

Eaton Logic Controller
PROFIBUS DP Distributed I/O Adapter
Module

INSTRUCTION SHEET

[Applicable Distributed I/O Adapter Module]

- ELC-CAPBDP

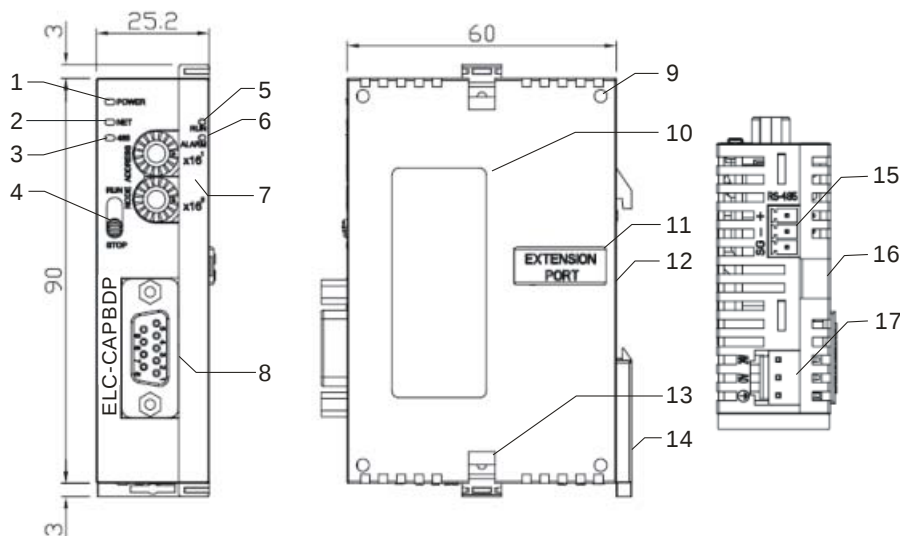
Thank you for choosing the Eaton Logic Controller (ELC) series products. The ELC-CAPBDP is a PROFIBUS DP distributed I/O adapter module that connects ELC I/O modules to PROFIBUS DP networks. The adapter provides I/O and module diagnostic information to PROFIBUS DP scanners. The power is supplied by a 24VDC power supply. The right side of ELC-CAPBDP is where the digital and analog I/O modules connect, and the RS-485 COM port is a standard Modbus master port that can be connected to Modbus slave stations.

- ✚ This instruction sheet provides information on the electrical specifications, functionality, installation and wiring for this module. It should be read and understood before attempting to install or use the module.
- ✚ Additional information can be found in the ELC series Programming Manual.
- ✚ The ELC should be kept in an enclosure away from airborne dust, humidity and vibration.
- ✚ DO NOT disconnect equipment unless power has been switched off or the area is known to be non hazardous.
- ✚ DO NOT connect AC power to any of the DC input / output terminals, as it will damage them. Check all wiring prior to power up.
- ✚ Ensure that the ground terminal Ⓢ is correctly grounded in order to prevent electromagnetic interference.
- ✚ DO NOT touch the internal circuit in one minute after the power is switched off.

■ Functions

- ❖ Supports PROFIBUS DP cyclic data transmission.
- ❖ Auto-detects baud rates; supports Max.12Mbps.
- ❖ Self-diagnosis
- ❖ Able to connect to a maximum of 8 specialty I/O modules and 32 digital I/O modules (max. 256 points) on the right side bus.
- ❖ The RS-485 COM port is able to connect to a maximum of 16 standard Modbus slave stations.
- ❖ Supports a maximum of 100 bytes of input data and 100 bytes of output data.

■ Product Profile & Dimension

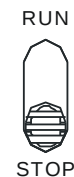


Unit: mm

1. POWER indicator	10. Nameplate
2. NET indicator	11. I/O module connection port
3. RS-485 indicator	12. DIN rail slot (35mm)
4. RUN/STOP switch	13. I/O module fixing clip
5. RUN indicator	14. DIN rail fixing clip
6. ALARM indicator	15. RS-485 COM port
7. Address setup switch	16. I/O module fixing notch
8. PROFIBUS DP COM port	17. DC24V power supply interface
9. I/O module positioning hole	

◆ Switch Definition: RUN/STOP

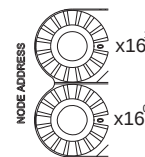
Status	Explanation
RUN → STOP	1. Specialty I/O modules switch from RUN to STOP 2. All Y points on the digital output modules are turned OFF 3. Modbus function disabled 4. RUN LED turns off
STOP → RUN	1. ELC-CAPBDP re-detects the number of digital I/O points and specialty I/O modules. 2. Specialty I/O modules switch from STOP to RUN. 3. Enable digital I/O modules. 4. Modbus function enabled. 5. RUN LED turns on.



◆ Address Setup Switch

The two rotary address setup switches, $x16^0$ and $x16^1$, set up the node address of the ELC-CAPBDP on the PROFIBUS DP network in hexadecimal format. The range is 0 ~ F (see below for more details).

Address	Explanation
H'1 ~ H'7D	Valid PROFIBUS addresses
H'0 or H'7E ~ H'FF	Invalid PROFIBUS addresses. NET LED will flash red if the node address falls within this range.



Example: If you need to set the node address of ELC-CAPBDP to 26 (decimal), set switch $x16^1$ to “1” and $x16^0$ to “A”. 26 (decimal) = 1A (hex) = $1 \times 16^1 + A \times 16^0$.

✍ Note:

1. Please switch off the power supply before setting up the node address of the ELC-CAPBDP module. Re-power the module after the setup is completed.
2. Changing the value on the switches during the operation of ELC-CAPBDP is invalid. The switches are read at power up only.
3. Use slot type screwdriver to set up the switch.

■ Function Specifications

◆ PROFIBUS DP Port

Interface	DB9 connector
Transmission method	High-speed RS-485

Transmission cable	Shielded twisted pair cable
Electrical isolation	500VDC

◆ Communication

Message type	Cyclic data exchange
Module name	ELC-CAPBDP
GSD document	ETON09B9.GSD
Product ID	09B9
Serial transmission speed supported (auto-detection)	9.6kbps; 19.2kbps; 93.75kbps; 187.5kbps; 500kbps; 1.5Mbps; 3Mbps; 6Mbps; 12Mbps (bits per second)

◆ Electrical Specifications

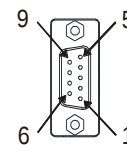
Power supply voltage	24VDC
Insulation voltage	500VDC
Power consumption	2.5W
Weight	90g

◆ 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,Digital Input:±2kV Communication I/O: ±2kV Conducted Susceptibility Test (EN61000-4-6, IEC 61131-2 9.10) : 150kHz ~ 80MHz,10V/m RS (IEC 61131-2, IEC 61000-4-3): 26MHz ~ 1GHz, 10V/m
Storage/operation	Operation: 0°C ~ 50°C (temperature), 50 ~ 90% (humidity), pollution degree 2 Storage: -25°C ~ 70°C (temperature), 5 ~ 95% (humidity)
Shock/vibration immunity	International standards: IEC 61131-2,IEC 68-2-6 (TEST Fc)/ IEC 61131-2& IEC 68-2-27 (TEST Ea)
Certificates	

◆ Definition of PROFIBUS DP Port

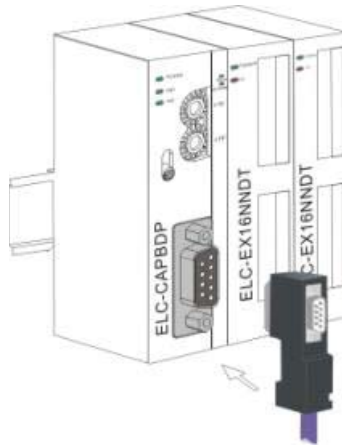
PIN	PIN name	Definition
1	-	Not defined
2	-	Not defined
3	Rxd/Txd-P	Sending/receiving data P(B)
4	-	Not defined
5	DGND	Data reference potential
6	VP	Power voltage – positive
7	-	Not defined
8	Rxd/Txd-N	Sending/receiving data N(A)
9	-	Not defined



■ Installation

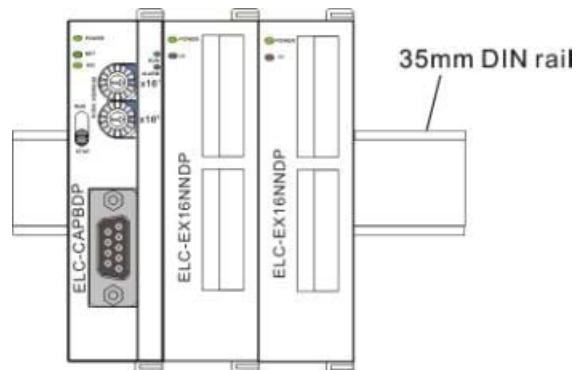
◆ Connecting to the PROFIBUS DP Port

Insert the PROFIBUS DP bus connector into the PROFIBUS DP port on ELC-CAPBDP. Screw it in tightly to ensure the ELC-CAPBDP and the PROFIBUS DP connectors are properly connected.



◆ Installing ELC-CAPBDP & I/O Modules on DIN Rail

1. Use 35mm DIN rail.
2. Open the DIN rail clips on ELC-CAPBDP and I/O module. Insert ELC-CAPBDP and I/O module on the DIN rail.
3. Clip up the DIN rail clips on ELC-CAPBDP and I/O module to fix them on the DIN rail.



■ LED Indication and Trouble shooting

There are 5 LED indicators on ELC-CAPBDP: POWER, NET, RS-485, RUN and ALARM.

◆ POWER Indicator

POWER LED displays whether the power supplied to the ELC-CAPBDP is correct.

LED Status	Indication	How to deal with
Green light on	Normal	--
Off	No power	Check the power supply.

◆ NET Indicator

NET LED displays whether the communication between ELC-CAPBDP and PROFIBUS DP master is working.

LED Status	Indication	How to deal with
Green light on	Normal	--
Red light on	ELC-CAPBDP is not connected to the master.	1. Check if ELC-CAPBDP is connected to PROFIBUS DP bus. 2. Check if the communication cable between ELC-CAPBDP and PROFIBUS DP master is correct. 3. Check if the address of the ELC-CAPBDP is consistent with the one set in the master configuration software,
Red light flashes	ELC-CAPBDP configuration error.	1. Check if the PROFIBUS address of ELC-CAPBDP is between 1 and 125 (decimal). 2. Check if the I/O modules connected to the ELC-CAPBDP and their order are consistent with the software configuration.

◆ RUN Indicator

RUN LED displays whether ELC-CAPBDP is operating or in stop status.

LED Status	Indication
Green light on	ELC-CAPBDP is operating.
Off	ELC-CAPBDP is in stop status.

◆ ALARM Indicator

ALARM LED displays whether the right-side specialty I/O modules are working normally and the power supply is sufficient.

LED Status	Indication	How to deal with
Off	Normal	--
Red light on	24VDC power supply is insufficient.	Check if the power supply is overloaded.
Red light slowly flashes (on 0.5s and off 0.5s)	Error in a specialty I/O module	Please refer to the descriptions for the error codes in the appropriate specialty I/O module manual.
Red light fast flashes (on 0.3s and off 0.3s)	Specialty I/O module is off-line.	1. Check that the power to the specialty I/O module is correct. 2. Check that the connections between ELC-CAPBDP and specialty module is correct.

◆ RS-485 Indicator

RS-485 LED displays whether the RS-485 communications between the ELC-CAPBDP and other Modbus devices is working properly.

LED Status	Indication	How to deal with
Green light on	Normal	--

LED Status	Indication	How to deal with
Green light flashes	The Modbus function has not been enabled, or no Modbus slave is configured	--
Red light on	All Modbus slaves are off-line.	Check if the RS-485 cable is properly connected, and the communication format is correct.
Red light flashes	The RS-485 communications to one or more of the connected Modbus devices is not working properly.	Check if one or more of the connected RS-485 devices is not responding or is responding incorrectly.