

LISTEN.
THINK.
SOLVE.®

SLC 500 SYSTEMS

SELECTION GUIDE



BULLETIN 1746 AND 1747



Benefits

Powerful, yet affordable - SLC 500 programmable controllers provide excellent value with extensive capabilities to address a broad range of applications including material handling, HVAC control, high speed assembly operations, small process control, simple motion control, and SCADA.

Modularity - Modular processes, power supplies, I/O, memory options, and communication interfaces allow for a configurable and expandable system. Configure your system for the number of I/O, the amount of memory, and the communication networks needed. Later, you can expand the system by adding I/O, memory, or communication interfaces.

Advanced instruction set - Includes indirect addressing, high level math capability, and a compute instruction.

Communication network versatility - Choose from on-board Ethernet, DH+, or DH-485, as well as options for ControlNet, DeviceNet, or Remote I/O communications.

Broad selection of I/O - Select from over 60 modules to control discrete, analog, and temperature signals. Third-party specialty modules are also available from Encompass partners to customize control solutions for your application needs.

Industrially hardened product - Designed to withstand the vibrations, thermal extremes, and electrical noise associated with harsh industrial environments.

Windows programming software - RSLogix 500 programming software maximizes productivity by simplifying program development and troubleshooting.

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SLC 500 System Overview

The Allen-Bradley SLC 500 is a small chassis-based family of programmable controllers, discrete, analog, and specialty I/O, and peripheral devices. The SLC 500 family delivers power and flexibility with a wide range of communication configurations, features, and memory options. The RSLogix 500 ladder logic programming package provides flexible editors, point-and-click I/O configuration, and a powerful database editor, as well as diagnostic and troubleshooting tools to help you save project development time and maximize productivity.



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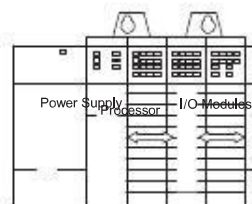
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Typical Systems

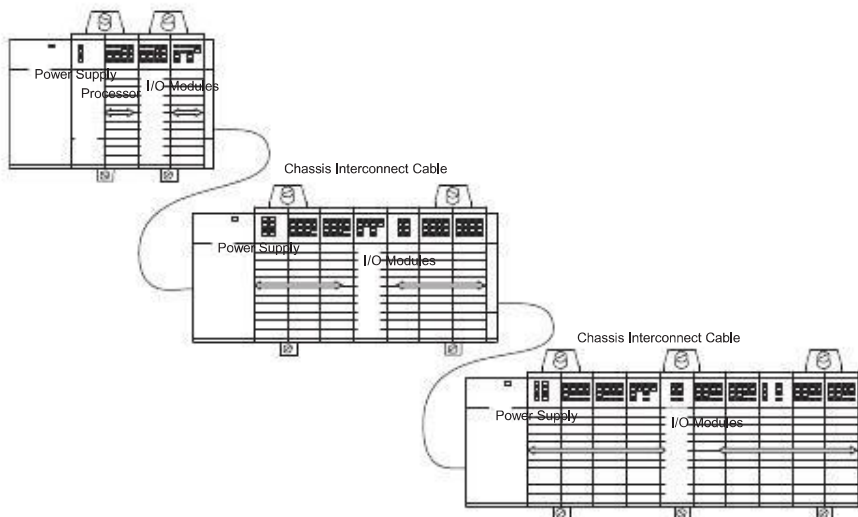
With up to 64 K of configurable data/program memory available and over 60 types of I/O modules, as well as a choice of networking options, the SLC system provides a powerful solution for stand-alone or distributed industrial control.

Local Systems

At minimum, a modular hardware SLC 500 control system consists of a processor module and I/O modules in a single 1746 chassis with a power supply.



You can configure a system with one, two, or three local chassis, for a maximum total of 30 local I/O or communication modules. You connect multiple local chassis together with chassis interconnect cables to extend the backplane signal lines from one chassis to another.



Distributed Systems

More complex systems can use:

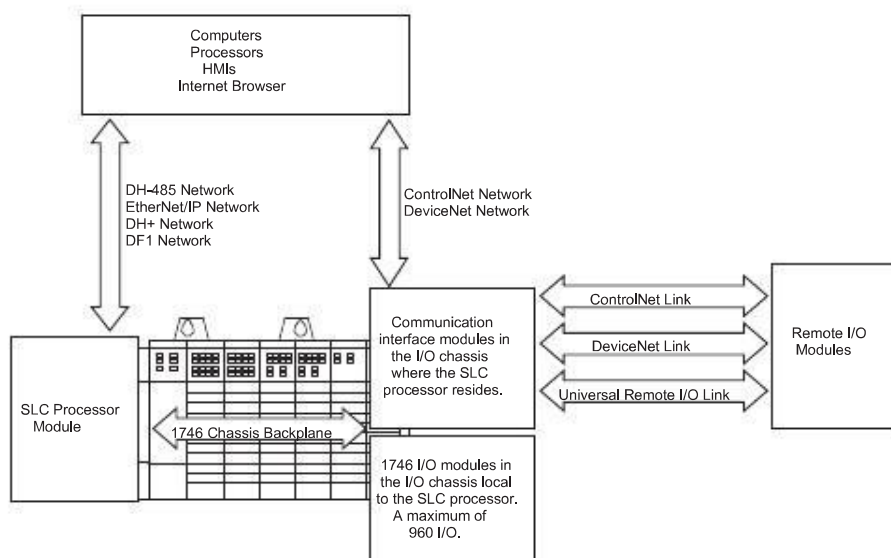
- distributed I/O.

- multiple controllers joined across networks.

- I/O in multiple platforms that are distributed in many locations and connected over multiple I/O links.

Choose the processor module with the on-board communication ports you need. You optionally add modules to provide additional communication ports for the processor. For I/O in locations remote from the processor, you can choose between a ControlNet, DeviceNet, or Universal I/O link. A communication interface module is required in both the local and remote chassis.

Depending upon the communication ports available on your particular SLC control system, you can select operator interfaces that are compatible.



Laying Out the System

Lay out the system by determining the amount of I/O necessary, the network configurations, and the placement of components in each location. Decide at this time

whether each chassis will have its own controller or a networked solution.

SLC 500 processors are available with a large range of memory sizes (1 K through 64

K) and can control up to 4096 input and 4096 output signals. All modular processors except the SLC 5/01 processor are capable of controlling remotely located I/O. By adding an I/O scanner module, you can use these processors to control/monitor these

remotely located I/O across ControlNet, DeviceNet, and Universal Remote I/O links.

SLC 500 processors are single-slot modules that you place into the left-most slot of a 1746 I/O chassis. For I/O in a location remote from the processor, the I/O adapter is a single-slot module that you place in the left-most slot of the I/O chassis. SLC 500 modular systems provide separate power supplies which must be mounted directly on the left end of the 1746 I/O chassis.

The 1746 I/O chassis are designed for back-panel mounting and available in sizes of

4, 7, 10, or 13 module slots. The 1746 I/O modules are available in densities up to a maximum of 32 channels per module.

Communications

Evaluate what communications need to occur. Knowing your communications requirements will help you determine which processor and which communications devices your application might require.

An SLC processor communicates across the 1746 backplane to 1746 I/O modules in the same chassis in which the processor resides. Various models of SLC processors have various on-board ports for communication with other processors or computers.

Also, separate modules are available to provide additional communication ports for communication with other processors, computers, and remotely located I/O. Each processor has one or two built-in ports for either EtherNet/IP, DH+, DH-485, or RS-232 (DF1, ASCII, or DH-485 protocol) communication.

In addition to the on-board ports available with SLC processors, you have the option of providing another communication port for an SLC processor by adding a communication module.

Adapter modules for 1746 I/O are available for ControlNet and Universal Remote I/O links. An I/O adapter module in a chassis with I/O modules interfaces the I/O modules with the I/O link for communication with a scanner port for a processor at another location.

SLC 500 Common Specifications

The following specifications apply to all SLC 500 modular components unless noted.

Description	Specification
Temperature	Operating: 0...60 °C (32...140 °F)
	Storage: -40...85 °C (-40...185 °F)
Humidity	5...95% without condensation
Vibration	Operating: 1.0 g at 5...2000 Hz
	Non-operating: 2.5 g at 5...2000 Hz
Shock	Operating: 30 g (3 pulses, 11 ms) - for all modules except relay contact
	Operating: 10 g (3 pulses, 11 ms) - for relay contact modules 1746-OWx and 1746-IOx combo
	Non-operating: 50 g, 3 pulses, 11 ms
Free fall (drop test)	Portable, 2,268 kg (5 lb) or less at 0,762 m (30 in.), six drops
	Portable, 2,268 kg (5 lb) or less at 0,1016 m (4 in.), three flat drops
Safety	Dielectric Withstand: 1500V ac (Industry Standard - UL 508, CSA C22.2 No. 142)
	Isolation between Communication Circuits: 500V dc
	Isolation between Backplane and I/O: 1500V ac
	Flammability and Electrical Ignition: UL94V-0
Certification * or (when product or packaging is marked)	UL Listed Industrial Control Equipment for Class I, Division 2, Groups A, B, C, D Hazardous Locations
	C-UL Listed Industrial Control Equipment for Class I, Division 2, Groups A, B, C, D Hazardous Locations
	CE, European Union 89/336/EEC EMC Directive, compliant with: EN50082-2 Industrial Immunity EN50081-2 Industrial Emissions
	EN61000-6-2 Industrial Immunity EN61000-6-4 Industrial Emissions
	European Union 73/23/EEC LVD Directive, compliant with safety-related portions of: EN61131-2 Programmable Controllers
	C-Tick, Australian Radio Communications Act, compliant with: AS/NZS 2064 Industrial Emissions

* See the Product Certification link at <http://ab.com> for Declarations of Conformity, Certificates, and other certification details.

SLC 500 System Selection Checklist

Use the following Checklist as a guide to completing your own system specification.

Step	See
1 Select I/O Modules	page 8
consider using an interface module or pre-wired 1492 cables	page 33
use a spreadsheet to record your selections	page 85
2 Select Communication Modules/Devices	page 39
determine your network communication requirements and select the necessary communication modules/devices	page 40
include appropriate communication cables	page 58
record your module/device selections on the system spreadsheet	page 85
3 Select an SLC 500 Processor	page 59
choose a processor based on memory, I/O, performance, programming requirements, and communication options	
4 Select an SLC 500 Chassis	page 64
determine the number of chassis and any interconnect cables required based on the physical configuration of your system	
5 Select an SLC 500 Power Supply	page 68
use the power supply loading worksheet to ensure sufficient power for your system	page 88
consider future system expansion when selecting a power supply	
6 Select Programming Software	page 78
select the appropriate package of RSLogix 500 Programming Software for your application	

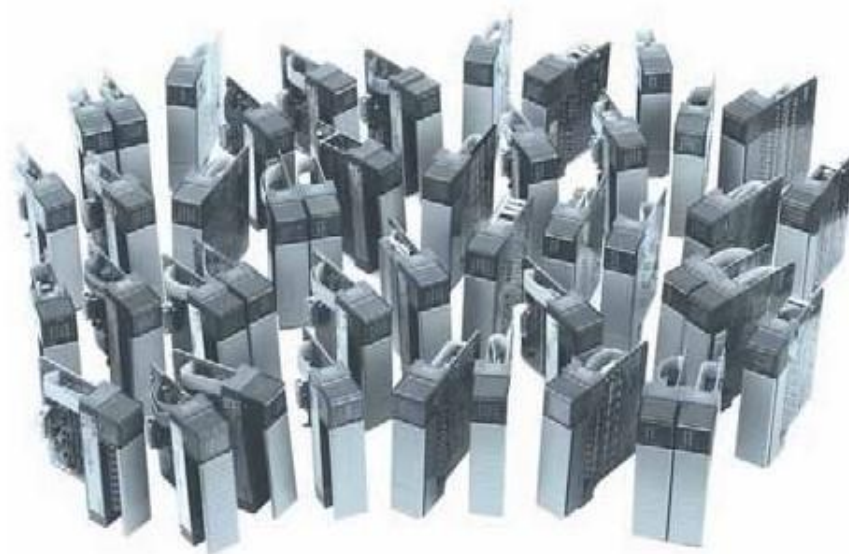
Step 1 - Select:

I/O modules - available in a variety of densities and voltage options. Some modules have diagnostic features, individually isolated inputs/outputs or electronic protection.

interface modules (IFMs) or pre-wired cables (optional)

Selecting SLC 500 I/O Modules

Digital I/O modules, analog I/O modules, and specialty temperature, counting, process control, and BASIC language modules are available to help you create a custom solution for your application.



1746 Digital I/O Modules

Digital I/O modules are available with 4, 8, 16, or 32 channels and in a wide variety of I/O voltages (including AC, DC, and TTL). Combination modules with 2 inputs/2 outputs, 4 inputs/4 outputs, and 6 inputs/6 outputs are also available.

Terminals on the 4, 8, 12, and 16-channel modules have self-lifting pressure plates that accept two 14 AWG (2 mm²) wires. LED indicators on the front of each module display the status of each I/O point.

32-channel I/O modules are equipped with a 40-pin, MIL-C-83503 type header and a removable wiring connector (1746-N3). The connector can be assembled with the wire type and length of your choice.

Output modules are available with solid-state AC, solid-state DC, and relay contact type outputs. High current solid-state output modules, catalog numbers 1746-OBP16, -OVP16, and -OAP12, have fused commons with a blown fuse LED indication. The 1746-OB16E, -OB6EI, and -OB32E modules provide electronic protection from short circuit and overload conditions.

Wiring of 16 and 32-channel modules can also be accomplished with a bulletin 1492 interface module and pre-wired cable. All 16-channel I/O modules and catalog numbers 1746-OX8, -OBP8, -OAP12, 1746-IO12 are equipped with color-coded removable terminal blocks.

Digital I/O Module Overview

Cat. No.	Voltage Category	I/O Points	Description	For Detailed Specifications, See
DC Modules				
1746-IB8	24V dc	8	Current Sinking DC Input Module	page 10 Sinking DC Input Modules
1746-IB16	24V dc	16	Current Sinking DC Input Module	
1746-IB32	24V dc	32	Current Sinking DC Input Module	
1746-ITB16	24V dc	16	Fast Response DC Sinking Input Module	
1746-IC16	48V dc	16	Current Sinking DC Input Module	
1746-IH16	125V dc	16	Current Sinking DC Input Module	page 10 Sourcing DC Input Modules
1746-IV8	24V dc	8	Current Sourcing DC Input Module	
1746-IV16	24V dc	16	Current Sourcing DC Input Module	
1746-IV32	24V dc	32	Current Sourcing DC Input Module	
1746-ITV16	24V dc	16	Fast Response DC Sourcing Input Module	
1746-IG16	5V dc	16	Current Sourcing TTL Input Module	page 11 Sourcing DC Output Modules
1746-OB6EI	24V dc	6	Electronically Protected Isolated Sourcing DC Output Module	
1746-OB8	24V dc	8	Current Sourcing DC Output Module	
1746-OB16	24V dc	16	Current Sourcing DC Output Module	
1746-OB16E‡	24V dc	16	Electronically Protected Current Sourcing DC Output Module	
1746-OB32	24V dc	32	Current Sourcing DC Output Module	page 11 Sinking DC Output Modules
1746-OB32E	24V dc	32	Electronically Protected Current Sourcing DC Output Module	
1746-OBP8‡	24V dc	8	High Current Sourcing DC Output Module	
1746-OBP16 *	24V dc	16	High Current Sourcing DC Output Module	
1746-OV8	24V dc	8	Current Sinking DC Output Module	
1746-OV16	24V dc	16	Current Sinking DC Output Module	page 11 Sinking DC Output Modules
1746-OV32	24V dc	32	Current Sinking DC Output Module	
1746-OVP16 *	24V dc	16	High Current Sinking DC Output Module	
1746-OG16	5V dc	16	Current Sinking TTL Output Module	
AC Modules				
1746-IA4	100/120V ac	4	120V ac Input Module	page 12 AC Input Modules
1746-IA8	100/120V ac	8	120V ac Input Module	
1746-IA16	100/120V ac	16	120V ac Input Module	
1746-IM4	200/240V ac	4	240V ac Input Module	
1746-IM8	200/240V ac	8	240V ac Input Module	
1746-IM16	200/240V ac	16	240V ac Input Module	page 12 AC Output Modules
1746-OA8	120/240V ac	8	120/240V ac Output Module	
1746-OA16	120/240V ac	16	120/240V ac Output Module	
1746-OAP12 *	120/240V ac	12	High Current 120/240V ac Output Module	
AC/DC Modules				
1746-IN16	24V ac/dc	16	24V ac/dc Input Module	page 12 AC Input Modules
1746-OW4 *	ac/dc Relay	4	Relay (Hard Contact) Output Module	page 13 Relay Output Modules
1746-OW8 *	ac/dc Relay	8	Relay (Hard Contact) Output Module	
1746-OW16 *	ac/dc Relay	16	Relay (Hard Contact) Output Module	
1746-OX8 *	ac/dc Relay	8	Isolated Relay Output Module	page 14 Combination I/O Modules
1746-IO4 *	120V ac (Inputs) 100/120V ac (Relay Contact Outputs)	2 In 2 Out	Combination Input/Output Module	
1746-IO8 *	120V ac (Inputs) 100/120V ac (Relay Contact Outputs)	4 In 4 Out	Combination Input/Output Module	
1746-IO12 *	120V ac (Inputs) 100/120V ac (Relay Contact Outputs)	6 In 6 Out	Combination Input/Output Module	
1746-IO12DC‡	24V dc (Inputs) 100/120V ac (Relay Contact Outputs)	6 In 6 Out	Combination Input/Output Module	

* Certified for Class 1, Division 2 hazardous location by C-UL only.
Not CE marked.

Sinking DC Input Modules

Specifications	1746-IB8	1746-IB16	1746-IB32	1746-IC16	1746-IH16	1746-ITB16
Number of Inputs	8	16	32	16	16	16
Points Per Common	8	16	8	16	16	16
Voltage Category	24V dc			48V dc	125V dc	24V dc
Operating Voltage Range	10...30V dc		15...30V dc @ 50 °C (122 °F) 15...26.4V dc @ 60 °C (140 °F)	30...60V dc @ 55 °C (131 °F) 90...146V dc * 30...55V dc @ 60 °C (140 °F)		10...30V dc
Backplane Current (mA) at 5V	50 mA	50 mA	50 mA	50 mA		
Backplane Current (mA) at 24V	0 mA	0 mA	0 mA	0 mA	0 mA	0 mA
Voltage, Off-State Input, Max	5.0V dc			10.0V dc	20.0V dc	5.0V dc
Nominal Input Current	8 mA @ 24V dc		5.1 mA @ 24V dc	4.1 mA @ 48V dc	2.15 mA @ 125V dc 2.25 mA @ 132V dc	8 mA @ 24V dc
Current, Off-State Input, Max	1 mA		1.5 mA		0.8 mA	1.5 mA
Signal On Delay, Max	8 ms max		3 ms max	4 ms max	9 ms max	0.30 ms max
Signal Off Delay, Max	8 ms max		3 ms max	4 ms max	9 ms max	0.50 ms max

* Max. Points ON Simultaneously: 16 @ 146V dc and 30 °C (86 °F); 12 @ 146V dc and 50 °C (122 °F); 14 @ 132V dc and 55 °C (131 °F); 16 @ 125V dc and 60 °C (140 °F)

If the input module is connected in parallel with an inductive load, use surge suppression across the load to protect the input module from damage caused by reverse voltage. Refer to the SLC 500 Modular Hardware Style User Manual, publication 1747-UM011, for more information on surge suppression.

Sourcing DC Input Modules

Specifications	1746-IG16	1746-IV8	1746-IV16	1746-IV32	1746-ITV16
Number of Inputs	16	8	16	32	16
Points Per Common	16	8	16	8	16
Voltage Category	5V dc	24V dc	24V dc	24V dc	24V dc
Operating Voltage Range	4.5...5.5V dc *	10...30V dc		15...30V dc @ 50 °C (122 °F) 15...26.4V dc @ 60 °C (140 °F)	10...30V dc
Backplane Current (mA) at 5V	140 mA	50 mA	85 mA	50 mA	85 mA
Backplane Current (mA) at 24V	0 mA	0 mA	0 mA	0 mA	0 mA
Voltage, Off-State Input, Max	2...5.5V dc	5.0V dc	5.0V dc	5.0V dc	5.0V dc
Nominal Input Current	3.7 mA @ 5V dc	8 mA @ 24V dc		5.1 mA @ 24V dc	8 mA @ 24V dc
Current, Off-State Input, Max	4.1 mA	1 mA		1.5 mA	1.5 mA
Signal On Delay, Max	0.25 ms max	8 ms max		3 ms max	0.30 ms max
Signal Off Delay, Max	0.50 ms max	8 ms max		3 ms max	0.50 ms max

* 50 mV peak-to-peak ripple (max.)

Typical signal delay for this module: ON = 0.1 ms, OFF = 0.25 ms @ 24V dc.

Sinking DC Output Modules

Specifications	1746-OG16	1746-OV8	1746-OV16	1746-OV32	1746-OVP16
Number of Outputs	16	8	16	32	16
Points Per Common	16	8	16	16	16
Voltage Category	5V dc	24V dc			
Operating Voltage Range	4.5...5.5V dc*	10...50V dc			
Backplane Current (mA) at 5V	180 mA	135 mA		5...50V dc	20.4...26.4V dc
Backplane Current (mA) at 24V	0 mA	0 mA	270 mA	190 mA	250 mA
Voltage Drop, On-State Output, Max	—	1.2V @ 1.0 A	0 mA	0 mA	0 mA
Load Current, Min.	0.15 mA	1 mA	1.2V @ 0.5 A	1.2V @ 0.5 A	1.0 V @ 1.0 A
Leakage Current, Off-State Output, Max	1 mA	1 mA	1 mA	1 mA	1 mA
Signal On Delay, Max (resistive load)	0.26 ms	0.1 ms	1 mA	1 mA	1 mA
Signal Off Delay, Max (resistive load)	50 ms	1.0 ms	0.1 ms	0.1 ms	0.1 ms
		8.0 A @ 30 °C (86 °F)	1.0 ms	1.0 ms	1.0 ms
		4.0 A @ 60 °C (140 °F)		8.0 A @ 0...60 °C (32...140 °F)	6.4 A @ 0...60 °C (32...140 °F)
Continuous Current per Module	N/A				
Continuous Current per Point	24 mA	1.0 A @ 30 °C (86 °F) 0.5 A @ 60 °C (140 °F)§	0.50 A @ 30 °C (86 °F) 0.25 A @ 60 °C (140 °F)§	0.50 A @ 30 °C 0.25 A @ 60 °C	1.5 A @ 30 °C (86 °F) 1.0 A @ 60 °C (140 °F)➤
Surge Current per Point for 10 ms	N/A	3.0 A		1.0 A @ 30 °C (86 °F) 1.0 A @ 60 °C (140 °F)	4.0 A

* 50 mV peak to peak ripple (max).

The 1746-OVP16 module features a fused common and blown fuse LED indicator.

‡ Fast turn-off modules provide fast OFF delay for inductive loads. Fast turn-off delay for inductive loads is accomplished with surge suppressors on this module. A suppressor at the load is not needed unless another contact is connected in series. If this is the case, a 1N4004 diode should be reverse wired across the load. This defeats the fast turn-off feature. Comparative OFF delay times for 1746-OB8, 1746-OV8 and fast turn-off modules, when switching Bulletin 100-B110 (24 W sealed) contactor, are: 1746-OB8 and 1746-OV8 modules OFF delay = 152 ms; fast turn-off modules OFF delay = 47 ms.

§ Recommended surge suppression: For transistor outputs, when switching 24V dc inductive loads, use a 1N4004 diode reverse-wired across the load. Refer to the SLC 500 Modular Hardware Style User Manual, publication 1747-UM011, for more information on surge suppression.

◆ To limit the effects of leakage current through solid-state outputs, a loading resistor can be connected in parallel with your load. For transistor outputs, 24V dc operation, use a 5.6 KΩ, 1/2 W resistor.

➤ Fast off-delay for inductive loads is accomplished with surge suppressors on the 1746-IB6EI and 1746-OBP8 series B and later, 1746-OB16E series B and later, 1746-OBP16 and 1746-OVP16 modules. A suppressor at the load is not needed unless another contact is connected in series. If this is the case, a 1N4004 diode should be reverse-wired across the load. This defeats the fast turn-off feature.

Repeatability is once every 1 s @ 30 °C (86 °F). Repeatability is once every 2 s @ 60 °C (140 °F).
Surge current = 32 A per module for 10 ms.

Sourcing DC Output Modules

Specifications	1746-OB6EI	1746-OB8	1746-OB16	1746-OB16E	1746-OB32	1746-OB32E	1746-OBP8	1746-OBP16
Number of Outputs	6 Electronically	8	16	16 Electronically Protected	32 Electronically Protected	32 Electronically Protected		16
Points Per Common	Protected Individually	8	16	16	16	16	4	16
Voltage Category	24V dc							
Operating Voltage Range	10...30V dc	10...50V dc		10...30V dc	5...50V dc	10...30V dc		20.4...26.4V dc
Backplane Current (mA) at 5V/46 mA	135 mA	135 mA	280 mA	135 mA	190 mA	135 mA		250 mA
Backplane Current (mA) at 24V/0 mA	0 mA	0 mA	0 mA	0 mA	0 mA	0 mA		0 mA
Voltage Drop, On-State Output, Max. 1.0V @ 2.0 A	1.2V @ 1.0 A	1.2V @ 1.0 A	1.2V @ 0.5 A	1.0V @ 0.5 A	1.2V @ 0.5 A	1.0V @ 2.0 A		1.0V @ 1.0 A
Load Current, Min. 1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA		1 mA
Leakage Current, Off-State Output, Max 1 mA§	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA		1 mA
Signal On Delay, Max (resistive load) 1.0 ms*	0.1 ms	0.1 ms	0.1 ms	1.0 ms*	0.1 ms	1.0 ms		0.1 ms*
Signal Off Delay, Max (resistive load) 2.0 ms	1.0 ms	1.0 ms	1.0 ms	1.0 ms	1.0 ms	2.0 ms		1.0 ms
	12.0 A @ 0...60 °C (32...140 °F)	8.0 A @ 30 °C (86 °F) 4.0 A @ 60 °C (140 °F)						6.4 A @ 0...60 °C (32...140 °F)
Continuous Current per Module				8.0 A @ 0...60 °C (32...140 °F)				
Continuous Current per Point	2.0 A @ 0...60 °C (32...140 °F)‡	1.0 A @ 30 °C (86 °F) 0.5 A @ 60 °C (140 °F)‡	0.50 A @ 30 °C (86 °F) 0.25 A @ 60 °C (140 °F)‡	1.0 A @ 30 °C (86 °F) 0.50 A @ 60 °C (140 °F)‡	0.50 A @ 30 °C (86 °F) 0.25 A @ 60 °C (140 °F)‡	2.0 A @ 0...60 °C (32...140 °F)‡	1.5 A @ 30 °C (86 °F) 1.0 A @ 60 °C (140 °F)‡	
Surge Current per Point for 10 ms	➤ 4.0 A	3.0 A		2.0 A	1.0 A @ 30 °C (86 °F) 1.0 A @ 60 °C (140 °F)	4.0 A		

* Fast turn-off modules provide fast OFF delay for inductive loads. Comparative OFF delay times for 1746-OB8, 1746-OV8 and fast turn-off modules, when switching Bulletin 100-B110 (24 W sealed) contactor, are: 1746-OB8 and 1746-OV8 modules OFF delay = 152 ms; fast turn-off modules OFF delay = 47 ms.

The 1746-OBP16 module features a fused common and blown fuse LED indicator.

‡ Fast off-delay for inductive loads is accomplished with surge suppressors on the 1746-IB6EI, 1746-OBP8 series B and later, 1746-OB16E series B and later, 1746-OBP16, and 1746-OVP16 modules. A suppressor at the load is not needed unless another contact is connected in series. If this is the case, a 1N4004 diode should be reverse-wired across the load. This defeats the fast turn-off feature.

§ To limit the effects of leakage current through solid-state outputs, a loading resistor can be connected in parallel with your load. For transistor outputs, 24V dc operation, use a 5.0 KΩ, 1/2 W resistor on 1746-OB8, 1746-OB16, and 1746-OB16E modules and a 5.6 KΩ, 1/2 W resistor on 1746-OB6EI, 1746-OBP8, 1746-OBP16 modules.

◆ An external fuse can be used to protect this module from short circuits. Recommended fuse is SANO MQ 4-3.15 A, 5x20 mm.

➤ Repeatability is once every 1 s @ 30 °C (86 °F). Repeatability is once every 2 s @ 60 °C (140 °F).

AC Input Modules

Specifications	1746-IA4	1746-IA8	1746-IA16	1746-IM4	1746-IM8	1746-IM16	1746-IN16
Number of Outputs	4	8	16	4	8	16	16
Points Per Common	4	8	16	4	8	16	16
Voltage Category	100/120V ac			200/240V ac			24V ac/dc 10...30V ac
Operating Voltage Range	85...132V ac @ 47...63 Hz			170...265V ac @ 47...63 Hz			10...30V dc 85 mA
Backplane Current (mA) at 5V	35 mA	50 mA	85 mA	35 mA	50 mA	85 mA	0 mA
Backplane Current (mA) at 24V	0 mA	0 mA	0 mA	0 mA	0 mA	0 mA	3.0V dc 3.0V ac
Voltage, Off-State Input, Max.	30V ac			50V ac			
Nominal Input Current	12 mA @ 120V ac			12 mA @ 240V ac			8 mA @ 24V dc 8 mA @ 24V ac
Current, Off-State Input, Max.	2 mA	2 mA	2 mA	2 mA	2 mA	2 mA	1 mA (dc) 1 mA (ac)
Inrush Current, Max. * 0,8 A				1,6 A			0,02 A (ac only)
Inrush Current Time Duration (max.)	0,5 ms	0,5 ms	0,5 ms	0,5 ms	0,5 ms	0,5 ms	15 ms max (dc) 25 ms (ac)
Signal On Delay, Max	35 ms max	35 ms max	35 ms max	35 ms max	35 ms max	35 ms max	
Signal Off Delay, Max	45 ms max	45 ms max	45 ms max	45 ms max	45 ms max	45 ms max	15 ms max (dc) 25 ms (ac)

* An ac input device must be compatible with SLC 500 input circuit inrush current. A current limiting resistor can be used to limit inrush current. However, the operating characteristics of the ac input circuit are affected.

AC Output Modules

Specifications	1746-OA8	1746-OA16	1746-OAP12
Number of Outputs	8	16	12
Points Per Common	4	8	6 *
Voltage Category	120/240V ac		
Operating Voltage Range	85...265V ac @ 47...63 Hz		
Backplane Current (mA) at 5V	185 mA	370 mA	
Backplane Current (mA) at 24V	0 mA	0 mA	0 mA
Voltage Drop, On-State Output, Max.	1.50V @ 1.0 A	1.50V @ 0.50 A	1.2V @ 2.0 A
Load Current, Min.	10 mA	10 mA	10 mA
Leakage Current, Off-State Output, Max.	2 mA	2 mA	2 mA
Surge Current per Point (max.)‡	10.0 A for 25 ms		17.0 A for 25 ms ➤
Signal On Delay, Max (resistive load)§	1 ms	1 ms	1 ms
Signal Off Delay, Max (resistive load)§	11 ms	11 ms	11 ms
Continuous Current per Point◆	1.0 A @ 30 °C (86 °F) 0.50 A @ 60 °C (140 °F)	0.50 A @ 30 °C (86 °F) 0.25 A @ 60 °C (140 °F)	2.0 A @ 30 °C (86 °F) 1.25 A @ 55 °C (131 °F) 1.0 A @ 60 °C (140 °F)
Continuous Current per Module	8.0 A @ 30 °C (86 °F) 4.0 A @ 60 °C (140 °F)		9.0 A @ 30 °C (86 °F) 6.0 A @ 60 °C (140 °F)

* The 1746-OAP12 module features a fused common and blown fuse LED indicator.

To limit the effects of leakage current through solid-state outputs, a loading resistor can be connected in parallel with your load. For 120V ac operation, use a 15 kΩ, 2 W resistor. For 240V ac operation, use a 15 kΩ, 5 W resistor.

‡ Repeatability is once every 1 s @ 30 °C (86 °F). Repeatability is once every 2 s @ 60 °C (140 °F).

§ Triac outputs turn on at any point in the ac line cycle and turn off at ac line zero cross.

◆ Recommended surge suppression: For triac outputs when switching 120V ac inductive loads, use Harris Metal-oxide Varistor, model number V220MA2A. Refer to the SLC 500 Modular Hardware Style User Manual, publication 1747-UM011 for more information on surge suppression.

➤ Surge current = 35 A per common for 10 ms.

Relay Output Modules

Specifications	1746-OW4	1746-OW8	1746-OW16	1746-OX8
Number of Outputs	4	8	16	8
Points Per Common	4	4	8	individually isolated
Voltage Category	ac/dc Relay			
Operating Voltage Range	5...125V dc 5...265V ac			
Backplane Current (mA) at 5V	45 mA	85 mA	170 mA	85 mA
Backplane Current (mA) at 24V	45 mA	90 mA	180 mA	90 mA
Load Current, Min.	10 mA @ 5V dc			
Leakage Current, Off-State Output	Max 0 mA	0 mA	0 mA	0 mA
Signal On Delay, Max (resistive load)	10 ms	10 ms	10 ms	10 ms
Signal Off Delay, Max (resistive load)	10 ms	10 ms	10 ms	10 ms
Continuous Current per Point‡	See relay contact ratings			
Continuous Current per Module	8,0 A ac 8,0 A/Common	16,0 A ac 8,0 A/Common		*

* Limit continuous current per module so that module power does not exceed 1440 VA.

† Certified for Class 1 Div 2 Hazardous Locations by CSA.

‡ Recommended surge suppression: for relay outputs, refer to SLC 500 Modular Hardware Style User Manual, publication 1747-UM011. Connecting surge suppressors across your external inductive load will extend the life of SLC relay contacts.

Relay Contact Ratings

Cat. No.	Maximum Volts		Amperes *		Amperes‡ Continuous	Volt-Amperes	
			Make	Break		Make	Break
1746-OW4 ac	240V ac 120V ac 125V dc 24V dc 240V ac 120V ac	240V ac	7.5 A	0.75 A	2.5 A	1800 VA	180 VA
1746-OW8		120V ac	15 A	1.5 A			
1746-OW16 dc		125V dc	0.22 A				
1746-OX8		24V dc	1.2 A		1.0 A	28 VA	
		240V ac	15 A		2.0 A		
	120V ac	30 A					
	ac	125V dc	0.22 A	1.5 A	5.0 A	3600 VA	360 VA
		24V dc	1.2 A	3.0 A			
1746-OX8	dc				1.0 A	28 VA	
					2.0 A		

* Connecting surge suppressors across your external load extends the life of SLC 500 relay contacts. For recommended surge suppression when switching ac inductive loads, consult the SLC 500 Modular Hardware Style User Manual, publication 1746-UM011. Recommended surge suppression for switching 24V dc inductive loads is 1N4004 diode reverse wired across the load.

For dc voltage applications, the make/break ampere rating for relay contacts can be determined by dividing the 28 VA by the applied dc voltage. For example, 28 VA/48V dc = 0.58 A for dc voltage applications less than 14V, the make/break ratings for relay contacts cannot exceed 2 A.

‡ The continuous current per module must be limited so the module power does not exceed 1440 VA.

Combination I/O Modules

Specifications	1746-IO4	1746-IO8	1746-IO12	1746-IO12DC
Number of Inputs	2	4	6	6
Number of Outputs	2	4	6	6
Points Per Common	2	4	6	6
	120V ac (Inputs)		24V dc (Inputs)	
Voltage Category	100/120V ac (Relay Contact Outputs)		100/120V ac (Relay Contact Outputs)	
Operating Voltage Range	85...132V ac @ 47...63 Hz (Inputs) 5...265V ac @ 47...63 Hz / 5...125V dc (Outputs)		10...30V dc (Inputs) 5...265V ac @ 47...63 Hz / 5...125V dc (Outputs)	
Backplane Current (mA) at 5V	30 mA	60 mA	90 mA	80 mA
Backplane Current (mA) at 24V	25 mA	45 mA	70 mA	60 mA
Continuous Current per Point	See Relay Contact Ratings for 1746-OW4 on page 13.		See Relay Contact Ratings for 1746-OW16 on page 13.	
Continuous Current per Module	1.8A		1.8A	

1746-SIM Input Simulator

The 1746-SIM Input Simulator is designed for use on 16-channel 24V dc sinking and sourcing modules with removable terminal blocks, including 1746-IB16, 1746-ITB16, 1746-IV16, 1746-ITV16, and 1746-IN16 modules. The input simulator provides 16 switches for simulating inputs to the SLC 500.

1746 Analog I/O Modules

Analog I/O modules feature user-selectable voltage or current inputs, backplane isolation, removable terminal blocks, and diagnostic feedback.

The 1746-NI4, 1746-NIO4I, and 1746-NIO4V input channels are filtered to reject high frequency noise and provide 14- to 16-bit (range-dependent) resolution.

All 4-channel analog output modules provide 14-bit resolution and a 2.5 ms conversion rate.

The 1746-FIO4I and 1746-FIO4V modules have less input filtering and can sense more rapidly changing inputs. However, their input resolution is only 12-bit. Because the input filter on the 1746-FIO4I or 1746-FIO4V module may pass more electrical noise, you should thoroughly ground and shield the input transducer, its power supply, and cables.

The 1746-NI8 module provides high accuracy and fast analog signal conversion. The 1746-NI8, 1746-NI16I and 1746-NI16V modules are high density analog input modules that are software configurable.

The 1746-NO8I (current output) and 1746-NO8V (voltage output) modules are high density, analog output modules that provide 8 individually configurable output channels with 16-bit resolution.