User Manual

QEC-RXXCFFG

EtherCAT Compound SubDevice with Digital I/O, Analog I/O, and COM port.

With Isolated 32-ch Digital Input/Output, 2-slot ADC/DAC, and 1-port RS232/RS485

(Revision 1.1)

REVISION

DATE	VERSION	DESCRIPTION
2025/01/08	**Version1.0**	**New Release.**
2025/05/02	**Version1.1**	• **Update product number from DFFG to CFFG.** • **Update COM port LED diagnosis information.** • **Update ESI table.**

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Ver.1.1 May, 2025

TRADEMARKS ACKNOWLEDGMENT

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- QEC: https://www.qec.tw/

This Manual is for the QEC series.

SAFETY INFORMATION

- Read these safety instructions carefully.
- Please carry the unit with both hands and handle it with caution.
- Power Input voltage +19 to +50VDC Power Input (Typ. +24VDC)
- Make sure the voltage of the power source is appropriate before connecting the equipment to the power outlet.
- To prevent the QEC device from shock or fire hazards, please keep it dry and away from water and humidity.
- Operating temperature between -20 to +70°C/-40 to +85°C (Option).
- When using external storage as the main operating system storage, ensure the device's power is off before connecting and removing it.
- Never touch un-insulated terminals or wire unless your power adaptor is disconnected.
- Locate your QEC device as close as possible to the socket outline for easy access and avoid force caused by the entangling of your arms with surrounding cables from the QEC device.
- If your QEC device will not be used for a period of time, make sure it is disconnected from the power source to avoid transient overvoltage damage.

WARNING!

DO NOT ATTEMPT TO OPEN OR TO DISASSEMBLE THE CHASSIS (ENCASING) OF THIS PRODUCT. PLEASE CONTACT YOUR DEALER FOR SERVICING FROM QUALIFIED TECHNICIAN.

Content

Ch. 1

General Information

1.1 Introduction

ICOP's QEC-RXXCFFG is an EtherCAT Subdevice with comprehensive functionality for modern industrial automation. It features isolated 32-channel Digital I/O, 2 slots of 16-bit ADC/DAC, and 1 COM Port (RS232/485) that deliver powerful capabilities while minimizing component costs.
It has passed the EtherCAT Conformance Test Tool (ET9400), ensuring seamless integration with EtherCAT MDevice. This guarantees reliable performance and compatibility with various industrial setups.

Advanced Digital I/O, AI/O, and Serial Capabilities
The QEC-RXXCFFG includes 16 isolated digital input channels and 16 isolated digital output channels. Its digital input supports sink configurations for both NPN and PNP types, with a safe operating frequency of up to 3000 Hz. The digital output can handle a load voltage rating of up to 60VDC with a typical load current of 500mA and a peak current of 1000mA. With isolation protection rated at 2500 Vrms for digital inputs and 1500 Vrms for digital outputs, these modules provide exceptional reliability and safety in industrial applications.
Each module is equipped with 1 channel of 16-bit DAC and 1 channel of 16-bit ADC, which supports high-accuracy voltage and current measurement. The analog output supports various ranges, including 0-24mA and ±12V, while the analog input offers range up to ±22V with a resolution of 16 bits and ±0.2% FSR at 25°C. It also features a standard RS232/485 serial port with data rates up to 115200 bps.

Precise Synchronization with Distributed Clock
The QEC-RXXCFFG's digital I/O functionality supports Distributed Clock (DC) mode, ensuring precise synchronization between devices. This is essential for applications requiring high accuracy and timing consistency. With a cycle time as low as 1 ms, these modules provide optimal performance for demanding industrial tasks.

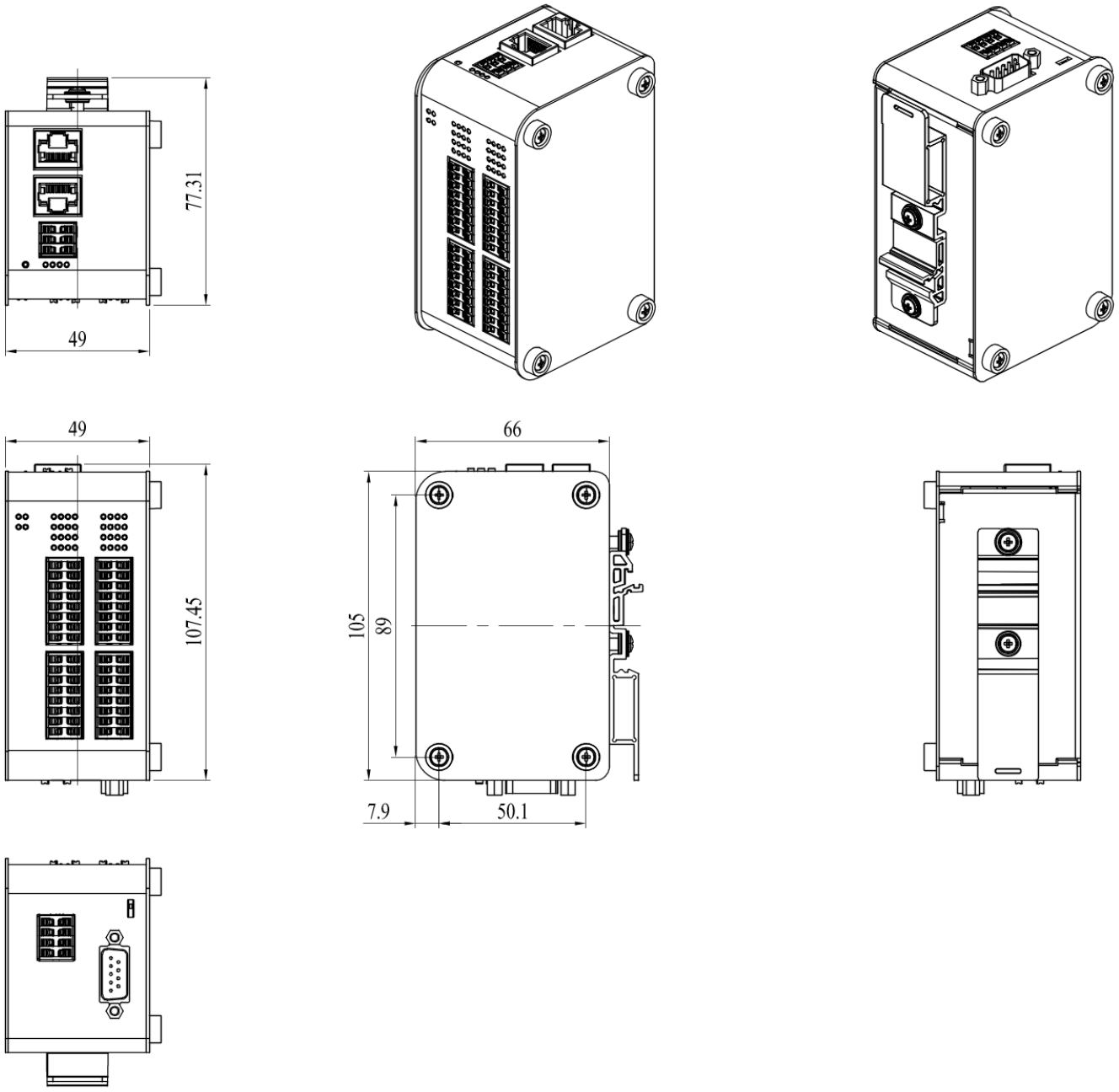
Compact and Reliable Design
The QEC-RXXCFFG, measuring 107.45 x 49 x 77.31 mm and weighing only 370g, supports DIN-rail mounting and features a robust Euroblock terminal block for hassle-free installation and wiring. Its operating temperature range is -20°C to +70°C (and an optional range of -40°C to +85°C). It also includes built-in monitoring for temperature, voltage, current, and startup time.

Comprehensive Industrial Automation Solution
The QEC-RXXCFFG provides a robust and versatile solution for industrial automation, combining advanced features with ease of use. Whether for high-precision tasks or versatile I/O configurations, these modules meet the needs of modern industries. Contact us today to learn how the QEC-RXXCFFG series can enhance your industrial automation systems!

1.2 Specifications

Digital I/O	**Digital Input**	**Digital Output**
Channels	16 (Isolated)	16 (Isolated)
Input Type	Sink (Supports both NPN and PNP configurations)	
Frequency	Safe Operating Frequency: ≤3000 Hz Rise Time (tr): 6us, Fall Time (tf): 6us	Operating Frequency: 1000Hz Turn-On Time: 0.25ms, Turn-Off Time: 20us
Load Voltage	+24V (Options: 24V or 48V)	+60Vdc
Load Current	-	Typ. 500mA (peak 1000mA)
Isolation Protection	2500 Vrms	1500 Vrms
Analog I/O	**Analog Input**	**Analog Output**
Channels	1 (Differential)	1
Input/Output Type	Voltage (V)	Voltage (V, mV), Current (mA)
Current Range	-	0~24mA, 3.5~23.5mA, 0~20mA, 4~20mA, ±24mA
Voltage Range	±22V, ±20V, ±11V, ±10V, 5V, 0~22V, 0~20V, 0~11V, 0~10V	0~5V, 0~10V, ±5V, ±10V, 0~6V, 0~12V, ±6V, ±12V
Overvoltage Protection	Up to ±24 V	-
Resolution	16-bit with accuracy ±0.2% FSR @25°C	16-bit with accuracy ±0.2% FSR@25°C
Serial Port		
Interface Mode	RS232/RS485 (D-Sub 9-pin)	
Data transfer rate (bps)	2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200	
Data width (bit)	5/6/7/8	
Hardware Flow Control	CTS/RTS	
EtherCAT		
Cable Type	Ethernet/EtherCAT Cable (Min. CAT 5), Shielded	
Cycle Time	1 ms	
Distributed Clock (DC)	Yes	
General		
Connector	Euroblock (Digital Input: Red, Digital Output: Orange, Analog Input: Green, Analog Output: Orange)	
Power Connector	4-pin Power Input/Output & 2-pin FGND	
Power Requirement	+19 to +50VDC Power Input (Typ. +24VDC)	
Power Consumption	3W	
Operating Temperature	-20 to +70°C	
Dimension	107.45 x 49 x 77.31 mm	
Weight	370 g	
Mounting	DIN-Rail	
Internal Monitoring	Temperature, Voltage, Current, Start-up time	

1.3 Dimension

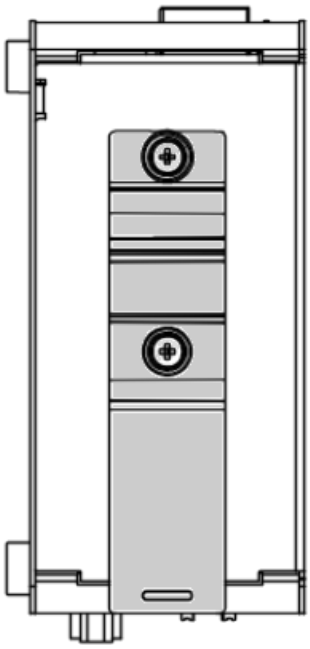


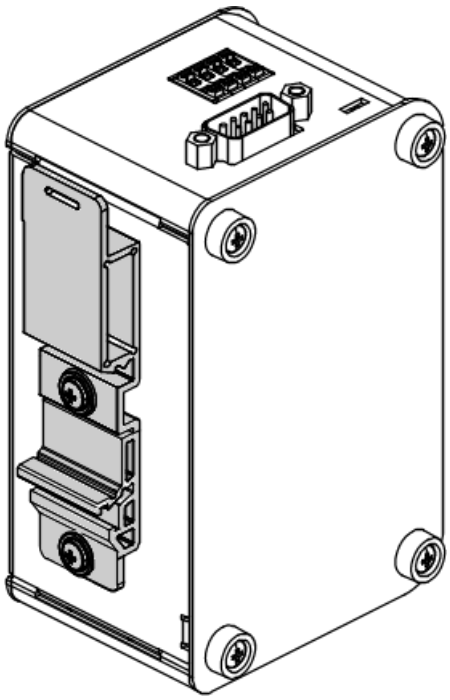
(Unit: mm)

1.4 Mounting Instruction

QEC-RXXCFFG is an easy-install design to help you set-up your modules easily. Please refer to Ch.3.1 DIN-Rail installation.

- **DIN-Rill**





1.5 Ordering Information

Type	RJ45 power source		Functions			Feature	-	Coating
	Input	Output	Digital	Input	Output	Digital Type		
QEC-R	X	X	C	X	X	X		X

1. Type: Code 1~4

R: EtherCAT SubDevice.

2. RJ45 Power source: Code 5~6

0: RJ45 In/Out w/o power

1: RJ45 PoE Device, Red Plastic Housing

3. Functions: Code 7~9

C: Digital I/O

X: 0, 8, F (16), T (32) input channels

X: 0, 8, F (16), T (32) output channels

4. Feature: Code 10

G: AD*1、DA*1、UART

K: DA*2、UART

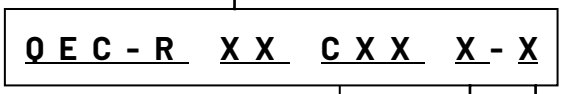
N: AD*2、UART

U: UART only

L: None

5. Coating: Code 11

C: Yes / N: Normal



1.5.1 Reference Ordering Part Number:

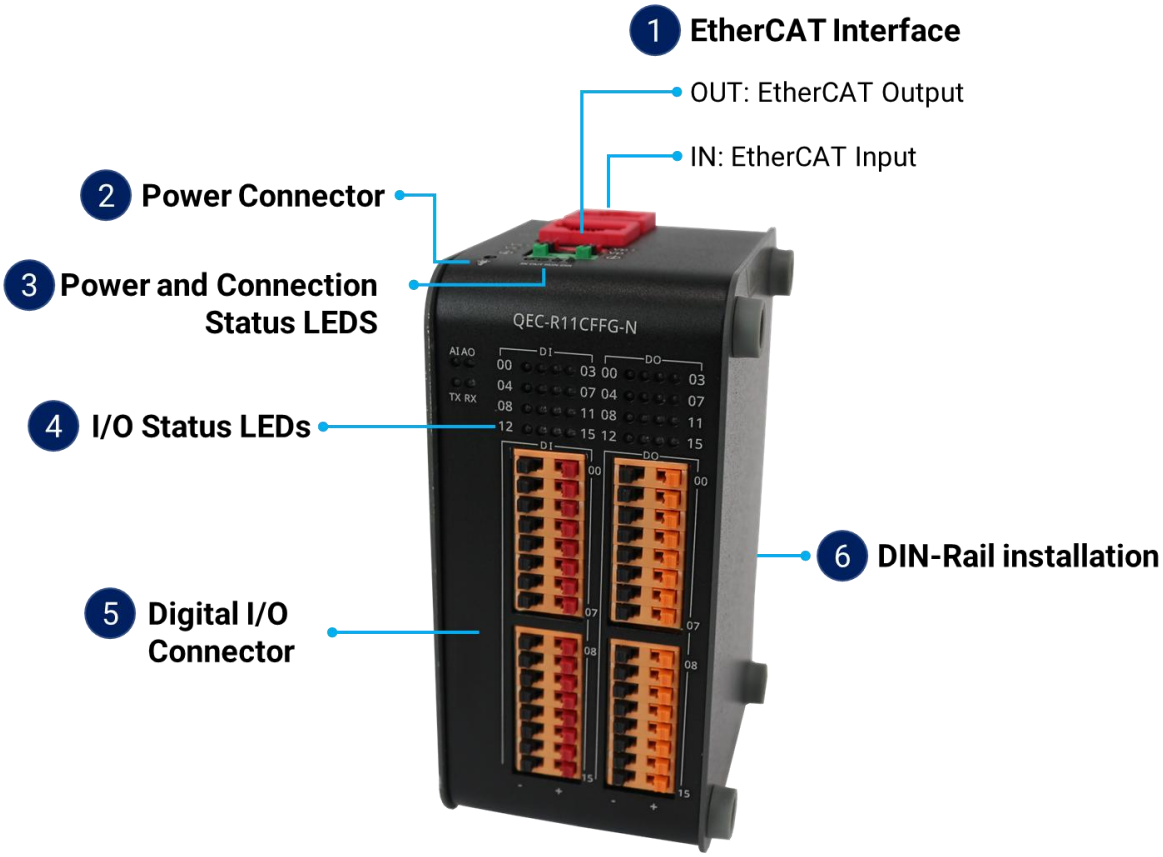
Below are the standard Part Numbers:

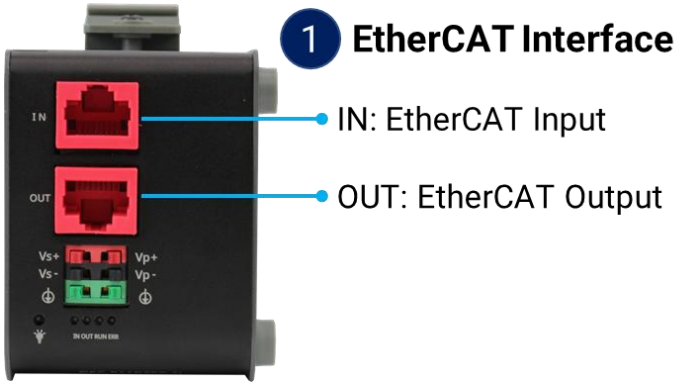
- **QEC-R00CFFG-N**: EtherCAT SubDevice 32-ch Digital I/O, 2-ch Analog I/O, and COM port Module
- **QEC-R11CFFG-N**: EtherCAT SubDevice 32-ch Digital I/O, 2-ch Analog I/O, and COM port Module/PoE
- **QEC-R00CFFU-N**: EtherCAT SubDevice 32-ch Digital I/O, and COM port Module
- **QEC-R11CFFU-N**: EtherCAT SubDevice 32-ch Digital I/O, and COM port Module/PoE
- **QEC-R00CFFL-N**: EtherCAT SubDevice 32-ch Digital I/O Module
- **QEC-R11CFFL-N**: EtherCAT SubDevice 32-ch Digital I/O Module/PoE

Ch. 2

Hardware System

2.1 General Technical Data



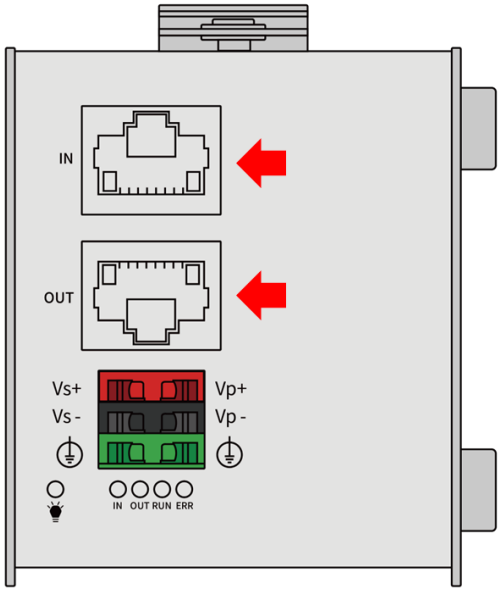


2.2 Connector Summary

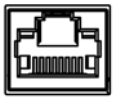
No.	Description		Type Narrative	Pin #
1	EtherCAT Interface	OUT	External RJ45 Connector (Gold finger)	8-pin
		IN		8-pin
2	Power Connector		Terminal Block Interface	6-pin
3	Power and Connection Status LEDs		External Status LEDs	-
4	I/O Status LEDs		External Status LEDs	-
5	Digital I/O Connector		32 channels push-in Terminal (Euroblock)	32-ch
6	DIN-Rail installation		DIN-Rail	-
7	Analog I/O Connector		2 slots push-in Terminal (Euroblock)	2-slot
8	Serial Port		DB9 serial port	9-pin

2.2.1 EtherCAT Interface

RJ45 Connectors.



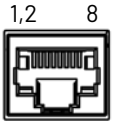
EC IN



Pin #	Signal Name	Pin #	Signal Name
1	LAN1_TX+	2	LAN1_TX-
3	LAN1_RX+	4	VS+
5	VP+	6	LAN1_RX-
7	VS- (GND)	8	VP- (GND)

* PoE LAN with the Red Housing; Regular LAN with Black Housing.
* L4, L5, L7, L8 pins are option, for RJ45 Power IN/OUT.

EC OUT

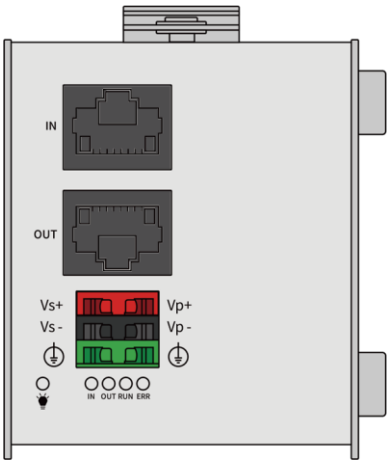


Pin #	Signal Name	Pin #	Signal Name
1	LAN2_TX+	2	LAN2_TX-
3	LAN2_RX+	4	VS+
5	VP+	6	LAN2_RX-
7	VS- (GND)	8	VP- (GND)

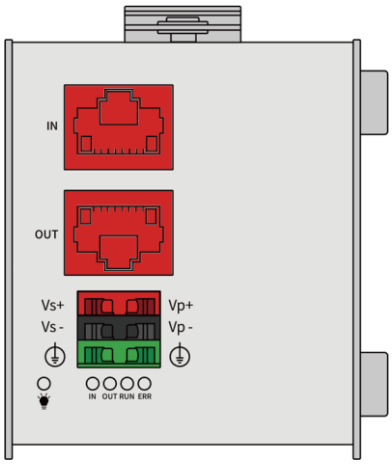
* PoE LAN with the Red Housing; Regular LAN with Black Housing.
* L4, L5, L7, L8 pins are option, for RJ45 Power IN/OUT.

Note. QEC's PoE (Power over Ethernet)

In QEC product installations, users can easily distinguish between PoE and non-PoE: if the RJ45 house is red, it is PoE type, and if the RJ45 house is black, it is non-PoE type.



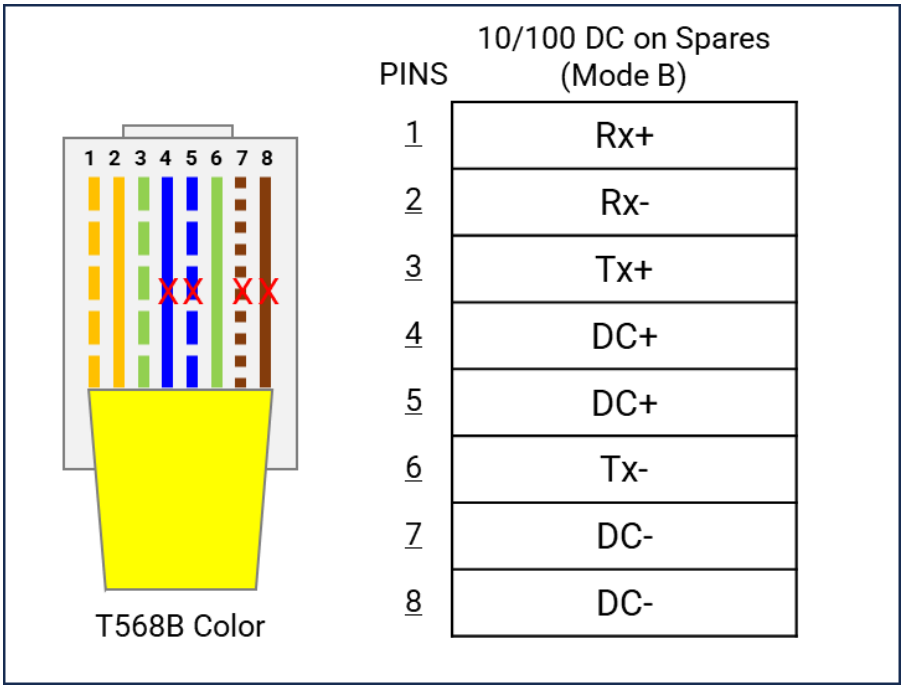
Non-PoE type



PoE type

PoE (Power over Ethernet) is a function that delivers power over the network. QEC can be equipped with an optional PoE function to reduce cabling. In practice, PoE is selected based on system equipment, so please pay attention to the following points while evaluating and testing:

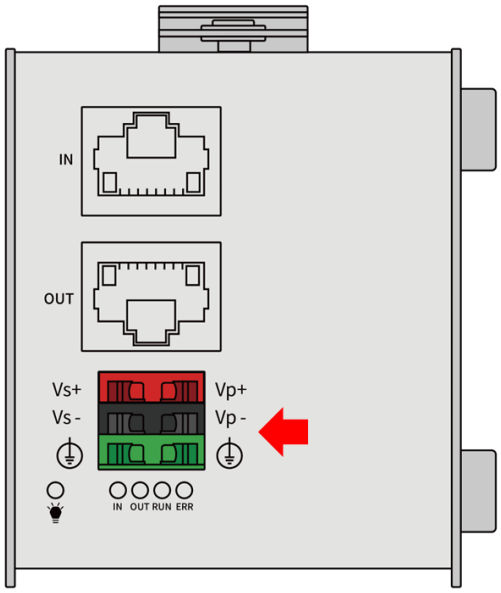
1. When connecting PoE and non-PoE devices, make sure to disconnect Ethernet cables at pins 4, 5, 7, and 8 (e.g., when a PoE-supported QEC EtherCAT MDevice connects with a third-party EtherCAT SubDevice).
2. The PoE function of QEC is different and incompatible with EtherCAT P, and the PoE function of QEC is based on PoE Type B, and the pin functions are as follows:



3. QEC's PoE power supply is up to **24V/3A**.

2.2.2 Power Connector

Euroblock Connectors.
4-pins Power Input/Output & 2-pins FGND.



Vs for system power; Vp for peripheral power and backup power.

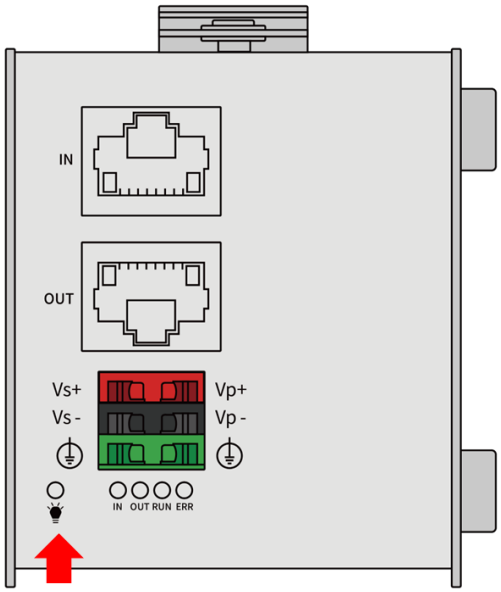
Pin #	Signal Name	Pin #	Signal Name
1	Vs+	2	Vp+
3	Vs- (GND)	4	Vp- (GND)
5	F.G	6	F.G

* Power Input voltage +19 to +50VDC Power Input (Typ. +24VDC)

2.2.3 Power and Connection Status LEDs

Power and connection status LEDs information.

Power Status LED



Power input is 24V (typical). The LED status provide high/low voltage warning.

Notation	States	Condition	Description
PWR	Green LED On	Voltage <= 50V and >= 45V Voltage <= 26V and >= 19V	When Vs and Vp voltages are confirmed to be normal, the Green LED will remain steady on.
	Green LED On Red LED On	Voltage < 45V and > 26V Voltage < 19V and > 12V	LEDs will alternately flash (at 0.3-second intervals) until the Vs and Vp voltages are correct.
	Orange LED On	Voltage > 50V or < 12V	Orange LED (Green + Red) will continuously flash (at 0.3-second intervals) until the Vs and Vp voltages are correct.

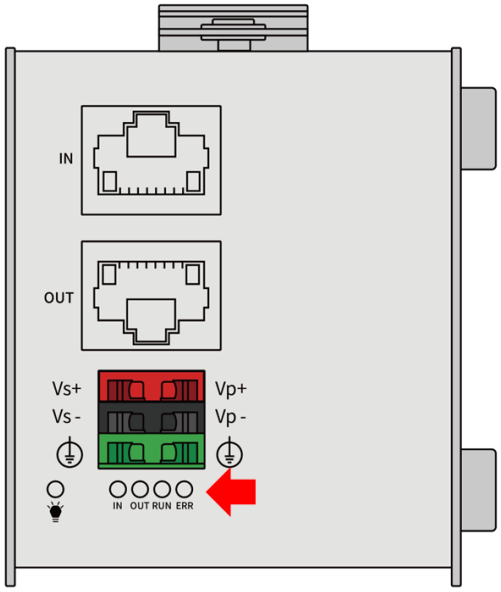
* Vs power status will be displayed first.

Power ERROR Code table (Red LED Flashing Display (2 seconds/cycle))：

Long Light	Short Flash	Description
0 Long Light	After microchip completes the Bootloader test, it proceeds to the APP program stage.	
	1 short flash	Microchip communication with the EtherCAT chip failed.
	2 short flashes	EtherCAT chip internal RAM test failed.
	5 short flashes or 6 short flashes	Quartz oscillator on the board abnormality.
1 Long Light	Indicates the microchip Bootloader stage during startup, APP program not yet executed.	
	1 short flash	microchip internal SRAM failed.
	2 short flashes	APP software CHECKSUM failed.
2 Long Lights	Not yet defined.	

* Note: If you encounter any of the above abnormal states, please contact us.

Connection Status LEDs

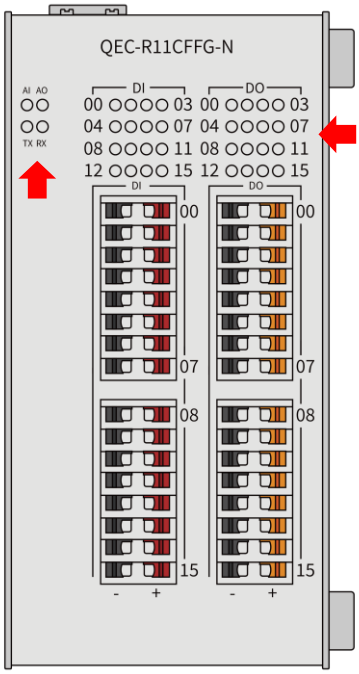


There are EtherCAT In, Out, Run, and Error Status LEDs.

Notation	Color	States	Description
In	Green	Off	No link
		Blinking	Link and activity
		On	Link without activity
Out	Green	Off	No link
		Blinking	Link and activity
		On	Link without activity
Run	Green	Off	The device is in state INIT
		Blinking	The device is in state Pre-Operation
		Single Flash	The device is in state Safe-Operation
		On	The device is in state Operation
Err	Red	Off	No error
		Blinking	Invalid Configuration
		Single Flash	Local Error
		Double Flash	Process Data Watchdog Timeout EtherCAT Watchdog Timeout
		On	The device is in state Error

2.2.4 I/O Status LEDs

The I/O status LEDs for the Digital I/O, Analog I/O, and COM port.



Digital Input

The LEDs of 16 digital inputs are 0 to 15, individually indicating the status of the 16 digital channels.

	Notation	Color	States	Description
DI 00 03 04 07 08 11 12 15	DI	-	Off	Digital input status is “Off”
		Green	On	Digital input status is “On”

Digital Output

The LEDs of 16 digital outputs are 0 to 15, individually indicating the status of the 16 digital channels.

	Notation	Color	States	Description
DO 00 03 04 07 08 11 12 15	DO	-	Off	Digital output status is “Off”
		Green	On	Digital output status is “On”

Analog Input and Output

The LEDs of 2 analog I/O, individually indicating the status of the Analog I/O.

	Notation	Color	States	Description
	AI	-	Off	Analog input status is “Off”
		Green	On	Analog input status is “On”
	AO	-	Off	Analog output status is “Off”
		Green	On	Analog output status is “On”

* The LEDs will be continuously bright, confirming that the internal chips for both the input and output channels are working properly.

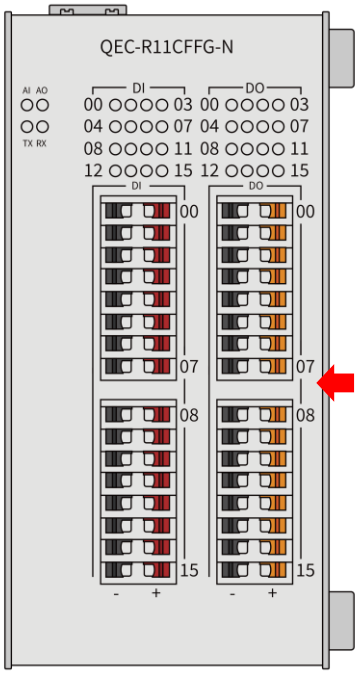
COM port (TX/RX)

The LEDs of the COM port.

	Notation	Color	States	Description
	TX	-	Off	No data is being transmitted
		Green	On	Data is being transmitted (TX active)
	RX	-	Off	No data is being transmitted
		Green	On	Data is being received (RX active)

2.2.5 Digital I/O Connector

The Digital I/O connector description.



For EtherCAT SubDevice index assignments, refer to .

The Digital I/O specification table:

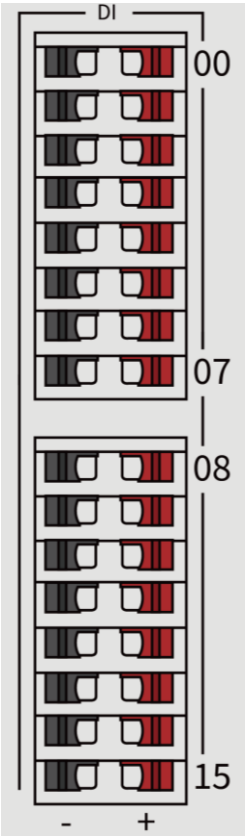
Digital I/O	Digital Input	Digital Output
Channels	16 (Isolated)	16 (Isolated)
Input Type	Sink (Supports both NPN and PNP configurations)	
Frequency	Safe Operating Frequency: ≤3000 Hz Rise Time (tr): 6us, Fall Time (tf): 6us	Operating Frequency: 1000Hz Turn-On Time: 0.25ms, Turn-Off Time: 20us
Load Voltage	+24V (Options: 24V or 48V)	+60Vdc
Load Current	-	Typ. 500mA (peak 1000mA)
Isolation Protection	2500 Vrms	1500 Vrms

Color Define:

- Digital Input: Positive (Red), Negative (Black).
- Digital Output: Positive (Orange), Negative (Black).

Digital Input

Digital Input: Positive (Red), Negative (Black).

Pin #	Signal Name		Pin #	Signal Name
00	DI_00-		00	DI_00+
01	DI_01-		01	DI_01+
02	DI_02-		02	DI_02+
03	DI_03-		03	DI_03+
04	DI_04-		04	DI_04+
05	DI_05-		05	DI_05+
06	DI_06-		06	DI_06+
07	DI_07-		07	DI_07+
08	DI_08-		08	DI_08+
09	DI_09-		09	DI_09+
10	DI_10-		10	DI_10+
11	DI_11-		11	DI_11+
12	DI_12-		12	DI_12+
13	DI_13-		13	DI_13+
14	DI_14-		14	DI_14+
15	DI_15-		15	DI_15+

Digital Input Load Voltage:

- Maximum Load Voltage: Load Voltage+24V (Options: 24V or 48V)

Channel Isolation:

- Isolated Channels: 16

Frequency

- Safe Operating Frequency: ≤3000 Hz (Rise Time (tr): 6us, Fall Time (tf): 6us)

I/O Type:

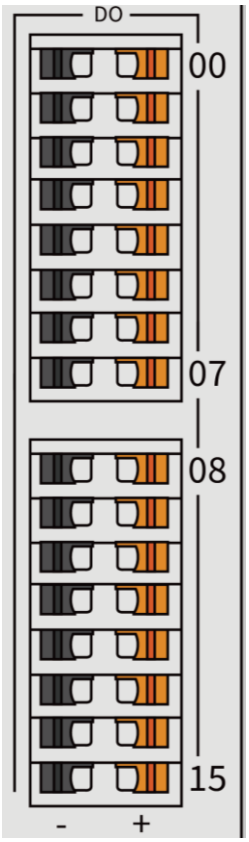
- Type: Sink (Supports both NPN and PNP configurations)

Isolation Protection

- 2500 Vrms

Digital Output

Digital Output: Positive (Orange), Negative (Black).

Pin #	Signal Name		Pin #	Signal Name
0+	DQ_00-		0-	DQ_00+
1+	DQ_01-		1-	DQ_01+
2+	DQ_02-		2-	DQ_02+
3+	DQ_03-		3-	DQ_03+
4+	DQ_04-		4-	DQ_04+
5+	DQ_05-		5-	DQ_05+
6+	DQ_06-		6-	DQ_06+
7+	DQ_07-		7-	DQ_07+
8+	DQ_08-		8-	DQ_08+
9+	DQ_09-		9-	DQ_09+
10+	DQ_10-		10-	DQ_10+
11+	DQ_11-		11-	DQ_11+
12+	DQ_12-		12-	DQ_12+
13+	DQ_13-		13-	DQ_13+
14+	DQ_14-		14-	DQ_14+
15+	DQ_15-		15-	DQ_15+

Digital Output Load Voltage:

- Maximum Load Voltage: +60Vdc

Digital Output Load Current:

- Typ. 500mA (peak 1000mA)

Channel Isolation:

- Isolated Channels: 16

Frequency

- Operating Frequency: 1000Hz (Turn-On Time: 0.25ms, Turn-Off Time: 20us)

I/O Type:

- Type: Sink (Supports both NPN and PNP configurations)

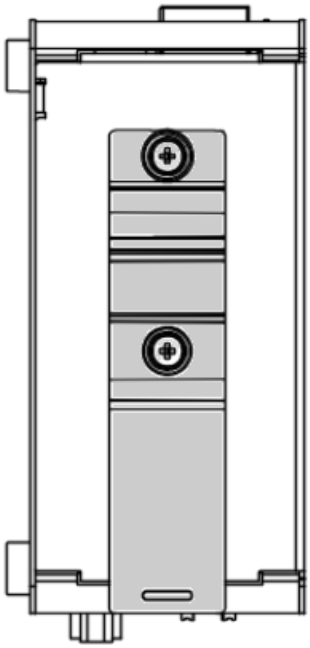
Isolation Protection

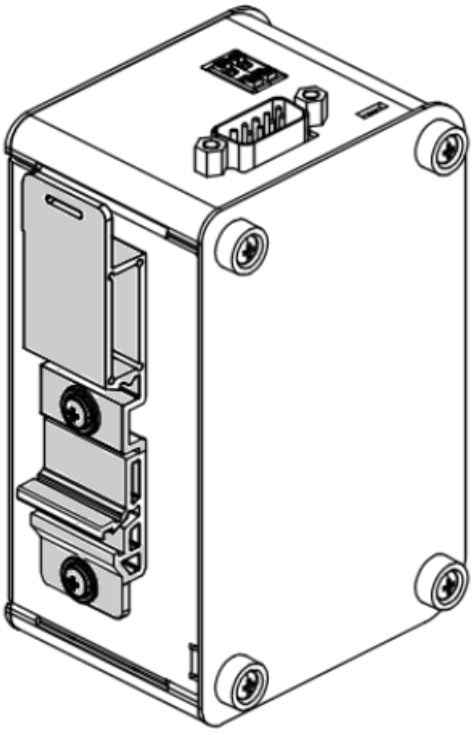
- 1500 Vrms

2.2.6 DIN-Rail

QEC-RXXCFFG is an easy-install design to help you set-up your modules easily. Please refer to Ch.3.1 DIN-Rail installation.

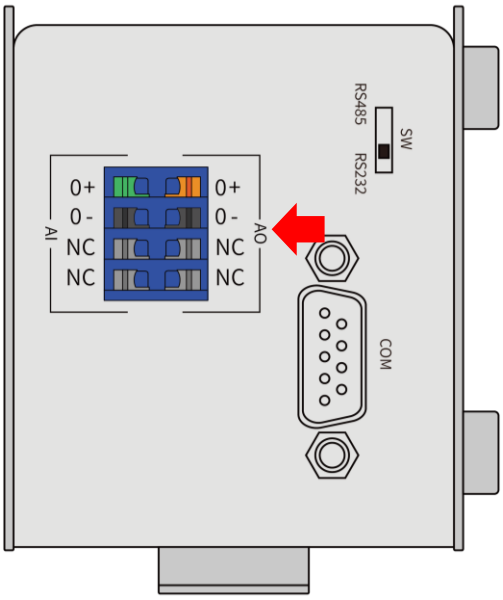
- **DIN-Rill**





2.2.7 Analog I/O Connector

The Analog I/O connector description.



For EtherCAT SubDevice index assignments, refer to 6.2.3 Function Objects.

The Analog I/O specification table:

Analog I/O	Analog Input	Analog Output
Channels	1 (Differential)	1
Input/Output Type	Voltage (V)	Voltage (V, mV), Current (mA)
Current Range	-	0~24mA, 3.5~23.5mA, 0~20mA, 4~20mA, ±24mA
Voltage Range	±22V, ±20V, ±11V, ±10V, 5V, 0~22V, 0~20V, 0~11V, 0~10V	0~5V, 0~10V, ±5V, ±10V, 0~6V, 0~12V, ±6V, ±12V
Overvoltage Protection	Up to ±24 V	-
Resolution	16-bit with accuracy ±0.2% FSR @25°C	16-bit with accuracy ±0.2% FSR@25°C

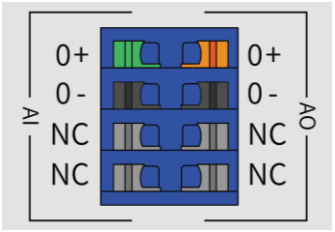
Color Define:

- Analog Input: Positive (Green), Negative (Black).
- Analog Output: Positive (Orange), Negative (Black).

Analog Input/Output

The QEC-RXXCFFG module supports 1 differential analog input channels (AI00) and 1 analog output channels (AO00).

Analog Input: Positive (Green), Negative (Black); Analog Output: Positive (Orange), Negative (Black).

Pin #	Signal Name		Pin #	Signal Name
0+	AI_00+		0+	AO_00+
0-	AI_00-		0-	AO_00-
NC	-		NC	-
NC	-		NC	-

Analog Input Specifications:

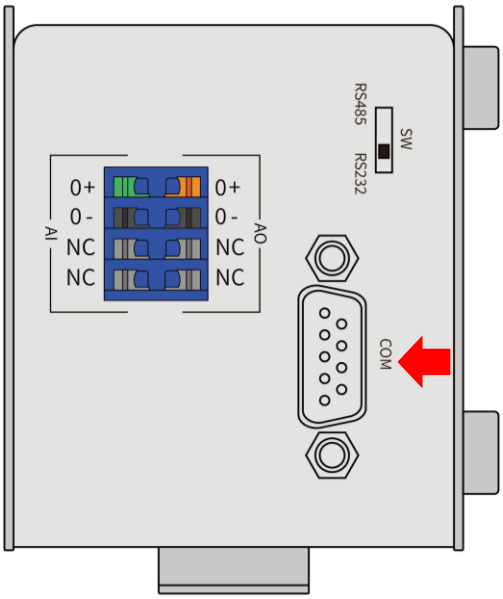
- Input Type: Voltage (V)
- Input Range ±22 V; ±20 V; ±11 V; ±10 V; ±5 V; 0 V – 22V; 0 V – 20 V; 0 V – 11 V; 0 V – 10 V
- Input Impedance: Constant resistive ≥ 1 MΩ
- Overvoltage Protection: Up to ±24 V
- Resolution: 16-bit with accuracy of ±0.2% Full-Scale Range (FSR) at 25°C
  When range is 0,1,2,3,4: Vin = (AnalogInput0-32768)*Resolution.
  When range is 5,6,7,8: Vin = (AnalogInput0)*Resolution.
  * Resolution please refer to the Index 0x5010.5

Analog Output Specifications:

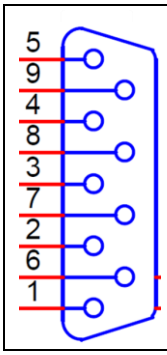
- Output Type: Voltage (V, mV), Current (mA)
- Output Current: 0 mA - 24 mA; 3.5 mA - 23.5 mA; 0 mA - 20 mA; 4 mA - 20 mA; ±24 mA
- Output Voltage: 0 V - 5 V; 0 V - 10 V; ±5 V; ±10 V; – 0 V - 6 V; 0 V - 12 V; ±6 V; ±12 V
- Resolution: 16-bit with accuracy ±0.2% FSR@25°C
- Slew Rate: Configurable (Option)
- Drift: ±10 ppm/°C

2.2.8 Serial Port

Standard DB9 connector for serial communication interface.
Supports RS232 or RS485; users can use a DIP switch to change the serial communication interface.



Serial Port



No.	Pin Assignment	No.	Pin Assignment
1	RS485-	6	DSR
2	RS485+/RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	VCC
5	GND	-	-

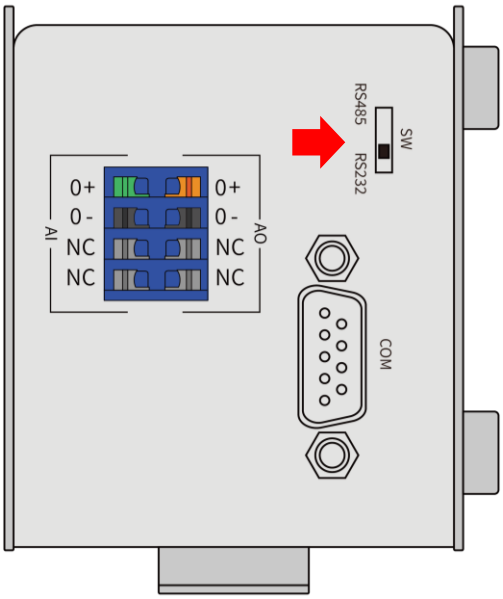
* Note: RS232 and RS485 cannot be used simultaneously.

The Serial specification table:

Serial Port	
Interface Mode	RS232/RS485 (D-Sub 9-pin)
Data transfer rate (bps)	2400,4800,9600,14400,19200,38400,57600,115200
Data width (bit)	5/6/7/8
Hardware Flow Control	CTS/RTS

Switch

DIP switch for changing serial communication to RS232 or RS485.

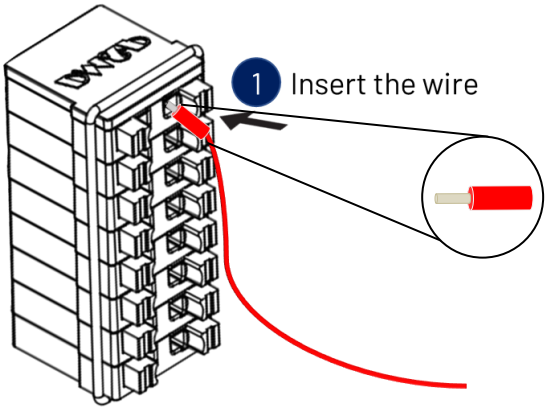


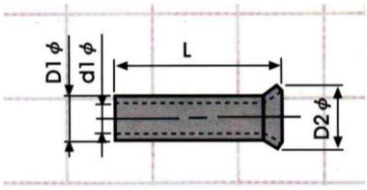
Notation	States
RS485	RS232 Enable
RS232	RS485 Enable

* Note: RS232 and RS485 cannot be used simultaneously.

2.3 Wiring to the Connector

2.3.1 Connecting the wire to the connector

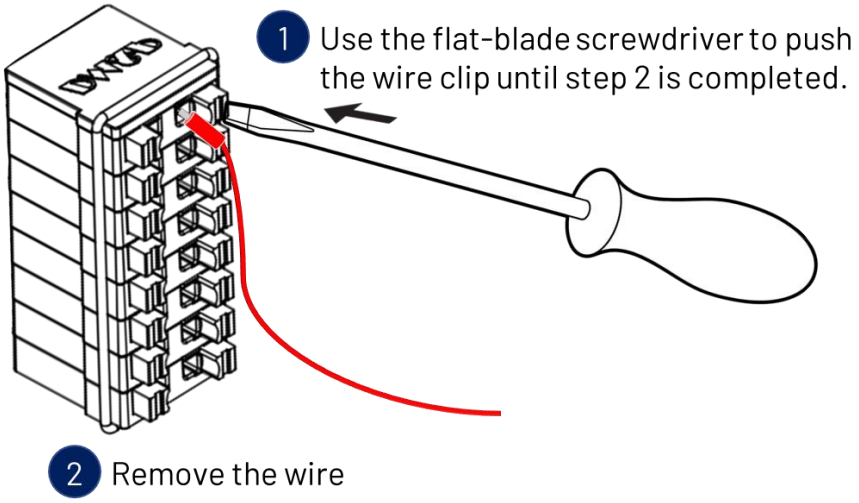




Insulated Terminals Dimensions (mm)

Position	L	ØD1	Ød1	ØD2
CN 0.5-6	6.0	1.3	1.0	1.9
CN 0.5-8	8.0	1.3	1.0	1.9
CN 0.5-10	10.0	1.3	1.0	1.9

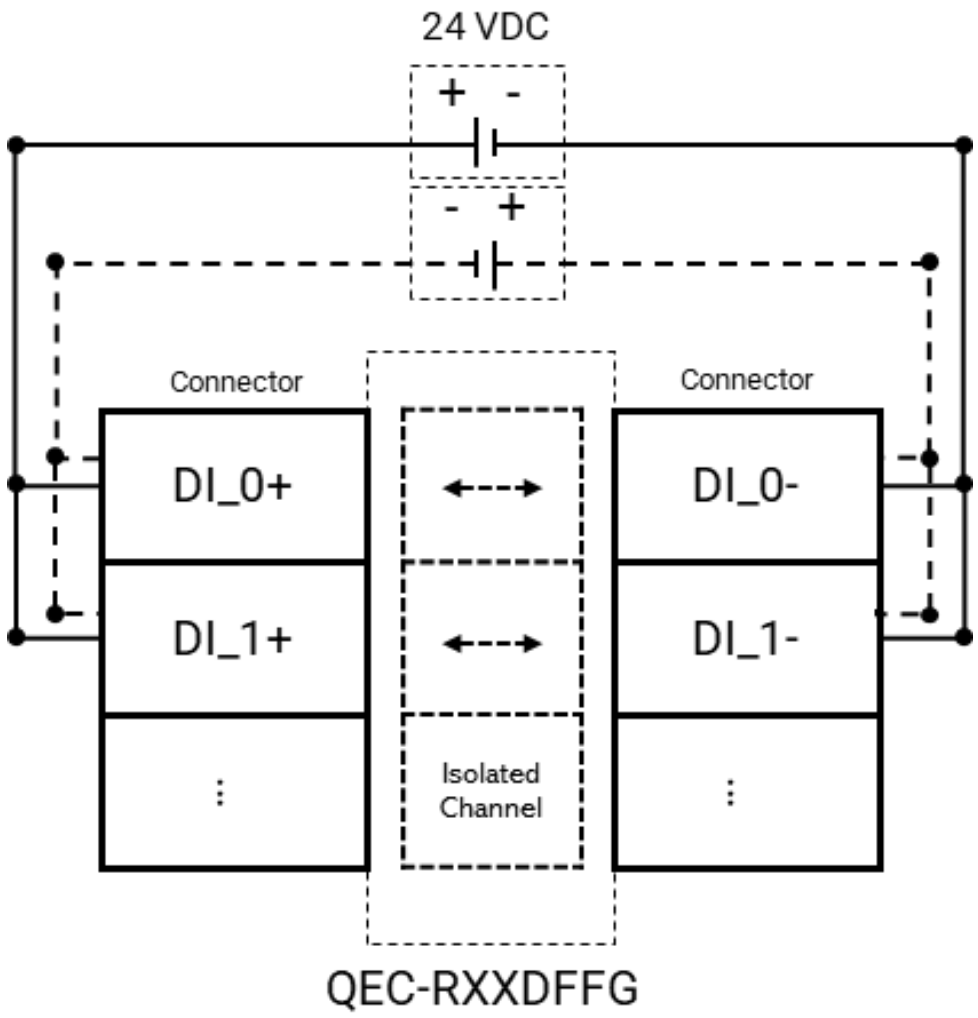
2.3.2 Removing the wire from the connector



2.3.3 Application Wiring

Digital Input

Example for Basic Digital Input Operation.

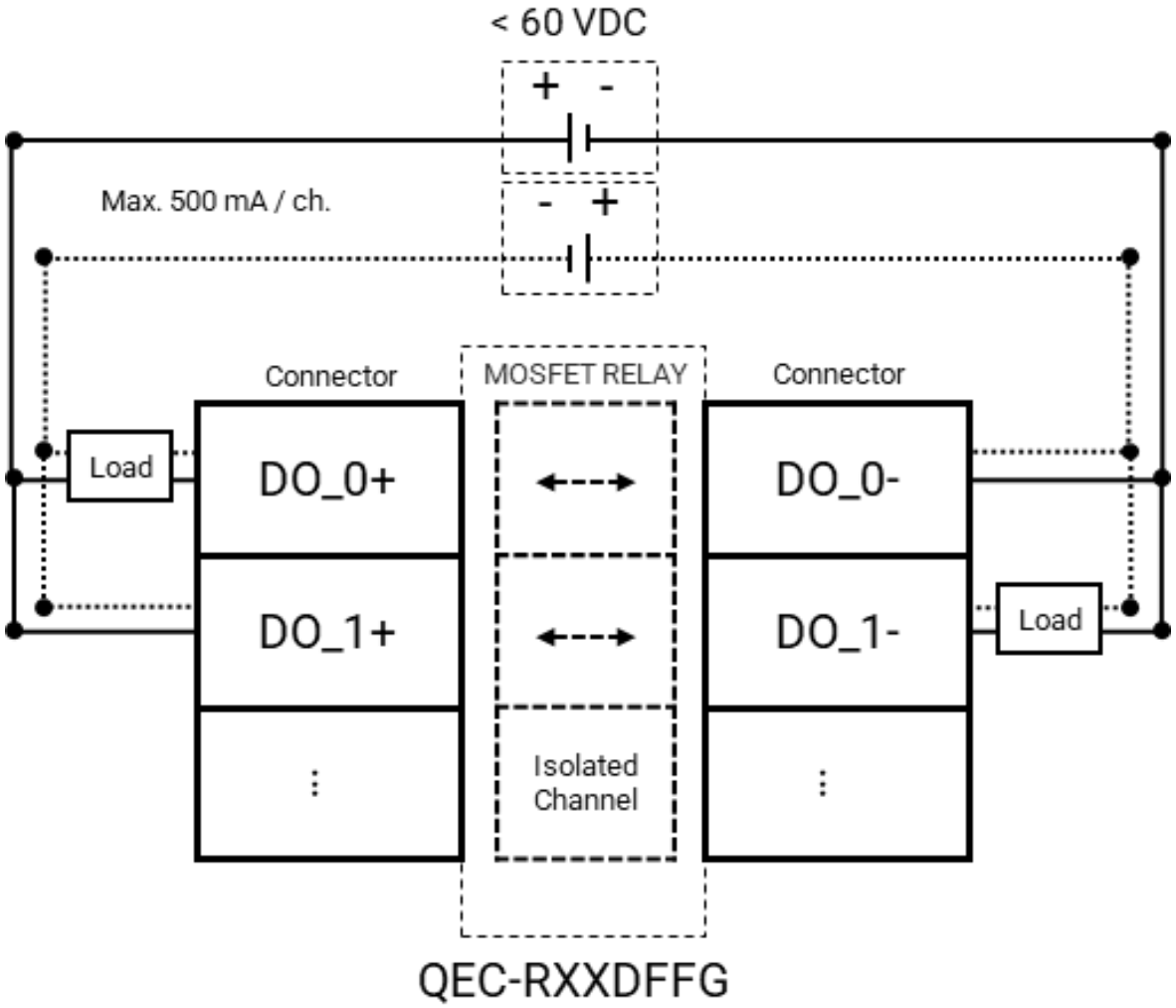


Digital Input Specification:

- Maximum Load Voltage: Load Voltage+24V (Options: 24V or 48V)
- Safe Operating Frequency: ≤3000 Hz (Rise Time (tr): 6us, Fall Time (tf): 6us)
- Type: Sink (Supports both NPN and PNP configurations)
- Isolation Protection: 2500 Vrms

Digital Output

Example for Basic Digital Output Operation.



Digital Output Specification:

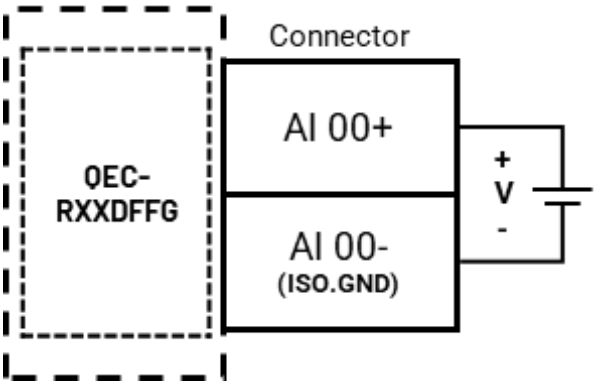
- Maximum Load Voltage: +60Vdc
- Typ. 500mA (peak 1000mA)
- Operating Frequency: 1000Hz (Turn-On Time: 0.25ms, Turn-Off Time: 20us)
- Type: Sink (Supports both NPN and PNP configurations)
- Isolation Protection: 1500 Vrms

Analog Input

Example for Analog Input Operation.

In the following diagram, an analog input operation is shown using Channel 0 (AI00) of the QEC-RXXCFFG module. The positive terminal (AI00+) connects to the signal source, and the negative terminal (AI00-) connects to the ground (GND).

- AI00+: Connects to the positive side of the input signal (e.g., a voltage sensor).
- AI00-: Connects to the negative side (ground) of the input signal.



* Important Note: Ensure the input voltage does not exceed the specified range to avoid damaging the device.

Analog Input Specification:

Input Type	Voltage (V)
Input Range	±22V, ±20V, ±11V, ±10V, 5V, 0~22V, 0~20V, 0~11V, 0~10V
Input Impedance	Constant resistive ≥ 1 MΩ
Overvoltage Protection	Up to ±24 V

Analog Output

Example for Analog Output Operation.

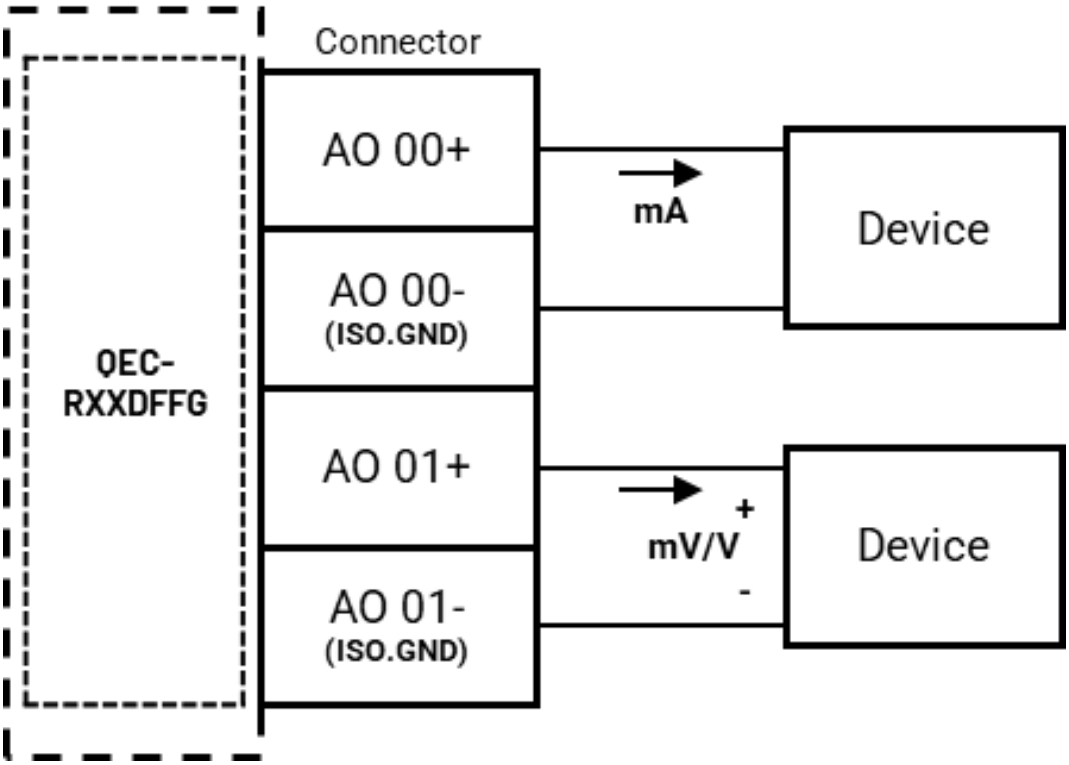
The diagram below illustrates an example of analog output wiring using Channel 0 (AO00) of the QEC-RXXCFFG module. This channel can output either a voltage or current signal, depending on the connected device.

Current:

- AO00+: Connects to the positive side of the device receiving the signal.
- AO00-: Connects to the ground of the device receiving the signal.

Voltage:

- AO01+: Connects to the positive side of the device receiving the signal.
- AO01-: Connects to the ground of the device receiving the signal.



* Important Note: Ensure the connected device supports the output type (voltage or current) to avoid misconfiguration.

Analog Output Specification:

Output Type	Voltage (V, mV), Current (mA)
Output Current	0~24mA, 3.5~23.5mA, 0~20mA, 4~20mA, ±24mA
Output Voltage	0~5V, 0~10V, ±5V, ±10V, 0~6V, 0~12V, ±6V, ±12V

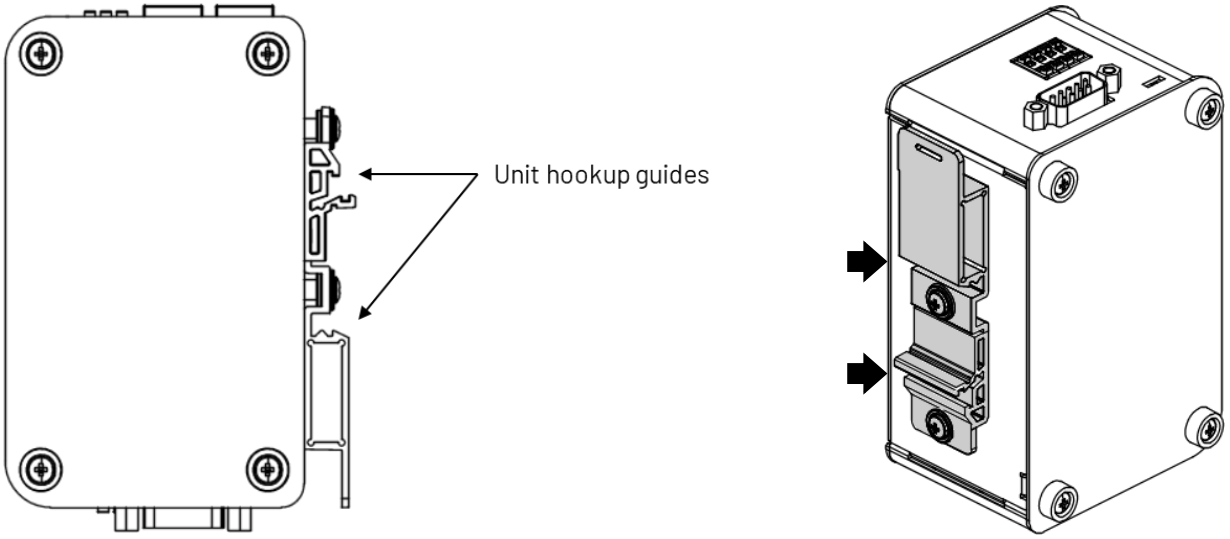
Ch. 3

Hardware Installation

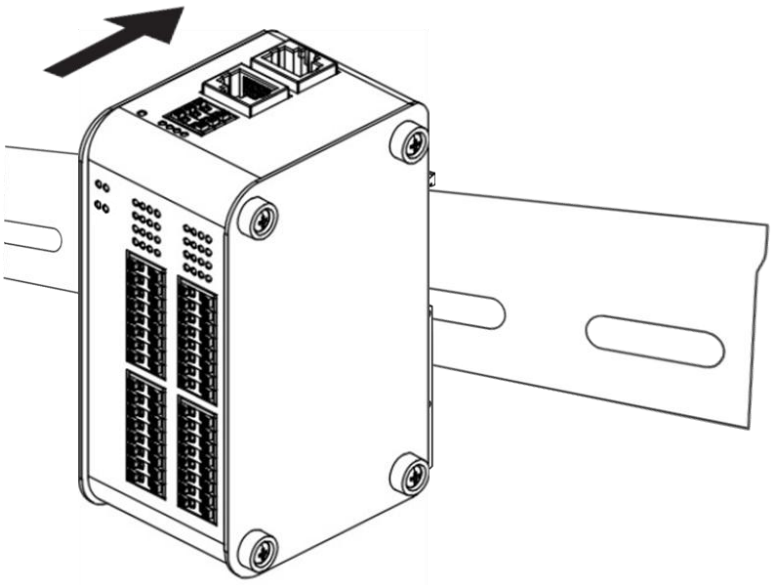
This section describes how to install QEC-RXXCFFG. Please turn OFF the power supply before you mount QEC-RXXCFFG. Always mount QEC-RXXCFFG one at a time.

3.1 DIN-Rail installation

Slide in the QEC-RXXCFFG on the hookup guides and press the QEC-RXXCFFG with a certain amount of force against the DIN track until the DIN Track mounting hook lock into place.



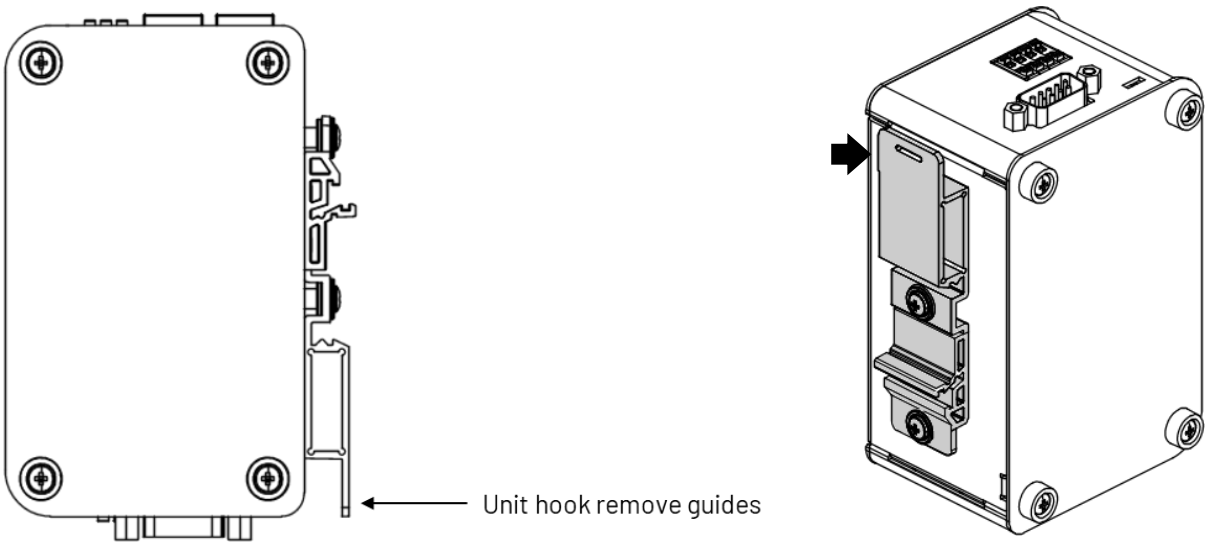
When you mount the QEC-RXXCFFG, releasing the DIN track mounting hook on the QEC-RXXCFFG is unnecessary. After you mount the QEC-RXXCFFG, make sure it is locked to the DIN Track.



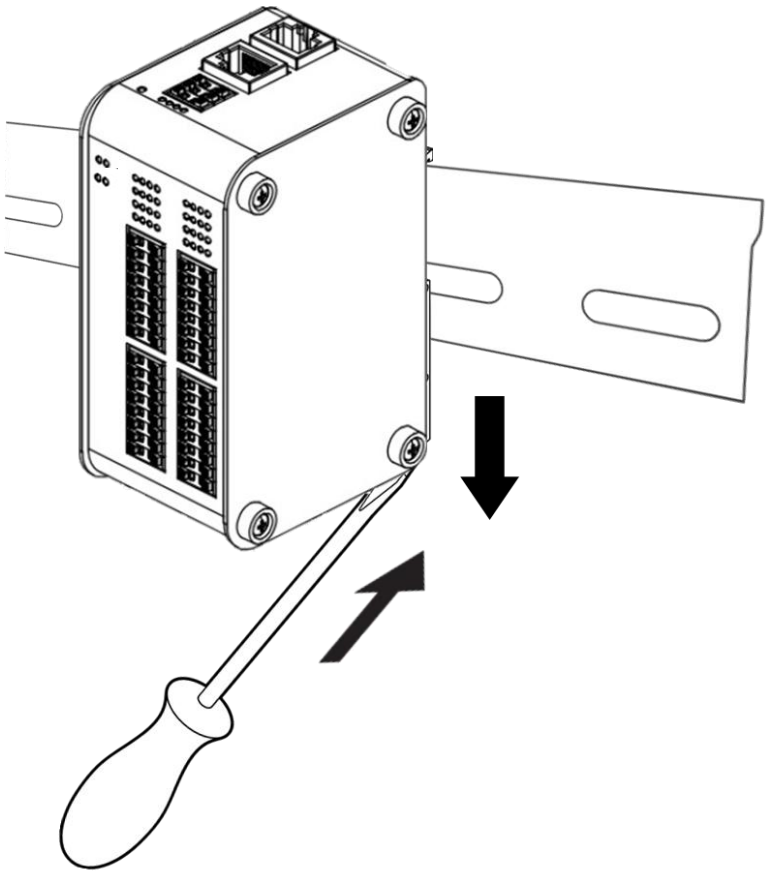
* Note: Always turn OFF the Unit power supply and I/O power supply before connecting and removing the QEC-RXXCFFG.

3.2 Removing QEC-RXXCFFG Unit

Use a flat-blade screwdriver to remove the DIN Track mounting hook on the unit.



Pull down and out the flat-blade screwdriver with force against the DIN track until you hear the DIN Track remove the hook.

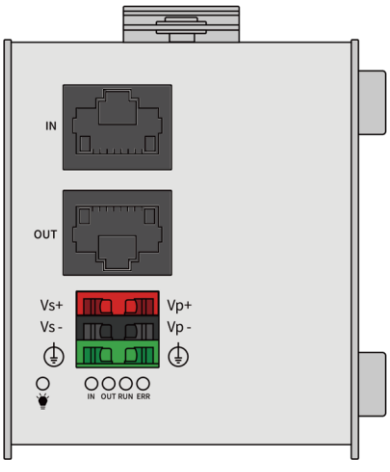


Ch. 4

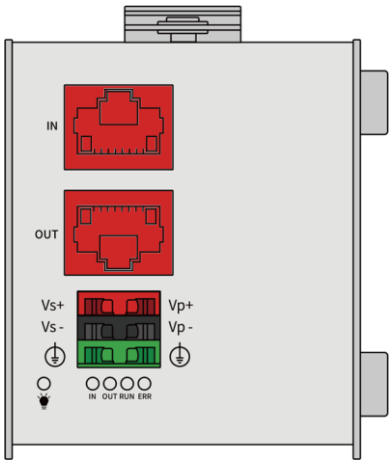
Getting Started

Note. QEC Device's PoE (Power over Ethernet)

In QEC product installations, users can easily distinguish between PoE and non-PoE: if the RJ45 house is red, it is PoE type, and if the RJ45 house is black, it is non-PoE type.



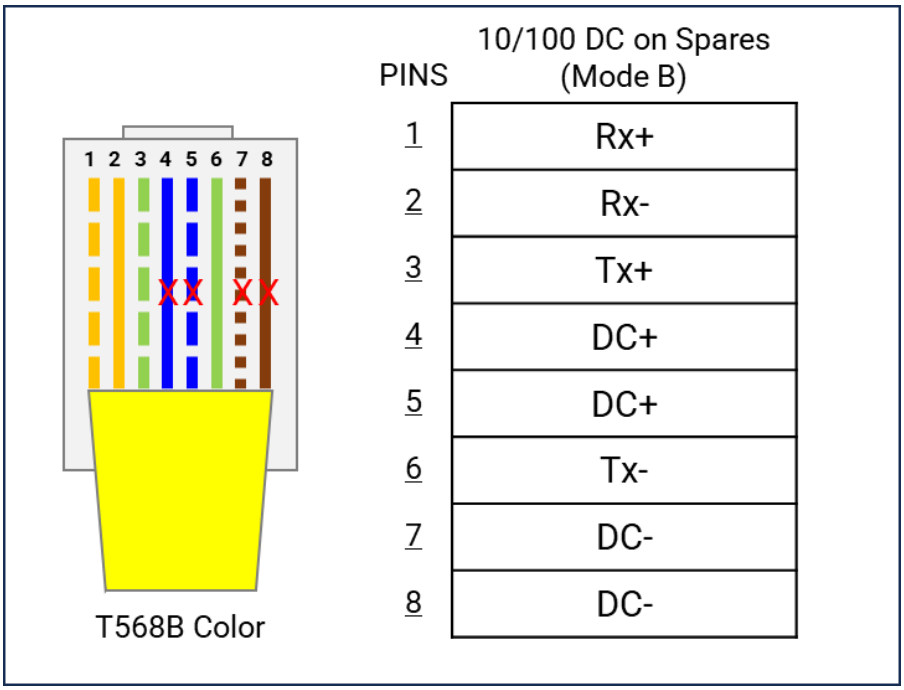
Non-PoE type



PoE type

PoE (Power over Ethernet) is a function that delivers power over the network. QEC can be equipped with an optional PoE function to reduce cabling. In practice, PoE is selected based on system equipment, so please pay attention to the following points while evaluating and testing:

1. When connecting PoE and non-PoE devices, make sure to disconnect Ethernet cables at pins 4, 5, 7, and 8 (e.g., when a PoE-supported QEC EtherCAT MDevice connects with a third-party EtherCAT SubDevice).
2. The PoE function of QEC is different and incompatible with EtherCAT P, and the PoE function of QEC is based on PoE Type B, and the pin functions are as follows:



3. QEC's PoE power supply is up to 24V/3A.

4.1 Introduction

Welcome to the Getting Started Chapter for the QEC-RXXCFFG module. This section is designed to assist you in efficiently setting up and utilizing the QEC-RXXCFFG module. To facilitate this process, we will focus on TwinCAT by Beckhoff Automation, which operates on a PC.

In the following pages, we will walk you through the steps for connecting your QEC-RXXCFFG and initiating your journey toward fully integrating this stepper motor driver into your projects. Our goal is to simplify the initial setup so you can quickly begin exploring your device's extensive capabilities.

4.2 TwinCAT Operation

This section is for you if you're ready to get your QEC-RXXCFFG module up and running with TwinCAT. We'll focus on using the Digital Input, Digital Output, Analog Input, and Analog Output.

4.2.1 Install the ESI file

1. Obtain the ESI file: The ESI file for the QEC-R11CFFG module is located on our website at the following link: https://www.qec.tw/product/qec-rxxcffg/.
   Simply download the ZIP file and extract it.

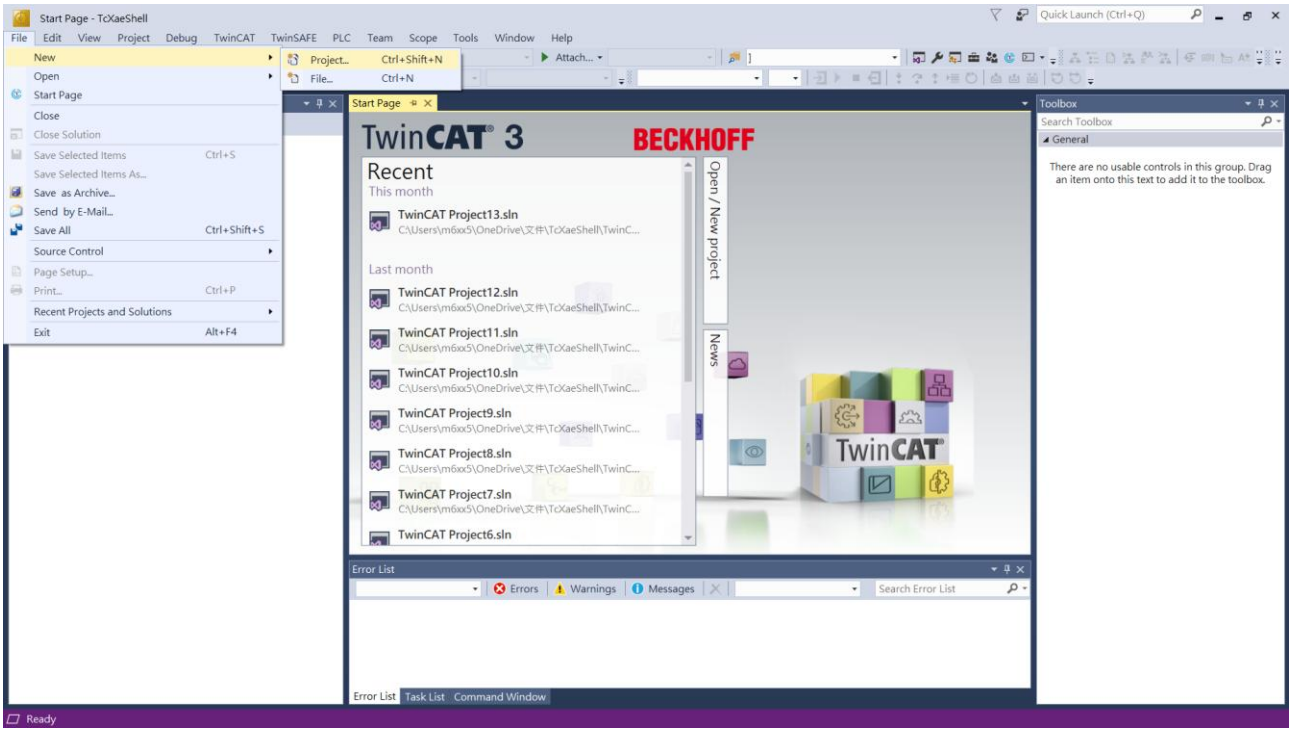
2. Install the ESI file: Once extracted, the XML file must be copied or moved to the appropriate system directory.

3. Restart the Programming System If Needed: If the TwinCAT program was running when the ESI file was copied to the appropriate system directory, you may have to restart the TwinCAT program before it will recognize the new ESI file.

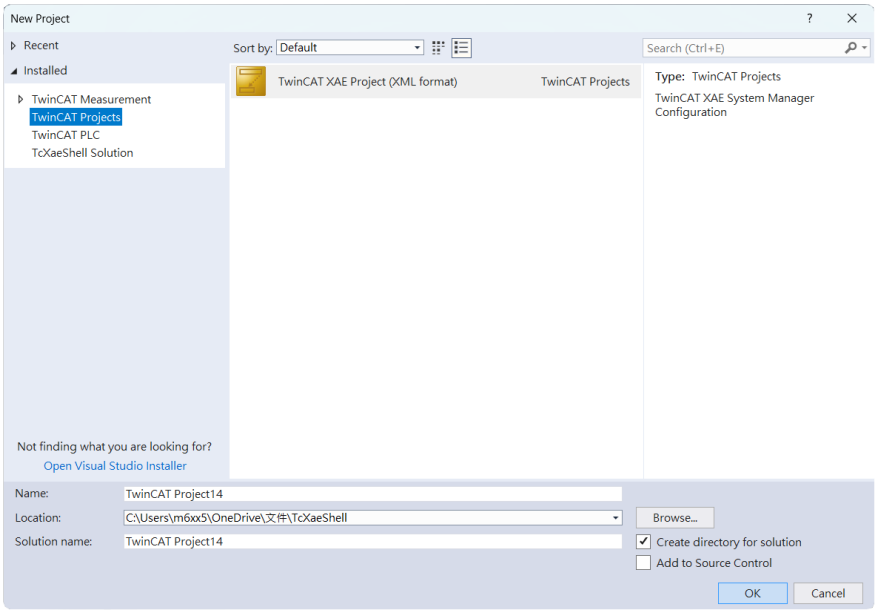
4.2.2 Add the QEC-R11CFFG to the Project

This section assumes that the TwinCAT software is in Config Mode.
For more information about TwinCAT, please refer to [TwinCAT | Automation software | Beckhoff Worldwide](), or contact Beckhoff Automation.

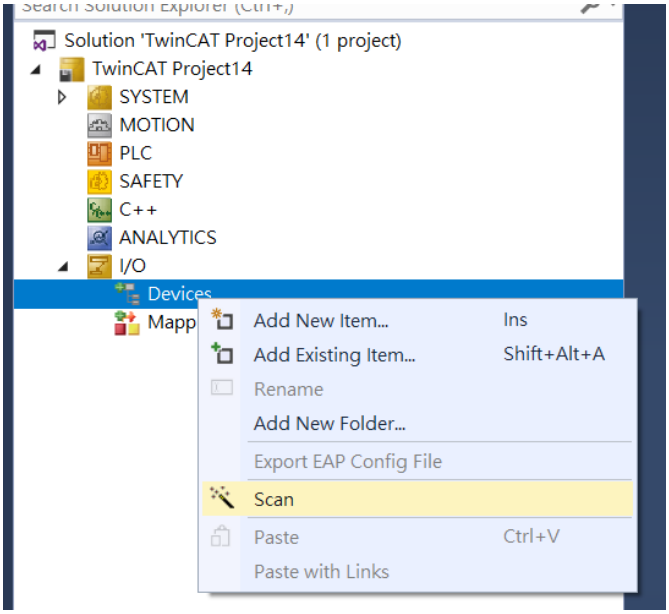
1. Click the New Project.



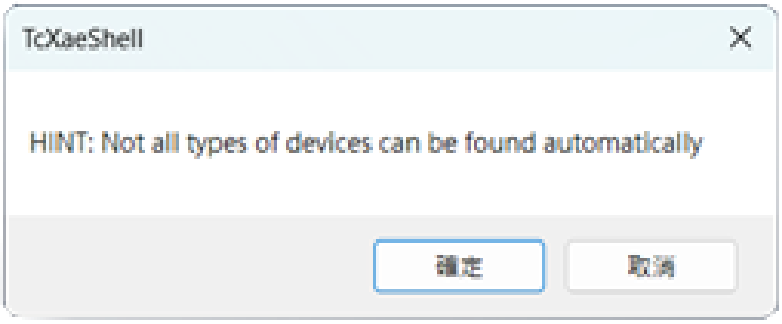
2. Select the “TwinCAT XAE Project (XML format), and change the project file name and location if you need. Then click “OK”.



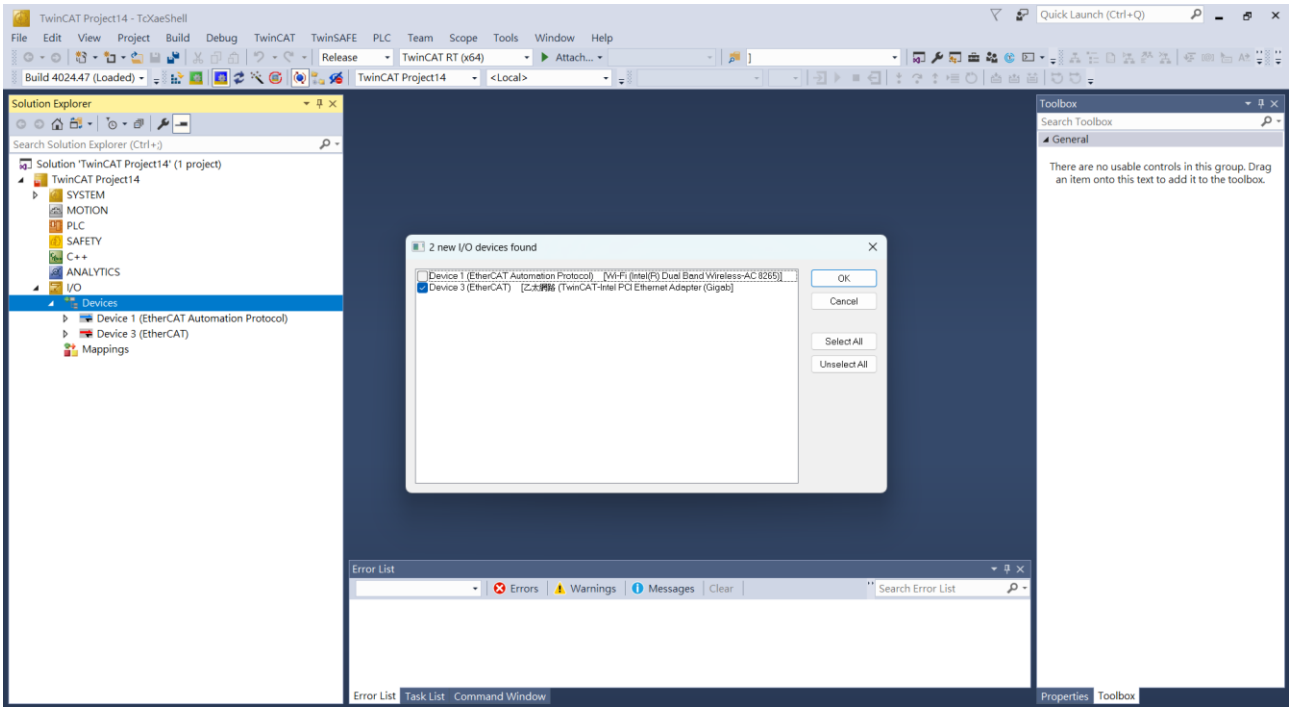
3. Right-click the “Devices” under the I/O node, and click the “Scan” button to start scanning. (If the “Scan” option is not available, the TwinCAT software is not in Config Mode.)



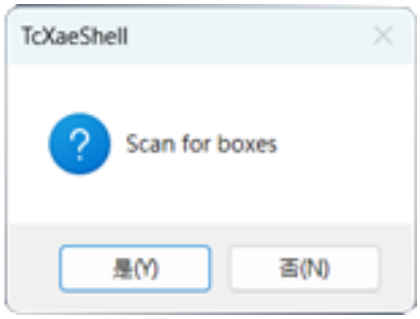
4. Click “OK” for the HINT message.



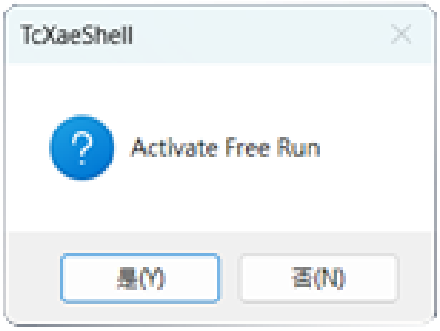
5. Choose the EtheCAT connection network.



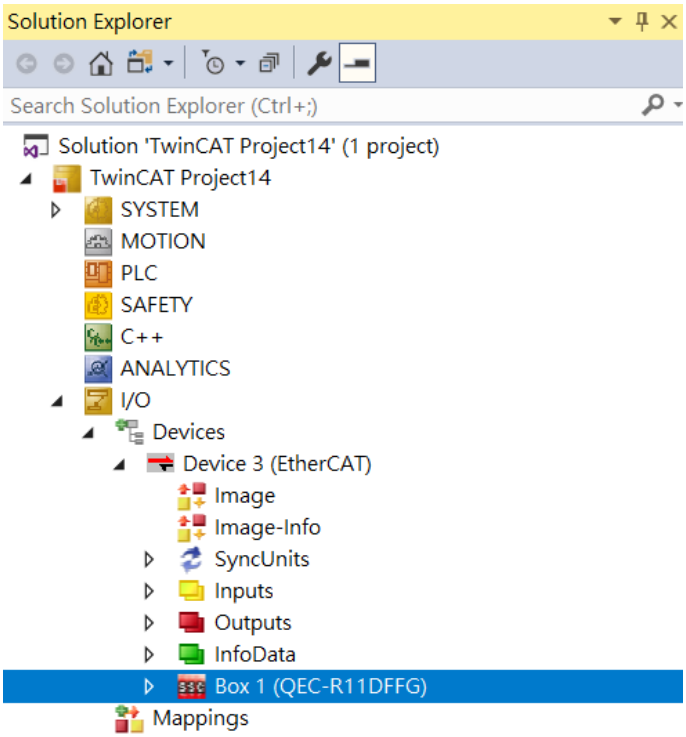
6. Confirm “Yes” to start the scan.



7. Choose “Yes” when TwinCAT asks you to activate Free Run. Then, EtherCAT Network will translate into OP state automatically.

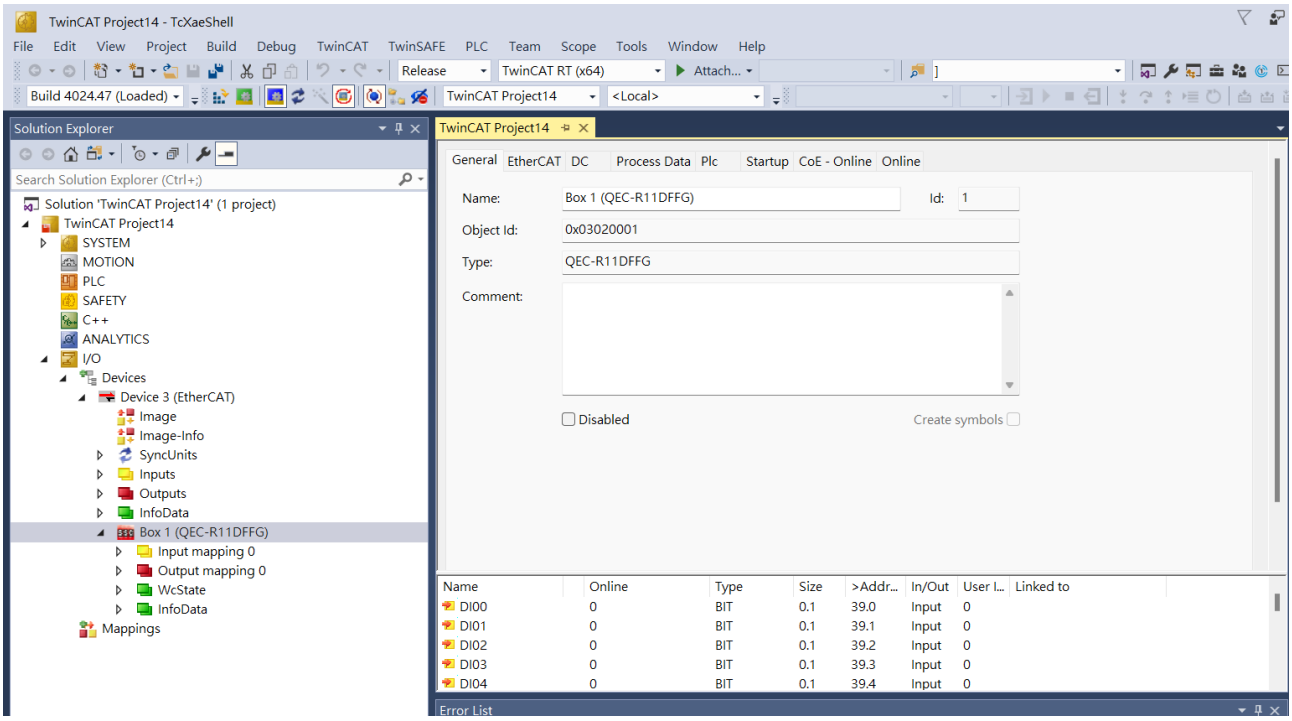


8. The QEC-R11CFFG will appear in the device tree and the name will typically begin with “Box”.

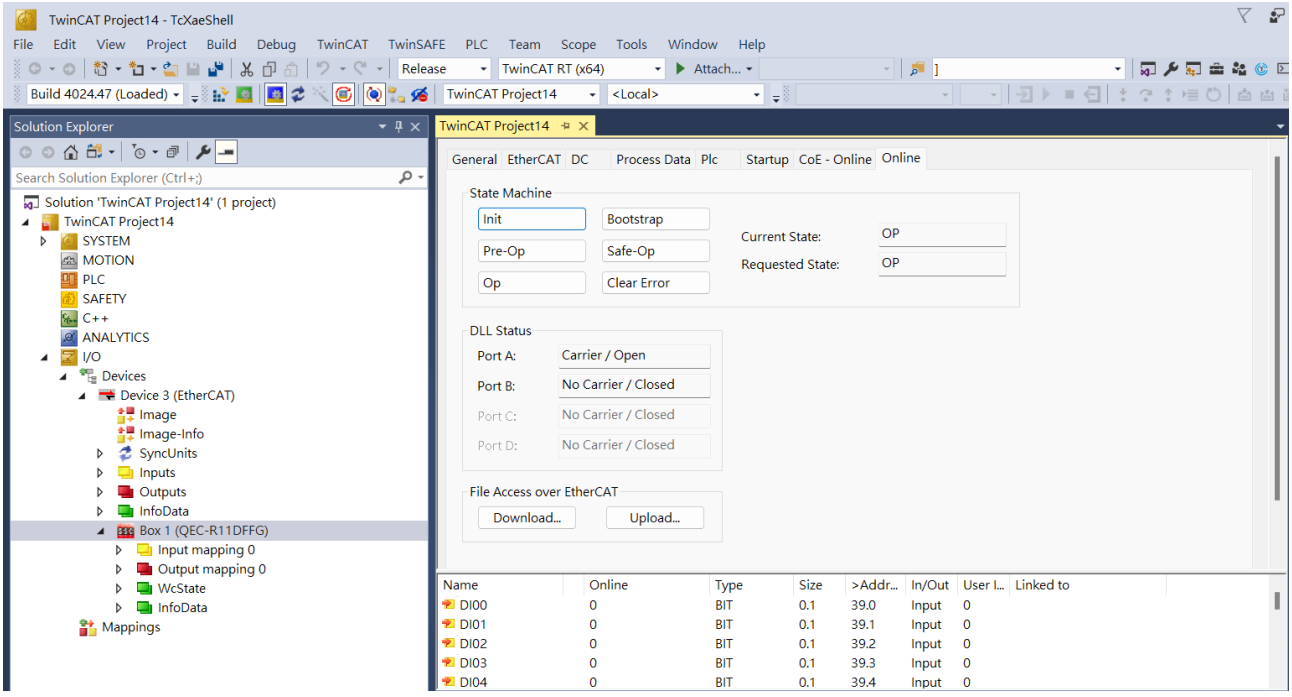


4.2.3 Start to Configure the QEC-R11CFFG

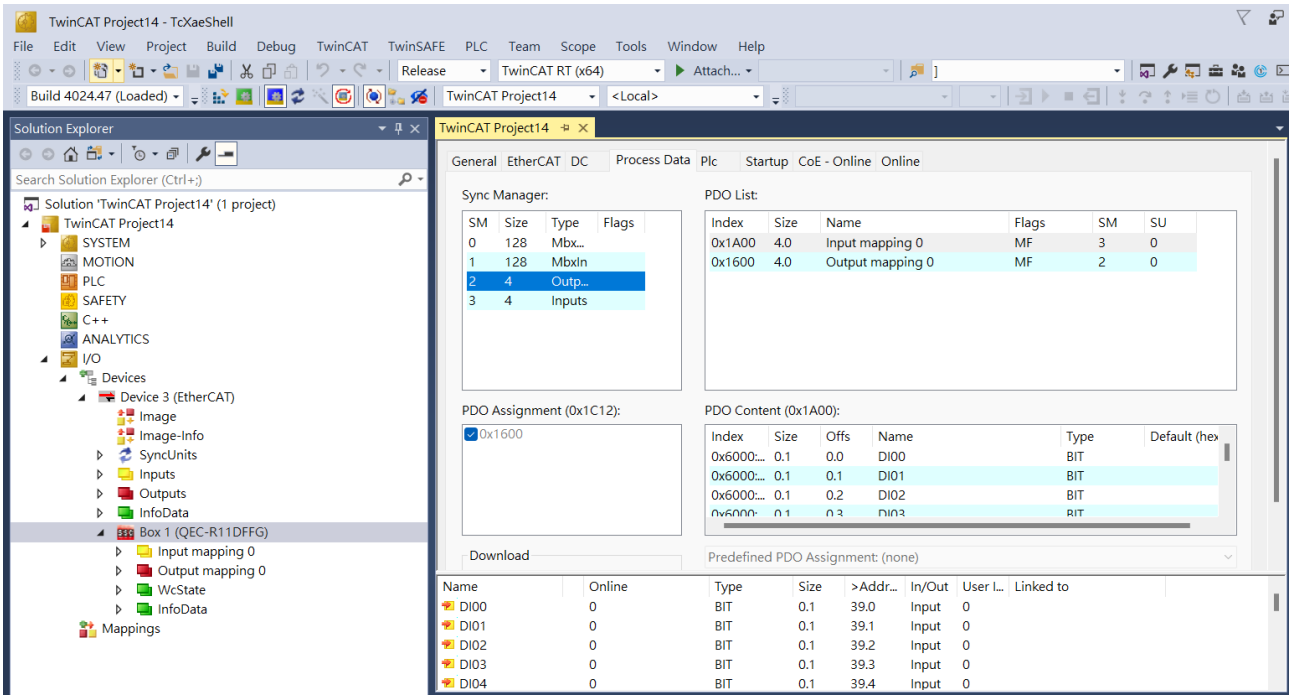
1. Click "Box 1 (QEC-R11CFFG)," and a dashboard for the EtherCAT SubDevice will appear in the right window. The default tab is “General”, and you can see the SubDevice’s Name, Object Id, Type, and Comment in this tab.



2. Click on the “Online” tab to check the EtherCAT SubDevice EtherCAT State Machine (ESM) is on OP status.

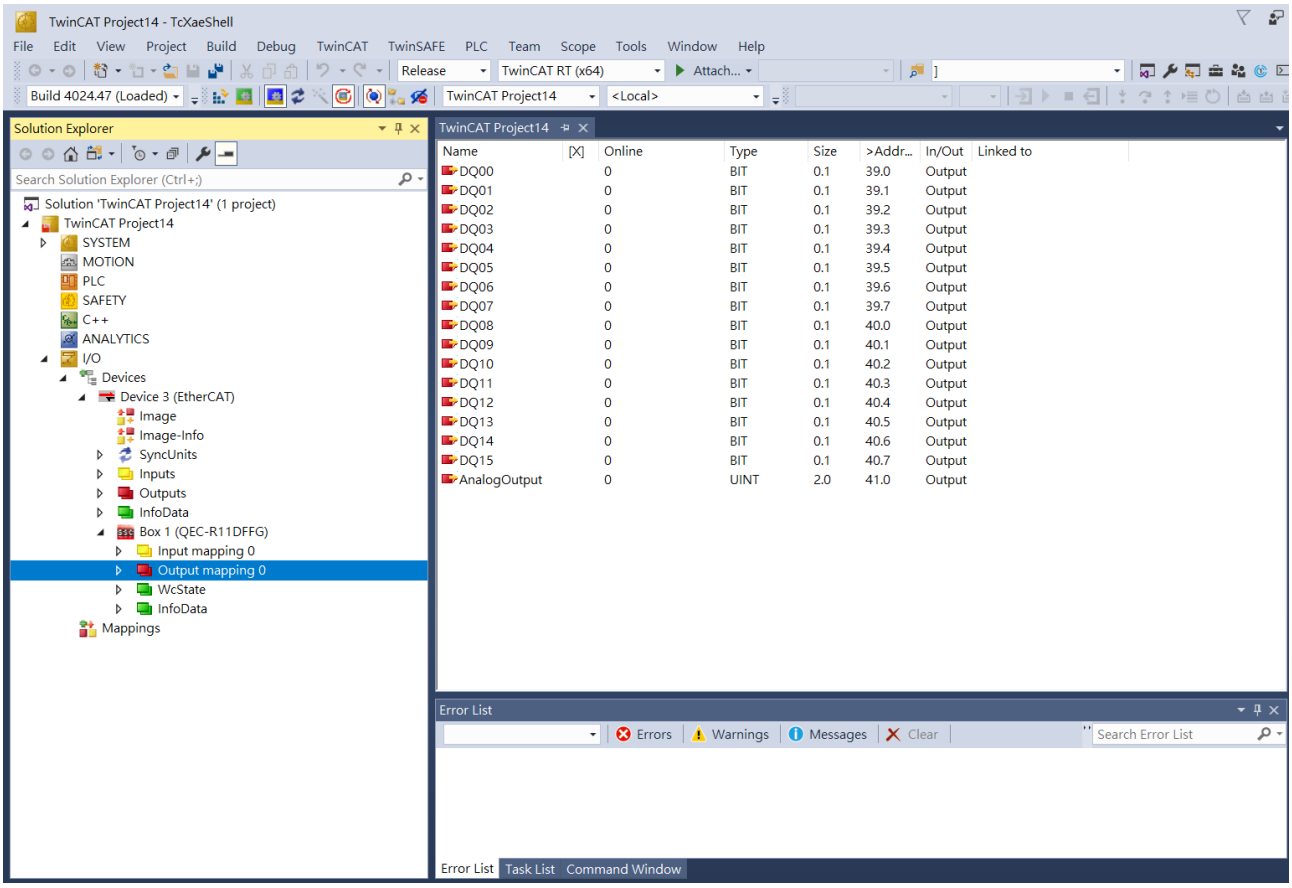


3. Click on the “Process Data” tab to check the PDO Assignment; the default PDO Output are Digital Output Index (0x7000) and Analog Output Index (0x7001), and PDO Input are Digital Input Index (0x6000) and Analog Input Index (0x6001).



4.2.4 Control the QEC-R11CFFG

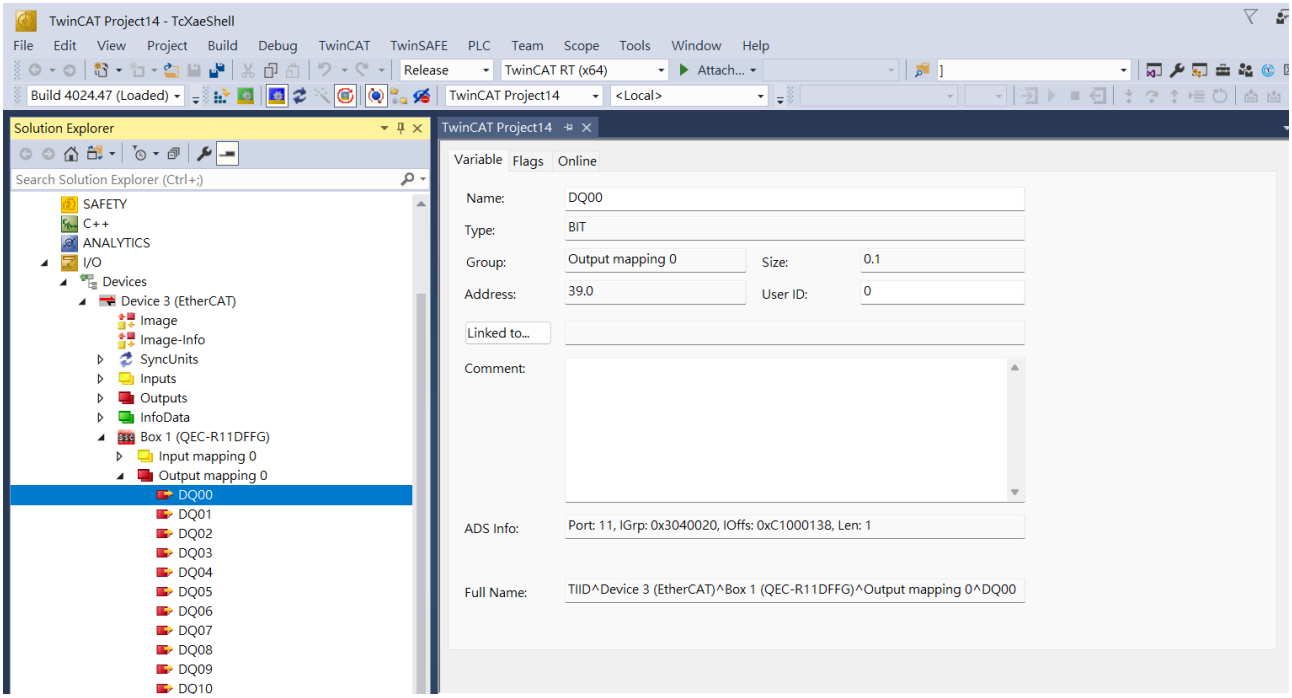
Next, we will set the Digital Output channel 0 "DQ00" to 1 to let it pull high. And then we will set the Analog Output channel 0 "AnalogOutput" to 65535 to output the maximum analog output value of its range.



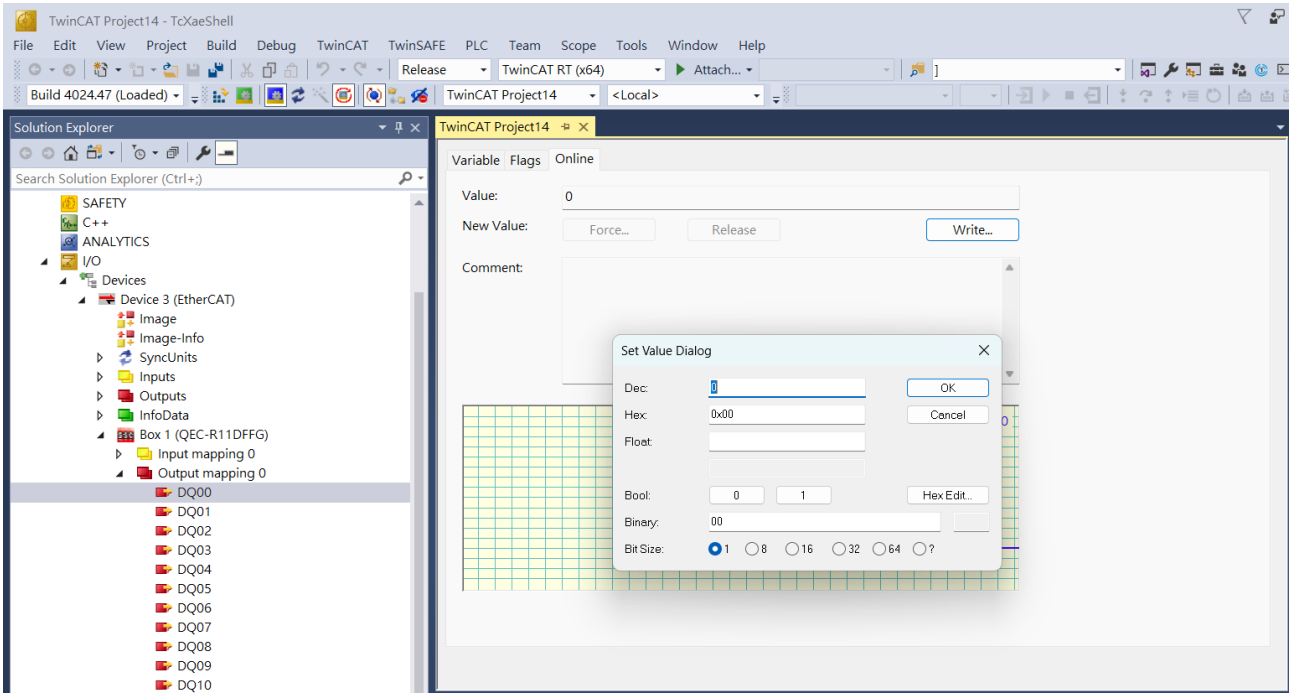
A. Digital Output

Configure the Digital Output.

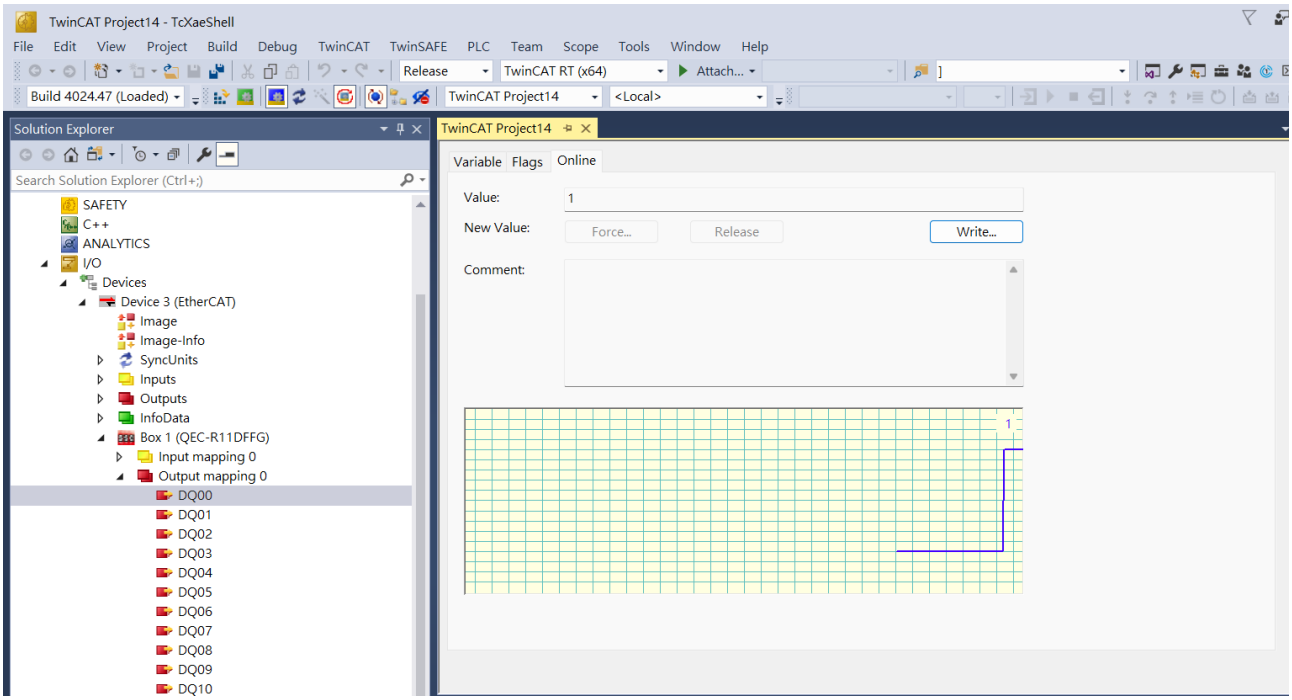
1. Select the drop-down list of the “Output mapping 0”. Click the “DQ00” and it’ll appear control dashboard in the right windows.



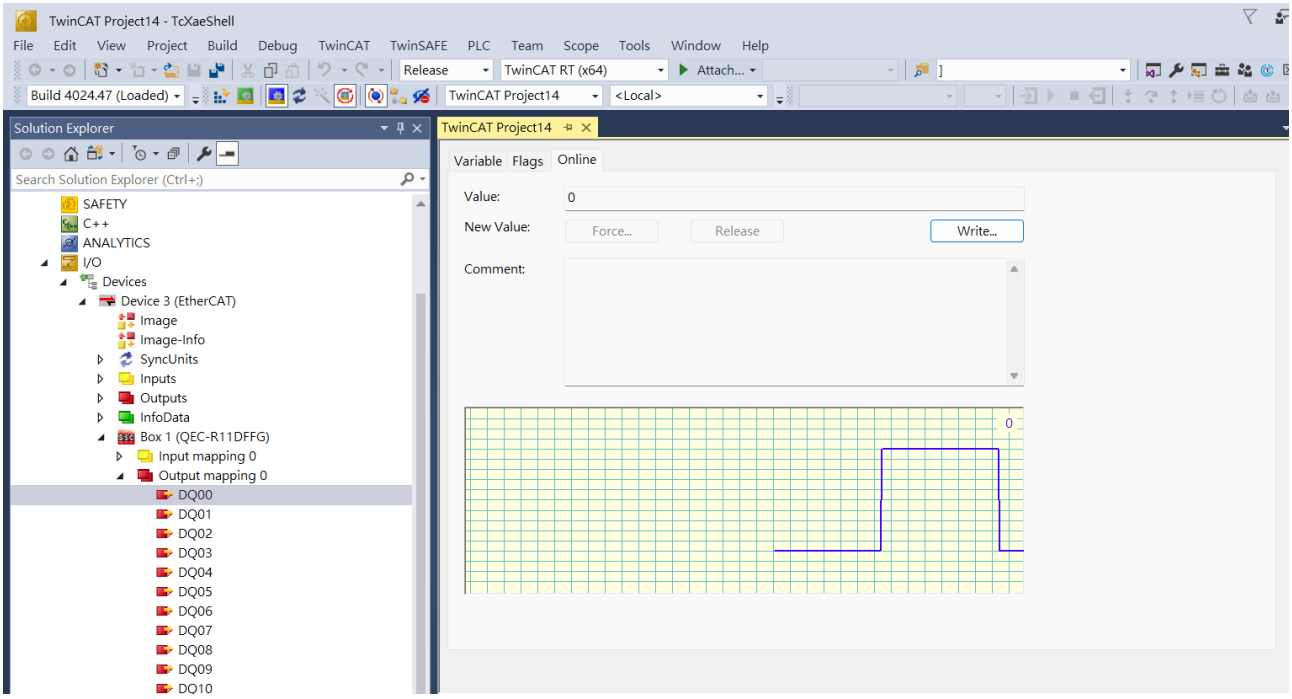
2. Click the “Online” tab, and click the "Write..." button. Enter "1" in the pop-up window to change the value of DQ00 to "1".



3. Then, the “DQ00” starts pull high (“Value” equals 1).



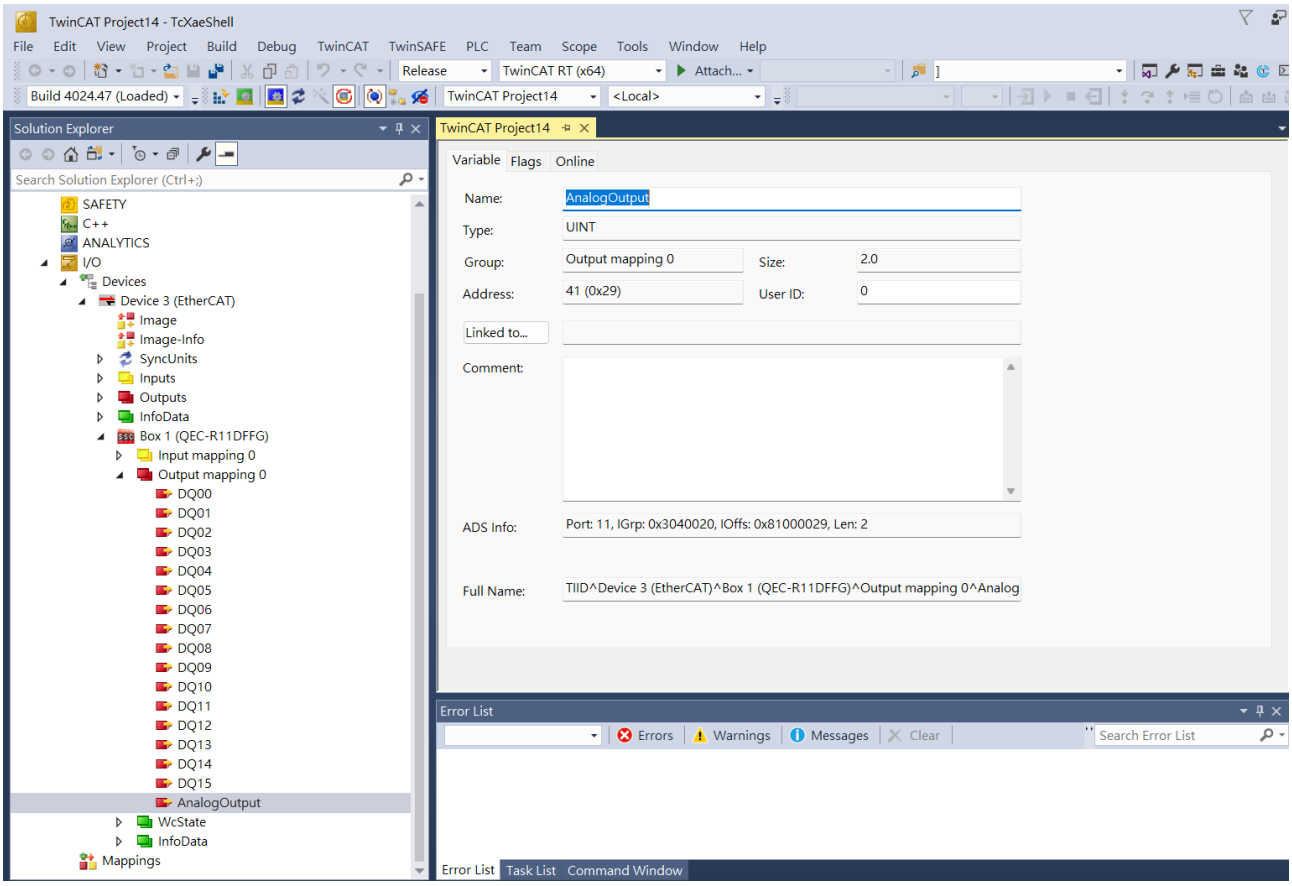
If you enter 0 to the Value, the “DQ00” starts pull low.



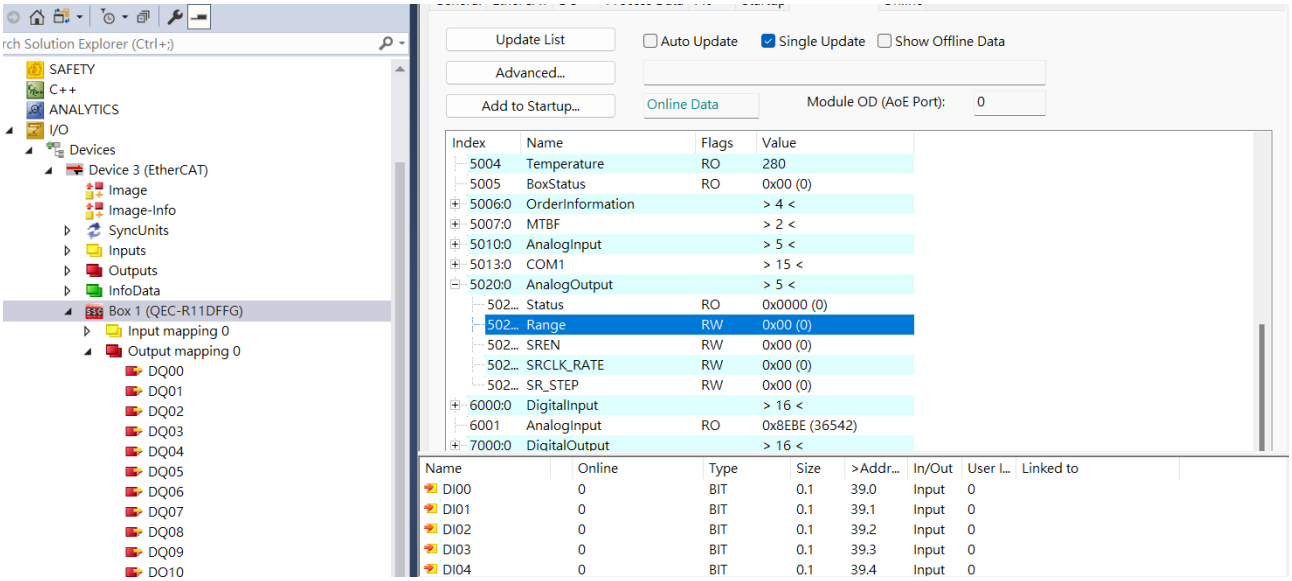
B. Analog Output

Configure the Analog Output.

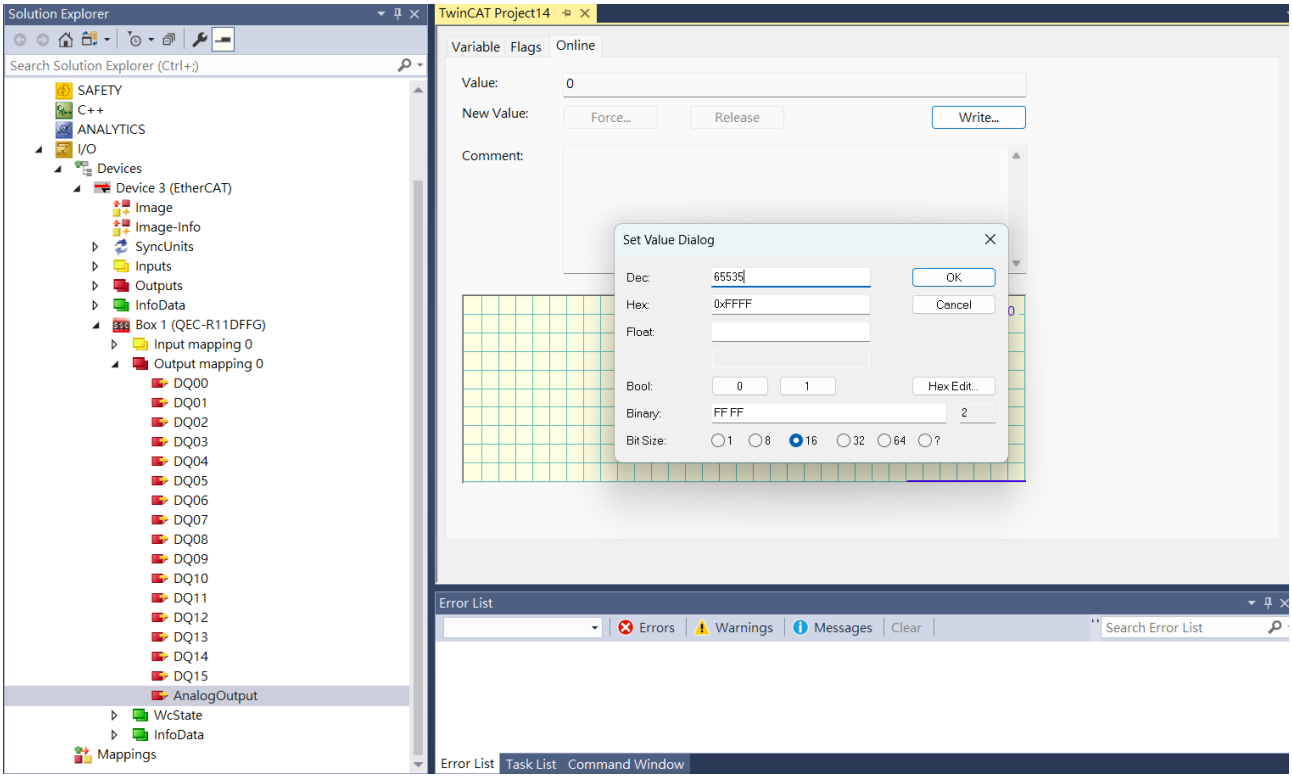
1. Select the drop-down list of the “Output mapping 0”. Click the “AnalogOutput” and it’ll appear control dashboard in the right windows.



2. You can click the "CoE - Online" page to view all objects and perform Mailbox transmission. Find SubIndex "0x5020:02 Range" under the object "0x5020 AnalogOutput" to know the Analog Output Range. (Please refer to Index 0x5020 Analog Output Configuration Objects.)

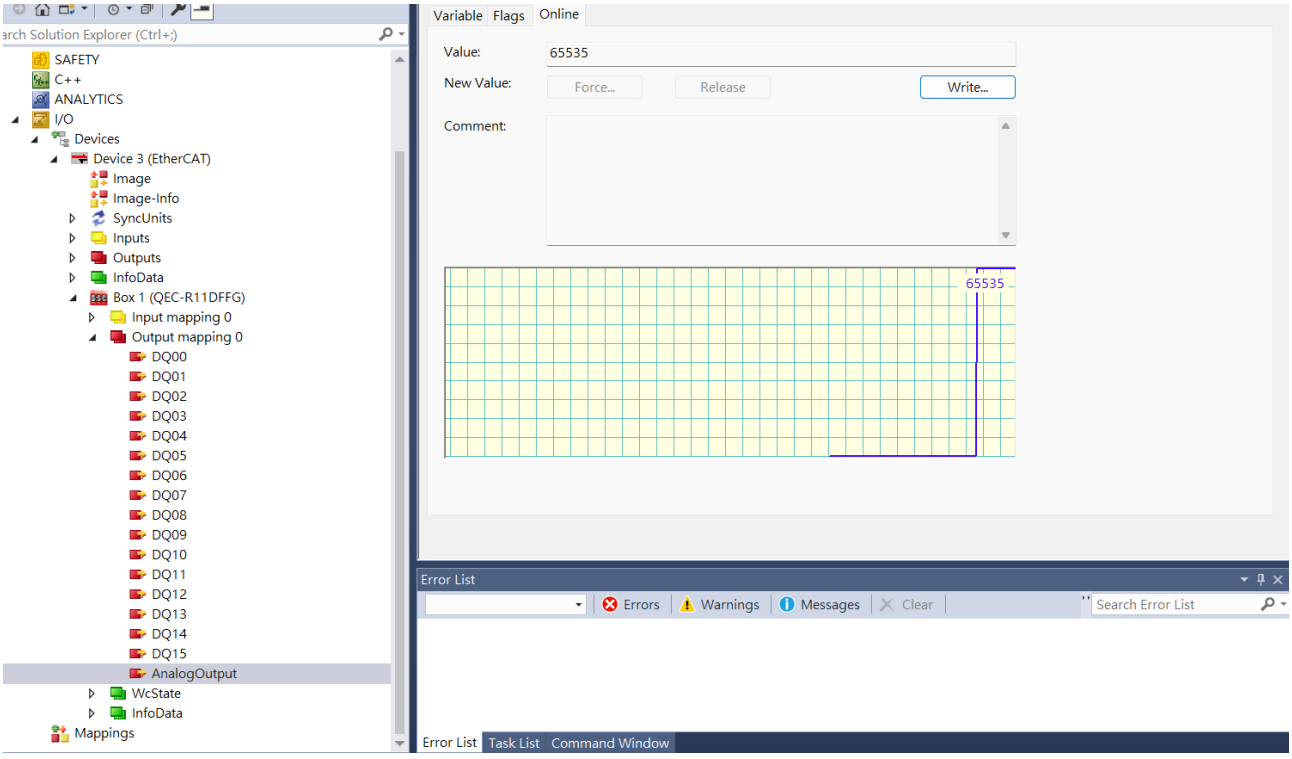


3. Go to "AnalogOutput" of "Output mapping 0", and click the “Online” tab, and click the "Write..." button. Enter "65535" in the pop-up window to change the value of AQ00 to "65535".



Due to the AnalogOutput object is in UINT16 datatype, so input value 65535 means the maximum value.

When the “Range” object for Analog Output is set to 0000, the analog output pin will output 5V.



Ch. 5

SubDevice Information

5.1 ESI (EtherCAT SubDevice Information) file

The ESI files contain information unique to the EtherCAT SubDevice Terminals in XML format. You can load an ESI file into the Support Software to easily allocate SubDevice Terminal process data and other settings. The ESI files for QEC EtherCAT SubDevices are already installed in the Support Software.

Note. Ensuring Up-to-date Installation of the XML Device Description File (ESI)

To ensure smooth functioning, it is important to install the latest version of the XML device description file in the EtherCAT MDevice software. The latest version of the XML device description file can be downloaded from the QEC website.

https://www.qec.tw/

5.2 Object Dictionary

The object dictionary defined here shall be used complementary with ETG.5001 and ETG.1000.

- Device Profile: 5001
- Modul Profile: 0
- Modular Device Profile

  Usage Notes:
  - The PDO mapping object and SyncManager assignment object doesn't need to be defined. In that case they are created automatically.
  - The following objects are fixed included in the SSC and shall not be defined in the file: 0x1000, 0x1001, 0x1008, 0x1009, 0x100a, 0x1010, 0x1011, 0x1018, 0x10F0, 0x10F1, 0x10F3, 0x1c00, 0x1c32, 0x1c33
  - Entries less or equal one 8Bit shall not overlap byte borders.
  - Entries greater 8Bit shall always start at an exact word border

5.2.1 Standard Objects (0x1000-0x1FFF)

Index 1000 Device type

Index	Name	Data type	Flags	Default
1000	Device type	UINT32	RO	0x00001389 (5001)

Index 1001 Error register

Index	Name	Data type	Flags	Default
1001	Error register	UINT8	RO	0x00 (0)

Index 1008 Device name

Index	Name	Data type	Flags	Default
1008	Device name	STRING	RO	Refer to Table 4-1.

Table 4-1: Device Name

Type	Device Name
Digital I/O + Analog I/O + Serial Port	QEC-R00CFFG
	QEC-R11CFFG

Index 1009 Manufacturer Hardware version

Index	Name	Data type	Flags	Default
1009	Hardware version	STRING	RO	Refer to Table 4-2.

Table 4-2: Manufacturer Hardware version

Device Name	Hardware version
QEC-R00CFFG	DM514
QEC-R11CFFG	

Index 100A Manufacturer Software version

Index	Name	Data type	Flags	Default
100A	Software version	STRING	RO	1.00

Index 1018 Identity Object

Index	Name	Data type	Flags	Default
1018:0	Identity	UINT8	RO	> 4 <
1018:01	Vendor ID	UINT32	RO	0x00000BC3 (3011)
1018:02	Product code	UINT32	RO	Refer to Table 4-3.
1018:03	Revision Number	UINT32	RO	Depending by model.
1018:04	Serial number	UINT32	RO	0x00000000 (0)

Table 4-3: Product code & Revision Number

Model Name	Product code
QEC-R11CFFG	0x0086D903

Index 10F1 Error Settings

Index	Name	Data type	Flags	Default
10F1:0	Error Settings	UINT8	RO	> 2 <
10F1:01	Local Error Reaction	UINT32	RW	0x00000001 (1)
10F1:02	Sync Error Counter Limit	UINT32	RW	0x0004 (4)

Index 10F8 Timestamp Object

Index	Name	Data type	Flags	Default
10F8	Timestamp Object	UINT8	RW P	B5 36 21 E6 0D 00 00 00

Index 1600 Output mapping 0

Index	Name	Data type	Flags	Default
1600:0	Output mapping 0	UINT8	R0	> 17 <
1600:01	SubIndex 001	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	UINT32	RO	0x7000:03, 1
1600:04	SubIndex 004	UINT32	RO	0x7000:04, 1
1600:05	SubIndex 005	UINT32	RO	0x7000:05, 1
1600:06	SubIndex 006	UINT32	RO	0x7000:06, 1
1600:07	SubIndex 007	UINT32	RO	0x7000:07, 1
1600:08	SubIndex 008	UINT32	RO	0x7000:08, 1
1600:09	SubIndex 009	UINT32	RO	0x7000:09, 1
1600:0A	SubIndex 010	UINT32	RO	0x7000:0A, 1
1600:0B	SubIndex 011	UINT32	RO	0x7000:0B, 1
1600:0C	SubIndex 012	UINT32	RO	0x7000:0C, 1
1600:0D	SubIndex 013	UINT32	RO	0x7000:0D, 1
1600:0E	SubIndex 014	UINT32	RO	0x7000:0E, 1
1600:0F	SubIndex 015	UINT32	RO	0x7000:0F, 1
1600:10	SubIndex 016	UINT32	RO	0x7000:10, 1
1600:11	SubIndex 017	UINT32	RO	0x7001:00, 16

Index 1A00 Input mapping 0

Index	Name	Data type	Flags	Default
1A00:0	Input mapping 0	UINT8	R0	> 17 <
1A00:01	SubIndex 001	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	UINT32	RO	0x6000:03, 1
1A00:04	SubIndex 004	UINT32	RO	0x6000:04, 1
1A00:05	SubIndex 005	UINT32	RO	0x6000:05, 1
1A00:06	SubIndex 006	UINT32	RO	0x6000:06, 1
1A00:07	SubIndex 007	UINT32	RO	0x6000:07, 1
1A00:08	SubIndex 008	UINT32	RO	0x6000:08, 1
1A00:09	SubIndex 009	UINT32	RO	0x6000:09, 1
1A00:0A	SubIndex 010	UINT32	RO	0x6000:0A, 1
1A00:0B	SubIndex 011	UINT32	RO	0x6000:0B, 1
1A00:0C	SubIndex 012	UINT32	RO	0x6000:0C, 1
1A00:0D	SubIndex 013	UINT32	RO	0x6000:0D, 1
1A00:0E	SubIndex 014	UINT32	RO	0x6000:0E, 1
1A00:0F	SubIndex 015	UINT32	RO	0x6000:0F, 1
1A00:10	SubIndex 016	UINT32	RO	0x6000:10, 1
1A00:11	SubIndex 017	UINT32	RO	0x6001:00, 16

Index 1C00 Sync manager type

Index	Name	Data type	Flags	Default
1C00:0	Sync manager type	UINT8	R0	> 4 <
1C00:01	SubIndex 001	UINT8	RO	0x01 (1)
1C00:02	SubIndex 002	UINT8	RO	0x02 (2)
1C00:03	SubIndex 003	UINT8	RO	0x03 (3)
1C00:04	SubIndex 004	UINT8	RO	0x04 (4)

Index 1C12 SyncManager 2 assignment

Index	Name	Data type	Flags	Default
1C12:0	SyncManager 2 assignment	UINT8	R0	> 1 <
1C12:01	SubIndex 001	UINT16	RO	0x1600 (5632)

* Note if this object is not defined it will be created automatically

Index 1C13 SyncManager 3 assignment

Index	Name	Data type	Flags	Default
1C13:0	SyncManager 3 assignment	UINT8	R0	> 1 <
1C13:01	SubIndex 001	UINT16	RO	0x1A00 (6656)

* Note if this object is not defined it will be created automatically

Index 1C32 SM output parameter

Index	Name	Data type	Flags	Default
1C32:0	SM output parameter	UINT8	R0	> 32 <
1C32:01	Synchronization Type	UINT16	RW	0x0001 (1)
1C32:02	Cycle Time	UINT32	RO	0x00000000 (0)
1C32:04	Synchronization Types supported	UINT16	RO	0x401F (16415)
1C32:05	Minimum Cycle Time	UINT32	RO	0x000186A0 (100000)
1C32:06	Calc and Copy Time	UINT32	RO	0x00000000 (0)
1C32:08	Get Cycle Time	UINT16	RW	0x0000 (0)
1C32:09	Delay Time	UINT32	RO	0x00000000 (0)
1C32:0A	Sync0 Cycle Time	UINT32	RW	0x00000000 (0)
1C32:0B	SM-Event Missed	UINT16	RO	0x0000 (0)
1C32:0C	Cycle Time Too Small	UINT16	RO	0x0029 (41)
1C32:0D	Shift Time too Short Counter	UINT16	RO	0x0000 (0)
1C32:20	Sync Error	BOOL	RO	TRUE

Index 1C33 SM input parameter

Index	Name	Data type	Flags	Default
1C33:0	SM input parameter	UINT8	RO	> 32 <
1C33:01	Synchronization Type	UINT16	RW	0x0022 (34)
1C33:02	Cycle Time	UINT32	RO	0x00000000 (0)
1C33:04	Synchronization Types supported	UINT16	RO	0x401F (16415)
1C33:05	Minimum Cycle Time	UINT32	RO	0x000186A0 (100000)
1C33:06	Calc and Copy Time	UINT32	RO	0x00000000 (0)
1C33:08	Get Cycle Time	UINT16	RW	0x0000 (0)
1C33:09	Delay Time	UINT32	RO	0x00000000 (0)
1C33:0A	Sync0 Cycle Time	UINT32	RW	0x00000000 (0)
1C33:0B	SM-Event Missed	UINT16	RO	0x0000 (0)
1C33:0C	Cycle Time Too Small	UINT16	RO	0x0029 (41)
1C33:0D	Shift Time too Short Counter	UINT16	RO	0x0000 (0)
1C33:20	Sync Error	BOOL	RO	TRUE

5.2.2 Manufacturer Objects (0x5000-0x5FFF)

Index 0x5000 to 0x5007 Manufacturer Object

Index	Object Code	DataType	Name	Default	Description
5000	VARIABLE	UINT16	SP_Voltage	0	Read SP Voltage.
5001	VARIABLE	UINT16	SP_Current	0	Read SP Current.
5002	VARIABLE	UINT16	PP_Voltage	0	Read PP Voltage.
5003	VARIABLE	UINT16	PP_Current	0	Read PP Current.
5004	VARIABLE	INT16	Temperature	0	Read Temperature.
5005	VARIABLE	UINT8	BoxStatus	0	Read Box Status, refer to Table 4-4.
5006:0	RECORD		OrderInformation	> 4 <	Order Information.
5006:01		STRING(6)	Customer	0	Customer.
5006:02		STRING(8)	OrderNo	0	Order No.
5006:03		STRING(11)	InvNo	0	Inv No.
5006:04		STRING(4)	DelyDate	0	Dely Date.
5007:0	RECORD	UINT32	MTBF	> 2 <	-
5007:01		INT32	WorkingHours	0	If return -1, the mean is EEPROM have error.
5007:01		INT32	BootTimes	0	If return -1, the mean is EEPROM have error.

Table 4-4: Index 0x5005 BoxStatus Definitions

Value	Description
0	Normal Operation
3	ESC 3p3 Power NG
4	DIQ 3p3 Power NG
5	External XTgal Stop
6	External XTgal Over Range
0x10	Power Voltage Low or High
0x11	Power Voltage Too Low or Too High

Index 0x5010 Analog Input Configuration Object

Index	Name	Data type	Flags	Default	Description
5010:0	Analog Input	UINT8	-	> 5 <	Read/Write Analog Input.
5010:01	Status	UINT16	RO	0x0000 (0)	Refer to Table 4-5.
5010:02	Range	UINT8	RW	0x00 (0)	Refer to Table 4-6
5010:03	Threshold_of_Input_High	UINT16	RW	0xFFFF (65535)	Threshold of Input High.
5010:04	Threshold_of_Input_Low	UINT16	RW	0x0000 (0)	Threshold of Input Low.
5010:05	Resolution	REAL32	RO	0.000680 (6.796196e-004)	Resolution.

Table 4-5: Index 0x5010:01 Analog Input voltage Status

Value	Description
Bit 0	Input too low
Bit 1	Input too high
Bit 2	AVDD low
Bit 3	AVDD high

Table 4-6: Index 0x5010:02 Analog Input voltage range

Value	Description
0000b	Full voltage ≒ ±22V
0001b	Full voltage ≒ ±20V
0010b	Full voltage ≒ ±11V
0011b	Full voltage ≒ ±10V
0100b	Full voltage ≒ ±5V
0101b	Full voltage ≒ 22V
0110b	Full voltage ≒ 20V
0111b	Full voltage ≒ 11V
1000b	Full voltage ≒ 10V

Index 0x5013 COM Object

Index	Name	Data type	Flags	Default
5013:0	COM1	UINT32	RW	> 15 <
5013:01	Baud_Rate	UINT8	RW	0x1C200
5013:02	Data_Width	UINT8	RW	0x08
5013:03	StopBit	UINT8	RW	0
5013:04	Parity	UINT16	RO	0
5013:05	BytesToWrite	UINT16	RO	0
5013:06	BytesToRead	UINT8	RW	0
5013:07	EnableHardwareFlowControl	UINT8	RW	0
5013:08	RTS	UINT8	RO	0
5013:09	CTS	UINT8	RW	0
5013:10	DTR	UINT8	RO	0
5013:11	DSR	STRING(256)	WO	0
5013:12	Tx	STRING(256)	RO	0
5013:13	Rx	UINT8	WO	0
5013:14	ClearFIFO	UINT8	RO	0
5013:15	Mode	UINT32	RW	0x01

Table 4-7: Index 0x5013 COM port Definitions

Subindex	Description
5013:01	2400,4800,9600,14400,19200,38400,57600,115200
5013:02	5, 6, 7, 8
5013:03	0 = One “STOP bit” is generated in the transmitted data. 1 = When select 5-bit word length, 1.5 “STOP bit” is generated in the transmitted data. When select 6-, 7- and 8-bit word length, 2 “STOP bit” is generated in the transmitted data.
5013:04	0=none; 1=odd; 3=even; 5= mark; 7=space
5013:05	Return How many bytes in Tx Buffer waiting to transmission
5013:06	Return How many bytes in Rx Buffer waiting to Read
5013:07	0: disable; 1: Enable
5013:08	work on hardware flow control is disabled & Mode=1(RS-232)
5013:010	work on hardware flow control is disabled & Mode=1(RS-232)
5013:015	1=RS232 Mode; 0=RS485 Mode

Index 0x5020 Analog Output Configuration Objects

Index	Name	Data type	Flags	Default	Description
5020:0	AnalogOutput		-	> 5 <	Read/Write Analog Output.
5020:01	Status	UINT16	RO	0x0000 (0)	Status.
5020:02	Range	UINT8	RW	0x00 (0)	Range, refer to Table 4-8.
5020:03	SREN	UINT8	RW	0x00 (0)	Slew Rate Enabled - When set, enables slew rate feature.
5020:04	SRCLK_RATE	UINT8	RW	0x00 (0)	Slew Clock Rate, refer to Table 4-9.
5020:05	SR_STEP	UINT8	RW	0x00 (0)	Slew Rate Step Size, refer to Table 4-10.

Table 4-8: Index 0x5020:02 Analog Output Range

Value	Description
0000	Voltage output 0 to +5 V (default)
0001	Voltage output 0 to +10 V
0010	Voltage output ±5 V
0011	Voltage output ±10 V
0100	Current output 3.5 mA to 23.5 mA
0101	Current output 0 to 20 mA
0110	Current output 0 to 24 mA
0111	Current output ±24 mA
1000	Voltage output 0 to +6 V
1001	Voltage output 0 to +12 V
1010	Voltage output ±6 V
1011	Voltage output ±12 V
1100	Current output 4 mA to 20 mA
Other number will Disable output	

Table 4-9: Index 0x5020:04 Analog Output Slew Clock Rate

Value	Description	Value	Description
0000	DAC updates at 258,065 Hz (default)	**1000**	DAC updates at 20,150 Hz
0001	DAC updates at 200,000 Hz	**1001**	DAC updates at 16,030 Hz
0010	DAC updates at 153,845 Hz	**1010**	DAC updates at 10,295 Hz
0011	DAC updates at 131,145 Hz	**1011**	DAC updates at 8,280 Hz
0100	DAC updates at 115,940 Hz	**1100**	DAC updates at 6,900 Hz
0101	DAC updates at 69,565 Hz	**1101**	DAC updates at 5,530 Hz
0110	DAC updates at 37,560 Hz	**1110**	DAC updates at 4,240 Hz
0111	DAC updates at 25,805 Hz	**1111**	DAC updates at 3,300 Hz

Table 4-10: Index 0x5020:05 Analog Output Slew Rate Step Size

Value	Description
000	1 LSB (default)
001	2 LSB
010	4 LSB
011	8 LSB
100	16 LSB
101	32 LSB
110	64 LSB
111	128 LSB

5.2.3 Especial Objects (0x6000-0xFFFF)

Index 0x6nnx Input Data of the Module (0x6000 - 0x6FFF)

Index	DataType	Name	Flags	Default	Description
6000:0	-	DigitalInput	TX	> 16 <	Digital Input
6000:01	BOOL	DI00	RO	FALSE	DI00
6000:02	BOOL	DI01	RO	FALSE	DI01
6000:03	BOOL	DI02	RO	FALSE	DI02
6000:04	BOOL	DI03	RO	FALSE	DI03
6000:05	BOOL	DI04	RO	FALSE	DI04
6000:06	BOOL	DI05	RO	FALSE	DI05
6000:07	BOOL	DI06	RO	FALSE	DI06
6000:08	BOOL	DI07	RO	FALSE	DI07
6000:09	BOOL	DI08	RO	FALSE	DI08
6000:10	BOOL	DI09	RO	FALSE	DI09
6000:11	BOOL	DI10	RO	FALSE	DI10
6000:12	BOOL	DI11	RO	FALSE	DI11
6000:13	BOOL	DI12	RO	FALSE	DI12
6000:14	BOOL	DI13	RO	FALSE	DI13
6000:15	BOOL	DI14	RO	FALSE	DI14
6000:16	BOOL	DI15	RO	FALSE	DI15
6001	UINT16	AnalogInput	RO	0x8EF8 (36600)	Analog Input, refer to Table 4-11

Table 4-11: Index 0x6001 Analog Input

Description
When Index 5010:02 Analog Input voltage range is 0,1,2,3,4: Vin = (AnalogInput0-32768) x Resolution.
When Index 5010:02 Analog Input voltage range is 5,6,7,8: Vin = (AnalogInput0) x Resolution.
* Resolution please refer to the Index 0x5010.5

Index 0x7nnx Output Data of the Module (0x7000 - 0x7FFF)

Index	DataType	Name	Flags	Default	Description
7000:0	-	DigitalOutput	RX	> 16 <	Digital Output
7000:01	BOOL	DQ00	RW	FALSE	DQ00
7000:02	BOOL	DQ01	RW	FALSE	DQ01
7000:03	BOOL	DQ02	RW	FALSE	DQ02
7000:04	BOOL	DQ03	RW	FALSE	DQ03
7000:05	BOOL	DQ04	RW	FALSE	DQ04
7000:06	BOOL	DQ05	RW	FALSE	DQ05
7000:07	BOOL	DQ06	RW	FALSE	DQ06
7000:08	BOOL	DQ07	RW	FALSE	DQ07
7000:09	BOOL	DQ08	RW	FALSE	DQ08
7000:10	BOOL	DQ09	RW	FALSE	DQ09
7000:11	BOOL	DQ10	RW	FALSE	DQ10
7000:12	BOOL	DQ11	RW	FALSE	DQ11
7000:13	BOOL	DQ12	RW	FALSE	DQ12
7000:14	BOOL	DQ13	RW	FALSE	DQ13
7000:15	BOOL	DQ14	RW	FALSE	DQ14
7000:16	BOOL	DQ15	RW	FALSE	DQ15
7001	UINT16	AnalogOutput	RW	0x0000 (0)	Analog Output.

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster. Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, originality to use this product. Vendor will not be liable for any claim made by any other related party. Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.