the **Next** button to continue.

🔗 New Inbound Rule Wizard	1	×
Action		
Specify the action to be taken whe	n a connection matches the conditions specified in the rule.	
Steps:		
Rule Type	What action should be taken when a connection matches the specified conditions?	
Protocol and Ports	Allow the connection	
Action	This includes commutions that are protected with IPsec as well as those are not.	
Profile	\bigcirc Allow the connection if it is secure	
Name	This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node. Customize Block the connection	
	< Back Next > Cancel	

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-97 -

3.5 Select the **Domain** checkbox and click the **Next** button to continue.



3.6 Enter the name of the rule and then click the **Finish** button to create the rule. Enter the notes if desired.

Namo		
Specify the name and description	nf this rule	
a,		
Steps:		
Rule Type	Specify the name and description of this rule	
Protocol and Ports	Specify the name and description of this fale	
Action		
Profile	Name:	
Name	MQ11 Blokel	
	Description (optional):	
	- Back Divish Consol	_

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-98 -

4.16.2 MQTTX Instructions

MQTTX is an open source, cross-platform MQTT 5.0 desktop client originally developed by EMQ, which can run on macOS, Linux and Windows.

Step1. Install MQTTX

Download and execute the installation file (V1.9.4) from the MQTTX website (https://mqttx.app/).

Step2. Open MQTTX

After the installation is complete, MQTTX will be automatically opened, and the user can also double-click the shortcut on the desktop to open the software.



Step3. Establish a connection

- 1. Click "+" and then click **New Connection** to establish a connection.
- 2. Enter the Broker name (See Section 4.2.1) and IP address, and click the **Connect** button.

MQTTX	iew Window Help		G	
	Connections 1	< Back	New 3	Connect
8	New Connection	General 2 Enter	r a recognizable name, e.g., Broker	
	New Group	* Name Broker] ∳
ዋ		* Client ID mqttx_33	53545a	C G
+		* Host mqtt://	∨ 10.0.8.51	
		* Port 1883	Enter the IP address of the MQTT ((Mosquitto) or broker.emax.io.	Broker
		Username	(
ß	No Data	Password SSL/TLS		
ŵ		Advanced 🔺		
2		MQTT Version	5.0	~
N 1		Connect Timeout	10	(s)
0		Keep Alive	60	(s)
		Auto Reconnect		

Step4. If the connection is available, the green light will be displayed.

S MQTTX					– 🗆 X
File Edit V	ïew Window Help				
	Connections	+	Broker 💿		(¹) 🖉 …
1	ever@10.0.8.51:1883		+ New Subscription	Plaintext ∨	All Received Published

Note: If the connection is unavailable, check to see if the version of the Mosquitto Broker is 1.6.4 (see C:\Program Files\mosquitto\ChangeLog.txt), and refer to Set up Mosquitto for installation.

4.16.3 MQTT - DO Example

The topic name of MQTT is composed of Main Topic Name (e.g., **ICPDAS**/, refer to MQTT page) and Sub Topic Name (e.g., **do_all**), which can be set on the **MQTT - DO** page.



Function	Description		
Subscribe	Used to subscribe to the topic. The DO statuses can be changed through MQTT messages		
Power-on Publish	The DO statuses will be published upon module power-up		
State-Change Publish	The DO statuses will be published whenever it changes.		
Periodic Publish	The DO statuses will be published periodically, based on the Cycle settings.		

(A) <u>MQTT DO – Subscribe</u>

Users can choose to enable/disable single-channel (DO0, DO1, etc.) or multi-channel (ALL) for topics operations. It is recommended to use multi-channel operations to reduce network traffic and to disable unused topics to reduce unnecessary processing and improve operational efficiency.

6)

<u>Step1.</u> Log in to the module's Web Server, and click the **Subscribe** option for the "**do_all**" on the MQTT - "**DO**" page to enable the function. After that, click **Update** to save the changes.

		\frown	
MQTT - Digital Outputs Show	Hide	1	
Digital Output	Power-on Publish	Subscribe	Sub Topic Name (Max. 63 chars)
ALL			do_all
Digital Output	Publish	Subscribe	Sub Topic Name (Max. 63 chars)
DO0			do00
DO1			do01
DO2			do02
DO3			do03
DO4			do04
DO5			do05
DO6			do06 2
DO7			do07
			Update

Step2. Make sure that the MQTT function has been enabled on the **MQTT** page, and the Broker's IP address and the Main Topic Name have been set.

Connectivity Settings

MQTT	Enable 🗸		
Broker	IPv4 / Host Name (Max. 127 chars) 10.0.8.51)	
Broker Port	1883	(Default= 1883)	
Client Identifier	tPET-P2R2_RevB_65FA7F		
User Name			(Max. 63 chars)
Password			(Max. 63 chars)
Reconnection Interval	10) (5 ~ 65000 s, Default= 10)	
Keep Alive Interval	20) (5 ~ 65000 s, Default= 20)	
Main Topic Name	ICPDAS/ (Max. 126 chars)		
		Update Settings	

<u>Step3.</u> Enter the message (e.g., 0xF) to be published for the "**ICPDAS/do_all**" topic, and click the button on the right corner to send the message.

Broker 📎 1		(¹) 🖉 …
+ New Subscription	Plaintext ∨	All Received Published
	3	Topic: ICPDAS/do_all QoS: 0 0xF
		2023–07–25 16:29:38:513
1	Payload: Plaintext V	QoS: 0 V O Retain Meta
(1. Enter th 2. Enter th	ne Topic name: ICPDAS/do_all ne text to be published: 0xF
		2

 Intervention
 Interventin
 Interventin
 I

<u>Step4.</u> The user can check whether the DO status is correct on the Home page.

The message "0Xf" indicates DO 0-3 = ON, DO 4-7 = OFF

(B) MQTT DO – Power on Publish

<u>Step1.</u> Make sure that the Mosquitto Broker is enabled and the MQTTX is connected. In this example, the topic is "ICPDAS/do_all". Refer to "Set up Mosquitto" and "MQTTX Instructions".



Step2. Log in to the module's Web Server, and click the Power-on Publish option for the "do_all" on the MQTT - "DO" page to enable the function. After that, click Update to save the changes.



Ethernet I/O Module

Home | Network | No Settings | Sync | PWM | Pair | Filter | Monitor | Password | Logout MQTT (Topics: DO | 1) | SNMP

MQTT - Digital Outputs Show	2TT - Digital Outputs Show Hide				
Digital Output	Power-on 1 Publish	Subscribe	Sub Topic Name (Max. 63 chars)		
ALL			do_all		
Digital Output	Power-on Publish	Subscribe	Sub Topic Name (Max. 63 chars)		
DO0			do00		
DO1			do01		
DO2			do02		
DO3			do03		
DO4			do04		
DO5			do05		
DO6			do06 2		
DO7			do07		
			Update		

<u>Step3.</u> On the **I/O Settings** page, set the DO power-on value, and then click Update Setting to update the settings.



DI/DO Configuration:

Digital Output	Modbus Address	
Host/Slave Watchdog Timeout	40257	0 (10 ~ 65000 Seconds, Default= 0, Disable= 0) Outputs DO with safe-value or <i>PWM</i> when host/slave timeout.
Enable Safe Value (Enable Watchdog)	00339 - 00332	0x0 (CH 7 - 0:)
Safe Value	00274 - 00267	0x0 (CH7-0: 0 0 0 .000)
Power-On Value	00242 - 00235	0x3 (CH 7 - 0:

The DO0, DO1 will be set to ON when the module starts.

<u>Step4.</u> After the module boots, the DO value will be set to the predefined power-on value.



Digital I/O (Modbus Address: DO=00000 to 00015, DI=10000 to 10015.)			
DO7 (1) DO6 (1) DO5 (1)	D04 🕐 D03 🕐	D02 🕐 D01	۵۵ 🕑
DI Channel Value (10000)	Counter (30016) / Frequency (30064)	High Latched (10032)	Low Latched (10064)
DIO	-		-
DI1	-	-	-

The DO0, DO1 will be set to ON after rebooting the module.

In addition, users can check the received DO values in MQTTX.



"0x3" indicates DO0 to DO1 are "ON" and the others are "OFF"

(C) MQTT DO – State Change Publish

<u>Step1.</u> Make sure that the Mosquitto Broker is enabled and the MQTTX is connected. In this example, the topic is "ICPDAS/rb_all". Refer to "Set up Mosquitto" and "MQTTX Instructions".

MQTTX le Edit View	Window Help	–
C.	onnections 🕂 Brok	× 0 1 Ů ∠ ···
8	• Broker@10.0.8.51:1883	New Subscription Plaintext V All Received Published
ዋ	Add a subscription	* Topic 2
+		* QoS The Topic name in this example, Main Topic: ICPDAS/
		0 Sub Topic: rb_all
F		Alias
ŵ		
2		Subscription Identifier
		No Local flag O true O false
0		Retain as Published flag O true o false
		Retain Handling 0 3
		Cance Confirm

Step2. Log in to the module's Web Server, and click the State-Change Publish option for the "rb_all" on the MQTT - "DO" page to enable the function. After that, click Update to save the changes.

Readbacks of the Digital Outputs Show Hide							
Readback	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)				
ALL			[rb_all				
Readback	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)				
DO0			00dr				
DO1			[rb01				
DO2			rb02				
DO3			rb03				
DO4			rb04				
DO5			rb05				
DO6			rb06				
DO7			rb07				
	Update						

<u>Step3.</u> On the **Home** page, set the DO0 to DO2 to "ON" in sequence.

(5	Hom	le l	: I/O ork <i>I</i> / s: DO	Modu O Settin DI) SN	 e gs S MP	ync PW	'M Pair	r Filter I	Monito	r Pass	word		ut
Digital I/O (Mod	Digital I/O (Modbus Address: DO=00000 to 00015, DI=10000 to 10015.)							~							
DO7	٢	DO6	٢	DO5	٢	DO4	٢	DO3		DO2)	D01		DO0	0

<u>Step4.</u> The user can view the received messages within the MQTTX window.

Broker 🛛 3		- □ × () <u>/</u> …
+ New Subscription	Plaintext ∨	All Received Published
ICPDAS/rb_all QoS 0	Topic: ICPDAS/rb_all QoS: 0 0x1 2023 07 13 00.17.52.005 Topic: ICPDAS/rb_all QoS: 0 0x3 2023 07 13 00.17.52.109 Topic: ICPDAS/rb_all QoS: 0 0x7 2023.07 13 09.47.54.189	It will receive messages with all DO statuses whenever it changes. 0x1: 0000 0001 (DO0 = ON) 0x3: 0000 0011 (DO0, DO1 = ON) 0x7: 0000 0111 (DO0, DO1, DO2 = ON)
	Payload: Plaintext V QoS: 0 V	C Retain Meta
	1980	$\bullet igodot$

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-107 -

(D) <u>MQTT DO – Periodic Publish</u>

<u>Step1.</u> Make sure that the Mosquitto Broker is enabled and the MQTTX is connected. In this example, the topic is "ICPDAS/rb_all". Refer to "Set up Mosquitto" and "MQTTX Instructions".

MQTTX	x
Connections + Broker 3	♥ 0 1
Add a subscription	* Topic 2 () ICPDAS/rb_all
+ 	 * QoS Main Topic: ICPDAS/ Sub Topic: rb_all
	Alias O
0	
N	Subscription Identifier
Ō	Retain as Published flag O true I false
	Retain Handling 0
	Cance

Step2. Log in to the module's Web Server, and click the Periodic Publish option for the "rb_all" on the MQTT - "DO" page to enable the function. After that, click Update to save the changes.

Readbacks of the Digital Outputs Show Hide								
Readbac	k State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)					
Al	L		rb_all					
Readbac	k State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)					
DC			rb00					
DC	1		rb01					
DC	2		rb02					
DC	03		rb03					
DC	04		rb04					
DC	5		rb05					
- DC	6		rb06					
DC	7		rb07					
	Update							
<u>Step3.</u> Go to the MQTT page, set the message publishing cycle (Cycle), and click "Update Setting" to save the changes.



Publication Settings

Publicatio		
Retai		
Cycl	9000 (100 ~ 2147483000 ms, in 10 ms step, Default= 9000)	
All Informatio		
Enabl	Disable V	
Sub Topic Nam	info (M	ax. 63 chars)
Last Will and Testamer	t	
Enabl		
Retai		
Qo	0 - At most once 🗸	
Тор	N/A (M	ax. 63 chars)
Messag	N/A (M	ax. 63 chars)
	Update Settings	

<u>Step4.</u> The user can view the received messages within the MQTTX window.

Broker 📎		(b) 🖉 …
+ New Subscription	Plaintext ∨	All Received Published
ICPDAS/rb_all QoS 0	Topic: ICPDAS/rb_all QoS: 0 0x0 2023-07-13 15:23:42:755 Topic: ICPDAS/rb_all QoS: 0 0x1 2023-07-13 15:23:51:762 Topic: ICPDAS/rb_all QoS: 0 0x0 2023-07-13 15:23:51:762 Topic: ICPDAS/rb_all QoS: 0 0x0 2023-07-13 15:24:00:759	Receiving DO statuses periodically. In this case, Cycle = 9 seconds

4.16.4 MQTT - DI Example

The topic name of MQTT is composed of Main Topic Name (e.g., ICPDAS/, refer to MQTT page) and Sub Topic Name (e.g., di_all), which can be set on the **MQTT - DI** page.



The MQTT – DI page provides the following functions:

Function	Description
State-Change Publish	The message will be published when the DI state changes.
Periodic Publish	The DI status is published periodically, and the release cycle is determined by the Cycle setting.

(A) MQTT DI – State Change Publish

Users can choose to enable/disable single-channel (DIO, DI1, etc.) or multi-channel (ALL) for topics operations. It is recommended to use multi-channel operations to reduce network traffic and to disable unused topics to reduce unnecessary processing and improve operational efficiency.

Step1. On the MQTT - **DI** page, click the **State-Change Publish** for the "**di_all**" to enable this function. After that, click **Update** to save the changes.

MQTT - Digital Inputs			
Digital Input	State-Change Pu <u>bli</u> sh 1	Periodic Publish	Sub Topic Name (Max. 63 chars)
ALL			di_all
Digital Input	□ State-Change □ Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)
DI0			di00
DI1			di01
DI2			di02
DI3			di03
DI4			di04
DI5			di05
DI6			di06 2
DI7			di07
			Update

<u>Step2.</u> Make sure that the Mosquitto Broker is enabled and the MQTTX is connected. In this example, the topic is "ICPDAS/di_all". Refer to "Set up Mosquitto" and "MQTTX Instructions".

MQTTX File Edit Vi	iew Window	Help	•	- 🗆 X
	Connect	tions 🕂 B	roker 🛛 💿 🚺	७ ⊉ …
8	Broker	@10.0.8.51:1883	+ New Subscription Plaintext ~	All Received Published
			Add a subscription	
ዊ		New Subscription		×
+	_	C	`	
		* Topic 2		0
		ICPDAS/di_all	a Tania nama in this ayampla	
Eø		N	lain Topic: ICPDAS/	
ŵ		* QoS	ub Topic: di_all	
2		0 At m	ost once 🗸 #91D937	Retain Meta
		Alias		0
(1)				
		Subscription Identifier		
		No Local flag	🔿 true 💿 false	
		Potain as Published fl		
		Retain Handling	0	3
			Cancel Con	nfirm

Step3. When the external signal changes, it will also change the DI status, and the module will send an MQTT message. For testing purposes, the user can consult the ET-2200 series Quick Start guide for wiring the I/O.

https://www.icpdas.com/en/download/show.php?num=2628



<u>Step4.</u> The user can view the received messages within the MQTTX window.

Broker 📎 🚺		() ∠ …
+ New Subscription	Plaintext ∨	All Received Published
ICPDAS/di_all QoS 0	Topic: ICPDAS/di_all Qot 0x1 It will receive me whenever it char 2023-01 It will receive me whenever it char DI0 is "1" and the	S: 0 essages with all DI statuses nges. " 0x1 " indicates the e others are " 0 ".

-112 -

(B) <u>MQTT DI – Periodic Publish</u>

<u>Step1.</u> Make sure that the Mosquitto Broker is enabled and the MQTTX is connected. In this example, the topic is "ICPDAS/di_all". Refer to "Set up Mosquitto" and "MQTTX Instructions".

MQTTX File Edit Vi	iew Windov	w Help		– 🗆 X
	Conne	ctions 🕂 Broker 🛛 🕕 🚺		• 🖉 …
8	• Brok	er@10.0.8.51:1883 + New Subscription Plaintext ~	All	Received Published
		Add a subscription	J	
ይ		New Subscription	×	
+				
		* Topic 2	()	
Ð		ICPDAS/di_all		
EQ		The Topic name in this example,		
ŵ		* QoS Sub Topic: di_all		
2		0	C	Retain Meta
		Alias	(!)	×
			11	
		Subscription Identifier		
		No Local flag O true I false		
		Retain as Published flag O true • false		
		Retain Handling 0	\bigcirc	
		Cancel	onfirm	1

Step2. Log in to the module's Web Server, and click the Periodic Publish option for the "di_all" on the MQTT - "DI" page to enable the function. After that, click Update to save the changes.



MQTT - Digital Inputs

Digital Input	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)	
ALL			di_all	
Digital Input	State-Change Publish	Periodic Publish	Sub Topic Name (Max. 63 chars)	
DI0			di00	
DI1			di01	
DI2			di02	
DI3			di03	
DI4			di04	
DI5			di05	
DI6			di06	
DI7			di07	
			Update	

<u>Step3.</u> Go to the MQTT page, set the message publishing cycle (Cycle), and click "Update Setting" to save the changes.



Ethernet I/O Module

ome Network | I/O Settings | Sync | PWM | Pair | Filter | Monitor | Password | Logout IQTT (opics: DO | DI) | SNMP

Publication Settings		
Publication		
Retain		
Cycle	9000 (100 ~ 2147483000 ms, in 10 ms step, Default= 9000)	
All Information		
Enable	Disable 🗸	
Sub Topic Name	info (M	ax. 63 chars)
Last Will and Testament		
Enable		
Retain		
QoS	0 - At most once 🗸	
Торіс	N/A (M	ax. 63 chars)
Message	N/A (M	ax. 63 chars)
	Update Settings	

<u>Step4.</u> The user can view the received messages in the MQTTX window.

The **Cycle** setting is set to 9 seconds in this example. MQTTX will receive a message with all DI statuses per nine seconds.

Broker 📎 137		() 🖉 ···
+ New Subscription	Plaintext ~	All Received Published
ICPDAS/di_all QoS 0	Topic: ICPDAS/di_all QoS: 0 0x1 2023-07-26 15:01:31:09	
	Topic: ICPDAS/di_all QoS: 0	
All statuses of DI channels 0x1: 0000 0001 (DO0 = ON)	2023-07-26 15:01:40:305	
0x0 : 0000 0000 (OFF)	Topic: ICPDAS/di_all QoS: 0	
	2023-07-26 15:0 49:806	

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-115 -

4.16.5 MQTT - AI Example

ICP	Ethernet I/O Module Home Network I/O Setting MQTT Topics: AI) NMP Filter Monitor Password Logout
	(dun)

On the MQTT page, enter "broker.emqx.io" in the Broker field and enter "ICPDAS/" in the Main Topic Name field, then click the Update Settings button. Keep the value "9000" in the Cycle field.

Connectivity Settings					
MQTT	Enable 🗸				
Broker	IPv4 / Host Name (Ma broker.emqx.io	x. 127 chars)	Online MQTT broker	: broker.emqx.io	
Broker Port	1883	(De	efault= 1883)		
Client Identifier	P/ET-2215H-16_FFFFFF				
User Name				(Max. 63 chars)	
Password				(Max. 63 chars)	
Reconnection Interval	10	(5	~ 65000 s, Default= 10)		
Keep Alive Interval	20	(5	~ 65000 s, Default= 20)		
Main Topic Name	ICPDAS/ (Max. 126 chars)				
		Upda	te Settings		
Publication Settings					
Pub	olication				
	Retain	_			
	Cycle 9000	100 ~ 21474	83000 ms, in 10 ms step, Defa	ault= 9000)	

On the **MQTT – AI** page, choose the **AIO** and **AI1** channels then click the **Update** button.

Analog Input Channel	Periodic Publish	Sub Top	pic Name (Max. 63 chars)
AIO		ai00	
Al1		ai01	
Al2		ai02	
Al3		ai03	
Al4		ai04	
AI5		ai05	
Al6		ai06	
AI7		ai07	

(A) <u>MQTT AI – Periodic Publish</u>

Publish the AI values periodically according to the Cycle settings.

Step1. Add a Connection

Also refer to MQTT page. The online public MQTT broker (broker.emqx.io) will be used in this example. Click " + " and select the **New Connection** to add a connection.



Enter a name that easy to identified (e.g., Broker) in the **Name** field and enter the host name of online MQTT broker (e.g., broker.emqx.io), then click the **Connect** button.

Connections	+	< Back	New	Connect V
		General		
		* Name	Broker	0
		* Client ID	mqttx_4ef22dd0	CO
		* Host	mqtt:// v broker.emqx.io	Online MQTT broker
No Data		* Port	1883	broker.emqx.io

If the connection is successful, a green light will illuminate. To cancel the connection, simply click the red power button.

Connections +	Broker 😣 🕕	
Bipker@broker.emqx	+ New Subscription	Plaintext V All Received Published

Step2. Add the subscription of Topics

In this example, there are two topics (i.e., ICPDAS/ai00, ICPDAS/ai01) will be subscribed. Click the "**New Subscription**" button and enter "**ICPDAS/ai00**" in the Topic field, then click the "**Confirm**" button.

Broker ४ 🕕		ு	þ	Ø	•••
+ New Subscription	Plaintext 🗸	All Re	eceived	Pub	lishe
New Subscription				×	
* Topic				1	
ICPDAS/ai00	opic name in this example,				
* QoS Sub T	Topic: ICPDAS/ opic: ai00	J			
0 At mos	#A68040			G	
Alias				(1)	
Subscription Identifier					
No Local Flag	🔿 true 💿 false				
Retain as Published Flag	🔿 true 💿 false				
Retain Handling	0		`	~	
		Cancel	Confir	m	

Using the same way to subscribe the "ICPDAS/ai01" topic.

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-118 -

Step3. View the messages of the subscribed Topics

In this case, the user subscribed messages will be published per nine seconds from the MQTT Broker. The PET-2215H-16 module features the open wire detection. When the AI value reads **-9999.9**, it indicates that the channel is disconnected. Check the wiring of the AI1.

Broker ४ ₆₅	<u>(')</u> 🕞 🖉 …
+ New Subscription	Plaintext V All Received Published
ICPDAS/ai00 QoS 0	Topic: ICPDAS/ai00 QoS: 0
ICPDAS/ai01 QoS 0	+025.26 2024-05-07 13:49:51:590
	Topic: ICPDAS/ai01 QoS: 0
	2024-05-07 13:49:51:757
	Topic: ICPDAS/ai00 QoS: 0 +027.39
	2024-05-07 13:50:00:593

After reconnecting the wiring, the subscribed AI1 messages will be displayed every 9 seconds.

ICPDAS/ai00	QoS 0	Topic: ICPDAS/ai01 QoS: 0
ICPDAS/ai01	QoS 0	+031.23 2024-05-07 14:17:07:543
		Topic: ICPDAS/ai01 QoS: 0
		+029.61 2024-05-0714:17:16:502

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-119 -

4.17 SNMP

The "SNMP" page provides the function for ET-2200 to send module information and I/O information to the SNMP Network Management Software or device to help administrators to monitor the status of the ET-2200 in real time.

If the Trap function is enabled, ET-2200 can actively send messages to the SNMP manager to keep track of data when the I/O status of the module changes or restarts. The detailed description is as follows.

Note:

For DI/DO modules:

SNMP function is available for **Firmware v2.3.4** and later. It is not supported for older versions. **For AI/AO modules**:

SNMP function is available for **Firmware v1.60** and later. It is not supported for older versions.



Note:

ET-2200 currently supports these MIB-II management items such as sysContact, sysLocation, sysDescr, and sysName.

4.17.1 SNMP Agent Configuration

SNMP v2c Agent Configuration

System Info		Setting		
Contact	User	(Max. 47 chars)		
Location	Site	(Max. 47 chars)		
Description	EtherIO	(Max. 47 chars)		
Name	Device	(Max. 47 chars)		
Function	Setting			
Read-Only Community	public	(Max. 47 chars, example: public)		
Read-Write Community	private	(Max. 47 chars, example: private)		
Trap Community	public	(Max. 47 chars, example: public)		
Manager / Trap IP #1	0.0.0.0] (IPv4/v6 Address, example: 10.0.8.123, fe80:0:0:0:a8ee:dc07:1cda:5678)		
Manager / Trap IP #2	0.0.0.0]		
Generic Trap	□Cold Start, □Warm Start			
Enable SNMP	Check to enable. (Default disabled)			
	Update Settings			

The table describes the parameters contained in the "System Info" section.

Item	Description	Default Value
Contact	The SNMP server's contact person	
Location	The server's location	
Description	The description of the device displayed on the Server	
Name	The name of the device displayed on the Server	Device

The table describes the parameters contained in the "Function" section.

ltem	Description	Default Value
Read-Only Community	Set the community name of the module for read-only data	public
Read-Write Community	Set the community name of the module for read-write data	private
Trap Community	Set the community name of the module for the trap	public
Manager / Trap IP #1	Set the IP address of Trap IP #1	0.0.0.0
Manager / Trap IP #2	Set the IP address of Trap IP #2	0.0.0.0
Generic Trap	Select to enable the Cold Start or Warm Start function	Disabled
Enable SNMP	Select the box to enable the SNMP communication function and deselect to disable it	Disabled
Update Settings	After saving the settings, also reboot the module to take eff	ect

4.17.2 SNMP Specific Trap

SNMP Specific Trap						
Digital Input		State-Change / Specific ID (1-255)				
All 🗌 1	A single trap contains all DI s	A single trap contains all DI states when any DI changes.				
□ DI 7 - 0 DI7:	DI6: DI5: 1	DI4: □ 1	DI3:	DI2:		DI0:
Digital Output		State-Change / Specific ID (1-255)				
All 🗌 🛽	A single trap contains all DO	states when any DO	changes.			
DO 7 - 0 DO7:	DO6: DO5: 1	DO4:	DO3:	DO2:	DO1:	DO0:
	Update Settings					
Reboot is required after SNI	MP configuration.					

The table describes the parameters contained in the " **Digital Input/ Digital Output** " section.

ltem	Description
Digital Input	
All	All DI channels share a single Trap. Check the box to send a Trap message when
All	any DI status changes. "Specific ID" is the ID number set for this Trap
	Each DI channel has a specific Trap. Check the box to enable the Trap function
DI 7-0	for that DI channel. "Specific ID" is the ID number set for individual channel
Digital Output	
	All DO channels share a single Trap. Check the box to send a Trap message when
All	any DO status changes. "Specific ID" is the ID number set for this Trap.
	Each DO channel has a specific Trap. Check the box to enable the Trap function
007-0	for that DO channel. "Specific ID" is the ID number set for individual channel
Update	After changing and caving the cattings, also repeat the module to take affect
Setting	After changing and saving the settings, also repoot the module to take effect
Reboot	Click the button to reboot the module

-122 -

SNMP Specific Trap

Analog Output	State-Change	Specific ID (1-255)		
AO0		1		
AO1		1		
AO2		1		
AO3		1		
AO4		1		
AO5		1		
AO6		1		
A07		1		
Update Settings				

The table describes the parameters contained in the " **Analog Output** " section.

ltem	Description
Analog Output	
AO 7-0	Each AO channel has a specific Trap. Check the box to enable the Trap function for that AO channel. "Specific ID" is the ID number set for individual channel
Update Setting	After changing and saving the settings, also reboot the module to take effect
Reboot	Click the button to reboot the module

4.17.3 SNMP I/O Example

In this article, we use **iReasoning MIB Browser** as an example. Please download the installer (V14) from its official website and run the installer.

http://www.ireasoning.com/mibbrowser.shtml

Step1. Start the iReasoning MIB Browser. Click the File → Load MIBs on the menu bar and click the specified MIB file of the module (e.g. ICPDAS-ET2200-MIB_20220705.mib), then click the Open button to open it.



<u>Step2.</u> Enter the IP address of the ET-2200 module in the **Address** field.

🚳 iReasoning MIB Browser	
File Edit Operations Tools Bookmarks Help	
Address: 10.0.8.169 V Advanced OID:	.1.3
SNMP MIBs	Result Table
MIB Tree iso.org.dod.internet	Name/OID

Step3. Click "Advanced..." to set the parameters of the SNMP agent. Enter the string in the Read/Write Community fields according to the Read-Only Community / Read-Write Community settings on the ET-2200. If these strings are different on both sides, the agent will not work correctly.

Function		Setting					
Read-Only Community	public			(Max. 4	7 chars, example: pu	blic)	
Read-Write Community	private			(Max. 4	7 chars, example: pri	vate)	
 iReasoning MIB Bruwser File Edit Operations To Address: 10.0.8.169 SNMP MIBs MIB Tree 	ols Bookma	rks Help Ivanced OID: .1.3	3	Result Table	Name/OID		
iso.org.dod.internet			_				
Enter the string a to the settings on	ccording ET-2200.	Advanced Propertie Address	es of SNM 10.0.8.1	IP Agent 169	×		
		Read Community Write Community	public private				
		SNMP Version	2 Ok	Cancel	~		

Note: If the **Write Community** field is not set, a Timeout error will occur during execution.

<u>Step4.</u> Enter the IP address of iReasoning MIB Browser in the Manager/Trap IP #1 field and enable the SNMP function, then click Update Settings to save the changes, and finally click the **Reboot** button to reboot the ET-2200 module.

Function		Setting					
Read-Only Community	public		(Max. 47 chars, example: public)				
Read-Write Community	private		(Max. 47 chars, example: private)				
Trap Community	public		(Max. 47 chars, example: public)				
Manager / Trap IP #1	10.0.8.17] (IPv4/v6 Address, example: 10.0.8.123, fe80:0:0:0:a8ee:dc07:1cda:5678)				
Manager / Trap IP #2	0.0.0.0]				
Generic Trap	Cold Start,	Warm Start					
Enable SNMP	Check to enabl	le. (Default disabled)					
		Update	Settings				
Report is required after SNMP configuration.							

Read the information of the ET-2200 – the Walk command

To do: Right-click the **iso.org.dod.internet** folder on the left side and click **Walk** to display the information of the ET-2200 in the **Result Table**.

🚳 iReasoning MIB Browser							- C	×
	C 1				Operations	Cot Novt		^ Co
Address. 10.0.8.169	6.1			~	Operations.	Gel Nexi	~	- G 0
SNMP MIBs	Result Table							
MIB Tree	Nar	me/OID		Value		Туре	IP:Port	6
iso.org.dod.internet	sysDescr.0			EtherlO		OctetString	10.0.8.16	
Find in subtree	sysObjectID.0			icpdas		OID	10.0.8.16	
Export to XMI	sysUpTime.0			48 minutes 46.13 seconds	(292613)	TimeTicks	10.0.8.16	_ L
Expand subtree	sysContact.0			User		OctetString	10.0.8.16	8
	sysName.0			Device		OctetString	10.0.8.16	
Graph View Ctrl+R	sysLocation.0			Site		OctetString	10.0.8.16	
Get Next Ctrl+N	sysServices.0			72		Integer	10.0.8.16	
Get Subtree Ctrl+E	ifNumber.0			1		Integer	10.0.8.16	
Walk Ctrl+W	ifIndex.1			1		Integer	10.0.8.16	
Table VINV Ctrl+T	ifDescr.1			e0		OctetString	10.0.8.16	
	ifType.1			ethernetCsmacd (6)		Integer	10.0.8.16	
	ifMtu.1			1500		Integer	10.0.8.16	
	ifSpeed.1			1000000		Gauge	10.0.8.16	
	ifPhysAddress.1			00-0D-E0-A1-8A-9F		OctetString	10.0.8.16	
	ifAdminStatus 1			up (1)		Integer	10.0.8.16	
	ifOperStatus 1			up (1)		Integer	10.0 8 16	
	ifl astChange 1			0 millisecond (0)		TimeTicks	10.0.8.16	-
	ifInOctets 1			0		Tounter32	10.0.8.16	
				o			10.0.0.10	
Result Table						\checkmark		
Name/OID				Value		Тур	e IP:Po	ort
snmpEnableAuthenTraps.0		disabled (2)				Intege	r 192.10	68 ^
.1.3.6.1.2.1.11.31.0		0				Count	er32 192.10	58
		0				Count	er32 192.10	58
aliasName 0		FiberIO				Octet	string 102.10	38
firmwareVersion 0		v01 6 0 [2022101:	31			Octets	String 192.16	58
webServerPort.0		80	-1			Intege	r 192.10	58
modbusTcpPort.0		502				Intege	r 192.10	58
modbusTcpNetID.0		1				Intege	r 192.10	58
ailndex.1		1				Intege	r 192.10	58
aiindex.2		2				Intege	r 192.10	58
ailndex.3		3				Intege	r 192.10	58
aindex.4		4				Intege	r 192.10	58
alindex.5		5				Intege	r 192.10	08
ailindex.o		7				Intege	r 192.10	38
aindex.7		8				Intege	r 192.10	58
aiName.1		AIO		-		Octets	String 192.10	58
aiName.2		Al1	The	information or	n analog	Octets	String 192.1	58
aiName.3		Al2	ine			Octets	string 192.1	68
aiName.4		AI3	ir	puts of the ET-	2200.	Octets	string 192.1	68
aiName.5		Al4	-	•	-	Octets	String 192.1	58
aiName.6		AI5				Octets	String 192.1	58
aiName.7		Al6				Octets	String 192.1	58
aiName.8		AI7				Octets	string 192.1	58
aiValue 2		+0.003V				Octets	string 192.16	58
aiValue 3		+0.002V				Octeto	String 102.10	58
aiValue.4		+0.002V				Octets	String 192 16	58
aiValue.5		+0.003V				Octets	String 192.10	58
aiValue.6		+0.002V				Octets	String 192.1	58
aiValue.7		+0.002V				Octets	String 192.1	58
aiValue.8		+0.002V				Octets	String 192.1	58
aiValue.8		(Snmp End Of Mib	View)			EndO	Mi 192.16	58 🗸

Control the DO channel to ON/OFF – the SET command

To do: Right-click the **doValue** entry in the **Result Table** and click **Set** to display the **SNMP SET** dialog box. Enter the value 0 (OFF) or 1 (ON) in the **Value** field to set the DO value.

Result Table					
Name/OID		Va	alue	Туре	IP:Port
doName.1		DO0		OctetString	10.0.8.16
doName.2		DO1		OctetString	10.0.8.16
doName.3		DO2		OctetString	10.0.8.16
doName.4		DO3		OctetString	10.0.8.16
doName.5		DO4		OctetString	10.0.8.16
doName.6		DO5		OctetString	10.0.8.16
doValue.1		off (0)		Integer	10.0.8.16
doValue.2		on (1)	Get	(Ctrl+G 16
doValue.3		off (0)	Get Next	(Ctrl+N 16
doValue.4		off (0)	Set		2trl+S 16
doValue.5		off (0)	Walk	(Ctrl+W 16
doValue.6	SNMP SET				
doValue.6					
doindex.1	OID	.1.3.6.1.4.1.34321.20.7	1.2.2.1.3.1		
doIndex.2					
doIndex.3	Data Type	Integer			
doIndex.4	Value	{off(0), on(1) }			
doIndex.5					
doIndex.6					
doName.1			Ok Cancel		
			our our our		

After setting the value, execute the Walk command by right-clicking the **iso.org.dod.internet** folder on the left side of the window to update the value.

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-127 -

Set the outputs of the AO channel – the SET command

<u>To do</u>: Right-click the **aoValue** entry in the **Result Table** and click **Set** to display the **SNMP SET** dialog box. Enter the value **1.000** (output 1V) in the **Value** field to set the AO value.

Name/OID		Value	Туре	IP:Port △	
snmpEnableAuthenTra	ps.0		disabled (2)	integer	192.168.1.
.1.3.6.1.2.1.11.31.0			0	Counter32	192.168.1.
.1.3.6.1.2.1.11.32.0		0	Counter32	192.168.1.	
modelName.0			P/ET-2228	OctetString	192.168.1.
aliasName.0			EtherIO	OctetString	192.168.1.
irmware∨ersion.0			v01.6.0 [20221013]	OctetString	192.168.1.
webServerPort.0			80	integer	192.168.1.
nodbusTcpPort.0			502	integer	192.168.1.
nodbusTcpNetID.0			1	integer	192.168.1.
aoIndex.1			1	integer	192.168.1.
aoIndex.2			2	nteger	192.168.1.
aoIndex.3			3	integer	192.168.1.
aoIndex.4			4	nteger	192.168.1.
aoIndex.5			5	nteger	192.168.1.
aoIndex.6			6	nteger	192.168.1.
aoIndex.7			7	nteger	192.168.1.
ioIndex.8		8	nteger	192.168.1.	
aoName.1			A00	OctetString	192.168.1.
aoName.2			A01	OctetString	192.168.1.
aoName.3			A02	OctetString	192.168.1.
aoName.4			A03	OctetString	192.168.1.
aoName.5			A04	OctetString	192.168.1.
aoName.6			A05	OctetString	192.168.1.
aoName.7			A06	OctetString	192.168.1.
aoName.8			A07	OctetString	192.168.1.
aoHexValue.1	Get	Ctrl+G	+0.000∨	OctetString	192.168.1.
aoHexValue.2	Get Next	Ctrl+N	+0.000/	Octotetring	102.169.1.
aoHexValue.3	Get Bulk 🛛 🚹	Ctrl+B	+ 🐨 SNMP SET		× <u>.1</u> .
aoHexValue.4	Set	Ctrl+S	+		.1.
aoHexValue.5	Walk	Ctrl+W	+ OID .1.3.6.1.4.1.34321.20.1.2.4.1.3.	1	.1.
aoHexValue.6	Find in Tree (double clic	0	+		.1.
aoHexValue.7	Сору		+ Data Type OctetString		~ .1.
aoHexValue.8	Delete		+		.1.
aoHexValue.8			🤃 Value 1.000		.1.

After completing the setting, execute the **Walk** command by right-clicking the **iso.org.dod.internet** folder on the left side of the window to update the value.

aoName.7	A06	OctetString	192.168
aoName.8	A07 👩	OctetString	192.168
aoHex∀alue.1	+1.001V	OctetString	192.168
aoHexValue.2	+0.000V	OctetString	192.168
aoHexValue.3	+0.000V	OctetString	192.168

4.17.4 SNMP Trap Example

<u>Step1.</u> Click Tools → Trap Receiver on the menu bar to display the window for receiving the Trap messages.

Address; 40.0.0.400	Tran Receiver	Otrial		Operational Opt Next	* 0a			
SNMP MIBs	Trap Sender Ping Trace Route	Result Table Trap Receiver	ult Table Trap Receiver ×					
iso.org.dod.inter	Network Discovery	> 🔇 🔠 🔽 🔏						
	Manage SNMPv3 USM Users	Description	Source	Time	Severity			
	Compare Devices	pecific: 10; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Port View	pecific: 11; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Switch Port Mapper	pecific: 2; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Dovice Spanshot	pecific: 9; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Cisco Device Snapshot	pecific: 4; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Cisco Device Silapsilot	pecific: 5; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Log Window	pecific: 8; icpdas	10.0.8.169	2022-11-11 15:50:42				
	Options	pecific: 7; icpdas	10.0.8.169	2022-11-11 15:50:42				
		Specific: 3; icpdas	10.0.8.169	2022-11-11 15:50:42				
		Specific: 1; icpdas	10.0.8.169	2022-11-11 15:50:42				
		Specific: 6; icpdas	10.0.8.169	2022-11-11 15:50:42				
		Specific: 0; icpdas	10.0.8.169	2022-11-11 15:50:42				
		warmStart	10.0.8.169	2022-11-11 15:50:41				

Step2. The Trap types for the alarms that receive from the ET-2200 module are as follows.

1. Cold Start Trap:

The Cold Start Trap will be sent when the module restarts after it has been completely powered off.

2. Warm Start Trap:

The Warm Start Trap will be sent when the module restarts without turning off the power. For example, the reboot command or the watchdog mechanism.

3. Specific Trap (DI/DO/AO State-Change):

When the specified DO/DI/AO channel is enabled, if the I/O status changes (e.g., ON/OFF or value change), a Trap message with a Specific ID, source IP, and time will be sent. This makes it easier to analyze the cause of the alarm and handle it appropriately.

Click the Trap message to view the details

🜔 🔕 🔠 🏹 🤞						
Description			Source	Time		Severity
Specific: 1; icpdas			10.0.8.169	2022-11-14 14:	22:58	
Specific: 1; icpdas			10.0.8. <mark>1</mark> 69	2022-11-14 14:	22:57	
Source:	10.0.8.169	Timestamp:	1 hour 4 minutes 48 s	seconds	SNMP Version:	1
Enterprise:	icpdas				Community:	public
Specific:	1	Generic:	enterpriseSpecific			
Variable Bindings:						
Name:	trapMessage					
Value:	[OctetString] DO0=1					
Description:						

Item	Description
Source	The IP address of the Trap from the device
Timestamp	How much time has passed after the module starts
SNMP Version	The version of SNMP
Enterprise	The name of the enterprise
Community	SNMP community name according to the Trap Community setting
community	on the ET-2200.
Specific	Specific ID
Generic	Generic ID
Name	The generic name for the Trap
Value	The I/O channel and status value of the module
value	(e.g., 0 = OFF, 1 = ON, or an AO value)

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

-130 -

4.17.5 SNMP Problem Solving

Unable to receive the Trap message from the device

- 1. Check the setting of the Windows firewall or the Anti-virus software. These functions can be disabled during the testing.
- 2. Check the setting of the Trap port. Using iReasoning MIB Browser as an example,

Click the **Trap Receiver Settings** button on the **Trap Receiver** page to open the window. Then, confirm the Trap Port, Bind IP, and Transport settings. The ET-2200 module uses the default Trap Port **162** under SNMP specifications.

SNMP MIBs		Result Table 10.0.8.169 - 0	doTable Trap Receiver ×		
Trap Receiver Settings		Т	he "Trap Receiver Set	ttings" button	×
Trap Port:	162	Bind IP: All	 ✓ Transport: 	Both ~	

3. Disable Windows SNMP Trap Service.

Note: Different versions of Windows have different configuration interfaces. The following example is based on Windows 10.

<u>Step1.</u> Open the **Control Panel** window and click **Administrative Tools**.



-131 -

Step2.	Double-click	the	Services	icon.
Step2.	Double click	unc	JUIVICUS	icon.

🎲 Registry Editor	2019/12/7 下午 05:	09 Shortcut	2 KB
Resource Monitor	2019/12/7 下午 05:	09 Shortcut	2 KB
Services	2019/12/7 下午 05:	09 Shortcut	2 KB
🛃 System Configuration	2019/12/7 下午 05:	09 Shortcut	2 KB
👰 System Information	2019/12/7 下午 05:	09 Shortcut	2 KB
💮 Task Scheduler	2019/12/7 下午 05:	09 Shortcut	2 KB
🞓 Windows Defender Firewall wit	th Advanc 2019/12/7 下午 05:	08 Shortcut	2 KB
📷 Windows Memory Diagnostic	2019/12/7 下午 05:	09 Shortcut	2 KB

Step3. Double-click the **SNMP Trap** and confirm the **Startup type** is set to "**Disabled**" and the **Service status** is set to "**Stopped**".

🔕 Services							—		×
File Action View	Help								
(+ +) 🖬 🗐 🖸	à 📑 🚺 📷 🕨 🔳 💵 🕪								
🔍 Services (Local)	Services (Local)	-							
	SNMP Trap	Name		Descrip	tion	Status	Startup Type	Log On As	^
	Start the service	🤹 Sensor Service 🎑 Server		A servio Suppor	ce fo ts fil	Running	Manual (Trig Automatic (T	Local Syste. Local Syste.	
		🎑 Service KMSELDI				Running	Automatic	Local Syste.	
	Description: Receives trap messages generated by	Shared PC Accour	SNMP T	ap Proper	ties (Loc	al Comput	er)		×
	local or remote Simple Network Management Protocol (SNMP)	Smart Card	General	Log On	Recove	ry Depend	encies		
	agents and forwards the messages to SNMP management programs	Smart Card Device	Servic	e name:	SNMPT	RAP			
	running on this computer. If this service is stopped, SNMP-based	SNMP Trap	Display	name:	SNMP '	Trap			
	programs on this computer will not receive SNMP trap messages, If this	Software Protection Spatial Data Service	Descri	otion:	Receive	es trap mess Simple Netw	ages generated by I ork Management Pr	ocal or 🖌	~
	service is disabled, any services that explicitly depend on it will fail to start.	Spot Verifier	Dath to	ave a dabl	(SNIMP)	anante and	forwarde the maeea	nee to	·
		SQL Server (ICPDA	C:\WI		e. ystem32∖	snmptrap.ex	e		
		SQL Server Browse	Startup	typ <u>e</u> :	Disable	ed		`	~
		SQL Server CEIP se							
		SSDP Discovery							-
		State Repository S	Servic	e status:	Stopped	ł			
		Still Image Acquisi		<u>S</u> tart	S	itop	<u>P</u> ause	<u>R</u> esume	
		Storage Service	You ca	in specify th	ne start pi	arameters th	at apply when you s	tart the service	
	Extended Standard	Wee storage ners man	from he	ere.					
			Start p	ara <u>m</u> eters:					
						OK	Cancel	Appl	y

-132 -

5. I/O Pair Connection Applications

The ET-2200 series modules can establish remote logical I/O connections via Ethernet. After configuring the settings, it becomes possible to continuously read the DI status of the local (or remote) module and then write it to the DO of the remote (or local) module. This function is useful when connecting DI/DO modules that have no Ethernet functionality.

To configure the Pair-Connection function, please consult the following chapters.

5.1 Set a Single Module to Pull/Push Mode (DI/DO)

Step 1: Connect the Module to the Network, PC, and Power Supply

Confirm that the ET-2200 series modules are functioning correctly. Refer to Chapter 3. "Getting Started" for more details. Here is the schematic diagram for this example, utilizing the ET-2260 module.



Step 2: Configure the Ethernet Settings

Contact your network administrator to get the correct network configuration information (e.g., IP/Mask/Gateway) needed to set up I/O modules. For more instructions, refer to Section 3.3 "Configuring the Network Settings".

🥩 eSearch Uti	ility [v1.2.6, Dec	.09, 2020]				×
File Server	Tools					
Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	^
ET-2260	#1	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0:65:e9:85	5
ET-2260	#2	192.168.79.100	255.255.0.0	192.168.1.1	00:0d:e0:65:cf:d3	
DL-302	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	00:0d:e0:92:06:69	1
DL-302	EtherIO	192.168.101.15	255.255.0.0	192.168.1.1	00:0D:E0:92:00:A	1 🗸
<					2	*
Search	Server	Configuration (UDF	ŋ w	eb	Exit	
Status						//

Step 3: Log into the ET-2200 Web Server

- 1. Choose the **ET-2200** module within the eSearch Utility and then click the "**Web**" button to open the login webpage.
- Enter the password in the Login password field (Defaults: "Admin") and click the "Submit" button to log into the Web Server.

	🥩 eSearch Util	ity [v1.2.6, Dec	.09, 2020]			-		<
\frown	File Server T	ools						
1	Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Add	ress	^
	ET-2260	#1	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0	:65:e9:85	
	ET-2260 d	#2	192.168.79.100	255.255.0.0	192.168.1.1	00:0d:e0	:65:cf:d3	
	DL-302 🔪	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	00:0d:e0	:92:06:69	
	DL-302	EtherIO	192.168.101.15	255 255.0.0	192.168.1.1	00:0D:E0):92:00:A1	¥
	<						>	
	Search	Server	Configuration (UDP		وه راس	Ex	cit	
	Status							11.



3. Click the "Pair" tab to display the I/O Pair-connection Settings page.



5.1.1 Pull Mode

- 1. In the **Pair-Connection Setting** section, choose **PULL** and check the box in the **Enable Mode** field to enable this mode.
- 2. In the **Remote IP...** : **Port** fields, enter the IP address and TCP Port of the remote **ET-2260#2** module.
- 3. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the **PULL Mode** (Remote DI to Local DO) configuration:

Enter "2" in the "IO Count" field and "0" in both the Local/Remote IO Address fields. This means DIO and DI1 of ET-2260#2 module correspond to DOO and DO1 of ET-2260#1 module.

- In the Local IO Address field, select "0x: Coil Output..." and enter the starting DO address.
 In the Remote IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
- 5. Choose the Modbus protocol (e.g., **TCPv4**) from the **Network Protocol** drop-down menu.
- 6. Click the "**Submit...**" button to complete the configuration.

Pa	Pair-Connection Settings: Submit 1-8 9-16											
#	Enable Mode	Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port	Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol				
01	PULL V	192.168.79.100 502	1	1000	2	0x:Coil ΟιΥ 0	1x:Discret∨ 0	TCPv4 🗸				
02	PULL V	502	1	1000	1	0x:Coil Οι ❤ 0	0x:Coil Οι ❤ 0	TCPv4 🗸				
03	B PULL V	502	1	1000	1	0x:Coil Oι ❤ 0	0x:Coil Oι ❤ 0	TCPv4 🗸				
04	PULL V	502	1	1000	1	0x:Coil Oι ✓ 0	0x:Coil Oι ❤ 0	TCPv4 🗸				
05	PULL V	502	1	1000	1	0x:Coil ΟιΥ 0	0x:Coil Oι ❤ 0	TCPv4 🗸				

5.1.2 Push Mode

- 1. In the **Pair-Connection Setting** section, choose **PUSH** and check the box in the **Enable Mode** field to enable this mode.
- In the Remote IP... : Port fields, enter the IP address and the TCP Port of the remote ET-2260#2 module
- 3. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the **PUSH Mode** (Local DI to Remote DO) configuration: Enter "2" in the **IO Count** field and "0" in both the Local/Remote IO Address fields. This

means DIO and DI1 of ET-2260#1 module correspond to DOO and DO1 of ET-2260#2 module.

- In the Local IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
 In the Remote IO Address field, select "0x: Coil Output..." and enter the starting DO address.
- 5. Choose the Modbus protocol (e.g., TCPv4) from the Network Protocol drop-down menu.
- 6. Click the **"Submit...**" button to complete the configuration.

Model Name ET-2260 Alias Name #1											
Firmware Version v2.4.0 [Sep.06 2022]	MAC Address 00-0d-e0-65-cf-d3										
IP Address 192.168.79.10	Initial Switch OFF										
TCP Timeout (Socket Watchdog, Seconds) 180 System Timeout (Network Watchdog, Seconds) 0											
air-Connection Settings: Submit 1-8 9-16											
# Enable Mode Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port		Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol				
01 PULL V 192.168.79.100	: 502	1	1000	2	0x:Coil ✓ 0	1x:Dis(❤ 0	TCPv4 🗸				
02 PUSH V 192.168.79.100	: 502	1	1000	2	1x:Dis(❤ 0	0x:Coil ✓ 0	TCPv4 🗸				
03 PULL V	: 502	1	1000	1	0X:Coll V 0	0X:COII •	TCPv4 🗸				
04 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸				
05 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓				
06 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸				
07 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸				
08 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸				
Note: PULL Mode = Remote to Local PUSH Mode = Local to Remote Pair composition is disabled if the LO Count is 0 (no data)											
(10 Address (base 0); 0 = 65535, no leading 0x/1x/3x/4x)											

5.2 Set Two Modules to Push Mode (Local DI to Remote DO)

Step 1: Connect the Module to the Network, PC, and Power Supply

Confirm that the ET-2200 series modules are functioning correctly. Refer to Chapter 3 "Getting Started" for more details. Here is the schematic diagram for this example, utilizing the **ET-2260** module.



Step 2: Configure the Ethernet Settings

Contact your network administrator to get the correct network configuration information (e.g., IP/Mask/Gateway) needed to set up I/O modules. For more instructions, refer to Section 3.3 "Configuring the Network Settings".

		🥩 eSearch Uti	lity [v1.2.6, D	ec.09, 2020]			—		×
(File Server T	ools						
	2	Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Add	Iress	^
	-	ET-2260	#1	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0):65:e9:85	
		ET-2260	#2	192.168.79.100	255.255.0.0	192.168.1.1	00:0d:e0):65:cf:d3	
		DL-302	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	00:0d:e0):92:06:69	r -
		DL-302	EtherIO	192.168.101.15	255.255 0.0	192.168.1.1	00:0D:E	D:92:00:A1	×
(1	<			(3)			>	•
	1	Search	Server	Configuration (UDF		eb	E>	<it< th=""><th></th></it<>	
		Status							11.

Step 3: Log into the ET-2200 Web Server

- Choose the ET-2260#1 or ET-2260#2 module within the eSearch Utility and then click the "Web" button to open the login webpage.
- Enter the password in the Login password field (Defaults: "Admin") and click the "Submit" button to log into the Web Server. (See Section 5.1 – Step3)

Step 4-1: Configure the Pair-Connection for the ET-2260#1 (Push Mode)

- 1. Click the **Pair** tab to display the configuration page.
- 2. In the **Pair-Connection Setting** section, choose **PUSH** and check the box in the **Enable Mode** field to enable this mode.
- In the Remote IP...: Port fields, enter the IP address and the TCP Port of the remote ET-2260
 #2 module
- 4. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the <u>PUSH Mode (Local DI to Remote DO)</u> configuration: Enter "1" in the IO Count field and "0" in both the Local/Remote IO Address fields. This means DIO of ET-2260#1 module correspond to DOO of ET-2260#2 module.

- In the Local IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
 In the Remote IO Address field, select "0x: Coil Output..." and enter the starting DO address.
- 6. Choose the Modbus protocol (e.g., **TCPv4**) from the **Network Protocol** drop-down menu.
- 7. Click the "Submit..." button to complete the configuration.

Model Name ET-2260			Alias Nar	ne <mark>#1</mark>						
Firmware Version v2.4.0 [Sep.06 2022]	MAC Address 00-0d-e0-65-cf-d3									
IP Address 192.168.79.10 Initial Switch OFF										
TCP Timeout (Socket Watchdog, Seconds) 180 System Timeout (Network Watchdog, Seconds) 0										
Pair-Connection Settings: Submit 1-8 9-16										
# Enable Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port		Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol			
0. PUSH V 192.168.79.100	: 502	1	1000	1	1x:Dis(▼ 0	0x:Coil ✓ 0	TCPv4 🗸			
02 PULL ▼	: 502	1	1000	1	0x:Coil v 0	0 x:Ooil v 0	TCPv4 🗸			
03 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
04 PULL V	: 502	1	1000	1	0x:Coil∨ 0	0x:Coil ✓ 0	TCPv4 🗸			
05 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
06 PULL V	: 502	1	1000	1	0x:Coil∨ 0	0x:Coil ✓ 0	TCPv4 🗸			
07 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
08 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
Note: PULL Mode = Remote to Local PUSH Mode = Local to Remote Pair-connection is disabled if the IO Count is 0 (no data)										
To Address (base of. 0 - 00000, no redding ox TX/0X/4X.										

Step 4-2: Configure the Pair-Connection for the ET-2260#2 (Push Mode)

- 1. Click the **Pair** tab to display the configuration page.
- 2. In the **Pair-Connection Setting** section, choose **PUSH** and check the box in the **Enable Mode** field to enable this mode.
- In the Remote IP...: Port fields, enter the IP address and the TCP Port of the remote ET-2260
 #1 module
- 4. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the <u>PUSH Mode (Local DI to Remote DO)</u> configuration: Enter "1" in the IO Count field and "0" in both the Local/Remote IO Address fields. This means DIO of ET-2260#2 module correspond to DOO of ET-2260#1 module.

- In the Local IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
 In the Remote IO Address field, select "0x: Coil Output..." and enter the starting DO address.
- 6. Choose the Modbus protocol (e.g., **TCPv4**) from the **Network Protocol** drop-down menu.
- 7. Click the "**Submit...**" button to complete the configuration.

Model Name FT-2260 Alias Name #2											
Firmware Version v2.4.0 [Sep.06 2022]			MAC Addre	ss 00-0d	-e0-65-e9-8	5					
IP Address 192.168.79.100	Initial Switch OFF										
TCP Timeout		S	ystem Timeo	out							
(Socket Watchdog, Seconds) (Network Watchdog, Seconds)											
Pair-Connection Settings:											
# Enable Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port		Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol				
01 PUSH V 192.168.79.10	: 502	1	1000	1	1x:Dis(❤ 0	0x:Coil ✓ 0	TCPv4 🗸				
02 PULL ✓	: 502	1	1000	1	0x:Coil ∨ 0	0x:Coil ✓ 0	TCPv4 🗸				
03 PULL V	502	1	1000	1	0x:Coil∨ 0	0x:Coil ✓ 0	TCPv4 🗸				
04 PULL V	502	1	1000	1	0x:Coil∨ 0	0x:Coil ✓ 0	TCPv4 🗸				
05 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸				
06 PULL V	: 502	1	1000	1	0x:Coil∨ 0	0x:Coil ✓ 0	TCPv4 🗸				
07 PULL V	502	1	1000	1	0x:Coil∨ 0	0x:Coil ✓ 0	TCPv4 🗸				
08 PULL V	: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸				
Note: PULL Mode = Remote to Local PUSH Mode = Local to Remote Pair.connection is disabled if the IO Count is 0 (no data)											
IO Address (base 0): $0 - 65535$ no leading $0x/1x/3x/4x$											

5.3 Set Two Modules to Pull Mode (Remote DI to 2-Local DO)

Step 1: Connect the Module to the Network, PC, and Power Supply

Confirm that the ET-2200 series modules are functioning correctly. Refer to Chapter 3 "Getting Started" for more details. Here is the schematic diagram for this example, utilizing the ET-2260 and ET-7255 modules.



Step 2: Configure the Ethernet Settings

Contact your network administrator to get the correct network configuration information (e.g., IP/Mask/Gateway) needed to set up I/O modules. For more instructions, refer to Section 3.3 "Configuring the Network Settings".

		🥩 eSearch Utility [v1.2.	6, Dec.09, 2020]				- 0	×
		File Server Tools						
	2	Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	^
	-	ET-2260	#1	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0:65:e9:8	5
		ET-2260	#2	192.168.79.100	255.255.0.0	192.168.1.1	00:0d:e0:65:cf:d3	
		DL-302	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	00:0d:e0:92:06:6	3
		DI -302	EtherlO	192 168 101 15	255 255 0 0	192 168 1 1	00.0D.E0.05.00.9	1
1		ET-7255/PET-7255	Slave	192.168.79.55	255.0.0	192.168.1.1	00:0d:e0:65:ed:d	I 🗸
	1	< l			3			>
	1	Search Serve	r Confi	guration (UDP)	Web		Exit	
		Status						11.

Step 3: Log into the Module's Web Server

- Choose the ET-2260#1/#2 or ET-7255 module within the eSearch Utility and then click the "Web" button to open the login webpage.
- Enter the password in the Login password field (Defaults: "Admin") and click the "Submit" button to log into the Web Server. (See Section 5.1 – Step3)

Step 4-1: Configure the Pair-Connection for the ET-2260#1 (Pull Mode)

- 1. Click the **Pair** tab to display the configuration page.
- 2. In the **Pair-Connection Setting** section, choose **PULL** and check the box in the **Enable Mode** field to enable this mode.
- 3. In the **Remote IP...** : **Port** fields, enter the IP address and TCP Port of the remote **ET-7255** module.
- 4. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the **<u>PULL Mode</u>** (**Remote** DI to **Local** DO) configuration:

Enter "2" in the "IO Count" field and "0" in both the Local/Remote IO Address fields. This means DIO and DI1 of ET-7255 module correspond to DOO and DO1 of ET-2260#1 module.

- In the Local IO Address field, select "0x: Coil Output..." and enter the starting DO address.
 In the Remote IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
- 6. Choose the Modbus protocol (e.g., TCPv4) from the Network Protocol drop-down menu.
- 7. Click the **"Submit...**" button to complete the configuration.

	Nodel Name ET 2260 Aliae Name #1											
					All		#1	F - F - 10				
		Firmware Version V2.4.0 [Sep.06 2022]	MAC Address UU-Ud-eU-ob-CT-d3									
		IP Address 192.168.79.10			Initi	al Switch	OFF					
	TCP Timeout (Socket Watchdog, Seconds) 180 System Timeout (Network Watchdog, Seconds) 0											
Pair-Connection Settings: Submit 1-8 9-16												
#	Enable Mode	Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port		Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol			
0	PULL V	192.168.79.55	: 502	1	1000	2	0x:Coil ✓ 0	1x:Dis(❤ 0	TCPv4 🗸			
02	PULL V		: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✔ 0	TCPv4 🗸			
03	PULL V		: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✔ 0	TCPv4 🗸			
04	PULL V		: 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
05	PULL V		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✔ 0	TCPv4 🗸			
06	PULL V		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
07	PULL V		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
80	PULL V		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸			
No PL PL Pa	ote: JLL Mode JSH Mode iir-connec	= Remote to Local = Local to Remote tion is disabled if the IO Count is 0 (no data)										
10	Address	(base 0): 0 - 65535, no leading 0x/1x/3x/4x.										

Step 4-2: Configure the Pair-Connection for the ET-2260#2 (Pull Mode)

- 1. Click the **Pair** tab to display the configuration page.
- 2. In the **Pair-Connection Setting** section, choose **PULL** and check the box in the **Enable Mode** field to enable this mode.
- 3. In the **Remote IP...** : **Port** fields, enter the IP address and TCP Port of the remote **ET-7255** module.
- 4. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the **<u>PULL Mode</u>** (**Remote** DI to **Local** DO) configuration:

Enter "2" in the "IO Count" field and "0/ 2" in both the Local/Remote IO Address fields. This means DI2 and DI3 of ET-7255 module correspond to DO0 and DO1 of ET-2260#2 module.

- In the Local IO Address field, select "0x: Coil Output..." and enter the starting DO address.
 In the Remote IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
- 6. Choose the Modbus protocol (e.g., TCPv4) from the Network Protocol drop-down menu.
- 7. Click the **"Submit...**" button to complete the configuration.

Model Name ET-2260 Alias Name #2								
Firmware Version v2.4.0 [Sep.06 2022]	MAC Address 00-0d-e0-65-e9-85							
IP Address 192.168.79.100	Initial Switch OFF							
TCP Timeout (Socket Watchdog, Seconds)	System Timeout (Network Watchdog, Seconds)							
Pair-Connection Settings: Submit 1-8 9-16								
Enable Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port Mode		Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol	
01 PULL V 192.168.79.55	502	1	1000	2	0x:Coil V 0	1x:Dis(❤ 2	TCPv4 🗸	
02 PULL V	502	1	1000	1	0x:Coll 🗸	0x.coll♥ 0	TCPv4 ✓	
03 PULL V	502	1	1000	1	0x:Coil ✔ 0	0x:Coil ✓ 0	TCPv4 ✓	
04 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓	
05 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓	
06 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓	
07 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸	
08 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓	
Note: PULL Mode = Remote to Local PUSH Mode = Local to Remote Pair-connection is disabled if the IO Count is 0 (no data) IO Address (base 0): 0 - 65535, no leading 0x/1x/3x/4x.								

5.4 Set Two Modules to Push Mode (2-Local DI to Remote DO)

Step 1: Connect the Module to the Network, PC, and Power Supply

Confirm that the ET-2200 series modules are functioning correctly. Refer to Chapter 3 "Getting Started" for more details. Here is the schematic diagram for this example, utilizing the ET-2260 and ET-7255 modules.



Step 2: Configure the Ethernet Settings

Contact your network administrator to get the correct network configuration information (e.g., IP/Mask/Gateway) needed to set up I/O modules. For more instructions, refer to Section 3.3 "Configuring the Network Settings".

	🥩 eSearch Utility [v1.2.	6, Dec.09, 2020]				- 0	×	
\frown	File Server Tools							
2	Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	^	
\sim	ET-2260	#1	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0:65:e9:8	5	
	ET-2260	#2	192.168.79.100	255.255.0.0	192.168.1.1	00:0d:e0:65:cf:d3		
	DL-302	EtherIO	192.168.84.62	255.255.0.0	192.168.0.1	00:0d:e0:92:06:69	3	
	DI -302	EtherlO	192 168 101 15	255 255 0 0	192 168 1 1	00.0D.E0.05.00.V	1	
	ET-7255/PET-7255	Slave	192.168.79.55	5 255.0.0	192.168.1.1	00:0d:e0:65:ed:d1	I 🗸	
	< l			3		:	>	
\neg	Search Server Confi		guration (UDP)			Exit		
	Status						11.	

Step 3: Log into the Module's Web Server

- 3. Choose the **ET-2260#1/#2 or ET-7255** module within the eSearch Utility and then click the "**Web**" button to open the login webpage.
- Enter the password in the Login password field (Defaults: "Admin") and click the "Submit" button to log into the Web Server. (See Section 5.1 – Step3)

Step 4-1: Configure the Pair-Connection for the ET-2260#1 (Push Mode)

- 1. Click the **Pair** tab to display the configuration page.
- 2. In the **Pair-Connection Setting** section, choose **PUSH** and check the box in the **Enable Mode** field to enable this mode.
- 3. In the **Remote IP...** : **Port** fields, enter the IP address and the TCP Port of the remote **ET-7255** module
- 4. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the <u>PUSH Mode (Local DI to Remote DO)</u> configuration: Enter "2" in the IO Count field and "0" in both the Local/Remote IO Address fields. This means DIO, DI1 of ET-2260#1 module correspond to DOO, DO1 of ET-7255 module.

- In the Local IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
 In the Remote IO Address field, select "0x: Coil Output..." and enter the starting DO address.
- 6. Choose the Modbus protocol (e.g., **TCPv4**) from the **Network Protocol** drop-down menu.
- 7. Click the "**Submit...**" button to complete the configuration.

Model Name ET-2260 Alias Name #1									
Firmware Version v2.4.0 [Sep.	06 2022]	MAC Address 00-0d-e0-65-cf-d3							
IP Address 192.168.79.	10	Initial Switch OFF							
TCP Timeout (Socket Watchdog, Seconds) System Timeout (Network Watchdog, Seconds) O									
Pair-Connection Settings: Submit 1-8 9-16									
# Enable Remote IPv4 / IPv6 / Host Name (Max. 1	27 chars) : Port	Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol		
01 PUSH V (92.168.79.55	502	1	1000	2	1x:Dis(❤ 0	0x:Coil ✓ 0	TCPv4 ✓		
02 PULL V	. 502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓		
03 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓		
04 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓		
05 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✓		
06 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 ✔		
07 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil▼ 0	TCPv4 ✓		
08 PULL V	502	1	1000	1	0x:Coil ✓ 0	0x:Coil▼ 0	TCPv4 ✔		
Note: PULL Mode = Remote to Local PUSH Mode = Local to Remote Pair-connection is disabled if the IO Count is 0 (no da IO Address (base 0): 0 - 65535, no leading 0x/1x/3x/4	ita)								
Step 4-2: Configure the Pair-Connection for the ET-2260#2 (Push Mode)

- 1. Click the **Pair** tab to display the configuration page.
- 2. In the **Pair-Connection Setting** section, choose **PUSH** and check the box in the **Enable Mode** field to enable this mode.
- 3. In the **Remote IP...** : **Port** fields, enter the IP address and the TCP Port of the remote **ET-7255** module
- 4. In the **IO Count** field, enter the mapped quantity for DI and DO.

For example, the <u>PUSH Mode (Local DI to Remote DO)</u> configuration: Enter "2" in the IO Count field and "0 / 2" in both the Local/Remote IO Address fields. This means DIO, DI1 of ET-2260#2 module correspond to DO2, DO3 of ET-7255 module.

- In the Local IO Address field, select "1x: Discrete Input.." and enter the starting DI address.
 In the Remote IO Address field, select "0x: Coil Output..." and enter the starting DO address.
- 6. Choose the Modbus protocol (e.g., **TCPv4**) from the **Network Protocol** drop-down menu.
- 7. Click the "**Submit...**" button to complete the configuration.

Model Name ET-2260 Firmware Version v2.4.0 [Sep.06 2022]				Ali MAC	as Name Address	#2 00-0d-e0-65	5-e9-85	
	IP Address 192.168.79.100			Initi	al Switch	OFF		
	TCP Timeout (Socket Watchdog, Seconds)	1)	letwork \	System Natchdog, S	Timeout Seconds)	0		
Pair-Conn	air-Connection Settings: Submit 1-8 9-16							
# Enable Mode	Remote IPv4 / IPv6 / Host Name (Max. 127 chars) : Port	:	Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol
01	192.168.79.55	502	1	1000	2	1x:Dis(~ 0	0x:Coil 2	TCPv4 🗸
02 PULL •	a	502	1	1000	1			TCPv4 🗸
03 PULL		502	1	1000	1	0x:Coil ✓ 0	0x:Coil∨ 0	TCPv4 🗸
04 PULL	z	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸
05 PULL V		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✔ 0	TCPv4 🗸
06 PULL	z	502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸
07 PULL		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸
08 PULL V		502	1	1000	1	0x:Coil ✓ 0	0x:Coil ✓ 0	TCPv4 🗸
Note: PULL Mod PUSH Mod Pair-conne IO Address	e = Remote to Local le = Local to Remote ction is disabled if the IO Count is 0 (no data) ; (base 0): 0 - 65535, no leading 0x/1x/3x/4x.							

5.5 Shared Memory

The ET-2200 DIO series add a 512-byte shared memory which can be used as a tiny data concentrator to store both the AIO and DIO data (256 Registers or 4096-bit shared single memory).

Shared memory used with the Pair-Connection function can effectively lower the host load. It can also perform Bits/Registers data exchange, i.e., read data from the remote device and store them in the memory or output signals from the memory to the remote device.

<u>Note</u>: Shared memory is only available for the firmware v2.4.0 and later. The older version is not supported.



5.5.1 Address Mapping for Shared Memory

Shared Memory Register Name	3x, 4x (AIO) Register Address	Mapping (=)	Shared Memory Bit Name	0x, 1x (DIO) Bit Address
Register 0	3000	← →	Bit 0 Bit 15	3000 3015
Register 1	3001	<>>	Bit 16 Bit 31	3016 3031
Register 2	3002	<>>	Bit 32 Bit 47	3032 3047
Register 3	3003	÷۲	Bit 48 Bit 63	3048 3063
Register 4	3004	÷۲	Bit 64 Bit 79	3064 3079
Register 5	3005	←→	Bit 80 Bit 95	3080 3095
Register 6	3006	÷۲	Bit 96 Bit 111	3096 3111
Register 7	3007	÷۲	Bit 112 Bit 127	3112 3127
Register 8	3008	÷۲	Bit 128 Bit 143	3128 3143
Register 9	3009	÷۲	Bit 144 Bit 159	3144 3159
Register 10	3010	÷۲	Bit 160 Bit 175	3160 3175

<u>Note</u>: All DI, DO, AI, and AO signals shared a single memory space. The storage address starts at 3000.

Writing **16** bits of DI/DO data to addresses **3000 – 3015** is equivalent to writing **one** 16-bit AI/AO register to the address **3000**.

Writing **16** bits of DI/DO data to addresses **3016 – 3031** is equivalent to writing **one** 16-bit AI/AO register to the address **3001**.

The correspondence of addresses is as follows, using the division to take the quotient and remove the remainder.

AIO_Address = (DIO_Address - 3000) / 16 + 3000

5.5.2 Application of spreading the load (DIO)



The original architecture on the left does not use the data concentrator feature, the host has to connect with all devices to exchange data (9 Modbus TCP connections in this case), and more devices will make the host overloaded.

The new architecture on the right uses the data concentrator feature on the ET-2200 series DIO module. The Pair-connection function supports up to **16** IP connections. The host can obtain the signals written in the data concentrator from Device#1 - #8 by connecting to the ET-2200 series DIO module. The number of Modbus TCP connections to the host is reduced from 9 to 1, which can effectively spread the load.

Host	ET-2200 + Concentrator IP	Remote IP	IO Address
		(Slave #1-8)	(Shared Memory)
		10.0.8. <mark>10</mark>	3000 3015
	10.0.8.200	10.0.8. <mark>11</mark>	3016 3031
50. 40. 30. Overlight		10.0.8. <mark>12</mark>	3032 3047
20.1 Fluorescent 10 0. Photoscent		10.0.8. <mark>13</mark>	3048 3063
40. 40. 30.		10.0.8. <mark>14</mark>	3064 3079
26c		10.0.8. <mark>15</mark>	3080 3095
		10.0.8. <mark>16</mark>	3096 3111
		10.0.8. <mark>17</mark>	3112 3127

Refer to Chapter 5 - I/O Pair Connection Application for detailed configuration

- 1. Click **Enable Mode** and choose the **PULL** mode (Remote DI to Local DO) to enable this function (#01 ~ #08).
- In the Remote IP...: Port field, enter the IP address and TCP port (502) of remote modules (Slave #1-8). In the IO Count field, enter the number of mapped DI (e.g., 16). In the Local IO Address field, select "Ox: Coil Output..." and enter the starting address of the shared memory.

In the **Remote IO Address** field, select "**1**x: Discrete Input..." and enter the starting **DI** address.

3. In Shared Memory, the host computer has the option to use either Bit or Register addresses to poll ET-2200, and both approaches can read the same data. Accessing a Register is equivalent to accessing 16 bits.

Ра	'air-Connection Settings: Submit 1-8 9-70								
#	Enable Mode	Remote IPv	4 / IPv6 / Host Name (Max. 127 chars) : Port	Net ID	Scan Time (ms)	IO Count	Local IO Address	Remote IO Address	Network Protocol
01	PULL 🗸	10.0.8.10	: 502	1	1000	16	0x:Coil O 🗸 3000	1x:Discre 0	TCPv4 🗸
02	PULL V	10.0.8.11	502	1	1000	16	0x:Coil O ✔ 3016	1x:Discre ➤ 0	TCPv4 🗸
03	PULL 🗸	10.0.8.12	502	1	1000	16	0x:Coil O ✔ 3032	1x:Discre ➤ 0	TCPv4 🗸
04	PULL V	10.0.8.13	502	1	1000	16	0x:Coil O ✔ 3048	1x:Discre ➤ 0	TCPv4 🗸
05	PULL V	10.0.8.14	502	1	1000	16	0x:Coil O ✔ 3064	1x:Discre ➤ 0	TCPv4 🗸
06	PULL V	10.0.8.15	502	1	1000	16	0x:Coil O ✔ 3080	1x:Discre ➤ 0	TCPv4 🗸
07	PULL V	10.0.8.16	502	1	1000	16	0x:Coil O ✔ 3096	1x:Discre ➤ 0	TCPv4 🗸
08	PULL V	10.0.8.17	502	1	1000	16	0x:Coil 0 ✔ 3112	1x:Discre ↓ 0	TCPv4 🗸
Ma									

Pair-Connection Settings: | Submit 1-8 | 9-16 |

PULL Mode = Remote to Local PUSH Mode = Local to Remote

Pair-connection is disabled if the IO Count is 0 (no data)

IO Address (base 0): 0 - 65535, no leading 0x/1x/3x/4x.

5.5.3 Example of Using Memory AIO

The example will show you how to read data from a remote AI module and then write data to the shared memory (AO) of the DO module.

Remote IP	Local IP	Memory AO
PET-2217 (AI)	ET-2260 (DO)	Address
192.68.79.17	192.68.79.60	3000 3003



Configure the following settings on the Pair page of the ET-2260 module.

- 1. Click **Enable Mode** and choose the **PULL** mode (**Remote** AI to **Local** AO) to enable this function.
- In the Remote IP...: Port field, enter the IP address and TCP port (502) of the PET-2217. In the IO Count field, enter the number of mapped AI/AO. (E.g., 4) In the Local IO Address field, select "4x: Holding Register/..." and enter the starting address of the shared memory (AO). (E.g., 3000). In the Remote IO Address field, select "3x: Input Register/..." and enter the starting AI

address. (E.g., 0).

3. Click the "**Submit...**" button to complete the configuration.



4. To read data in shared memory by using the **Modbus Master Tool.**

https://www.icpdas.com/tw/product/guide+Software+Development_Tools+Modbus_Tool#674



5. Select either AI or AO in the **Type** field; the readings will be the same. Set the starting address to "**3000**" and read **four** values.



6. Select "Connection > Connect" and enter the ET-2260's IP address, and then click OK.

🔝 Mo	odbus Ma	aster Tool V1.1.	5.0 2021/0	06/04D:\tool\Mod	lbusMasterToolPC	
File	Setup	Connection	Window	About		
		Connect				
		🔣 Conne	ct			×
			Interface:	TCP/IP ~	Scan Interva	al(ms): 220
		Remote	e Server IP:	192.168.79.60	Timeou	t(ms): 200
		Modbu	s TCP Port:	502	Delay Between Pol	ll(ms): 20
					Canc	el OK

 The user can view the values stored in addresses 3000 to 3003 within the Shared Memory of ET-2260. Additionally, you can verify the data by checking the Home page of PET-2117.

Modbus Master Tool V1.	1.5.0 2021/06/04D:\tool\		Ethernet I/	O Module	
File Setup Connection	Window About	DAS	Home Network	k I/O Settin <u>gs M</u> QTT S	NMP Pair Filter
Master0			Moo	del Nalhe P/ET-2217	
Slove ID = 1 EC = 2			Firmwar	e Version V01.9.0 [202307]	26]
From = 0			IF	Address 192.168.79.17	
AO (4x) Base 0	Value Descrip	tion (Socket	Watchdog, Sec's)TCF	PTimeout 180	
3000 (0xBB8)	8493		Modbus Format Engineering		
3001 (0xBB9)	7493		Analog In	put Mode Differential	
3002 (0xBBA)	6196	Analog In	nut (Madhua Add		
3003 (0xBBB)	9991	Analog II	iput (Woubus Add	iless. Al=30000 ~)	
		Al Chann	value (30000~)	Type (40427~)	Channel Enable (00595~)
Connection is established. IP=	192.168.79.60	AI	0: 8.494	0x08:-10 ~ +10V	Enabled
		A	11: 7.496	0x08:-10 ~ +10V	Enabled
		Al	2: 6.197	0x08:-10 ~ +10V	Enabled
		A	3: 9.993	0x08:-10 ~ +10V	Enabled
		A	4: 0.000	0x08:-10 ~ +10V	Disabled

5.5.4 Master/Slave/MTCP/MUDP Data Exchange



- 1. Two hosts can exchange data via shared memory.
- 2. With the Pair-connection function, two Slave devices can also exchange data via shared memory.
- 3. With the Pair-connection function, the host can indirectly control the Slave device via the shared memory.
- 4. Shared memory can be used as a concentrator for multiple hosts and Slave devices to exchange data.

5.5.5 Bits / Registers Data Exchange



< Master#2 diagram >

Generally, the device cannot exchange the Bit and Register data directly, but this can achieve by using the shared memory of ET-2200 as a concentrator. As the diagram above, the Modbus Master#1 writes data **255 (0X00FF)** to the shared memory with a Register address **3000**. The Modbus Master#2 reads data from the shared memory with Bit addresses 30**15** to 30**00** and gets the result **0000 0000 1111 1111**.

The data stored in shared memory can be read with the Bit or Register address.

6. Modbus Information

The ET-2200 series is a family of IP-based Modbus I/O devices that allow you to remotely control DI/DO terminals via an Ethernet connection and uses a master-slave communication technique in which only one device (the master) can initiate a transaction (called queries), while other devices (slaves) respond by either supplying the requested data to the master or by taking the action requested in the query.

Most SCADA (Supervisory Control and Data Acquisition) and HMI software, such as Citect (Schneider Electric), ICONICS, iFIX, InduSoft, Intouch, Entivity Studio, Entivity Live, Entivity VLC, Trace Mode, Wizcon (ElUTIONS), and Wonderware, etc. can be used to easily integrate serial devices via the Modbus protocol.

6.1 What is Modbus TCP/IP?

Modbus is a communication protocol that was developed by Modicon Inc. in 1979. Detailed information regarding the Modbus protocol can be found at: http://www.modbus.org.

The different versions of the Modbus protocol used today include Modbus RTU, which is based on serial communication interfaces such as RS-485 and RS-232, as well as Modbus ASCII and Modbus TCP, which uses the Modbus RTU protocol embedded into TCP packets.

Modbus TCP is an internet protocol. The protocol embeds a Modbus frame into a TCP frame so that a connection-oriented approach is obtained, thereby making it more reliable. The master queries the slave and the slave responds with a reply. The protocol is open and, hence, highly scalable.

6.2 Modbus Message Structure

Modbus devices communicate using a master-slave (client-server) technique in which only one device (the master/client) can initiate transactions (called queries). The other devices (slaves/servers) respond by either supplying the requested data to the master or by taking the action requested in the query.

A query from a master will consist of a slave, or broadcast, address, a function code defining the requested action, any required data, and an error-checking field. A response from a slave consists of fields confirming the action taken, any data to be returned, and an error-checking field.

The Modbus/TCP Message Structure

Bytes 00 - 05	Bytes 06 - 11
6-byte header	RTU Data

The Leading 6 bytes of a Modbus/TCP Protocol Query

Byte 00	Byte 01	Byte 02	Byte 03	Byte 04	Byte 05
Transaction Identifier Pro		Protocol Id	lentifier	Length Field (upper byte)	Length Field (lower byte)

- Transaction identifier = Assigned by the Modbus/TCP master (client)
- Protocol identifier = 0
- ✓ **Length field (upper byte) =** 0 (since all messages are smaller than 256)
- Length field (lower byte) = The number of following RTU data bytes

Modbus RTU Data Structure

Byte 06	Byte 07	Bytes 08 - 09	Bytes 10 - 11	
Net ID (Station Number)	Function Code	Data Field		
		Reference Number (Address Mapping)	Number of Points	

- ✓ **Net ID:** Specifies the address of the receiver (i.e., the Modbus/TCP slave).
- ✓ **Function Code:** Specifies the message type.
- ✓ **Data Field:** The data block.

Net ID (Station Number)

The first byte in the frame structure of a Modbus RTU query is the address of the receiver. A valid address is in the range of 0 to 247. Address 0 is used for general broadcast purposes, while addresses 1 to 247 are assigned to individual Modbus devices.

Function Code

The second byte in the message structure of a Modbus RTU query is the function code, which describes what the slave device is required to do. Valid function codes range between 1 and 255. To answer the query, the slave device uses the same function code as contained in the request. The highest bit of the function code will only be set to '1' if an error occurs in the system. In this way, the master device will know whether or not the message has been correctly transmitted.

Code	Function	Reference (Address)
01 (0x01)	Read the Status of the Coils (Read DO Readback values)	Oxxxx
02 (0x02)	Read the Status of the Input (Read DI values)	1xxxx
03 (0x03)	Read the Holding Registers (Read AO Readback values)	4xxxx
04 (0x04)	Read the Input Registers (Read AI values)	Зхххх
05 (0x05)	Force a Single Coil (Write DO value)	Oxxxx
06 (0x06)	Set a Single Register (Write AO value)	4xxxx
15 (0x0F)	Force Multiple Coils (Write DO values)	Oxxxx
16 (0x10)	Set Multiple Registers (Write AO values)	4xxxx

Data Field

Data is transmitted in 8-, 16- and 32-bit formats. The data for 16-bit registers is transmitted in highbyte first format. For example, 0x0A0B will be transmitted as 0x0A, 0x0B. The data for 32-bit registers is transmitted as two 16-bit registers and is low-word first. For example: 0x0A0B0C0D will be transmitted as 0x0C, 0x0D, 0x0A, 0x0B.

The data field for messages sent between a master device and a slave device contains additional information about the action to be taken by the master, or any information requested by the slave. If the master does not require this information, the data field can be empty.

Reference (Address)	Description
Охххх	Read/Write Discrete Outputs or Coils. An 0x reference address is used to output device data to a Digital Output channel.
1xxxx	Read Discrete Inputs. The ON/OFF status of a 1x reference address is controlled by the corresponding Digital Input channel.
Зхххх	Read Input Registers. A 3x reference register contains a 16-bit value received from an external source, e.g. an analog signal.
4xxxx	Read/Write Outputs or Holding Registers. A 4x register is used to store 16 bits of numerical data (binary or decimal), or to send data from the CPU to an output channel.

Note:

For more details regarding the address mapping, refer to Section 6.3 (DIO) or Section 6.4 (AIO) "Modbus Register Table".

6.2.1 01(0x01) Read the Status of the Coils (Read DO Readback values)

This function code is used to read either the current status of the coils or the current Digital Output readback value from the ET-2200 series module.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x01
			Refer to Section 6.3 or 6.4 "Modbus Register
02.02	Starting DO Addross	2 Putor	Table" to find the address.
02-05	Starting DO Address	2 Dytes	Byte 02 = high byte
			Byte 03 = low byte
04.05	Number of Deints (Channels)	2 Dutos	Byte 04 = high byte
04-05	Number of Points (Channels)	2 bytes	Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x01
02	Puto Count	1 Byte	Byte Count of the Response
02	Byte Count		(n = (Points+7)/8)
			n= 1; Byte 03 = data bit 7 to 0
02	Data	n Bytoc	n= 2; Byte 04 = data bit 15 to 8
03	Data	n Bytes	
			n= m; Byte m+2 = data bit (8m-1) to 8(m-1)

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x81
02	Evention Code	1 Duto	Refer to the Modbus Standard Specifications
02		т Буге	for more details

-158 -

Example: Function 01 (0x01), Readback DOs

Reads the Digital Output value

	[Leading 6 bytes]	[Request]
Command:	<u>01 02 00 00 00 06</u>	<u>01 01 00 00 00 02</u>
	[Leading 6 bytes]	[Response]
Response:	<u>01 02 00 00 00 04</u>	<u>01 01 01 03</u>

> A description of the command and response is as follows:

Command:	[Leading 6 by	tes]		
	Bytes 00-03	01 02 00 00	(Message Number)	
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)	
	[Request]			
	Byte 00	01	(Net ID)	
	Byte 01	01	(Function Code)	
	Byte 02-03	00 00	(Starting DO Address)	
	Byte 04-05	00 02	(Number of Points)	

Response:	[Leading 6 byt	:es]	
	Bytes 00-03	01 02 00 00	(Message Number)
	Bytes 04-05	00 04	(Number of bytes remaining in this frame)
	[Response]		
	Byte 00	01	(Net ID)
	Byte 01	01	(Function Code)
	Byte 02	01	(Byte Count of the Response)
	Byte 03	03	(Value for DO0 to DO1)

6.2.2 02(0x02) Read the Status of the Input (Read DI values)

This function code is used to read the current Digital Input value from the ET-2200 series module.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x02
			Refer to Section 6.3 or 6.4 "Modbus Register
02.02	Starting DI Addross	2 Dutoc	Table" to find the address.
02-05	Starting DI Address	2 Dytes	Byte 02 = high byte
			Byte 03 = low byte
04.05	Number of Deints (Channels)	2 Dutoc	Byte 04 = high byte
04-05	Number of Points (Channels)	Z Bytes	Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x02
02	Puto Count	1 Duto	Byte Count of Response
02	Byte Count	1 Byte	(n =(Points+7)/8)
			n= 1; Byte 03 = data bit 7 to 0
03	Data	n Bytes	n= 2; Byte 04 = data bit 15 to 8
03	Data	n Bytes	
			n= m; Byte m+2 = data bit(8m-1) to 8(m-1)

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x82
02	Evention Code	1 Durto	Refer to the Modbus Standard Specifications
02	Exception code	твуце	for more details

-160 -

Example: Function 02 (0x02), ReadDIs

Reads the Digital Input value

Command:	[Leading 6 bytes] 01 02 00 00 00 06	[Request] <u>01 02 00 00 00 02</u>
Response:	[Leading 6 bytes] 01 02 00 00 00 04	[Response] <u>01 02 01 03</u>

> A description of the command and response is as follows:

Command:	[Leading 6 bytes]		
	Bytes 00-03	01 02 00 00	(Message Number)
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)
	[Request]		
	Byte 00	01	(Net ID)
	Byte 01	02	(Function Code)
	Byte 02-03	00 00	(Starting DI Address)
	Byte 04-05	00 02	(Number of Points)

Response:	[Leading 6 bytes]		
	Bytes 00-03	01 02 00 00	(Message Number)
	Bytes 04-05	00 04	(Number of bytes remaining in this frame)
	[Response]		
	Byte 00	01	(Net ID)
	Byte 01	02	(Function Code)
	Byte 02	01	(Byte Count of the Response)
	Byte 03	03	(Value for DI0 to DI1)

6.2.3 03(0x03) Read the Holding Registers (Read AO Readback values)

This function code is used to read back either the current values in the holding registers or the Analog Output value from the ET-2200 series module. These registers are also used to store the preset values for the Digital Counter, the host watchdog timer, the module name, the TCP timeout, etc.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x03
			Refer to Section 6.3 or 6.4 "Modbus Register
02-03	Starting AO Address 2 Bytes	Table" to find the address	
			Byte 02 = high byte ; Byte 03 = low byte
04.05	Number of 16-bit Registers	2 Dutoc	Word Count
04-05	(Channels)	Z Dytes	Byte 04 = high byte ; Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x03
Data Count	1 Puto	Byte Count of the Response	
02	byte Count	т Буге	(n=Points x 2 Bytes)
			Register Values
		n= 2; Byte 03 = high byte	
03~	Register Values	n Bytes	Byte 04 = low byte
05	הבצוזנכו עמועבז	n Bytes	
			n= m; Byte m+1 = high byte
		Byte m+2 = low byte	

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x83
02	Evention Code	1 Durto	Refer to the Modbus Standard Specifications
02	Exception code	твуце	for more details

Example: Function 03 (0x03), Read AOs

Reads the name of the module for the ET-2260

Command:	[Leading 6 bytes] 01 02 00 00 00 06	[Request] <u>01 03 01 03 00 01</u>
Response:	[Leading 6 bytes] 01 02 00 00 00 05	[Response] <u>01 03 02 22 60</u>

> A description of the command and response is as follows:

Command:	[Leading 6 bytes]			
	Bytes 00-03	01 02 00 00	(Message Number)	
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)	
	[Request]			
	Byte 00	01	(Net ID)	
	Byte 01	03	(Function Code)	
	Byte 02-03	01 03	(Starting AO Address)	
	Byte 04-05	00 01	(Number of Points)	

Response:	onse: [Leading 6 bytes]		
	Bytes 00-03	01 02 00 00	(Message Number)
	Bytes 04-05	00 05	(Number of bytes remaining in this frame)
	[Response]		
	Byte 00	01	(Net ID)
	Byte 01	03	(Function Code)
	Byte 02	02	(Byte Count of the Response)
	Byte 03-04	22 60	(Module Name)

6.2.4 04(0x04) Read the Input Registers (Read AI values)

This function code is used to read either the input registers or the current analog input value from the ET-2200 series module. These registers are also used to store the current value for the digital counter, the number of DI channels and the number of DO channels, etc.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x04
			Refer to Section 6.3 or 6.4 "Modbus Register
	Table" to find the address.		
02-03	Starting Al Address	2 Byles	Byte 02 = high byte
		2 Bytes	Byte 03 = low byte
	Number of 16 bit Desisters		Word Count
04-05	(Chappele)	2 Bytes	Byte 04 = high byte
	(Channeis)		Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x04
02	Byte Count	1 Byte	Byte Count of the Response (n=Points x 2 Bytes)
03~	Register Values	n Bytes	Register Values n= 2; Byte 03 = high byte Byte 04 = low byte n= m; Byte m+1 = high byte Byte m+2 = low byte

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x84
02	Exception Code	1 Duto	Refer to the Modbus Standard Specifications
02		т вусе	for more details.

Example: Function 04 (0x04), Read Als

> Reads the number of the DI channels on the ET-2260

	[Leading 6 bytes]	[Request]
Command:	<u>01 02 00 00 00 06</u>	<u>01 04 00 64 00 01</u>
	[Leading 6 bytes]	[Response]
Response:	01 02 00 00 00 05	<u>01 04 02 00 02</u>

> A description of the command and response is as follows:

Command:	[Leading 6 byte	s]			
	Bytes 00-03	01 02 00 00	(Message Number)		
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)		
	[Request]				
	Byte 00	01	(Net ID)		
	Byte 01	04	(Function Code)		
	Byte 02-03	0064	(Starting AI Address)		
	Byte 04-05	00 01	(Number of 16-bit Registers)		

Response:	se: [Leading 6 bytes]		
	Bytes 00-03	01 02 00 00 (Message Number)	
	Bytes 04-05	00 05	(Number of bytes remaining in this frame)
	[Response]		
	Byte 00	01	(Net ID)
	Byte 01	04	(Function Code)
	Byte 02	02	(Byte Count of the Response)
	Byte 03-04	00 02	(Number of DI channels on the ET-2260)
	byte 05 04	00 02	(Number of Di channels on the Er 2200)

6.2.5 05(0x05) Force a Single Coil (Write DO value)

This function code is used to set the status of a single coil or a single Digital Output value for the ET-2200 series module.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x05
			Refer to Section 6.3 or 6.4 "Modbus Register
02-03	DO Address	2 Bytes	Table" to find the address.
			Byte 02 = high byte ; Byte 03 = low byte
			0xFF 00 sets the output to ON.
			0x00 00 sets the output to OFF.
04-05	Output Value	2 Bytes	All other values are invalid and will not affect
			the coil.
			Byte 04 = high byte ; Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x05
02.02	DO Addrocc	2 Bytes	The value is the same as Bytes 02-03 of the
02-03	DO Address	Z Dytes	Request
04.05	Output Value	2 Dutoc	The value is the same as Bytes 04-05 of the
04-05		z bytes	Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x85
02	Evention Code	1 Duto	Refer to the Modbus Standard Specifications
02	Exception code	твује	for more details.

Example: Function 05 (0x05), Write DO

Sets channel DO1 to ON

	[Leading 6 bytes]	[Request]
Command:	<u>01 02 00 00 00 06</u>	<u>01 05 00 01 FF 00</u>
	[Leading 6 bytes]	[Response]
Response:	<u>01 02 00 00 00 06</u>	<u>01 05 00 01 FF 00</u>

> A description of the command and response is as follows:

Command:	[Leading 6 bytes]			
	Bytes 00-03	01 02 00 00 (Message Number)		
	Bytes 04-05	00 06 (Number of bytes remaining in this frame		
	[Request]			
	Byte 00	01	(Net ID)	
	Byte 01	05	(Function Code)	
	Byte 02-03	0001	(DO Address)	
	Byte 04-05	FF 00	(Sets the output to ON)	

Response:	[Leading 6 bytes]	[Leading 6 bytes]		
	Bytes 00-03	01 02 00 00 (Message Number)		
	Bytes 04-05	00 06 (Number of bytes remaining in this fra		
	[Response]			
	Byte 00	01	(Net ID)	
	Byte 01	05	(Function Code)	
	Byte 02-03	00 01	(DO Address)	
	Byte 04-05	FF 00	(Indicates that the DO has been set to ON)	

6.2.6 06(0x06) Set a Single Register (Write AO value)

This function code is used to set a specific holding register to store the configuration values for the ET-2200 series module.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x06
			Refer to Section 6.3 or 6.4 "Modbus Register
	2 Dutor	Table" to find the address.	
02-05	AU AUUIESS	2 Dytes	Byte 02 = high byte
			Byte 03 = low byte
			Register Value
04-05	Register Value	2 Bytes	Byte 02 = high byte Byte 03 = low byte Register Value Byte 04 = high byte
			Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x06
02.02	AQ Addross	2 Bytes	The value is the same as Bytes 02-03 of the
02-03	AU AUUIESS	2 Dytes	Request
04.05	Pagistor Value	2 Dutoc	The value is the same as Bytes 04-05 of the
04-05	negister value	2 Dytes	Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x86
02	Evention Code	1 Duto	Refer to the Modbus Standard Specifications
02	Exception code	1 Byte 1 Byte	for more details.

Example: Function 06 (0x06), WriteAO

Sets the system timeout to 60 seconds

Command:	[Leading 6 bytes] 01 02 00 00 00 06	[Request] <u>01 06 01 08 00 3C</u>
Response:	[Leading 6 bytes] 01 02 00 00 00 06	[Response] <u>01 06 01 08 00 3C</u>

> A description of the command and response is as follows:

Command:	[Leading 6 bytes]			
	Bytes 00-03	01 02 00 00 (Message Number)00 06(Number of bytes remaining in this frame		
	Bytes 04-05			
	[Request]			
	Byte 00	01	(Net ID)	
	Byte 01	06	(Function Code)	
	Byte 02-03	0108	(AO Address)	
	Byte 04-05	003C	(Sets the system timeout to 60 seconds)	

Response:	[Leading 6 byte	[Leading 6 bytes]			
	Bytes 00-03	01 02 00	00 (Message Number)		
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)		
	[Response]				
	Byte 00	01	(Net ID)		
	Byte 01	06	(Function Code)		
	Byte 02-03	01 08	(AO Address)		
	Byte 04-05	003C	(Indicates that the system timeout has		
			been set to 60 seconds)		

6.2.7 15(0x0F) Force Multiple Coils (Write DO values)

This function code is used to set the status of multiple coils or to write multiple Digital Output values for the ET-2200 series module.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x0F
			Refer to Section 6.3 or 6.4 "Modbus Register
02-03	Starting DO Address	2 Bytes	Table" to find the address.
			Byte 02 = high byte ; Byte 03 = low byte
04.05	Number of Output Channels	2 Bytoc	$P_{\rm M}$ = high byte : $P_{\rm M}$ = low byte
04-05	(Points)	2 Bytes	Byte 04 – High byte , Byte 05 – Iow byte
06	Byte count	1 Byte	n = (Points +7)/8
	Output value	n Bytes	A bit corresponds to a channel. A value of 1
			for a bit denotes that the channel is ON,
			while a value of denotes that the channel is
07			OFF.
07			n= 1; Byte 07 = data bit 7 to 0
			n= 2; Byte 08 = data bit 15 to 8
			n= m; Byte m+6 = data bit (8m-1) to 8 (m-1)

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x0F
02-03	Starting DO Address	2 Bytes	The value is the same as Puter 02 OF of the
04-05	Number of Output Channels (Points)	2 Bytes	Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1to 247
01	Function Code	1 Byte	0x8F
02	Exception Code 1 Bute	Refer to the Modbus Standard Specifications	
02			for more details.

Example: Function 15 (0x0F), Write DOs

Sets the safe value (DO0 ~ DO1)

Command:	[Leading 6 bytes] 01 02 00 00 00 08	[Request] <u>01 OF 01 OB 00 02 01 03</u>
Response:	[Leading 6 bytes] 01 02 00 00 00 06	[Response] <u>01 OF 01 OB 00 02</u>

A description of the command and response is as follows:

Command:	[Leading 6 bytes]				
	Bytes 00-03	01 02 00 00	(Message Number)		
	Bytes 04-05	00 08	(Number of bytes remaining in this frame)		
	[Request]				
	Byte 00	01	(Net ID)		
	Byte 01	OF	(Function Code)		
	Byte 02-03	010B	(Starting DO Address)		
	Byte 04-05	0002	(Number of Output Channels)		
	Byte 06	01	(Byte Count)		
	Byte 07	03	(Output Value)		

Response:	[Leading 6 bytes]			
	Bytes 00-03	01 02 00 00 (Message Number)		
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)	
	[Response]			
	Byte 00	01	(Net ID)	
	Byte 01	OF	(Function Code)	
	Byte 02-03	01 OB	(Starting DO Address)	
	Byte 04-05	00 02	(Number of Input Channels)	

6.2.8 16(0x10) Set Multiple Registers (Write AO values)

This function code is used to set multiple holding registers that are used to store the configuration values for the ET-2200 series module.

[Rec	lnes	t]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x10
			Refer to Section 6.3 or 6.4 "Modbus Register
02-03	Starting AO Address	2 Bytes	Table" to find the address.
			Byte 02 = high byte ; Byte 03 = low byte
04-05	Number of 16-bit Registers	2 Dutos	Word Count.
	(Channels)	Z Dytes	Byte 04 = high byte ; Byte 05 = low byte
06	Byte Count	1 Byte	n =Points x 2 Bytes
	Register Values	n Bytes	Register Values.
			n= 2; Byte 03 = high byte
07			Byte 04 = low byte
07			
			n= m; Byte m+1 = high byte
			Byte m+2 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x10
02.02	Starting AO Addross	2 Bytes	The value is the same as Bytes 02-03 of the
02-03	Starting AO Address		Request
04-05 Number of 16-bit Registers 2 Bytes (Channels)	Number of 16-bit Registers	2.0.4.4	The value is the same as Bytes 04-05 of the
	Request		

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x90
02	Exception Code	1 Duto	Refer to the Modbus Standard Specifications
oz Exception code i Byte		т вуге	for more details.

Example: Function 16 (0x10), WriteAOs

Sets the preset value for the digital counter

Command:	[Leading 6 bytes] 01 02 00 00 00 0B	[Request] 01 10 00 32 0 001 02 03 E8 00 00
Response:	[Leading 6 bytes] 01 02 00 00 00 06	[Response] <u>01 10 00 32 00 01</u>

A description of the command and response is as follows:

Command:	[Leading 6 bytes]		
	Bytes 00-03	01 02 00 00	(Message Number)
	Bytes 04-05	00 OB	(Number of bytes remaining in this frame)
	[Request]		
	Byte 00	01	(Net ID)
	Byte 01	10	(Function Code)
	Byte 02-03	0032	(Starting AO Address)
	Byte 04-05	0001	(Number of 16-bit Registers)
	Byte 06	02	(Byte Count)
	Byte 07-10	03 E8 00 00	(Preset value for the digital counter)

Response:	[Leading 6 bytes]		
	Bytes 00-03	01 02 00 00	D (Message Number)
	Bytes 04-05	00 06	(Number of bytes remaining in this frame)
	[Response]		
	Byte 00	01	(Net ID)
	Byte 01	10	(Function Code)
	Byte 02-03	0032	(Starting AO Address)
	Byte 04-05	00 01	(word count)

6.3 Modbus Register Table (For DIO Module)

Data from 16-bit registers is transmitted in high-byte first order. For example: 0x0A0B ==> 0x0A, 0x0B. Data from 32-bit registers is transmitted as two 16-bit registers and is in low-word first order. For example: 0x0A0B0C0D ==> 0x0C, 0x0D, 0x0A, 0x0B.

6.3.1 Common Functions

Starting Address	Points	Description	Bits per Point	Range	Access Type
127 (0x7F)	1	Restores all default web settings	1	1 = Restore	W (Pulse)
128 (0x80)	1	Default ID Settings	1	1 = Restore	W (Pulse)
133 (0x85)	1	Reboots the ET-2200 module	1	1 = Reboot	W (Pulse)
Notes	" W ": Wr	ite			

Oxxxx: DO Address (Base 0)

3xxxx: AI Address (Base 0)

Starting Address	Points	Description	Bits per Point	Range	Access Type
151 (0x97)	1	Firmware Version	16	"123" denotes that the version is 1.2.3	R
158 (0x9E)	1	Modbus Communication Status	16	0 = No Error 1 = Timeout	R
160 (0xA0)	1	Pair-Connection Status	16	0 = Normal 1 = Timeout 2 = Disconnected	R
Notes	" R ": Read	3			

4xxxx: AO Address (Base 0)

Starting Address	Points	Description	Bits per Point	Range	Access Type
255 (0xFF)	1	CPU Reset Status	16	 1 = Reset at Power-on 2 = Reset by the WDT 3 = Reset using the reset command 	R/W
257 (0x101)	1	Sets the Host Watchdog Timer (WDT)	16	<5: Disabled 5 to 65535: Enabled (units: seconds) 0: Default If the ET-2200 series module loses communication with the host PC for more than the period defined in the WDT settings, the DO channels will revert to their safe values and the Host WDT Events Counter will be increased by one.	R/W/F
258 (0x102)	1	Host WDT Events	16	Denotes how many Host WDT Events have occurred since the last CPU reset	R/W
259 (0x103)	1	Module Name	16	Module Name	R
263 (0x107)	1	Sets the TCP Timeout Value	16	<5: Disabled 5 to 65535: Enabled (units: seconds) 0: Default	R/W/F
264 (0x108)	1	Sets the System Timeout Value	16	< 30: Disabled 30~65535: Enabled (unit: second) 0: Default	R/W/F
Notes	"R": Read "W": Wri "F": Setti Warning:	d; te; ng is recorded in flash as defa Frequent writing to the Flash	ult. I can cause i	it to become corrupt.	

6.3.2 Specific Functions

The nDI and nDO parameters for each ET-2200 series module used in the following Modbus Address Tables are as follows:

Model Name	Universal DIO (UDIO)	Number of DO channels (nDO)	Number of DI channels (nDI)
ET-2242/ET-2242U	-	16	-
ET-2251	-	-	16
ET-2254/ET-2254P	16	Depend on your configuration	Depend on your configuration
ET-2255/ET-2255U	-	8	8
ET-2260	-	6	6
ET-2261	-	10	-
ET-2261-16	-	16	-
ET-2268	-	8	-

> 0xxxx: DO Address (Base 0)

Starting Address	Points	Description	Bits per Point	Range	Access Type
0 (0x00)	1 to nDO	Digital Output Channels	1	0 = Off 1 = On	R/W
32 (0x20)	1	Clears the status of all high- latched DI Channels	1	1 = Clear	W
33 (0x21)	1	Clears the status of all low- latched DI Channels	1	1 = Clear	W
34 (0x22)	1 to nDI	Clears the high-speed digital counter for all DI Channels	1	1 = Clear	W
60 (0x3C)	1	Saves specific data to Flash (The access type for some registers labeled with an " E")	1	0: cannot write 1: can be write	W
100 (0x64)	1 to nDO	Enables the PWM for all DO Channels	1	0 = Off 1 = On (Default= 0)	R/W
150 (0x96)	1	Enables the high and low latches for all DI Channels	1	0 = Disable 1 = Enable (Default= 0)	R/W/F

Starting Address	Points	Description	Bits per Point	Range	Access Type
151 (0x97)	1 to nDI	Enables the high-speed digital counter for all DI Channels	1	0 = Disable 1 = Enable (Default= 0)	R/W/F
190 (0xBE)	1 to nDI	Enables frequency measurement for all DI Channels	1	0 = Disable 1 = Enable (Default= 0)	R/W/F
235 (0xEB)	1 to nDO	Sets the Power-on value for all DO Channels	1	0 = Off 1 = On (Default= 0)	R/W/F
267 (0x10B)	1 to nDO	Sets the Safe value for all DO Channels	1	0 = Off 1 = On (Default= 0)	R/W/F
299 (0x12B)	1	Force the DI/DO Mode. (for the ET-2254 only) 0 = Dynamic I/O type based on DO requests. 1 = Static I/O type by configuration (web or Modbus).	1	0 = Dynamic 1= Static	R/W
300 ~ 315 (0x12C ~ 0x13B)	1 to UDIO	Sets the Universal DIO channels to DI or DO Port. (for the ET-2254 only) 300 is the CHO address, 301 is the CH1 address, and so on.	1	0 = DO type 1= DI type	R/W
Notes	"R": Read "W": Write "F": Settings "E": After wri Warning: Fre	are recorded in flash by default iting DO[60] register, the data will be st quency writing to the Flash can cause i	ored in flasl t to become	n. e corrupt.	

Note:

Because of the characteristics of the relay functions, it is recommended that the PWM on ET-2260/2261/2268 series (i.e., modules with relay functions) is not used for extended periods.

1xxxx: DI Address (Base 0)

Starting Address	Points	Description	Bits per Point	Range	Access Type
0	1 to nDI	The status of all Digital Input Channels	1	0 = Off	R
0x00)		······································	_	1 = On	
32	1 to nDI	The status of all high-latched DI	1	0 = None	D
(0x20)		Channels	L	1 = Latched	r
64	1 to pDI	The status of all low latched DI Channels	1	0 = None	р
(0x40)		The status of an low-latched DI Channels	T	1 = Latched	ĸ
Notes	" R ": Read				

3xxxx: AI Address (Base 0)

Starting Address	Points	Description	Bits per Point	Value	Access Type
16 (0x10)	1 to nDI	The Digital Counter Value	32	0 to 4294967296	R
64 (0x40)	1 to nDI	The frequency Value is * 1,000. (Note: The Client must first divide the value by 1,000.)	32	0 to 4294967296	R

Note:

The "DI Counter (0x10)" and "DI Frequency (0x40)" record data as a 32-bit value and are transmitted as two 16-bit registers. Consequently, the register's address has an offset of 2, i.e., the address of the second channel will be at the starting address +2, and so on. You can refer to "FAQ_How do I read DI Counter for the PETL/t(P)ET/ET-2200 Series Modules correctly" for more detailed information.

Example: Reads the 6 DI Counter on the ET-2260.

	[Lead	ing 6 bytes]	[Request]				
Command: 01 02 00 00 00 06		01 04 00 <u>10</u> 00 <u>0C</u> −	 ▶ 6 chan = 12 re 	nels * 2 registe gisters	ers		
			Starting Address				
100 (0x64)	1	Number of DI Channels		16	nDI	R	
110 (0x6E)	1	Number of DO Channel	S	16	nDO	R	
121 (0x79)	1	Number of high-speed counters		16	nDI	R	
Notes	" R ": Read						

4xxxx: AO Address (Base 0)

Starting Address	Points	Description	Bits per Point	Range	Access Type		
50 (0x32)	1 to nDI	The preset value for the high-speed digital counter	32	0 to 4294967296	R/W/E		
Note: "Preset DI Counter Value (0x32)" that the records data as a 32-bit value and is transmitted as two 16-bit registers. Consequently, the register's address has an offset of 2, i.e., the address of the second channel will be at the starting address +2, and so on. You can refer to "FAQ_How do I read DI Counter for the t(P)ET/ET-2200 Series Modules correctly" for more detailed information. Example: Reads the preset value of 6DI Counter on the ET-2260. [Leading 6 bytes] Command: 01 02 00 00 00 06 [Request] 01 04 00 32 00 0C [Leading 6 bytes] Command: 01 02 00 00 00 06							
100 (0x64)	1 to nDO	The duty cycle for the DO PWM The first word (16-bit register) is the high pulse width, while the second word is the low pulse width. The units rein m	n s 32	0 to 65535; 0 to 65535;	R/W/E		
150 (0x64)	1 to nDO	and the resolution is about 10 ms. The Scan mode for the DI frequency measurement. Refer to Section 4.4.2 "DI/DO Configuration" for more details.	16	1000= 1000ms 100= 100ms 2000=Single pulse	R/W/F		
200 (0x64)	1 to nDI	The moving average of the DI frequency measurement.	16	1= No average 2=Average 2 values 4=Average 4 values 8=Average 8 values	R/W/F		
268 (0x10C)	1 to nDO	The Min-Switching Time for all DO Channels	16	1 to 65535 second	R/W/F		
284 (0x11C)	1 to nDO	The Auto-off Time for all DO Channels	16	1 to 65535 second	R/W/F		
 "R": Read "W": Write "F": Settings are recorded in flash by default "E": After writing the DO[60] register, the data will be stored in flash. Warning: Frequent writing to the Flash can cause it to become corrupt. 							

6.4 Modbus Register Table (For AIO Module)

6.4.1 Modbus Register Table for (P)ET-2215H, (P)ET-2215H-16

Address 3xxxx / 4xxxx (Base 0)

Address	Description	Attribute
30000 ~ 30015 40000 ~ 40015	Temperature of channel 0 to 15	R
30100 40100	Number of the digital input channels	R
30110 40110	Number of the digital output channels	R
30120 40120	Number of the analog input channels	R
30130 40130	Number of the analog output channels	R
30151 40151	Firmware version	R
30180 ~ 30194 40180 ~ 40194	Alias name	R
40212 - 40227	Type code of channel 0 to 15	R/W
40257	Ethernet host watchdog timeout value, 5 to 65535, in second, 0 to disable.	R/W
30258 40258	Ethernet host watchdog timeout count.	R
30259 ~ 30260 40259 ~ 40260	Module name, e.g., (P)ET-2215H displays 0x2215, 0x4800; (P)ET-2215H-16 displays 0x2215, 0x4810	R
40263	TCP disconnection timeout value, 5 to 65535, in second, 0 to disable.	R/W
40264	Module reset timeout value, 30 to 65535, in second, 0 to disable.	R/W
40288 ~ 40303	Channel temperature offset of channel 0 to 15 in 0.01°C	R/W
30320 ~ 30351 40320 ~ 40351	Temperature of channel 0 to 15 in floating point format, two registers for each channel	R
Address	Description	Attribute
--------------------------------	--	-----------
40384 ~ 40399	Channel resistance offset of channel 0 to 15 in 0.01 Ω	R/W
30416 ~ 30431 40416 ~ 40431	Resistance of channel 0 to 15 in 0.01 Ω	R
40489	Disable/enable channels. 0: Disable, 1: Enable Bit 0 for channel 0, bit 1 for channel 1, etc.	R/W
40497	Number of moving averaging, 1 to 128, default 1	R/W
40500	Number of moving averaging without written to EEPROM, 1 to 128, default 1	R/W
30512 ~ 30527 40512 ~ 40527	High latched analog input value of channel 0 to 15	R
30544 ~ 30559 40544 ~ 40559	Low latched analog input value of channel 0 to 15	R
00096 ~ 00111	Open wire status of channel 0 to 15, 1 for open wire	R
00127	Write 1 to reload default settings	W
00128	Write 1 to set Modbus TCP ID to 1	W
00133	Write 1 to reboot module	W
00141	Sampling rates, 0: 1.5 Hz, 1: 90 Hz	R/W
00142	Write 1 to reload factory calibration parameters	W
00279	Write 1 to clear all high latched analog input values	W
00280	Write 1 to clear all low latched analog input values	W
00384 ~ 00399	Write 1 to clear high latched analog input value of channel 0 to 15	W
00416 ~ 00431	Write 1 to clear low latched analog input value of channel 0 to 15	W

6.4.2 Modbus Register Table for (P)ET-2217

Coils (0xxxx)

Reg	ister	Dointo	Description	Data Format	Attribute	Factory
DEC	HEX	Points	Description	Data Format	Attribute	Value
00162:	00A2:	0	Clear 1 ch historical Al may value	1. Cloar	14/	
00169	00A9	0	Clear 1-ch historical Al max. value		vv	-
00194:	00C2:	0	Clear 1 ch historical Al min value	1. Cloar	\A/	
00201	00C9	0			vv	-
00226	00E2	1	Reset the I/O settings to the factory default state	1: Reset	W	-
00233	00E9	1	Reboot the module	1: Reboot	W	-
00595:	0253:	0	Enable (Disable the Al function	0: Disable	D/\\//E	
00602	025A	0		1: Enable	K/VV/E	Ţ
00628	0274	1	Sot the Al compling rate	0: Normal mode (20 Hz)	D /\\//E	0
00028	0274	Ţ	Set the Arsamping rate	1: Fast mode (200 Hz)	N/ VV/L	0
00621	0277	1	Sat the Al data format	0: Hexadecimal format	D /\\//E	0
00031	0277	1		1: Engineering unit		0
00632	0278	1	Reset the AI calibration to the factory settings	1: Reset	W	-
00634	027A	1	Clear all historical AI max. values	1: Clear	W	-
00635	027B	1	Clear all historical AI min. values	1: Clear	W	-
00636:	027C:	0	Enable/Disable the AI high alarm	0: Disable		0
00643	0283	0	function	1: Enable	K/VV/E	0
00668:	029C:	0	Enable/Disable the AI low alarm	0: Disable	D /\\//E	0
00675	02A3	0	function	1: Enable	N/ VV/E	0
00700:	02BC:	Q	Set the AL high alarm mode	0: Momentary mode	D/\\//F	0
00707	02C3	0	Set the Arnigh alarm mode	1: Latching mode		0
00732:	02DC:	Q	Set the ALlow alarm mode	0: Momentary mode	D/\\//F	0
00739	02E3	0		1: Latching mode		0
00764:	02FC:	Q	Clear the AI high alarm status	1. Clear	\\/	-
00771	0303	0			vv	-

Regi	ister	Dointe	Description Data Format		Attributo	Factory			
DEC	HEX	Points	Description		Attribute	Value			
00796:	031C:	0	Clear the Allow clarm status	1. Clear	14/				
00803	0323	8	Clear the Arlow alarm status	1. Clear	vv	-			
00020	0225	1	Enable (Disable the Al calibration	0: Disable					
00830	033E	1	Enable/Disable the AI calibration	1: Enable	K/ VV	-			
00831	033F	1	Zero calibration for channel 0	1: Set	W	-			
00022	0832 0340 1		0340	0240	00.40	Span/Gain calibration for the channel	1. Cot	14/	
00832			0~7	1. Set	vv	-			
00022	0244	1	Al Input Mode	0: Differential	R/W/E	-			
00833	0341	L	(Differential or Single-ended)	1: Single-ended					

Discrete Inputs (1xxxx)

Regi	ster	Points Description		Data Format	Attributo
DEC	HEX	Points	Description		Allindule
10224: 10231	00E0: 00E7	8	Read Al high alarm status. When the Al value is higher than the high alarm value, the status becomes 1.	0: Normal 1: Alarmed	R
10256: 10263	0100: 0107	8	Read AI low alarm status. When the AI value is lower than the low alarm value, the status becomes 1.	0: Normal 1: Alarmed	R

Input Register (3xxxx)

Reg	Register		No. Per	Description	Data Format	Attribute
DEC	HEX	Points	Point			Attribute
30000:	0000:	0	1	Alvalua	-32768 to 32767	D
30007	0007	õ	Ţ		(0x0000 to 0xFFFF)	ĸ
30236:	00EC:	8	1	Al historical may value	-32768 to 32767	R
30243	00F3			Al historical max. value	(0x0000 to 0xFFFF)	
30268:	010C:	8	1	At historical min. value	-32768 to 32767	R
30275	0113			Al historical min. Value	(0x0000 to 0xFFFF)	
30320	0140	1	1	Number of the AI channel	8	R
20251	0155	1	1	Firmware version	0x123 means version	D
30351	UISF	T	1 I	1.2.3		ĸ
20200	0100	1	1	Communication state of the	0: Normal	D
30360	0108	L		pair-connection	< 0: Failed	К

Holding Register (4xxxx)

Regi	ster	Dointe	No. Per	Description	Data Format	Attributo	Factory
DEC	HEX	POINTS	Point	Description	Data Format	Attribute	Value
40271	010F	1	1	Set the module identification (Modbus NetID)	0 to 255	R/W/E	1
40296:	0128:	0	1	Sot the AL high alarm value	-32768 to 32767	D/\\//E	32767
40303	012F	0	Ţ	Set the Arnigh diarm value	(0x0000 to 0xFFFF)		(0x7FFF)
40328:	0148:	0	1	Set the ALlow alarm value	-32768 to 32767	D/\\//E	-32768
40335	014F	0	Ţ	Set the Arlow alarm value	(0x0000 to 0xFFFF)	K/ VV/E	(0x8000)
					0x07: 4 ~ 20 mA		
					0x08: +/-10 V		
					0x09: +/-5 V		
40427:	01AB:	0	1	Sat the Al range	0x0A: +/-1 V	R/W/E	0208
40434	01B2	0	1	Set the Allange	0x0B: +/-500 mV		0,08
					0x0C: +/-150 mV		
					0x0D: +/-20 mA		
					0x1A: 0 ~ 20 mA		
					1: Power-on		
					2:		
40555	022B	1	1	Read the module reset status	Module Watchdog	R	-
					3: Software		
					Reset Command		
				Read the boot count of the			
				module.			
40556	022C	1	1	The factory default value is 0	1 to 32767	R	-
				when the settings are set to			
				the factory default values.			
40559	022F	1	1	Read the module name	0x2217	R	-

6.4.3 Modbus Register Table for ET-2217CI

Address 3xxxx / 4xxxx (Base 0)

Address	Description	Attribute
30000 ~ 30007	Analog input values of channels 0 to 7	R
40000 ~ 40007		
30100	Number of the digital input channels	R
40100		
30110	Number of the digital output channels	R
40110		
30120	Number of the analog input channels	R
40120		
30130	Number of the analog output channels	R
40130	Number of the analog output channels	
30151	The firmware version	
40151		
30180 ~ 30194	The alias name	
40180 ~ 40194		
40212 ~ 40219	The type codes of analog input channels 0 to 7	R/W
40257	Ethernet host watchdog timeout value, 5 to 65535, in seconds,	
40257	0 to disable.	K/ VV
30258		D
40258	Ethernet host watchdog timeout count.	К
30259 ~ 30260		P
40259 ~ 40260	The module name.	К
40262	TCP disconnection timeout value, 5 to 65535, in second,	5/44
40263	0 to disable.	R/W
40264	Module reset timeout value, 30 to 65535, in second,	5/14/
40264	0 to disable. Only for Modbus TCP protocol	R/W
30512 ~ 30519	The high latched value of analog input channel 0 to 7	
40512 ~ 40519		
30544 ~ 30551		_
40544 ~ 40551	The low latched value of analog input channel 0 to 7	R

Address	Description	Attribute	
40864	RTC year (2000 ~ 2159)	R/W	
40865	RTC month (1 to 12)	R/W	
40866	RTC date (1 to 31)	R/W	
40867	RTC hour (0 to 23)	R/W	
40868	RTC minute (0 to 59)	R/W	
40869	RTC second (0 to 59)	R/W	
40870 ~ 40871	The index of the last log record	R	
40872 ~ 40873	The index of the log record to be read	R/W	
40874	The status of the data logging, 0: stopped, 1: running	R	
40875	The data logger command,	D /\\/	
40875	0: stop, 1: run in continuous mode, 2: run in a period mode		
40876	If the data logger is full, will it continue to write data?	R/W	
	0: no, 1: yes	,	
40878	The sampling period of the data logger (units: seconds)	R/W	
40879	The sampling period of the data logger (units: milliseconds)	R/W	
+0073	(0 to 1000, the value should be a multiple of 5.)		
40880	The starting year of recording in period mode (2000 to 2159)	R/W	
40881	The starting month of recording in period mode (1 to 12)	R/W	
40882	The starting day of recording in period mode (1 to 31)	R/W	
40883	The starting hour of recording in period mode (0 to 23)	R/W	
40884	The starting minute of recording in period mode (0 to 59)	R/W	
40885	The starting second of recording in period mode (0 to 59)	R/W	
40886	The ending year of recording in period mode (2000 to 2159)	R/W	
40887	The ending month of recording in period mode (1 to 12)	R/W	
40888	The ending date of recording in period mode (1 to 31)	R/W	
40889	The ending hour of recording in period mode (0 to 23)	R/W	
40890	The ending minute of recording in period mode (0 to 59)	R/W	
40891	The ending second of recording in period mode (0 to 59)	R/W	
40898 ~ 40899	The index of the first log record	R	

-186 -

Address	Description	Attribute
34097 ~ 34206 44097 ~ 44206	Read log data and it should be multiple of 11 registers. For every 11 registers, they are a value of channel 0,, the value of channel 7, time stamp low word, time stamp high word, and millisecond time stamp. The timestamp is in Epoch time format.	R
00096 ~ 00103	Under range status of channel 0 to 7 for 0mA to 20mA and	R
10096 ~ 10103	4mA to 20mA ranges	
00127	Write 1 to reload the default settings	W
00128	Write 1 to set Modbus TCP ID to 1	W
00133	Write 1 to reboot the module	W
00140	Data format, 0: hex, 1: engineering	R/W
00141	Sampling rates, 0: 10Hz, 1: 200Hz	R/W
00142	Write 1 to reload factory calibration parameters	W

6.4.4 Modbus Register Table for (P)ET-2218H/S1, (P)ET-2218H-16/S1

Address 3xxxx / 4xxxx (Base 0)

Address	Description	Attribute
30000 ~ 30015 40000 ~ 40015	Temperature of channel 0 to 15	R
30100 40100	Number of the digital input channels	R
30110 40110	Number of the digital output channels	R
30120 40120	Number of the analog input channels	R
30128 40128	CJC temperature in 0.1°C	
30130 40130	Number of the analog output channels	R
30151 40151	Firmware version	R
30180 ~ 30194 40180 ~ 40194	Alias name	R
40212 - 40227	Type code of channel 0 to 15	R/W
40257	Ethernet host watchdog timeout value, 5 to 65535, in second, 0 to disable.	R/W
30258 40258	Ethernet host watchdog timeout count.	R
30259 ~ 30260 40259 ~ 40260	Module name, e.g., (P)ET- 2218H /S1 displays 0x2218, 0x4800; (P)ET- 2218H-16 /S1 displays 0x2218, 0x4810	R
40263	TCP disconnection timeout value, 5 to 65535, in second, 0 to disable.	R/W
40264	Module reset timeout value, 30 to 65535, in second, 0 to disable.	R/W
40288 ~ 40303	Channel temperature offset of channel 0 to 15 in 0.01°C for type M and 0.1°C for other types	R/W
30320 ~ 30351 40320 ~ 40351	Temperature of channel 0 to 15 in floating point format, two registers for each channel	R

Address	Description	Attribute
40384 ~ 40399	Channel CJC offset of channel 0 to 15 in 0.1°C, -128 to 128.	R/W
40489	Disable/enable channels, bit 0 for channel 0, bit 1 for channel 1, etc. 0 to disable and 1 to enable	R/W
40490	Module CJC offset in 0.1°C, -128 to 128	R/W
40497	Number of moving averaging, 1 to 128, default 1	R/W
40500	Number of moving averaging without written to EEPROM, 1 to 128, default 1	R/W
30512 ~ 30527 40512 ~ 40527	High latched analog input value of channel 0 to 15	R
30544 ~ 30559 40544 ~ 40559	Low latched analog input value of channel 0 to 15	R
00096 ~ 00111	Open wire status of channel 0 to 15, 1 for open wire	R
00127	Write 1 to reload default settings	W
00128	Write 1 to set Modbus TCP ID to 1	W
00133	Write 1 to reboot module	W
00141	Sampling rates, 0: 1.5 Hz, 1: 100 Hz	R/W
00142	Write 1 to reload factory calibration parameters	W
00267	1: enable, 0: disable CJC	R/W
00279	Write 1 to clear all high latched analog input values	W
00280	Write 1 to clear all low latched analog input values	W
00384 ~ 00399	Write 1 to clear high latched analog input value of channel 0 to 15	W
00416 ~ 00431	Write 1 to clear low latched analog input value of channel 0 to 15	W

6.4.5 Modbus Register Table for (P)ET-2218HS-16

Address 3xxxx / 4xxxx (Base 0)

Address	Description	Attribute
30000 ~ 30015 40000 ~ 40015	Temperature of channel 0 to 15	R
30100 40100	Number of the digital input channels	R
30110 40110	Number of the digital output channels	R
30120 40120	Number of the analog input channels	R
30130 40130	Number of the analog output channels	R
30151 40151	Firmware version	R
30180 ~ 30194 40180 ~ 40194	Alias name	R
40212 - 40227	Type code of channel 0 to 15	R/W
40257	Ethernet host watchdog timeout value, 5 to 65535, in second, 0 to disable.	R/W
30258 40258	Ethernet host watchdog timeout count.	R
30259 ~ 30260 40259 ~ 40260	Module name, e.g., 0x2218, 0x5310	R
40263	TCP disconnection timeout value, 5 to 65535, in second, 0 to disable.	R/W
40264	Module reset timeout value, 30 to 65535, in second, 0 to disable.	R/W
40288 ~ 40303	Channel temperature offset of channel 0 to 15 in 0.01°C for type M and 0.1°C for other types	R/W
30320 ~ 30351 40320 ~ 40351	Temperature of channel 0 to 15 in floating point format, two registers for each channel	R
40384 ~ 40399	Channel CJC offset of channel 0 to 15 in 0.1°C, -128 to 128.	R/W

-190 -

Address	Description	Attribute
30416 ~ 30431 40416 ~ 40431	CJC temperature of channel 0 to 15 in 0.1°C	
40489	Disable/enable channels, bit 0 for channel 0, bit 1 for channel 1, etc. 0 to disable and 1 to enable	R/W
40497	Number of moving averaging, 1 to 128, default 1	R/W
40500	Number of moving averaging without written to EEPROM, 1 to 128, default 1	R/W
30512 ~ 30527 40512 ~ 40527	High latched analog input value of channel 0 to 15	R
30544 ~ 30559 40544 ~ 40559	Low latched analog input value of channel 0 to 15	R
00096 ~ 00111	Open wire status of channel 0 to 15, 1 for open wire	R
00127	Write 1 to reload default settings	W
00128	Write 1 to set Modbus TCP ID to 1	W
00133	Write 1 to reboot module	W
00141	Sampling rates, 0: 1.5 Hz, 1: 100 Hz	R/W
00142	Write 1 to reload factory calibration parameters	W
00267	1: enable, 0: disable CJC	R/W
00279	Write 1 to clear all high latched analog input values	W
00280	Write 1 to clear all low latched analog input values	W
00384 ~ 00399	Write 1 to clear high latched analog input value of channel 0 to 15	W
00416 ~ 00431	Write 1 to clear low latched analog input value of channel 0 to 15	W

6.4.6 Modbus Register Table for (P)ET-2224CIS/(P)ET-2228CIS

Register		Points	Description	Data Format	Attribute	Factory
DEC	HEX	FUIIIS	Description		Attribute	Value
00226	00E2	1	Reset the all settings to the factory default state	1: Reset	W	-
00233	00E9	1	Reboot the module	1: Reboot	W	-
00340: 00347	0154: 015B	4/8	Set OVP Alarm Enable (0/1=Disable/Enable) /Read OVP Alarm Enable Status	0: Disable 1: Enable	R/W/F	0
00360: 00367	0168: 016F	4/8	Clear OVP Alarm Status (wr:1) /Read OVP Alarm Status	<mark>(wr:1)</mark> 0/1=Normal/Alarm	R/W/F	0
00631	0277	1	Set the AO data format	0: Hexadecimal format 1: Engineering unit	R/W/F	0
00632	0278	1	Reset the AO calibration to the factory settings	1: Reset	W	-
00769: 00776	0301: 0308	4/8	Enable retained analog output for channel 0 to 7	0: Disable 1: Enable	R/W/F	0

F : Setting are recorded in flash by default

Discrete Inputs (1xxxx)

Register		Deinte	Description	Data Format	Attribute
DEC	HEX	Points	Description	Data Format	Attribute
10290: 10297	0122: 0129	4/8	Read Current mode wire break status.	0: Normal 1: Wire Break	R

Input Register (3xxxx)

Register		Dointo	No. Per	Description	Data Format	Attributo
DEC	HEX	Points	Point	Description		Allfibule
30000 : 30007	0000: 0007	4/8	1	ADC OVP Read Back Value	Engineering Value, 0 ~ 20000	R
30016: 30023	0010: 0018	4/8	1	Last AO Value	0 to 65535 (0x0000 to 0xFFFF)	R
30064: 30071	0010: 0018	4/8	1	AO Retained Value	0 to 65535 (0x0000 to 0xFFFF)	R
30330	014A	1	1	Number of the AO channel	1	R
30351	015F	1	1	Firmware version	0x0123 means version V01.2.3	R
30360	0168	1	1	Communication state of the pair-connection	1: Connect 0: Disconnect	R

Holding Register (4xxxx)

Regi	ster	Doints	No. Per	Description	Attributo	Factory										
DEC	HEX	Points	Point	Data Format	Attribute	Value										
40000:	0000:	4/0	4	AO value												
40007	0007	4/8	T	0 to 65535 (0x0000 to 0xFFFF)	K/ VV	-										
		_	_	Set the module identification (Modbus NetID)	- ()-	1										
402/1	010F	1	1	1~247	R/W/F											
40360:	0168:			Set the power-on value for the AO channel												
40367	016F	4/8	1	0 to 65535 (0x0000 to 0xFFFF)	R/W/E	0										
40392:	0188:			Set the safe value for the AO channel												
40399	018F	4/8	1	0 to 65535 (0x0000 to 0xFFFF)	R/W/F	0										
				Set the AO range												
40459:	01CB:	4/8	1	0x30: 0 ~ 20 mA	R/W/F	0x32										
40466	01D2	-7,0	D2		0x32: 0 ~ 10 V											
				0x34: 0 ~ 5 V												
				Set the AO slew rate range	-											
								0x00: Immediate								
									0x01: 0.0625 V/sec or 0.125 mA/sec							
									0x02: 0.125 V/sec or 0.25 mA/sec							
										0x03: 0.25 V/sec or 0.5 mA/sec						
															0x04: 0.5 V/sec or 1.0 mA/sec	
															0x05: 1.0 V/sec or 2.0 mA/sec	
40523:	020B:	4/8	1	0x06: 2.0 V/sec or 4.0 mA/sec	R/W/F	0x00										
40530	0212	., c	_	0x07: 4.0 V/sec or 8.0 mA/sec	τ, νν, Γ											
				0x08: 8.0 V/sec or 16 mA/sec												
				0x09: 16 V/sec or 32 mA/sec												
				0x0A: 32 V/sec or 64 mA/sec												
				0x0B: 64 V/sec or 128 mA/sec												
				0x0C: 128 V/sec or 256 mA/sec												
				0x0D: 256 V/sec or 512 mA/sec												
				0x0E: 512 V/sec or 1024 mA/sec												
				Read the module reset status												
40555	022B	1	1	1: Power-on	R	-										
				2: Module Watchdog												
				5. Software Reset Command												

Regis	egister No. Per Description		Attributo	Factory			
DEC	HEX	Points		Point Data Format		Attribute	Value
40556	022C	1	1	Read the boot count of the module. The factory default value is 0, when Reset to factory default. 1 to 32767	R	-	
				Set the Host WDT timeout (unit: second)			
40557	022D	1	1	0 ~ 4: Disable the Host WDT 5 ~ 65535: Enable the Host WDT	R/W/F	0	
40558	022E	1	1	Read the WDT event count. The initial value is 0 when the module is reset, and is increased when the WDT even happens.	R	-	
				Read the module ID			
40559	022F	1	1	0x2324/0x2328	R	-	
40580:	0244:	4 /0	1	Set Over Value Protect Value			
40587	024B	4/ð	T	Engineering Value, 0 ~ 20000	K/ VV / F	-	

6.4.7 Modbus Register Table for (P)ET-2224CI/(P)ET-2228CI

Coils	(0xxxx)
-------	---------

Reg	Register		Description	Data Format	Attributo	Factory
DEC	HEX	i onto	Description	Data Format	Attribute	Value
00226	00E2	1	Reset the all settings to the factory default state	1: Reset	W	-
00233	00E9	1	Reboot the module	1: Reboot	W	-
00631	0277	1	Set the AO data format	0: Hexadecimal format 1: Engineering unit	R/W/F	0
00632	0278	1	Reset the AO calibration to the factory settings	1: Reset	W	-
00769: 00776	0301: 0308	4/8	Enable retained analog output for channel 0 to 7	0: Disable 1: Enable	R/W/F	0

F : Setting are recorded in flash by default

Discrete Inputs (1xxxx)

Register		Dointo	Description	Data Format	Attribute
DEC	HEX	Points	Description	Data Format	Attribute
10290: 10297	0122: 0129	4/8	Read Current mode wire break status.	0: Normal 1: Wire Break	R

Input Register (3xxxx)

Register		Deinte	No. Per	Description	Data Format	Attributo
DEC	HEX	Points	Point	Description	Data Format	Attribute
30016: 30023	0010: 0018	4/8	1	Last AO Value	0 to 65535 (0x0000 to 0xFFFF)	R
30064: 30071	0010: 0018	4/8	1	AO Retained Value	0 to 65535 (0x0000 to 0xFFFF)	R
30330	014A	1	1	Number of the AO channel	1	R
30351	015F	1	1	Firmware version	0x0123 means version V01.2.3	R
30360	0168	1	1	Communication state of the pair-connection	1: Connect 0: Disconnect	R

Holding Register (4xxxx)

Regi	ster	Dointo	No. Per	Description	Attributo	Factory								
DEC	HEX	Points	Point	Data Format	Attribute	Value								
40000:	0000:	4/0	1	AO value										
40007	0007	4/8	T	0 to 65535 (0x0000 to 0xFFFF)	K/ VV	-								
				Set the module identification (Modbus NetID)		_								
40271	010F	1	1	1~247	R/W/F	1								
40360:	0168:	. / 5		Set the power-on value for the AO channel	- 6 1-									
40367	016F	4/8	1	0 to 65535 (0x0000 to 0xFFFF)	R/W/E	0								
40392:	0188:			Set the safe value for the AO channel	5 / h k / F	•								
40399	018F	4/8	1	0 to 65535 (0x0000 to 0xFFFF)	R/W/F	0								
				Set the AO range										
40459:	01CB:	4/8	1	0x30: 0 ~ 20 mA	R/W/F	0x32								
40466	01D2	-,0		0x31: 4 20 mA 0x32: 0 ~ 10 V										
				0x34: 0 ~ 5 V										
	020B: 4/8				20B: 4/8							Set the AO slew rate range		
							0x00: Immediate							
						020B: 4/8		0x01: 0.0625 V/sec or 0.125 mA/sec						
		020B: 4/8								0x02: 0.125 V/sec or 0.25 mA/sec				
									0x03: 0.25 V/sec or 0.5 mA/sec					
			020B: 4/8					0x04: 0.5 V/sec or 1.0 mA/sec						
				020B: 4/8)20B:		0x05: 1.0 V/sec or 2.0 mA/sec					
40523:								B: , /o	020B:	1	0x06: 2.0 V/sec or 4.0 mA/sec	D/\\/E	0.00	
40530	0212	4,0	-	0x07: 4.0 V/sec or 8.0 mA/sec	K/ VV/ F	0,00								
				0x08: 8.0 V/sec or 16 mA/sec										
				0x09: 16 V/sec or 32 mA/sec										
				0x0A: 32 V/sec or 64 mA/sec										
				0x0B: 64 V/sec or 128 mA/sec										
				0x0C: 128 V/sec or 256 mA/sec										
				0x0D: 256 V/sec or 512 mA/sec										
					0x0E: 512 V/sec or 1024 mA/sec									
				Read the module reset status		-								
40555	022B	1	1	1: Power-on	R									
				2: Module Watchdog										
				3: Software Reset Command										

Register		Dointo	No. Per	Description	Attributo	Factory
DEC	HEX	POINTS	Point	Data Format	Attribute	Value
40556	022C	1	1	Read the boot count of the module. The factory default value is 0, when Reset to factory default.	R	-
				1 to 32767		
				Set the Host WDT timeout (unit: second)		
40557	022D	1	1	0 ~ 4: Disable the Host WDT 5 ~ 65535: Enable the Host WDT	R/W/F	0
40558	022E	1	1	Read the WDT event count. The initial value is 0 when the module is reset, and is increased when the WDT even happens.	R	-
				0 to 32767		
10550	0225	1	1	Read the module ID	D	_
40339	UZZF		T	0x2324/0x2328	n	-

6.4.8 Modbus Register Table for (P)ET-2224/2228

Coils (0xxxx)

Register		Dointe	Description	Data Format	Attribute	Factory	
DEC	HEX	Points	Description		Attribute	Value	
00000 0050		1	Reset the I/O settings to the	1. Posot	W	-	
00226 00E2	factory default state		I. Reset				
00233	00E9	1	Reboot the module	1: Reboot	W	-	
				0:			
00631	0277	77 1	1	1 Set the AO data format I	Hexadecimal format	R/W/E	0
				1: Engineering unit			
00622	0270	278 1	Reset the AO calibration to the	1. Deset	W		
00032	0278		factory settings			-	

Discrete Inputs (1xxxx)

Register		Deinte	Description	Data Farmat	Attailente
DEC	HEX	Points	Description	Data Format	Attribute
10290: 10297	0122: 0129	4/8	Read the Current mode wire break status.	0: Normal 1: Wire Break	R

Input Register (3xxxx)

Reg	Register Points No. Per		No. Per	Description	Data Format	Attributo						
DEC	HEX	PUIIIts	Point	Description		Attribute						
30330	014A	1	1	Number of the AO channel	8	R						
20254 0455		1	1	1	1	1	1	1	1	Eirmware version	0x123 means	D
20221	UIJF	, T	Ŧ		version 1.2.3	n						
20260			Communication state of the neir connection	0: Normal	D							
30360 0168			L	communication state of the pair-connection	<0: Failed	ĸ						

Holding Register (4xxxx)

Reg	ister	Dointo	No. Per	Description	Data Format	Attributo	Factory
DEC	HEX	Points	Point	Description	Data Format	Attribute	Value
40000:	0000:	4 /0	1		-32768 to 32767		
40007	0007	4/8	Ţ		(0x0000 to 0xFFFF)	K/ W	-
40271	010F	1	1	Set the module identification (Modbus NetID)	0 to 255	R/W/E	1
40360:	0168:	A /O	1	Set the power-on value for	-32768 to 32767		0
40367	016F	4/0	4/0	the AO channel	(0x0000 to 0xFFFF)	K/ VV/ E	0
40392:	0188:	4 /0	1	Set the safe value for the AO	-32768 to 32767		0
40399	018F	4/8	Ţ	channel	(0x0000 to 0xFFFF)	K/VV/E	0
					0x30: 0~20 mA		
					0x31: 4~20 mA		
40459:	01CB:	л /o	1	Sat the AO range	0x32: 0~10 V	D/\\//E	0v22
40466	01D2	4/0		Set the AO range	0x33: +/-10 V	K/VV/E	0x32
					0x34: 0~5 V		
					0x35: +/-5 V		

Regi	ister	Deinte	No. Per	Description	Data Format	Attailanta	Factory
DEC	HEX	Points	Point	Description	Data Format	Attribute	Value
					0x00: Immediate		
		0x01:	0x01:				
					0.0625 V/sec or 0.125 mA/sec		
					0x02: 0.125 V/sec or 0.25 mA/sec		
		0x03: 0.25 V/sec or 0.5 mA/sec					
					0x04: 0.5 V/sec or 1.0 mA/sec		
			0x05: 1.0 V/s Set the AO slew 0x06: 2.0 V/s	0x05: 1.0 V/sec or 2.0 mA/sec			
40523:	020B:	1/9		Set the AO slew	0x06: 2.0 V/sec or 4.0 mA/sec		0×00
40530	0212	4/0	T	rate range	0x07: 4.0 V/sec or 8.0 mA/sec		0,00
					0x08: 8.0 V/sec or 16 mA/sec		
					0x09: 16 V/sec or 32 mA/sec		
					0x10: 32 V/sec or 64 mA/sec		
					0x11: 64 V/sec or 128 mA/sec		
					0x12: 128 V/sec or 256 mA/sec		
					0x13: 256 V/sec or 512 mA/sec		
					0x14: 512 V/sec or 1024 mA/sec		

Regi	ister	Dointe	No. Per	Description	Data Format	Attributo	Factory					
DEC	HEX	Points	Point	Description	Data Format	Allribule	Value					
					1: Power-on							
10555	0228	1	1	Read the module reset status	2: Module Watchdog	P	_					
40555 0228	1	T		3: Software Reset	ĸ	-						
				Command								
				Read the boot count of the								
40556 022C 1	1	1	module. The factory default	1 to 20767	P	_						
		т		Ŧ	T	Ŧ	T	T	T	value is 0 when the settings are	1 (0 32/0/	n
			set to the factory default values.									
					0:							
40557	חככט	1	1	Set the Host WDT timeout	Disable the Host WDT	D/\\//F						
40557	0220		L		L	L T	' [⊥]	Ţ		(unit: second)	6 to 65535:	
					Enable the Host WDT							
				Read the WDT event count.								
10550	0225	1	1	The initial value is 0 when the	0 to 22767	D						
40558	UZZL	1	T	module is reset and is increased	0 10 32707	N	-					
				when the WDT event happens.								
40559	022F	1	1	Read the module name	0x2224/0x2228	R	-					

6.5 Analog Input Type and Data Format Table

Type Code	Input Type	Data Format	Max.	Min.
05		Engineering unit	+25000	-25000
05	-2.5 (0 +2.5 V	2's comp HEX	7FFF	8000
06	20 to 120 mA	Engineering unit	+20000	-20000
00	-20 to +20 mA	2's comp HEX	7FFF	8000
07	14 to 120 mA	Engineering unit	+20000	+4000
07	+4 to +20 mA	2's comp HEX	FFFF	0000
08	10 to 110 V	Engineering unit	+10000	-10000
08	-10 (0 +10 v	2's comp HEX	7FFF	8000
00		Engineering unit	+5000	-5000
09	-5 t0 +5 V	2's comp HEX	7FFF	8000
0.0	1+0+11	Engineering unit	+10000	-10000
UA	-1 (0 +1 V	2's comp HEX	7FFF	8000
00	20 to 120 mA	Engineering unit	+20000	-20000
UD	-20 to +20 mA	2's comp HEX	7FFF	8000
1.0	0 to 120 mA	Engineering unit	+20000	0
A	0 t0 +20 MA	2's comp HEX	FFFF	0000

6.6 RTD Type Code Table

Type Code	RTD Type	Min.	Max.
0x20	Pt 100, α = 0.00385, -100 ~ 100°C	-10000	10000
0x21	Pt 100, α = 0.00385, 0 ~ 100°C	0	10000
0x22	Pt 100, α = 0.00385, 0 ~ 200°C	0	20000
0x23	Pt 100, α = 0.00385, 0 ~ 600°C	0	60000
0x24	Pt 100, α = 0.003916, -100 ~ 100°C	-10000	10000
0x25	Pt 100, α = 0.003916, 0 ~ 100°C	0	10000
0x26	Pt 100, α = 0.003916, 0 ~ 200°C	0	20000
0x27	Pt 100, α = 0.003916, 0 ~ 600°C	0	60000
0x28	Ni 120, -80 ~ 100°C	-8000	10000
0x29	Ni 120, 0 ~ 100°C	0	10000
0x2B	Cu 100, α = 0.00421, -20 ~ 150°C	-2000	15000
0x2C	Cu 100, α = 0.00427, 0 ~ 200°C	0	20000
0x2E	Pt 100, α = 0.00385, -200 ~ 200°C	-20000	20000
0x2F	Pt 100, α = 0.003916, -200 ~ 200°C	-20000	20000
0x80	Pt 100, α = 0.00385, -200 ~ 600°C	-2000	6000
0x81	Pt 100, α = 0.003916, -200 ~ 600°C	-2000	6000
0x82	Cu 50, -50 ~ 150°C	-5000	15000
0x83	Ni 100, -60 ~ 180°C	-6000	18000
0x84	Ni 120, -80 ~ 150°C	-8000	15000
0x85	Cu 100, α = 0.00428, 0 ~ 150°C	0	15000
0x86	Pt 100, α = 0.00385, -100 ~ 300°C	-10000	30000
0x87	Pt 100, α = 0.003916, -100 ~ 300°C	-10000	30000

For ranges of type code 0x23 and 0x27, the under range value is 0 and the over range value is +65535. For other ranges, the under range value is -32768 and the over range value is +32767.

6.7 Thermocouple Type Code Table

Type Code	Thermocouple Type	Min.	Max.
0x0E	Type J Thermocouple -210 ~ 760°C	-2100	7600
0x0F	Type K Thermocouple -270 ~ 1372°C	-2700	13720
0x10	Type T Thermocouple -270 ~ 400°C	-2700	4000
0x11	Type E Thermocouple -270 ~ 1000°C	-2700	10000
0x12	Type R Thermocouple 0 ~ 1768°C	0	17680
0x13	Type S Thermocouple 0 ~ 1768°C	0	17680
0x14	Type B Thermocouple 0 ~ 1820°C	0	18200
0x15	Type N Thermocouple -270 ~ 1300°C	-2700	13000
0x16	Type C Thermocouple 0 ~ 2320°C	0	23200
0x17	Type L Thermocouple -200 ~ 800°C	-2000	8000
0x18	Type M Thermocouple -200 ~ 100°C	-20000	10000
0x19	Type LDIN43710 Thermocouple -200 ~ 900°C	-2000	9000

The under range value is -32768 and the over range value is +32767.

Appendix A: Troubleshooting

A.1 How can I Factory Reset the Module (Password: Admin)?

If the module encounters an anomaly and you cannot access the module's web server for configuration, or if you have forgotten the login password, you can perform a factory reset of the module. Please note that after completing the following steps, all of your customized settings will be erased

Init

Run

ET-2217C

Step 1

Adjust the Init/Run switch to the "Init" mode and reboot the module to load factory settings, including the default web password.

Step 2

Execute the eSearch Utility to verify that the module has been reset to the factory settings. For example, the default IP address is "192.168.255.1". And then, modify the network settings (e.g., the IP, Mask, and Gateway addresses) and click the **"OK"** button.

	🥩 eSearch Utility [v1.2.0	– 🗆 🗙	c .				
	File Server Tools						
\bigcap	Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	^
2	iDS-720	UA-Serie	192.168.85.23	255.255.0.0	192.168.1.1	90:70:65:40:A0:C7	
\sim	ET-2260	EtherIO	192.168.255.1	255.255.0.0	192.168.0.1	00:0d:e0:65:e9:85	
	E1-2260 DL-302 DL-302	#2 EtherIO EtherIO	192.168.79.100 192.168.84.62 192.168.101.15	255.255.0.0 255.255.0.0 255.255.0.0	192.168.1.1 192.168.0.1 192.168.1.1	00:0d:e0:65:c1:d3 00:0d:e0:92:06:69 00:0D:E0:92:00:A1	
\frown	ET-7255/PET-7255	Slave	192.168.79.55	255.255.0.0	192.168.1.1	00:0d:e0:65:ed:d1	v
$\begin{pmatrix} 1 \end{pmatrix}$	<					>	
Ч	Search Serve	r Confi	iguration (UDP)	Web		Exit	
Configure	Server (UDP)						
Server	Name: ET-2260	3					
DHCP:	0: OFF	▼ S	ub-net Mask : 2	55.255.0.0	Alias:	#1	
IP Addr	ess: 192.168.79.10) G	ateway : 19	92.168.1.1	MAC:	00:0d:e0:65:e9:85	
Warnin Contac	ıg!! t your Network Administ	rator to get co	rrect configuration	n before any chang	ing!	OK Cance	:I

Step 3

Adjust the Init/Run switch back to the **"Run"** mode and reboot the module.



Step 4

Log in to the ET-2200 web server. Enter the factory password "Admin" and specify the new password, and then click the **Submit** button to save the settings.



A.2 How to update the firmware via Ethernet?

If the module is not functioning correctly (e.g. there is no response to a search request, or if the system LED is continuously displayed as either OFF or ON), download new firmware from the ICPDAS website. http://www.icpdas.com/en/download/show.php?num=2626

To update the Firmware for your ET-2200 module, connect the ET-2200 module and PC in the same sub-network. Please note that there should be only one network card on the PC. Then, download and install the **eSearch Utility**:

http://www.icpdas.com/en/product/guide+Software+Utility_Driver+eSearch__Utility

Step 1: Run the eSearch utility and click on the Search Server button to find the ET-2200 module.Step 2: Right-click on the module name and select Firmware Update.

🥩 eSearch Utility [v1.2.	6, Dec.09, 2020	0]			- 0	×
File Server Tools						
Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	^
iDS-720	UA-Serie	. 192.168.85.23	255.255.0.0	192.168.1.1	90:70:65:40:A0	:C7
ET-2260	#1	100 100 70 10	ore or 5.0.0	192.168.1.1	00:0d:e0:65:e9	:85
ET-2260	#2	Ping Server	5.0.0	192.168.1.1	00:0d:e0:65:cf:	d3
DL-302	Ethe 👘	Configure Server (UDP)	5.0.0	192.168.0.1	00:0d:e0:92:06	:69
DL-302	Ethe	0	5.0.0	192.168.1.1	00:0D:E0:92:00):A1
ET-7255/PET-7255	Slav 🛄	Firmware Update	5.0.0	192.168.1.1	00:0d:e0:65:ed	:d1 🗸
		Locate 🖌				>
Search Serve	r 🗈	Copy to Clipboard	Web		Exit	
Status						/

Step 3: Select the firmware file and click on the Open button.

ø Open							×
$\leftarrow \rightarrow \cdot \cdot \uparrow$	« Desk	> ET2200_v201	~ 0	ט		0_v201_1908	822
Organize 🔻	New folder					-	?
ET2200.dat							
	File name:	ET2200.dat		\sim	firmware file (*.dat	:)	\sim
					Open	Cance	

Step 4: Make sure the IP address and MAC address are correct. Click on the OK button.

Firm	ware Update (Tiny	Module only)			×
	File Name kt	op\ET2200_v2 Address is de	201_190822\ pending on y	ET2200.dat our network,	
	while the MAC	C address in d	epending on	your device.	
	IP Address 192.168.79.10 For Updating				
	MAC Address	00:0d:e0:65:	e9:85	MAC Finder	
		ок	Cancel		

Step 5: The progress 0% will be displayed in a command prompt window. Follow the steps.



Method 1 - Local Update:

Set the Init/Run switch to the "Init" position and reboot the module to start the update.

Method 2 - Remote Update:

Click the **Web** button and log into the web page of the module, and then click the **Update** button on the **Network** page to start the update.

🥩 eSearch Utility [v1.2.	.6, Dec.09, 2020					×
File Server Tools						
Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address	~
ET-2260	#1	192.168.79.10	255.255.0.0	192.168.1.1	00:0d:e0:65:e9:85	5
E1-2260 DL-302 DL-302 ET-7255/PET-7255	#∠ Etherl0 Etherl0 Slave	192.168.79.100 192.168.84.62 192.168.101.15 192.168.79.55	255.255.0.0 255.255.0.0 255.255.0.0 255.255.0.0	192.168.1.1 192.168.0.1 192.168.1.1 192.168.1.1	00:00:e0:65:c1:03 00:0d:e0:92:06:69 00:0D:E0:92:00:A 00:0d:e0:65:ed:d1	} 1 ↓
Search Serve	r Cont	figuration (VDP)	Web	_ _	Exit	,]



Step 6: After the update is complete, press any key to close the window. For the local update, Set the Init/Run switch to the **"Run"** position and reboot the module.



Step 7: Search the module again and log into the web page by using the eSearch Utility.After that, the user can check the Firmware Version on the Home page.



A.3 How to Perform Batch Setup for ET-2200 Module?

Visit the ICP DAS website and search for **EtherDOT**. Click the "Download" button on the webpage to download the software and user manual.

https://www.icpdas.com/tw/product/guide+Software+Utility_Driver+EtherDOT

• icpdas.com/?Lang=US	Q	*
ICP DAS	EtherDOT Solution,Tag & 🔮 Engl Noskule, EmerDOT Info: Utility for ethernet module setting, backup/recover/mass deploy	ish → CT US
★ HOME > PRODUCTS > Software > 0 ★ HOME > PRODUCTS > Software > 0 EtherDOT Toolkit provides batch/exproblem of human setting errors. ★ DOWNLOAD ★ DOWNLOAD ★ DOWNLOAD ★ Support Module: tDS-700 series tGW-700 series tSL-P4R1 series DS-2200 series GW-2200 series ET-2200 series 	EtherDOT In Solution,Tag In I	JS
Online One-to-many clone modu	e settings DAS Ethernet Device Organize ToolKit W700 Series ICP DAS Ethernet Device Organize Toolkit A EXPLORE C 10W-700 Series	

(A) <u>Tab – Device Setting</u>

This tab allows users to perform operations on a single module, including configuring network settings, locating the module, and updating firmware.

• After entering the page, first search for modules on the network.



Locato the module	To identify modules with the same model. After clicking the icon, the				
Locate the module	LED on the front panel of corresponding module will begin blinking.				
Module webpage	To open the module's configuration page.				
Update firmware	The update method is the same as described in Section A.2, Steps 3–6.				
Madify Catting	If the Confirm button is not visible after modifying the network settings,				
Modify Setting	click on any field to make it appear.				

Firmware Update Notice:

When updating the firmware in **RUN mode**, if the command window shows **0%** as shown below, **switch the module to INIT mode and reboot.**



The update will then automatically proceed from 0% to 100%. Once the update is complete, switch back to **RUN mode and reboot again**. After that, use EtherDOT to search the module again, then log in to the web interface to check the firmware version (e.g., **v2.4.3 [Aug. 6, 2024]**).

(B) <u>Tab – Mass Network Setting</u>

This tab allows users to modify network settings for multiple modules simultaneously.

- After entering the page, search for modules on the network.
- Add the module(s) you want to modify to the device list.
- Expand the **Batch Processing Device Rules**.



• After setting the rules for batch processing, click [Batch Edit Device Information] to apply and review the rules.



• Click [Save All] to write settings to the modules. After that, the list will be cleared.



(C) <u>Tab – Mass Device Setting</u>

This tab provides the following functions:

Clone Device Settings	Duplicate settings from one module to one or more others		
Export Device Settings	Export module settings to a file		
Import Device Settings	Import a configuration file to one or more modules		

 For detailed instructions, refer to the EtherDOT User Manual: https://www.icpdas.com/web/product/download/software/utility_driver/etherdot/d ocument/manual/EhterDOT_manual_en.pdf

[Clone Device Settings]:

Users can duplicate the settings from one module to others. **Note:** If the network settings have changed, please search for the modules again.

- After entering the page, search for modules on the network.
- Source Device: Select a module, e.g., 192.168.79.62.
- Destination Device: Select one (or more) modules, e.g., 192.168.79.63.

	ICP DAS	Ethernet [)evice	Organize ToolK	lit		Language English -	ር
Information Links:	Home	Ň	V-700 Se	eries 🏾 🇖 tSH-	-700 Series	nilows sir	DS-2200 Series	
Source Device (Onl	Device Sett	ing		Destination Dev	vice	S	election	//C →
Device	Mass Netw	ork Setting	s	Device	e II	P Address	MAC Address	- 1
DL-302	Mass Devic	e Setting	22	ET-2260	192.	168.79.62	4 20:65:e9:85	
DL-302	'U		2F	ET-2260	192.	168.79.63	00:0d:e0:65:cf:d3	
DL-302	192.168.20.12	00:0D:E0:92:00	:FF		1			
DL-302	192.168.1.203	00:0D:E0:92:00	:6A	3				
ET-2260	192.168.79.62	00:0d:e0:65:e9:	85	Click to list	t all mo	dules	\frown	
ET-2260	192.168.79.63	00:0d:e0:65:cf:	d3	of the sa	me mo	del.	(2)	
RPAC-2658M	192.168.78.100	00:0d:e0:c0:00:	25		S	aarch Ether	net Device	
RPAC-2658M	172.16.255.1	00:0d:e0:c0:00:	26		5			
RPAC-2658M	10.0.255.1	00:0d:e0:c0:00:	27	(Clone Devic	ce Setting 🛛 🗖).
ACS-11-MF	192.168.1.241	00:0d:e0:c0:04:	fd			Evport Dovi	ico Sotting	
ACS-11-MF	192.168.1.242	00:0d:e0:c0:04:	f7					2
						mport Devi	ce Setting 🛛 🖻	
							X	

• After clicking **[Clone Device Setting]**, the user will be prompted to enter the login passwords for both the source and destination modules.

Source	Destination	
×		require creating a new password.
Welcome!	Welcome! Set Log in Password to ET-226	
Log in ET-2260	192.168.79.63	
192.168.79.62	erenter Old Password ●●●●●	Clone Device Setting
⊶Enter Password 🗞	←Enter New Password	
	←Enter Confirm New Password	
	CHANGE	×

 After completion, an ✓ icon will appear on the destination device, indicating that the settings from the source module have been successfully copied to the selected module.

Destination Device							
	Device	IP Address	MAC Address				
	ET-2260	192.168.79.62	00:0d:e0:65:e9:85				
(√)	ET-2260	192.168.79.63	00:0d:e0:65:cf:d3				

[Export Device Settings]:

Users can export the module's settings as a .cfg file. This configuration file can later be imported into multiple modules.

 Source device:
 Select a module to export the settings from.

	Source Device (Online)							
L	Device	IP Address	MAC Address					
ι	DL-302	192.168.101.15	00:0D:E0:92:00:2F					
	DL-302	192.168.15.101	00:0D:E0:92:00:22					
	DL-302	192.168.1.203	00:0D:E0:92:00:6A					
	ET-2260	192.168.79.62	00:0d:e0:65:e9:85					
	ET-2260	192.168.79.63	00:0d:e0:65:cf:d3					

- Click **Export Device Setting**, choose the file location, enter a filename, and click Save.
- Enter the module's login password. A confirmation message will appear once the export is complete.

Source Device (Onli	Save file		
Device	C:\ > ICPD/	AS > EtherDOT >	2 MAC Address
DL-302			00:0d:e0:65:e9:85
DL-302	Folders	×	↑ 00:0d:e0:65:cf:d3
DL-302		<u>8</u>	
ET-2260	ar-DZ 2025/5/19		0
ET-2260		-	
RPAC-2658M		Welcome!	•
RPAC-2658M	ET-2260-1	Log in ET-2260	CFG files
RPAC-2658M		192.168.79.62	
ACS-11-MF			CANCEL SAVE
ACS-11-MF	192.168.1.241 00:0d:	e0:c0	
		LOGIN 5	Export Device Setting
	File e \Ethe	xport succeeded To C:\ICPDAS rDOT\ET-2260-62.cfg	

[Import Device Settings]:

If the user already has a configuration file (.cfg), it can be imported into other modules.

• Click Import Device Setting and select the .cfg file you want to import.



- Select the module and click **Clone Device Setting**.
- Enter login passwords as required.



After completion, an ✓ icon will appear on the destination device.


A.4 Why is the Host computer unable to ping or search for the

ET-2200 module?



The Host computer can only establish communication with a module through specific ports. Confirm with your network administrator that access to UDP Port 7, Port 57188, and Port 54321 is not being denied by another network device.

The following provides more detailed information related to TCP/UDP ports:

TCP Port:

Port Number	Description
80	HTTP (Hyper Text Transport Protocol)
502	Modbus Data Port

UDP Port:

Port Number	Description
7	Echo (Ping)
57188	UDP Search Request
54321	UDP Search Response

Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.

A.5 What is Digital-Input Filter (DI Filter)?

A: An input signal can come from a myriad of sources, such as buttons, switches, sensors, relays, etc. Each of these types of mechanical devices also contributes to a common problem - "**contact bounce**".

The switch between Digital Input states is usually accompanied by several unwanted pulses, known as "switch bounce". In certain environments and situations, these input signals may inevitably generate an unstable signal or noise, which can potentially cause incorrect data counting or operation failure. Consequently, these errors must be removed from the input signals, especially if the signals are used in crucial applications.

A low-pass Digital Input filter is a software function that can be used to eliminate high-frequency interference from input signals. The input state will only be changed when the width of any new signal is greater than the value specified as the filtering time, meaning that short, high-frequency interference pulses will be ignored, as illustrated in the diagram below. This is especially useful when attempting to eliminate contact bounce.



Copyright © 2023 ICP DAS CO., Ltd. All Rights Reserved.