

SECTION I

484 GENERAL INFORMATION

1.0 INTRODUCTION

The introduction provides a general overview of Programmable Controllers (PC) and specific orientation to the MODICON 484. All topics discussed here are discussed in more detail in other sections of the manual. For information on family trees refer to Appendix A and for information on external cables to Appendix B. A Glossary of Terms is included at the back.

1.1 GENERAL SYSTEM DEFINITION

A Programmable Controller (PC) is a solid-state device designed to make logic decisions in industrial control situations. Relays and solid-state electronics can be replaced with a PC.

Outstanding features of a PC include:

- o Reliable, fast responses in hostile environments.
- o Programmable and reprogrammable with ladder diagram language.
- o Simplified troubleshooting with diagnostic indicator lights at major points.
- o Easy maintenance with modular replacement.

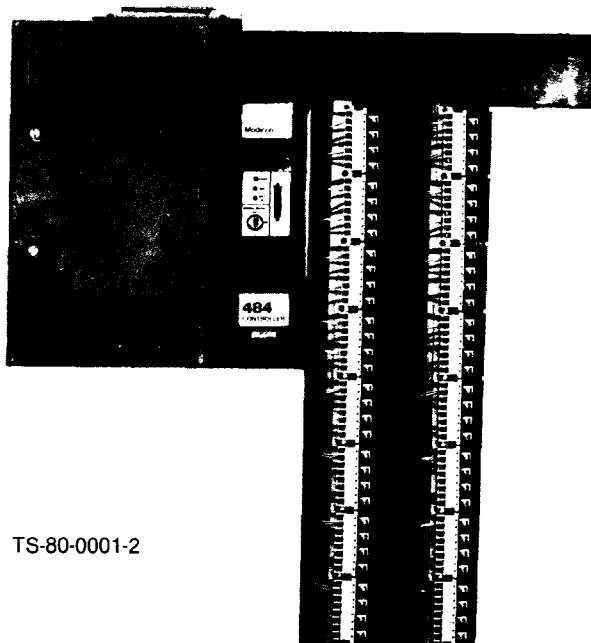
The MODICON 484 is one of the finest examples of PC technology available. It is designed to replace control systems of 10 to 400 relays. Advantages over relays and other solid-state devices include:

- o Lower hardware costs.
- o Faster scan rate: 4 to 20 ms depending on memory size.
- o Expandable memory in six sizes: 1/4K to 8K.
- o Expandable Input/Output (I/O) with four point modules.
- o Easier installation.
- o Retentive memory for logic and timer/counter values.
- o Direct plug-in programming devices.
- o Real-time, on line programming.

Table I-1 lists the specifications for a basic 484 Controller, and Figure I-1 shows the controller system.

Table I-1. Basic 484 Controller Specifications

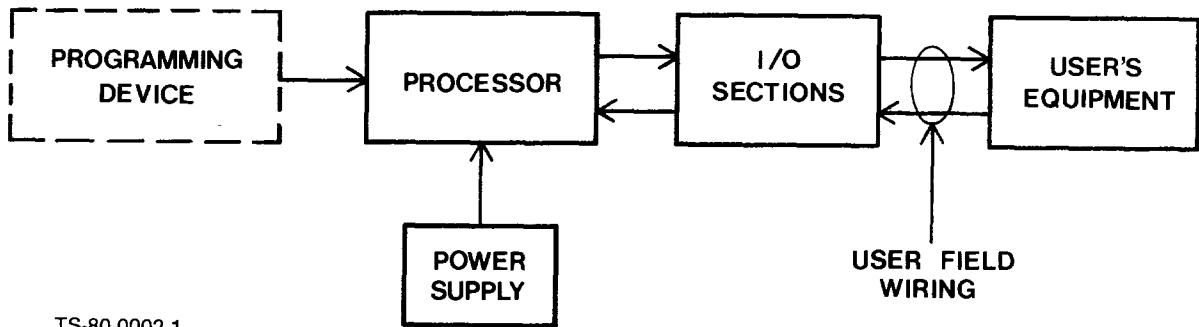
<p>Power Requirements:</p> <p>Standard</p>	<p>115 VAC \pm 15%, 60 Hz \pm 150 Volt amps (max) 3 amp peak start-up transient</p>						
<p>Optional</p>	<p>115/220 VAC \pm 15%, 50 Hz \pm 5% 150 Volt amps (mac) 3 amp peak start-up transient (2 amp on 220 V)</p>						
<p>Environmental Requirement:</p> <p>Ambient Temperature</p> <p>Humidity (non-condensing)</p>	<table border="0"> <tr> <td>Operating</td> <td>Storage</td> </tr> <tr> <td>0° C to 60° C</td> <td>-40° C to 80° C</td> </tr> <tr> <td>0% to 95%</td> <td>0% to 95%</td> </tr> </table>	Operating	Storage	0° C to 60° C	-40° C to 80° C	0% to 95%	0% to 95%
Operating	Storage						
0° C to 60° C	-40° C to 80° C						
0% to 95%	0% to 95%						
<p>Dimensions (WxHxD):</p> <p>Processor (w/Power Supply)</p> <p>Single I/O housing (including I/O Duct)</p> <p>Eight Housings (One Channel)</p>	<p>15 in. x 20.5 in. x 6.5 in. (38 cm x 53 cm x 16.5 cm)</p> <p>5 in. x 32 in. 6 in. (13 cm x 81 cm x 15 cm)</p> <p>40 in. 32 in. 6 in. (102 cm x 81 cm x 15 cm)</p>						
<p>Weight:</p> <p>Processor (w/Power Supply)</p> <p>I/O Module</p> <p>Single I/O Housing (w/Modules)</p> <p>Eight Housings w/Modules & Duct)</p>	<p>33 lbs (15 Kg)</p> <p>1 lb (0.5 Kg)</p> <p>15 lbs (7 Kg)</p> <p>136 lbs (62 Kg)</p>						
<p>Controls and Indicators:</p> <p>CPU</p>	<p>RUN light POWER on light BATT OK light MEMORY PROTECT key</p>						
<p>I/O Modules:</p>	<p>Circuit Terminal Voltage light Blow Fuse light (outputs ONLY)</p>						



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Figure I-1. 484 Controller System

A typical PC (Figure I-2) is divided into four components: Processor, Power Supply, I/O Section, and a Programming Device.

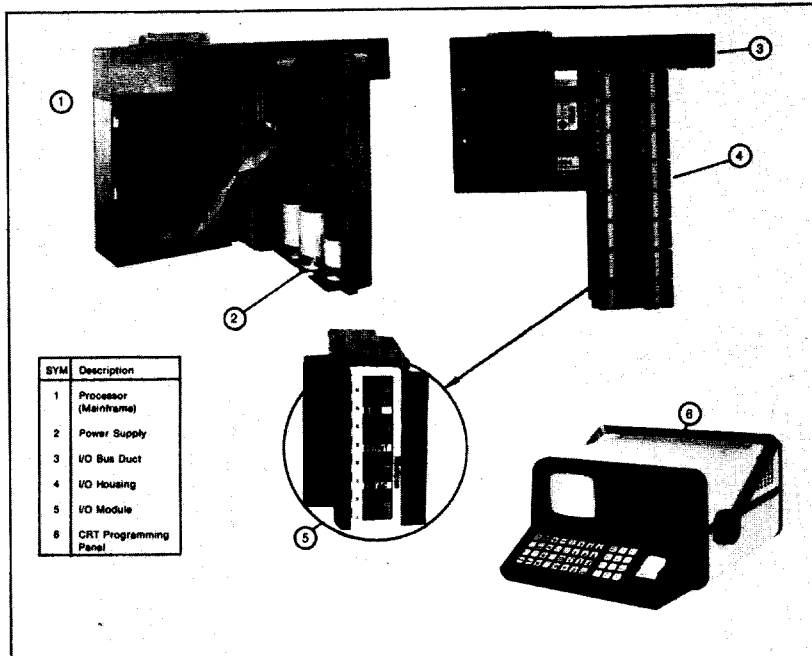


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Figure I-2 Basic Block Diagram

1.2 COMPONENTS: SYSTEM DESCRIPTION

Each of the four components of a PC are described briefly in this section (Figure I-3). Peripherals available for the Modicon 484 are also introduced.



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Figure I-3. 484 Components

1.2.1 PROCESSOR

The processor or brain of the PC is a completely solid-state device. It is sometimes called the Central Processing Unit (CPU) and sometimes called the mainframe. This is the part of the PC which actually replaces relays and timer/counters. In the MODICON 484 the processor is expandable for computational functions or for simulation of stopper switches.

The processor is programmed in relay ladder diagram language. The program uses up to ten relay contacts per rung.

The processor operates on DC power furnished by the power supply. This internal DC power is routed through the processor to operate the I/O Section. When the program is entered into the processor it remains until changed deliberately by a user. Power failure or power-off conditions do not destroy the program.

An access port enables entry of instructions and data and permits monitoring of perviously entered information. The most common method of entering data or programs into the processor through this port is with the P180 CRT Programming Panel. Other devices that may be connected to this port are a Tape Loader, a Computer, or a Telephone Interface. Communication with these devices is done via an adapter which allows simultaneous operation with the CRT Programming Panel.

1.2.2 POWER SUPPLY

The Power Supply mounts inside the front cover of the processor. It operates on 115 VAC, 60Hz or 115/220 VAC, 50Hz (non interchangeable). No adjustments or maintenance are required. A lamp indicates power-ready status. No external cooling is necessary, although free air circulation is required. The Power Supply has sufficient capacity to operate the processor; 128 inputs, and 128 outputs. An expander power supply is used to extend the PC/s capability to 256 inputs and 256 outputs.

1.2.3 INPUT/OUTPUT (I/O) SECTION

A major characteristic of the 484 Controller is the input and output control devices that are directly connected to the controller. User wiring to and from the controller is accomplished through heavy duty housings. These housings are designed to hold up to eight I/O modules. Each module contains four circuits; either input or output. A smaller I/O housing accommodating up to four I/O modules is available. The covered wireway (I/O duct) enables easy installation and access to the wiring.

A wide variety of I/O modules is offered. The modules are output driving or input handling circuits. These solidly constructed units are easily removed from or plugged into their housings. Once inserted, electrical contact is automatically made through plated spring connectors. I/O modules can be removed and replaced without removing power on the field devices or internal logic. There is no need to shut down the system to replace I/O modules.

Each input and output circuit is isolated by photo diodes thus preventing transients on the field wiring from affecting the internal logic. No periodic maintenance is required. The 484 output modules, AC or DC, have individual output fuses. Indicators on each module show the field power status and output fuses condition. I/O modules and field wiring can be located in any possible configuration regardless of voltage level.

There are four classes of signals between the 484 system and the user's equipment:

- o Discrete I/O connections.
- o Register I/O (three-digit numeric interfaces, to and from the register multiplexer; analog I/O; special purpose modules).
- o RS232C peripheral interface from the EIA Adapter, using the appropriate MODICON protocol.
- o MODBUS Communication Interface - Used in connecting communication options to a computer or other intelligent device.

Field inputs consist of up to 128 discrete points or 256 with the I/O expander unit. Each has an ON or OFF state. Each has up to 32 inputs or register data. Register data is represented by a decimal number in the range of 0 to 999. All discrete inputs are read once during every scan.

1.2.4 CRT PROGRAMMING PANEL

The Model P180 CRT Programmer (Figure I-4) is a 5-inch CRT in a rugged case. It is easily carried to the work site near the controller. The entire CRT unit is well suited to the industrial setting. It is designed to operate in locations where electromagnetic noise, high temperatures and humidity, mechanical shock, or other threatening environmental problems may be present.



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Figure I-4. P180 CRT Programming Panel

The P180 CRT connects directly to the 484 Controller. It provides a simple method to program the processor. The ladder diagram language used for programming the PC is familiar relay symbology. There are no required programmer languages to learn. The CRT also allows easy, rapid system checkout and maintenance.

A delux CRT permits the use of a standard RS232C printer. Thus, a hard copy of the ladder diagram contained in the controller can be generated.

1.2.5 PERIPHERALS

Several standard MODICON support units are available for use with the 484 Controller. These units provide a wide variety of support functions. Complete system support is always

available. The support units use the J470 EIA Adapter for connection to the processor. This adapter allows a P180 Programmer and another peripheral device to be connected to the controller simultaneously.

Available support equipment includes:

- o T158 Telephone Interface for communication with MODICON's service center.
- o L206 Universal Tape Loader for local recording of the user's program.
- o MODBUS Interface (J474) which allows plant-wide or nation-wide communications.
- o P180 CRT Programmer for entering user logic.
- o J470 Communications interface.
- o J471 I/O Expander for additional I/O capacity.

1.3 SUMMARY

Programmable controllers are used in industrial settings to replace relays and other solid-state electronic devices. Controllers are faster to respond to instructions and operate with maximum reliability. They are easily programmed with ladder diagram language. Because they are modular they are easier to maintain and install, and less space is required. Hardware costs are lower. They operate in hostile environments.

A typical controller is divided into four components: Processor, Power Supply, I/O Section, and a Programming Device.

The processor is the brain of the PC. The processor operates on DC power furnished by the power supply. The I/O Section is the controller's link with the "real world". The programming panel is the main device used to program the controller.

The MODICON 484 Programmable Controller is designed to replace control systems of 10 to 400 relays. It has an expandable I/O with four point modules. It also has an expandable memory in six sizes ranging from 1/4K to 8K. The P180 Programming Device is connected directly to the 484.

All of these features make the MODICON 484 Programmable Controller one of the most up-to-date PC's on the market today.