SIEMENS

SIMATIC TI505

Smart Slice
Discrete I/O Module

User Manual

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Preface

This manual contains instructions for installing, wiring, and operating the SIMATIC® TI505™ Smart Slice Discrete Input/Output (I/O) Module. The module operates with either the SIMATIC® TI560T™/TI565T™ or the SIMATIC® TI545™ Programmable Controller.

References

Refer to the following manuals for instructions on installing, programming, and troubleshooting your Series 505™ equipment.

- *SIMATIC TI545 System Manual*
  (PPX:545–8101–x)

- *SIMATIC TI560T/TI565T System Manual*
  (PPX:560/565–8105–x)

- *SIMATIC® TI505/TI500™ Programming Reference Manual*
  (PPX:505–8104–x)

- *SIMATIC® TI505 TISOFT™ User Manual*
  (PPX:TS505–8101–x)

Agency Approvals

The Series 505 Smart Slice Discrete I/O module meets the standards of the following regulatory agencies.

- Underwriters Laboratories: UL® Listed (Industrial Control Equipment)

- Canadian Standards Association: CSA® Certified (Process Control Equipment)

- Factory Mutual Approved: Class I, Div 2 Hazardous Locations

Series 505 products have been developed with consideration of the draft standard of the International Electrotechnical Commission Committee proposed standard (IEC-65A/WG6) for programmable controllers. Contact Siemens Industrial Automation, Inc., for a listing of the standards to which Series 505 complies.

Telephoning for Assistance

If you need information that is not included in this manual, or if you have problems using the SIMATIC TI505 Smart Slice, contact your Siemens Industrial Automation, Inc. distributor or sales office. If you need assistance in contacting your U.S. sales office, call 1–800–964–4114.

1.1   Features

The SIMATIC TI505 Smart Slice I/O module (shown in Figure 1-1) allows access to input and output points that are not located near a TI500/TI505 base. The module attaches directly to the RS–485 remote I/O link and emulates a remote base. The module has ten inputs and six outputs. Power is derived from field excitation voltage. The PPX:505–9201 operates on 24 VDC; the PPX:505–9202 operates on 110 VAC. See Appendix A for the voltages supported.

Two terminals are provided on a removable connector for each I/O point to eliminate the need for a terminal strip. The sinking inputs have a high-side (line or positive) terminal and the sourcing outputs have a low-side (neutral or negative) terminal. A single replaceable fuse protects all the inputs and outputs. Status indicators are provided for each I/O point, the fuse, remote I/O communications, and module power.

The module appears to the controller as a high-density, 16-point input, 8-point output module. See Chapter 3 for a configuration example.

The module is compatible with TI545 and TI560/TI565 Programmable Controllers (PLCs).
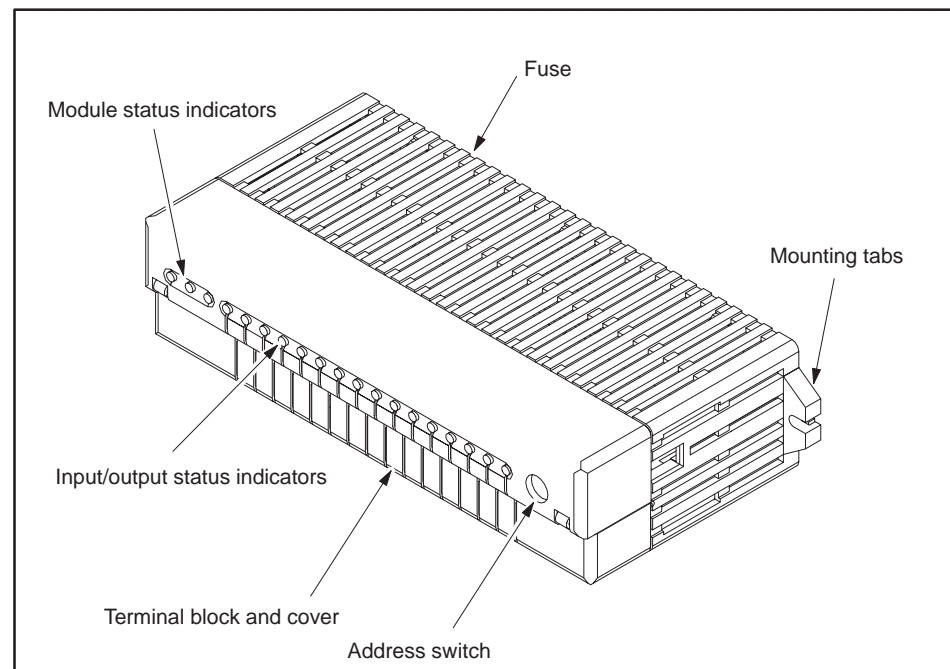
a000626

Figure 1-1   SIMATIC TI505 Smart Slice I/O Module

Installing the Module

2.1   Overview of Installation

Flow of Tasks   Figure 2-1 shows the organization of the tasks described in this chapter.

```
┌─────────────────────────────────────────────────────┐
│                 Set address switch                    │
└─────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────┐
│               Secure module to panel                  │
└─────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────┐
│                 Wire terminal block                   │
└─────────────────────────────────────────────────────┘
                            │
                            ▼
┌─────────────────────────────────────────────────────┐
│                      Power up                         │
└─────────────────────────────────────────────────────┘
```
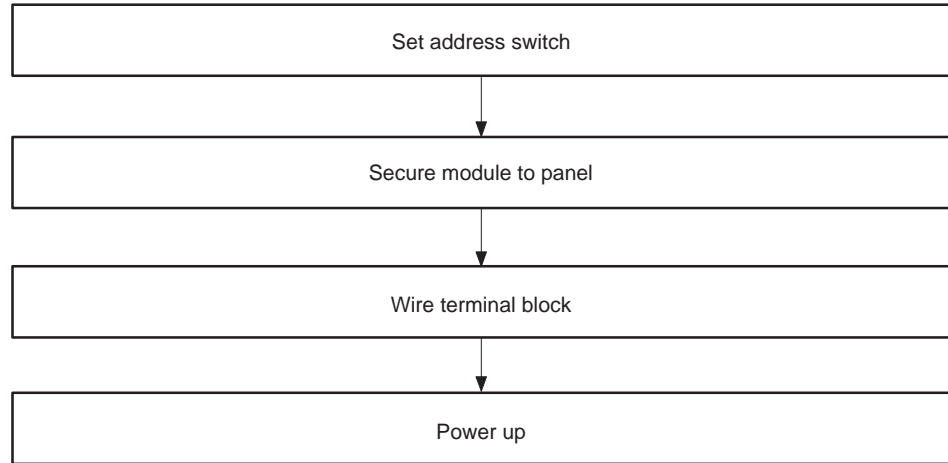
Figure 2-1   Flowchart of Installation

Visual Inspection   If there is any visible damage to the module, contact your Siemens Industrial Automation, Inc. distributor or sales office. If you need assistance in contacting your U.S. sales office, call 1–800–964–4114.

Setting the Address Switch   Use the address switch to assign the address number to the unit for system identification. Each unit must have a unique address number. The switch is labeled 0 through F, hexadecimal. Therefore, a switch number of 5 equals address 5, and a switch number of E equals address 14. An address of 0 is valid only with the TI560/TI565 controller.

⚠ **WARNING**   **To minimize the potential risk of injury to personnel or damage to the system, do not change the unit address switch while the system is operating. Unpredictable behavior may result.**

2.2   Field Wiring Guidelines

⚠ WARNING

To minimize the potential risk of injury to personnel or damage to the system, use supply wires suitable for at least 75° C. Signal wiring connected to this module must be rated at least 300 V.

⚠ *ATTENTION*

Employer des fils d'alimentation pour au moins 75° C. Le cablage de signalisation raccorde dans cette boite doit convenir pour une tension nominale d'au moins 300 V.

Avoiding Noise

To avoid noise problems, follow these guidelines when you install the module.

- Use the shortest possible wires.

- Avoid placing signal wires parallel to high-energy wires. If the two must meet, cross them at right angles.

- Avoid bending the wire into sharp angles.

- Use wireways for wire routing.

- When you use shielded wires, ground them only at the source end for better noise immunity.

- Place wires so that they do not interfere with existing wiring.

2.3   Terminal Block

The module is equipped with a 38-position, removable terminal block. All field wiring is connected to this terminal block. The terminal block accepts wires between 14 and 22 AWG.

The terminal block is covered with a hinged shroud, which has a terminal identification label on the inside. The terminal block is divided into four different sections: power, outputs, inputs, and communication. See Figure 2-4.

⚠ WARNING

To minimize the potential risk of injury to personnel or damage to the system, ensure that all user-supplied wiring is de-energized before attempting to connect to terminal block.

Power

The three leftmost terminals are dedicated to user-supplied power and ground. See Appendix A for the voltages supported.

Outputs

The output load terminals are labeled 1 through 6, while the output return terminals are labeled YC. All the output return terminals are low-side (neutral or negative) terminals, and are connected together inside the module as shown in Figure 2-2.

I003040
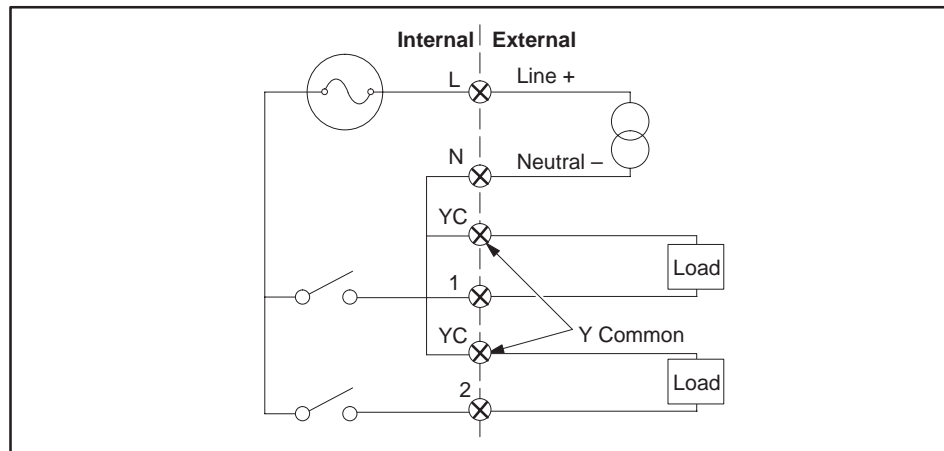
Figure 2-2   Output Wiring

Inputs

The input signal terminals are labeled 1 through 10, while the input source terminals are labeled XC. All the input source terminals are high-side (line or positive) terminals, and are connected together inside the module as shown in Figure 2-3.
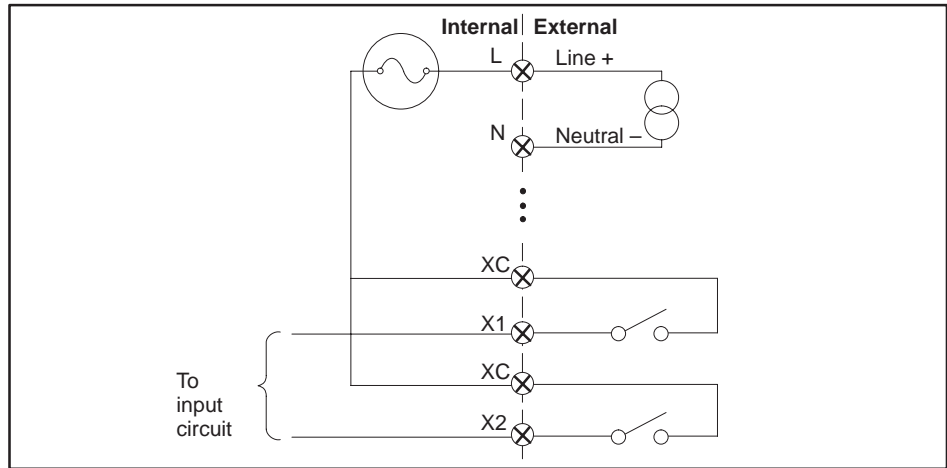
Figure 2-3   Input Wiring

Communication   The three right-most terminals are dedicated to the connection of the RS–485 communication cable that is connected to the system controller. Refer to Section 2.5 for communications cable configuration.
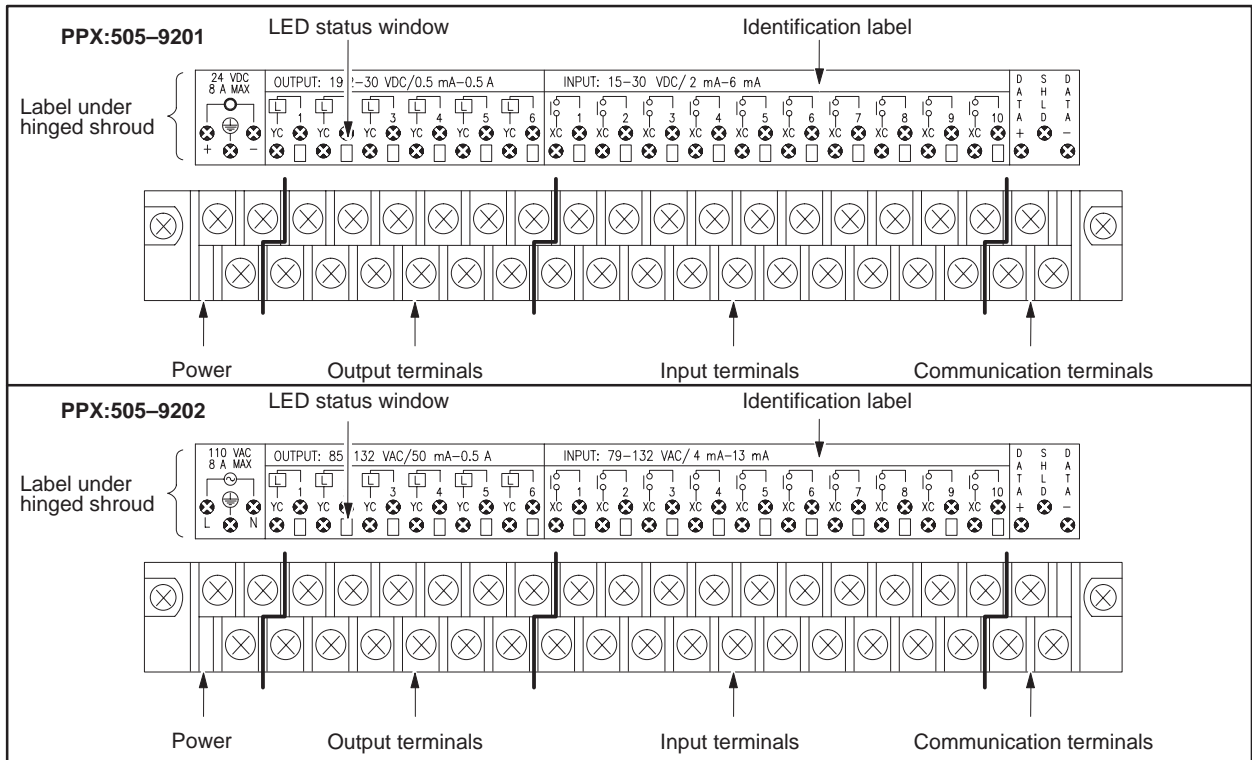
Figure 2-4   Terminal Block

2.4 Mounting the Module

Mounting Tabs Use the mounting tabs to secure the module. The tabs accept #8–32 screws.

Clearance for Cooling Allow one inch of space around the module to allow for sufficient air flow. Figure 2-5 shows mounting dimensions.
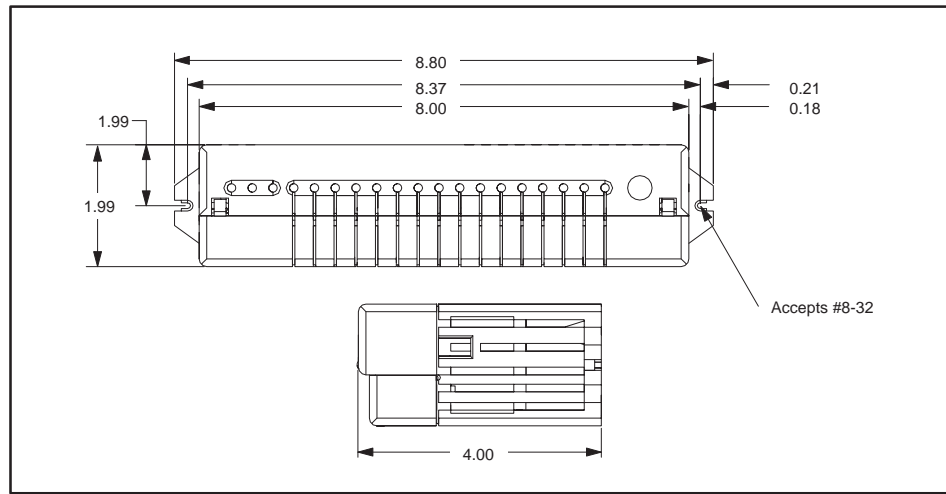
Figure 2-5   Mounting Tabs and Dimensions

2.5   Communications Cable Configuration

Installing Terminating Resistors

Install a terminating resistor across the DATA+ and DATA– terminals. If your application involves a series of Smart Slices, install a terminating resistor on the Smart Slice on the end. If your application uses only one Smart Slice, install a terminating resistor on that one. Refer to your controller user manual for cable installation guidelines and for the resistor values for your cable type.

Connecting the Trunk

You must connect the trunk directly to the Smart Slice. Do not use drop lines to connect to the Smart Slice. Refer to Figure 2-6.
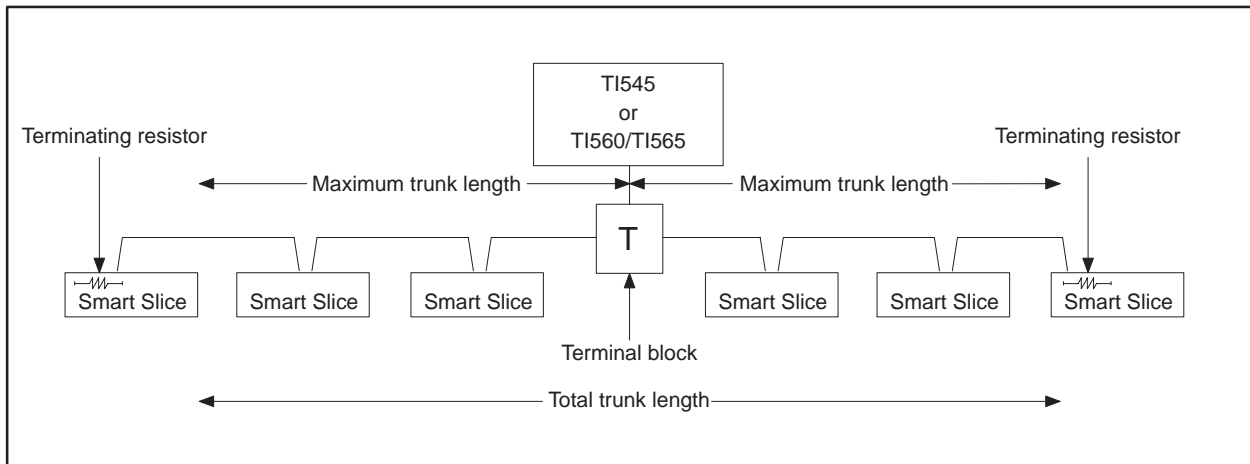
I002749

Figure 2-6   Communications Cable Configuration

Programming and Assigning I/O Points

3.1   Programming the Controller

Refer to the program design manual for your controller for specific details on designing a program.

The Smart Slice appears to the controller as a high-density, 16-point input and 8-point output module as shown in Table 3-1. Since the Smart Slice has 10 inputs and 6 outputs, the balance of 6 input points and 2 output points are not used in the I/O configuration table.

Table 3-1   I/O Configuration

Density	Inputs	Outputs	I/O Points	Values
High	16	8	X1–10 X11–16 Y17–22 Y23–24	Input points 1–10 Not used Output points 1–6 Not used

Table 3-2 shows how the I/O address is determined for a module with the starting address of 81.

Table 3-2   Addressing Example

Program Input Address	Corresponding Module Input Address	Program Output Address	Corresponding Module Output Address
X81	X1	Y97	Y17
X82	X2	Y98	Y18
X83	X3	Y99	Y19
X84	X4	Y100	Y20
X85	X5	Y101	Y21
X86	X6	Y102	Y22
X87	X7		
X88	X8		
X89	X9		
X90	X10		

3.2 Logging the Module into the Controller

Selecting the I/O Definition Chart

Figure 3-1 shows a sample I/O definition chart with a module designated with address 01. Refer to your TISOFT manual for detailed instructions.
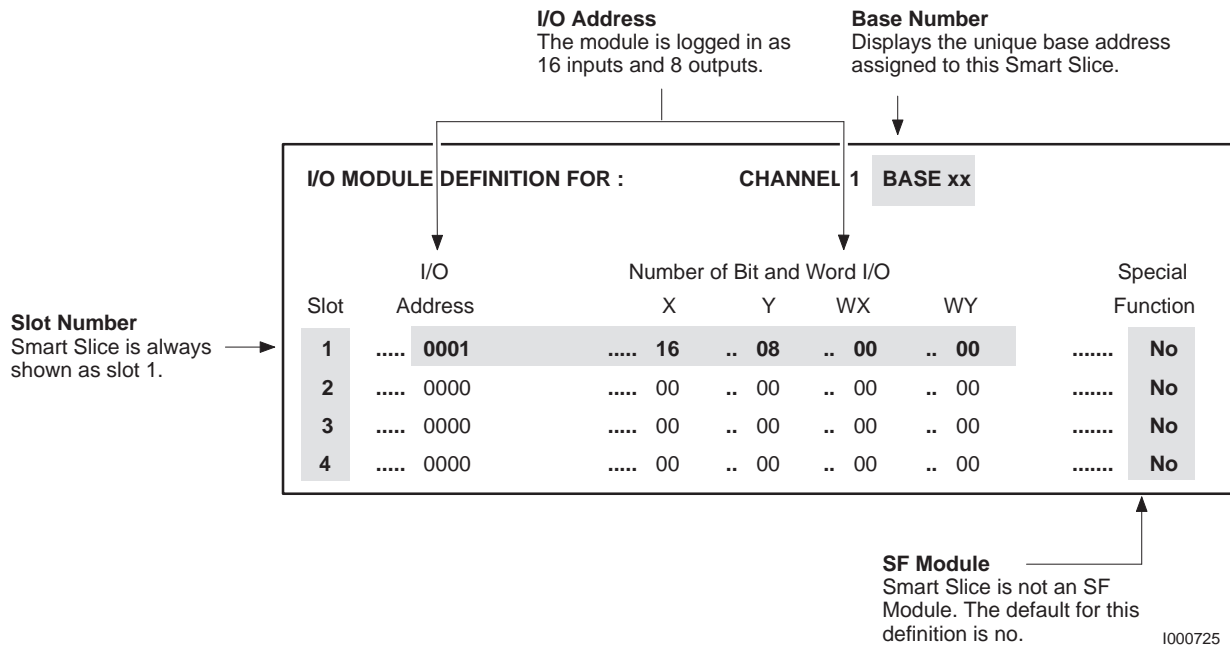
I/O Address
The module is logged in as 16 inputs and 8 outputs.

Base Number
Displays the unique base address assigned to this Smart Slice.

Slot Number
Smart Slice is always shown as slot 1.

I/O MODULE DEFINITION FOR :   **CHANNEL 1**   **BASE xx**

Slot	I/O Address		Number of Bit and Word I/O				Special Function
			X	Y	WX	WY	
1	.....	**0001**	..... **16**	.. **08**	.. **00**	.. **00**	.... **No**
2	.....	0000	 00	.. 00	.. 00	.. 00	.... **No**
3	.....	0000	 00	.. 00	.. 00	.. 00	.... **No**
4	.....	0000	 00	.. 00	.. 00	.. 00	.... **No**

SF Module
Smart Slice is not an SF Module. The default for this definition is no.

I000725

Figure 3-1   Sample I/O Definition Chart

Viewing the I/O Configuration Chart

Use SHOW or a similar menu selection to display the I/O Configuration Chart. The configuration in Figure 3-1 appears as shown in Figure 3-2.

```
          I/O CONFIGURATION CHART FOR CHANNEL . . . 1  BASE . . . . . 01
                                 I/O POINTS

            1        2        3        4        5        6        7        8
SLOT 1    X0001    X0002    X0003    X0004    X0005    X0006    X0007    X0008

            9       10       11       12       13       14       15       16
SLOT 1    X0009    X0010    X0011    X0012    X0013    X0014    X0015    X0016

           17       18       19       20       21       22       23       24
SLOT 1    Y0017    Y0018    Y0019    Y0020    Y0021    Y0022    Y0023    Y0024


SLOT 2


SLOT 3


SLOT 4
```

Figure 3-2   I/O Configuration Chart

Chapter 4
Troubleshooting

4.1   Status Indicators

Module Status Indicators

The MOD GOOD indicator turns on when the module is receiving the correct power.

The COM OK indicator has three modes of operation. When the LED is not on, this indicates that the communication cable is not installed properly or that the controller is not functioning properly. When the LED is blinking, it indicates that the module is not configured properly in the controller. When the LED remains on, this indicates that communication is occurring and that the unit is configured properly.

The FUSE indicator turns on when the fuse is blown. You also can determine the status of the fuses by using RLL to check the module fail bit in the controller. (See your SIMATIC TI505 Programmable Controller manual.)

I/O Status Indicators

There are six output status LEDs. The output status indicators show the status of the output points. When an output point is on, the corresponding LED lights. The output indicators show the status from the logic (controller) side, not the field side.

There are ten input status LEDs. The input status indicators show the status of the input points. When an input point is on, the corresponding LED lights. The input indicators show status from the field side, not the logic (controller) side.

4.2   Replacing the Fuse

⚠WARNING   **To minimize the potential risk of injury to personnel or damage to the system, ensure that all user-supplied power is disconnected from the module before attempting the replace the fuse.**

The fuse is located in the rear of the module, through an access opening. Use an 8 A, 250 VAC 5×20 mm normal-blow replacement fuse. Replace the fuse only when the FUSE indicator is on.

Specifications

Table A-1   Electrical Specifications

Specification	PPX:505–9201	PPX:505–9202
Description	24 VDC, 10 inputs/6 outputs	110 VAC, 10 inputs/6 outputs
Rated voltage	20–30 VDC	90–132 VAC, 47–63 Hz
Input type	Sinking, high-side common	Sinking, high-side common
Input on voltage range	15 VDC min, 30 VDC max	79 VAC min, 132 VAC max
Input on current range	2.0 mA min, 6.0 mA max	4.0 mA min, 13.0 mA max
Input off voltage range	0.0 VDC min, 5.0 VDC max	0.0 VAC min, 20.0 VAC max
Input off current range	0.5 mA max	1.0 mA max
Input delay time	2 ms max	6 ms min, 40 ms max
Output type	Sourcing, low-side common	Sourcing, low-side common
Output current	0.5 A max at 60°C, 1.0 A max at 40°C	0.5 A max at 60°C, 1.0 A max at 40°C
Output temporary overload	3.0 A for 1 ms	5.0 A rms for 2 cycles
Output DV/DT	—	300 V/μs
Output on voltage drop	1.0 VDC	1.4 Vrms at 1.0 A
Output off leakage current	0.02 mA max	2.0 mA max
Output delay time	4.0 ms on-to-off, 2.0 ms off-to-on	11 ms on-to-off, 2.0 ms off-to-on

Table A-2   Environmental Specifications

Wire gauge	14–22 AWG
Spade lug for use with connector	Amp part number 321462
Ring lug for use with connector	Amp part number 327891
Operating temperature	0 to 60°C (32 to 140°F)
Storage temperature	−40 to +70°C (−40 to 158°F)
Relative humidity	5% to 95% noncondensing
Pollution degree	2, IEC 664, 664 A

Vibration	Sinusoidal
	     IEC 68-2-6, Test Fc
	     0.15 mm peak-to-peak, 10–57 Hz;
	     1.0 g, 57–150 Hz
	Random
	     IEC 68-2-34, Test Fdc,
	     equivalent to NAVMAT P–9492
	     0.04 g^2/Hz, 80–350 Hz

Electrostatic discharge	IEC 801, Part 2, Level 4, (15 kV)
Shock	IEC 68-2-27; Test Ea
Noise immunity, conducted	IEC 801, Part 4, Level 3
Noise immunity on user power lines	MIL STD 461B, CS01, CS02, CS06, IEC 255-4, IEEE 472
Noise immunity, radiated	IEC 801, Part 3, Level 3, MIL STD 461B, RS01, RS02, RS03
Corrosion protection	All parts of corrosion-resistant material or plated or painted as corrosion protection
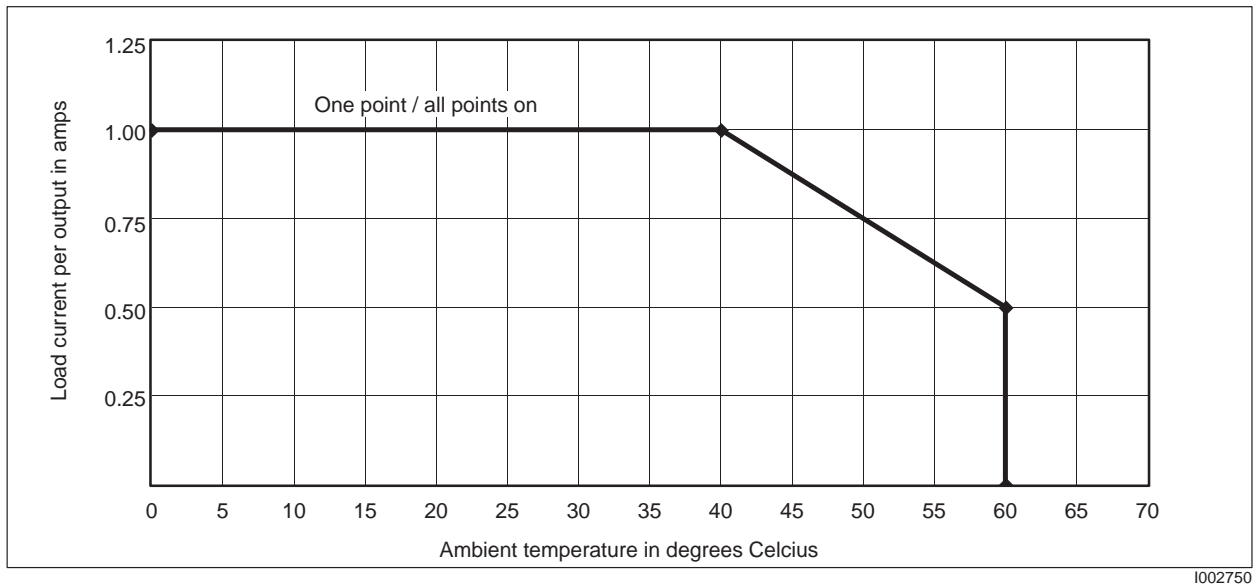
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Figure A-1   Derating for Both Models

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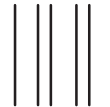**Manual Name:**   SIMATIC TI505 Smart Slice Discrete I/O Module User Manual   **Edition:**   Second
Manual Assembly Number: 2586546-0063   **Date:**   08/93
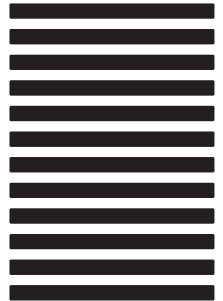**Order Number:**   PPX:505–8105–2

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