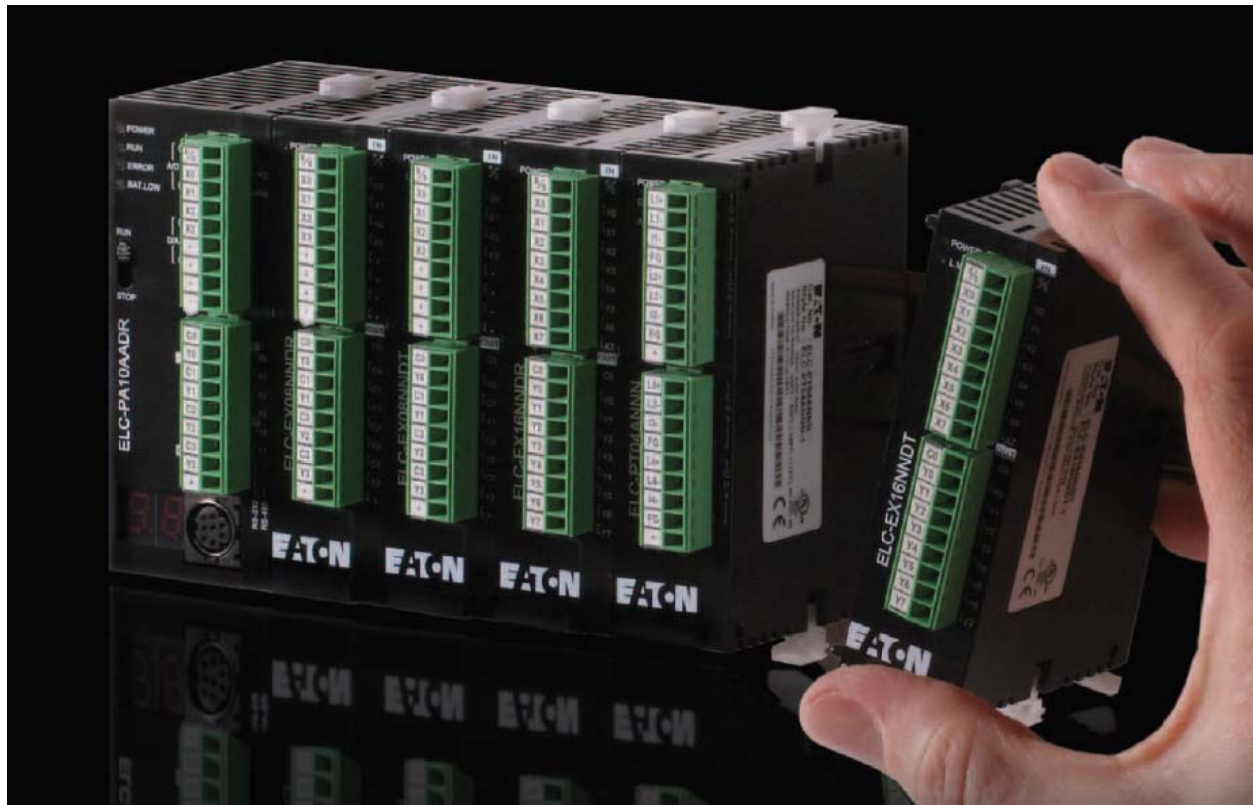


## Differences between ELC series and ELC2 series PLCs



## Application Summary

The differences between ELC-PB and ELC2-PB; ELC-PC/PH and ELC2-PC; and ELC-PV and ELC2-PV.

## Products and Revisions

| Vendor | Product             | Applicable Revision | Tested Revision |
|--------|---------------------|---------------------|-----------------|
| Eaton  | ELC-PA/PB/PC/PH/PV  |                     |                 |
| Eaton  | ELC2-PA/PB/PC/PE/PV |                     |                 |

## Supporting Documentation

| Manual Name            | Reference Number |
|------------------------|------------------|
| Operation Manual ELC   | MN05003006E      |
| Programming Manual ELC | MN05003003E      |

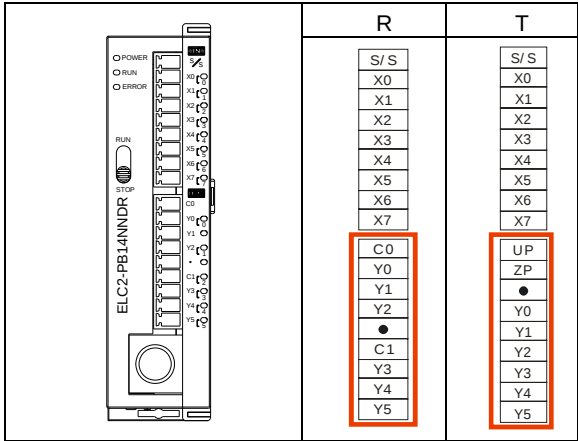
## Introduction:

ELC2 is the newer version PLC in Eaton ELC series. There are some hardware differences between ELC and ELC2 PLCs. This application note shows these differences in I/O terminals, wiring, memory maps and other technical specifications. Other changes and differences between the ELC and ELC2 are summarized below:

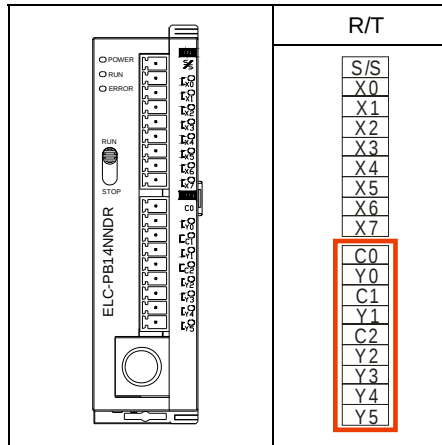
- The ELC2 models are 32-bit CPUs vs the ELCs that are 16-bit CPUs so they are faster and more powerful
- The ELC-PC12NNAR has been obsoleted and there is no ELC2 replacement for this CPU
- The ELC-PA10AADR and ELC-PA10AADT will remain as being available as 16-bit controllers because of their 37mm width
- The ELC2-PA20 is a new addition which is 70mm wide and consisting of the ELC2-PA20AADR, ELC2-PA20AADP and ELC2-PA20AADT
- All of the ELC2-PC controllers include high-speed 100kHz inputs as standard
- The ELC-PH will be replaced by an ELC2-PC model as there is no need to have separate high-speed input models
- The ELC2-PE is a new CPU model (37mm wide) with on-board Ethernet communications consisting of the ELC2-PE12NNDR and ELC2-PE12NNDT
- New PNP transistor output models for the ELC2-PB and ELC2-PV are available consisting of the ELC2-PB12NNDP (12 vs 14 I/O - 8I/6O) and ELC2-PV28NNDP

1. The difference in output terminals between ELC and ELC2 models.

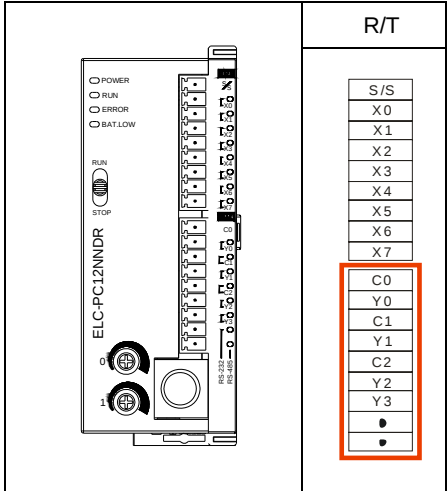
ELC2-PB



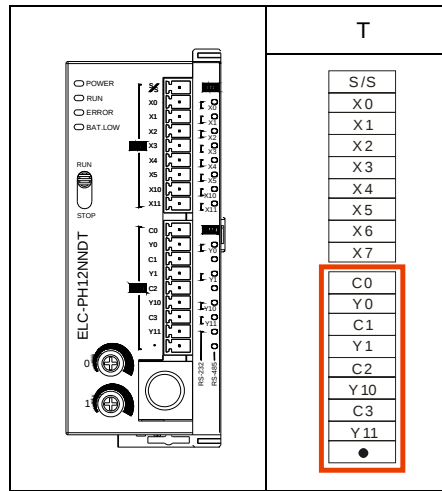
ELC-PB



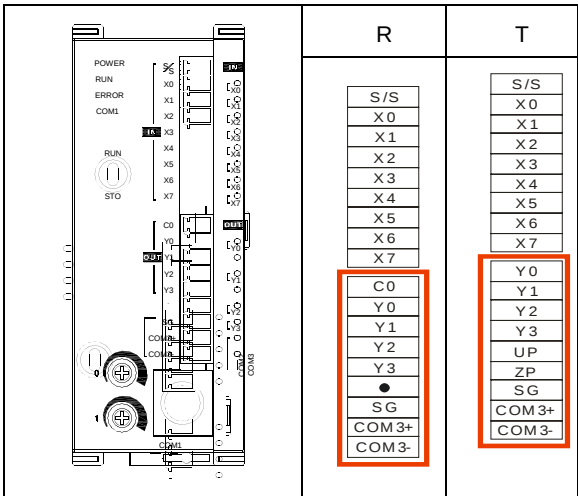
ELC-PC



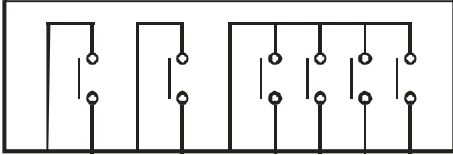
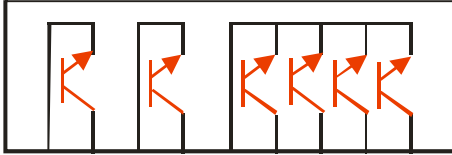
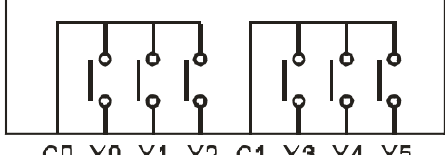
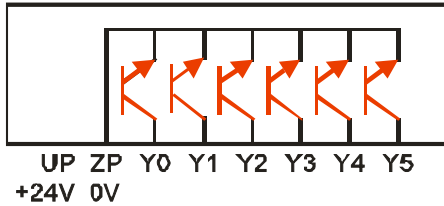
ELC-PH

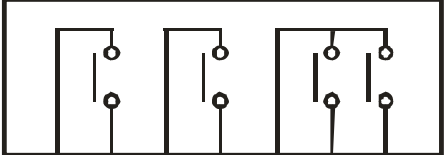
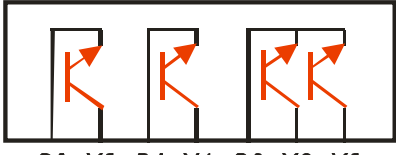
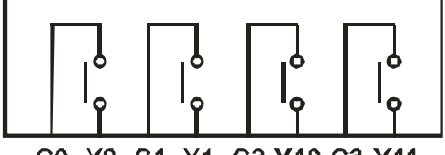
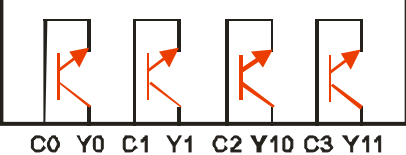
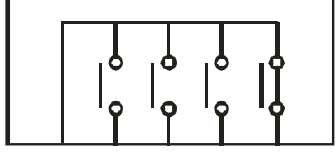
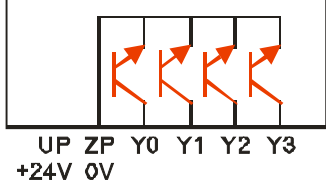


ELC2-PC



2. The difference in output wiring between ELC and ELC2 models.

|         | Relay                                                                                                               | Transistor                                                                                                                    |
|---------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| ELC-PB  |  <p>C0 Y0 C1 Y1 C2 Y2 Y3 Y4 Y5</p> |  <p>C0 Y0 C1 Y1 C2 Y2 Y3 Y4 Y5</p>          |
| ELC2-PB |  <p>C0 Y0 Y1 Y2 C1 Y3 Y4 Y5</p>    |  <p>UP ZP Y0 Y1 Y2 Y3 Y4 Y5<br/>+24V 0V</p> |

|         | Relay                                                                                                                | Transistor                                                                                                                 |
|---------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| ELC-PC  |  <p>C0 Y0 C1 Y1 C2 Y2 Y3</p>      |  <p>C0 Y0 C1 Y1 C2 Y2 Y3</p>           |
| ELC-PH  |  <p>C0 Y0 C1 Y1 C2 Y10 C3 Y11</p> |  <p>C0 Y0 C1 Y1 C2 Y10 C3 Y11</p>      |
| ELC2-PC |  <p>C0 Y0 Y1 Y2 Y3</p>            |  <p>UP ZP Y0 Y1 Y2 Y3<br/>+24V 0V</p> |

### 3. The difference in specification between ELC-PB and ELC2-PB.

| Module name        | ELC-PB                    | ELC2-PB                          |
|--------------------|---------------------------|----------------------------------|
| CPU type           | 16-bit                    | 32-bit                           |
| Program size       | 3972 steps                | 7920 steps                       |
| D device size      | 600 words (latched 192)   | 5000 words (latched 2100)        |
| LD execution time  | 3.8 us                    | 0.76 us                          |
| High-speed input   | 10KHz x 4 points          | 10KHz x 8 points                 |
| High-speed output  | 10KHz x 2 points (Y0, Y1) | 10KHz x 4 points (Y0~Y3)         |
| Total bandwidth    | 40KHz (X0~X3, Y0, Y1)     | None                             |
| DHSCS/DHSCR        | 4 comparators             | 6 comparators                    |
| External interrupt | 4 points (rising edge)    | 8 points (rising / falling edge) |

#### New major functions added to ELC2-PB:

- PLSY, PWM, PLSR can be selected to output Y2 and Y3. DDRVI, DDRVA, and DZRN are supported.
- COM1 can be used in a master mode, and it can receive a GPS protocol (device mode).

#### 4. The difference in specification between ELC-PC/PH and ELC2-PC.

| Module name         | ELC-PC/PH                                         | ELC2-PC                          |
|---------------------|---------------------------------------------------|----------------------------------|
| CPU type            | 16-bit                                            | 32-bit                           |
| Program size        | 7920 steps                                        | 15872 steps                      |
| D device size       | 5000 words (latched 3800)                         | 10000 words (latched 2100)       |
| File register       | 1600                                              | 5000                             |
| Battery             | Yes                                               | None                             |
| LD execution time   | 3.8 us                                            | 0.76us                           |
| High-speed input    | 10KHz x 6, 100KHz x 2 points                      | 10KHz x 6, 100KHz x 2 points     |
| High-speed output   | 10KHz x 2, 100KHz x 1 point                       | 10KHz x 2, 100KHz x 2 points     |
| Total bandwidth     | 40KHz (X0~X5, Y0, Y1), 130KHz (X10,X11, Y10, Y11) | None                             |
| RS485 port          | 1                                                 | 2                                |
| Left side interface | None                                              | Support                          |
| External interrupt  | 6 points (rising edge)                            | 8 points (rising / falling edge) |

#### New major functions added to ELC2-PC:

- COM1 and COM3 can be used in a master mode, and COM1 can receive a GPS protocol (device mode).
- New solar tracking instruction: DSPA
- After 24V power is OFF, the RTC can still keep track of time for 7 days without a battery.
- One 2-axis synchronized positioning control (linear and arc interpolation).
- The frequency with which an A/B phase output is produced can be up to 50 KHz.

**5. The difference in specification between ELC-PV and ELC2-PV.**

| Module name        | ELC-PV      | ELC2-PV                 |
|--------------------|-------------|-------------------------|
| CPU type           | 16-bit      | 32-bit                  |
| Program size       | 15872 steps | 30000 steps             |
| D device size      | 10000 words | 12000 words             |
| File register      | 10000 words | 50000 words             |
| API execution time | slower      | 4 times faster than ELC |

**6. There are many new instructions for ELC2 series:**

- Basic instructions can be used to manipulate the bits in a word device, e.g. BLD D0 K7 (LD D0.7)
- Basic instructions can be used with index devices, e.g. LD X0E1
- Floating-point comparison input instruction: FLD>, FLD>=, FLD< .....

## 7. The ELC vs ELC2 memory maps.

- The ELC2 memory map is different from the ELC memory map – except the ELC2-PV, which is the same as the ELC-PV; the differences are listed below:

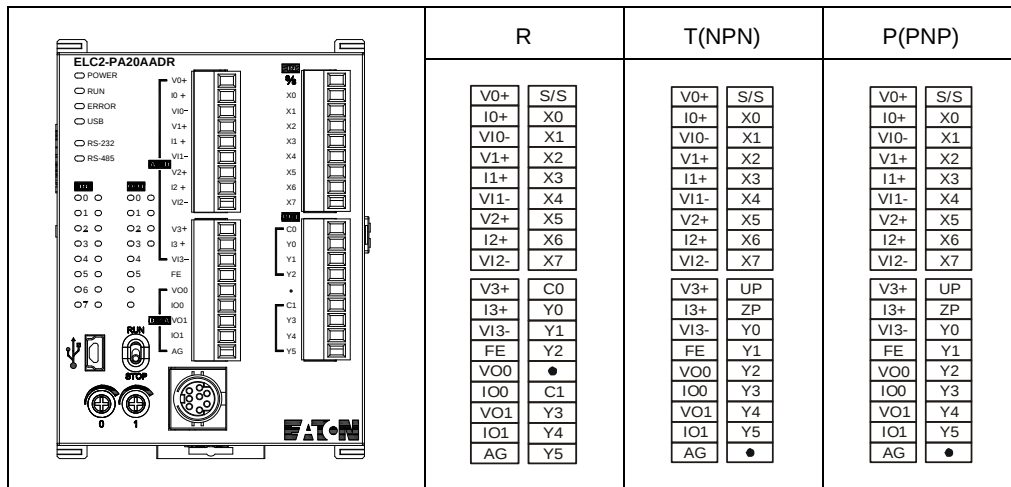
| Device | Non Latched Area |                                       | Latched Area |                           |
|--------|------------------|---------------------------------------|--------------|---------------------------|
|        | ELC-PB           | ELC2-PB                               | ELC-PB       | ELC2-PB                   |
| S      | None             | S128~S911                             | S0~S127      | S0~S127,<br>S912~S1023    |
| M      | M0~M511          | M0~M511,<br>M768~M999<br>M2000~M2047  | M512~M767    | M512~M767,<br>M2048~M4095 |
| D      | D0~D407          | D0~D407,<br>D600~D999,<br>D3920~D4999 | D408~D599    | D408~D599<br>D2000~D3919  |

| Device     |     | Non Latched Area |                                   | Latched Area |           |
|------------|-----|------------------|-----------------------------------|--------------|-----------|
|            |     | ELC-PB           | ELC2-PB                           | ELC-PB       | ELC2-PB   |
| T<br>(ms)  | 100 | T0~T63           | T0~T126<br>T128~T199<br>T250~T255 | None         | None      |
|            | 10  | T64~T126         | T200~T245                         | None         | None      |
|            | 1   | T127             | T127, T246~T249                   | None         | None      |
| C<br>(Bit) | 16  | C0~C111          | C0~C111<br>C128~C199              | C112~C127    | C112~C127 |
|            | 32  | None             | C200~C223                         | C235~C255    | C224~C255 |

| Device     |     | Non Latched Area      |                                       | Latched Area             |                           |
|------------|-----|-----------------------|---------------------------------------|--------------------------|---------------------------|
|            |     | ELC-PA/PC/PH          | ELC2-PA/PC                            | ELC-PA/PC/PH             | ELC2-PA/PC                |
| S          |     | S0~S511               | S128~S911                             | S512~S1023               | S0~S127,<br>S912~S1023    |
| M          |     | M0~M511               | M0~M511,<br>M768~M999<br>M2000~M2047  | M512~M999<br>M2000~M4095 | M512~M767,<br>M2048~M4095 |
| D          |     | D0~D199               | D0~D407,<br>D600~D999,<br>D3920~D9999 | D200~D999<br>D2000~D4999 | D408~D599<br>D2000~D3919  |
| T<br>(ms)  | 100 | T0~T199,<br>T250~T255 | T0~T126<br>T128~T199<br>T250~T255     | None                     | None                      |
|            | 10  | T200~T245             | T200~T245                             | None                     | None                      |
|            | 1   | T246~T249             | T127, T246~T249                       | None                     | None                      |
| C<br>(Bit) | 16  | C0~C95                | C0~C111<br>C128~C199                  | C96~C199                 | C112~C127                 |
|            | 32  | C200~C215             | C200~C223                             | C216~C255                | C224~C255                 |

### 8.1 I/O configuration of a terminal block

## 8.1 I/O configuration of a terminal block



## 8.2 Major specification

| Module name         | ELC-PA10<br>(4DI + 2DO + 2AI + 2AO) | ELC2-PA20<br>(8DI + 6DO + 4AI + 2AO) |
|---------------------|-------------------------------------|--------------------------------------|
| CPU type            | 16-bit                              | 32-bit                               |
| Program size        | 7920 steps                          | 15872 steps                          |
| D device size       | 5000 words (latched 3800)           | 10000 words (latched 2100)           |
| File register       | 1600                                | 5000                                 |
| Battery             | Yes                                 | None                                 |
| LD executing time   | 3.8 us                              | 0.76us                               |
| High-speed input    | 10KHz x 2, 20KHz x 2 points         | 10KHz x 6, 100KHz x 2 points         |
| High-speed output   | 10KHz x 2 point                     | 10KHz x 2, 100KHz x 2 points         |
| Total bandwidth     | 40KHz (X0~X3, Y0, Y1),              | None                                 |
| USB port            | None                                | Support                              |
| Left side interface | None                                | Support                              |
| External interrupt  | 6 points (rising edge)              | 8 points (rising / falling edge)     |

### 8.3 ELC2-PA's memory map, function and instructions are same as ELC2-PC's.

- After 24V power is OFF, the RTC can still keep track of time for 7 days without a battery.
- One 2-axis synchronized positioning control (linear and arc interpolation).

## Additional Help

In the US or Canada: please contact the Technical Resource Center at 1-877-ETN-CARE or 1-877-326-2273.

| Location      | Contact                                                        |
|---------------|----------------------------------------------------------------|
| United States | Technical Resource Center at 1-877-ETN-CARE or 1-877-326-2273. |
| Canada        |                                                                |
| Europe        |                                                                |

All other supporting documentation is located on the Eaton web site at [www.eaton.com/plc](http://www.eaton.com/plc)



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Printed in USA  
Publication No. AP070002EN  
April 2014

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