Solutions for Replacing the ELC-PC12NNAR or for ELC Applications Requiring AC Voltage Inputs

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Application Summary

This application note will cover the replacement solutions for the ELC-PC12NNAR which is no longer available. The mapping of digital inputs and outputs will be covered, as well as some practical examples for using the ELC-EX08NNAN to accommodate the lost AC inputs.

Products and Revisions

Vendor	Product	Applicable Revision	Tested Revision
Eaton	ELC-PC12NNAR	All	All
Eaton	ELC-PC12NNDR	All	All
Eaton	ELC-EX08NNAN	All	All

Supporting Documentation

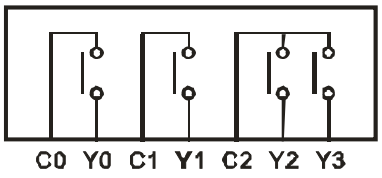
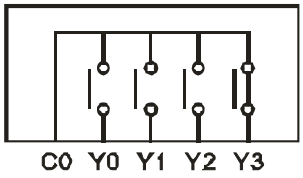
Manual Name	Reference Number
Eaton Logic Controller Programming Manual	MN05003003E
Eaton Logic Controller Operation Manual	MN05003006E

Application Details

The ELC-PC12NNAR has become obsolete and there is no direct replacement for this component. Applications requiring the use of 110 Vac inputs will have to use the extension module ELC-EX08NNAN. The primary purpose of this application note is to illustrate the differences in wiring the units and addressing the inputs.

ELC Migration to the ELC2

All ELC controllers are replaced by the ELC2 series controller. This means that as of the writing of this application note, when the ELC-PC12NNDR stock is depleted, it will be replaced by the ELC2-PC12NNDR. The ELC2-PC12NNDR's output terminals and wiring are different from the ELC-PC12NNAR. See chart below.

	ELC-PC12NNDR	ELC2-PC12NNDR
Output Terminals & Wiring		

All extension modules will continue to use the ELC prefix and their catalog numbers will not change. Any projects that have been developed for the ELC series can be used in the ELC2 series; you will simply have to change the ELC type in the development software to reflect the new controller. For the remainder of this document, when I refer to the ELC series this covers both the ELC and ELC2 catalog prefixes.

ELC Series Input and Output Extension Unit Addressing

The ELC controller automatically addresses discrete I/O based on the position of each I/O module with respect to the controller. Independent of the number of discrete I/O points on the controller, the first Input on the first input module to the right of the controller will be X20. The first output on the first output module to the right of the controller will be Y20. Keep in mind that the I/O addressing uses an octal numbering system. The controller always reserves input addresses X0 through X7 and X10 through X17. That is why the inputs for the first input module start at X20. Addresses will never end in 8 or 9 because they do not exist in an octal numbering system.

Extension position	ELC Catalog No.	Number of input points	Number of output points	Input addresses	Output addresses
1st extension	ELC-EX08NNDN	8	-	X20~X27	-
2nd extension	ELC-EX06NNNI	-	6	-	Y20~Y25
3rd extension	ELC-EX16NNDR	8	8	X30~X37	Y30~Y37
4th extension	ELC-EX08NNNR	-	8	-	Y40~Y47
5th extension	ELC-EX08NNDR	4	4	X40~X43	Y50~Y53
6th extension	ELC-EX08NNAN	8	-	X50~X57	-

Even though the second extension unit ELC-EX06NNNI only has 6 outputs, the other two output addresses associated with it, Y26 and Y27 are invalid and should not be used.

It is important to note that any analog I/O modules are not included in the addressing associated with the discrete I/O modules. The data sent to and read from analog modules by the controller is accomplished via TO and FROM instructions used in the controller program.

Example:

Extension position	ELC Catalog No.	Number of input points	Number of output points	Input addresses	Output addresses
1st extension	ELC-EX08NNDN	8	-	X20~X27	
2nd extension	ELC-AN06AANN	-	-	-	-
3rd extension	ELC-EX16NNDR	8	8	X30~X37	Y20~Y27
4th extension	ELC-AN04ANNN	-	-	-	-
5th extension	ELC-EX08NNDR	4	4	X40~X43	Y30~Y33
6th extension	ELC-EX08NNAN	8	-	X50~X57	-

In regards to the replacement of the ELC-PC12NNAR, below is the recommendation using an ELC-PC12NNDR with an ELC-EX08NNAN extension module.

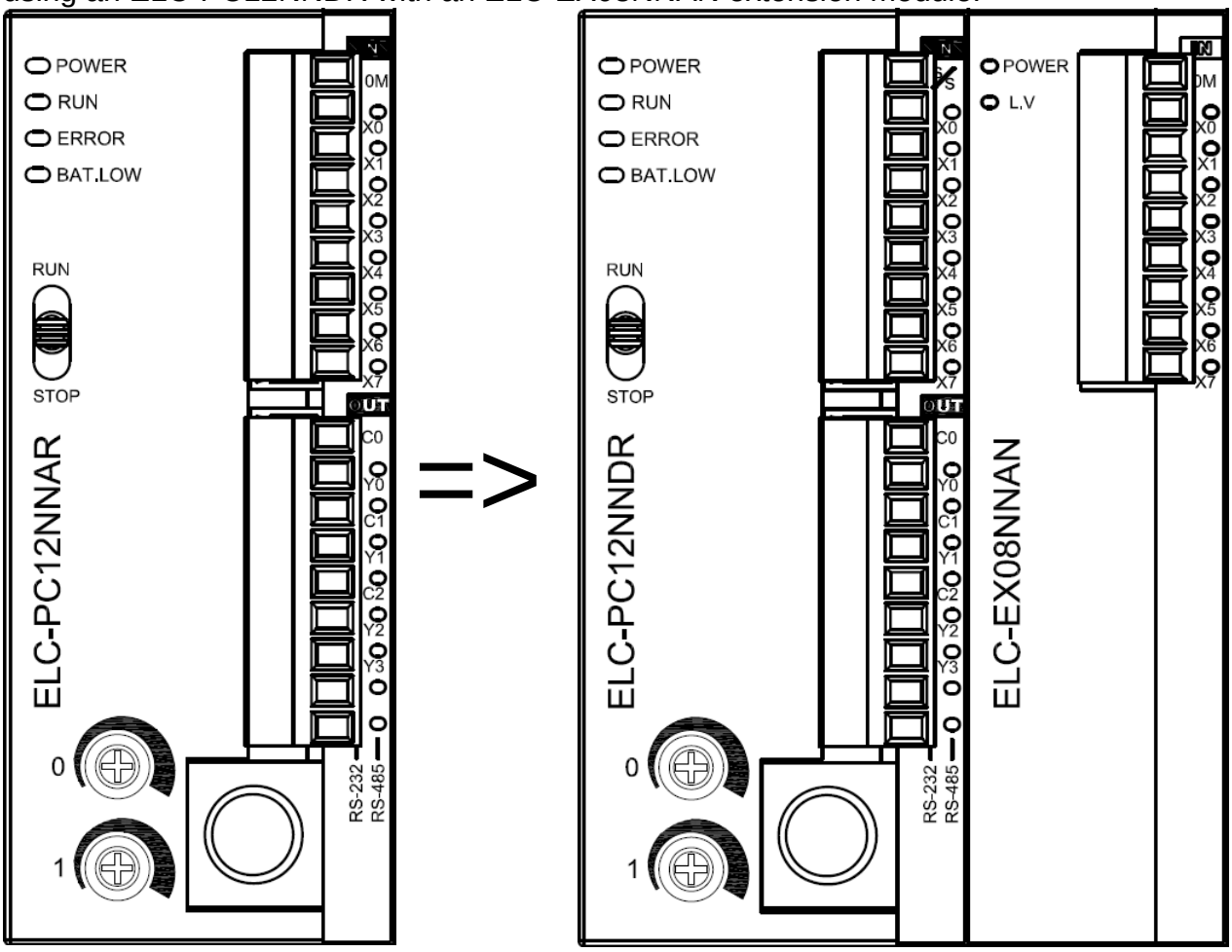
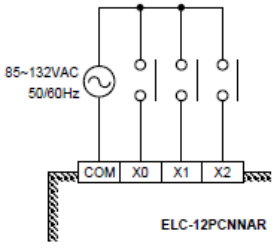


Illustration 1

The physical wiring of the AC inputs will be the same, except that they will now go into the ELC-EX08NNAN module instead. In the simplest of cases just move the terminal block from the ELC-PC12NNAR to the ELC-EX08NNAN. Please refer to the tables below for more details on wiring the AC inputs.

Input Circuit Connection


110V AC Input Specifications	
Input voltage	100~120VAC (-15%~+10%)
Input impedance	21Kohm/50Hz 18Kohm/60Hz
Input current	4.7mA 100VAC/50Hz 6.2mA 110VAC/60Hz
OFF→ON/ON→OFF	80V 3.8mA/30V 1.7mA
Response time	OFF→ON:30ms ON→OFF:50ms
Circuit isolation/Operation indication	Photocoupler/LED On

As we have described before, now that we are using an extension module, the mapping of the AC input will now be different in your ladder logic. Inputs X0~X7 will now have the address X20~X27 and any contacts or coils using X0~X7 will have to be replaced in your ladder logic with the corresponding X20~X27 input addresses. Please refer to the table below.

X0	X20
X1	X21
X2	X22
X3	X23
X4	X24
X5	X25
X6	X26
X7	X27

Let's consider an application in which the controller is already utilizing an extension module. In this case the ELC-EX16NNDR has 8 digital inputs and 8 digital outputs. Because the ELC-PC12NNAR is no longer available, we have to replace it with an ELC-PC12NNDR and add an ELC-EX08NNAN extension module as depicted in illustration 2. Because the new extension module is in the 2nd position, its inputs are mapped to the X30 block. Change any inputs in your ladder logic from X0~X7 to X30~X37.

X0	X30
X1	X31
X2	X32
X3	X33
X4	X34
X5	X35
X6	X36
X7	X37

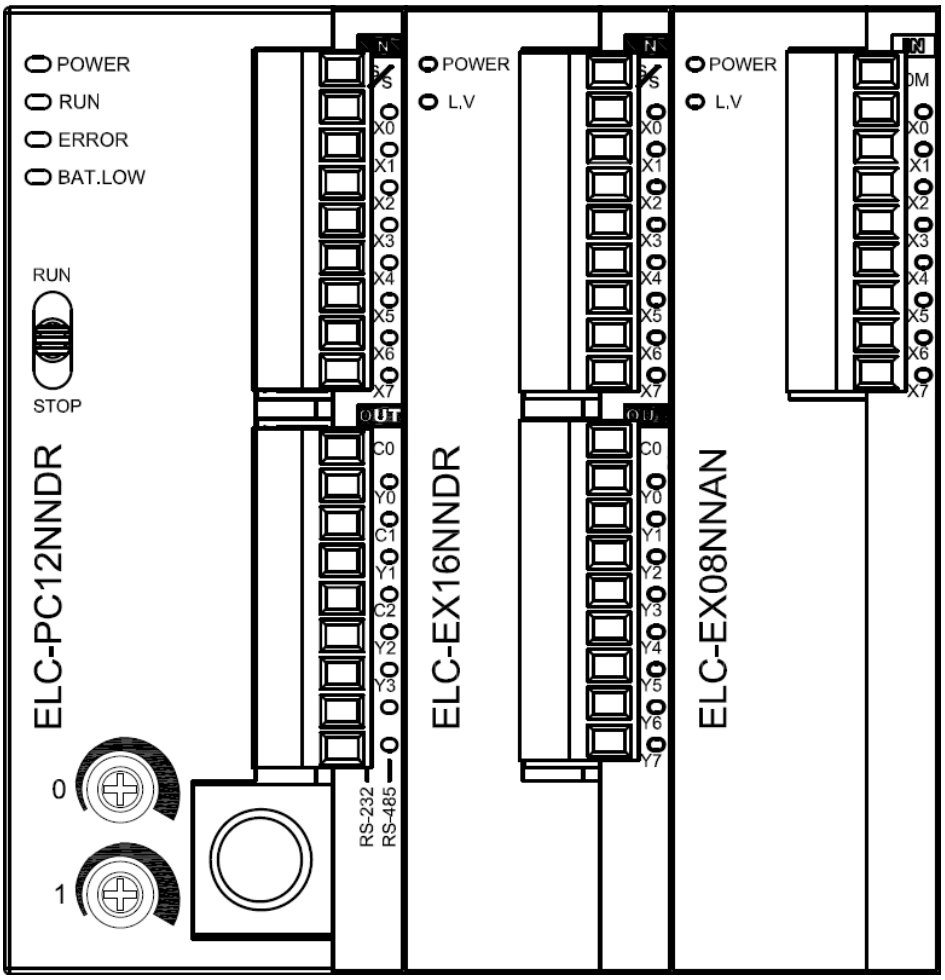


Illustration 2

As a final example, we will look at an application in which an ELC-PC12NNAR had an analog extension module and a digital extension module. As described before, analog extension modules do not count toward the mapping of digital inputs or outputs. When we replace the ELC-PC12NNAR with an ELC-PC12NNDR and add an ELC-EX08NNAN module to the right end (as shown in illustration 3), the ELC-EX08NNAN is actually the 2nd digital input module. Its inputs would be mapped to the X30 block as in the previous example.

X0	X30
X1	X31
X2	X32
X3	X33
X4	X34
X5	X35
X6	X36
X7	X37

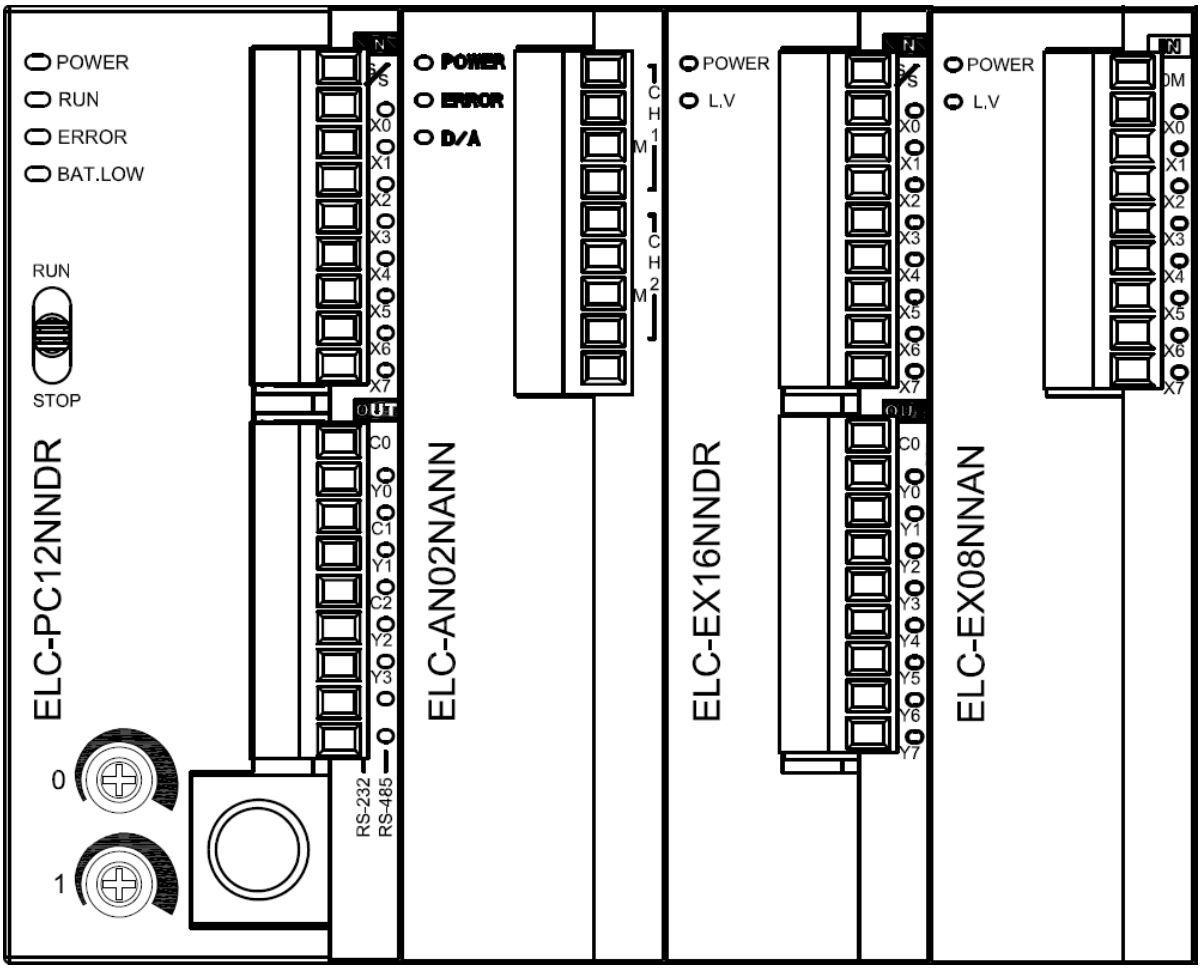


Illustration 3

In the original ladder logic, X0, X1, and X2 are used as shown in illustration 4. Therefore they need to be replaced with X30, X31, and X32 respectively. Please refer to illustration 5.

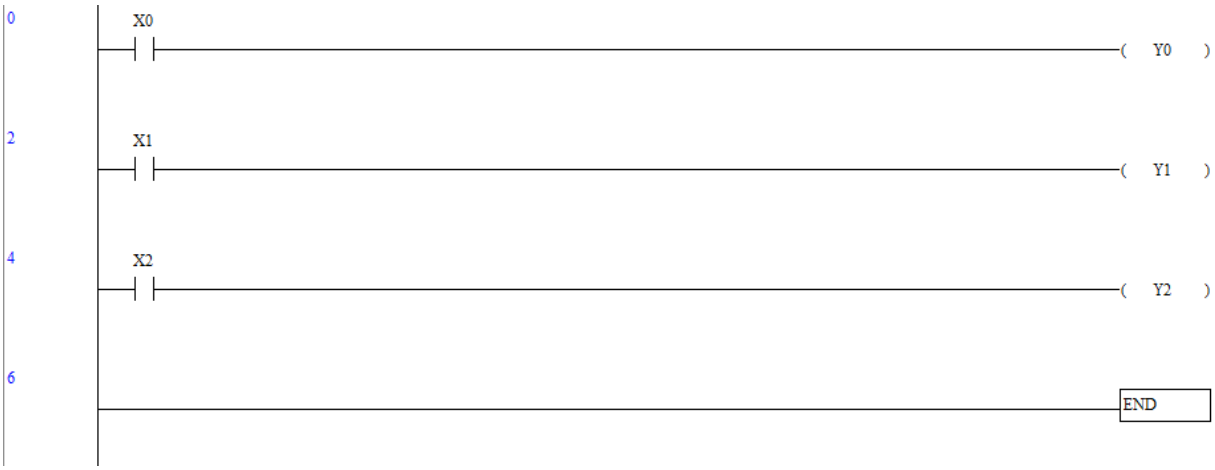


Illustration 4

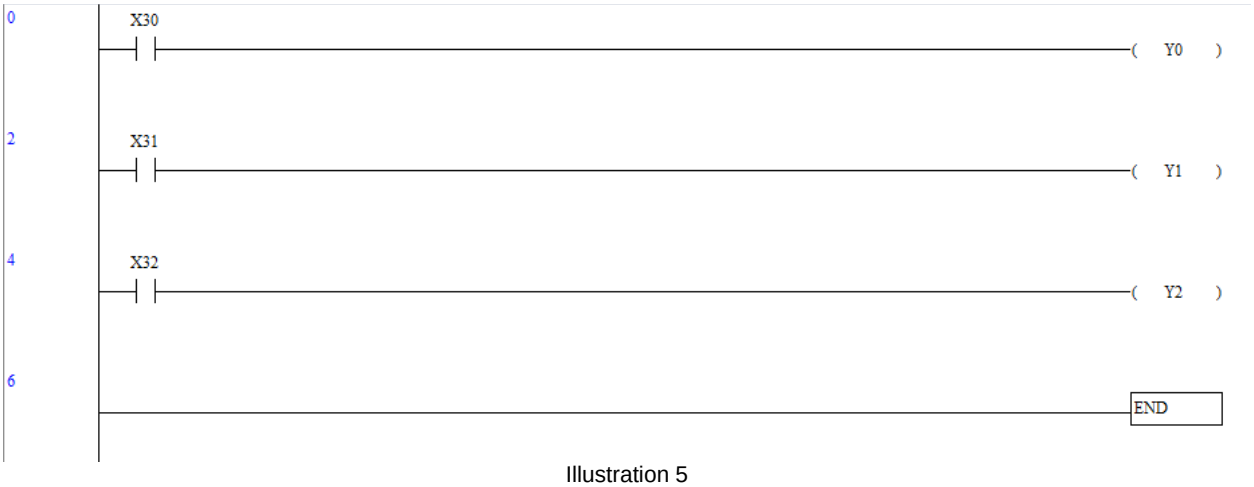


Illustration 5

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

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