ELC-COENETM

Instruction Sheet

Ethernet Communication Module

⚠ WARNING

- This instruction sheet only provides introductory information on electrical specification, general specifications, installation, basic operation and settings of ELC-COENETM. For more detailed information on the network protocols, please refer to relevant references or literatures.
- This is an OPEN TYPE Controller. The ELC should be kept in an enclosure away from airborne dust, humidity, electric shock risk and vibration. Also, it is equipped with protective methods such as some special tools or keys to open the enclosure, so as to avoid the hazard to users and the damage to the ELC. Do NOT touch terminals when power on.
- Please read this instruction sheet carefully before use and follow this instruction to operate the device in order to prevent damages on the product or injuries to staff.

1 INTRODUCTION

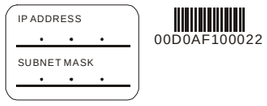
1.1 Model Explanation and Peripherals

Thank you for choosing Eaton Logic Controller (ELC) series products.

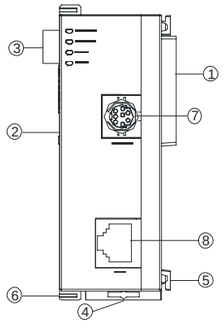
Functions:

- ❖ Supports MODBUS TCP/IP
- ❖ Supports Master and Slave Data Exchange
- ❖ ELC-PV28NNDR/T Automatic Time Correction
- ❖ Supports E-Mail
- ❖ RS-232/Ethernet Configuration
- ❖ Transmission Speed: 10/100 Mbps

IP Label **MAC Address**

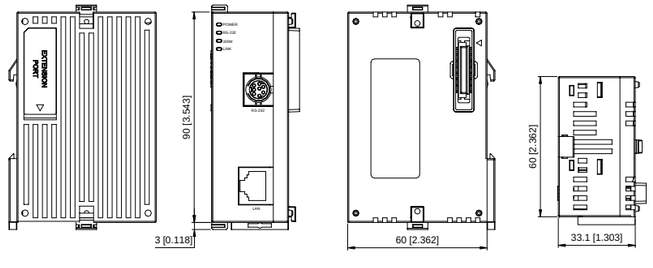


1.2 Product Profile and Outline



①	Extension Port to connect Device
②	Extension Port to connect Extension module
③	POWER, LINK, RS-232, 100M LED
④	DIN rail clip
⑤	Extension hole for mounting unit or module
⑥	Extension clip
⑦	RS-232 port
⑧	Ethernet RJ-45 port

Product Profile: Unit mm [inchs]



2 STANDARD SPECIFICATIONS

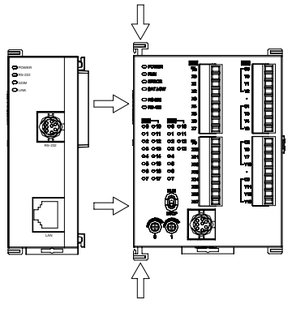
Function Specifications

Network Interface	
Interface	RJ-45 with Auto MDI/MDIX
Number of ports	1 Port
Transmission method	IEEE 802.3, IEEE 802.3u
Transmission cable	Category 5e (TIA/EIA-568-A,TIA/EIA-568-B)
Transmission Rate	10/100 Mbps Auto-Detect
Protocol	ICMP, IP, TCP, UDP, DHCP, SMTP, NTP, MODBUS TCP
Serial Interface	
Interface	RS-232
Number of Ports	1 Port
Transmission Cable	ELC-CBPCELC3
Environmental Specifications	
Noise Immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV, Communication I/O: 1KV Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS (IEC 61131-2, IEC 61000-4-3): 26MHz ~ 1GHz, 10V/m
Environment	Operation: 0℃ ~ 55℃ (Temperature), 50 ~ 95% (Humidity), Pollution degree 2; Storage: -25℃ ~ 70℃ (Temperature), 5 ~ 95% (Humidity)
Vibration/ Shock Resistance	Standard: IEC61131-2, IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)
Electrical Specifications	
Power supply voltage	24VDC (-15% ~ 20%) (Power is supplied by the internal bus of MPU.)
Power Consumption	1.5W
Insulation voltage	500V
Weight (g)	92 (g)

3 INSTALLATION

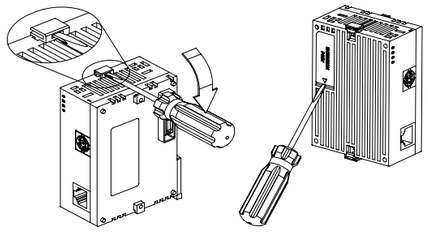
3.1 How to Connect ELC-COENETM with ELC

1. Adjust the extension clip on the left side of the MPU.
2. Meet the extension port of the MPU with ELC-COENETM and connect them as the figure shown below.
3. Fasten the extension clip.



3.2 Install ELC-COENETM with Other Module

To connect ELC-COENETM with the other extension module, lift the extension clip of the extension module by a screwdriver and open the side cover.



4 CR (CONTROL REGISTER)

CR NO. HW	CR NO. LW	Type	Register	Description
	#0	R	Model NO	Read only; ELC-COENETM model NO.=H'4050

CR NO. HW	CR NO. LW	Type	Register	Description
	#1	R	Firmware version	System firmware version; The type is hex. For example, H'0100 means the firmware version is v1.00.
	#2	R	Communication Mode	b0 Modbus TCP mode setting b1 Data Exchange mode setting
	#3	W	E-Mail Event 1 Trigger	Set as 1 to send the E-mail 1.
	#4	W	E-Mail Event 2 Trigger	Set as 1 to send the E-mail 2.
	#5	W	E-Mail Event 3 Trigger	Set as 1 to send the E-mail 3.
	#6	W	E-Mail Event 4 Trigger	Set as 1 to send the E-mail 4.
	#7	R	E-Mail 1, 2 Status Register	b0~b7 Status of E-Mail 2; b8~b15 Status of E-Mail 1
	#8	R	E-Mail 3, 4 Status Register	b0~b7 Status of E-Mail 4; b8~b15 Status of E-Mail 3
	#9	R/W	E-Mail 1 Additional Message	User defined message to be sent by email.
	#10	R/W	E-Mail 2 Additional Message	User defined message to be sent by email.
	#11	R/W	E-Mail 3 Additional Message	User defined message to be sent by email.
	#12	R/W	E-Mail 4 Additional Message	User defined message to be sent by email.
	#13	R/W	Data Exchange trigger	Set to 1 to start the Data Exchange transaction.
	#14	R	Data Exchange Status Register	Status of Data Exchange transaction
#24 ~ #15		-	Reserved	Reserved
#26	#25	R/W	Destination IP	Destination IP address for Data Exchange
	#27	-	Reserved	Reserved
	#28	R/W	Destination Slave ID	Destination Slave ID for Data Exchange
#48 ~ #29		R/W	Default Transmission Buffer	Transmitted data buffer for Data Exchange mode
#68 ~ #49		R	Default Received Buffer	Received data buffer for Data Exchange mode
	#69	R/W	DHCP/Static IP	Select DHCP Mode or Static IP
#71	#70	R/W	IP Address	IP Address
#73	#72	R/W	Subnet Mask	Subnet Mask of ELC-COENETM
#75	#74	R/W	Gateway	Default gateway IP address
	#76	R	Network Status Register	Status of IP address setting
#80 ~ #77		-	Reserved	Reserved
	#81	R/W	Slave Transmission Buffer Address	Slave Transmission buffer Address for Data Exchange
	#82	R/W	Number of Received Registers	Number of Received Registers
	#83	R/W	Master Received Buffer Address	Master Received Buffer Address for Data Exchange
	#84	R/W	Slave Received Buffer Address	Slave Received Buffer Address for Data Exchange
	#85	R/W	Number of Sending Registers	Number of Sending Registers
	#86	R/W	Master Transmission Buffer Address	Master Transmission Buffer Address for Data Exchange
#110 ~ #87		-	Reserved	Reserved
	#111	R/W	Modbus TCP Operating Mode	Set to 1 to configure Modbus TCP for 8-bit mode.
#113 ~ #112		-	Reserved	Reserved
	#114	R/W	Modbus TCP Time-Out	Modbus TCP transaction time-out (ms)
	#115	R/W	Modbus TCP Trigger	Set to 1 to send Modbus command.
	#116	R/W	Modbus TCP Status Register	Status of Modbus TCP transaction
#118 ~#117		R/W	Modbus TCP Destination IP	The Destination IP Address of Modbus TCP transaction
	#119	R/W	Modbus TCP Data Length	Data length of Modbus TCP in CR#120 ~ CR#219
#219 ~ #120		R/W	Modbus TCP Data Buffer	Data buffer of Modbus TCP Mode for storing sending/receiving data
#250 ~ #220		-	Reserved	Reserved
	#251	R	Error Code	The ELC-COENETM error code
#255 ~ #252		-	Reserved	Reserved

Symbol definition: R: Read, W: Write

Read and write CR register

1. ELC uses the FROM/DFROM instruction to read CR data of fast expansion modules.
2. ELC uses the TO/DTO instruction to write CR data of fast expansion modules.
3. The number of fast expansion modules is from 100 to 107 (m1=100~107).

Explanation

1. CR#2: Communication mode setting: Set as 0 to Disable; Set as 1 to Enable.

bit	Mode	0	1
b0	Modbus TCP Mode	Modbus TCP Mode Disable	Modbus TCP Mode Enable
b1	Data Exchange Mode	Data Exchange Mode Disable	Data Exchange Mode Enable

2. CR#251: Error codes; Please refer to the following chart.

CR#251	Error status
b0	Not connected.
b1	IP setting error.
b2	CR#13 is set as data sending but data exchange is disabled.
b3	CR#13 is set as data sending but the data exchange mode has not been enabled.
b4	Connecting to NTP Server fails.
b7	Connecting to SMTP Server fails.
b8	DHCP did not acquire correct network parameters.

Sending E-mail Function

1. CR#3 ~ CR#6: E-mail will be sent when set to 1. After the E-Mail sending is complete, the CR value will be set to 0. Please use differential command to trigger CR#3 ~ CR#6 in order to avoid continual e-mails.
2. CR#7, CR#8: E-Mail Status. See the table below.

CR Value	E-Mail Status
0	Nothing
1	Processing
2	Success
3 ~ 9	Reserve
10	Cannot connect to SMTP-Server
11	E-mail Address error
12	Error response SMTP-Server transmission error
13	No available TCP connection
14 ~ 255	Reserve

3. CR#9 ~ CR#12: The user defined value entered into the register will be displayed in the e-mail subject.

Data Exchange Function

1. CR#13: The data in Data Exchange Buffer will be exchanged when CR#13 is set to 1. CR#13 will be set to 0 when the transaction is finished.
2. CR#14: The statuses register of Data Exchange transaction. CR#14 = 1 when the Data Exchange transaction is being processed. CR#14 = 2 when the Data Exchange transaction is completed. CR#14 = 3 when an error occurs.
3. CR#28: The Destination Slave ID for Data Exchange. Range: K1 ~ K255. ELC-COENETM will look up the Slave IP address in the Slave ID–IP lists of Data Exchange function. When CR#28 is set to 0, CR#25 and CR#26 will be the Slave IP Address.
4. CR#25 ~ CR#26: Before setting up the destination IP address of Data Exchange Mode, set CR#28 to 0. See CR#70 and CR#71 for the steps of setting up IP address.
5. CR#29 ~ CR#48: The default Data Exchange registers for storing the data to be sent to the remote MPU.
6. CR#49 ~ CR#68: The default Data Exchange registers for storing the received data from the remote MPU.
7. CR#81：Setting the Modbus Address of Sending Buffer in Slave for Data Exchange Mode. It's only permitted to use D Registers. Ex. D0 = H1000.
8. CR#82：The number of reading registers for data exchange Mode. Range: K1 ~ K128.
9. CR#83：Setting the Modbus Address of Receiving Buffer in Master for Data Exchange Mode. It's only permitted to use D Registers.
10. CR#84：Setting the Modbus Address of Receiving Buffer in Slave Data Exchange Mode. It's only permitted to use D Registers.
11. CR#85：The number of sending registers for data exchange Mode. Range: K1 ~ K128.
12. CR#86：Setting the Modbus Address of Sending Buffer in Master for Data Exchange Mode. It's only permitted to use D Registers. For example, set CR#81 as H1000 (D0), set CR#82 as K1, and set CR#83 as H1064 (D100). When the Data Exchange is executed, It will read the Slave's D0 and write into the D100 in Master. Set CR#84 as H1002 (D2), set CR#85 as K4, and set CR#86 as H1008 (D8). When the Data Exchange is executed, It will read Master's D8~D11 and write into Slave's D2~D5. The sending and receiving functions can be executed at one time. If both values of CR#82 and CR#85 are 0, default sending and receiving buffers (CR#29~CR#68) and default register number (K20) will be used.

Network Configuration Function

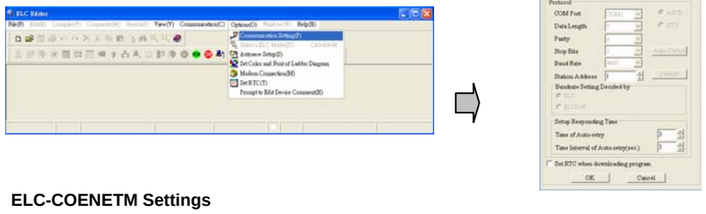
1. CR#69: IP mode setting. Set to 0 to be Static IP address; Set to 1 to obtain IP address by DHCP (Dynamic IP).
2. CR#70 ~ CR#71: IP Address setting. This is accessed through Hex Mode and can only be used with a static IP. For example, if the user wants to set the IP as 192.168.0.2, write H'0002 to CR#70 and H'C0A8 to CR#71. (K192 = H'C0, K168 = H'A8, K0 = H'00, K2 = H'02)
3. CR#72 ~ CR#73: Subnet Mask setting. This is accessed through Hex Mode and can only be used with a static IP. For example, if the user wants set Subnet Mask as 255.255.255.0, write H'FF00 to CR#72 and H'FFFF to CR#73.
4. CR#74 ~ CR#75: Default Gateway IP Address setting. This is accessed through Hex Mode and can only be used with a static IP. See CR#70 and CR#71 for the steps of Default Gateway IP Address setting.
5. CR#76: Status of IP Address. CR#76 = 0 refers to normal; CR#76 = 1 when the DHCP transaction is uncompleted; CR#76 = 2 when IP Address setting is in progress.

Modbus TCP Function

1. CR#111：The Modbus TCP communicating Mode. Set CR#111 to 1 for 8-bit mode or set to 0 for 16-bit mode.
2. CR#114: CR#114 is the time-out for Modbus TCP transaction (ms).
3. CR#115: When CR#115 is set to 1, the Modbus TCP transaction will start. Once finished, CR#115 will be set to 0. Use differential instruction to trigger.
4. CR#116: The status registers of Modbus TCP transaction. CR#116 = 1 when the Data Exchange transaction is being processed. CR#116 = 2 when the Data Exchange transaction is completed. CR#116 = 3 when an error occurs.
5. CR#117 ~ CR#118: Destination IP address of Modbus TCP. See CR#70 and CR#71 for the steps to setting the IP address.
6. CR#119: The data length of Modbus TCP in CR#120 ~ CR#247. In 8-bit mode the range is K1 to K100. In 16-bit mode the range is K1 to K200.
7. CR#120 ~ CR#247: Modbus TCP registers for storing the data to be sent and received.

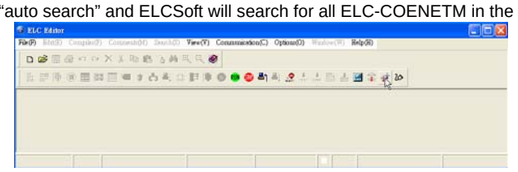
5 Software Setting

1. Communication: Start ELCSoft and click on "Options (O) > Communication Setting (P)". Set connection type to "Ethernet".

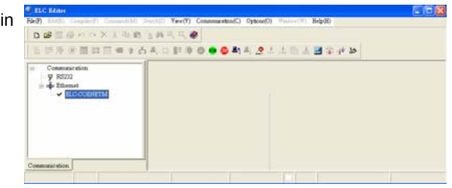


2. ELC-COENETM Settings

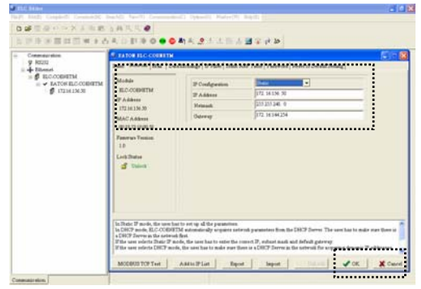
- Click on the "auto search" and ELCSoft will search for all ELC-COENETM in the network.



- ELCSoft displays all ELC-COENETM in the network. Click on the desired module and click twice again to open the setup screen.



- Enter the "Network" setup screen to modify the network setting. If there exists DHCP Server in the network, the user may use DHCP to automatically acquire the network configuration parameters or use Static IP to set up the network configuration parameters.
- Click "OK" after completing the settings.
- After returning to the screen 2, click on the desired module to start communicating.



6 LED Indication & Troubleshooting

6.1 LED Indication

LED	LED Status	Indication	How to deal with
POWER	Green constantly ON	Power supply is normal	None
	Green constantly OFF	No power supply	Check if the module is powered.
RS-232	Red flashes	Data are being transmitted in the serial port	None
	Red constantly OFF	No data transmission	Check if the RS-232 cable is connected when using RS-232 communication.
100M	Orange constantly ON	Transmission speed: 100M	None
	Orange constantly OFF	Transmission speed: 10M	Check if the network transmission speed is 100M.
LINK	Green constantly ON	Network works normally	None
	Green flashes	Network is working	None
	Green constantly OFF	Network is not connected	Check if the RJ-45 cable is tightly connected.

6.2 Troubleshooting

Abnormality	Cause	How to deal with
POWER LED OFF	MPU is not powered	Check if the MPU is powered and whether the power supply is normal.
	Not connected to MPU	Check if ELC-COENETM is tightly connected with MPU.
LINK LED OFF	Not connected to the network	Check if the RJ-45 cable is correctly connected to the network.
	RJ-45 poor contact	Check if the RJ45 contact is tightly connected to the Ethernet RJ-45 port.
100M LED OFF	The module is not connected to the network	Check if the RJ-45 cable is correctly connected to the network.
	Transmission speed: 10M	Check if the network transmission speed is 100M.
	RJ-45 poor contact	Check if the RJ45 contact is tightly connected to the Ethernet RJ-45 port.
Unable to locate a module	Not connected to the network	Check if ELC-COENETM is correctly connected to the network.
	The computer and MPU are blocked by the firewall.	Search by IP address or use RS-232 for settings.
Unable to open ELC-COENETM setup screen	Not connected to the network	Check if ELC-COENETM is correctly connected to the network.
	Incorrect communication settings in ELCSoft	Check if you select "Ethernet" in the communication settings.
	The computer and MPU are blocked by the firewall.	Use RS-232 for settings.
Fail to up/down load program and monitor by ELCSoft	The network setting of ELC-COENETM is incorrect	Check if the network setting of ELC-COENETM is correct. Consult the IT staff if you are using the Intranet in the company or refer to the network setting instructions provided by your ISP.
Unable to send out emails	ELC-COENETM settings are incorrect	Check if the settings of ELC-COENETM are correct.
	Incorrect CR settings	Check if the CR is used correctly.
	Incorrect settings of mail server	Check the IP address of SMTP-Server.