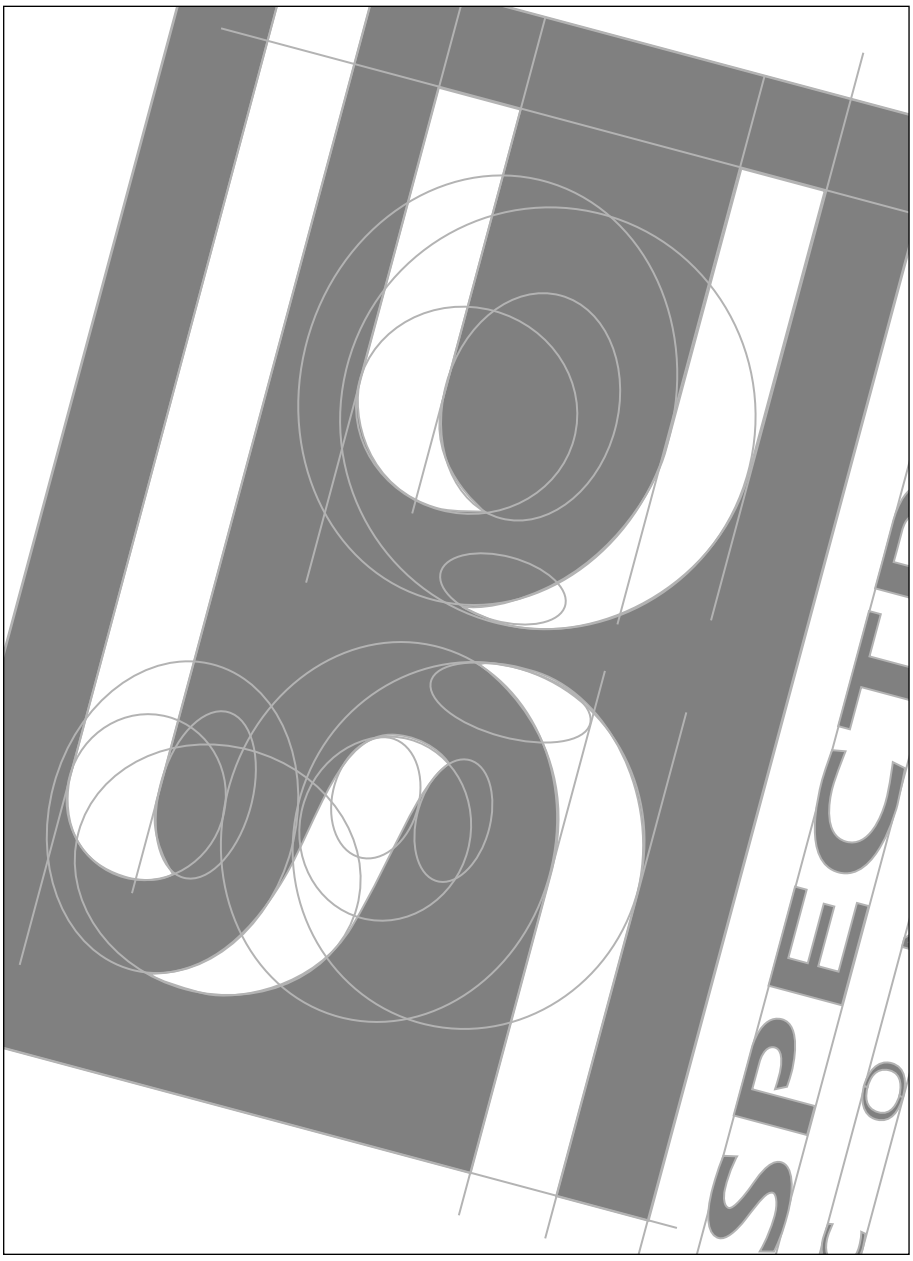
PUBLICATION 0300050-07 REV. C.0

SOI-260

OPERATOR INTERFACE



IMPORTANT NOTES

1. READ ALL OF THE INFORMATION CONTAINED IN THIS MANUAL BEFORE YOU INSTALL THE PRODUCT.
2. The information contained in this manual applies to hardware and software version 1.0 or later.
3. This manual assumes a full working knowledge of the relevant PLC.

NOTICE

The products and services described in this manual are useful in a wide variety of applications. Therefore, the user and others responsible for applying the products and services described herein are responsible for determining their acceptability for each application. While efforts have been made to provide accurate information within this manual, Spectrum Controls assumes no responsibility for the accuracy, completeness or usefulness of the information contained herein.

Under no circumstances will Spectrum Controls be responsible or liable for any damages or losses, including indirect or consequential damages or losses, arising out of either the use of any information contained within this manual or the use of any product or service referenced herein.

No patent liability is assumed by Spectrum Controls with respect to the use of any of the information, products, circuits, programming or services referenced herein.

The information contained in this manual is subject to change without notice.

Caution

Spectrum Controls' devices contain electronic components which are susceptible to damage from electrostatic discharge. A static charge can accumulate on the surface of ordinary plastic wrapping or cushioning material. If any Spectrum Controls' device must be returned to Spectrum Controls, the following packaging instruction must be followed:

PREFERRED: Use the original packaging material as supplied by Spectrum Controls. Place the device inside the conductive plastic bag.

ACCEPTABLE: Wrap the device in some type of antistatic material. Antistatic plastic material can be identified by its pink color, and can be obtained in sheet or bag form.

UNACCEPTABLE: Do not use ordinary plastic film, foam, or styrene chips ("popcorn" or "peanuts"). These materials can accumulate charges in excess of 10,000 volts, resulting in possible damage to the Spectrum Controls electronic device.

Antistatic (metallized plastic) bags can be obtained from the following manufacturers:

3M Company	(800-328-1368)	Type 2100 bag
Static, Inc.	(800-782-8424)	8000 Series bag
Charles Water	(617-964-8370)	CP-303 bag

LIMITED WARRANTY

Spectrum Controls warrants that its products are free from defects in material and workmanship under normal use and service, as described in Spectrum Controls literature covering this product, for a period of 1 year. Spectrum Controls' obligations under this warranty are limited to replacing or repairing, at its option, at its factory or facility, any product which shall, in the applicable period after shipment, be returned to Spectrum Controls' facility, transportation charges prepaid, and which after examination are determined, to the satisfaction of Spectrum Controls, to be thus defective.

This warranty shall not apply to any such equipment which shall have been repaired or altered except by Spectrum Controls or which shall have been subject to misuse, neglect or accident. In no case shall Spectrum Controls' liability exceed the purchase price. The aforementioned provisions do not extend the original warranty period of any product which has either been repaired or replaced by Spectrum Controls.

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UL AND CSA APPROVAL

The equipment described in this manual is now listed with Underwriters Laboratories Inc. (UL) and the Canadian Standards Association (CSA). With this UL listing (file number E180101) and CSA listing (file number LR 101622), this equipment is suitable for use in Class I, Division 2, Groups A, B, C, and D hazardous locations or non-hazardous locations only.

When installing this equipment, you must ensure that the ultimate enclosure is in accordance with Class I, Division 2 wiring methods as described in the National Electrical Code (ANSI/NFPA 70) and the Canadian Electrical Code. You must also ensure that peripheral equipment is suitable for the location in which it is used.

Lastly, you must observe the warnings shown below. Failure to observe these warnings can cause personal injury.

WARNING
EXPLOSION HAZARD
Substitution of components may impair suitability for Class I, Division 2.

WARNING
EXPLOSION HAZARD
Do not connect or disconnect equipment while circuit is live unless the area is known to be non-hazardous.

ATTENTION
Use P1 powered units only with a Class 2 power source limited to 30 Vdc open circuit and 8 A short circuit.

WARNING
EXPLOSION HAZARD
Do not replace fuse unless power has been switched off or the area is known to be non-hazardous.

CONTENTS

CHAPTER 1: INTRODUCTION

The SOI-260 was designed to communicate to industrial programmable controllers. Communications may be directed to the PLC communications port or via a communication module.

The SOI-260 unburdens the processor by providing on-board control of all screen functions and communications. This allows you to be prompted by the SOI-260 through a sequence of menus and screens displayed in plain English.

Overview of this Manual

The SOI-260 Operator Interface Module User Manual is organized as follows:

Chapter title	Description
Introduction	Provides introductory information for the SOI-260 hardware and the SOI-SPS Programming Software for PLC processors.
Hardware	Describes the hardware, providing a complete operational description of the SOI-260.
Function Keys	Describes PLC functions that can be performed using the eight menus that are available.
Communications	Provides cabling information for the SOI-260.
Troubleshooting	Provides troubleshooting information for SOI-260.
Appendices	Contains supplementary information that may be helpful: Appendix A, Specifications Appendix B, Terminal Mode Appendix C, SOI-260 Mounting Template

Manual Conventions

This manual uses the following conventions:

Keys that you press on the SOI-260 are enclosed in brackets [ ]. For example: [NEXT] refers to the NEXT key on the SOI-260.

References to menus are initial cap followed by the word Menu. For example: Special Menu, Main Menu, Other Menu.

All SOI-260 displays are shown inside a rectangular box.

Related Publications

The publications you may require for additional reference are listed in the following table.

SOI-260 Publications

Tech. Publication	Title
0300054-01	SOI-SPS Software Programming Manual for SOI-100 and -200 Series
0300051-01	SOI-120 User Manual

The SOI-260

The SOI-260 operator interface provides a cost-efficient interface between a machine operator and a host control system.

The SOI-260 directly interfaces to the PLC through the communications port or it can communicate as a node on a network. The SOI-260 unburdens the PLC by providing on-board control of all screen functions and communications. This allows an operator to be prompted by the SOI-260 through a sequence of menus and screens displaying plain English statements.

Installation

Using the SOI-260 requires that you establish the proper connections:

- Connect to the computer to download the program.
- Connect to the PLC to run the program.

Before you can employ the SOI-260, you need to use the SOI-SPS Programming Software to create the program you want to run, then download the program from the computer to the SOI-260.

The SOI-260 can be set to simulation mode to test your program. After you have tested your program, you can set the SOI-260 to the run mode and connect it to the PLC.

The SOI-SPS Programming Software

The SOI-260 requires a program in order to function. SOI-SPS lets you develop programs for the SOI-260.

The programming software does not require any programming knowledge. It is menu-driven and generates a program based on your selections and specifications. Because the SOI-260 software is simple to use, you can concentrate more on the application rather than on how the application is accomplished.

Note: See SOI-SPS Software Programming Manual for more information on programming the SOI-200 and -100 series products.

CHAPTER 2: HARDWARE

Description of the SOI–260

The SOI–260 is housed in an aluminum or stainless steel case designed to be flush mounted in harsh industrial environments. Gasketing is provided to meet NEMA 4 requirements.

The front panel of the SOI–260 is a sealed unit comprised of a 4 x 20 character display window, 3 LED's, and 25 tactile feedback keys. The VFD version does not include the half moon brightness key and, therefore has only 24 keys.

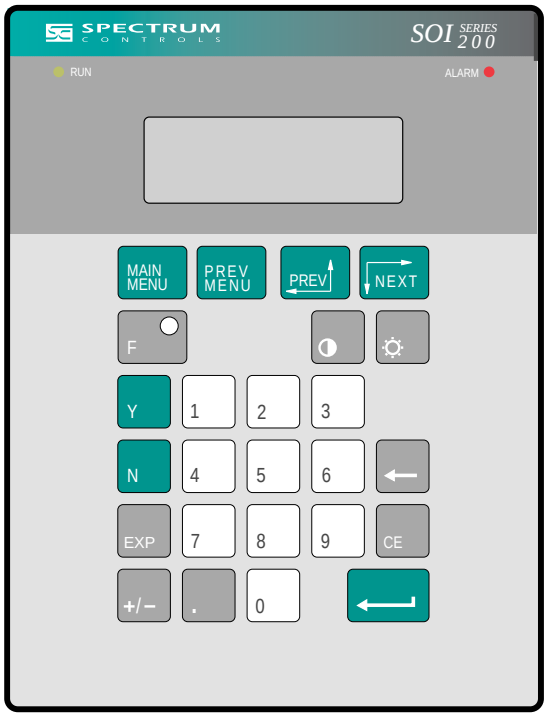


Figure 2.1: SOI-260 (LCD Display)

The 4 line by 20 character display uses either high contrast LCD technology with LED backlighting or Vacuum Fluorescent Display (VFD) technology to provide high reliability and superior readability in all light conditions. On LCD displays both the contrast and backlight levels are keypad adjustable. You can only adjust brightness on VFD displays.

The keypad is separated by color into easily identified groups or functions. In addition, each key has a raised perimeter to provide tactile feedback which provides a positive response even if the hand is gloved.

A RUN LED in the upper left corner of the operator interface indicates proper operation of the onboard microprocessor. A red LED in the upper right corner indicates an ALARM condition. A yellow LED in the upper right corner of the F (Function) key illuminates when the function mode is activated.

Storage of the PLC driver (communications protocol), configuration information, and user-programmed screens are maintained in 8K or 40K of nonvolatile memory. The operator interface containing 8K of onboard memory provides storage for approximately 50 user-programmed screens. The operator interface containing 40K of onboard memory provides storage for approximately 240 user programmed screens.

SOI–260 Functional Diagram

The diagram below provides a functional block diagram of the SOI–260.

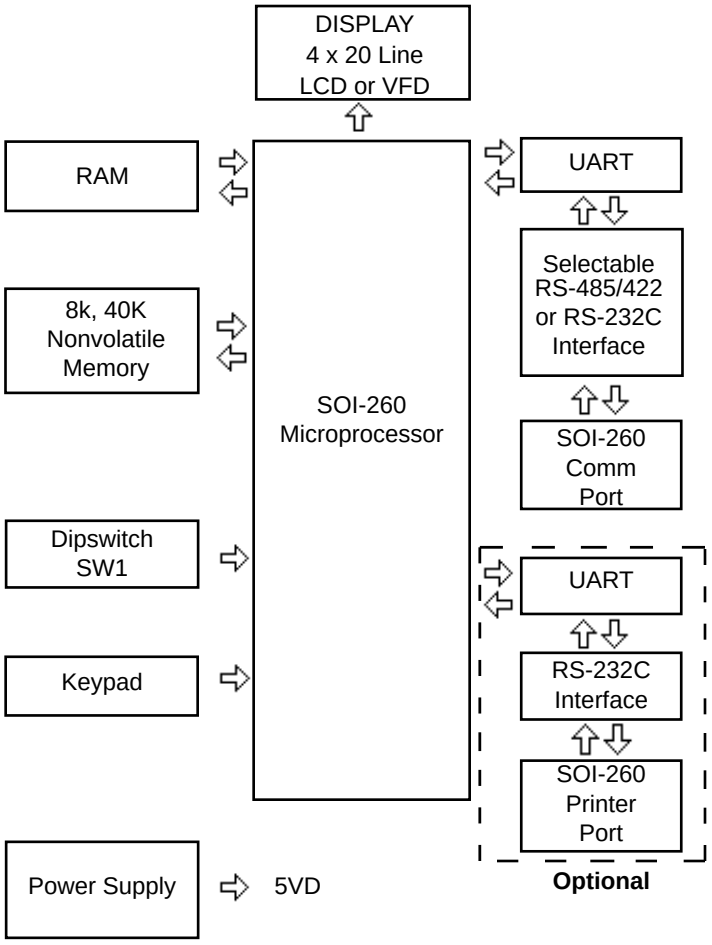


Figure 2.2 SOI-260 Functional Block Diagram

Installing the SOI–260

Installing the SOI–260 is a three-step process:

- Mounting
- Power and communications connections
- Establishing communications

Mounting the SOI–260: Environmental Considerations

The SOI–260 is rated for an operating temperature range of 32 to 113 ºF (0 to 45 ºC) for the LCD version and 32 to 140 ºF (0 to 60 ºC) for the VFD version. The storage temperature range is -4 to 185 ºF (-20 to 85 ºC). The humidity rating is 5 to 95% relative humidity (noncondensing). The operator interface is rated for NEMA Type 4 environments (indoor use only). The SOI-260S versions of the SOI–260 are rated for NEMA Type 4X environments.

Installation

Select a suitable location for mounting the SOI–260. The SOI–260 is intended to be flush mounted on the front of a control cabinet within the environmental conditions stated above.

Using the template provided in Appendix C, mark the location of the six mounting holes which secure the SOI–260 on your panel.

Mount the SOI–260. A neoprene gasket and a package of #6 - 32 UNC nuts are provided. Tighten nuts to 4 inch-pounds.

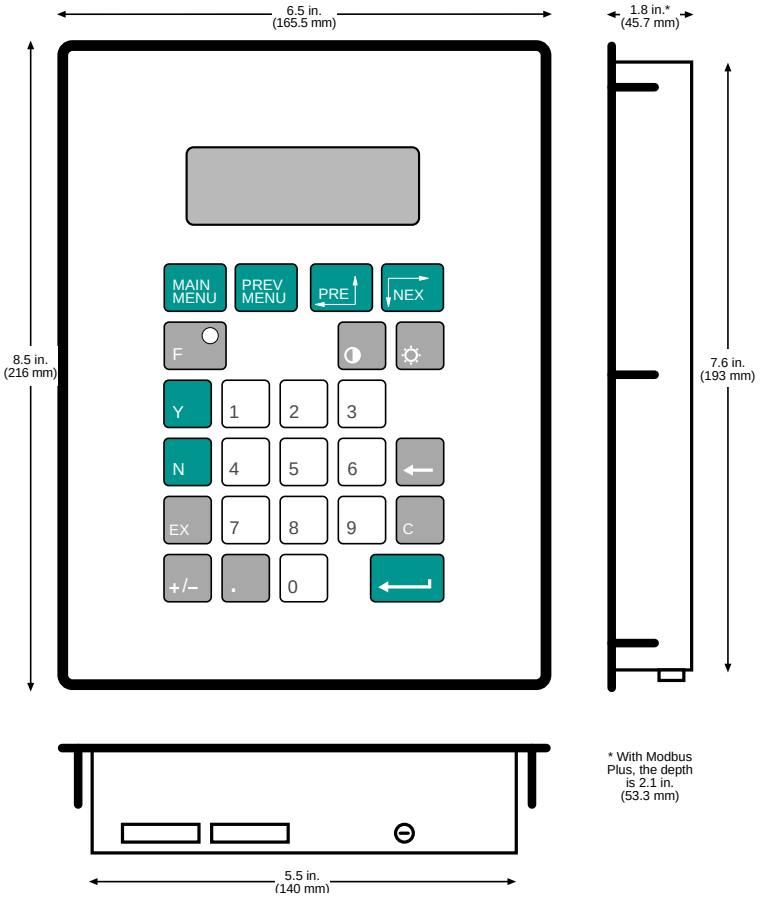


Figure 2.3 SOI-260 Dimensions

Power Connections

Before attempting to wire the SOI–260 ensure all power has been removed from the power source.

The SOI–260 is available in two voltage ranges. Be certain that the voltage available for your application matches the rating of the SOI–260. The wrong voltage may damage the SOI–260.

ATTENTION: Verify that power is disconnected from the power source before wiring the SOI–260. High voltage can cause injury or death.

Wiring Recommendations

Careful wire routing helps cut down on electrical noise. Route incoming power to the SOI–260 on a path separate from the communications cables. Do not run signal wiring and power wiring in the same conduit. Where power and communications lines must cross, their intersections should be perpendicular. Communications lines can be installed in the same conduit as low level DC I/O (less than 10 volts) lines.

All communications lines should be shielded. The shield should only be connected to ground at the transmitting device.

Note: To prevent damage to the power terminals, make sure the power wiring is not too tight (strained).

Grounding Recommendations

Grounding is an important safety measure in electrical installations. Grounding also helps eliminate the effects of noise due to electromagnetic interference (EMI).

An authoritative source on grounding requirements is the National Electrical Code published by the National Fire Protection Association of Boston, Massachusetts. Article 250 of the Code describes the types and sizes of wire conductors and safe methods of grounding electrical equipment and components.

Power connections for the 15 - 23 VAC or 20 - 30 VDC (AC1) and 85 - 265 VAC or 110 - 300 VDC (AC2) are provided below.

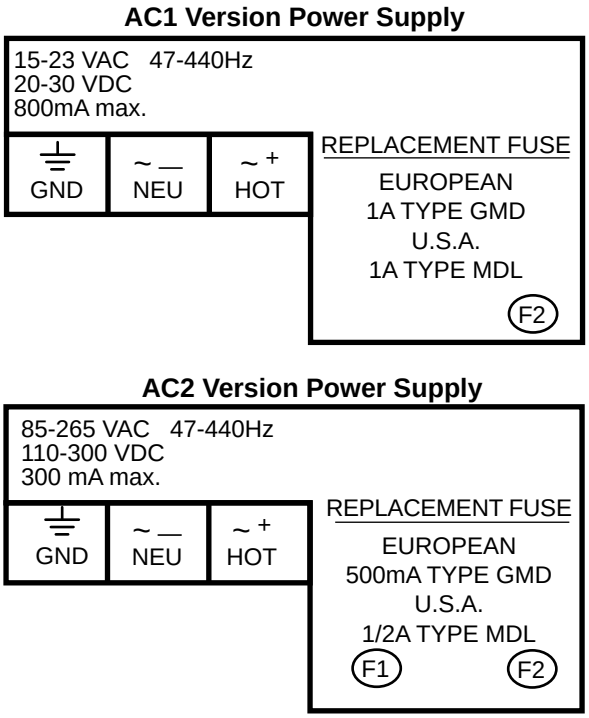


Figure 2.4 AC1 and AC2 Power Supply Connections

Establishing Communications

The SOI–260 requires connections for communications to:

- IBM PC or 100% compatible computer
- Programmable Controller (PLC)
- RS-232C serial printer (optional)

Connecting to a Computer

To connect the SOI–260 communication port to the computer serial communications port, they must both use the same type signals (RS-232C or RS-485) for the communication to be compatible and operational. This communication is required to download or upload a program file.

To establish communication between the SOI-260 RS-232 communication port and your computer, the SOI-260 must be selected for RS-232 communications and a RS-232 cable is required.

Note: See Chapter 4 for cabling and connection information.

To establish communication between the SOI–260 RS-485 communications port and your computer, one of the following is required:

- An RS-485 serial port (COM1 or COM2) is installed in your computer, and the appropriate cabling connects the SOI–260 RS-232C printer port to your computer RS-232C by setting DIP switch SW-1-2 OFF.

or

- An RS-232C serial port (COM1 or COM2) is installed in your computer, and an optional SOI–260 RS-232C printer port with the appropriate cabling connects the SOI–260 RS-232C printer port to your computer RS-232C serial port. The printer port must be enabled for successful operation.

Note: See Chapter 4 for cabling and connection information.

Connecting to a Printer

The optional RS-232C printer port for the SOI–260 connects to a matching RS-232C serial printer and allows printing of preprogrammed Printer Forms. You can configure the SOI–260 printer port for specific baud rate, data bit, and parity settings. These communication parameters must match that of the connected printer or data will not be correctly received by the printer.

The SOI–260 Printer Port option is RS-232C format with a standard IBM nine pin "D" style connector.

Note: See Chapter 4 for cabling and connection information.

DIP Switch 1 (SW1)

DIP switch 1 settings enable or disable certain functions on the SOI–260. The DIP switch is located under a removable plastic cover on the upper back of the enclosure.

To access the DIP switch, remove the plastic cover from the upper back of the SOI–260.

To select the appropriate settings for the application, set the switch rocker up or down. Move the switch to the closed (ON) position to enable a setting or to the open (OFF) position to disable a setting.

When you have set the DIP switches, replace the plastic cover.

The DIP switch (SW1) supplied as the standard configuration is defined as:

DIP Switch	Function	Factory Setting
SW1-1	Upload/Download Enable	On
SW1-2	Communication Port Selection	On
SW1-3	Master Security Enable	Off
SW1-4	Function Key Enable	On
SW1-5	Terminal Mode Enable	Off
SW1-6	COMM Upload/Download Enable	Off

Note: When you change some of the DIP switch settings you may need to reset or repower the SOI–260 before the new setting will take effect. Changes to DIP SW1-2 take effect immediately. To reset the SOI–260, remove power for at least 15 seconds, or use the Function (F) and 4 key sequence. See function key description for more information.

Figures 2.4, 2.5 and 2.6 illustrate typical switch settings for download/ upload, and PLC communications.

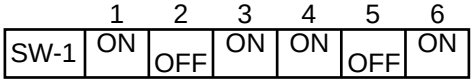


Figure 2.4 Typical Download/Upload Switch Settings

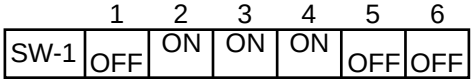


Figure 2.5 Typical Switch Settings for Communicating with a PLC using the RS-485/422 Connection

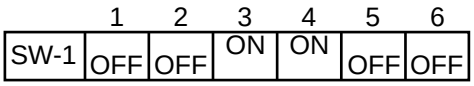


Figure 2.6 Typical Switch Setting for Communicating with a PLC using the RS-232 Connection

SW1-1 Upload/Download Enable

The ON position disables communications between the SOI–260 and the PLC. All keypad activity is also disabled. In this mode, application files can be uploaded/downloaded between the SOI–260 and a personal computer. The OFF position enables communication between the SOI–260 and PLC. The SOI–260 resets each time SW1-1 is changed.

SW1-2 Communication Port Selection

Selects the communication standard for the communications port. When SW1-2 is ON, the port is configured for RS-485 operation. When OFF the port is configured for RS-232. Changes to SW1-2 take effect immediately.

SW1-3 Master Security Enable

When this switch is ON, the master code is enabled and allows any security code to be accessed or modified. When OFF, the master code does not allow other security codes to be modified. However, the master code allows access to the security screens. Changes to SW1-3 take effect immediately.

SW1-4 Function Key Enable

When SW1-4 is ON, the front panel function key is enabled. All items associated with the function key are accessible from the keypad. The OFF position disables the function key. Changes to SW1-4 take effect immediately.

SW1-5 Terminal Mode Enable

When SW1-5 in ON, the SOI–260 operates in terminal mode displaying all ASCII data received from the communications port and transmitting text from any keys pressed. When OFF terminal mode is disabled an the SOI–260 operates normally.

Note: Manually reset the SOI–260 after enabling or disabling terminal mode.

SW1-6 Comm Upload/Download Enable

<u>40K Versions (with Printer Port)</u>

When this switch is ON it enables uploads and downloads through the communication port.

When the switch is OFF the communication port may not be used to upload or download using the SOI–260 programming software. You may only upload or download using the printer port. This allows you to maintain a network connection at the communication port.

The SOI–260 should manually be reset after changing the setting on this switch.

Important: If the SOI–260 is connected for RS-232 communication to the PLC and you desire to download an application program using the printer port, the following must be performed prior to downloading:

- Set DIP switch 1-6 to OFF.
- Set DIP switch 1-1 to ON (program download enable).
- Set Dip switch 1-2 to ON (RS-485).
- Download the application program.

When you have completed downloading the application program, perform the following:

- Place DIP switch 1-1 to the run mode (OFF).
- Place DIP switch 1-2 to the RS-232 (OFF).
- Place DIP switch 1-6 to ON.

8K Versions (Without Printer Port)

ON or OFF - The SOI–260 allows uploading or downloading through the communication port when the switch either is ON or OFF.

Important: If switch SW1-6 is ON AND you are connected to a network through the communication port, improper SOI–260 operation may occur.

Indicator LEDs

Three LED indicators are located on the front panel of the SOI–260. When illuminated, these indicators provide a visual status of the RUN, ALARM and FUNCTION key modes of the SOI–260:

Run LED (Green)

The RUN LED is located in the upper left corner of the front panel. When illuminated, this LED provides an indication that the SOI–260 is functioning correctly. This LED should always be illuminated during SOI–260 operation.

Alarm LED (Red)

The ALARM LED is located in the upper right corner. This LED will flash on and off to indicate that an alarm has been triggered. It will continue to flash until all alarms have been acknowledged.

Function LED (Yellow)

The FUNCTION LED is located in the upper right corner of the gray F (Function) key. This LED illuminates when a function key operation is in progress. You initiate a function key operation by pressing the F key when in normal operation.

The LED is extinguished when the Function mode is terminated or by exiting the function key operation.

Note: DIP switch SW1-4 must be ON for the function key to operate.

Keypad

The keys on the SOI–260 keypad are distinguished by their color-coded operational typed or category. Each color grouping of keys denotes a common type of operation which you may perform.

Key Color	Function
Green	Movement and operator response
Light Gray	Display and format control
White	Numeric Entry

Figure 2.7 illustrates the keys and describes their basic functions.

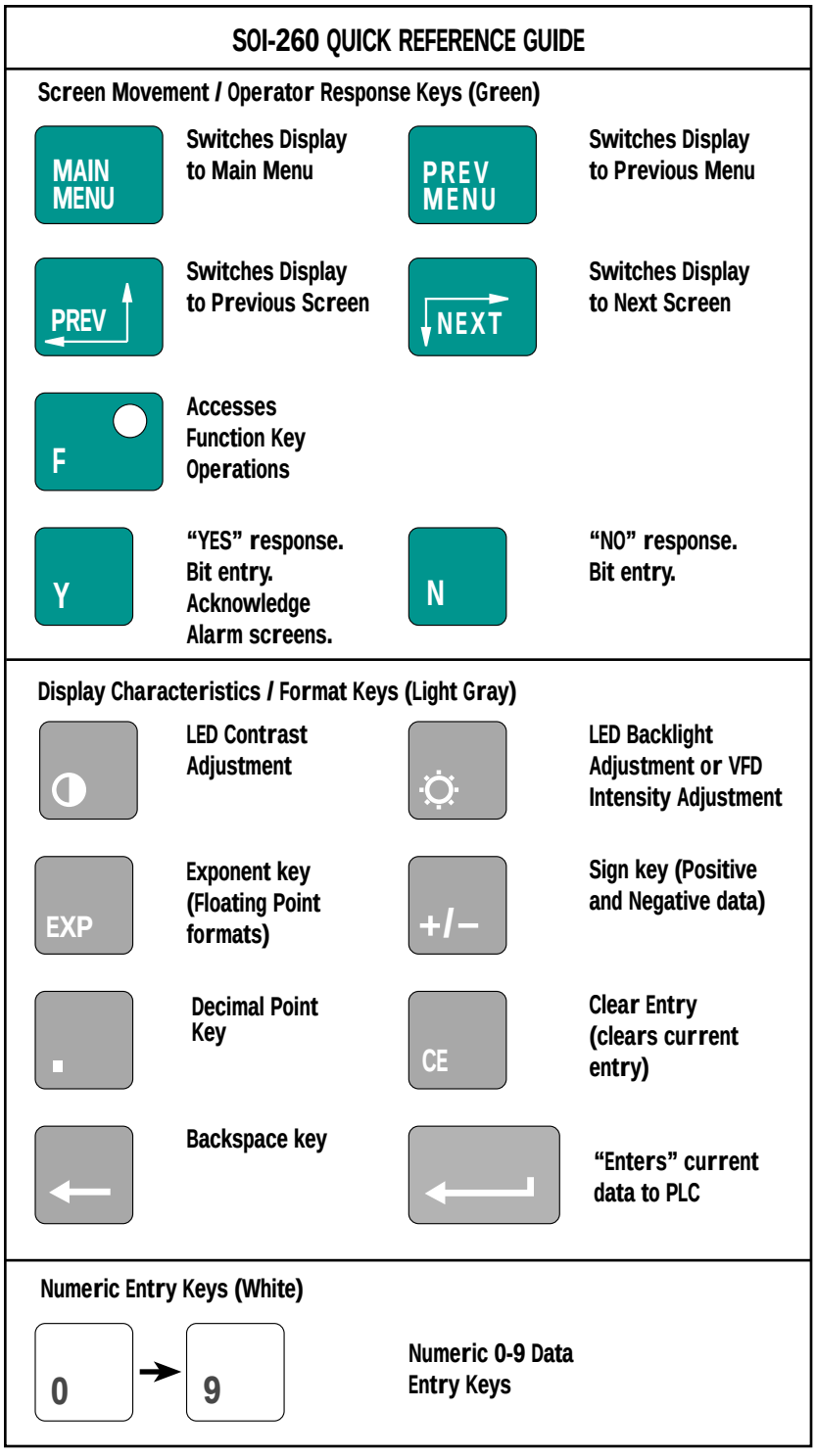


Figure 2.7 SOI-260 Keypad

Green Keys

The seven green keys located at the top of the SOI–260 control movement within a program. You can move from menu to menu using the MAIN MENU and PREV MENU keys from screen to screen using the PREV and NEXT keys. A description of these keys is provided below.

MAIN MENU key*
The MAIN MENU key returns you to the main menu of the application program you are presently in whenever the key is pressed.

PREV MENU key*
(Previous Menu)

The PREV MENU key steps you back through menus. This is very helpful when submenu screens occur extensively throughout a program. By pressing the PREV MENU key enough times, you eventually will return to the main menu.

* = *Note:* *The PREV MENU and MAIN MENU keys operate in the same manner in the event an ALARM condition has been detected. If the ALARM LED is flashing, the green Y key must be pressed acknowledging the ALARM condition before you are able to proceed to the main menu using the MAIN MENU key.*

PREV Key
(Previous)

The PREV key moves to the previous non-menu screen in any given sequence of linked screens.

Note: *Refer to SOI–SPS Software Programming Manual for more information on linking screens.*

NEXT Key
The NEXT key moves to the next screen in any given sequence of linked screens.

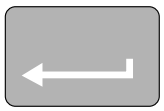
The yes and no keys are for operator responses, and the Enter key sends data to the PLC.

Y Key
(Yes)

The Y key enters a yes response or acknowledged when an alarm is displayed. You can use the Y key to set the status of a bit at a data entry screen. Also, when you are in P-A/D press this key to increment the Address fields.

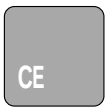
N key
(No)

The N key enters a no response or acknowledgment. You can also use the N key to clear the status of a bit at a dat entry screen. Also, when you are in P-A/D press this key to decrement the Address fields.



↵ Key
(Enter)

The enter key sends the entered data to the PLC processor. It does not matter whether the data on the display is a default value or a value you entered, the data is still sent to the processor.

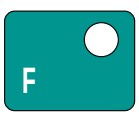


CE Key
(Clear Entry)

The CE key deletes an entire data entry.

For example, you might enter a five digit number and the first and third digits were incorrect. By pressing the CE key the entire value would be deleted, and you could enter a new value.

Once you press the ENTER key, the value entered is sent to the PLC processor and cannot be deleted with the CLEAR ENTRY key.



F Key
(Function)
(Used to select PLC-specific features)

The F key sets special features and operating parameters of the SOI–260. The F key is enabled or disabled for the PLC by setting DIP switch SW 1-4. See the DIP switches section in this chapter for more information.

When you press the function key, the F LED illuminates, indicating the SOI–260 is in the function mode. At this time, the function key menu is displayed.

The MAIN MENU key aborts the function key and returns you to the main menu regardless of the function key mode in progress.

The PREV MENU key allows you to move through the previous selections until the function key menu is displayed, the F key terminates the function mode and returns operation to the main menu.

The function key menu appears as follows:

1	**C-Port**	**5**	**Special**
2	**P-Port**	**6**	**Term**
3	**Clk/Cal**	**7**	**Test**
4	**Reset**	**8**	**Other**

To select a menu item, press the number on the keypad corresponding to the menu item number.

Each of these functions are described in Chapter 3: Function Keys.

Light Grey Keys

The eight light grey keys control the visual characteristics, numeric format of the display, and access to the special features and operating parameters mode.

Contrast Key
(Half Moon Symbol)

The contrast key adjusts the amount of contrast the display uses for viewing purposes. Contrast is adjustable in four steps.

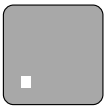
This key is useful for fine tuning the display in unique lighting, temperature, or viewing conditions.

Note: This key is only included with the liquid crystal display (LCD) model of the SOI–260.

Brightness Key
(Sun Symbol)

The brightness key adjusts the amount of LED backlighting on LDC displays, which is adjustable in 4 steps. This key also adjusts the character brightness on VFD displays in 4 steps.

Backlighting is useful if the ambient lighting conditions are not bright enough to allow clear viewing of the display.



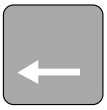
. Key
(Decimal Point)

The decimal point key enters a decimal point in data entry screens.

EXP Key
Pressing the EXP key sends the screen currently displayed on the SOI–260 to a connected serial printer. When used with PLC's supporting floating point, this key also allows entry of exponential numbers. This feature must be enabled via the function key menu as described in Chapter 3.

+/- Key
(Change Sign)

The change sign key indicates negative or positive numeric values. The key toggles an entry value between + (positive) and - (negative), and is fully functional with all valid signed-entry data types.



‹— Key
(Backspace)

The backspace key moves the cursor back one position (character) at a time, and deletes the character in the process.

White Keys
The ten white numeric keys control data entry.

CHAPTER 3: FUNCTION KEY

This chapter describes the operations performed by the function key menu. Each of the eight menu items listed below is described in detail.

1. C-Port (Communications Port)
2. P-Port (Printer Port)
3. CLK/CAL (Clock/Calendar)
4. Reset
5. Special
6. Term (Terminal)
7. Test
8. Other

C-Port (Communications Port) Menu Item 1

This menu item sets the SOI-260 operating parameters of the communications port (RS-485/422 or RS-232C).

Normally all communications port parameters are set automatically when you download an application program to the SOI-260. If you need to make a change to these settings, you would do that here.

The C-Port function has an associated menu which appears as:

```
Select item:

1  Baud Rate     4  Exit
2  Data Bits
3  Parity
```

Baud Rate

The BAUD RATE menu allows you to change the comm port speed of data transfer to any of the following:

300
1200
2400
4800
9600
19200
38400

Use the NEXT or PREV key to sequence through the baud values. Press ENTER to select the value.

Data Bits

You can select either 7 or 8 data bits. The number of data bits used for the printer port normally is defined by the software.

Parity

Parity allows you to change parity on the printer port to:

even
odd
none

Select the parity similar to baud rate selection .

Exit

Steps back to the main menu.

P-Port (Printer Port) Menu Item 2

This menu item allows parameters of the RS-232 printer port to be set manually. Normally, these parameters are set from the programming software when an application program is downloaded to the SOI-260.

The P-PORT menu is shown below:

```
1  Baud Rate    5  L/Feed
2  Data Bits    6  Penabl
3  Parity       7  Exit
4  Hndshk
```

Baud Rate

The BAUD RATE menu allows you to change the printer port speed to any of the following:

300
1200
2400
4800
9600
19200
38400

Use the NEXT or PREV key to sequence through the baud values. Press ENTER to select the value.

Data Bits

You can select either 7 or 8 data bits. The number of data bits used for the printer port normally is defined by the software.

Parity

Parity allows you to change parity on the printer port to:

even
odd
none

Select the parity similar to baud rate selection.

Handshake (Hndshk)

Hardware handshaking choices are enable or disable as shown below:

```
HNDSHK Enable OFF (0)
"1" or "Y" = ON
"0" or "N" = OFF
ENTER = NC
```

Handshaking is a request to send a communications signal (RTS and notification that a transmission may be sent (CTS).

Line Feed (L/Feed)

Choices for Line Feed are ON and OFF as shown below:

```
L/Feed Enable OFF (0)
"1" or "Y" = ON
"0" or "N" = OFF
ENTER = NC
```

When enabled the SOI-260 sends a line feed (LF), in addition to a carriage return after a form has been printed. When disabled only a carriage return will be sent.

Printer Port (Penabl)

The printer can be selected as ON or OFF as shown below:

```
PORT Enable ON (1)
"1" or "Y" = ON
"0" or "N" = OFF
ENTER = NC
```

Note: To upload or download using the printer port, the printer port must be enabled.

Exit

Exit steps back to the function key menu.

CLK/CAL (Clock/Calendar) Menu Item 3

This function key menu item sets and displays the internal real time clock of the SOI-260 (available on SOI-260-x40 units only).

The CLK/CAL option provides time and date information for SOI-260 operations. The time and date may also be inserted into operator screens and printer forms or downloaded to the PLC using the Time Synchronization Command. Refer to the SOI-260 Programming Manual for more information concerning time synchronization.

The internal real time clock is accurate to +/- 1 minute per month @ 25° C.

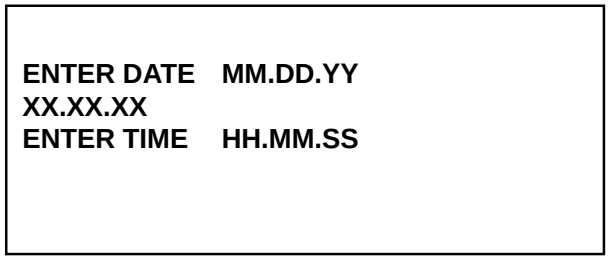
When you select the CLK/CAL item, the following is displayed:

```
ENTER DATE MM.DD.YY
```

MM = Month
DD = Day of Month
YY = Year

Enter new values with decimal points between each of the numbers for the date and press ENTER to load. The new values are then stored in the SOI-260 (but not loaded into the clock).

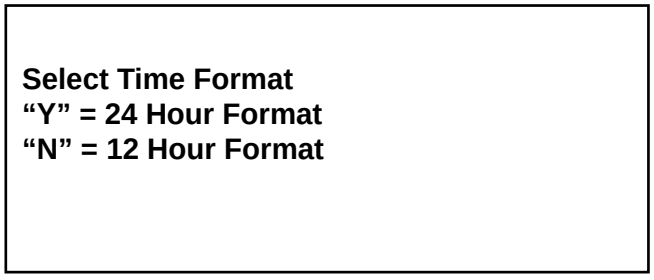
When you have entered the new values, the following is displayed:



HH = Hour (0-23 or 1-12)
MM = Minutes (0-59)
SS = Seconds (0-59)

Enter new values with decimal points between each of the numbers for the time and press ENTER to load. The new values are then stored in the SOI-260.

When you have entered the new values, you are prompted to enter "Y" or "N" for your choice of time format with the following display:



Enter "Y" to select the 24 hour format, or "N" to select the standard (AM/PM) format. If you enter "N", you are prompted for an AM or PM setting.

The new date and time are loaded into the internal clock and displayed.

Reset
Menu Item 4

This function key menu item initiates a "soft" reset of the SOI-260, restarting all internal circuitry.

When you select RESET, the following screen appears:

If you enter Y, the SOI-260 resets. This feature is useful for activating the Term mode if the Term Mode DIP switch is set to ON.

Note: See DIP Switches in Chapter 2 for more information.

Special
Menu Item 5

This function key menu item will allow access to the Point Access/ Display function. A security access code can be defined in the programming software and will be implemented once the application has been downloaded.

The Point Access/Display function allows access to all unrestricted PLC data registers. These registers can be displayed and modified at the SOI-260. The NEXT and PREV keys scroll forward and backward through the PLC register types. Select a desired register by pressing the Enter key.

If you have specified a valid register, it will be displayed. If it is invalid, the SOI-260 will display a communication error message which is cleared by pressing the MAIN MENU key.

Note: Refer to the PLC reference section on the data registers and types supported for each protocol selection.

The PA/D is useful when starting up or debugging SOI-260 programs or regular PLC operations.

ATTENTION: The P-A/D should be restricted only to authorized personnel. It is possible to change PLC data which may alter the correct operation of the SOI-260.

When a P-A/D screen is displayed, the PREV MENU key will return you to the Special Menu and the MAIN MENU key will exit the function key mode and return you to online operation.

Term (Terminal Mode) Menu Item 6

This function key menu item allows you to set communication and display parameters for the Terminal mode.

The Terminal mode disables execution of the downloaded program and enables the SOI-260 to function as a terminal device. In the Terminal mode, the SOI-260 displays any ASCII data received through the communications port. The ASCII codes associated with the keys on the SOI-260 keypad are transmitted through the communications port when a key is pressed.

Note: Refer to Appendix B, Terminal Mode, for the ASCII codes displayed and mapped to the keypad.

To activate the Term mode, set DIP switch SW 1-5 to the closed (ON) position and reset the SOI-260. The display will then blank and be ready to receive incoming ASCII data.

When you select TERM, the following screen appears:

```
1  Half Duplex
2  Line Feed Enable
3  Cursor Enable
4  Exit
```

Half Duplex

Select this item to designate half duplex communications to and from the host device.

The half duplex selection echoes (displays) to the screen the SOI-260 keys pressed.

Line Feed Enable

Select this item to enable or disable the use of a Line Feed character each time a Carriage Return character is received.

Cursor Enable

Select this item to enable or disable a block cursor display.

Exit

Select this item to exit Term operation.

Test
Menu Item 7

The Test menu has selections which allow you to perform diagnostic testing. At the completion of a diagnostic testing. At the completion of a diagnostic test, all SOI-260 configurations are restored to pretest settings. When you select the test function from the function key menu, the following screen appears:

```
SOI-260 Diagnostic
NEXT to Select Text
Enter to Initiate
Reset DUT
```

Press the NEXT and PREV keys to toggle through the available test selections. When the test you want is displayed, press ENTER. The available selections are:

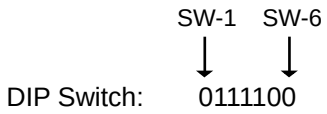
- Reset DUT
- Dipswitch
- Display Test
- Keyboard
- Comm Port
- Printer Port
- Display Control
- RAM Test
- System Memory
- Program File
- Clock/Calendar
- TXEN & Alarm

Reset DUT

Pressing the Enter key with Reset DUT displayed performs a soft reset. It is the only way to terminate the test menu.

Dipswitch Test

The SOI-260 displays the current DIP switch positions in binary format. The OFF (open) position displays as logic 0 and the ON (closed) position displays as logic 1. Switch positions 1 through 6 are shown from left to right.



Display Test

The Display Test verifies that each display pixel is operating properly. All pixel turn on, then off, then alternate a checkerboard pattern (positive and negative) until a key is pressed.

Keyboard Test

This test prompts you to press each key on the keypad in a sequential manner to test keypad operation.

Comm Port Test

This test transmits a message our the communications port. If a loopback connector is attached as shown in figure 3.1, the message will be received by the same port and will continuously display until a key is pressed. The test operates in both RS-232 and RS-485 settings if the correct loopback connector is attached.

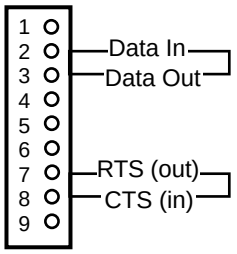
The message displayed during the test is a moving display as shown below.

SOI-260 Self Looping Serial Test
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890

Printer Port Test

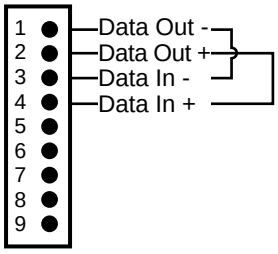
This test transmits a message out the Printer Port. If a loopback connector is attached (as shown in figure 3.1), the message will be received by the same port and continuously displayed on the screen until a key is pressed. This test will not run if the port is disabled.

SOI-260 RS-232C Loopback Connector Communications or Printer Port (9 Pin Female Printer Port, 9 Pin Male Communications Port)



○ = Female Connector

SOI-260 RS-485/422 Loopback Connector Communications Port 9 Pin Male



● = Male Connector

Display Control

This test adjusts the LCD display to each of the 4 contrast and brightness setting (only 2 for the VFD display). During the brightness test, the following screen appears:

```
**************************************************

        DISPLAY BRIGHTNESS
              TEST

**************************************************
```

The Contrast test immediately follows the Brightness test and shows the following screen:

```
**************************************************

        DISPLAY CONTRAST
              TEST

**************************************************
```

VFD version of the SOI-260 does not include the Contrast test.

RAM Test

The System RAM test checks the integrity of the internal RAM and displays whether the test passed or failed.

```
RAM : passed

Press ENTER
```

System Memory Test

This test checks the operating system portion of the non-volatile memory in the SOI-260 (64K in 8K memory units and 128K in 40K memory units). The display shows the results of the checksum as pass or fail.

```
Checksum : passed

Press ENTER
```

Program File Test

This test checks the user memory size and the checksum of the application file stored in the nonvolatile memory of the SOI-260.

```
40K user memory

Checksum : passed
Press ENTER
```

Clock/Cal Test

This test displays the current date and time in the SOI-260. The display updates the time until the ENTER key is pressed. This test is only supported by units that have a real time clock.

TIME XX:XX:XX PM
DATE Day Mon XX XX

Press ENTER

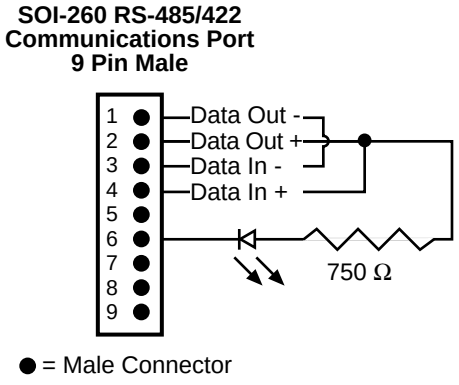
TXEN and Alarm Test

This test verifies the operation of the transmit enable line on the Communications Port when set for RS-485 and also toggles the Alarm LED to verify its operation. The test toggles the TXEN line and alarm LED at a rate of approximately 1 cycle per second until you press the ENTER key.

Toggling TXEN line
Astable Alarm LED

Press ENTER

The figure below shows how to connect an LED to the transmit line. The LED will flash approximately once every second during the TXEN test.



Other
Menu Item 8

This menu item will contain miscellaneous functions that will influence the operation of the SOI-260. This menu contains the following functions:

1	Simulate	5	Mastr C
2	BL / INT	6	Scale E
3	Contrast	7	Exit
4	Prn Scrn		

Simulate

Simulate protocol selections are enable or disable.

When simulate is enabled, communication between the SOI-260 and PLC is halted. In this mode the SOI-260 will simulate communication with the PLC. All expected data is returned as 0 (zeros). When disabled, the brightness will remain at the current setting and can not be changed with the front panel keys. The setting will be maintained after power is cycled to the SOI-260.

Simulate mode is a great tool for dry-running programs to ensure proper operation and screen flow and layout.

BL/INT (Backlighting / Intensity)

When brightness is enabled, you can adjust the display backlighting for LCD versions, or character intensity for VFD versions. When disabled, the brightness will remain at the current setting and cannot be changed with the front panel keys. The setting will be maintained after power is cycled to the SOI-260.

Contrast (LCD version only)

When enabled on the LCD version, you may adjust the contrast of the character display. When disabled, the contrast will remain at the current setting and cannot be changed with the front panel keys. The setting will be maintained after power is cycled to the SOI-260.

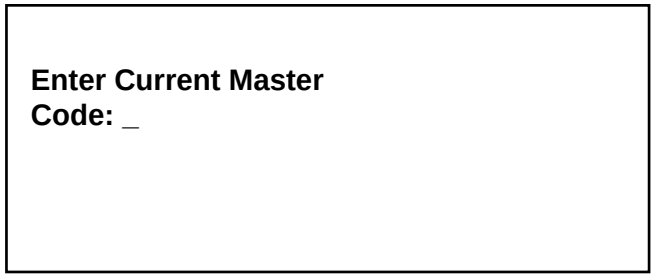
Prn Scrn (Print Screen)

When print screen is enabled, the current display is captured and sent to the Printer Port whenever the EXP key on the front panel is pressed. The display is also printed if the EXP key is pressed for entering floating point data. When disabled, print screen is disabled and the EXP key can only be used for entering floating point data.

Mastr C (Master Security Code)

The master security code function allows you to edit the master security code of the SOI-260. The code must be 8 digits in length. If less than 8 digits are entered, the code is padded with zeros. For example, a code defined as “1234” will be used in the SOI-260 “12340000”.

When selected, the following screen is displayed.



The current master code needs to be entered for verification. If the wrong code is entered, the SOI-260 display will indicate the wrong code has been entered and exit to the other menu. When the correct code is entered, the SOI-260 will prompt you to enter a new code as shown below.

An entry of all zeros (0) as the new master code will allow you to modify the code without the need to enter the current code. In this case the SOI-260 will only prompt you to “Enter New Master Code”. If the master code is defined as all 9’s the SOI-260 will not allow you to modify the master security code. Only the PLC software should be used to set the master code as all 9’s.

Since wild cards (?) are used with the security codes, these codes have precedence over the master code. For example, security code = 12?????? and master code = 12340000. If the master code is entered on the SOI-260 it will be interpreted as the security code. You are responsible for creating a different master code from any security code which may have wild cards.

Scale E (Scale Enable)

Scale E enables or disables SOI-260 auto-scaling. When enabled, numeric values from the PLC will be scaled to engineering units. When disabled, numeric values will not be scaled.

Exit

Exit allows you to exit the Other Menu and returns you to the main Function Key Menu.

CHAPTER 4: COMMUNICATIONS

This chapter describes the cabling and configuration needed to use the SOI-260 communications port and the optional printer port.

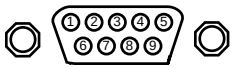
Use these ports to upload and download program files to and from a computer. Also, use these ports for communications with a PLC, printer, or other serial device.

Note: Some versions of the SOI-260 Operator Interface are equipped with a 9-pin ModBus Plus Port. Please refer to Spectrum Controls Publication #0300062-xx, "Modicon Reference," for information regarding the ModBus Plus Communications Port.

Using the Communications Port

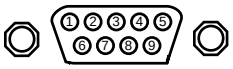
All communications occur through a 9-pin connector on the bottom of the SOI-260. The connector can be configured as either an RS-232 or RS-485 port by setting the SOI-260's DIP switches. The DIP switches are described in *Chapter 2: Hardware*, under *Installing the SOI-260*.

RS-232



PIN#	Signal Name
1	Not Used
2	Receive Data (RD)
3	Transmit Data (TD)
4	Not Used
5	Signal Ground
6	Not Used
7	Not Used
8	Not Used
9	Shield

RS-485



PIN#	Signal Name
1	Data Out -
2	Data Out +
3	Data In -
4	Data In +
5	Signal Ground
6	Transmit Enable
7	Not Used
8	Signal Ground
9	Shield

SOI-260 Upload/Download Cabling

Figure 4.1 shows the cabling between the SOI-260 communications port and the serial port of a personal computer (this will allow you to upload or download SOI-260 program files). The illustration below indicates pinouts for both 9-pin and 25-pin connections. Spectrum Controls offers a RS232C 9-pin to RS232C 25-pin cable for purchase (catalog number SCC-3).

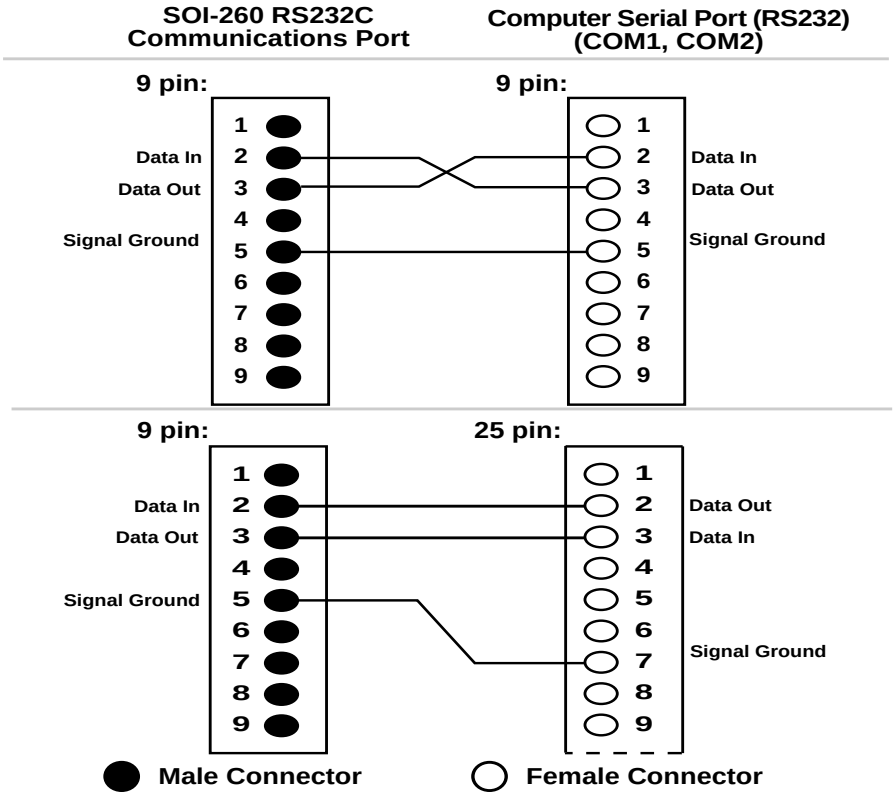


Figure 4.1

SOI-260 to PLC Cabling.

The communication cable used to connect an SOI-260 to a specific PLC is unique to the PLC that it is connected to. Refer to the *PLC Reference Section* for SOI-260 to PLC communication cable wiring diagrams.

Using the Printer Port

Figure 4.2 shows the cabling for the optional RS-232C Printer Port of the SOI-260. Use this port to send data to a printer or other serial device such as a large display. The illustration below indicates pin-outs for both 9-pin and 25-pin connections.

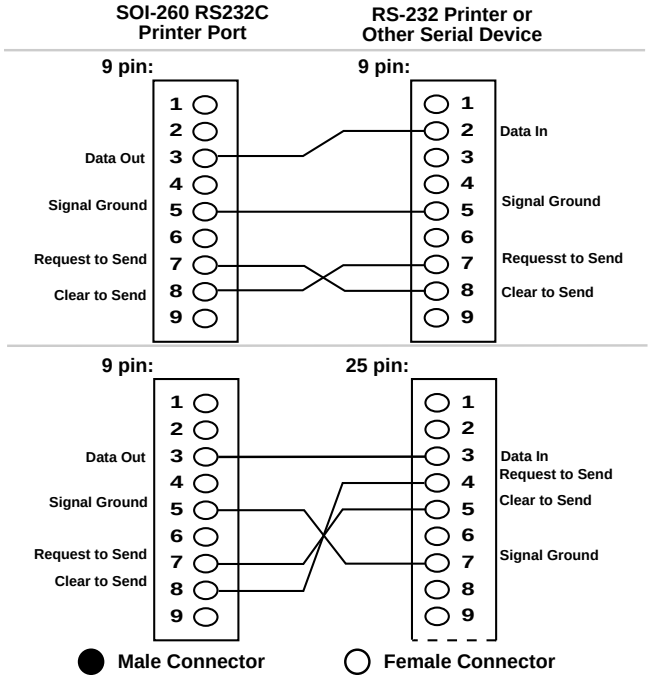


Figure 4.2

SOI-260 to Computer connections

Figure 4.3 illustrates the typical connection method used when up/ downloading the SOI-260 program.

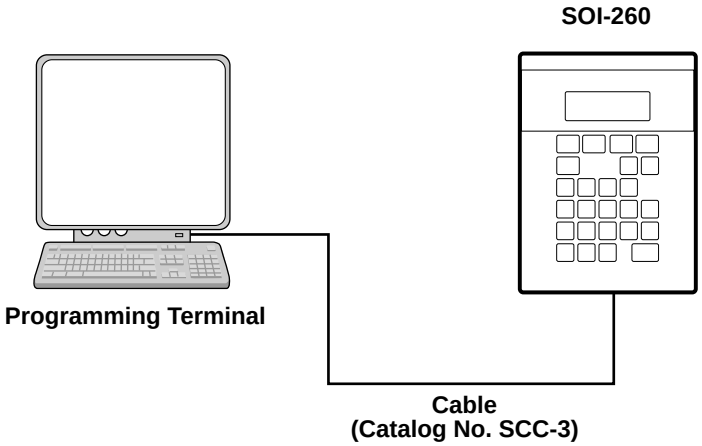


Figure 4.3

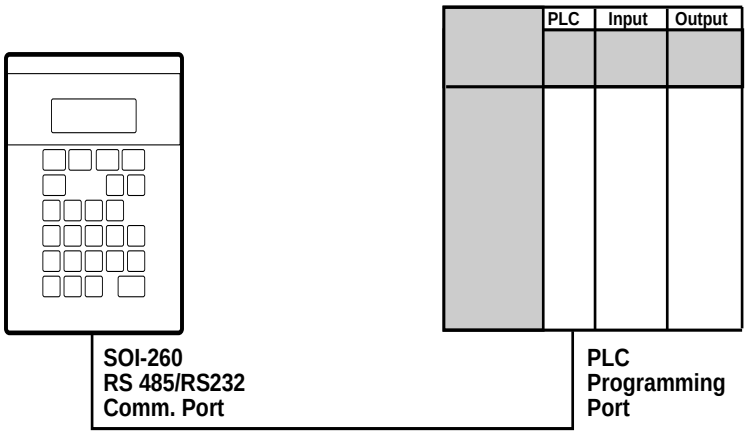
Note: The SCC-3 cable may be purchased from Spectrum Controls, Inc.

SOI-260 to PLC Connections

Figures 4.4 through 4.8 illustrate the connections between the SOI-260 and the PLC. Connections to the PLC communication port, connection via communication modules, as well as connection to a Printer are shown as examples below.

Figure 4.4 illustrates the connections between the SOI-260 and a PLC communication port.

SOI-260 / PLC Direct Connect

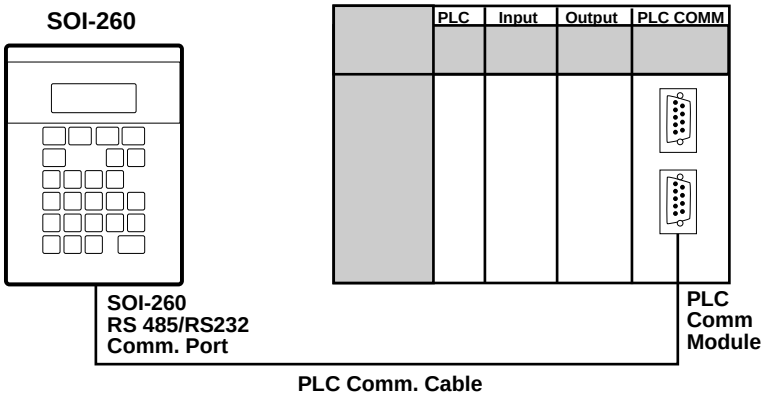


- SOI-260 Comms to PLC
- SOI-260 & PLC are connected to the same power source and ground potential

Figure 4.4

Figure 4.5 illustrates the connections between the SOI-260 and PLC via a communication module.

SOI-260 Connection to a PLC Communication Module

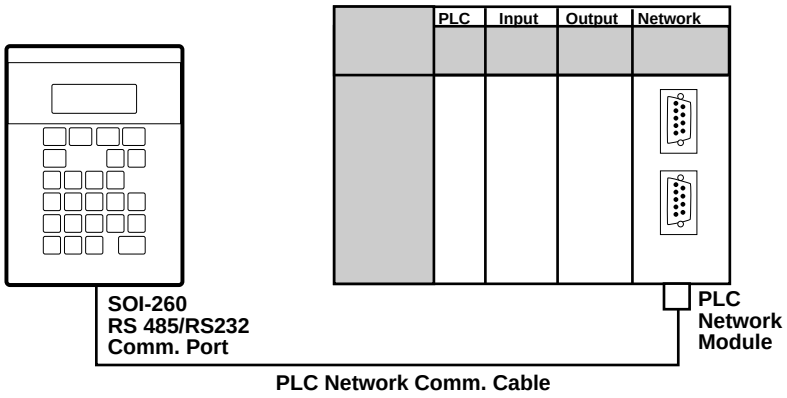


- SOI-260 Comms to PLC Comm Module
- SOI-260 & PLC with PLC Comm Module are separated by a distance specified by the PLC Manufacturer

Figure 4.5

Figure 4.6 illustrates the connections between the SOI-260 and PLC via network modules. (network modules residing in PLC racks)

SOI-260 Connection to a PLC Network Module

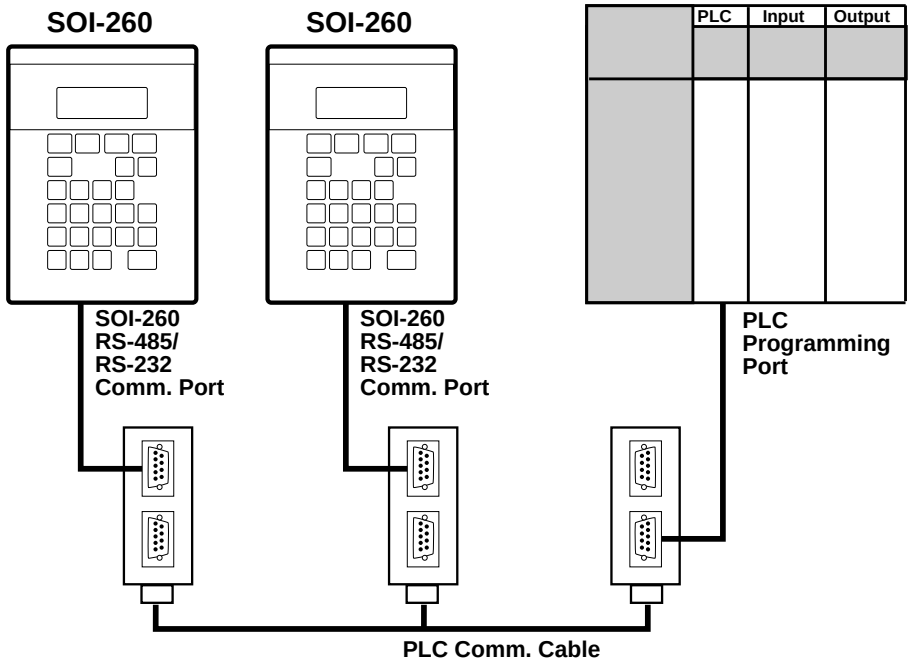


- SOI-260 Comms to PLC Network Module
- SOI-260 & PLC Network Module are separated by a distance specified by the PLC Manufacturer

Figure 4.6

Note: The SOI-260 does not support all network communications. Refer to the PLC reference section and the PLC manufacturers operations manual for details on the specific PLC.

Figure 4.7 illustrates the connections between the SOI-260 and PLC via network modules. (network modules external to the PLC)



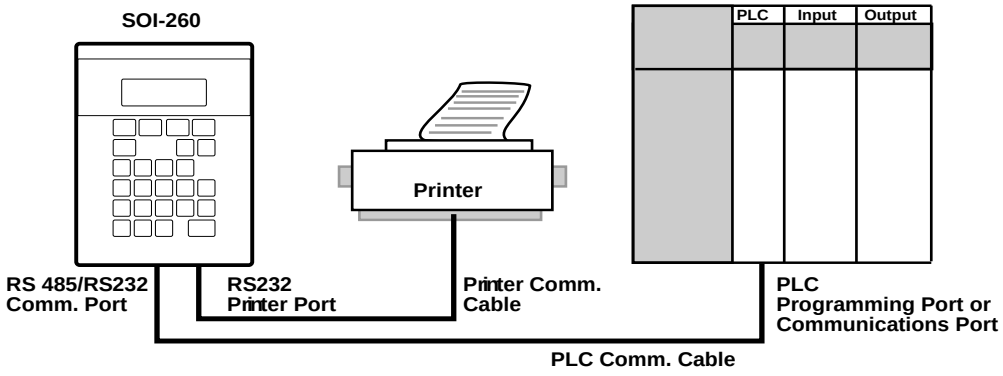
- SOI-260 Comms to PLC
- SOI-260 & PLC are connected to the same power source and ground potential

Figure 4.7

Note: The SOI-260 does not support all network communications. Refer to the PLC reference section and the PLC manufacturers operations manual for details on the specific PLC.

Figure 4.8 illustrates the connections between the SOI-260 and a standard printer.

SOI-260 / PLC Direct Connect



- SOI-260 Comms to PLC
- SOI-260 & PLC are connected to the same power source and ground potential
- Please refer to the Printer Port Cabling section for wiring diagram. For printer details, refer to the printer manufacturer's operations manual.

Figure 4.8

CHAPTER 5: TROUBLESHOOTING

The following troubleshooting information pertains to general conditions of the SOI-260 and its operations. This information is presented as potential symptoms and describes possible solutions.

The SOI-260 will display a variety of screens or error codes upon detection of extraordinary conditions. The information displayed may help in isolating problems. The SOI-260 also contains a Self Test mode that performs a full functional test of the unit.

Note: The Self Test mode operation is described in Chapter 3: Function Keys, under Test Menu Item 7.

Important: The symptoms and descriptions described below encompass a wide range of both hardware problems and indications of operator entry errors. For problems relating to the SOI-260 and PLC operations, refer to the applicable SOI and specific PLC software manuals.

PLC Error Conditions

The following provides a list of SOI-260 displays for error conditions of the PLC. Possible corrective actions is also provided.

Checksum failed

ROM checksum is incorrect. Possible defective ROM.

Action

Reset the SOI-260. If problem still exists, reload the operating system through the software. If problem persists, return SOI-260 for repair.

RAM fail

RAM memory failed write or read test.

Action

Reset the SOI-260. If problem persists, return SOI-260 for repair.

Error Conditions

Check-sum: nnnn (.CFG file)
Check-sum: nnnn (SOI-260)
CFG File is invalid

Application file checksum is incorrect. Possible bad application file.

Action

Download the application program (.CFG) file again. If problem persists, return SOI-260 for repair.

Watch Dog Fault
Push key to continue

Watch dog timer not within specifications.

Action

Return SOI-260 for repair.

Watch Dog Fault Push key to reset

Watch dog timer timed out or pass bits not set.

Action

Return SOI-260 for repair.

Establishing Comm

Attempting to communicate to PLC.

Action

No action is required. This is the normal screen when initiating communications with the PLC.

PLC not found

This display is presented after a 2 second interval of attempting to establish communications with the PLC.

Action

Check cabling and communications parameters to verify the PLC matches those of the SOI-260.

PLC not Responding
PLACE PLC ON LINE

Communication failure to respond to repeated attempts after initial communications were achieved.

Action

Press any key. Check SOI-260 to PLC cabling. Check PLC operating conditions.

COMM ERROR, Press "Y"

Communication with the PLC was lost after XX attempts.

Action

Check SOI-260 to PLC cabling. Check PLC operating conditions.

Comm ERROR PRESS Y
PLC error code: nnn

Communication error code (nnn). Received a PLC error code.

Action

Refer to the error code information in the specific PLC hardware or software manual.

Attempt made to
"call" and invalid or
unprogrammed screen

Illegal or unprogrammed screen type detected (.CFG) file and download. Check linking.

NOT PROGRAMMABLE

Master code is 99999999 and is not programmable by the user.

Action

Download new and valid master security code using the applicable software.

INVALID SECURITY
CODE ACCESS DENIED
"Y" TO CONTINUE

Master code or 3 screen codes did not match

Action

Either an incorrect master security code or a code that did not match the 3 programmed codes was entered. Ensure the security code you are entering is correct and is entered properly.

Printer not Ready
Press "Y" to Abort
Press "N" to Resume

Printer offline for more than 2 seconds.

Action

This may occur if handshaking is enabled. Place printer on-line.

Self Test Failure

In the self test mode the transmitted character did not match the received character. The transmitted character and the received character also appear on the display.

Action

Verify that the loopback connector is connected to the communication and/or printer ports. If problem persists, return SOI-260 for repair.

**** Input Error ****			**** Input Error ****
Low	**High**		**Low** **n.nnnnn**
n.nn	**n.nnn**	**OR**	**High** **n.nnnnn**
"Y" to Continue			**"Y" to Continue**

The data entered is not within the programmed limits. The low and high limits, as programmed, are displayed.

Action

Verify the displayed limits are within programmed limits. The low and high limits as programmed, are displayed.

NaN (Not a number)

The floating point data is not a correct floating point data format.

Action

Check the data in the PLC location and verify the data for correct Floating Point format.

INF

The floating point data has been received as a +/- infinity type.

Action

Check the data in the PLC location and verify the data for correct Floating Point format.

No relation

Indication that an invalid floating point compare was done.

Action

Verify that the PLC location allows floating point formats.

READONL

The PLC location is not configured for a write function (P-A/D function).

Action

Verify that the PLC location being accessed by the P-A/D allows write functions.

SOI-260 Programming Software / SOI-260 Version Mismatch
*** SOI-260 LOCKED ***

An incorrect unlock code sent by SOI-SPS programming software. Wrong version of SOI-260 programming software.

Action

Verify that the version of SOI-260 programming software is compatible for the PLC type supported by the SOI-260, and reload the operating system as described in Chapter 2.

(Any unusual characters being displayed)

Check the screen linkage in your application and reload the operating system as required.

or

The baud rate is incorrect. Ensure the baud rates between the SOI-260 and the PLC are the same.

APPENDIX A: SOI-260 SPECIFICATIONS

SOI-260 LCD Display

Character Size (H x W)	0.19 x 0.12 in. (4.75 x 2.95 mm)
Character Format	5 mm x 8 mm dot matrix
Column and Character	4 lines x 20 characters
Backlight	Four: 0, 33, 66, & 100% (via keypad)
Contrast	Four (via keypad)
Display Viewing Area (H x W)	0.83 x 2.76 in. (21 mm x 70 mm)
Viewing Angle	Horizontal +/-30° to +/-60°, Vertical -20° to +30°

SOI-260 Vacuum Fluorescent Display

Character Size (H x W)	0.20 x 0.12 in. (5.0 x 3.0 mm)
Character Format	5 mm x 8 mm dot matrix
Column and Character	4 lines x 20 characters
Intensity Settings	Four: 100, 85, 70 & 50% (via keypad)
Luminance	350 CD/M^2 nominal
Display Viewing Area (H x W)	1.02 x 3.54 in. (26.0 mm x 90.0 mm)
Viewing Angle	Horizontal +/-60°, vertical +/-60°

Keypad

Keypad Type	Tactile stainless steel, domed keys, sealed membrane
Operation Force	12 oz +/-3 oz (341g +/-85g)
Operational Life	1 million operations

Electrical

Communications Port	RS-232/RS-485
Communication Distances	
RS-232	50 ft (15 meters) max
RS-485/422	10,000 ft (3047 meters) max
Power Requirements	
P1	15-23 Vac 47-440 Hz, or 20-30 Vdc, 800 mA max, 1 Amp fuse
P2	85-265 Vac 47-440 Hz, or 110-300 Vdc, 300 mA max, 1/2 Amp fuse

Environmental

Operating Temperature	
$SOI\text{-}260_{LC}$	0-45°C (32-113°F)
$SOI\text{-}260_{VF}$	0-60°C (32-140°F)
Storage Temperature	-20 to 85°C (-4 to 185°F)
Relative Humidity	5 to 95%, non-condensing
Shock	30G operating, 50B non-operating
Vibration (5 to 2000 Hz)	2.5G operating, 5.0G non-operating
Agency Ratings	NEMA Type 4, 12, 13 (indoor use only), CSA, and UL/CUL Class I Division 2 Groups A B C D. The SOI-260 Series D or later, the Intrinsically Safe SOI-260 Series B or later, and the DeviceNet SOI-260 Series C or later also conform to EC Council Directives 72/23/EEC for Low Voltage and 89/336/EEC for Electromagnetic Compatibility. This does not include the Modbus Plus SOI-260 products.

Mechanical

Dimensions (approximate)	
Height	7.6 in. (193.5 mm)
Width	5.5 in. (139.7 mm)
Depth	1.8 in. (45.7 mm) 2.1 in. (53.3 mm) w/ Modbus Plus
Front Panel	
Height	8.5 in. (216.4 mm)
Width	6.5 in. (165.5 mm)
Weight (max)	3.4 lb (1.5 kg) 4.1 lb (1.9 kg) w/ Modbus Plus
LED Indicators	Run LED (green) Alarm LED

APPENDIX B: TERMINAL MODE

ASCII Transmission Characters

When using the SOI-260 in terminal mode, the keypad is mapped to characters shown in the following table.

SOI-260 Key ..... ASCII	Hex	Decimal
Main Menu	85	133
Prev Menu	84	132
Prev	82	130
Next	80	128
*F	86	134
*Contrast	83	131
*Backlight (Sun)	81	129
Y ..... Y	59	89
N ..... N	4E	78
Back Space ..... <BS>	8	8
EXP ..... E	45	69
CE ..... <FF>	0C	12
+/- ..... +/-	2B/2D	43/45
(.)	2E	46
Enter ..... <CR>	D	13
9 9	39	57
8 8	38	56
7 7	37	55
6 6	36	54
5 5	35	53
4 4	34	52
3 3	33	51
2 2	32	50
1 1	31	49
0 0	30	48

** These keys will not transmit a code if DIP Switch SW1-5 is enabled. They will operate in their normal mode until SW1-5 is disabled. Once SW1-5 is disabled, the list codes will be transmitted.*

ASCII Display Characters

The following charts show the ASCII display characters and their corresponding Hexadecimal codes.

TERMINAL MODE - SUPPORTED DISPLAY CHARACTER SET

DEC	HEX	CHR
32	20	
33	21	!
34	22	"
35	23	#
36	24	$
37	25	%
38	26	&
39	27	'
40	28	(
41	29	)
42	2A	*
43	2B	+
44	2C	,
45	2D	-
46	2E	.
47	2F	/
48	30	0
49	31	1
50	32	2
51	33	3
52	34	4
53	35	5
54	36	6
55	37	7

DEC	HEX	CHR
56	38	8
57	39	9
58	3A	:
59	3B	;
60	3C	<
61	3D	=
62	3E	>
63	3F	?
64	40	@
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G
72	48	H
73	49	I
74	4A	J
75	4B	K
76	4C	L
77	4D	M
78	4E	N
79	4F	O

DEC	HEX	CHR
80	50	P
81	51	Q
82	52	R
83	53	S
84	54	T
85	55	U
86	56	V
87	57	W
88	58	X
89	59	Y
90	5A	Z
91	5B	[
92	5C	¥
93	5D	]
94	5E	^
95	5F	_
96	60	`
97	61	a
98	62	b
99	63	c
100	64	d
101	65	e
102	66	f
103	67	g

** All of the above characters are supported when 8 data bit communication is enabled. Hex codes below 80H are supported by 7 data bit communication.*

TERMINAL MODE - SUPPORTED DISPLAY CHARACTER SET

DEC	HEX	CHR
104	68	h
105	69	i
106	6A	j
107	6B	k
108	6C	l
109	6D	m
110	6E	n
111	6F	o
112	70	p
113	71	q
114	72	r
115	73	s
116	74	t
117	75	u
118	76	v
119	77	w
120	78	x
121	79	y
122	7A	z
123	7B	{
124	7C	|
125	7D	}
126	7E	→
127	7F	←

DEC	HEX	CHR
160	A0	
161	A1	｡
162	A2	｢
163	A3	｣
164	A4	､
165	A5	･
166	A6	ｦ
167	A7	ｧ
168	A8	ｨ
169	A9	ｩ
170	AA	ｪ
171	AB	ｫ
172	AC	ｬ
173	AD	ｭ
174	AE	ｮ
175	AF	ｯ
176	B0	ｰ
177	B1	ｱ
178	B2	ｲ
179	B3	ｳ
180	B4	ｴ
181	B5	ｵ
182	B6	ｶ
183	B7	ｷ

DEC	HEX	CHR
184	B8	ｸ
185	B9	ｹ
186	BA	ｺ
187	BB	ｻ
188	BC	ｼ
189	BD	ｽ
190	BE	ｾ
191	BF	ｿ
192	C0	ﾀ
193	C1	ﾁ
194	C2	ﾂ
195	C3	ﾃ
196	C4	ﾄ
197	C5	ﾅ
198	C6	ﾆ
199	C7	ﾇ
200	C8	ﾈ
201	C9	ﾉ
202	CA	ﾊ
203	CB	ﾋ
204	CC	ﾌ
205	CD	ﾍ
206	CE	ﾎ
207	CF	ﾏ

** All of the above characters are supported when 8 data bit communication is enabled. Hex codes below 80H are supported by 7 data bit communication.*

TERMINAL MODE - SUPPORTED DISPLAY CHARACTER SET

DEC	HEX	CHR
208	D0	
209	D1	
210	D2	
211	D3	
212	D4	
213	D5	
214	D6	
215	D7	
216	D8	
217	D9	
218	DA	
219	DB	
220	DC	
221	DD	
222	DE	
223	DF	
224	E0	
225	E1	
226	E2	
227	E3	
228	E4	
229	E5	
230	E6	
231	E7	

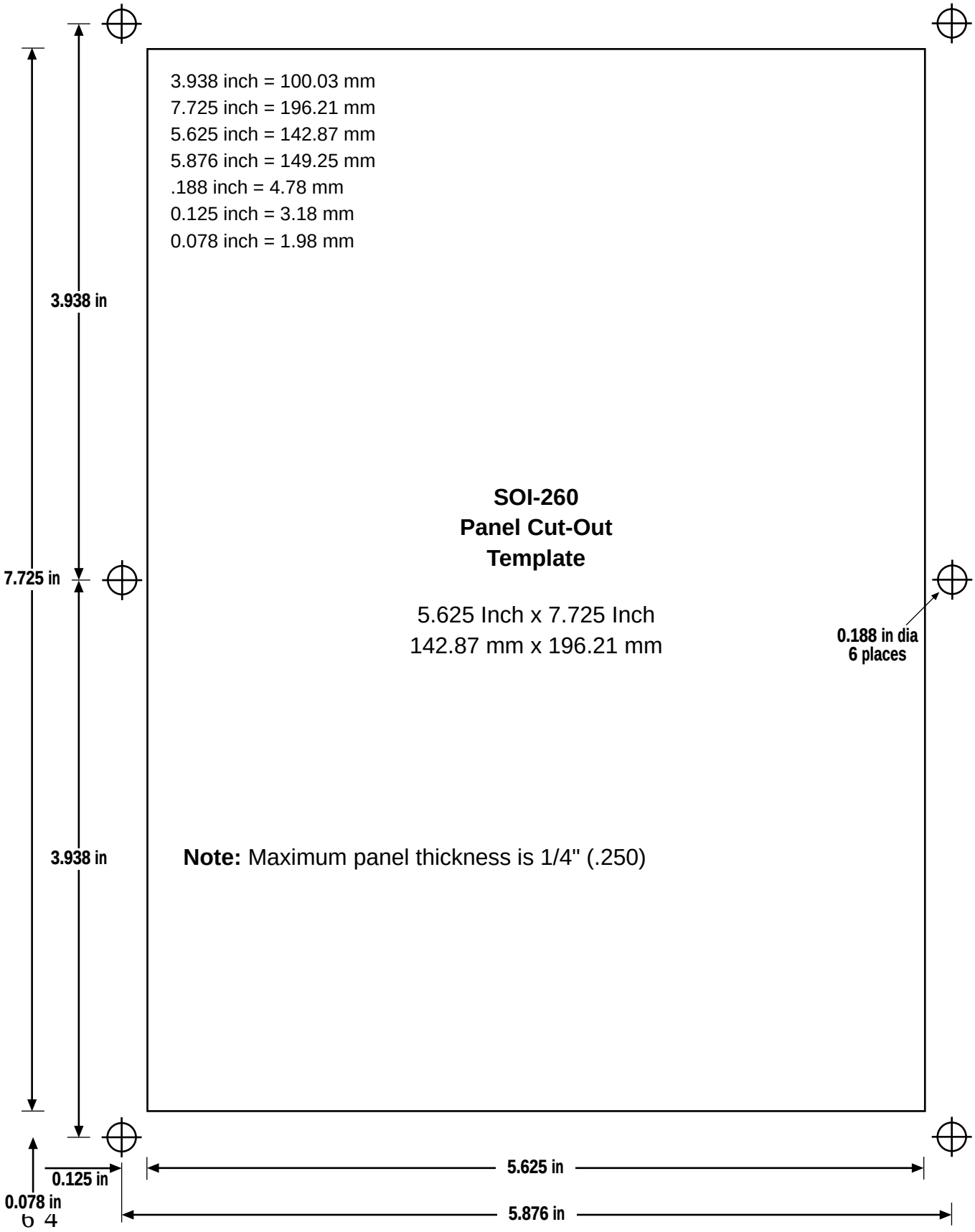
DEC	HEX	CHR
232	E8	
233	E9	
234	EA	
235	EB	
236	EC	
237	FD	
238	EE	
239	EF	
240	F0	
241	F1	
242	F2	
243	F3	
244	F4	Ω
245	F5	
246	F6	
247	F7	
248	F8	
249	F9	
250	FA	
251	FB	
252	FC	
253	FD	÷
254	FE	
255	FF	

** All of the above characters are supported when 8 data bit communication is enabled. Hex codes below 80H are supported by 7 data bit communication.*

Terminal Mode--Screen Control Codes

Hex	Function	Description
08	BS	Back Space
0A	LF	Line Feed
0C	FF	Blanks the screen, moves the cursor to the upper left corner of the display.
0D	CR	Moves the cursor to the extreme left position of the line.

APPENDIX C: SOI-260 TEMPLATE


3.938 inch = 100.03 mm
7.725 inch = 196.21 mm
5.625 inch = 142.87 mm
5.876 inch = 149.25 mm
.188 inch = 4.78 mm
0.125 inch = 3.18 mm
0.078 inch = 1.98 mm
3.938 in
7.725 in
3.938 in
SOI-260
Panel Cut-Out
Template
5.625 Inch x 7.725 Inch
142.87 mm x 196.21 mm
0.188 in dia
6 places
Note: Maximum panel thickness is 1/4" (.250)
0.078 in
0.125 in
5.625 in
5.876 in

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