List of Tables

Preface

This manual provides the information needed to install, wire, and configure the SIMATIC® TI505™ Input/Output modules listed below.

- Discrete Input Modules (AC Input):
  PPX:505–4008 PPX:505–4016 PPX:505–4032
  PPX:505–4008–A PPX:505–4016–A PPX:505–4032–A
  PPX:505–4208 PPX:505–4216 PPX:505–4232
  PPX:505–4208–A PPX:505–4216–A PPX:505–4232–A
  PPX:505–4408 PPX:505–4416 PPX:505–4432*
  PPX:505–4408–A PPX:505–4416–A PPX:505–4432–A*

- Discrete Input Modules (DC Input):
  PPX:505–4108 PPX:505–4116 PPX:505–4132
  PPX:505–4308 PPX:505–4316 PPX:505–4332
  PPX:505–4316–A

- Discrete Output Modules (DC Sinking):
  PPX:505–3508 PPX:505–3516 PPX:505–3532
  PPX:505–3708* PPX:505–3716* PPX:505–3732*

- Discrete Output Modules (DC Sourcing):
  PPX:505–4508 PPX:505–4516 PPX:505–4532
  PPX:505–4708* PPX:505–4716* PPX:505–4732*

- Discrete Output Modules (AC Output):
  PPX:505–4608 PPX:505–4616 PPX:505–4632
  PPX:505–4808* PPX:505–4816* PPX:505–4832*

- Relay Output Modules:
  PPX:505–4908 PPX:505–4916 PPX:505–4932*
  PPX:505–5417
  PPX:505–5518

- Word Input Module:
  PPX:505–6308*

- Word Output Module:
  PPX:505–6408*

- Input Simulator:
  PPX:505–6010

- Output Simulator
  PPX:505–6011

* double-wide

1.1 Module Descriptions

Discrete Input/Output Modules

The 505 Discrete Input and Discrete Output modules (see Figure 1-1) contain 8-, 16- or 32- input or output circuits and can accept AC or DC voltage, depending on the model. (See Appendix A for model numbers and number of input or output points.)

Both the input and output circuits are grouped into four commons for each module. (Isolation is provided between each of the four commons. See Appendix A for isolation specifications.)

The Discrete Input modules are particularly valuable in areas where applications such as limit switches or pushbuttons are needed.

The Discrete AC Output modules are equipped with heavy-duty triacs, without zero cross circuits, to give a faster turn-on response.

Relay Output Modules

The 505 Relay Output Modules (see Figure 1-1) may contain 8-, 16- or 32-output points. (See Appendix A for number of points contained in each model.) These modules are particularly valuable for applications where:

- A “no leakage” output is mandatory in the off-state condition.
- Load currents must be isolated.
- A mixture of voltages must be connected to the same module (for example, 24 VDC and 24 VAC).

The 16- and 32- point relay modules are equipped with four isolated commons, and can switch either AC or DC power at each common. The 8-point module is equipped with 8 isolated commons (one for each point), and can switch either AC or DC power at each point. These modules are less susceptible than other DC-type modules to inductive load transients when the outputs are turned on or off.

The 32- and 16- point modules (PPX:505–4932 and PPX:505–4916) provide normally open (Form-A) contacts, while the 8-point module (PPX:505–4908) provides both normally open and normally closed contacts (Form-C). The PPX:505–5417 and PPX:505–5518 provide both normally open and normally closed contacts (Form-C).

The PPX:505–5518 module provides snubbers on the normally open contacts. This snubber should be used with inductive loads to extend the contact life. The snubber is composed of a series 330 Ω resistor and a 0.1 μf capacitor. If the load requires a “dry contact” relay then the snubber can be disconnected. To connect the snubber, move the shorting plug associated with the output point, to on. For example, for a normally open output 5 the snubber is controlled by E5. See Figure 3-14 for a typical connection.

Relay Output Modules

The 8-point Relay Output Module (PPX:505–4908) is equipped with one fuse for each point. The 16-point Relay Output Modules (PPX:505–5417 and PPX:505–5418) are equipped with one fuse for each common (4 fuses). See Figure 1-1. Table 1-3 lists the fuses, their ratings, and spare part numbers. The fuses are located on the PCB and can be accessed by removing the module from the base.

The 16-point (PPX:505–4916) and 32-point (PPX:505–4932) modules are not fuse-protected.

⚠WARNING

Disable all power to the module and base before attempting to replace a fuse. Failure to do so may result in injury to personnel or damage to equipment.

⚠CAUTION

The fuse protects the PCB and minimizes the risk of fire in case of an overload. The fuse does not always protect the output circuit.

Table 1-3 Agency-Approved Fuses for Relay Output Modules

Module	UL/CSA
PPX:505-4908	3 A 125 V Normal Blow 1.25″ x .25″ SS2-3 A San-O Ind. Corp. or equivalent (2587679–8006)
PPX:505-5417	4 A 250 V Fast Blow 1.25″ x .25″ SS2-4 A San-O Ind. Corp. or equivalent (2587679–8016)
PPX:505-5518	8 A 250 V Fast Blow 1.25″ x .25″ AGC-8 Cooper Industries or equivalent (2587679–8017)

Table 3-12 Terminal Block Pin-out: 16-Point Relay Output Module (PPX:505–4916)

User Connection	LED	User Connection	LED
AR = Common for 1–4	–	AC = Common for 5–8	–
A1 = N/O* 1	A1	A5 = N/O 5	B1
A2 = N/O 2	A2	A6 = N/O 6	B2
A3 = N/O 3	A3	A7 = N/O 7	B3
A4 = N/O 4	A4	A8 = N/O 8	B4
BR = Not Used	–	BC = Not Used	–
B1 = Not Used	–	B5 = Not Used	–
B2 = Not Used	–	B6 = Not Used	–
B3 = Not Used	–	B7 = Not Used	–
B4 = N/O 9	C1	B8 = N/O 13	D1
CR = N/O 10	C2	CC = N/O 14	D2
C1 = N/O 11	C3	C5 = N/O 15	D3
C2 = N/O 12	C4	C6 = N/O 16	D4
C3 = Not Used	–	C7 = Not Used	–
C4 = Not Used	–	C8 = Not Used	–
DR = Not Used	–	DC = Not Used	–
D1 = Not Used	–	D5 = Not Used	–
D2 = Common for 9–12	–	D6 = Common for 13–16	–
D3 = Not Used	–	D7 = Not Used	–
D4 = User Coil Power (+)	–	D8 = User Coil Power (–)	–

* N/O = Normally Open

Relay Output Modules

Table 4-2 shows symptoms, probable causes, and corrective actions to take if the relay modules are not operating correctly.

Table 4-2 Troubleshooting Chart for Relay Output Modules

Symptom	Probable Cause	Corrective Action
Module LED is not lit	Not receiving power	Check power supply and connections.
	Not configured	Configure I/O.
	Faulty LED	Return the module for repair
Outputs not on	Wrong terminal block connections	Trace wiring connections.
	Not receiving coil power	Check coil power connections.
	Blown fuse (PPX:505–4908 PPX:505–5417 and PPX:505–5518)	Check for overvoltage or reversed polarity. Replace the fuse. *
	Not configured	Configure I/O.
	Relay damaged	Replace relay ** (PPX:505–4932 only)
		Return the module for repair. (PPX:505–4908, PPX:505–4916, PPX:505–5417, and PPX:505–5518)
Nonfatal error as a result of the module	Module configured incorrectly	Re-configure the module.

* See Section 4.2.

** See Section 4.3.

A.1 Environmental Specifications

Table A-1 Environmental Specifications (Discrete I/O, Relay Output and Word I/O Modules)

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% non-condensing
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 Hz to 350 Hz, 3dB/Octave rolloff 80 – 20 Hz, 350 – 2000 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, and CS06 per part 4, IEC 255-4, Appendix E; IEEE 472, 2.5 kV; EEC 4517
Noise immunity, radiated	IEC 801, Part 3, Level 3; MIL STD 461B RS01 &RS02
Corrosion protection	All parts of corrosion-resistant material or plated or painted as corrosion protection

* Note: 6 kV to terminals on PPX:505–49xx Modules

Table A-2 Isolation

Discrete Input and Output Modules	1500 Vrms, input-to-controller 500 Vrms, common-to-common
Relay Output Modules (PPX:505–4908, PPX:505–4916, PPX:505–4932, PPX:505–5417, and PPX:505–5518)	1500 Vrms, input-to-controller 1500 Vrms, common-to-common 1500 Vrms, coil-to-contact
Word Input and Output Modules (PPX:505–6308 and PPX:505–6408)	1500 Vrms, input/output-to-controller

Relay Output Modules

Table A-13 contains the electrical specifications for the 505 Relay Output Modules and Figure A-11 shows the derating curves for the same.

⚠CAUTION

The Relay Output Module may be damaged if more than one channel is overloaded at the same time, or if the temporary overload specification is exceeded.

Table A-13 Electrical Specifications for Relay Output Modules (PPX:505–49xx)

Model Number	No. of Outputs	Module Width
PPX:505–4908	8	Single-wide
PPX:505–4916	16	Single-wide
PPX:505–4932	32	Double-wide

Rated Voltage Range	24–230 VAC, 6–24 VDC
Operating voltage range	20–265 VAC, 4.5–30 VDC
Temporary overload	5.0 A for 1 ms (See Caution)
Max. off-state leakage current	0.0 mA
Total relay contact resistance	250 milliohms for PPX:505–4916 and –4932 300 milliohms for PPX:505–4908
Max. Delay time through module	10 ms on to off 10 ms off to on
Max. module power from base	2.5 W
Output fuse for PPX:505–4908 (1 fuse per common)	3 A, 250 V 1.25″ x 0.25″, normal blow
Type of contact	Form-A for PPX:505–4916 and –4932 Form-C for PPX:505–4908
Type of outputs	Non-latching type, unprotected
Repetition rate	6 Hz max.
User Power Supply	21.6 – 26.4 V @ 80 mA for the PPX:505–4908 160 mA for the PPX:505–4916 300 mA for the PPX:505–4932
Life cycles (@ 1 Hz repetition rate)	@ Full rated current 100,000 @ 0.5 A for PPX:505–4916 and –4932 300,000 @ 0.5 A for PPX:505–4908 500,000 @ 0.1 A for PPX:505–4908, –4916, and –4932 1,000,000

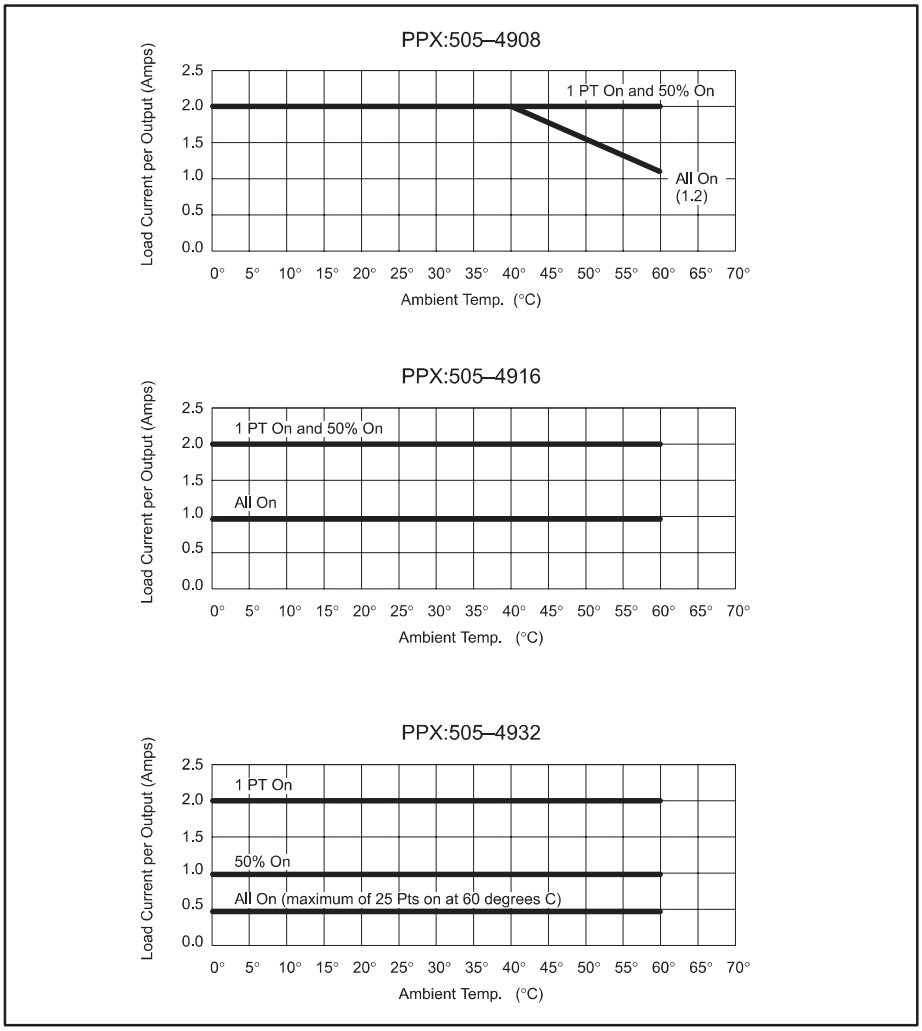

Figure A-11 Derating Curves for PPX:505–49xx

These modules in Table A-14 can be used with inductive loads at the following ratings:

Table A-14 Pilot Duty Ratings at 60°C Ambient

Load Type	PPX:505–4932	PPX:505–4916	PPX:505–4908
1 point on AC	1.0 A	1.0 A	2.0 A
1 point on DC	0.88 A	0.88 A	1.44 A