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Series 110/120 PLC Workstation Guide

DOC-IWS-201
Revision C
December 1993

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Chapter 1

Getting Started

This guide describes how to use CP, a Configuration Program that runs on a PC-compatible and makes it easy to set up your Series 110 or Series 120 PLC Workstation.

Guide Organization

This guide contains the following chapters:

Chapter	Contents
2. Display and Keyboard	Features and adjustments for display, LED indicators and keyboard.
3. Hardware Installation	Environment, dimensions, hazardous locations.
4. Connections	Power connector and communications ports (for PLC connection information, see Chapter 22).
5. Software Installation	PC-based software, Workstation's power-up sequence, firmware version numbers, downloading firmware.
6. On-Line Utility	Performing utility functions and serial port tests.
7. Service	Fuse replacement, battery replacement, pushbutton reset jumper installation.
8. Using CP	Overview of CP's operation: screen layout, user entries, keyboard commands.
9. Configure	Selection of PLC, Workstation model, printer, etc.
10. Screen Types	Description of four screen types (register, on/off, custom and empty) and configuration options common to all screens (screen select register action, key definitions, configuring [↑], [↓], and [Enter] keys).
11. Register Screens	Selection of labels, descriptions, addresses, scaling, and alarms for registers.
12. On/Off Screens	Selection of labels, descriptions, addresses, status messages and alarms for on/off locations.
13. Custom Screens	Configuration of each line type (register, cascade, on/off, text, selector switch, bar graph, hex display, bit, date/time).
14. Download	Sending firmware and your Configure/Edit information to the Workstation.
15. File	Retrieving and saving your Configure/Edit information on disk.
16. Print	Printing your information to a printer or disk file.
17. New	Clearing memory to start a new file.

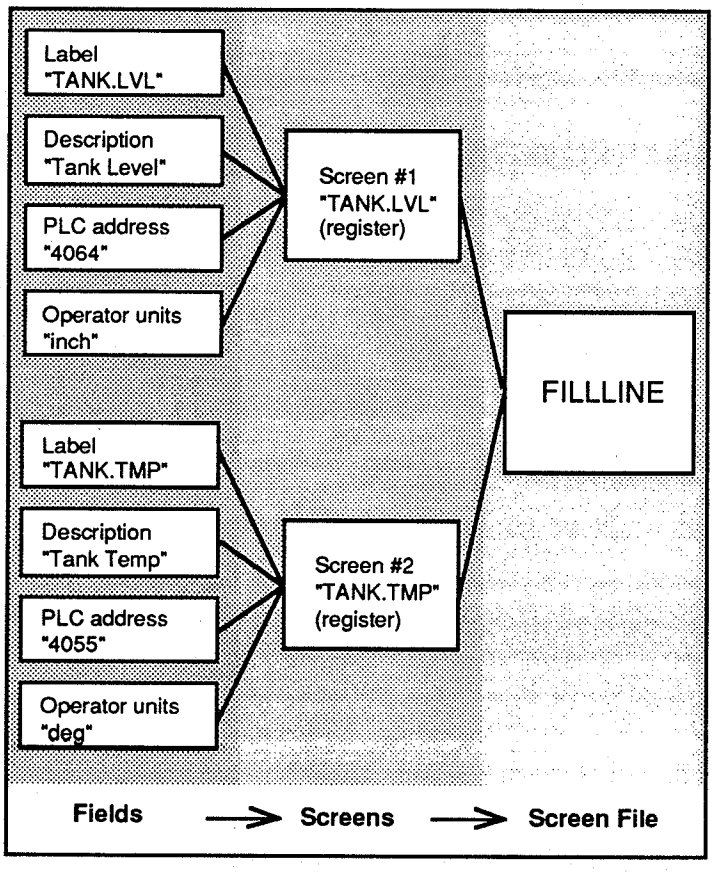
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Terms

This guide uses the following terms in describing how CP (Configuration Program) collects, transfers, and uses information that you enter:

Term	Definition
PC	IBM or IBM-compatible personal computer.
CP	Setup program included with the IWS-SETUP-120 package for configuring a Series 110/120 PLC Workstation.
Register location	Refers to any numeric locations within the PLC, including registers, timers, and counters.
On/Off location	Refers to contacts, coils, and internal coils.
Field	Each piece of information that you enter; for example: label, PLC address, description, and operator units.
Screen	Each screen consists of up to four lines of information and text that the Workstation displays. CP identifies each screen by number.
Screen file	When you have finished entering all the information about all of the locations for a single Workstation, you can have CP store all of the screens as a "screen file" on a disk. You can then tell CP to download the file into the Workstation's memory.

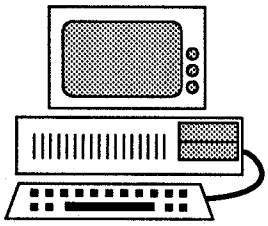
The following illustration shows that each application is a "screen file" that consists of a number of screens, and each screen consists of a variety of information contained in "fields."



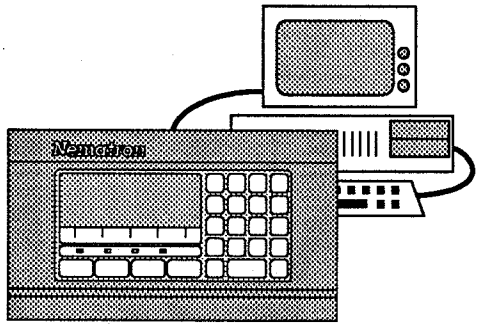
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Three Steps to Set Up the PLC Workstation

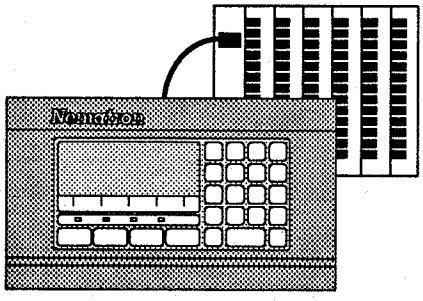
Here are the steps required by CP to configure your Workstation to talk to a programmable controller:



1. Run CP on your PC-compatible and answer questions about each location that you want the operator to be able to monitor or change. CP collects and saves this information as a file.



2. Download (send) the file of information to the Workstation, which stores it in non-volatile memory.



3. Connect the Workstation to the programmable controller so that they can talk to each other through their communications ports.

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The Workstation's user memory provides storage for your screen file, the past 50 alarms, and a buffer for storing messages waiting to print. If your screen file exceeds the "Maximum Screen File" size shown below, then it leaves less memory available for the printer buffer and past alarms:

Model	Total User Memory	Maximum Screen File
IWS-1x0	26,624 bytes	24,624 bytes
IWS-1x3/1x7	57,344 bytes	55,344 bytes

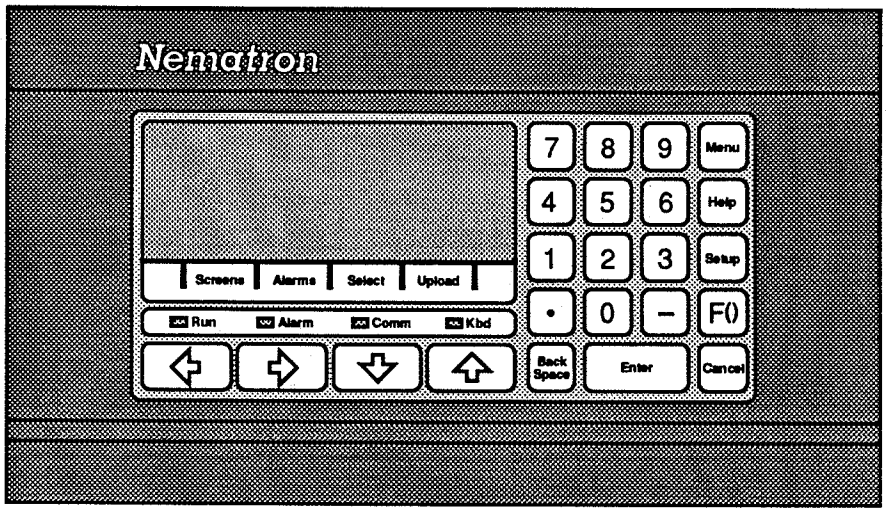
Each message in the printer buffer uses 27 bytes; each past alarm uses 13 bytes. The Workstation allocates all unused memory as a printer buffer.

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Chapter 2

Display and Keyboard

This chapter describes the displays, indicators, keys, and controls on the front of all models of the Series 110 and Series 120 Workstations.



Display

The Series 110/120 Workstations display four lines with 20 characters on each line. The Series 110 Workstation's display is a liquid crystal display (LCD) with LED backlighting; the Series 120 Workstation's display is a vacuum fluorescent display (VFD).

Character Set

The display's character set includes the entire standard ASCII character set. The Series 120 Workstation can display the same International characters that are on the IBM PC's Multilingual code page (850), while the Series 110 Workstation is limited to mostly U.S. characters.

Brightness/ Viewing Angle

You can control the viewing angle (contrast) of the Series 110 display or the brightness of the Series 120 display by holding down the [F()] key while pressing [↑] or [↓].

Screen Saver

You can configure your Workstation to disable its display after 1 to 255 minutes of inactivity in order to prolong the display's life. When the screen saver is active in the Series 120 Workstation, the unit displays a continuously moving cursor on an otherwise blank screen. When the screen saver is active in the Series 110 Workstation, the LED backlighting is off. Your operator can cancel the screen saver by pressing any key.

To enable the screen saver, follow the instructions on page 9-7.

Display Fault Indicator

If the display fails to operate properly, the *Run* light flashes slowly, and the screen remains blank.

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Keyboard

The keyboard on the Series 110/120 Workstations is a sealed-membrane type with stainless steel domes that provide tactile feedback.

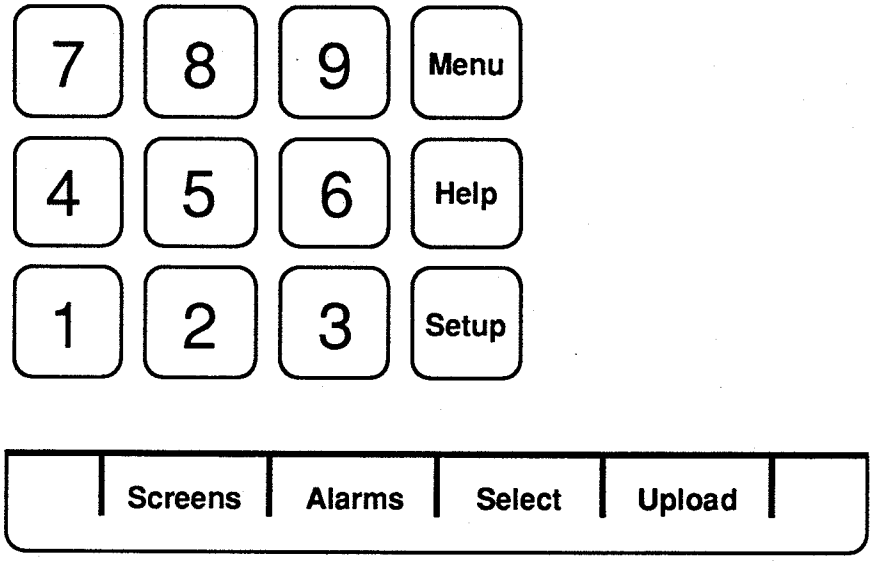
Keyboard Inserts

Some of the key legends are changeable by replacing an insert that simply slides in behind the keyboard. To replace the inserts, you may first have to remove the back cover of the Workstation in order to relieve enough pressure on the keyboard so that the insert slides in.

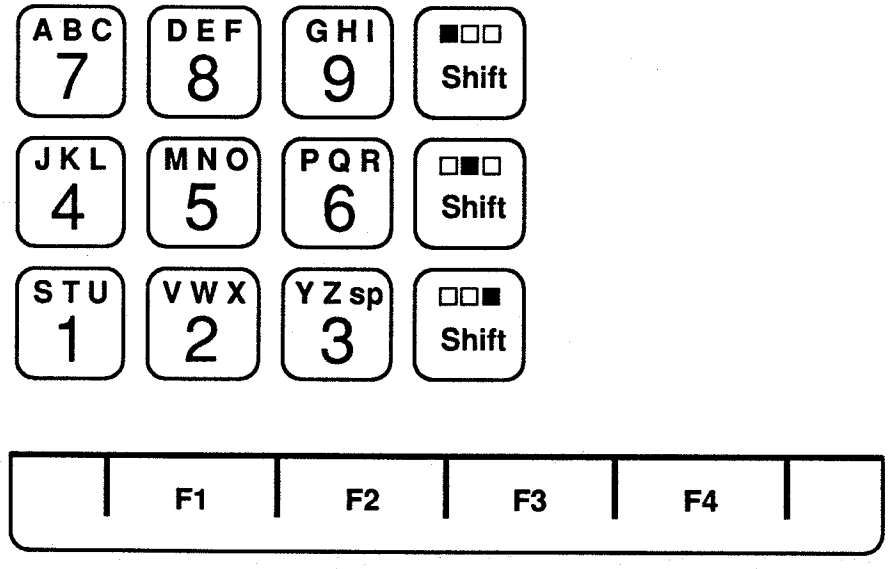
The Workstation comes with two sets of legends. The legends installed in the unit are typically for using the unit as a PLC Workstation, while the extra set is alphanumeric (general-purpose).

You can assign new functions to the blue keys and the [Menu], [Help] and [Setup] keys (see Chapter 10). However, the PLC Workstation firmware does not support the use of alphabetic keys. (Only BASIC and Terminal firmware support alphabetic keys.)

PLC Workstation



Alphanumeric



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Chapter 3

Hardware Installation

This chapter describes how to install your Workstation in a panel. The end of this chapter contains detailed instructions for installing the Workstation in hazardous locations.

Environment

Listed below are the various environmental specifications and tolerances of the Series 110/120 Workstations. The end of this chapter contains detailed instructions for installing the Workstation in hazardous locations.

Temperature and Humidity

The Series 110 Workstation operates in ambient temperatures between 32° and 122°F (0° to 50°C), while the Series 120 Workstation operates in ambient temperatures between 32° and 131°F (0° to 55°C). The Workstations operate in relative humidity ranging between 5 and 95%. All models tolerate storage temperatures of -40° to 158°F (-40° to 70°C).

Sealing

Your unit is rated for NEMA 4 (water-tight) and NEMA 12 (dust-tight) environments, provided you install it with its gasket intact in a similarly-rated standard gauge metal enclosure. We have tested the Workstations in enclosures made of 14 gauge sheet steel, which has a thickness of about 0.075" (1.9 mm).

StrongArm Designs makes a NEMA 12 enclosure (catalog number N127-00-00) that is designed especially for the Series 110/120 Workstations. Their address is 935A Horsham Road, Horsham, Pennsylvania 19044; their phone is 215-443-3400.



For installation in plastic enclosures or thin-gauge metal enclosures, please order COS-BKT-120, which contains stiffening brackets that compensate for the excessive flexing of plastic or thin metal.

Shock and Vibration

The Workstation can withstand sinusoidal vibration for two hours in each of the three mutually perpendicular axes at frequencies from 5 to 500 Hz. Our test fixture created a 0.25" displacement between 5 and 15.3 Hz, and a 3 G amplitude between 15.3 and 500 Hz.

The Workstation can tolerate a total of eighteen 40 G shocks lasting 9 milliseconds each with a 1/2 sine wave form.

Torque Specifications

After placing the Workstation in the cutout, you should tighten each nut to 20 inch/pounds (0.14 newton/ meters) of torque. If you don't have a torque wrench, then try to tighten the nuts to compress the gasket to about 50% of its original thickness.

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Installation in Hazardous Locations

The remainder of this chapter describes the installation of Series 110/120 Industrial Workstations in hazardous locations.

Safety Agency Approvals

Nematron designed the Series 110/120 Industrial Workstations to meet the requirements of Class I, Division 2 Hazardous Locations applications. Class II, Division 2 requirements can also be met when the system is installed in an approved Type 4 enclosure. The Workstations have been investigated and received UL Listing and CSA Certification as follows:

- Underwriters Laboratories Inc., UL 1604 Standard for Safety, ELECTRICAL EQUIPMENT FOR USE IN CLASS I and CLASS II, DIVISION 2, AND CLASS III HAZARDOUS (CLASSIFIED) LOCATIONS.

  UL File No. E146533

  Approved for installation in hazardous locations, Class I, groups A, B, C, and D, Division 2; and Class II, groups F and G, Division 2. Operating temperature code: T6.

- Canadian Standards Association, Specification C22.2 No. 213-M1987, NON-INCENDIVE ELECTRICAL EQUIPMENT FOR USE IN CLASS I, DIVISION 2 HAZARDOUS LOCATIONS.

  CSA Report No. LR 65779-9

  Certified for installation in hazardous locations, Class I, groups A, B, C, and D, Division 2. Operating temperature code: T6.



The Workstations have been UL Listed and CSA Certified as non-incendive devices. They are *not* intrinsically safe and must never be operated within a Division 1 hazardous location when installed according to this guide. Nor should any peripheral interface device attached to these Workstations be located within Division 1 locations unless approved and/or certified shunt zener diode barriers are placed in series with each individual signal and DC power line.

Division 1 installations are beyond the bounds of our design intent. Nematron accepts no responsibility for installations of this equipment, or any devices attached to this equipment, in Division 1 locations.

If the intended location does not presently have a Class, Division, and Group rating, then you must consult the appropriate authorities having jurisdiction in order to determine the correct rating.

In accordance with Federal, State/Provincial, and Local regulations, all hazardous locations installations must be inspected by the appropriate authority having jurisdiction prior to use.

These systems are to be installed, serviced, and inspected only by technically qualified personnel.

Note These systems are both CSA Certified and UL Listed for installation within Class I, Division 2 locations. They are UL Listed for Class II, Division 2 locations only when installed within a UL-recognized Type 4 enclosure as described in the following sections. Canadian Class II installations require investigation of the enclosed installation by Canadian Standards Association in order to obtain a Class II Safety approval.

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Groups

Flammable and combustible substances are grouped based on the following three factors:

1. Maximum experimental safe gap (MESG)
2. Explosion pressure
3. Ignition temperature

For example, Group A includes vapors and gasses with the lowest ignition temperatures (e.g. acetylene). Group D vapors and gasses have higher ignition temperatures and include acetone, methane, and natural gas among others. You should consult NFPA 497M for more information on group identification and ignition temperature.

Both the component temperatures and potential for spark based upon voltage, current, and circuit characteristics determine the Group rating.

Class I refers only to Groups A, B, C, and D, while Class II refers only to Groups E, F and G. Group E refers to an atmosphere of metal dust, which is *always* Division 1 only.

A device approved for installation within Division 2, Group A locations may be also be used in Groups B, C, or D. Please note that approved Class I equipment may not be suitable for Class II installations.

Series 110/120 Workstations are listed with UL for Class I, groups A, B, C, and D, Division 2; and Class II, groups F and G, Division 2; and Certified by CSA for Class I, groups A, B, C, and D, Division 2.

Temperature Code Rating

The temperature code rating reflects the highest component temperature inside of the equipment when the ambient temperature is 40° C (104° F). These internal component temperatures may not exceed the ignition temperature of the substance in question. Temperature Identification numbers are assigned and range from T1 (450° C, 842° F) to T6 (85° C, 185° F).

The Series 110/120 Workstations are assigned a T6 (85° C) temperature code by Underwriters Laboratories and Canadian Standards Association.

Enclosures

You must install your Series 110/120 Workstation within a clean and dry enclosure for both ordinary and hazardous locations. Failure to do so voids the UL Listing and CSA Certification. For the proper panel cutout dimensions, you must refer to the beginning of this chapter.

The front panel meets the requirements of UL and CSA Type 4 and Type 12 enclosures.

For Class I hazardous locations, the enclosure you use must have a minimum rating of Type 12 (NEMA 12, IP 5X). However, we strongly recommend that you use a Type 4 (IP X6) enclosure.

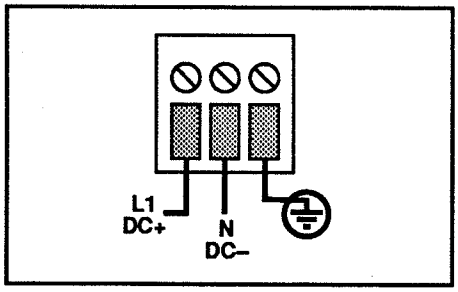
For Class II hazardous locations, you must use a Type 4 enclosure with conduit knockouts. You must install power and communication cables through separate conduit. Failure to do so voids UL Listing. These systems are *not* CSA Certified for installation within Class II hazardous locations.

Panel flatness and rigidity are crucial if a proper panel seal is to be maintained. The Workstations employ an open-cell gasket material that must be compressed 50% or more in order to meet the requirements of Type 4 enclosures.

If you use non-metal type enclosures, such as plastic or fiberglass, then you must install a rigid metal stiffener behind the front panel. Failure to do so may result in an inadequate panel seal due to flexing of the front panel material between the mounting studs.

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Terminal	AC	DC
L1	Hot	DC +
N	Neutral	DC –
⏚	earth	earth



Communication Cables

All communication cables should include a chassis ground shield. This shield should include both copper braid and aluminum foil. The D-sub connector housing should be of the conductive type and the ground shield should be well terminated at the connector housing.

The strain relief normally built into the cable connector cover must match the cable itself in order to provide a reliable degree of strain relief. You must *always* secure the D-sub connectors to the Workstation's mating connectors with the screw on each side.

The communication cables must never be connected or disconnected while power is applied at either end of the cable. This may result in an incendive spark. Furthermore, permanent damage to the Workstation may occur.

Operation and Maintenance

UL and CSA have evaluated the Series 110/120 Workstations with respect to spark ignition and with the understanding that the keyboard keys are the only make/break components that the operator normally exercises. Connections and switch settings located at the rear of the Workstation must not be accessible to the operator and must never be adjusted while power is applied.

With respect to hazardous locations installations, the following rules must always be observed:

1. The Workstation must be installed within an enclosure suitable for the specific application. General purpose enclosures may be acceptable for Class I applications but are never acceptable for Class II applications. Type 4 (IP 66) enclosures are recommended even where not required by regulations.

2. Enclosure doors or openings must remain closed at all times, except when performing service, in order to avoid the accumulation of foreign matter inside of the Workstation.

3. The Workstation must never be subjected to any installation or service procedures unless:

   (a) Power is known to be removed, and
   (b) The area is known to be non-hazardous.

   This includes the installation or removal of power cables, communication cables, power fuse and internal battery as well as setting the DIP switches located at the rear.

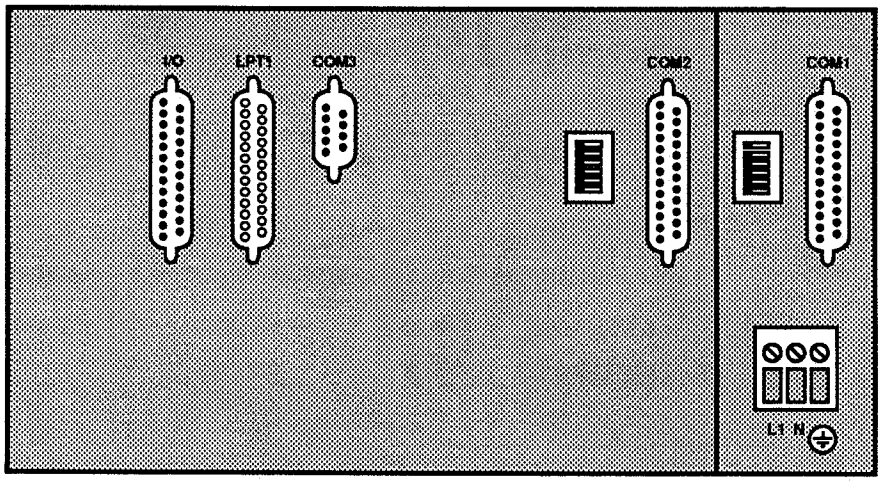
4. All installation and service must be performed only by technically qualified service personnel. These Workstations require no service by an operator in the course of normal operation.

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Chapter 4

Connections

For the rest of this chapter, you should refer to the figure below; note that only the IWS-117 and IWS-127 models have all the communications ports indicated; the IWS-110/120 and IWS-113/123 provide only the COM1 connector.



Power Connections

The next few pages show how to connect to the line power connector.

You must ground your Workstation at all times. You should also ensure that the Workstation is on the same ground as any other equipment connected to its communications ports (especially if you connect anything to COM3 or LPT1).

If you are installing your Workstation in a hazardous location, then you must follow the instructions at the end of Chapter 3.

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Communications Ports

The IWS-117 and IWS-127 have the following communications ports; the IWS-110/120 and IWS-113/123 have only the COM1 port:

Name	Type
COM1	RS-232/RS-422/RS-485 serial
COM2	RS-232/RS-422/RS-485 serial
COM3	RS-232 serial
LPT1	Centronics-compatible printer
I/O	Connects to CBL-D8 I/O racks (not s upported by PLC Workstation firmware)

The following pages describe the specifications of each port.

Cabling

We urge you to use the proper wire for your communications cables. Many communications problems occur with RS-422 and RS-485 connections because of improper cable selection or installation.

For RS-232 applications, we recommend Alpha 1243/5 or equivalent; for RS-422, we recommend Belden 9830 or equivalent; for RS-485, we recommend Belden 9842 or equivalent. For RS-422 cables, you must make sure that one twisted pair is the transmit pair while the other twisted pair is the receive pair. For RS-485 cables, you must make sure that one twisted pair is the transmit/receive pair.

In order to maximize the protection of cable shields, the connectors should be conductive; we recommend using connectors with metal shells.

The maximum length of an RS-232 cable is 50 feet (15 meters); the maximum length of an RS-422 or RS-485 cable is 4000 feet (1200 meters).



Never connect the signal and chassis grounds together.



You must connect the signal grounds at each end of the cable.



You must connect the chassis ground to earth at only one end of the cable, as shown in the drawings on the following pages.

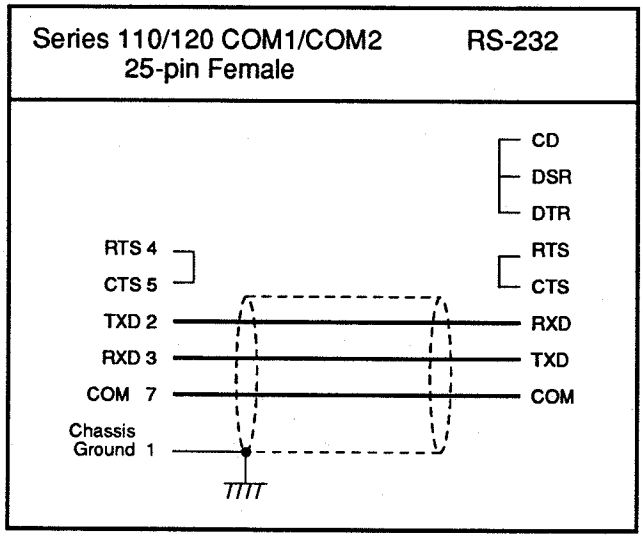


Although +5VDC is provided on the COM1 and COM2 connectors, there is only 100 mA available; you must take care not to overload the Workstation's power supply.

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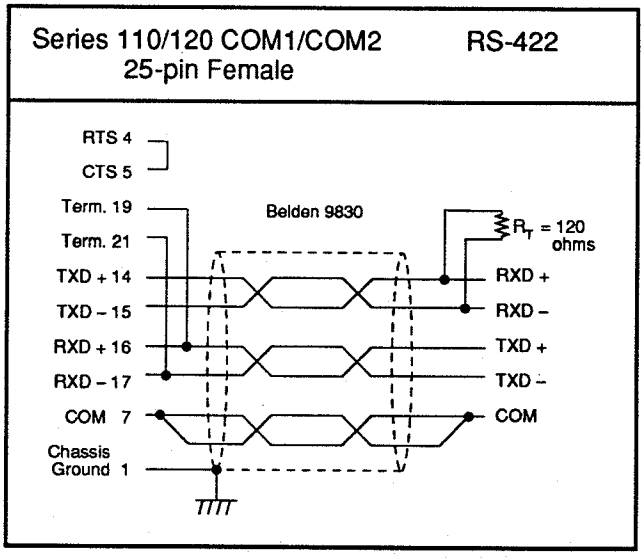
COM1/COM2 to RS-232

The following schematic illustrates a typical RS-232 connection, including typical jumpering:



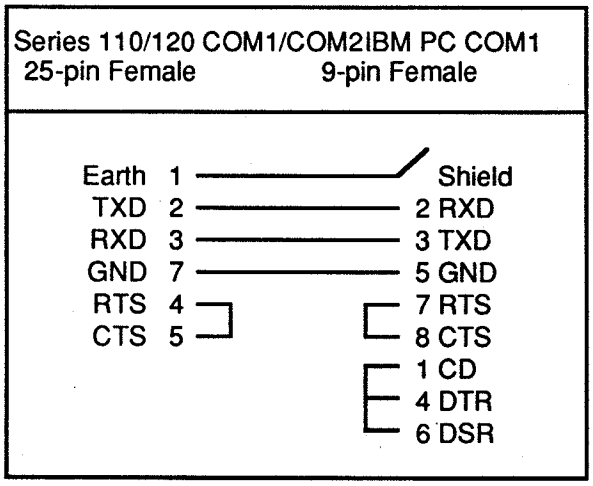
COM1/COM2 to RS-422

The resistor available on pins 19 and 21 terminates the receive side of an RS-422 or RS-485 connection. However, when more than two stations are connected together, you should terminate only the stations at each end; intermediate stations are not terminated. The following cable shows the use of terminating resistors:



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COM1/COM2 to IBM PC's 9-pin connector



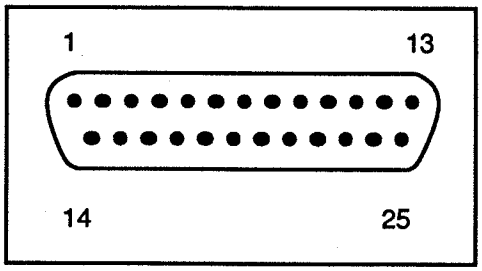
The cable to connect your PC-compatible's 9-pin serial port to the Workstation's COM1 port is available from Nematron under part number CBL-C2. Included with IWS-SETUP-120 is an adapter that allows you to plug a CBL-C1 cable (illustrated previously) to your PC's serial port.

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I/O

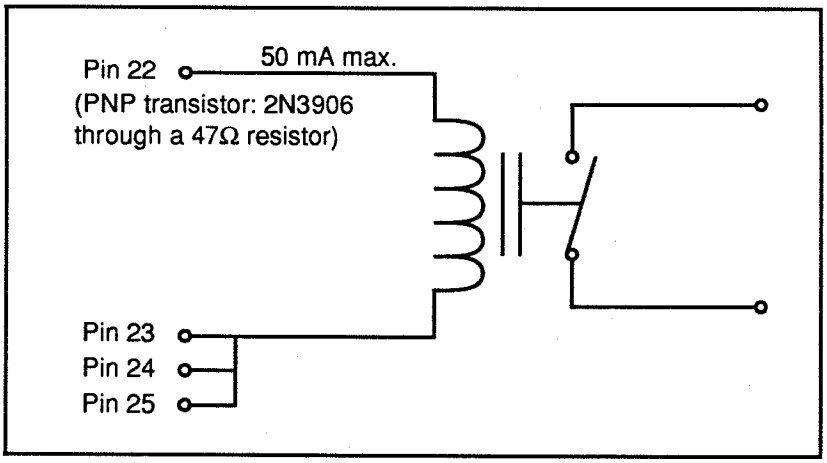
The I/O connector provides a transistor output on pin 22 that remains on whenever alarms remain to be acknowledged. You can use this transistor to drive a relay that controls an external horn or other device to indicate an unacknowledged alarm.

As an alternative, the Workstation can control a coil in your PLC to achieve the same function; you simply enable the "Alarm Horn Output" on CP's Configuration screen and enter the address of the coil.



I/O bus; 25-pin Male

The transistor that drives pin 22 is a 2N3906 with a 47Ω resistor connected in series. To drive an electromechanical or solid-state relay from this pin, you should create a circuit as the following diagram illustrates:



The I/O connector has several other active pins, but their functions are not available for users of the PLC Workstation firmware. Following is the I/O port's complete pinout:

Pin	Direction	Function
2	Output	Output Enable
5		Data; D1
6		Data; D3
7		Data; D5
8		Data; D7
10-12	Output	+5VDC
13	Output	Strobe
14	Output	I/O reset
17		Data; D0
18		Data; D2
19		Data; D4
20		Data; D6
22		Transistor output
23-25		Logic ground

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Chapter 5

Software Installation

This chapter describes how to install the Series 110/120 software to your PC and how to set up the Workstation to accept a download of new firmware.

When you think of "firmware," you might think of integrated circuits, usually EPROMs, that hold program code. The Series 110/120 PLC Workstations use only a little bit of this kind of firmware, and we have never changed it. Most of the Workstation's firmware is in "Flash" EPROM, which you can change by simply downloading data from your PC-compatible to the Workstation's serial port. In other words, you don't have to change chips in order to change firmware!

Installing the PC Software

The IWS-SETUP-120 software package includes one 5 1/4" diskette and two 3 1/2" diskettes. You must install this software on your PC's hard disk drive according to the following paragraphs.

Note Versions 3.30 and later of CP support only the Series 110/120 PLC Workstations. You must keep an earlier version of CP, such as V3.10, if you own older Workstation models such as IWS-101, IWS-102, or IPT-100.

Insert the diskette labeled IWS-SETUP-120 DISK 1 into your PC's floppy disk drive, and type *A:INSTALL* or *B:INSTALL* and press [Enter]. Follow the instructions at each menu to select the Workstation models you have, the firmware models you want, and the PLC models you use. To select an item on a menu, press [↑] or [↓] until the item is highlighted, and then press the space bar. (To cancel a selection, highlight it and press the space bar again.) To select all items on a menu, press [F10]. To proceed to the next menu, press [Enter]. To cancel the installation process, press [Ctrl]-X.

When you're finished with the last menu, the installation program displays a list of disk drives that have sufficient unused space to accept the installation files. After you select a disk drive, then you can either choose the default directory name of "NEMA" or type in some other directory name. After you press [Enter] to enter the directory name, the installation program installs the files.

We give you the option to install only what you need so that you use the minimum amount of disk space. If you later decide that you need something else, just run the installation program again. Under the licensing conditions that we provide our software to you, you have the right to install an unlimited number of copies at a single site; you may have any number of simultaneous users at that site. Our installation software permits an unlimited number of installations.

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Power-Up Sequence

When your Series 110/120 Workstation is properly installed and wired to your power source, the following should occur upon power-up:

1. If the unit has no firmware, it performs an exhaustive test of the firmware memory. During this test, which lasts about one minute, the *Run* LED flashes quickly.

   If the firmware memory test fails, the unit halts, but continues to flash the *Run* light.

   If the firmware memory test passes, the unit displays the following message and waits for you to download firmware:

   ```
   Firmware memory is
   empty or invalid.
   You must download
   new firmware. (U2).
   ```

2. If the unit has firmware, the horn plays the "bugle call" and all four LEDs momentarily flash.

3. The *Run* LED remains on and the other LEDs go off.

4. The unit performs a self-test including memory, clock, battery, and display. If a test passes, the unit displays "pass" briefly; if a test fails, the unit displays "fail"; if the corresponding hardware is not present, the unit displays "none."

   To speed up the self-test, press [Cancel]; you cannot speed up the first-time self-test.

   If the *Run* light flashes slowly, the display has failed. If the unit stops with just the *Alarm* light on, it indicates that the external memory test has failed. If the unit stops with just the *Comm* light on, it indicates that the internal memory test has failed. In all cases, you must send the unit in for service.

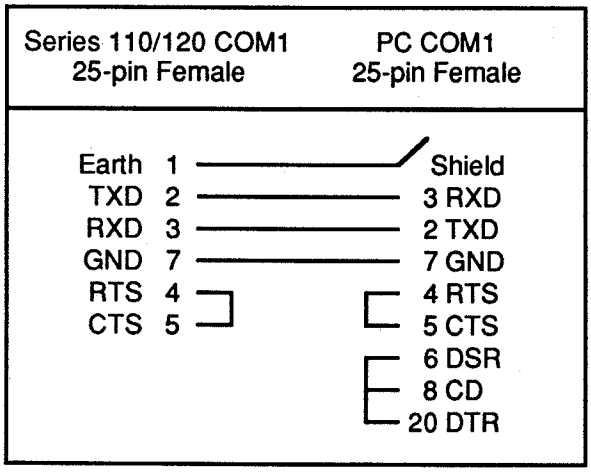
5. At the end of the self-test, the unit automatically begins normal operation, which varies depending on the firmware. Normally, a brand new unit displays the following screen:

   ```
   First-time power-up!
   Download firmware or
   hit any key for on-
   line configuration.
   ```

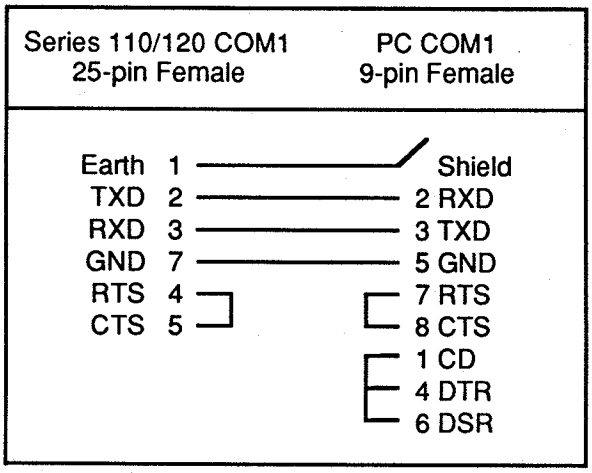
   This screen is displayed by the Terminal firmware. When you see this screen, you should *not* press a key to go to the on-line configuration menu. Instead, you should proceed with downloading your screen file. *You do not have to download firmware separately.*

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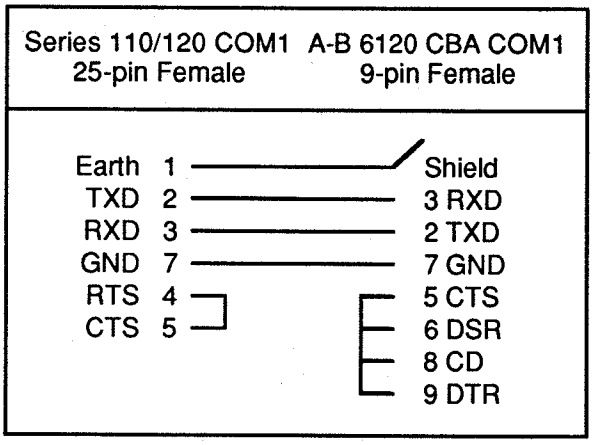
COM1 to PC's 25-pin connector (CBL-C1)



COM1 to PC's 9-pin connector (CBL-C2)



COM1 to Allen-Bradley PC



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Chapter 6

On-Line Utility Menu

This chapter describes how to access and use the Workstation's built-in utility program.

The utility program allows you to alter or test the operation of your Workstation.

Accessing the On-Line Utility Menu

To access the Utility Menu, hold down [F()] and [Cancel] simultaneously during the power-up self-test.

Utility Menu

When you enter the on-line utility program, the Workstation displays the following menu:

```
1 - Clear alarms
2 - Clear printer
3 - Test ports
4 - Upload firmware
```

The following pages explain each of these options. Pressing [Cancel] on any other screen returns to this menu; to exit the utility program entirely, press [Cancel] at this screen.

1 – Clear Alarms

Pressing *1* from the Utility Menu allows you to clear the alarm buffer; in other words, you can tell the Workstation to erase all old alarms from its memory. When you select this item, you see the following screen:

```
Clear Alarms
Hit [Enter] to clear
or [Cancel] to quit.
```

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To select a port to test, install the loopback as shown on the previous page and then press the appropriate number key. A few seconds after you select the port, the Workstation displays the result of the test. The following screen shows an example of a successful test:

```
Select Port to Test:
1 - COM1: Pass
2 - COM2
3 - COM3
```

If the port does not work properly, the Workstation displays one of the following messages:

Break	Indicates that a "break" character was received; probably indicates a failed transmitter.
Compare	Indicates that the Workstation received different characters than expected; the probable cause is a hardware failure.
Framing	Indicates that the Workstation received a character with a framing error; the probable cause is a hardware failure.
No CTS	Indicates that the CTS input appears not to be asserted; this is caused either because the jumper between RTS and CTS is missing from the loopback connector or because the RTS output or CTS input has failed.
Overflow	Indicates that the Workstation received too many characters; the probable cause is a hardware failure.
Overrun	Indicates that the Workstation was unable to process characters as fast as they arrived; the probable cause is a hardware failure.
Parity	Indicates that the Workstation received a character with a parity error; the probable cause is a hardware failure.
Timeout	Indicates that the Workstation received no characters at all; this is caused either because the jumper between RXD and TXD is missing from the loopback connector or because the transmitter or receiver has failed.

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Chapter 7

Service

This chapter describes how to replace the fuse and battery, as well as how to enable the pushbutton reset capability.

Changing the Fuse

Units with a 90-250V power supply require a 1/2 Amp Slo-Blo (type T) fuse; Nematron offers fuses under part number COS-FUS-120, which contains five fuses. For 24V units, you should obtain COS-FUS-120-V4, which contains five 1 Amp Slo-Blo (type T) fuses.

The fuse holder is accessible from the bottom of the Workstation.

If the fuse blows, the Workstation will not run and none of the LED indicators will light. Follow these steps to replace it:

1. Disconnect power to the unit.
2. Correct the condition (usually a power supply overload) that caused the fuse to blow.
3. Using a flat screwdriver, turn the fuse holder counter-clockwise about 30°, until it pops out about 1/4 inch.
4. Remove the old fuse from the holder and replace it with a new one of the same rating.
5. Push the holder back into the socket, and use the screwdriver to both push in and turn the holder until it locks back into place.

Changing the Battery

The *Alarm* LED continually flashes very slowly when the battery is low, which means that you should replace the battery immediately.

Typically, the battery should last ten years, although we conservatively rate its life at six years. If your battery fails significantly sooner than six years, then you should return your Workstation to the factory.

You can order a replacement battery under part number COS-BAT-120, which includes two batteries.



To replace the battery and preserve the memory, you should **not** turn off power to the unit. If you do turn off power, then the Workstation's memory contents will be lost.

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Chapter 8

Using CP

CP software is a Configuration Program included with the IWS-SETUP-120 package that helps you set up your Series 110/120 PLC Workstation.

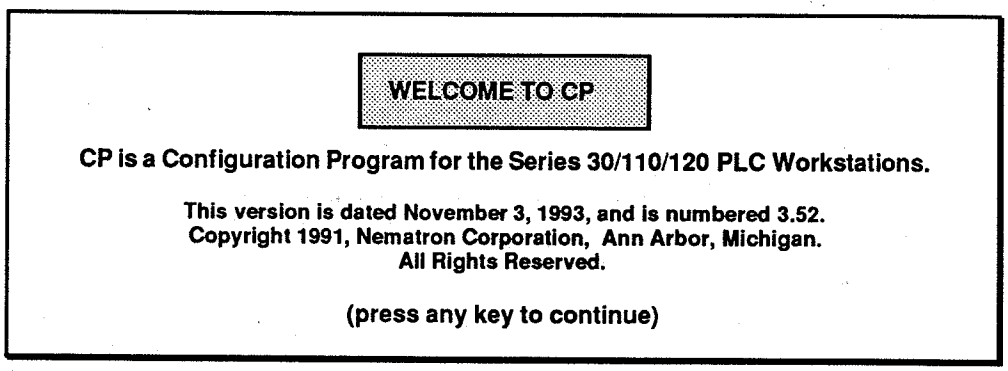
This chapter describes the basics of operating the software, while the following chapters describe each of CP's major functions in detail.

This chapter does *not* contain information about the operation of your PC. You must be familiar with booting your computer, changing directories, and other DOS functions described in your PC's documentation.

Starting Up CP

To run CP, change the DOS pathname to the proper subdirectory, type *CP* and press [Enter] at the **C>** prompt. If you get the message *Error: insufficient memory to run CP!*, then you must either terminate other programs that are currently occupying memory, add memory to your PC, or use a PC with more memory. Your PC must have 640K of memory to run CP; adding memory above 640K does not help, because CP cannot use extended or expanded memory.

If your PC has sufficient memory available, then it loads CP and displays the following screen:



If CP displays are difficult to read, try quitting and running CP again by typing *CP -bw*, which runs CP in monochrome (Black-and-White) mode. To set up CP so that it always operates in the monochrome mode, following the instructions in Chapter 18.

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CP Functions

The second line of the CP screen above shows the "Main Menu." Each of the selections on the Main Menu is described below:

Selection	Function
Configure	Allows you to select the model of Workstation and PLC and enter communications parameters.
Edit	Allows you to edit screens that already exist and create new screens.
Download	Sends screen files from the PC to the Workstation's memory. To use this option you must first connect a cable between the Workstation's COM1 port and the PC's serial communications port (COM1 or COM2).
File	Retrieves a previously saved screen file from the disk, saves a screen file to the disk, lists the screen files on the disk, erases a screen file, and allows you to enter a directory and/or pathname for a screen file.
Print	Prints all or part of a screen file on a printer connected to your PC or to a disk file.
New	Clears the current screen file from the PC's main memory to allow room for a new screen file. Use this option when you want to create a new screen file.
	Caution The *New* option destroys any information that you have not saved on the disk.
Options	Allows you to select the PC's serial port for downloading screen files and various screen display options including colors.
Version	Displays the CP version number and date on the screen of your PC.
Quit	Exits CP and returns to DOS.

Typical Procedure

When you sit down to create your first screen file, you typically follow these steps:

1. Select *Configure* from the main menu and describe your setup, including PLC manufacturer and model, communications parameters, and other information about your particular hardware configuration.
2. Select *Edit* from the main menu to create your screens. After you create your first screen, press [F9] to go to the second screen.
3. Select *File* from the main menu and then *Save* to save your screens on your PC's disk.
4. Select *Download* from the main menu (and select *Upload* on your Workstation) to transmit your screen file to your Workstation.
5. Connect your Workstation's COM1 port to your PLC's communications port.
6. Your Workstation should operate normally.

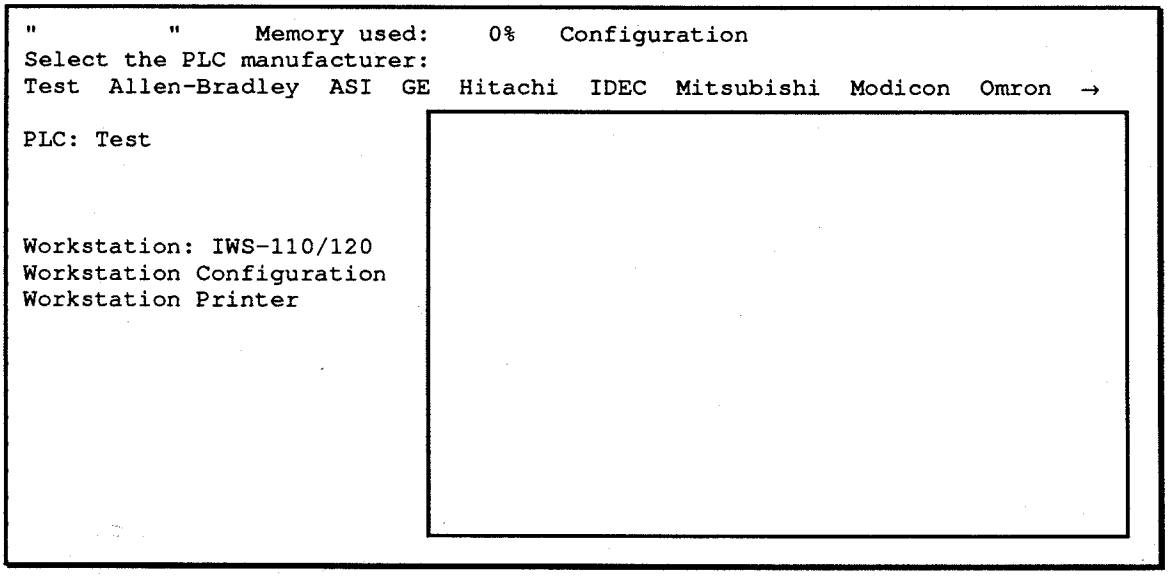
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Help Line

```
Configure your hardware; including memory, PLC model, communications.
```

Additional information about the currently selected menu item automatically appears below the menu. This additional information is called the "help line." The help line changes as you move the cursor through the menu.

After you choose the Configure function by pressing [Enter] or typing *C*, you see the second display:



Test in the option list appears in reverse video as the default choice for "PLC."

Option Lists

The screen above shows an option list under the help line "Select the PLC manufacturer." An option list is displayed like a menu, but you can select an item in the list only by moving the cursor to highlight your choice and pressing [Enter]. Some option lists, such as a list of filenames, allow you to make your choice either by selecting from the list or by typing in its name.

The right arrow "→" at the end of the option list above indicates that there are more options available. Pressing [→] from the last option or pressing [↓] at any time brings up the remaining options.

Prompts

```
Enter the network station number (if any) for the PLC (0 to 255):  1
```

"Enter the network station number . . . " is a "prompt," that is, a question with a free-form response. There is no option list or menu from which to choose your answer, but there is a default answer that you can accept by pressing [Enter], or change by typing in a new value and pressing [Enter].

Data Entry Panels

On the right side of the screen, CP displays a "data entry panel" that often contains additional information that belongs to the field highlighted on the left side of the screen.

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International Characters

The Series 120 Workstation supports the Multilingual character set that is on code page 850 of your PC (more information is available in your DOS manual). In particular, the Series 120 supports all of the characters necessary for the European languages, but does not support ®, $^3/_4$, or the box-drawing characters.

You can enter European characters in CP software just as you would in many other PC applications: either press the special key on your keyboard or hold down the [Alt] key while using the *numeric* keypad to enter the character's 3-digit decimal ASCII code as listed in the Appendix.

The Series 110 Workstation supports only a few of the European characters, including ñ, Ñ, ü, ä, Ä, and ö.

All Workstation models can print European characters if the printer uses the same ASCII codes as your PC. Many printers, such as Epson, provide a PC emulation mode.

Function Keys

The PC's function keys are labeled [F1] through [F10] or [F12] and are usually located on the left side or across the top of your PC's keyboard.

The meanings of the function keys appear on the bottom line of your PC's display. Some or all of the following functions are available within the Configure, Edit, and Download functions.

1 Help	3 Insert	4 Delete	5 Goto	7 Restore	8 Prev	9 Next

[F1] Help

Displays a help screen in the Configure, Edit, and Download functions.

[F3] Insert

(Available in Edit only) Inserts a new screen before the currently displayed screen.

Why would you use the Insert Function? Screens appear on the Workstation's display in numerical order. For the convenience of the operator, you should place the most frequently accessed screens near the beginning of your file.

If you omit a frequently accessed screen when you are creating a file, you can use [F3] Insert to insert a screen where needed.

[F4] Delete

(Available in Edit only) Deletes the current screen from the screen file in memory. CP asks you if you want to delete the screen before it actually deletes it. You *cannot* recover a deleted screen with [F7] Restore.

[F5] Goto

(Available in Edit only) Allows you to select a screen to edit either by number or by label. When you select this function, CP lists the top line of each screen. To select a screen to edit, you can either use [←] or [→] to select a label and then press [Enter], or you can simply enter the screen number and press [Enter].

[F7] Restore

(Available in Configure and Edit) Cancels any changes you have made on the current screen. You must use this key to restore your previous entries only *before* exiting to the menu or to another screen.

[F8] Prev

(Available in Edit only) Selects the previous screen for editing (or the last if you are already on the first).

[F9] Next

(Available in Edit only) Selects the next screen for editing (or the first if you are already on the last).

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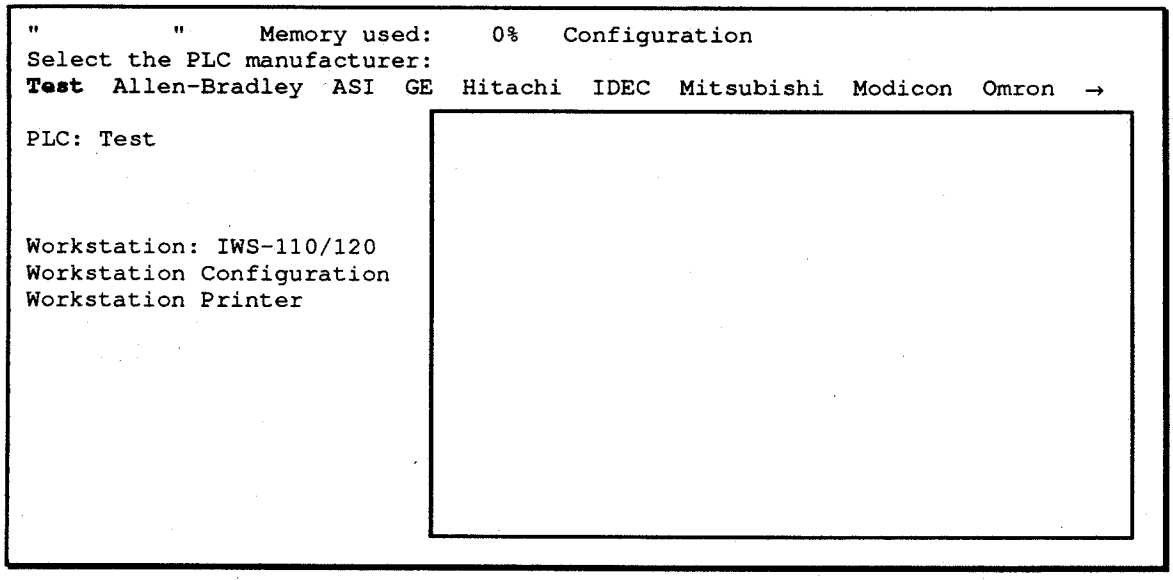
Chapter 9

Configure

The Configure function allows you to enter information about your Workstation and PLC installation, including Workstation model number , PLC manufacturer and model, communications parameters, and other important information.

The Configure function is available from the main menu. Select the Configure function from the main menu by typing *C* or by using [→] or [←] to highlight Configure, then pressing [Enter].

After you select the Configure function and press [Enter], you see the following screen:



The following pages describe the prompts and parameters for entering the configuration information.

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