

PL-1746 Series

PL μ S® Plug-In Modules for the Allen-Bradley SLC-500 PLC

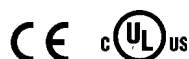


PL-1746-C01

PL-1746-C02

PL-1746-C03

PL-1746-C04



The PL μ S PL-1746 Series Plug-In Modules for Allen-Bradley PLC's, incorporate advanced PLS functions in a 1746 I/O module package.

The PL μ S Plug-In Modules provide 12 bit absolute position, and accurate control of functions at high speeds, based on rotary position input. They complement the control capabilities of the PLC by performing tasks that typically must occur much faster than a normal PLC scan cycle.

In addition to providing precise control of events based on rotary position, these modules incorporate high speed control logic and automatic speed compensation, independent of the PLC scan. Output Groups and High Speed Logic Modes move beyond standard PLS functionality to give the user powerful tools that solve control problems accurately and at high speeds.

Programming of the PL-1746 modules may be done through the backplane or through the Electro Cam Corp. model 6400 keypad/display.

PL-1746 Series Features

PL-1746 Model	12 bit Resolution	Leading/ Trailing Speed Compensation	2 Analog Backplane Outputs	8 Sinking/ Sourcing DC Inputs	32 Solid State Relay Output via I/O Rack	6 Sinking DC Outputs Onboard	6 Sourcing DC Outputs Onboard	2 Analog Outputs	Onboard Display	Encoder Based	Resolver Based	Shift Register
C01-R1	*	*	*	*	*			*	*		*	
†C02-E1-S	*	*	*	*			*		*	*		*
C02-R1	*	*	*	*			*		*		*	OPTION -S
†C03-E1-S	*	*	*	*		*			*	*		*
C03-R1	*	*	*	*		*			*		*	OPTION -S
C04-R1	*	*	*								*	

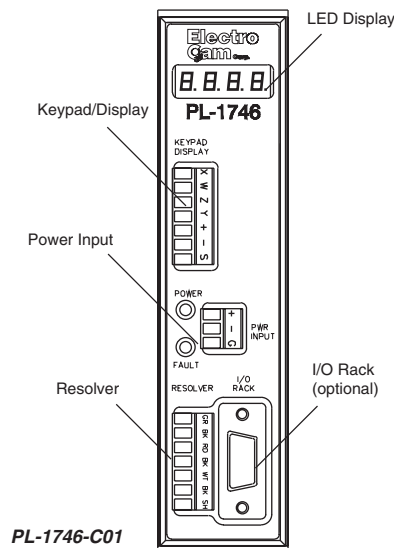
†PL-1746-C02-E1-S AND PL-1746-C03-E1-S are only available with the "S" (Shift Register) Option. The "S" Option is included at no charge – on these two units – only.

Standard PL-1746 Series Features

- Non-Volatile Memory - configurations saved when power is interrupted.
- Absolute position with high resolution (Up to 4096 increments per revolution)
- 48 available programs - active programs selected through the backplane or via the Electro Cam Corp. 6400 series keypad/display.
- Complete module status available through the backplane.
- Automatic leading & trailing edge speed compensation - to advance/retard output channel timing to compensate for ON/OFF delay in valves and other devices.
- 2 levels of motion detection - to enable/disable speed critical machine functions.
- 4 timed outputs for controlling time critical functions initiated by position.
- Output Groups and Operating Modes - allows high speed logic to be done in the PLS, separate from the PLC scan.
- Able to connect up to 2 Electro Cam Corp. Model 6400 keypad/displays for remote adjustment.
- Ability to access user selected parameters while operating in an Allen-Bradley remote I/O chassis
- The Shift Register (C02/C03) allows reduced scan time, simplified programming, and ease of troubleshooting in the event of a sensor failure.

PL-1746-C01 Plug-In Module

- Up to 32 PLS output channels available through 1746 backplane. All channels are available to use either with the Electro Cam Corp. I/O rack (High Speed/Real World), or any 1746 discrete output module.
- Real world, high speed I/O available via either an 8 input/8 output, or an 8 input/16 output external DIN mount rack.
- Up to 32 digital plus 2 analog outputs available.
(Requires two racks, 16 I/O per rack)
- SLIMLINE™ module outputs: AC, DC



The **PS-4108-13-L08** and **PS-4108-13-L16** I/O racks provide inputs, analog outputs, and digital power outputs (requiring SLIMLINE™ solid state relays) for the PL-1746-C01 PLμS plug-in modules.



PS-4108-13-L08 & PS-4108-13-L16 I/O Racks

Resolvers

Electro Cam Corp. Resolvers are designed for rugged industrial applications. They feature dual bearing construction (except the 5212 model), and come in a variety of mounting styles and shaft sizes. Some resolver configurations are shown here.

See Price List (Lit. #202) for complete listing of part numbers and specifications.



**PS-5275-11-ADS
Foot Mount**

- 3/4" Shaft
- Top side, right side, left side or rear connection



**PS-5238-11-ADR
Flange Mount**

- 3/8" or 5/8" Shaft
- Top side, right side, left side or rear connection

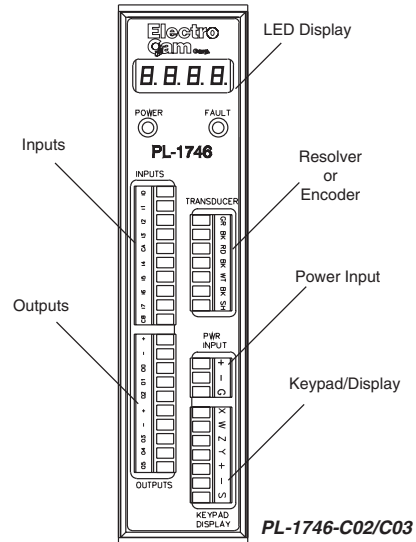
PL-1746-C02/C03 Plug-In Module

- 6 real world DC outputs, and 8 DC inputs mounted on the front of the PL-1746 module.
(-C02 = sourcing[†] outputs, -C03 = sinking[†] outputs)
- Up to 32 PLS output channels available through the 1746 backplane.
- 2 analog values based on speed, available through the backplane. These are "tunable" to a specific machine speed range.

Optional Features

- Incremental Encoder input.
- Shift register with 256 shifts (standard on encoder models).
- Output assignment allowing the user to choose which six (6) channels are the real world power outputs.

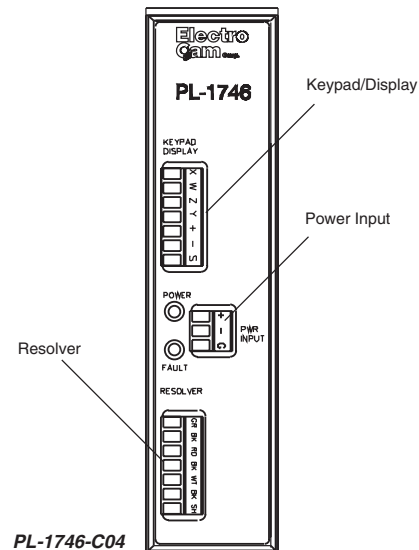
All other features of the PL-1746-C02/C03 models are the same as those for standard PL-1746 series modules.



PL-1746-C04 Plug-In Module

- Up to 32 PLS output channels available through the 1746 backplane.
- 2 analog outputs available through the backplane.
- Real-Time Position information is available via the Input File over the SLC 500 backplane. This position can be scaled and zeroed to match actual machine position.
- A register provides detailed hardware error diagnostics. This allows customized handling of faults if they occur.

All other features of the PL-1746-C04 model are the same as those for standard PL-1746 series modules.



PS-5275-051-ADL Foot Mount Geared

- 3/4" Shaft
- 5:1 Gear Ratio
- Top side, right side or left side connection
- Available in ratios 2:1 thru 36:1 (Consult Factory for availability)



PS-5262-11-CTG Stainless Steel

- 5/8" Shaft
- Left side or right side connection



PS-5238-11-SDR Servo Mount

- 3/8" Shaft
- Top side, right side, left side or rear connection



PS-5212-11-SVW Unhoused Servo Mount

- .120" Shaft
- Standard size 11

[†]See page 4 for sinking/sourcing definitions.

Plug-In Module Part Number Breakdown

PL - XXXX - XXX - XX - X

PL = Plugs into backplane
Utilizes Allen-Bradley
technology.

PLATFORM TYPE
1746 = SLC 500

SUB-CATEGORY
C01 = Display, 32 Real World I/O with
External I/O racks
C02 = Display, Built-in 8 Inputs and 6
Sourcing[†] DC Outputs, 1.5 A
C03 = Same as C02, except with
Sinking[†] outputs
C04 = No Display, No Real World I/O

TYPE TRANSDUCER
R - Resolver
E - Encoder

**NUMBER OF
TRANSDUCERS**
1 = One

OPTIONS
S = Shift Register & Output
assignment feature

Resolver Part Number Breakdown

PS - 52 XX - XXX - X X X - X

PLS
Part Number

Resolver

SHAFT SIZE
12 - 1/8 DIA.
15 - 15 mm DIA.
20 - 20 mm DIA.
38 - 3/8" DIA., 2.06" Bolt Flange
62 - 5/8" DIA., 2.25" Bolt Flange
75 - 3/4" DIA.

RATIO
11 - Standard 1:1 (Note: 3rd digit
not used on Standard 1:1)
021 - Geared 2:1 - Ext. shaft to
internal resolver shaft
thru
361 - Geared 36:1 - Ext. shaft to
internal resolver shaft
Various ratios available,
contact Factory.

HOUSING
A - Can housing w/flange
or foot endbells.
C - Stainless steel
square housing.
E - 74 mm bolt spacing,
flange mount
S - Servo mount
(.12 = size 11;
.38 = size 25)

TYPE OF CABLE CONNECTION
D - Military bayonet style connector
T - Terminal strip with NO conduit
entrance
V - No connector, just stripped &
tinned wires
S - Sealed connector — screw type

Note: Part # PS-5903-01-001
conduit entrance for
terminal strip models
sold separately.

LOCATION OF CABLE CONNECTION
W - With stripped & tinned leads
G - Right (120° from top on "A" housings)
R - Rear (not available on Geared Resolver)
L - Left (120° from top on "A" housings)
S - Side (Top)

OPTION
V - Vertical Mount
Note: Only required
for vertical mounting
of PS-5262-11-CTX
Models.

Plug-In Module Typical Systems

Component(s)	Qty.	Part Number
PL-1746-C01 System		
C01 Plug-In Module	(1)	PL-1746-C01-R1
Resolver	(1)	PS-5275-11-ADR
Resolver Cable	(1)	PS-5300-01-010
Keypad/Display	(1)	PS-6400-24-001
Keypad-to-controller cable(s)	(1)	PS-6300-01-005
I/O Rack	(1)	PS-PS-4108-13-L08
I/O Rack Cable	(1)	PS-4308-10-005
SLIMLINE™ Output Modules	(16)	EC-ODC060-3
SLIMLINE™ Analog Modules	(2)	EC-SANL-010V

PL-1746-C02 System (C03 for [†]Sinking)		
C02/C03 Plug-In Module	(1)	PL-1746-C02-R1
Resolver	(1)	PS-5275-11-ADR
Resolver Cable	(1)	PS-5300-01-010
Keypad/Display	(1)	PS-6400-24-001
Keypad-to-controller cable(s)	(1)	PS-6300-01-005

PL-1746-C04 System		
C04 Plug-In Module	(1)	PL-1746-C04-R1
Resolver	(1)	PS-5275-11-ADR
Resolver Cable	(1)	PS-5300-01-010
Keypad/Display	(1)	PS-6400-24-001
Keypad-to-controller cable(s)	(1)	PS-6300-01-005

[†]**SINKING or SOURCING** (as pertaining to Electro Cam Corp. products)

Sinking means that when the logic is true and the output (or input device) is ON, the output (or input device) is providing a DC common or ground to the connected device.

Sourcing means that when the logic is true and the output (or input device) is ON, the output (or input device) is providing a +DC voltage to the connected device.

This information is important when interfacing an Electro Cam Corp. product with another electronic device. If you are using an Electro Cam Corp. product input to an Allen-Bradley 1746-IN16 "sinking" input card* or similar A-B device, you have to supply a +DC voltage (Electro Cam Corp. **Sourcing** output) to this card, NOT a DC common or ground. In these cases, **Sinking** is what the card does with the input voltage; sinks it to common or ground.

* Other manufacturers include, but not limited to: Koyo (formerly GE Series 1, Texas Instruments, or Siemens SIMATIC PLS's) that use descriptions similar to Allen-Bradley.

PL-1746 Specifications

Plug-In Module Part Numbers	PL-1746-C01-R1	PL-1746-C02-E1-S PL-1746-C02-R1 PL-1746-C03-E1-S PL-1746-C03-R1	PL-1746-C04-R1
Electrical			
Input Power	20-30 VDC. Keypad/display is powered from controller.	20-30 VDC. Keypad/display is powered from controller.	
Backplane Power	5VDC @ 500 mA max.	5 VDC @ 500 mA max.	5VDC @ 500 mA max.
I/O Power	20-30 VDC, 80 mA + 150 mA per keypad + 230 mA per rack. Example: Total = 840 mA with 2 keyboards and 2 racks. Certain types of power supplies employ a self protection feature called current fold back limiting. The inrush currents of the high efficiency switching regulators may cause power supplies to enter current limit mode. Power supplies with current fold back limiting should be sufficient to supply three times the steady state current of the system. Inrush current @ 30v, 40 amps max. for 600 µs (2 keyboards, 2 racks)	20-30 VDC @ 90 mA max. + 150 mA per PS-6400 keypad Certain types of power supplies employ a self protection feature called current fold back limiting. The inrush currents of the high efficiency switching regulators may cause power supplies to enter current limit mode. Power supplies with current fold back limiting should be sufficient to supply three times the steady state current of the system.	20-30 VDC @ 80 mA max. + 150 mA per PS-6400 keypad (include power supply warning).
Permanent Memory	EEPROM (no battery required)	EEPROM (no battery required)	EEPROM (no battery required)
Environment			
Operating Temp.	0° to 55°C (32° to 131°F)	0° to 55°C (32° to 131°F)	0° to 55°C (32° to 131°F)
Storage Temp.	-40° to 70°C (-40° to 160°F)	-40° to 70°C (-40° to 160°F)	-40° to 70°C (-40° to 160°F)
Humidity	95% maximum relative non-condensing	95% maximum relative non-condensing	95% maximum relative non-condensing
NEMA Rating	Keypad/Display: NEMA 4	Keypad/Display: NEMA 4	Keypad/Display: NEMA 4
Physical			
Weight	PLµS Module: 0.5 lbs (0.2 kg) Keypad/Display: 0.5 lbs. (0.2 kg)	PLµS Module: 0.5 lbs (0.2 kg) Keypad/Display: 0.5 lbs. (0.2 kg)	PLµS Module: 0.5 lbs (0.2 kg) Keypad/Display: 0.5 lbs. (0.2 kg)
Mounting			
Controller	Mounts in SLC-500 chassis.	Mounts in SLC-500 chassis.	Mounts in SLC-500 chassis.
Rack	Brackets accept EN-50035 ("G" profile) or EN-50022 ("Top Hat" profile) DIN Rail		
Keypad/Display	Mounts up to 1000' from controller. 0 to 2 keypads may be connected to one controller.	Mounts up to 1000' from controller. 0 to 2 keypads may be connected to one controller.	Mounts up to 1000' from controller. 0 to 2 keypads may be connected to one controller.
Inputs on Rack			
DC Inputs	8 sinking [†] or sourcing [†] DC inputs, optically isolated (1st rack only).		
Input ON State Voltage	10-30 VDC		
Input Current	11 mA @ 24 VDC		
Response	2 µs max.		
Outputs on Rack			
Real World Outputs	Up to 16 SLIMLINE™ modules may be mounted on the rack. Modules may be any mix of AC, DC, and reed relay. All modules (except reed relay) optically isolated.		
Analog Output	Up to 2 SLIMLINE™ analog output modules may be mounted on the rack in addition to the 16 digital modules.		

[†]See page 4 for sinking/sourcing definitions.

PL-1746 Specifications (continued)

Plug-In Module Part Numbers	PL-1746-C01-R1	PL-1746-C02-E1-S PL-1746-C02-R1 PL-1746-C03-E1-S PL-1746-C03-R1	PL-1746-C04-R
Outputs On Rack (cont') Output Types Resolution Update Frequency Linearity Set-up	4-20 mA or 0-10 VDC, proportional to RPM 12 bit 10 ms $\pm 0.3\%$ of full scale @ 25°C (77°F) Offset & full scale RPM are programmable		
Inputs on Module DC Inputs Input ON State Voltage Input Current Response		8 DC inputs, optically isolated, sinking [†] or sourcing [†] in banks of 4. 20-30 VDC 11 mA @ 24 VDC 2 μ s max.	
Outputs on Module Real World Outputs Analog Output Resolution Update Frequency Set-up		6 DC outputs @ 1.5A each, 20-30V Note: -C02 all outputs are SOURCING[†] -C03 all outputs are SINKING[†] Analog outputs accessible through backplane only; they are proportional to RPM. 12 bit 10 ms Offset & full scale RPM are programmable	
Operation Scan Time Position Resolution Speed Compensation Output Timeout Number of Timed Outputs Multiple Programs Total Pulse Memory Pulses per Program Pulses per Output Maximum Speed	Less than 1000 μ s typical (exact time determined by programming) 12 bits (4096 increments) Programmed in 0.1 msec steps. 16 individually compensated outputs max. Updated 5 times per second. Separate leading/trailing edge compensation standard. 1.0 ms time base (accuracy: +1,-0 ms) Four maximum 48 programs standard 1252 pulses standard 512 maximum standard 512 maximum standard 3000 RPM. Note: Pulses generated with Pulse Train command are not included in pulses per program or pulses per output counts.	Less than 1000 μ s typical (exact time determined by programming). 12 bits (4096 increments) Programmed in 0.1 msec steps. 16 individually compensated outputs max. Separate leading/trailing edge compensa- tion standard. 1.0 ms time base (accuracy: +1,-0 ms) Four maximum 48 programs standard 1252 pulses standard 512 maximum standard 512 maximum standard 3000 RPM.	Less than 1000 μ s typical (exact time determined by programming). 12 bits (4096 increments) Programmed in 0.1 msec steps. 16 individually compensated outputs max. Updated 5 times per second. Separate leading/trailing edge compensation standard. 1.0 ms time base (accuracy: +1,-0 ms) Four maximum 48 programs standard 1252 pulses standard 512 maximum standard 512 maximum standard 3000 RPM. Note: Pulses generated with Pulse Train command are not included in pulses per program or pulses per output counts.

[†]See page 4 for sinking/sourcing definitions.

**Copyright © 2002
All Rights Reserved**

Neither this document nor any part may be reproduced or transmitted in any form or by any means without permission in writing from the publisher.

Electro Cam, PL μ S, **SLIMLINE**, and PL μ SNET are all registered trademarks of **Electro Cam Corp.**

This product incorporates patented technology which is licensed by Allen-Bradley Company, Inc. A-B has not technically approved, nor does it warrant or support this product. All warranty and support for this product and its application is provided solely by Electro Cam Corp.

SLC-500 is a trademark of Allen-Bradley Company.