DTDM-ECAT

EtherCAT Communication Module

Operation Manual

Precautions

⚠ This machine is an open type device, so when using this machine, it must be installed in a distribution box that is dustproof, moisture-proof and free from electric shock/shock, and must have protective measures (such as special tools or keys to open) to prevent non-maintenance personnel from operating or accidentally impacting the body, causing danger and damage.

⚠ Note! Please follow the relevant precautions in the following manuals, failure to comply may cause the controller or peripheral products to malfunction, and even cause fire, electric shock, and casualties.

⚠ Note! Electric shock danger! When the power supply is powered on, do not touch the exposed electrical terminals to avoid being struck. When checking the input power, confirm that the power is off.

⚠ This machine is an open device, please avoid using it in dangerous applications to avoid serious injury to personnel and damage to other equipment, and make sure that it is installed on equipment with fail-safe guards.

⚠ The machine is not equipped with a power switch or fuse, so there should be a Switch or Circuit-Breaker in the product application system, and the Switch or Circuit-Breaker should be located in a position easily accessible to the operator, and there must have a clear indication of disconnection mark.

1. Use a pin-type terminal with a diameter of 1.3 mm smaller than the crimp at the front, do not use excessive force when locking the terminal, and make sure that the wiring is connected to the correct and appropriate terminal.
2. If dust or metal debris falls into the body and may cause malfunction, please install it in a dustproof, moisture-proof, and shock/electric shock-resistant enclosure or distribution box.
3. Unauthorized modification or disassembly of this controller may cause unforeseen errors or hazards.
4. Install away from areas with high voltage, high frequency noise, or high current flowing through to prevent interference.
5. Avoid using the unit in a place where the following situations occur.
   (a) excessive dust and corrosive or flammable gases; (b) High humidity with condensation; (c) shock and shock; (d) High radiation.
6. Be sure to turn off the power supply when wiring and when replacing the temperature controller.
7. Please confirm that the power supply/signal is properly assembled before powering on, otherwise it may cause serious damage.
8. Do not touch the machine terminals or perform maintenance while the power is on, as this may result in electric shock.
9. Within one minute of cutting off the power supply, the power line is not completely discharged, do not touch the internal line and external terminals.
10. When maintaining the module, please turn off the power first and use a dry cloth to clean the surface of the body, and do not disassemble the shell to contact the internal circuit to avoid circuit damage and failure. Do not use liquids containing acids or alkalis for cleaning.
11. The EtherCAT communication module is required for use with a DTDM measurement host module..
12. When adding/replacing this EtherCAT module, please be sure to power off the measurement host, and then power on again after installation, this series of products does not support hot swapping except for network cables, please do not install without power off.

13. The length of the EtherCAT cable should be less than 30 meters.

Revision History

Version	Change Description	Release Date
V1.0	The first edition was released	2023/12/4
V1.1	1. Added Chapter 4 to illustrate the connection example between DTDM-ECAT and Delta PLC AX308 series. 2. Added section 3.1 to explain the EtherCAT OD structure and SDO/PDO definitions.	2024/12/24
V1.2	1. Revised the DTDM-ECAT illustrations in Chapter 1. 2. Added the TxPDO and RxPDO information in Section 3.2.	2025/12/9

DTDM-ECAT EtherCAT Communication Module

Operation Manual

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Chapter 1 Product Introduction

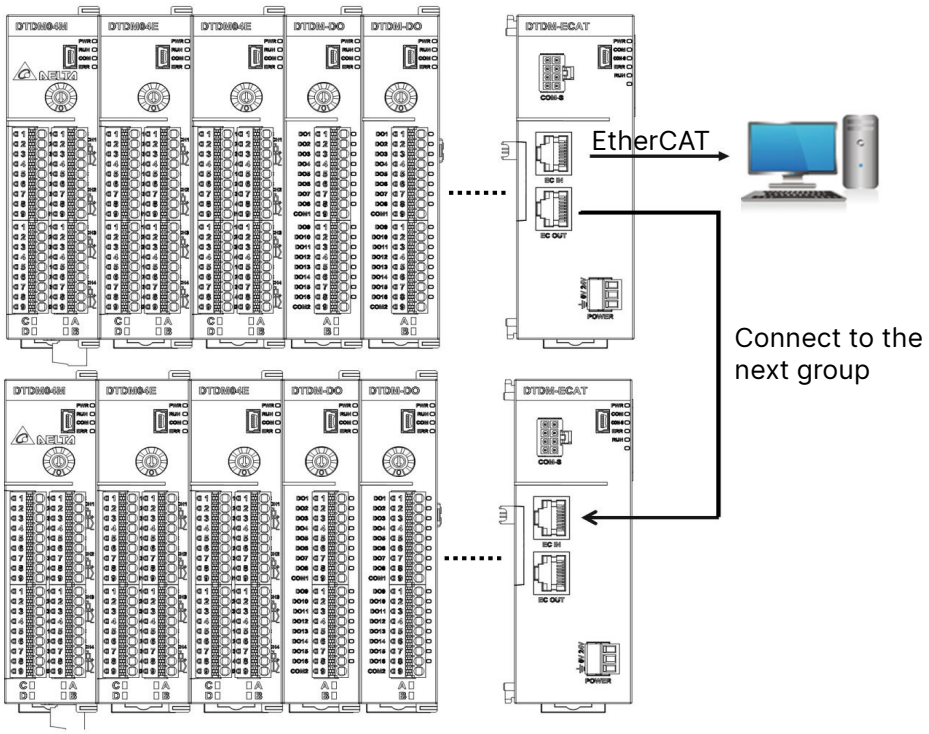
1.1 DTDM-ECAT Product Overview

DTDM-ECAT is an EtherCAT communication module dedicated to DTDM series temperature controllers, DTDM measurement host has a built-in RS485 communication interface (slave), if you need EtherCAT communication interface, you can install DTDM-ECAT communication module on the far right side of DTDM group. The DTDM-ECAT has the function of collecting data from the main station, which will exchange the parameters of the connected temperature controller to the memory of the DTDM-ECAT through the internal bus, and the user can access the parameter data of the DTDM temperature controller by the external host controller through high-speed EtherCAT communication. Each DTDM-ECAT has two built-in EtherCAT ports (EC IN and EC OUT), allowing users to connect multiple EtherCAT devices in series.

EtherCAT communication has been widely used in the field of semiconductor and electronics industry control, and it has the following advantages:

1) High speed: EtherCAT is hardware-based to process the communication data, so the communication cycle is very short, and it can provide a transfer speed of up to 100 MB/s.
2) Immediacy: With nanosecond (ns) level data synchronization, it can meet the efficient real-time control (generally used for servo motion control).
3) Cost-effective and easy to configure: It can run on top of existing Ethernet networks, provide flexible topologies (line, tree, star, etc.) and support up to 65,535 device connections to meet the needs of complex systems.

■ **Example configuration of the DTDM-ECAT communication module**



The DTDM series is mainly composed of the following products:

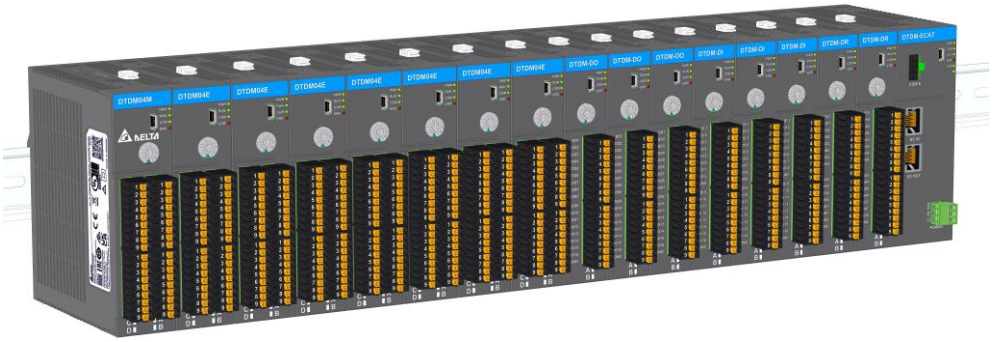
1) Measurement host: DTDM04M (4-CH), DTDM08MP (8-CH), DTDM16MT (16-CH).
2) Measurement expansion module: DTDM04E (4-CH).
3) Output modules: DTDM-DO16P, DTDM-DO16N, DTDM-DO08R
4) Input module: DTDM-DI16
5) EtherCAT communication module: DTDM-ECAT

DTDM04M Measurement Host	DTDM08MP Measurement Host	DTDM16MT Measurement Host	DTDM04E Measurement Expansion Module
			
DTDM-DO16P(N) Digital Output Module	**DTDM-DO08R Relay Output Module**	**DTDM-DI16 Digital Input Module**	**DTDM-ECAT EtherCAT Communication Module**
			

- DTDM-ECAT connection to DTDM04 measurement host:

Up to 8 measurement modules (32 channels) and up to 8 DI/DO expansion modules and 1 EtherCAT communication module can be connected.

The measurement host (and measurement expansion modules) are installed on the far left first, and then the IO expansion module is added sequentially from the right side, while the EtherCAT communication module needs to be installed on the last one on the right.

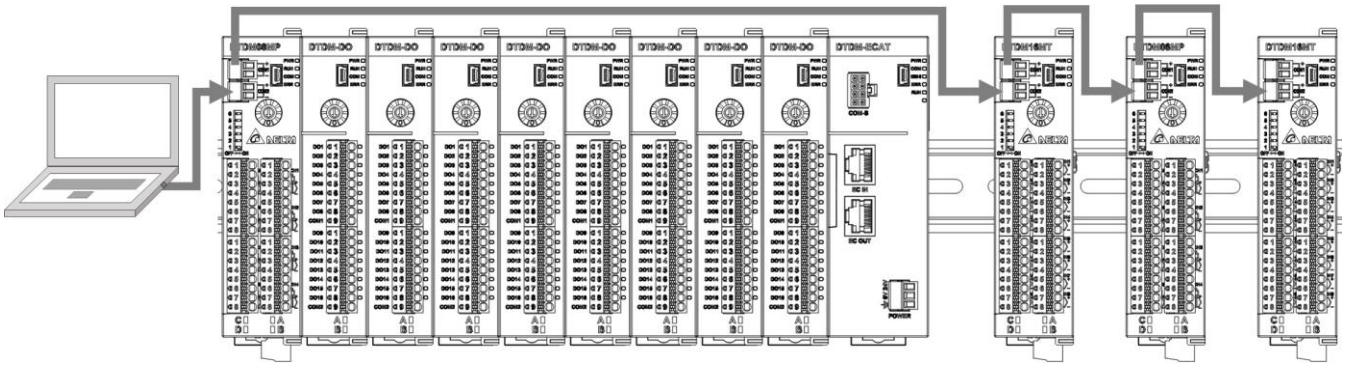


- DTDM-ECAT connection to DTDM16/08 measurement host:

Up to 4 measurement modules (1 master + 3 slaves), and up to 8 DO expansion modules and 1 EtherCAT communication module can be connected.

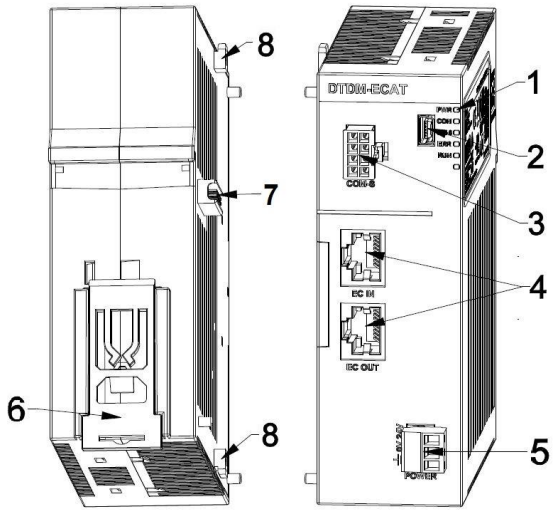
The master station of the measurement host needs to be installed on the far left, and then the IO expansion module is added sequentially from the right, and the EtherCAT communication module needs to be installed on the last one on the far right.

The EtherCAT communication module can only be installed on the master station of the measurement module (not on slave station of the measurement module).The slave station of measurement module is installed independently and separately, connecting to other measurement modules with RS-485 cables. Please refer to DTDM16/08 operation manual for detail connection description.



1.2 External Appearance of Product and Names of Parts

EtherCAT Communication Module: DTDM-ECAT



No.	Name
(1)	Status light
(2)	Product maintenance interface (For Delta technical personnel only)
(3)	RS-485 remote SSR communication interface (Used with DTDM-DO08S)
(4)	EtherCAT communication interface
(5)	24V power input terminal
(6)	DIN Rail mounting clip
(7)	Expansion connector
(8)	Expansion mounting structure

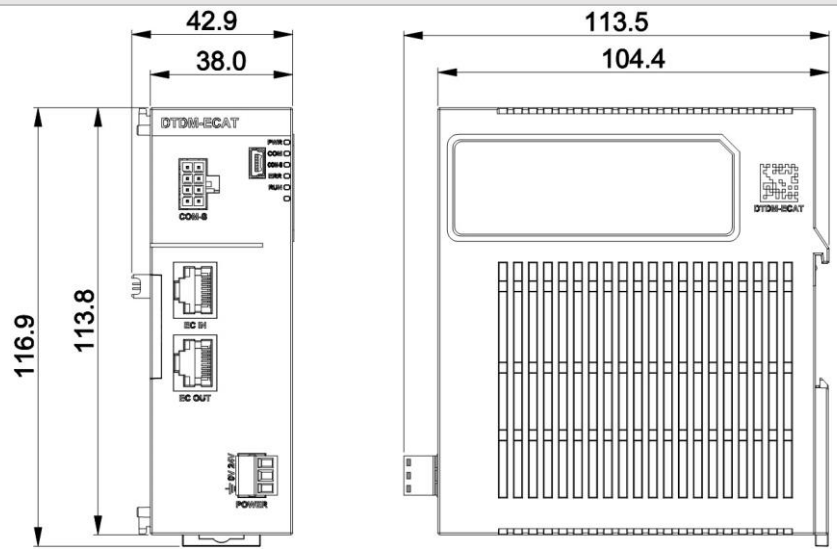
1.3 Ordering Information

DTDM - 1

The name of the series	Delta DTDM Series Temperature Controller Expansion Module
1 Module Type	ECAT = EtherCAT Communication Module

1.4 Product Dimensions

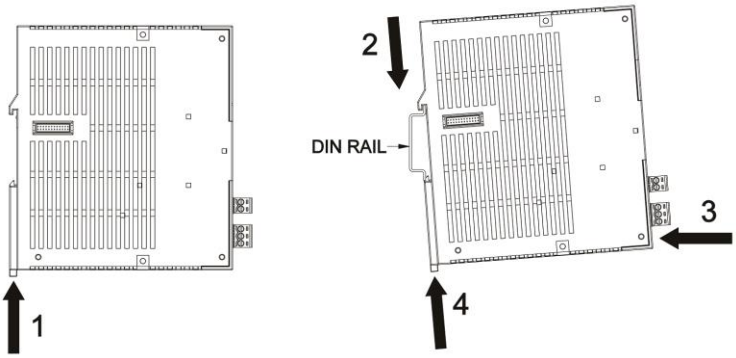
EtherCAT communication module (Unit: mm)



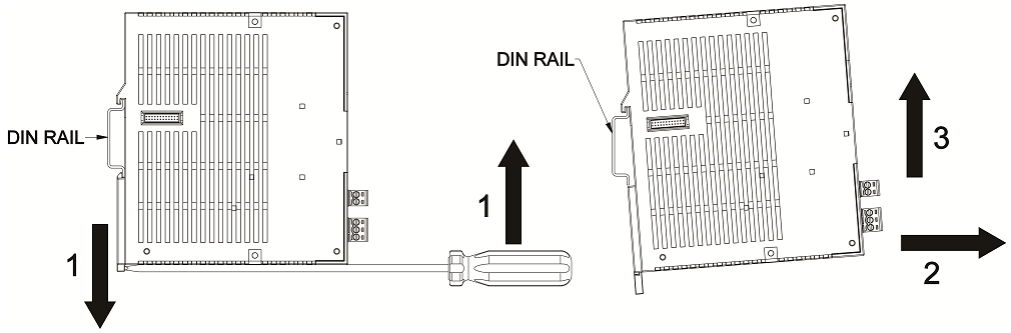
1.5 Installation Instructions

Installation and removal:

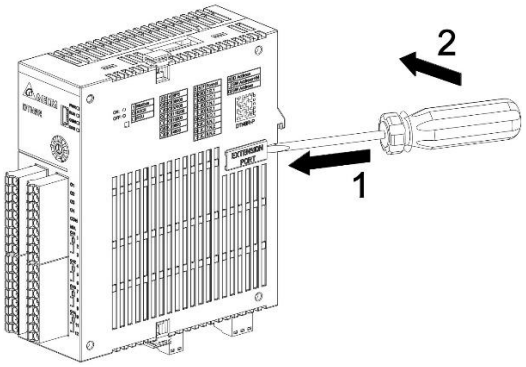
Installation
1) Fasten the DIN RAIL fastener 2) Hang the DIN RAIL mounting structure above the controller diagonally on the DIN RAIL 3) Press in under the controller to fasten the DIN RAIL fastener below 4) Confirm that the DIN RAIL fastener is fastened to the DIN RAIL



Remove the controller
1) Insert the DIN RAIL fixture into the square hole of the DIN RAIL fixture and apply force in the direction of the arrow to loosen the DIN RAIL fixture 2) Pull the controller in the direction of step 2 3) Lift the controller up to remove it

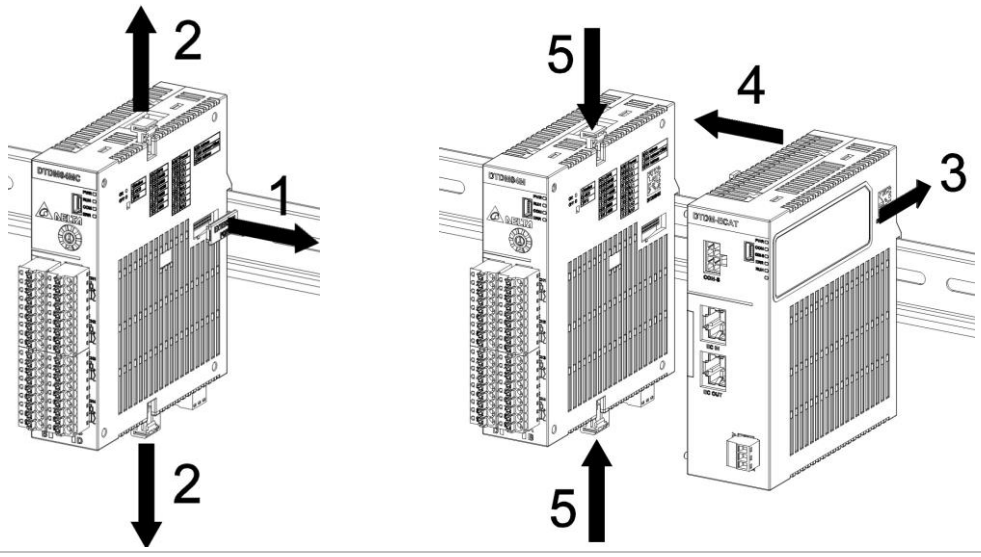


Remove the protective cover
1) Insert the slotted into the removal hole of the protective cover 2) Apply force in the direction of the arrow to remove the protective cover



Expansion Method:

Expand the controller
1) Use a flathead screwdriver to remove the protective cover of the expansion connector of the host controller 2) Pull open both ends of the expansion fixture according to the direction indicated by the arrow 3) Install the controller that needs to be expanded on the aluminum rail 4) Connect the controller that needs to be expanded with the host controller along the aluminum rail, and ensure it is fully seated and flush against the host 5) Fasten the expansion fixture to complete the expansion



Note:

1. When adding/replacing the expansion controller, please be sure to power off the main unit, and then power it back on after installation, this series of products does not support hot swapping, please do not perform expansion operations without power failure.

Installation precautions

1. In order to avoid signal interference, make sure that the power line, the load line and the measurement cable are arranged in different trunkings.
2. After the installation of the EtherCAT network module, there should be a certain amount of space around it to ensure proper heat dissipation and easy removal and installation of fixed accessories.
   - There should be 100mm of space on the top and bottom sides, and 100mm of space on the right side.
3. Please use 16AWG~24AWG withstand voltage 300V for power supply; Heat-resistant 60/75°C single or poly thread.

Chapter 2 System Specifications

2.1 Electrical Specifications

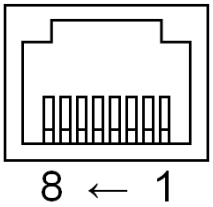
Input power	DC 24 volts ± 10%, isolated switching power supply
Power consumption	The main body consumes 3W max. The power transmitted to the DTDM-DO08S via a standard dedicated cable is not counted as the main body consumption
Installation:	The DIN rail and Ethernet modules are mounted on the far right side of the DTDM module
Weight	200g max
Internal connectivity function	An internal connection terminal is provided to transmit communication signals through the terminals
Vibration resistance	10 ~ 55Hz 10m/s2 3-axis direction 10min
Shock resistance	Max. 300m/s2, 3 axes and 6 directions, 3 times each
Operating temperature	0°C ~ +55°C
Storage temperature	-20°C ~ +65°C
Operating altitude	Below 2000 meters above sea level
Operating humidity	35% to 85% RH (no condensation)
Pollution level	2

2.2 Communication Specifications

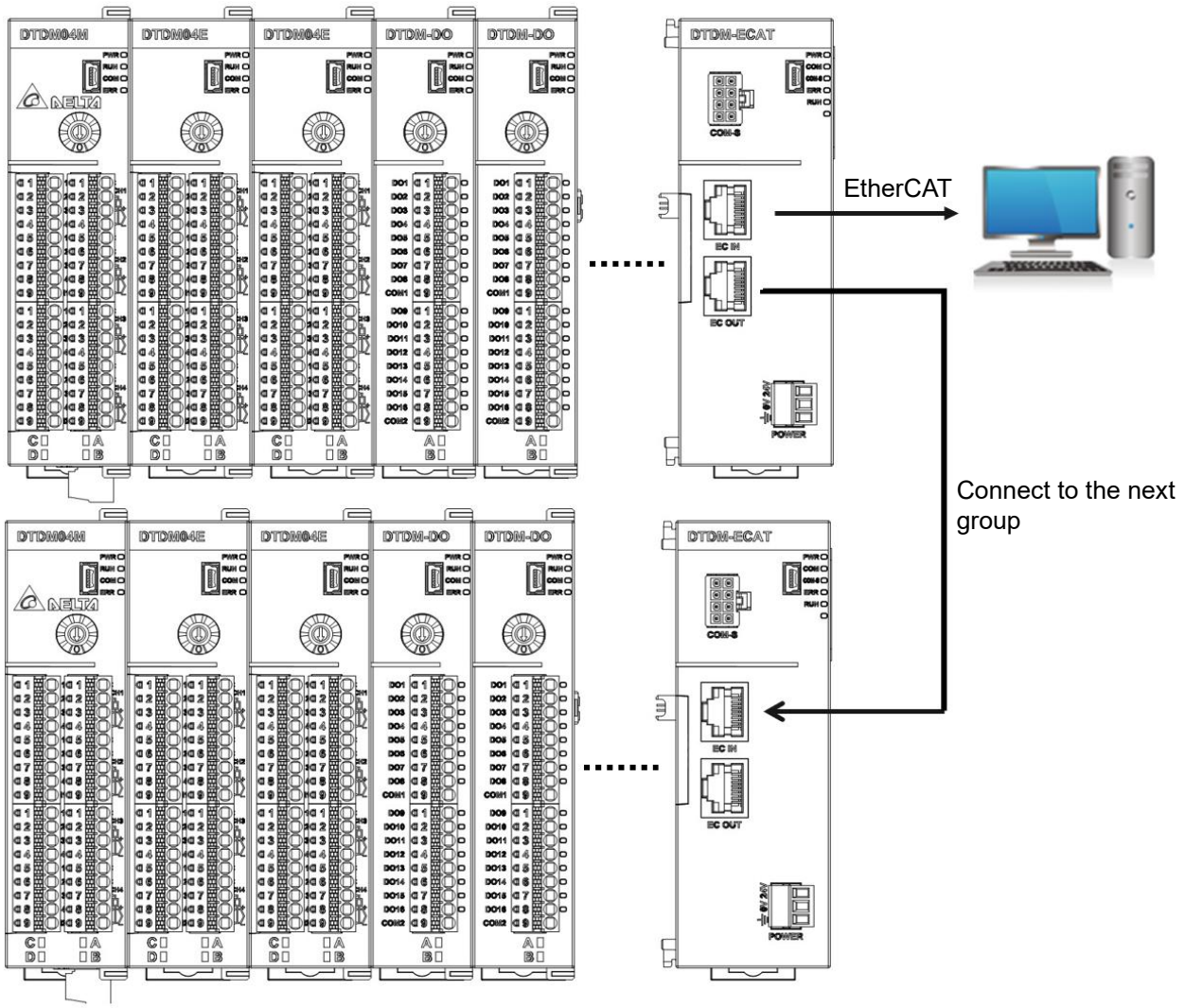
Item		Specification
LAN interface specifications	Communication protocols	EtherCAT
	Communication rate	10/100 Mbps Auto-Detection
	Transmission mode	IEEE 802.3、IEEE 802.3u
	Transmission lines	Category 5e or higher, 100 m (max) The distance between two adjacent nodes is not more than 30M (Max)
	Communication interface	RJ-45 with Auto MDI/MDIX
	Primary periodic task	250us to 8ms (in 250us increments)
	Distributed clock	Not Supported
	Number of ports	2
	Sync mode	Free-run mode (asynchronous)
	Communication Objects	Process Data Object (PDO) Service Data Object (SDO)

Item		Specification
	Network topology	Point-to-point Ring topology Linear Topology Star Topology

EtherCAT communication interface IN and OUT RJ45 pin definition:

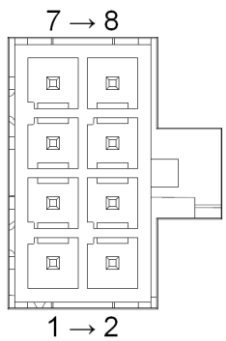
Schematic diagram of RJ45	Terminal number	Definition	Note
	1	TX+	Transmit data - positive end
	2	TX-	Transmit data - negative end
	3	RX+	Receiving data - positive end
	4	--	N/C
	5	--	N/C
	6	RX-	Received data - negative end
	7	--	N/C
	8	--	N/C

EtherCAT Wiring:
1) Please use a Category 5e or higher grade transmission line, with a cable length of less than 30M 2) The second EtherCAT communication port of the DTDM-ECAT communication module can be connected to the next DTDM-ECAT module



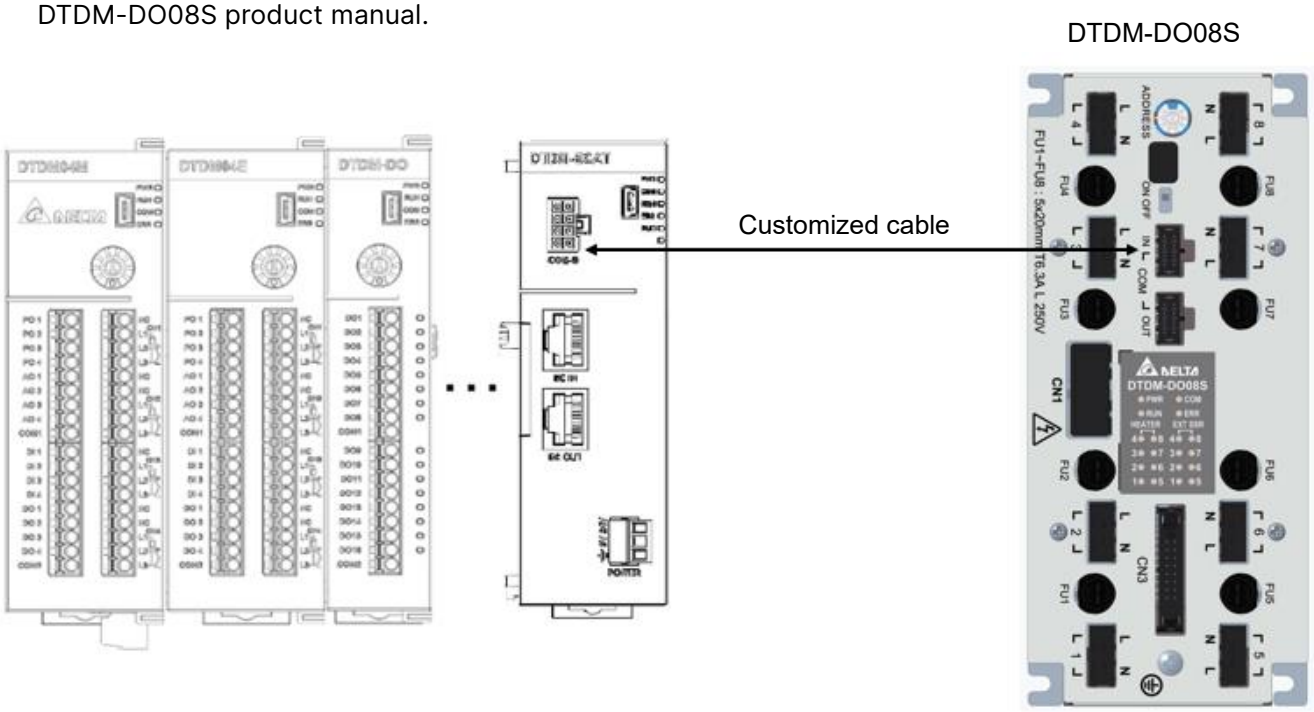
Pin definition for COM-S:

(Must be matched with customized cables, such as DTDM-CARM002; DTDM-CARM010; DTDM-CARM020; DTDM-CARM030)

Schematic diagram of COM-S	Terminal number	Definition	Note
	1	24V	Power - Positive
	2	24V	Power - Positive
	3	0V	Power - Negative
	4	0V	Power - Negative
	5	FG	Power – Ground
	6	FG	Power – Ground
	7	D-	RS485 Differential Signal - Negative
	8	D+	RS485 Differential Signal - Positive

Connect the remote output module DTDM-DO08S with COM-S

1) The COM-S port on the top of the DTDM-ECAT is a dedicated interface that provides an RS-485 communication interface and a power interface, used for communication with the remote output module DTDM-DO08S.
2) COM-S must be used with customized cables. For cable models and usage instructions, please refer to the DTDM-DO08S product manual.



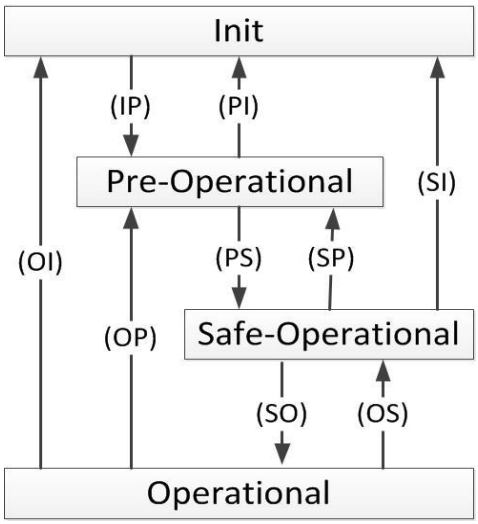
Chapter 3 Communication Register

3.1 EtherCAT Introduction

EtherCAT (Ethernet for Control Automation Technology) is an open real-time fieldbus technology originally developed by Beckhoff in Germany based on the Ethernet communication protocol and applied to the field of automation and industrial control. This technology is currently supported by the EtherCAT Technology Group (EtherCAT Technology Group; ETG) is responsible for supporting and promoting the future development of this technology.

The EtherCAT operating state architecture of the DTDM temperature controller is as follows:

Communication Layer: This protocol covers communication objects (PDOs, SDOs), as well as related communication object dictionaries.



Status	Description
Init	The thermostat was successfully initialized after power-on without any errors; There is no communication at the application layer.
Pre-Operational	The current status can be communicated using a mailbox.
Safe-Operational	PDO input data (TxPDO) can be read. PDO output data (RxPDO) cannot be received.
Operational	Periodic I/O communication is performed to process PDO output data (RxPDO).
Status Change Command	Description
IP	Start an email newsletter.
PI	Disconnect mailbox communication.

PS	Start updating the input data (TxPDO).
SP	Terminate the update of input data (TxPDO).
SO	Start updating the output data (RxPDO).
OS	Terminate the update of the output data (RxPDO).
OP	Terminate the update of input/output data.
SI	Terminate the update of input information and email newsletters.
OI	Terminate all input/output data updates and email communications.

3.1.1 Definition and Structure of EtherCAT OD

OD (Object Dictionary) is a core concept in the EtherCAT communication protocol, which is mainly used to describe and manage all the functions and parameters of slave devices. OD provides a structured way to define the data and services of a device and supports interaction with the master device.

Definition of OD

An OD is a collection of all the accessible objects of a device, which can be parameters, state information, or other data structures. The OD is designed so that the slave equipment can be flexibly configured and controlled by the master.

Structure of OD

The structure of an OD typically includes the following parts:

Name	Description
Object Entry	Each object item has a unique index value and can contain multiple attributes, such as data type, access permissions, and data length.
Index	Each object item is uniquely identified using an integer index, which is usually represented in hexadecimal terms.
Sub-index	For multiple attributes in an object item, use sub-indexes to subdivide.
Data Type	Each object item in OD has a specified data type, such as an integer, floating-point number, or string.
Access Rights	Defines how object items can be accessed, including read, write, or read/write.
Default Value	Some object items have default values that are initialized when the device boots up.

3.1.2 Definition of EtherCAT SDO

SDO (Service Data Object) is an important component of the EtherCAT communication protocol, which is mainly used for the transmission and configuration of non-real-time data. Here are some of the key features of SDOs:

Feature	Description
Configuration and management	The SDO is mainly used for the configuration and parameterization of the device, allowing the master to set up and manage the slave device in detail.
Data type	SDOs support a variety of data types, including basic data types (e.g., integers, floating-point numbers) and complex data structures (e.g., arrays and records).
How to access	SDOs typically use a request-response approach for data exchange, where the master can send a request to read or write the slave's parameters.
Non-real-time	Unlike PDOs, SDOs do not require real-time transmission, so they can be operated when the system is not busy.
Multi-level access	The SDO provides multi-level access to slave devices, allowing users to access and modify the parameters of the devices in a flexible manner.

3.1.3 Definition of EtherCAT PDO

PDO (Process Data Object) is an important concept in the EtherCAT communication protocol for the transmission of real-time data. Its main function is to enable fast data exchange between devices, especially in automation and control systems. Here are some of the key features of PDOs:

Feature	Description
Real-time	PDOs provide low-latency data transmission and are suitable for applications that require real-time reactions.
Data structure	PDOs can contain multiple data items, and each data item can be of different types of data, such as integers, floating-point numbers, and so on.
Configuration flexibility	The content and transmission of the PDO can be configured according to the user's needs, which makes the EtherCAT system flexible to suit different application requirements.
Transmission mode	PDO supports a variety of transmission modes, such as synchronous transmission and asynchronous transmission, to adapt to different control needs.
Mapping to EtherCAT hardware	The data from the PDO can be mapped directly to the hardware registers of the EtherCAT slaves, which increases the efficiency of data access.

Transmission modes: PDO supports a variety of transmission modes, such as synchronous transmission and asynchronous transmission, to adapt to different control needs.

Mapping to EtherCAT hardware: The data from the PDO can be mapped directly to the hardware registers of the EtherCAT slaves, which increases the efficiency of data access.

3.2 System Overview

3.2.1 PDO Mapping Configuration

The following table shows the PDO mapping configuration for data exchange using EtherCAT for DTDM thermostats, which is also defined in the XML file of the EtherCAT slave. The Receive PDO and Transmit PDO of each group can be matched with each other.

3.2.1.1 Receive PDO Mapping

DTDM04 Series Dedicated RxPDO

Item	Address	Content	Mapping OD: Subindex
RxPDO01	0x1600h	ID1 Target Temperature Value CH1~CH4	0x3001:01~04
RxPDO02	0x1601h	ID1 Output 1 Manipulation Value CH1~CH4	0x3002:01~04
RxPDO03	0x1602h	ID1 Output 2 Manipulation CH1~CH4	0x3003:01~04
RxPDO04	0x1603h	ID1 Execute/Stop CH1~CH4	0x3004:01~04
RxPDO05	0x1604h	ID1 Auto-Tuning CH1~CH4	0x3005:01~04
RxPDO06	0x1605h	ID1 Manual Switch Selection CH1~CH4	0x3006:01~04
RxPDO07	0x1606h	ID1 SV Selection CH1~CH4	0x3095:01~04
RxPDO08	0x1607h	ID2 Target Temperature Value CH1~CH4	0x3001:05~08
RxPDO09	0x1608h	ID2 Output 1 Operation Value CH1~CH4	0x3002:05~08
RxPDO10	0x1609h	ID2 Output 2 Operation Quantity CH1~CH4	0x3003:05~08
RxPDO11	0x160Ah	ID2 Execute/Stop CH1~CH4	0x3004:05~08
RxPDO12	0x160Bh	ID2 Auto-Tuning CH1~CH4	0x3005:05~08
RxPDO13	0x160Ch	ID2 Manual Switch Selection CH1~CH4	0x3006:05~08
RxPDO14	0x160Dh	ID2 SV Selection CH1~CH4	0x3095:05~08
RxPDO15	0x160Eh	ID3 Target Temperature Value CH1~CH4	0x3001:09~0C
RxPDO16	0x160Fh	ID3 Output 1 Operation Value CH1~CH4	0x3002:09~0C
RxPDO17	0x1610h	ID3 Output 2 Operation Quantity CH1~CH4	0x3003:09~0C
RxPDO18	0x1611h	ID3 Execute/Stop CH1~CH4	0x3004:09~0C
RxPDO19	0x1612h	ID3 Auto-Tuning CH1~CH4	0x3005:09~0C
RxPDO20	0x1613h	ID3 Manual Switch Selection CH1~CH4	0x3006:09~0C
RxPDO21	0x1614h	ID3 SV Selection CH1~CH4	0x3095:09~0C
RxPDO22	0x1615h	ID4 Target Temperature Value CH1~CH4	0x3001:0D~10
RxPDO23	0x1616h	ID4 Output 1 Manipulation Quantity CH1~CH4	0x3002:0D~10
RxPDO24	0x1617h	ID4 Output 2 Manipulation CH1~CH4	0x3003:0D~10
RxPDO25	0x1618h	ID4 Execute/Stop CH1~CH4	0x3004:0D~10
RxPDO26	0x1619h	ID4 Auto-Tuning CH1~CH4	0x3005:0D~10
RxPDO27	0x161Ah	ID4 Manual Switch Selection CH1~CH4	0x3006:0D~10

RxPDO28	0x161Bh	ID4 SV Selection CH1~CH4	0x3095:0D~10
RxPDO29	0x161Ch	ID5 Target Temperature Value CH1~CH4	0x3001:11~14
RxPDO30	0x161Dh	ID5 Output 1 Operation Quantity CH1~CH4	0x3002:11~14
RxPDO31	0x161Eh	ID5 Output 2 Operation Quantity CH1~CH4	0x3003:11~14
RxPDO32	0x161Fh	ID5 Execute/Stop CH1~CH4	0x3004:11~14
RxPDO33	0x1620h	ID5 Auto-Tuning CH1~CH4	0x3005:11~14
RxPDO34	0x1621h	ID5 Manual Switch Selection CH1~CH4	0x3006:11~14
RxPDO35	0x1622h	ID5 SV Selection CH1~CH4	0x3095:11~14
RxPDO36	0x1623h	ID6 Target Temperature Value CH1~CH4	0x3001:15~18
RxPDO37	0x1624h	ID6 Output 1 Operation Value CH1~CH4	0x3002:15~18
RxPDO38	0x1625h	ID6 Output 2 Operation Value CH1~CH4	0x3003:15~18
RxPDO39	0x1626h	ID6 Execute/Stop CH1~CH4	0x3004:15~18
RxPDO40	0x1627h	ID6 Auto-Tuning CH1~CH4	0x3005:15~18
RxPDO41	0x1628h	ID6 Manual Switch Selection CH1~CH4	0x3006:15~18
RxPDO42	0x1629h	ID6 SV Selection CH1~CH4	0x3095:15~18
RxPDO43	0x162Ah	ID7 Target Temperature Value CH1~CH4	0x3001:19~1C
RxPDO44	0x162Bh	ID7 Output 1 Manipulated Variable CH1~CH4	0x3002:19~1C
RxPDO45	0x162Ch	ID7 Output 2 Manipulated Variable CH1~CH4	0x3003:19~1C
RxPDO46	0x162Dh	ID7 Execute/Stop CH1~CH4	0x3004:19~1C
RxPDO47	0x162Eh	ID7 Auto-Tuning CH1~CH4	0x3005:19~1C
RxPDO48	0x162Fh	ID7 Manual Switch Selection CH1~CH4	0x3006:19~1C
RxPDO49	0x1630h	ID7 SV Selection CH1~CH4	0x3095:19~1C
RxPDO50	0x1631h	ID8 Target Temperature Value CH1~CH4	0x3001:1D~20
RxPDO51	0x1632h	ID8 Output 1 Operation Value CH1~CH4	0x3002: 1D~20
RxPDO52	0x1633h	ID8 Output 2 Manipulation Value CH1~CH4	0x3003: 1D~20
RxPDO53	0x1634h	ID8 Execute/Stop CH1~CH4	0x3004:1D~20
RxPDO54	0x1635h	ID8 Auto-Tuning CH1~CH4	0x3005:1D~20
RxPDO55	0x1636h	ID8 Manual Switch Selection CH1~CH4	0x3006:1D~20
RxPDO56	0x1637h	ID8 SV Selection CH1~CH4	0x3095:1D~20

DTDM08/16 Series Dedicated RxPDO

Item	Address	Content	Mapping OD: Subindex
RxPDO81	0x1650	ID1 Target Temperature Value	0x3201:01~10
RxPDO82	0x1651	ID1 Output 1 Operation Value	0x3202: 01~10
RxPDO83	0x1652	ID1 Execute/Stop	0x3203:01~10
RxPDO84	0x1653	ID1 Self-Tuning	0x3204:01~10
RxPDO85	0x1654	ID1 Manual Switch Selection	0x3223:01~10
RxPDO86	0x1655	ID2 Target Temperature Value	0x3201:11~20
RxPDO87	0x1656	ID2 Output 1 Manipulation Quantity	0x3202: 11~20

RxPDO88	0x1657	ID2 Execute/Stop	0x3203:11~20
RxPDO89	0x1658	ID2 Self-Tuning	0x3204:11~20
RxPDO90	0x1659	ID2 Manual Switch Selection	0x3223:11~20
RxPDO91	0x165A	ID3 Target Temperature Value	0x3201:21~30
RxPDO92	0x165B	ID3 Output 1 Operation Quantity	0x3202: 21~30
RxPDO93	0x165C	ID3 Execute/Stop	0x3203:21~30
RxPDO94	0x165D	ID3 Auto-Tuning	0x3204:21~30
RxPDO95	0x165E	ID3 Manual Switch Selection	0x3223:21~30
RxPDO96	0x165F	ID4 Target Temperature Value	0x3201:31~40
RxPDO97	0x1660	ID4 Output 1 Operation Value	0x3202: 31~40
RxPDO98	0x1661	ID4 Execute/Stop	0x3203:31~40
RxPDO99	0x1662	ID4 Auto-Tuning	0x3204:31~40
RxPDO100	0x1663	ID4 Manual Switch Selection	0x3223:31~40

3.2.1.2 Transmit PDO Mapping

DTDM04 Series Dedicated TxPDO

Item	Address	Content	Mapping OD: Subindex
TxPDO01	0x1A00h	ID1 Actual Temperature Value CH1~CH4	0x3000:01~04
TxPDO02	0x1A01h	ID1 LED Indicator Status (Channels) CH1~CH4	0x3008:01~04
TxPDO03	0x1A02h	ID1 Dynamic SV Value CH1~CH4	0x3009:01~04
TxPDO04	0x1A03h	ID1 Output 1 Manipulation Value CH1~CH4	0x3002:01~04
TxPDO05	0x1A04h	ID1 Output 2 Manipulation CH1~CH4	0x3003:01~04
TxPDO06	0x1A05h	ID1 Logical Operation Result 1~16	0x306D:01~10
TxPDO07	0x1A06h	ID1 DI Terminal Read CH1~CH4	0x306E:01~04
TxPDO08	0x1A07h	ID1 Error Message 01_05	0x30F8:01~05
TxPDO09	0x1A08h	ID2 Actual Temperature Value CH1~CH4	0x3000:05~08
TxPDO10	0x1A09h	ID2 LED Indicator Status (Channel) CH1~CH4	0x3008:05~08
TxPDO11	0x1A0Ah	ID2 Dynamic SV Value CH1~CH4	0x3009:05~08
TxPDO12	0x1A0Bh	ID2 Output 1 Operation Value CH1~CH4	0x3002:05~08
TxPDO13	0x1A0Ch	ID2 Output 2 Operation Quantity CH1~CH4	0x3003:05~08
TxPDO14	0x1A0Dh	ID2 Logical Operation Result 1~16	0x306D:11~20
TxPDO15	0x1A0Eh	ID2 DI Terminal Read CH1~CH4	0x306E:05~08
TxPDO16	0x1A0Fh	ID2 Error Message 01_05	0x30F8:09~0D
TxPDO17	0x1A10h	ID3 Actual Temperature Value CH1~CH4	0x3000:09~0C
TxPDO18	0x1A11h	ID3 LED Indicator Status (Channel) CH1~CH4	0x3008:09~0C
TxPDO19	0x1A12h	ID3 Dynamic SV Value CH1~CH4	0x3009:09~0C
TxPDO20	0x1A13h	ID3 Output 1 Operation Value CH1~CH4	0x3002:09~0C

TxPDO21	0x1A14h	ID3 Output 2 Operation Quantity CH1~CH4	0x3003:09~0C
TxPDO22	0x1A15h	ID3 Logical Operation Result 1~16	0x306D:21~30
TxPDO23	0x1A16h	ID3 DI Terminal Read CH1~CH4	0x306E:09~0C
TxPDO24	0x1A17h	ID3 Error Message 01_05	0x30F8:11~15
TxPDO25	0x1A18h	ID4 Actual Temperature Value CH1~CH4	0x3000:0D~10
TxPDO26	0x1A19h	ID4 LED Indicator Status (Channel) CH1~CH4	0x3008:0D~10
TxPDO27	0x1A1Ah	ID4 Dynamic SV Value CH1~CH4	0x3009:0D~10
TxPDO28	0x1A1Bh	ID4 Output 1 Manipulation Quantity CH1~CH4	0x3002:0D~10
TxPDO29	0x1A1Ch	ID4 Output 2 Manipulation CH1~CH4	0x3003:0D~10
TxPDO30	0x1A1Dh	ID4 Logical Operation Result 1~16	0x306D:31~40
TxPDO31	0x1A1Eh	ID4 DI Terminal Reading CH1~CH4	0x306E:0D~10
TxPDO32	0x1A1Fh	ID4 Error Message 01_05	0x30F8:19~1D
TxPDO33	0x1A20h	ID5 Actual Temperature Value CH1~CH4	0x3000:11~14
TxPDO34	0x1A21h	ID5 LED Indicator Status (Channel) CH1~CH4	0x3008:11~14
TxPDO35	0x1A22h	ID5 Dynamic SV Value CH1~CH4	0x3009:11~14
TxPDO36	0x1A23h	ID5 Output 1 Operation Quantity CH1~CH4	0x3002:11~14
TxPDO37	0x1A24h	ID5 Output 2 Operation Quantity CH1~CH4	0x3003:11~14
TxPDO38	0x1A25h	ID5 Logical Operation Result 1~16	0x306D:41~50
TxPDO39	0x1A26h	ID5 DI Terminal Reading CH1~CH4	0x306E:11~14
TxPDO40	0x1A27h	ID5 Error Message 01_05	0x30F8:21~25
TxPDO41	0x1A28h	ID6 Actual Temperature Value CH1~CH4	0x3000:15~18
TxPDO42	0x1A29h	ID6 LED Indicator Status (Channel) CH1~CH4	0x3008:15~18
TxPDO43	0x1A2Ah	ID6 Dynamic SV Value CH1~CH4	0x3009:15~18
TxPDO44	0x1A2Bh	ID6 Output 1 Operation Value CH1~CH4	0x3002:15~18
TxPDO45	0x1A2Ch	ID6 Output 2 Operation Value CH1~CH4	0x3003:15~18
TxPDO46	0x1A2Dh	ID6 Logical Operation Result 1~16	0x306D:51~60
TxPDO47	0x1A2Eh	ID6 DI Terminal Read CH1~CH4	0x306E:15~18
TxPDO48	0x1A2Fh	ID6 Error Message 01_05	0x30F8:29~2D
TxPDO49	0x1A30h	ID7 Actual Temperature Value CH1~CH4	0x3000:19~1C
TxPDO50	0x1A31h	ID7 LED Light Status (Channel) CH1~CH4	0x3008:19~1C
TxPDO51	0x1A32h	ID7 Dynamic SV Value CH1~CH4	0x3009:19~1C
TxPDO52	0x1A33h	ID7 Output 1 Manipulated Variable CH1~CH4	0x3002:19~1C
TxPDO53	0x1A34h	ID7 Output 2 Manipulated Variable CH1~CH4	0x3003:19~1C
TxPDO54	0x1A35h	ID7 Logical Operation Result 1~16	0x306D: 61~70
TxPDO55	0x1A36h	ID7 DI Terminal Reading CH1~CH4	0x306E:19~1C
TxPDO56	0x1A37h	ID7 Error Message 01_05	0x30F8: 31~35
TxPDO57	0x1A38h	ID8 Actual Temperature Value CH1~CH4	0x3000: 1D~20
TxPDO58	0x1A39h	ID8 LED Indicator Status (Channel) CH1~CH4	0x3008: 1D~20
TxPDO59	0x1A3Ah	ID8 Dynamic SV Value CH1~CH4	0x3009: 1D~20

TxPDO60	0x1A3Bh	ID8 Output 1 Operation Value CH1~CH4	0x3002: 1D~20
TxPDO61	0x1A3Ch	ID8 Output 2 Manipulation Value CH1~CH4	0x3003: 1D~20
TxPDO62	0x1A3Dh	ID8 Logical Operation Result 1~16	0x306D: 71~80
TxPDO63	0x1A3Eh	ID8 DI Terminal Read CH1~CH4	0x306E: 1D~20
TxPDO64	0x1A3Fh	ID8 Error Message 01_05	0x30F8: 39~3D
TxPDO65	0x1A40h	IO Expansion Unit 1 to 8 DI Read Values	0x3100: 01~08
TxPDO66	0x1A41h	Current output values for 128 channels of IO expansion units 1 to 8.	0x3108: 01~80

DTDM08/16 Series Dedicated TxPDO

Item	Address	Content	Mapping OD: Subindex
TxPDO81	0x1A50	ID1 Actual Temperature (Channel)	0x3200: 01~10
TxPDO82	0x1A51	ID1 LED Indicator Status (Channel)	0x3205: 01~10
TxPDO83	0x1A52	ID1 Dynamic Target Value	0x3206: 01~10
TxPDO84	0x1A53	ID1 Output 1 Operation Value	0x3202: 01~10
TxPDO85	0x1A54	ID1 Error Message 01_08	0x30F8: 01~08
TxPDO86	0x1A55	ID2 Actual Temperature (Channel)	0x3200: 11~20
TxPDO87	0x1A56	ID2 LED Indicator Status (Channel)	0x3205: 11~20
TxPDO88	0x1A57	ID2 Dynamic Target Value	0x3206: 11~20
TxPDO89	0x1A58	ID2 Output 1 Manipulation Quantity	0x3202: 11~20
TxPDO90	0x1A59	ID2 Error Message 01_08	0x30F8: 09~10
TxPDO91	0x1A5A	ID3 Actual Temperature (Channel)	0x3200: 21~30
TxPDO92	0x1A5B	ID3 LED Indicator Status (Channel)	0x3205: 21~30
TxPDO93	0x1A5C	ID3 Dynamic Target Value	0x3206: 21~30
TxPDO94	0x1A5D	ID3 Output 1 Operation Quantity	0x3202: 21~30
TxPDO95	0x1A5E	ID3 Error Message 01_08	0x30F8: 11~18
TxPDO96	0x1A5F	ID4 Actual Temperature (Channel)	0x3200: 31~40
TxPDO97	0x1A60	ID4 LED Light Status (Channel)	0x3205: 31~40
TxPDO98	0x1A61	ID4 Dynamic Target Value	0x3206: 31~40
TxPDO99	0x1A62	ID4 Output 1 Operation Value	0x3202: 31~40
TxPDO100	0x1A63	ID4 Error Message 01_08	0x30F8: 19~20
TxPDO101	0x1A64	Error Code	0x2009:00
TxPDO102	0x1A65	SSR Actual Output Quantity CH01_16	0x311C: 01~10
TxPDO103	0x1A66	SSR Actual Output Quantity CH17_32	0x311C: 11~20
TxPDO104	0x1A67	SSR Actual Output Quantity CH33_48	0x311C: 21~30
TxPDO105	0x1A68	SSR Actual Output Quantity CH49_64	0x311C: 31~40
TxPDO106	0x1A69	SSR Actual Output Quantity CH65_80	0x311C: 41~50
TxPDO107	0x1A6A	SSR Actual Output Quantity CH81_96	0x311C: 51~60
TxPDO108	0x1A6B	SSR Actual Output Quantity CH97_112	0x311C: 61~70

TxPDO109	0x1A6C	SSR Actual Output Quantity CH113_128	0x311C: 71~80

3.2.2 Object Specification Description

Object Type:

Object type	Description
Variable	A single value, such as an Unsigned8, Boolean, Float, Interger16, etc.
Array	An object with multiple data fields composed of multiple variables of the same data type, such as an Unsigned16 array. The Sub-index 0 data type belongs to Unsigned8 and is therefore not array data.
Record	An object with multiple data fields consisting of multiple variables of different data types. Sub-index0 belongs to Unsigned8, so it is not a Record.

Data Type:

Data type	Data size	Range
Boolean	1 bit	0~1
Unsigned8(UINT8)	1 byte	0~255
Unsigned16(UINT16)	2 bytes	0~65535
Unsigned32(UINT32)	4 bytes	0~4294967295
Integer8(INT8)	1 byte	-128~127
Integer16(INT16)	2 bytes	-32768~327671
Integer32(INT32)	4 bytes	-2147483648~2147483647
Visible string	-	-

Object Dictionary:

- Communication OD 1000H group

OD No.	Object type	Name	Data type	Read/Write	PDO mapping
1000H	Variable	Device type	Unsigned32	R	N
1001H	Variable	Error register	Unsigned8	R	N
1008H	Variable	Device name	String	R	N
100AH	Variable	Software version	String	R	N
1018H	Record	Identity	Identity	R	N
1600H~1663H	Record	Receive PDO mapping	PDO mapping	R	N
1A00H~1A6CH	Record	Transmit PDO mapping	PDO mapping	R	N
1C12H	Array	RxPDO assign	Unsigned16	RW	N
1C13H	Array	TxPDO assign	Unsigned16	RW	N

- DTDM-ECAT system OD2XXXH group

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
2000H	V	FW version	UINT16	R	N	

2001H	V	LED Status	UINT16	R	N	b0=Comm; b1=RS485;
						b2=Err; b3=MSR;
						b4=MSG; b5=NSR;
						b6=NSG

2002H	V	Number of SSR	UINT8	R	N	
2003H	V	Number of DTDM-M/E	UINT8	R	N	
2004H	V	Number of DTDM-DO modules	UINT8	R	N	
2005H	V	Number of DTDM-DI modules	UINT8	R	N	
2006H	V	Time out interval of DTDM data collection	UINT16	RW	N	Unit: 1ms
2007H	V	Time out interval of SSR data collection	UINT8	RW	N	Unit: 100ms
2008H	V	Card Error Code	UINT16	R	N	b0: DAVE_FAILURE b1: WATCHDOG_RESET b2: SPI_SCAN_FAIL b3: SPI_ALIGN_FAIL. b4: SPI_NO_IRQ b5: SPI_TX_CRC b6: SPI_RX_CRC
2009H	V	Error Code	UINT16	R	N	b0 = The number of DTDMs is greater than 8 b1 = same knob number b2=Monitor leak b3=DTDM collection failed b4=Error in collecting checkcodes b5=Write error b6=Collection is not complete

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						b7=CAN busy b8=CAN content error b9=CAN buffer error
200AH	V	DTDM-ECAT Status	UINT16	R	N	0=Reset; 1=Collecting; 2=Ready
200BH	A	History Error Code	UINT16	R	N	
200CH	V	Model	UINT16	R	N	DTN_ECAT = 0, DTDM_ECAT = 1, DTDM_4CH_ECAT = 4, DTDM_8CH_ECAT = 5, DTDM_16CH_ECAT = 6
200DH	V	Auto Assign	UINT16	R/W	N	1=Enable, 0=Disable
200EH	A	Auto Assign Source Map	UINT8	R/W	N	
200FH	A	Auto Assign Function Map	UINT8	R/W	N	
2010H	V	Rotary_SW_Value-IDx	UINT8	R	N	
2011H	V	FW_version-IDx	UINT16	R	N	
2012H	V	Model	UINT8	R	N	0=DTDM04MC 1=DTDM04ML 2=DTDM04EC 3=DTDM04EL 4=DTDMDO16P 5=DTDMDO16N 6=DTDMDI16 7=DTDMECAT 8=DTDMDO08S 9= DTDMDO08R 10=DTDM16MT 11=DTDM08MP 12=DTDM16ET 13=DTDM08EP 14=DTDM16MT_E 15=DTDM08MP_E
2013H	V	Physical_Position-IDx	UINT8	R	N	Count from the left
2014H	V	Connection Status	UINT8	R	N	0=offline; 1=Collecting; 2=In the connection; 3=Collection failed
220FH	A	Serial Number	UINT16	R	N	

- DTDM04-series temperature controller parameters = >OD 3000H ~ OD 30F7H group

- The architecture is that each measuring machine has 4 channels, and up to 8 can be connected in series, so it can reach 4*8=32 channels, so the following OD content will contain the data of 32 sub index (except for a small number of OD numbers with IDs with names will be defined in different ways for more data).
  1) For example, in the OD number of 3000H (actual temperature), the content will contain the actual temperature values of 32 channels with sub index 1~32.
  2) For example, in the OD number of 30B0H (PID setting ID1), because the name has an ID, it will contain multiple PID data, and because of the large amount of data, one OD number will only contain all the PID contents of 4 channels of 1 measuring machine, but not all 32 channels of 8 measuring machines.

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
3000H	A	Active_PV-IDx-CHx	INT16	R	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current) This is the PV value assigned by the PV source, which is not necessarily equivalent to the PV value of hardware IN1~IN4
3001H	A	Active_SV-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3002H	A	MV1-IDx-CHx	UINT16	RW	Y	Write --> the amount of manual output
3003H	A	MV2-IDx-CHx	UINT16	RW	Y	Write-> manual output is only valid under heating cooling control
3004H	A	Controller_status-IDx-CHx	UINT8	RW	Y	0=Standby; 1=Execution; 2=End of procedure; 3=Program pause; 4=Program skip step
3005H	A	Auto_Tune-IDx-CHx	UINT8	RW	Y	0=Stop; 1=Execution
3006H	A	Control_mode_transfer-IDx-CHx	UINT8	RW	Y	0=Automatic; 1=Manual
3007H	A	SP_Ramp_Rate-IDx-CHx	INT16	RW	Y	Unit: 0.1°C or °F/min (thermocouple and platinum resistance); Unitless (analog voltage/current)
3008H	A	Channel_Status-IDx-CHx	UINT16	R	Y	b0=ALM3; b1=ALM2; b2=°C; b3=°F; b4=ALM1; b5=OUT2; b6=OUT1; b7=AT
3009H	A	Dynamic_SV-IDx-CHx	INT16	R	Y	You can select the display when the program or slope is controlled
300AH	A	Current_Pattern-IDx-CHx	UINT8	R	N	It can be displayed when it can be programmed
300BH	A	Current_Step-IDx-CHx	UINT8	R	N	It can be displayed when it can be programmed
300CH	A	Remaining_Time_Minute-IDx-CHx	UINT16	R	N	It can be displayed when it can be programmed
300DH	A	Remaining_Time_Second-IDx-CHx	UINT16	R	N	It can be displayed when it can be programmed
300EH	A	Current_PID_Group-IDx-CHx	UINT8	R	N	It is displayed when multiple groups of PIDs are controlled
300FH	A	Remaining_Looping_Times-IDx-CHx	UINT8	R	N	It can be displayed when it can be programmed
3010H	A	Ramp_Soak_Status-IDx-CHx	UINT8	R	N	bit0=END (End of program) bit1=HOLD (program pause)

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						bit2=STOP (program termination)
3011H	A	Resume_Program_Status-IDx-CHx	UINT8	RW	N	0=The program stateis not stored, andthe program controlwill be restartedafter powering on 1=Store the programstate, and controlthe steps beforepowering off afterpower-on
3012H	A	AO Scale High	INT16	RW	N	
3013H	A	AO Scale Low	INT16	RW	N	
3014H	A	DO Period	UINT16	RW	N	Unit: 0.1 second, 0 means disabled
3015H	A	DO Max	UINT16	RW	N	Unit: 0.1%
3016H	A	DO Min	UINT16	RW	N	Unit: 0.1%
3017H	A	Feedforward Output	INT16	RO	N	Feedforward Output The Final Output = Pid Out + FF Output
3018H	A	Feedforward Delay	UINT16	RW	N	FF Delay Time(0.1sec)
3019H	A	Feedforward FF1 Time	UINT16	RW	N	FF1 Execution Time (0.1sec)
301AH	A	Feedforward FF1 Output Type	UINT8	RW	N	FF1 rise/fall from 0 to FF1 Value with below style: 0:Instant Step 1:Exponential
301BH	A	Feedforward FF1 Output Value	INT16	RW	N	FF1 Final Value, unit 0.1%
301CH	A	Feedforward FF2 Time	UINT16	RW	N	FF2 Execution Time(0.1sec) FF2 start with the last FF value then rise/fall to FF2 Value
301DH	A	Feedforward FF2 Output Type	UINT8	RW	N	FF1 rise/fall from last FF Value to FF2 Value with below style: 0:Instant Step 1:Exponential
301EH	A	Feedforward FF2 Output Value	INT16	RW	N	FF2 Final Value, unit 0.1%
301FH	A	Feedforward FF3 Time	UINT16	RW	N	FF3 Execution Time(0.1sec) FF3 start with the last FF value then down to 0
3020H	A	Force Active Time	UINT16	RW	N	Force Feedforward Control Active Time since triggered unit [0.1s]
3021H	A	OL Source Function Assignment	UINT8	RW	N	0=Off;1=MV1; 2=MV2; 3=PV; 4=SV; 5=dynaSV; 6=PV-SV;
3022H	A	OL Source Channel Assignment	UINT8	RW	N	0=Off;1~4=CH1 ~CH4 (Input, Control)

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
3023H	A	OL Operation Type	UINT8	RW	N	0:Off, 1:Interpolated, 2:Stepped
3024H	A	OL Source Value	INT16	RO	N	
3025H	A	OL Output Value	INT16	RO	N	
3026H	A	Output Offset	INT16	RW	N	
3027H	A	OL Output Unit	UINT8	RW	N	Pending Feature: 0 = Source Value Unit; 1 = No Unit; 2 = mV (0.1%); 3 = Temperature (0.1°C)
3028H	A	OL Input Point #1 ~ #10 ID1	INT16	RW	N	
3029H	A	OL Input Point #1 ~ #10 ID2	INT16	RW	N	
302AH	A	OL Input Point #1 ~ #10 ID3	INT16	RW	N	
302BH	A	OL Input Point #1 ~ #10 ID4	INT16	RW	N	
302CH	A	OL Input Point #1 ~ #10 ID5	INT16	RW	N	
302DH	A	OL Input Point #1 ~ #10 ID6	INT16	RW	N	
302EH	A	OL Input Point #1 ~ #10 ID7	INT16	RW	N	
302FH	A	OL Input Point #1 ~ #10 ID8	INT16	RW	N	
3030H	A	OL Output Point #1 ~ #10 ID1	INT16	RW	N	
3031H	A	OL Output Point #1 ~ #10 ID2	INT16	RW	N	
3032H	A	OL Output Point #1 ~ #10 ID3	INT16	RW	N	
3033H	A	OL Output Point #1 ~ #10 ID4	INT16	RW	N	
3034H	A	OL Output Point #1 ~ #10 ID5	INT16	RW	N	
3035H	A	OL Output Point #1 ~ #10 ID6	INT16	RW	N	
3036H	A	OL Output Point #1 ~ #10 ID7	INT16	RW	N	
3037H	A	OL Output Point #1 ~ #10 ID8	INT16	RW	N	
3038H	A	Model Output Switch	UINT16	RW	N	Default: 0 = Disabled; 1 = Enabled. Once this feature is enabled, the feedforward output will be calculated automatically.
3039H	A	Model Output Percent	UINT16	RW	N	Unit: %
303AH	A	Model Output Gain	UINT16	RW	N	Unit: 0.1
303BH	A	Model Output Time Constant	UINT16	RW	N	Unit: 0.1 seconds
303CH	A	Model Output Base Temperature	UINT16	RW	N	Unit: Corresponds to input type

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
303DH	A	Model Output Value	UINT16	RO	N	The output quantity calculated by the model output function, unit: 0.1%.
3040H	A	Input_Type-IDx-CHx	UINT8	RW	Y	0=TC-K; 1=TC-J; 2=TC-T; 3=TC-E; 4=TC-N; 5=TC-R; 6=TC-S; 7=TC-B; 8=TC-L; 9=TC-U; 10=TC-TXK; 11=TC-C; 12=TC-D; 13=JPT100; 14=PT100; 15=PT1000; 16=Ni120; 17=Cu50; 18=0~5V; 19=0~10V; 20=0~20mA; 21=4~20mA; 22=0~50mV
3041H	A	PV-F-IDx-CHx	UINT8	RW	N	
3042H	A	PV-R-IDx-CHx	UINT16	RW	N	Unit: 0.1°C
3043H	A	PV-Offset-IDx-CHx	INT16	RW	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3044H	A	PV-Gain-IDx-CHx	INT16	RW	N	Unit: 0.001
3045H	A	Display_Update_Time-IDx-CHx	UINT16	RW	N	Unit: 0.1 seconds
3046H	A	Display_Value_Scaling_Point_1-IDx-CHx	INT16	RW	N	Unit: 1 display point is valid only for analog inputs
3047H	A	Display_Value_Scaling_Point_2-IDx-CHx	INT16	RW	N	Unit: 1 display point is valid only for analog inputs
3048H	A	Cold_Junction_Compensation-IDx-CHx	UINT8	RW	N	0=Internal; 1=External
3049H	A	Enable_Input_Linearization-IDx-CHx	UINT8	RW	N	0=Close; 1=Enabled
304AH	A	Operation_Type-IDx-CHx	UINT8	RW	N	0=fixed value; 1 = amount of deviation
304BH	A	Input_Linearization_In_Value-IDx-CHx	INT16	R	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
304CH	A	Input_Linearization_Out_Value-IDx-CHx	INT16	R	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
304DH	A	Input_Linearization_InOut_Table-ID1	INT16	RW	N	Each group of IDs provides the following contents of CH1~CH4 respectively: Enter the lower limit value for the line table; Input points 1~14 for the line table;
304EH	A	Input_Linearization_InOut_Table-ID2	INT16	RW	N	
304FH	A	Input_Linearization_InOut_Table-ID3	INT16	RW	N	
3050H	A	Input_Linearization_InOut_Table-ID4	INT16	RW	N	
3051H	A	Input_Linearization_InO	INT16	RW	N	

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
		ut_Table-ID5				Enter the upper limit value for the line table; The lower limit value of the line table output; The output point of the line table is 1~14; The upper limit of the line table output
3052H	A	Input_Linearization_InOut_Table-ID6	INT16	RW	N	
3053H	A	Input_Linearization_InOut_Table-ID7	INT16	RW	N	
3054H	A	Input_Linearization_InOut_Table-ID8	INT16	RW	N	
3055H	A	Input_PV-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3060H	A	PO_Source_Channel_Assignment-IDx-CHx	UINT8	RW	Y	0~3=CH1~CH4
3061H	A	PO_Source_Function_Assignment-IDx-CHx	UINT8	RW	Y	0=Close; 1=MV1; 2=MV2
3062H	A	PO_Output_Period-IDx-CHx	UINT16	RW	Y	Unit: 0.1 seconds; 0 means closed
3063H	A	PO_Output_Max-IDx-CHx	UINT16	RW	N	Unit:0.1%
3064H	A	PO_Output_Min-IDx-CHx	UINT16	RW	N	Unit:0.1%
3065H	A	PO_Output_Invert-IDx-CHx	UINT8	RW	N	0=Positive; 1=Reverse
3066H	A	ACO_Source_Channel_Assignment-IDx-CHx	UINT8	RW	Y	0~3=CH1~CH4
3067H	A	ACO_Source_Function_Assignment-IDx-CHx	UINT8	RW	Y	0=MV1; 1=MV2; 2=PV; 3=SV; 4=Dynamic SV; 5=PV-SV
3068H	A	ACO_Update_Time-IDx-CHx	UINT16	RW	N	Unit: 0.1 seconds, 0 means off
3069H	A	ACO_Low_Scaling_Value-IDx-CHx	INT16	RW	Y	Low> High = Reverse
306AH	A	ACO_High_Scaling_Value-IDx-CHx	INT16	RW	Y	Low> High = Reverse
306BH	A	DO_Source_Function_Assignment-IDx-CHx	UINT8	RW	Y	0=OFF H11~H43=Alarm Status (Hxy=CHx-ALMy · For example: H13=CH1-ALM3) H50~H5F=LOG1~LOG16
306CH	A	DO_Output_Invert-IDx-CHx	UINT8	RW	Y	0=Positive; 1=Reverse
306DH	A	LOGIC_FUNCTION_OUTPUT IDx CHx	UINT8	R	Y	0=OFF; 1=ON
306EH	A	DI_Status-IDx-CHx	UINT8	R	Y	0=OFF; 1=ON
306FH	A	Event_Operation-IDx-SETx	UINT8	RW	N	0=Disable 1=SV switching 2=Run/Stop toggle 3=Auto/Manual 4=AT Stop/Start Switch 5 = +1 for PID group 6 = PID group +2 7 = PID group +3 8=Stop slope control

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						9=Reset ALL ALM 10=Reset ALM1 11=Reset ALM2 12=Reset ALM3 13=Profile Start 14=Profile Stop 15=Profile Advance 16=Profile Hold
3070H	A	EVENT_INPUT_SEL_APPILED_CH-ID1	UINT8	RW	N	Each group of IDs provides the following information for EVENT1~8: Enter the source selection (Refer to Section 5.2.2 [State Database] of the DTDM Host Manual)
3071H	A	EVENT_INPUT_SEL_APPILED_CH-ID2	UINT8	RW	N	
3072H	A	EVENT_INPUT_SEL_APPILED_CH-ID3	UINT8	RW	N	
3073H	A	EVENT_INPUT_SEL_APPILED_CH-ID4	UINT8	RW	N	
3074H	A	EVENT_INPUT_SEL_APPILED_CH-ID5	UINT8	RW	N	
3075H	A	EVENT_INPUT_SEL_APPILED_CH-ID6	UINT8	RW	N	
3076H	A	EVENT_INPUT_SEL_APPILED_CH-ID7	UINT8	RW	N	
3077H	A	EVENT_INPUT_SEL_APPILED_CH-ID8	UINT8	RW	N	
3078H	A	Alarm_1_Mode-IDx-CHx	UINT8	RW	Y	Please refer to Section 4.2 [Alarm Function] setting in the DTDM host manual
3079H	A	Alarm_1_Delay-IDx-CHx	UINT8	RW	N	Unit: seconds
307AH	A	Alarm_1_Option-IDx-CHx	UINT8	RW	N	b0 = standby; b1=output reverse; b2=hold; b3 = peak record
307BH	A	Alarm_1_High-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
307CH	A	Alarm_1_Low-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
307DH	A	Alarm_2_Mode-IDx-CHx	UINT8	RW	Y	Please refer to Section 4.2 [Alarm Function] setting in the DTDM host manual
307EH	A	Alarm_2_Delay-IDx-CHx	UINT8	RW	N	Unit: seconds
307FH	A	Alarm_2_Option-IDx-CHx	UINT8	RW	N	b0 = standby; b1=output reverse; b2: hold; B3: Peak record
3080H	A	Alarm_2_High-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance);

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						Unitless (analog voltage/current)
3081H	A	Alarm_2_Low-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3082H	A	Alarm_3_Mode-IDx-CHx	UINT8	RW	Y	Please refer to Section 4.2 [Alarm Function] setting in the DTDM host manual
3083H	A	Alarm_3_Delay-IDx-CHx	UINT8	RW	N	Unit: seconds
3084H	A	Alarm_3_Option-IDx-CHx	UINT8	RW	N	b0 = standby; b1=output reverse; b2=hold; b3 = peak record
3085H	A	Alarm_3_High-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3086H	A	Alarm_3_Low-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3087H	A	Alarm_Reset-IDx-CHx	UINT8	W	Y	b0=Alarm1; b1=Alarm2; b2=Alarm3; (bit=ON)
3088H	A	Alarm_1_Peak High-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3089H	A	Alarm_1_Peak Low-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
308AH	A	Alarm_2_Peak High-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
308BH	A	Alarm_2_Peak Low-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
308CH	A	Alarm_3_Peak High-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
308DH	A	Alarm_3_Peak Low-IDx-CHx	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance);

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						Unitless (analog voltage/current)
3090H	A	PV_Source_Assignment-IDx-CHx	UINT8	RW	Y	1=In1; 2=In2; 3=In3; 4=In4; 5=swIn1; 6=swIn2
3091H	A	Loop_Mode-IDx-CHx	UINT8	RW	Y	0=Single; 1=Cascade
3092H	A	Auto_Control_Mode-IDx-CHx	UINT8	RW	Y	0=PID; 1=ONOFF; 2=Program PID
3093H	A	Control_Action-IDx-CHx	UINT8	RW	N	0=Reverse; 1=Direct; 2=Heating and Cooling
3094H	A	PID_Mode_Selection-IDx-CHx	UINT8	RW	N	0=Standard; 1=Fast
3095H	A	SetValue_Selection-IDx-CHx	UINT8	RW	Y	0=SV1; 1=SV2
3096H	A	SV1-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3097H	A	SV2-IDx-CHx	INT16	RW	Y	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3098H	A	SV-H-IDx-CHx	INT16	RW	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
3099H	A	SV-L-IDx-CHx	INT16	RW	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
309AH	A	Input_Fail_Power_Level-MV1-IDx-CHx	UINT16	RW	Y	Unit:0.1% It is not limited by the upper and lower limits of the MV
309BH	A	Input_Fail_Power_Level-MV2-IDx-CHx	UINT16	RW	N	Unit: 0.1% Only Valid in H/C is not limited by the upper and lower limits of MV
309CH	A	Standby_Power_Level-MV1-IDx-CHx	UINT16	RW	Y	Unit:0.1% It is not limited by the upper and lower limits of the MV
309DH	A	Standby_Power_Level-MV2-IDx-CHx	UINT16	RW	N	Unit:0.1% It is not limited by the upper and lower limits of the MV
309EH	A	Manual_MV1-IDx-CHx	UINT16	RW	Y	Unit:0.1% It is not limited by the upper and lower limits of the MV
309FH	A	Manual_MV2-IDx-CHx	UINT16	RW	Y	Unit:0.1% It is not limited by the upper and lower limits of the MV

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
30A0H	A	PDOF-IDx-CHx	UINT16	RW	N	Unit:0.1%
30A1H	A	Deadband-IDx-CHx	INT16	RW	N	Unit: 0.1°C (0.1°F).
30A2H	A	OUT_TS-IDx-CHx	INT16	RW	N	Effective when ON-OFF is controlled
30A3H	A	OUT2_TS-IDx-CHx	INT16	RW	N	Effective when ON-OFF is controlled
30A4H	A	Slope_program_time_unit-IDx-CHx	UINT8	RW	N	0=points; 1=seconds
30A5H	A	Starting_Pattern-IDx-CHx	UINT8	RW	N	
30A6H	A	Starting_Step-IDx-CHx	UINT8	RW	N	
30A7H	A	Autotune PB Ratio	UINT16	RW	N	Pending Feature: Allows users to adjust the auto-tuning PB result, PB = PB' × PB Ratio / 100
30A8H	A	Autotune Ti Ratio	UINT16	RW	N	Pending Feature: Allows users to adjust the auto-tuning TI result, TI = TI' × TI Ratio / 100
30A9H	A	PV Stable Range	UINT16	RW	N	Pending Feature: Determines that temperature fluctuations within this value can be considered stable
30AAH	A	Starting_Slope-IDx-CHx	INT16	RW	N	Unit: 0.1°C (0.1°F).
30ABH	A	Waiting_Temperature-IDx-CHx	INT16	RW	N	Unit: 0.1°C (0.1°F).
30ACH	A	Waiting_Time-IDx-CHx	UINT16	RW	N	Unit: minutes or seconds
30ADH	A	MV1_TOP_BTM_Limit-IDx-CHx	UINT16	RW	N	Unit: 0.1%; Manual control and Invalid under ON-OFF control
30AEH	A	MV2_TOP_BTM_Limit-IDx-CHx	UINT16	RW	N	Unit: 0.1%; Manual control and Invalid under ON-OFF control
30AFH	A	AT_SV_Ratio-IDx-CHx	UINT16	RW	N	Unit: 1%
30B0H	A	PID Setting Part01 ID1	UINT16	RW	Y	Each group of IDs provides the following contents of CH1~CH4 respectively: proportional bands; integration time; differential time; integration time on the cooling side; cooling-side differential time; Iof; Alpha; Beta; Gamma
30B1H	A	PID Setting Part01 ID2	UINT16	RW	Y	
30B2H	A	PID Setting Part01 ID3	UINT16	RW	Y	
30B3H	A	PID Setting Part01 ID4	UINT16	RW	N	
30B4H	A	PID Setting Part01 ID5	UINT16	RW	N	
30B5H	A	PID Setting Part01 ID6	UINT16	RW	N	
30B6H	A	PID Setting Part01 ID7	UINT16	RW	N	
30B7H	A	PID Setting Part01 ID8	UINT16	RW	N	
30B8H	A	PID_Group_Selection-IDx-CHx	UINT8	RW	N	0=Group 1; 1=Group 2; 2=Group 3; 3=Group 4; 4=Auto
30B9H	A	SV_at_which_PID_Group_1to2-IDx-CHx	INT16	RW	N	The switching temperature of Group

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						2~4 should be arranged from small to large
30BAH	A	SV_at_which_PID_Group_2to3-IDx-CHx	INT16	RW	N	The switching temperature of Group 2~4 should be arranged from small to large
30BBH	A	SV_at_which_PID_Group_3to4-IDx-CHx	INT16	RW	N	The switching temperature of Group 2~4 should be arranged from small to large
30BCH	A	PID Setting Part02 ID1	UINT16	RW	N	Each group of IDs provides the following contents of CH1~CH4 respectively: Proportional band 1~4; Integration time: 1~4; Differential time 1~4; Cooling side ratio zone 1~4; The integration time on the cooling side is 1~4; Cooling side differentiation time 1~4;
30BDH	A	PID Setting Part02 ID2	UINT16	RW	N	
30BEH	A	PID Setting Part02 ID3	UINT16	RW	N	
30BFH	A	PID Setting Part02 ID4	UINT16	RW	N	
30C0H	A	PID Setting Part02 ID5	UINT16	RW	N	
30C1H	A	PID Setting Part02 ID6	UINT16	RW	N	
30C2H	A	PID Setting Part02 ID7	UINT16	RW	N	
30C3H	A	PID Setting Part02 ID8	UINT16	RW	N	
30CCH	A	Cascade_Slave_SV Mode-IDx-SETx	UINT8	RW	N	0=Absolute; 1 = Deviation mode
30CDH	A	Cascade_Slave_SV_Setting-IDx-SETx	INT16	RW	N	Unit: 0.1°C/°F (thermocouple and platinum resistance); Unitless (analog voltage/current)
30CEH	A	Cascade_Slave_AT_SV_Calb-IDx-SETx	UINT8	RW	N	Autotuning mode: 2=Slave AT; 3=Master AT One-key calibration: When the read status is 9, any value can be written to update the upper and lower limits of the secondary SV
30CFH	V	Temperate Alarm Result	UINT8	RW	N	0=Disable; 1=Enable When enabled, if an alarm occurs, the action will only be activated once and will not be automatically restored
30D0H	A	SV_of_Step-ID1-CHx	INT16	RW	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
30D1H	A	SV_of_Step-ID2-CHx	INT16	RW	N	
30D2H	A	SV_of_Step-ID3-CHx	INT16	RW	N	
30D3H	A	SV_of_Step-ID4-CHx	INT16	RW	N	
30D4H	A	SV_of_Step-ID5-CHx	INT16	RW	N	
30D5H	A	SV_of_Step-ID6-CHx	INT16	RW	N	
30D6H	A	SV_of_Step-ID7-CHx	INT16	RW	N	
30D7H	A	SV_of_Step-ID8-CHx	INT16	RW	N	
30D8H	A	Time_of_Step-ID1-CHx	UINT16	RW	N	Unit: minutes or seconds
30D9H	A	Time_of_Step-ID2-CHx	UINT16	RW	N	

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
30DAH	A	Time_of_Step-ID3-CHx	UINT16	RW	N	
30DBH	A	Time_of_Step-ID4-CHx	UINT16	RW	N	
30DCH	A	Time_of_Step-ID5-CHx	UINT16	RW	N	
30DDH	A	Time_of_Step-ID6-CHx	UINT16	RW	N	
30DEH	A	Time_of_Step-ID7-CHx	UINT16	RW	N	
30DFH	A	Time_of_Step-ID8-CHx	UINT16	RW	N	
30E0H	A	Input_Switch_Over-ID1	UINT16	RW	N	Each ID provides the following for CH1&CH2 and CH3&CH4 respectively: Low Temperature/High Temperature Source Setting; Minimum/upper sensor temperature limits; High/low temperature switching setting; sensor error handling; Displays the source of the current input; Sensor status reading; Displays the Switch PV temperature
30E1H	A	Input_Switch_Over-ID2	UINT16	RW	N	
30E2H	A	Input_Switch_Over-ID3	UINT16	RW	N	
30E3H	A	Input_Switch_Over-ID4	UINT16	RW	N	
30E4H	A	Input_Switch_Over-ID5	UINT16	RW	N	
30E5H	A	Input_Switch_Over-ID6	UINT16	RW	N	
30E6H	A	Input_Switch_Over-ID7	UINT16	RW	N	
30E7H	A	Input_Switch_Over-ID8	UINT16	RW	N	
30E8H	A	Input_Selection_of_module-IDx-SETx	UINT8	RW	N	b0~b3=CH1~CH4 0=not used; 1=On;
30E9H	A	Alarm_High_Limit-IDx	UINT16	RW	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
30EAH	A	Action-IDx	UINT8	RW	N	0=Disable 1=SV Switch2 = Run/Stop Switch3 =Auto/Manual Switch4 =AT Stop/Start Switch5 =PID Group+1 6=PID Group+2 7=PID Group-1 8=Stop Slope Control 9=All alarms reset 10=Alarm One Reset 11=Alarm Two Reset 12=Alarm Three Reset 13=Program Start 14=Program stopped 15=Program Jump 16=Program Pause
30EBH	A	Delay_Time-IDx	UINT16	RW	N	Unit: 0.1 seconds
30ECH	A	Alarm Hold	UINT8	RW	N	0=Disable; 1=Enable When enabled, if an alarm occurs, the action will only be activated once and will not be automatically restored
30EDH	A	Actual_Steps_in_the_pattern-IDx-CHx	UINT8	RW	N	Range: 0~15

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
30EEH	A	Loop_Times-IDx-CHx	UINT8	RW	N	Range: 0~99
30EFH	A	Linking_Pattern-IDx-CHx	UINT8	RW	N	0~3=Pattern 0~3 4=END (End of Program) 5=STOP
30F0H	A	Logic_Operator_Parameters-ID1	UINT8	RW	N	Each group of IDs provides the following content for 16 sets of logical operations: Select input A~D; Enter A~D to reverse; arithmetic selection; The output is reversed; ON delay time; OFF delay time
30F1H	A	Logic_Operator_Parameters-ID2	UINT8	RW	N	
30F2H	A	Logic_Operator_Parameters-ID3	UINT8	RW	N	
30F3H	A	Logic_Operator_Parameters-ID4	UINT8	RW	N	
30F4H	A	Logic_Operator_Parameters-ID5	UINT8	RW	N	
30F5H	A	Logic_Operator_Parameters-ID6	UINT8	RW	N	
30F6H	A	Logic_Operator_Parameters-ID7	UINT8	RW	N	
30F7H	A	Logic_Operator_Parameters-ID8	UINT8	RW	N	

- DTDM04/08/16 series shared temperature controller error related parameters = >OD 30F8H ~ OD 30FBH group

- The architecture is that each host expansion machine has 8 sets of error codes, 20 groups of historical errors, and can connect up to 8 units in series, up to 64/160 units, and OD0x30F9/30FA only has a maximum of 8 individual data in series.

  For example, in the OD number of 30F8H (error code), the content will contain sub index 1~64, a total of 8*8.

  For example, in the OD number of 30FBH (historical error), the content will contain sub index 1~160, a total of 8*20.

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
30F8H	A	Error_log_Message-IDx-SETx	UINT16	R	Y	
30F9H	A	Error_log_count-IDx	UINT16	R	N	Since the log is cleared, if the same error code occurs multiple times, it will only be recorded in the log the first occurrence, but the number of errors will continue to accumulate
30FAH	A	Clear_Error_log-IDx	UINT8	RW	N	Write 1 clear
30FBH	A	Error_log-IDx-SETx	UINT8	R	N	

➢ DTDM04/08/16 series shared extended I/O machine parameter = >OD 31XXH

- The architecture is that each expansion IO machine has 16 channels, and the maximum number of 8 channels can be connected in series, so it can reach 16*8=128 channels, so the following OD content will contain the data of 128 sub index (except OD: 0x3100/3110~3113 only have the individual data of the maximum number of eight units in series)
  For example, in the OD number of 3101H (DO source station number), the content will contain the source station numbers of 128 channels with sub index 1~128.

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
3100H	A	Digital Input Expand IDx	UINT16	R	Y	bit=0: Input Low bit=1: Input High
3101H	A	Source Rotary IDx CHx	UINT8	RW	Y	b0~b3=knob range 1~8
3102H	A	Source Function IDx-CHx	UINT8	RW	Y	0=OFF H11~H45=Alarm Status or MV1 or MV2 input Hxy: x=channel CH1~CH4; y=1 to 5; 1=ALM1; 2=ALM2; 3=ALM3; 4=MV1; 5=MV2 for example: H13=Specify to CH1-ALM3 input H50~H5F=Specify to LOG1~LOG16;
3103H	A	Output Period DO IDx CHx	UINT16	RW	Y	Unit: 0.1 seconds, the default value varies by model (Relay = 20 seconds; others=4 seconds).
3104H	A	Output Max DO IDx CHx	UINT16	RW	Y	Unit: 0.1%
3105H	A	Output Min DO IDx CHx	UINT16	RW	Y	Unit: 0.1%
3106H	A	Output Invert DO IDx CHx	UINT8	RW	Y	0=not reversed; 1=Reverse
3107H	A	Standby Out Percentage DO IDx CHx	UINT16	RW	Y	Unit: 0.1%
3108H	A	Current MV DO IDx CHx	UINT16	R	Y	Unit: 0.1%
3110H	A	SSR Rotary NO IDx	UINT16	R	N	
3111H	A	SSR FW Version Idx	UINT8	RW	N	
3112H	A	SSR Error Info Idx	UINT8	RW	N	b0=485, b1=FRAM
3113H	A	SSR Mirror Switch Idx	UINT16	RW	N	The default 0 represents OUT 9~15, which is equal to OUT1~8 and sets 1, which represents OUT1~16 independent output
3114H	A	SSR Out Source Selection IDx CHx	UINT16	RW	N	b0~b3:Rotary SW,range from 0 to F;

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
3115H	A	SSR Out Assignment IDx CHx	UINT16	RW	N	0=Disable 11h~45h= Alarm Status or MV1 or MV2 (xyh, x=channel, range from 1 to 4; y=function, range from 1 to 5, 1:ALM1; 2:ALM2; 3:ALM3; 4:MV1; 5:MV2, ie. 13= CH1-ALM3) 50h~5Fh= LOG1 ~ LOG16;
3116H	A	SSR Out Period IDx CHx	UINT16	RW	N	unit: 0.1 secondThe default value varies depending on the model (Relay=20 seconds; others=4 seconds).
3117H	A	SSR Out Max IDx CHx	UINT16	RW	N	Unit: 0.1%
3118H	A	SSR Out Min IDx CHx	UINT16	RW	N	Unit: 0.1%
3119H	A	SSR Output Invert IDx CHx	UINT8	R	N	0=Direct; 1=Reverse
311AH	A	SSR Out Percentage IDx CHx	UINT16	R	N	Unit: 0.1%
311BH	A	SSR Current MV IDx CHx	UINT16	RW	N	Unit: 0.1%
311CH	A	SSR Actual MV IDx CHx	UINT16	RW	N	Unit: 0.1%

- DTDM08/16 series dedicated temperature controller parameter = >OD 32XXH group
- The architecture is that each measuring machine has 8/16 channels, and up to 4 can be connected in series, so it can reach 16*4=64 channels, so the following OD content will contain the data of 64 sub index transactions.

  For example, in the OD number of 3200H (actual temperature), the content will contain the actual temperature values of 64 channels with sub index 1~64.

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
3200H	A	Active_PV-IDx-CHx	INT16	R	Y	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3201H	A	Active_SV-IDx-CHx	INT16	RW	Y	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3202H	A	MV1-IDx-CHx	UINT16	RW	Y	Write --> the amount of manual output
3203H	A	control_mode_transfer -IDx-CHx	UINT16	RW	Y	0: Standby; 1: Execution; 2: End of program;

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						3: The program is suspended; 4: The program skips steps
3204H	A	Auto_Tune-IDx-CHx	UINT8	RW	Y	0: Stop 1: Execute
3205H	A	controller_status-IDx-CHx	UINT8	RW	Y	b0:ALM3; b1:ALM2; b2:C; b3:F; b4:ALM1; b5:OUT2; b6:OUT1; b7:AT
3206H	A	dynamic_SV-IDx-CHx	UINT8	RW	Y	You can select the display when the program or slope is controlled
3207H	A	Input Type	INT16	RW	Y	0= TC-K; 1= TC-J; 2= TC-T; 3= TC-E; 4= TC-N; 5= TC-R; 6= TC-S; 7= TC-B; 8= TC-L; 9= TC-U; 10= TC-TXK; 11= TC-C; 12= TC-D; 13= JPT100; 14= PT100; 15= PT1000; 16= Ni120; 17= Cu50; 18=0~5V; 19=0~10V; 20= 0~20mA; 21=4~20mA; 22= 0~50mV
3208H	A	PV-F	UINT16	R	N	Unit: 0.1°C
3209H	A	PV-R	INT16	R	N	Unit: 0.1°C/°F (thermocouple/platinum resistance); Unitless (analog voltage/current)
320AH	A	PV-Offset	UINT8	R	N	Unit: 0.001
320BH	A	PV-Gain	UINT8	R	N	Unit: 0.1 seconds
320CH	A	Display Update Time	UINT16	R	N	Unit: 1 display point is valid only for analog inputs
320DH	A	Cold Junction Compensation	UINT16	R	N	0=Internal; 1=External
320EH	A	Operation	UINT8	R	N	0=Forbidden energy; Disable 1=Execution/Standby Switching; Switch Run/Stop 2=Auto/Manual Switching; Switch Auto/Manual 3=AT stop/start switching; Switch AT Stop/Run 4=Stop slope control; Stop Ramping 5=All alarms reset;

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						Reset ALL ALM 6=Alarm one reset; Reset ALM1 7=Alarm two reset; Reset ALM2
320FH	A	Input Selection	UINT8	R	N	Refer to status database
3210H	A	Applied Channel	UINT8	R	N	0= All channels 1= CH1; 2= CH2; ... 16= CH16
3211H	A	Alarm 1 Mode	UINT8	RW	Y	0=NO, 1=DEV_UPPER_LOWER, 2= DEV_UPPER, 3=DEV_LOWER, 4=ABS_UPPER_LOWER 5=ABS_UPPER, 6=ABS_LOWER, 7=HYS_UPPER, 8=HYS_LOWER
3212H	A	Alarm 1 Delay	UINT8	RW	N	unit: Second
3213H	A	Alarm 1 Option	UINT8	RW	N	Bit4: Emergency kill switch Bit3: Peak record Bit2: Hold Bit1: The output is reversed Bit0: Standby
3214H	A	Alarm 1 High	UINT16	RW	Y	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3215H	A	Alarm 1 Low	INT16	RW	Y	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3216H	A	Alarm 2 Mode	INT16	RW	Y	0=NO, 1=DEV_UPPER_LOWER, 2= DEV_UPPER, 3=DEV_LOWER, 4=ABS_UPPER_LOWER, 5=ABS_UPPER, 6=ABS_LOWER, 7=HYS_UPPER, 8=HYS_LOWER
3217H	A	Alarm 2 Delay	UINT16	RW	N	unit: Second
3218H	A	Alarm 2 Option	INT16	RW	N	Bit4: Emergency kill switch Bit3: Peak record Bit2: Hold Bit1: The output is reversed Bit0: Standby
3219H	A	Alarm 2 High	INT16	RW	Y	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog

OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
						voltage/current).
321AH	A	Alarm 2 Low	UINT8	RW	Y	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
321BH	A	Alarm Reset	UINT8	RW	Y	b0: Alarm 1; b1:Alarm 2; Write 1 to reset alarm is write-only, and the read value is always 0
321CH	A	Auto Control Mode	UINT8	RW	Y	0: PID, 1:ONOFF
321DH	A	Control Action	INT16	R	Y	0: Reverse; 1: Direct
321EH	A	PID Mode Selection	INT16	R	N	0: Standard, 1:Fast
321FH	A	SV-H	INT16	RW	N	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3220H	A	SV-L	INT16	RW	N	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3221H	A	Input Fail Power Level-MV	INT16	RW	Y	Unit: 0.1% is not subject to the upper and lower limits of MV
3222H	A	Standby Power Level-MV	INT16	RW	Y	Unit: 0.1% is not subject to the upper and lower limits of MV
3223H	A	Control Mode Transfer(Auto/Manual)	INT16	RW	Y	0: Automatic, 1: Manual
3224H	A	Manual MV	INT16	RW	Y	Unit: 0.1% is not subject to the upper and lower limits of MV
3225H	A	PDOF	INT16	RW	N	unit: 0.1%
3226H	A	Out TS	INT16	RW	N	For Reverse / Direct Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
3227H	A	SP Ramp Rate	INT16	R	Y	Unit: 0.1 °F/min or °C/min (thermocouple and platinum resistance) unitless (0~50mV).
3228H	A	Slope Time Unit	UINT8	RW	N	0=Min ; 1=Sec
3229H	A	MV Upper Limit	UINT8	RW	N	Unit: 0.1% is invalid under manual control and ON-OFF control

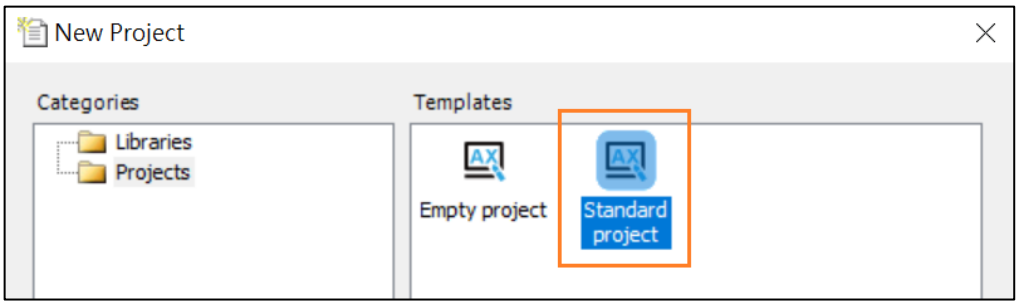
OD No.	Object type	Name	Information type	Read/ Write	PDO mapping	Description
322AH	A	MV Lower Limit	UINT16	RW	N	Unit: 0.1% is invalid under manual control and ON-OFF control
322BH	A	AT SV Ratio	UINT16	RW	N	Unit: 0.1%
322CH	A	PB Proportional band	UINT16	RW	N	Unit: 0.1 °C/°F (thermocouple and platinum resistor) unitless (analog voltage/current).
322DH	A	Ti Integral time	UINT8	RW	N	Unit: Second
322EH	A	Td Derivative time	UINT8	RW	N	Unit: Second
322FH	A	IOF	UINT8	RW	N	Unit: 0.1%
3230H	A	LBA Usage	UINT16	RW	N	
3231H	A	LBA Time	INT16	RW	N	
3232H	A	LBA Deadband	INT16	RW	N	
3233H	A	Clear	UINT8	RW	N	

Chapter 4 Connection Example

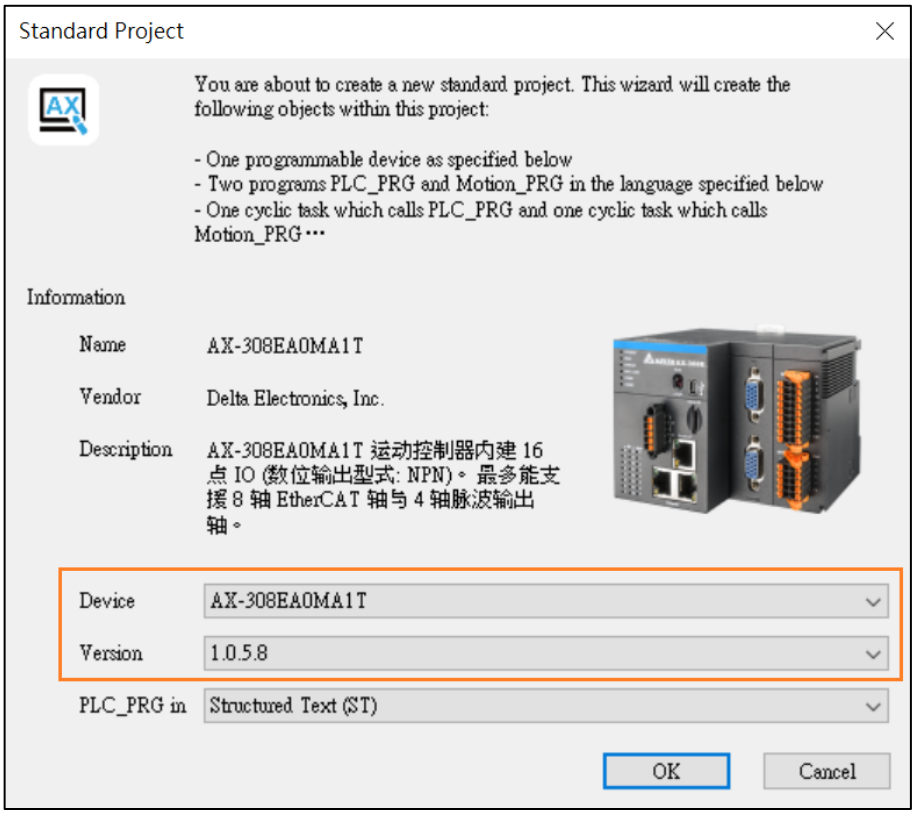
4.1 Delta AX308PLC Connection

The following describes the connection setting mode of Delta AX308 PLC and DTDM-ECAT, which needs to be carried out by using Delta's DIADesigner software, and importing the ESI file (file extension name xml) of DTDM-ECAT into the AX308 controller through the software for automatic connection and automatic data exchange. The setup is performed by DIADesigner, and the software is opened first.

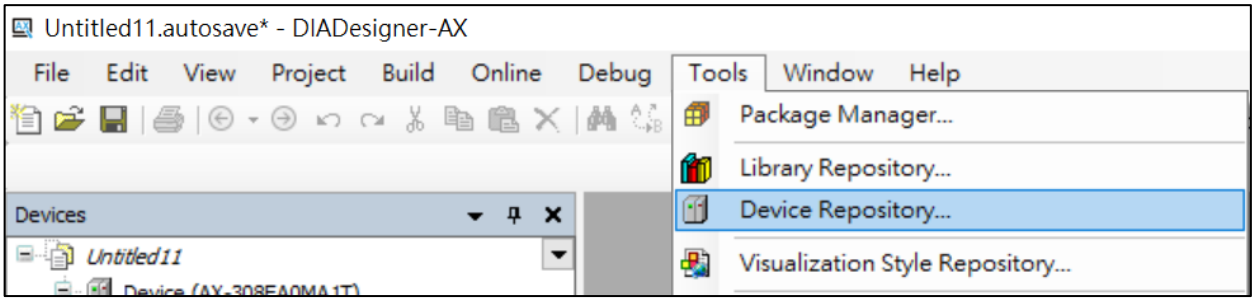
1) Select [New Project] to start a new project, and then select [Standard project].



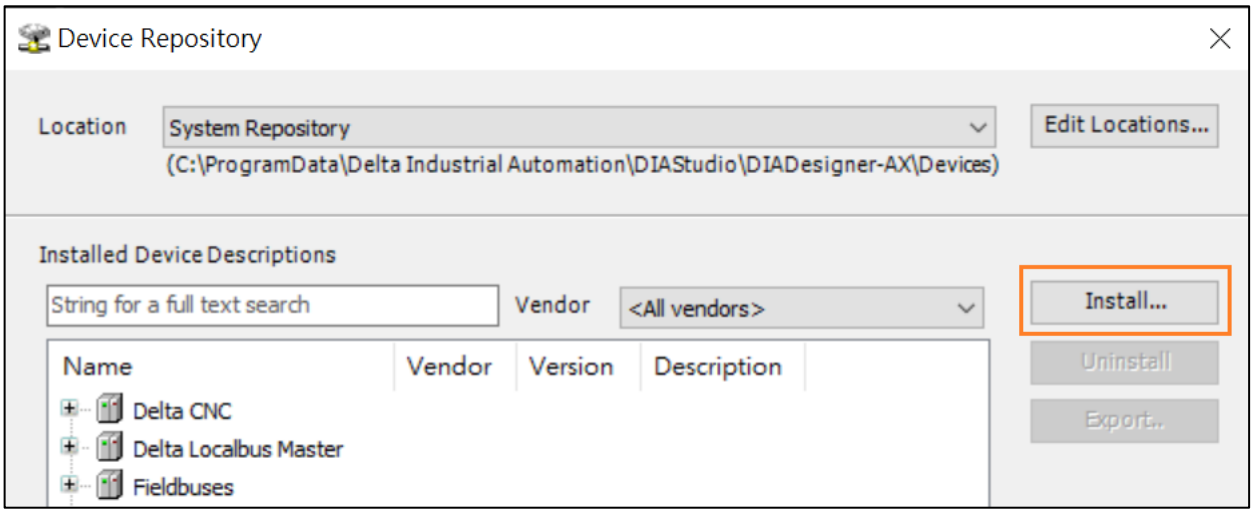
2) Select the corresponding settings based on the label content on the AX308 body.



3) Click [Tools] > [Device Repository...] to prepare the xml file of DTDM-ECAT to be imported into the software.

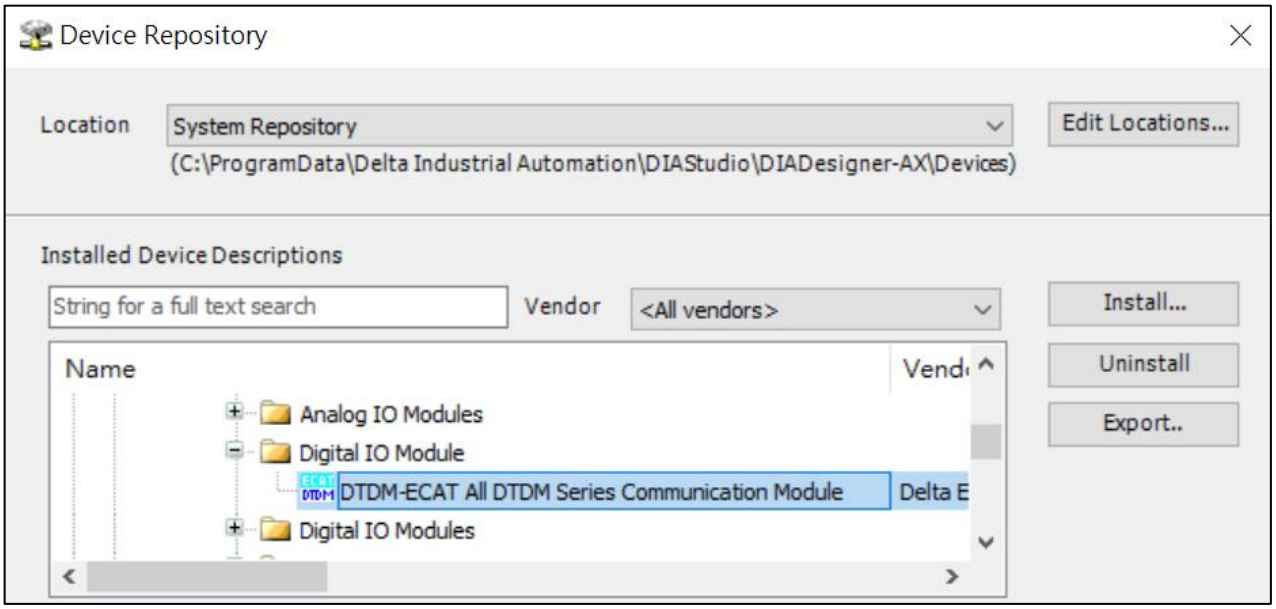


Then select [Install...]

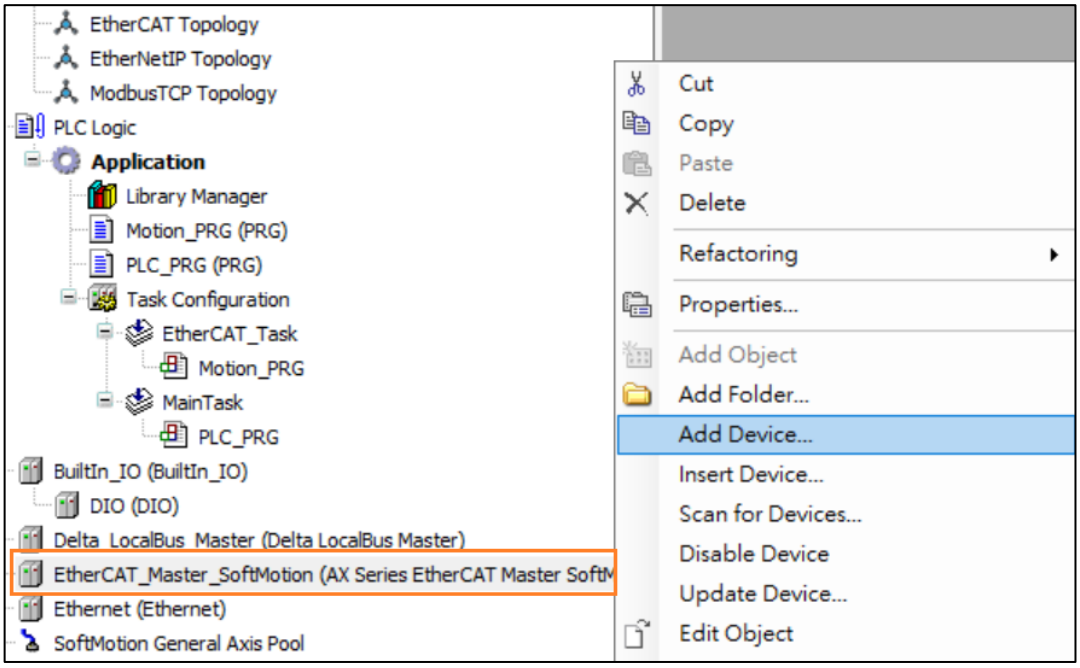


Select the DTDM_ECAT_XMC_ESC.xml files provided by DTDM-ECAT.

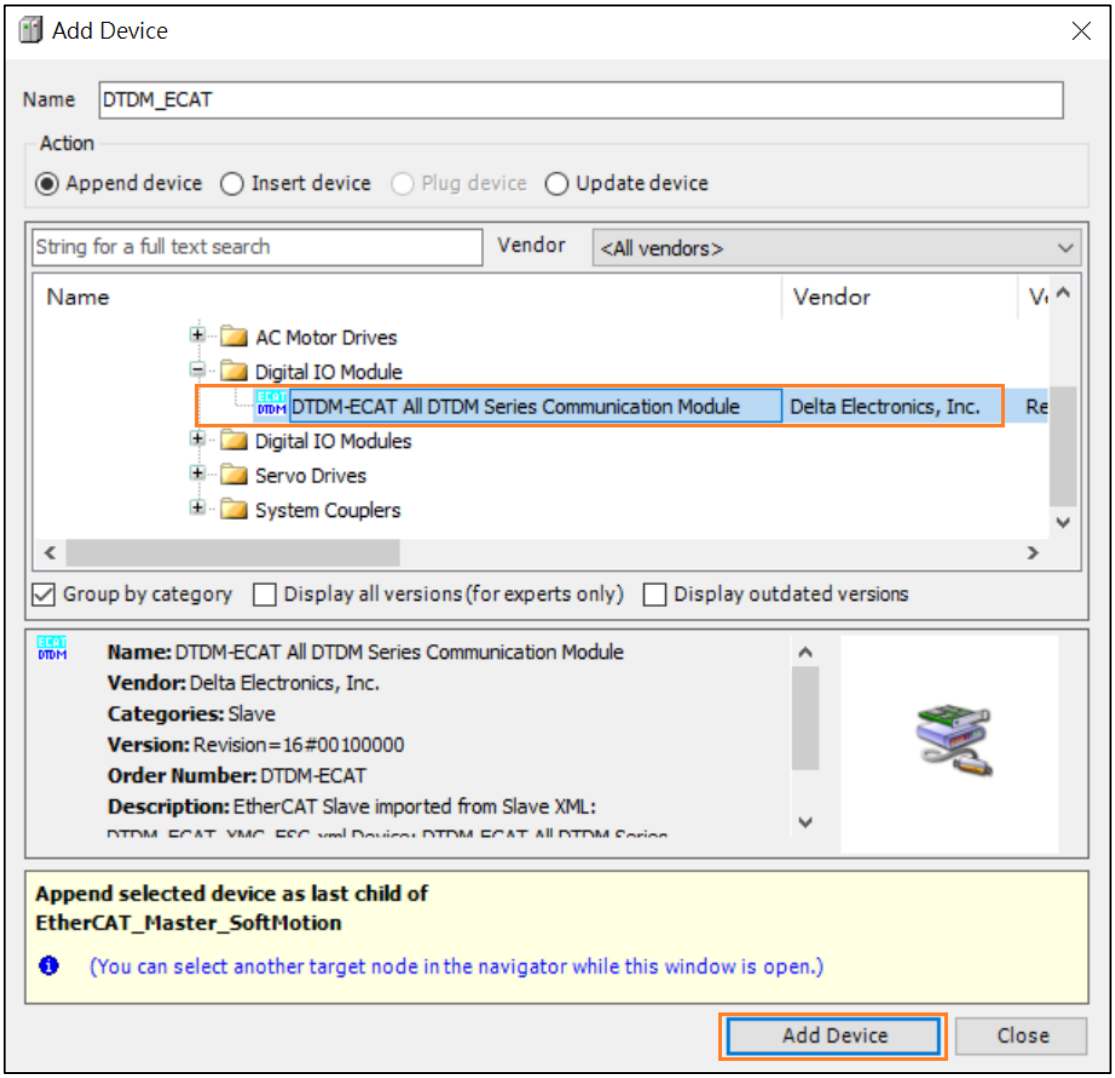
After importing, you can see that the import has been made in the [Digital IO Module] project.



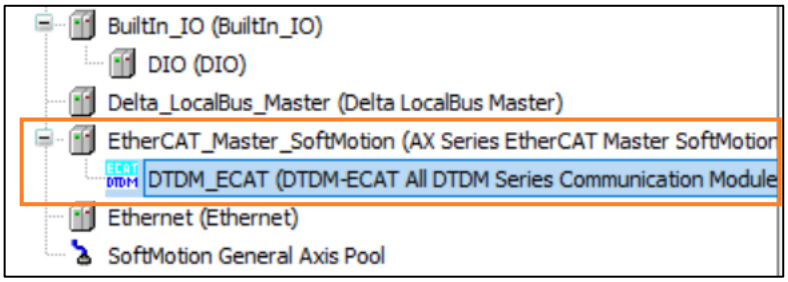
4) Right-click [EtherCAT_Master_SoftMotion (AX Series EtherCAT...) on the left side of the screen and select Add Device].



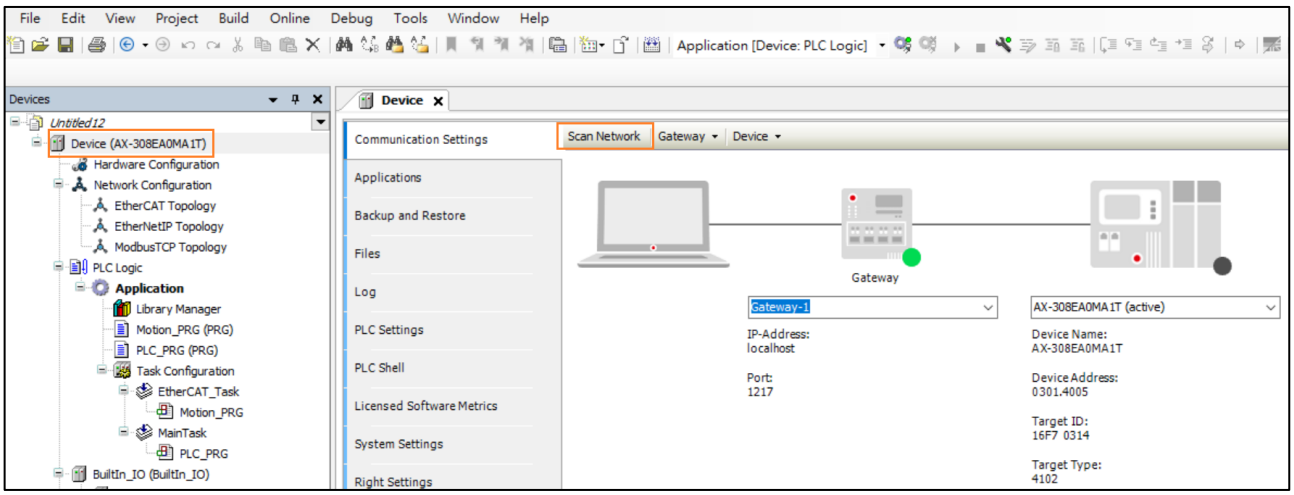
Selecting the DTDM-ECAT All DTDM Series in the Digital IO Module... Then click [Add Device].



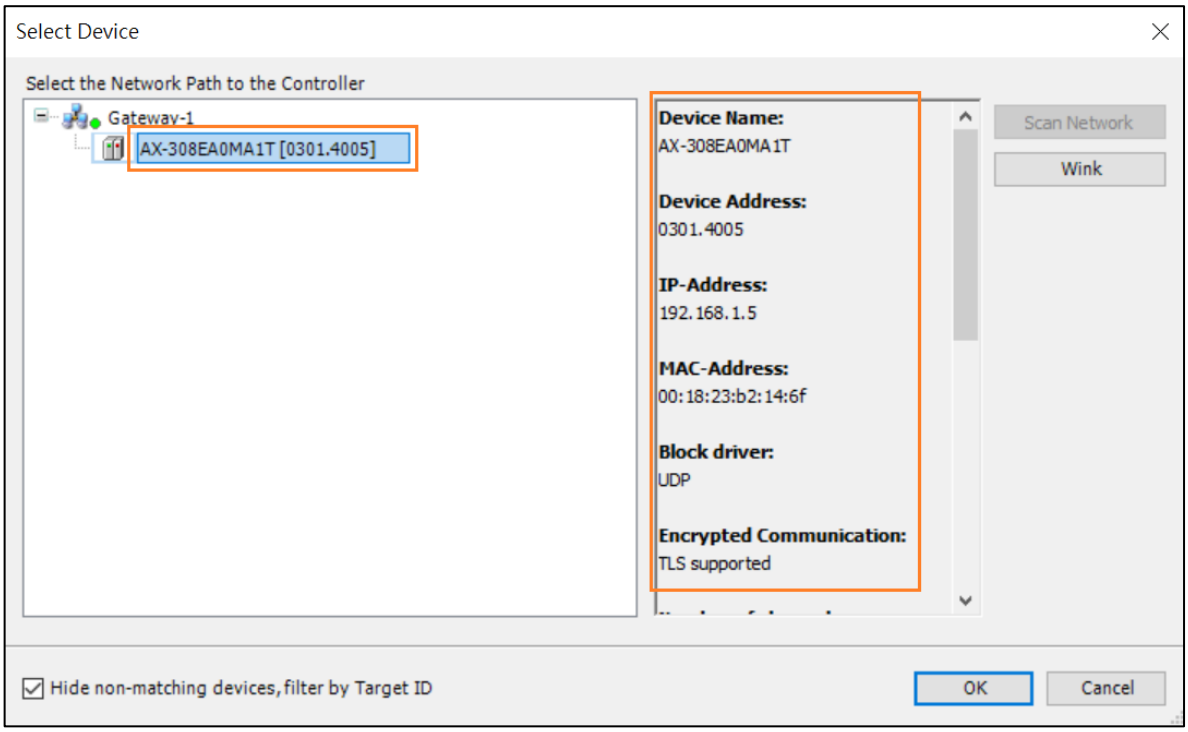
After the addition is complete, in the [EtherCAT_Master_SoftMotion (AX Series...)] is added below DTDM_ECAT... of the project.



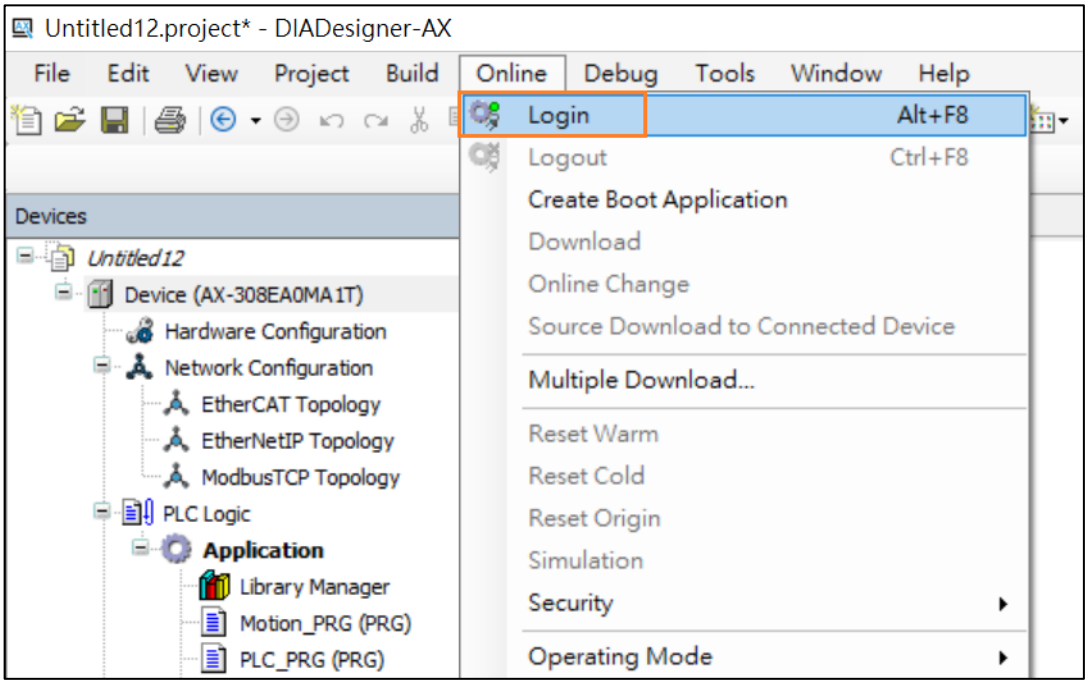
5) Prepare to download the settings data from the DIADesigner software to the AX308.
Since the default IP address of AX308 is 192.168.1.5, you need to set the PC to the same domain first.
First, select [Device(AX-308E...] on the left. , and then tap [Scan Network] on the right.



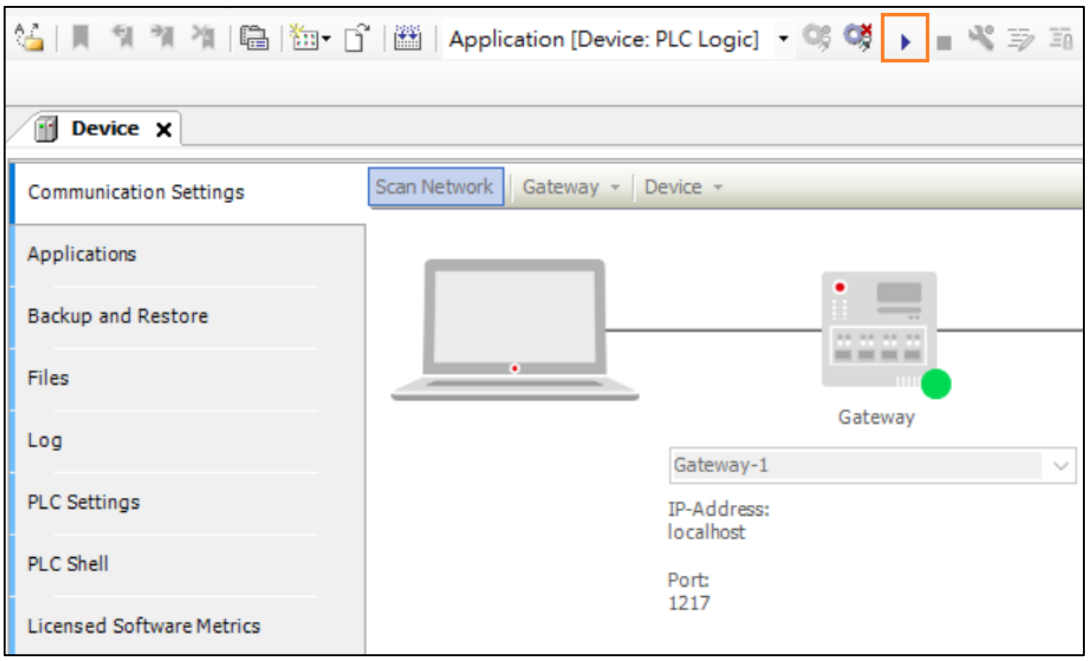
Then select [AX-308EA...] in the dialog box, if there is display data on the right, it means that the connection is successful.



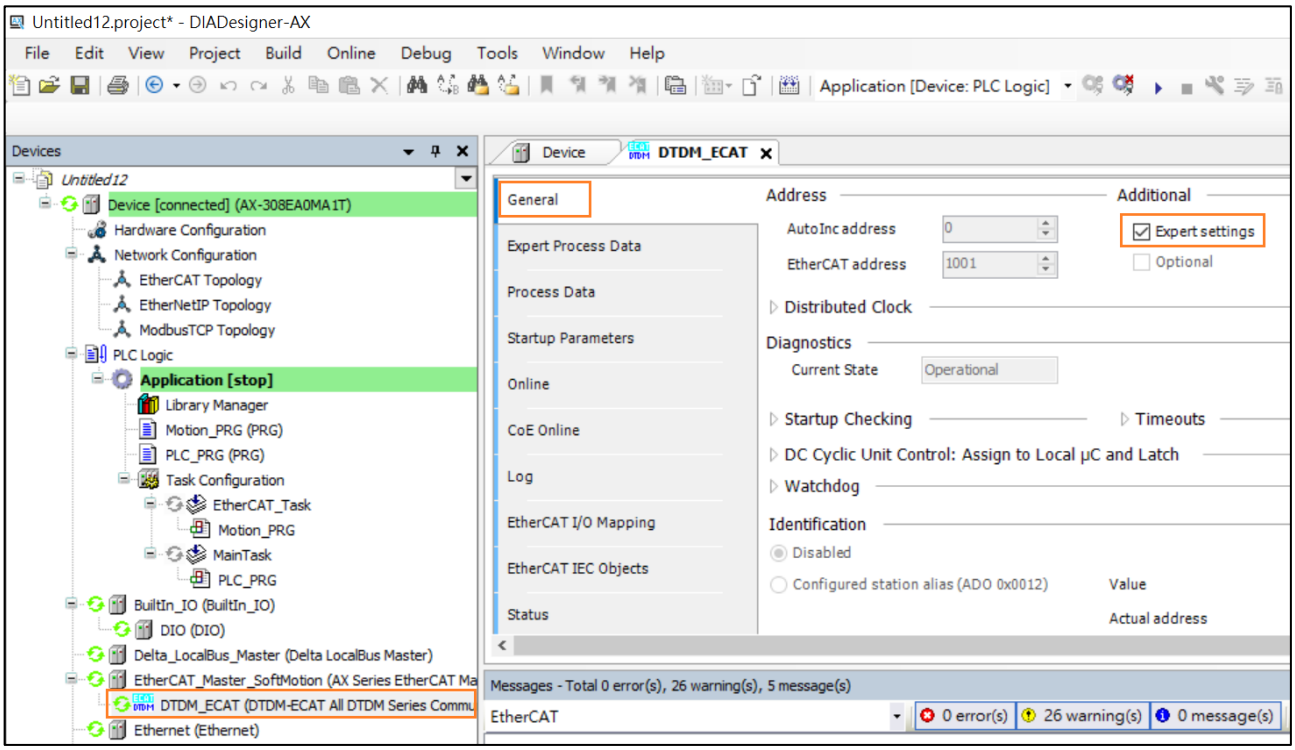
6) Select [Login] to start downloading the settings from the software to the AX308.



7) Select the [Start] button to execute the run.



8) Then click on the left [DTDM_ECAT(DTDM-ECAT ALL...) and check [Expert settings] in General.



9) In the [DTDM_ECAT] field, select [CoE Online] and select [Auto update] to see that ECAT communication updates (e.g. PV value updates) are being performed.