

# Eaton Logic Controller (ELC)



*Powering Business Worldwide*

# The Eaton Logic Controller.



Compact, modular, and ready to communicate. It's the cost-effective solution to machine control.

The Eaton Logic Controller (ELC) puts sophisticated PLC logic, an extensive set of I/O, and communications capabilities in packages as small as 1"W x 2.4"D x 3.5"H.

Half the size of most PLCs, the Cutler-Hammer ELC puts the right amount of I/O right where you need it.

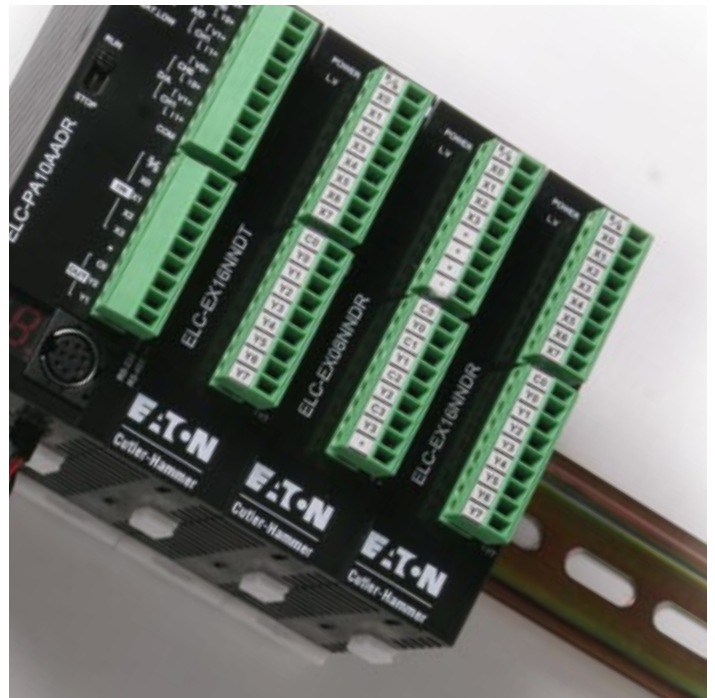
**The right amount of I/O.**

Why pay for functionality you don't need? Why be trapped with functionality you can't scale to meet changing needs? Eaton is changing everything with the ELC.

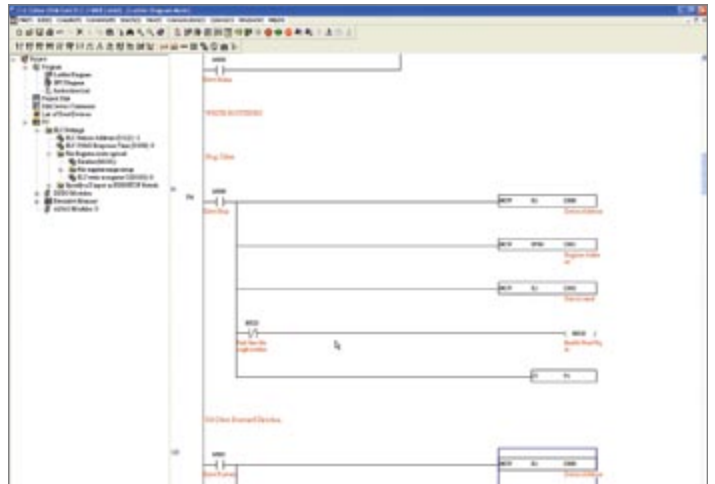
At less than half the size of most PLCs, the Cutler-Hammer ELC is an ideal solution when space is at a premium and specialized I/O needs present themselves.

**Space saving. Cost saving.**

This space-saving design is as perfectly at home in a small machine control station as it is in an MCC and other enclosed applications where space is critical. Reduced space also means smaller control cabinets and panels, or more capability in the same amount of space. However you look at it, the ELC means value.



ELC Controller and Expansion Modules



**ELC Programming Software**

Program on your PC and download to the ELC through a serial cable or over Ethernet. Make online changes, monitor and remote control the run/stop operation. Software wizards simplify the programming process.



# Machine space is measured in inches.



The ELC is measured  
the same way.

#### **Add value with the ELC.**

While the ELC is perfectly suited for small applications of 40 I/O and less, it can also be expanded to 512 I/O. What's more, with the ELC's two communication ports it can provide a network of distributed controls. The ELC is capable of sharing information with other control and operator interface devices. Its small size allows for reduced panel size, and saves valuable machine space.

## ELC's value added differences.

### 5 controller styles:

- **PB Base Model**—14 I/O (8i/6o)  
Over 130 instructions provide all the power you need. Two serial ports for master/slave communications.
- **PC Clock/Calendar Model**—12 I/O (8i/4o)  
Same as the PB model, plus clock/calendar, twice the program steps, distributed I/O, and retentive data storage.
- **PA Analog Model**—10 I/O (6i/4o)  
Same as the PC model, plus embedded analog I/O.
- **PH High-Speed Model**—12 I/O (8i/4o)  
Same as the PC model, plus the ability to capture or output 100 kHz pulses.
- **PV Advanced Model**—28 I/O (16i/12o)  
Almost 10 times faster than the other ELC controllers, high speed I/O to 200 kHz, and additional advanced features. Add left side expansion modules for master communications on networks such as Ethernet and DeviceNet™.

### More Controller Features

- High-speed pulse capture and high-speed pulse output on all controllers.
- Broad selection of AC/DC In, relay/transistor and high current output modules.
- Large selection of analog In/Out in various I/O counts per module.
- 2 Modbus® (ASCII / RTU) serial ports: 1 slave only, 1 master/slave.
- Over 200 instructions to choose from: Floating point math, communications, 16- and 32-bit math, logical, block move, block compare, retentive data storage, conversion, time base from clock/calendar.

### ELC benefits solve applications:

**Size**—large PLC features in a 1" package. Half the size of competitive offerings. ELC can retrofit more I/O in the same space or allow more cost savings by reducing cabinet size.

**Flexibility**—ELC controllers expand from 28 to 512 I/O on the PV models, and 10 to 256 I/O on all other models.

- Add only the amount of I/O you need. Choose I/O counts as small as 2 points and as large as 16 points per module.
- DIN-rail mounting lets you add as many modules as needed by snapping them into mating connectors.

### Large PLC Features—

Multiple communications ports, distributed I/O capability, high speed counters, high speed pulse outputs, interrupts, timer resolution to 1ms, PIDs, plus much more.

**Software**—ELCSoft programs in standard ladder or sequential function chart programming.

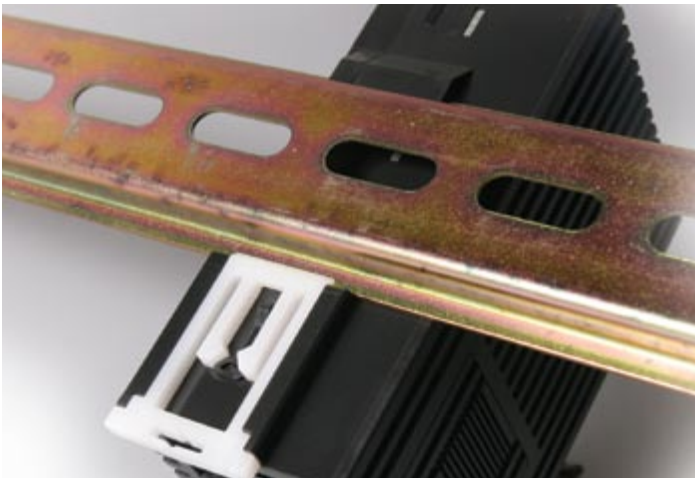
- Display registers "in use" and modules attached to the ELC.
- Monitor runtime applications. Force (except PB model), and enter/modify register values.
- Wizards aid programming of ELC Link for distributed I/O, standard communications, high speed counters, pulse outputs, positioning, interrupts, PIDs, and extension module setup.

### Communications—

Connecting to networks is easy on Modbus®, Modbus TCP, DeviceNet™, and Profibus.

### No racks required

A DIN-rail lets you add as many modules as desired. Just snap on, and slide into place. All connections are done automatically.



### Built-in display

An integral LED display on some models provides user-assigned process monitoring, error messages, alarms, display counts and more.



# ELC Features and Specifications

## ELC Controller Features and Specifications

| Controller                                | ELC-PB14NNDR/DT  | ELC-PA10AADR/DT   | ELC-PC12NNAR/DR/DT | ELC-PH12NNDT | ELC-PV28NNDR/DT                               |
|---|--|---|--------------------|--------------|---|
| <b>Dimensions WxHxD (mm)</b>              | 25.2 x 90 x 60   | 37.4 x 90 x 60  |                    |              | 70 x 90 x 60                                  |
| <b>Maximum I/O—Expandable</b>             | 256 (128 In/128 Out)   |   |                    |              | 512 (256 In/256 Out)                          |
| <b>I/O Type—Embedded</b>                  | 14 (8 DI/6DO)  | 10 (4DI/2DO/2AI/2AO)  | 12 (8 DI/4 DO)     |              | 28 (16DI/12DO)                                |
| <b>DC In Sink/Source</b>                  | Yes  |   |                    |              |   |
| <b>Execution Speed</b>                    | Basic instructions—2 $\mu$ s minimum                                 |   |                    |              | 0.24 $\mu$ s minimum                          |
| <b>Program Language</b>                   | Instructions + Ladder Logic + SFC                                    |   |                    |              |   |
| <b>Program Capacity (steps)</b>           | 3792   | 7920  |                    |              | 15,872  |
| <b>Data Memory Capacity (bits)</b>        | 1280   | 4096  |                    |              |   |
| <b>Data Memory Capacity (words)</b>       | 744  | 5000  |                    |              | 10,000  |
| <b>Index Registers</b>                    | 2  | 8   |                    |              | 16  |
| <b>File Memory Capacity (words)</b>       | None   | 1600 Words  |                    |              | 10,000 Words                                  |
| <b>Retentive Storage</b>                  | Yes  |   |                    |              |   |
| <b>Commands Basic/Advanced</b>            | 32/107   | 32/168  |                    |              | 32/193  |
| <b>Floating Point</b>                     | Yes  |   |                    |              |   |
| <b>SFC Commands (steps)</b>               | 128  | 1024  |                    |              |   |
| <b>Timers Qty</b>                         | 128  | 244 standard with additional timers for subroutine and retentive applications |                    |              |   |
| <b>Timers Resolution</b>                  | 1–100ms  |   |                    |              |   |
| <b>Counters Qty</b>                       | 128  | 250   |                    |              | 253   |
| <b>High Speed Counters</b> (See Note)     | Up to 4  | Up to 6   |                    | Up to 8      | Up to 8                                       |
| <b>Max High Speed Counting</b> (See Note) | 2 at 20 kHz  | 1 at 30 kHz   |                    | 1 at 100 kHz | 2 at 200 kHz                                  |
| <b>Pulse Output</b>                       | 2 channels, 10 kHz Max   | 2 channels, 50 kHz Max  |                    | 100 kHz      | 200 kHz                                       |
| <b>PID</b>                                | Yes  |   |                    |              |   |
| <b>Master Control Loop</b>                | 8 Loops  |   |                    |              |   |
| <b>Subroutines</b>                        | 64 Subroutines   | 256 Subroutines   |                    |              |   |
| <b>For/Next Loops</b>                     | Yes  |   |                    |              |   |
| <b>Interrupts</b>                         | 6  | 15  |                    |              | 22  |
| <b>Real-time Clock / Calendar</b>         | No   | Built-in  |                    |              |   |
| <b>Password Security</b>                  | Yes  |   |                    |              |   |
| <b>Diagnostic Relays</b>                  | Yes  |   |                    |              |   |
| <b>Diagnostic Word Registers</b>          | Yes  |   |                    |              |   |
| <b>Specialty Expansion Modules</b>        | 8 (Analog In/Analog Out/TC/RTD/PT) Modules do not count in total I/O |   |                    |              |   |
| <b>Serial Ports</b>                       | 2 Modbus® (ASCII/RTU) 1=Slave (RS-232)/1=Master-Slave (RS-485)       |   |                    |              |   |
| <b>Remote I/O</b>                         | No   | With 16 other devices   |                    |              | With 32 other devices                         |
| <b>Run Time Editing</b>                   | No   | Yes   |                    |              |   |
| <b>Run / Stop Switch</b>                  | Yes  |   |                    |              |   |
| <b>Removable Terminal Strips</b>          | Yes  |   |                    |              |   |
| <b>Special Features</b>                   | —  | 2, 7-Segment Displays   | 2 Potentiometers   |              | 2 Potentiometers<br>High-speed, left side bus |

Note: High speed counter inputs can be used for different types of 32-bit counting, such as single-ended, single-phase two inputs, and quadrature. Therefore, all high speed counters may not be used at the same time. Please refer to the ELC Systems Manual, MN05003003E, for details.

## ELC Expansion Module Features

| Digital I/O Model                           | Power  | Input Unit |                   | Output Unit |                    |
|---|--------|------------|-------------------|-------------|--------------------|
|   |        | Point      | Type              | Point       | Type               |
| <b>Dimensions WxHxD (mm)</b> 25.2 x 90 x 60 |        |            |                   |             |                    |
| ELC-EX08NNAN                                | 24 Vdc | 8          | AC                | 0           | —                  |
| ELC-EX08NNDN                                |        | 8          | DC Sink or Source | 0           | —                  |
| ELC-EX08NNNR                                |        | 0          |                   | 8           | Relay              |
| ELC-EX08NNNT                                |        | 0          |                   | 8           | Transistor         |
| ELC-EX06NNNI                                |        | 0          |                   | 6           | High Current Relay |
| ELC-EX08NNDR                                |        | 4          |                   | 4           | Relay              |
| ELC-EX16NNDR                                |        | 8          |                   | 8           |                    |
| ELC-EX08NNDT                                |        | 4          |                   | 4           | Transistor         |
| ELC-EX16NNDT                                |        | 8          |                   | 8           |                    |

| Analog I/O Model                            | Power  | Input Unit |                | Output Unit |                 |
|---|--------|------------|----------------|-------------|-----------------|
|   |        | Point      | Type           | Point       | Type            |
| <b>Dimensions WxHxD (mm)</b> 25.2 x 90 x 60 |        |            |                |             |                 |
| ELC-AN02NANN                                | 24 Vdc | 0          | —              | 2           | 0~+20mA 0V~+10V |
| ELC-AN04NANN                                |        | 0          |                | 4           |                 |
| ELC-AN06AANN                                |        | 4          | -20mA~+20mA    | 2           |                 |
| ELC-AN04ANNN                                |        | 4          | -10V~+10V      | 0           |                 |
| ELC-PT04ANNN                                |        | 4          | Platinum Temp. | 0           | —               |
| ELC-TC04ANNN                                |        | 4          | Thermocouple   | 0           |                 |

## Electrical Specifications

|                                   |   |
|-----------------------------------|---|
| <b>Input Voltage Requirements</b> | ELC: 24 Vdc (-15%~+20%) (with DC input reverse polarity protection), Expansion Unit: supplied by the ELC  |
| <b>Power Consumption</b>          | Typically 3–6W  |
| <b>Insulation Resistance</b>      | >5 MΩ at 500 Vdc (Between all inputs/outputs and earth)   |
| <b>Noise Immunity</b>             | ESD: 8 kV Air Discharge EFT: Power Line 2 kV, Digital I/O: 1 kV, Analog & Communication I/O: 1 kV Damped-Oscillatory Wave: Power Line: 1 kV, Digital I/O: 1 kV RS: 26 MHz–1 GHz, 10 V/m |
| <b>Temperature</b>                | Operation: 0°C–55°C (Temperature), 50–95% (Humidity), Pollution degree 2; Storage: -40°C~70°C (Temperature), 5~95% (Humidity)   |
| <b>Vibration/Shock Resistance</b> | Standard: IEC1131-2, IEC 68-2-6 (TEST Fc)/IEC1131-2 & IEC 68-2-27 (TEST Ea)   |
| <b>Certifications</b>             | C-Tick, cULus, CE, Class I Div 2 Groups A, B, C, D  |

## ELC Accessories

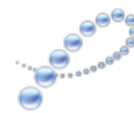
| Catalog Number | Description  |
|----------------|--|
| ELC-PS01       | 24 Watt, 1 Amp Power Supply  |
| ELC-PS02       | 48 Watt, 2 Amp Power Supply  |
| ELC-HHP        | Hand-Held Programmer (includes cable)  |
| ELC-CBPCELC3   | Cable to Connect a PC or ELC-GP unit to ELC, 3 meters (DB9 pin female to 8 pin DIN)                          |
| ELC-CBP CGP3   | Cable to Connect a PC to an ELC-GP unit, 3 meters (DB9 pin female to DB9 pin female)                         |
| ELC-GPXFERMOD  | Program transfer module for ELC-GP units   |
| ELC-ACPGMXFR   | Program transfer module for ELC controllers  |
| ELC-ACCOVER    | Plate mount for specialty modules, qty. 10   |
| ELCSTARTKIT1   | ELC Starter Kit (includes ECL-PA10AADT, ELC-PS01, ELC-GP04, ELC-CBPCELC3, ELC-CBP CGP3, ELCSOFT, ELCSOFT GP) |
| ELC-COENETM    | 10/100 Ethernet Module, need ELC-PV, ModbusTCP, P-P, for use with ELC-PV only                                |
| ELC-CODNETM    | DeviceNet™ Module, need ELC-PV, Scanner, Poll, CC, COS, BS, for use with ELC-PV only                         |
| ELC-COPBDP     | Profibus DP Slave Module   |
| ELC-CODNET     | DeviceNet™ Slave Module  |
| ELC-485APTR    | RS-485 Easy Connect Adapter, DB9, RJ-12, 2-Pin Connections to RS-485   |
| ELC-MC01       | Motion Control, 1 Axis Module (Up to 8 Modules per Controller)   |

Eaton Corporation is a diversified power management company ranked among the largest Fortune 500 companies. The electrical group is Eaton's largest division and is a global leader in electrical control, power distribution, power quality, automation, and monitoring products and services. Eaton's global electrical brands, including Cutler-Hammer®, MGE Office Protection Systems®, Powerware®, Holec®, MEM®, Santak and Moeller, provide customer-driven PowerChain Management® solutions to serve the power system needs of the industrial, institutional, government, utility, commercial, residential, IT, mission critical and OEM markets worldwide.

PowerChain Management solutions help enterprises achieve sustainable and competitive advantages through proactive management of the power system as a strategic, integrated asset throughout its life cycle. With Eaton's distribution, generation and power quality equipment; full-scale engineering services; and information management systems, the power system is positioned to deliver powerful results: greater reliability, operating cost efficiencies, effective use of capital, enhanced safety, and risk mitigation.

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