Introduction

1.0 Introduction to This Manual

This manual presents the information you need to program and operate your Allen-Bradley PLC-2/30 Programmable Controller.

After reading this manual, you should be able to:

- establish system configurations consisting of:
  - scanners
  - interface modules
  - input modules
  - output modules
  - power supplies

- program:
  - timers
  - counters
  - extended arithmetic functions
  - relay-type functions
  - and data transfer, for a few examples.

This manual is your entry into understanding the PLC-2/30 programmable controller.

To find what the topics are in the individual chapters — **Use the Table of Contents.**

To get an overview of what that chapter presents — **Look in the "General" section of each chapter.**

To get a better understanding of slot addressing — **Use the Appendix.**

To find where a specific item is located in the text — **Use the Index.**

1.1 General

The PLC-2/30 programmable controller consists of:

- The 1772-LP3 processor
- An I/O structure (I/O chassis containing I/O modules)

With a user-written program and appropriate I/O modules, the PLC-2/30 programmable controller can be used to control many types of industrial applications such as:

- Process control
- Material handling
- Palletizing
- Measurement and gauging
- Pollution control and monitoring

The 1772-LP3 processor has a read/write CMOS memory that stores user program instructions, numeric values and I/O device status. The user program is a set of instructions in a particular order that describes the operations to be performed and the operating conditions. It is entered into memory, rung by rung, in a ladder diagram and functional block display format from the keyboard of a 1770-T3 or 1784–T50 terminal. The ladder diagram symbols closely resemble the relay symbols used in hardwired relay control systems. The functional block displays are an easy method of programming and monitoring advanced instructions.

During program operation, the PLC-2/30 processor continuously monitors the status of input devices and, based on user program instructions, either energizes or de–energizes output devices. Because the memory is programmable, the user program can be readily changed if required by the application.

The PLC-2/30 processor's functions include:

- Relay-type functions (Examine On, Examine Off, Output Energize, Output Latch, Output Unlatch and Branching)
- Complete forced I/O
- Data transfer
- Data comparison
- Three-digit, four-function arithmetic $(+, -, \times, :-) :-:-$
- Timing functions: On-Delay and Off-Delay, Retentive and Nonretentive with time bases of 1.0, 0.1 and 0.01 seconds (timing range 0.02 to 999 seconds).
- Bidirectional counting (up or down) with a range of 0 to 999 counts.
- Self-monitoring/diagnostic capabilities
- Expandable data table
- Memory capacity of 16,256 words
- 896 I/O device capacity is available in local or remote configurations.
- 896 inputs and 896 outputs when used with specific configurations.
- Memory write protect
- Program control instructions
  - Jump
  - Subroutines

- Functional Block Instructions
  - Shift Register instructions
  - File-to-File and Word-to-File Logic instructions
  - File-to-File, Word-to-File and File-to-Word transfer instructions
- Binary to BCD and BCD to Binary conversions
- On-line programming
- Data Highway and Data Highway II compatible
- Sequencers
- Contact histogram
- Report generation

1.2 Capabilities

The data table for the 1772-LP3 processor can be expanded to 8,064 words with an 8K memory or to 8,192 words with a 16K memory. However, an 8,064 word data table is impractical with an 8K memory since there would be nothing available for the user program.

You can expand the data table from the default size of 128 words (1 rack) to 256 words (2 racks, word address 377_8) in 2-word increments. From word address 400_8 on, the data table must be expanded in 128-word sections. The I/O image tables, therefore, can be configured in size from 1 to 7 I/O racks. Each rack added, above one, increments by 10_8 the first available address for timers and counters. Table 1.A lists the first available timer/counter address when different numbers of racks are selected.

In addition, the processor can control up to 896 inputs and 896 outputs for a total of 1,792 I/O points in a remote system of seven 128 I/O racks (Table 1.A).

Table 1.A
PLC-2/30 Processor Capabilities (Cat. No. 1772-LP3)

#I/O Racks	Max. I/O Points[1] (decimal)	First Available T/C Address (octal)
1	128	020
2	256	030
3	384	040
4	512	050
5	640	060
6	768	070
7	896	200

[1] Without complementary I/O. With complementary I/O, maximum I/O points is double the tabulated number up to 1,792.