
Preface

Read this preface to familiarize yourself with the rest of the owner's guide. This preface covers:

- who should use this guide
- what this guide covers
- related Allen-Bradley documents
- terms & abbreviations you should know

Who Should Use This Guide

Use this guide if you design, install, program, or maintain a control system that uses Allen-Bradley Small Logic Controllers.

You should have a basic understanding of SLC 500 products. You should also understand electronic process control and the ladder program instructions required to generate the electronic signals that control your application. If you do not, contact your local Allen-Bradley representative for the proper training before using these products.

What This Guide Covers

This guide covers the 1746sc-NO8i and 1746sc-NO8v analog output modules. It contains the information you need to install, wire, use, and maintain these modules. It also provides diagnostic and troubleshooting help should the need arise.

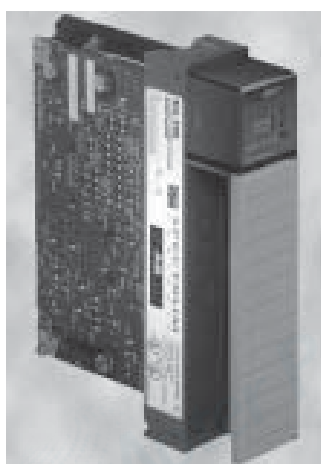
Related Allen-Bradley Documents

Table 1 lists several Allen-Bradley documents that may help you as you use these products.

Chapter 1

Overview And Specifications

The 1746sc-NO8i provides eight channels of current outputs, while the 1746sc-NO8v provides eight channels of voltage outputs. In both modules, the current or voltage ranges are independently configurable for each channel. These modules also provide new, advanced features to make your control systems more dependable and flexible.



Read this chapter to familiarize yourself further with your isolated analog module (shown above). This chapter covers:

- general features and benefits
- detailed specifications

General Features And Benefits

Increased System Accuracy and Reliability

Both modules provide 8 output channels with a high *usable* resolution. They also provide 500 Vdc field-wiring-to-backplane isolation to protect the processor and rack. These modules maintain their accuracy with fluctuating ambient temperatures, which is important for crowded control cabinets.

Reduced System Costs

Several low-density modules may be replaced with one eight channel module. They also provide a single-slot solution for applications requiring up to eight outputs, so you don't have to buy more I/O than you need. Your ladder logic is simplified as the module provides channel ramping, limit alarms, output clamping, and various data scaling options.

State-of-the-Art Performance

These modules incorporate proprietary Allen-Bradley technology, so they operate and perform like the latest Allen-Bradley products. They also provide 16-bits of resolution, user-programmable range settings, requires no field calibration, software configuration, programmable output limits, and programmable safe states in case of a fault.

Detailed Specifications

Table 2. Electrical specifications—module

Backplane Current Consumption (maximum)		
1746sc-NO8i	120 mA @ 5 Vdc	
	250 mA @ 24 Vdc	
1746sc-NO8v	120 mA @ 5 Vdc	
	160 mA @ 24 Vdc	
Optional External 24V supply	+24V +/-10%	
Backplane Power Consumption (typical)	5.6 W	
Number Of Channels	8 single-ended	
I/O Chassis Location	Any 1746 I/O module slot except slot 0	
A/D Conversion Method	Sigma-Delta	
Calibration	Factory calibrated	
Opto-Electrical Isolation	500 Vdc field wiring-to-backplane	
Module ID Code		
1746sc-NO8i	3527	Class 1
	12727	Class 3
1746sc-NO8v	3528	Class 1
	12728	Class 3
Thermal Dissipation	6.6 W	

Table 3. Electrical specifications—outputs

Output Current Ranges—NO8i (selectable for each channel)	4 to 20 mA 0 to 20 mA 0 to 21 mA 0 to 21.5 mA
Output Voltage Ranges—NO8v only (selectable for each channel)	-10 to +10 Vdc -10.25 to +10.25 Vdc 0 to 10 Vdc 0 to 5 Vdc 1 to 5 Vdc
SLC Communication Formats (selectable for each channel)	Scaled engineering units Scaled for PID Proportional counts 1746-NO4 format User-defined scale
Output Impedance Current Outputs—NO8i Voltage Outputs—NO8v	Greater than 1 Mohm Less than 1.0 ohm
Load Range Current Outputs—NO8i Voltage Outputs—NO8v	0 to 500 ohm 1Kohm and greater
Max. Current, Voltage Mode—NO8v	10mA
Output Step Response Time	1 ms (0–95% of full scale)
Channel Update Time (typical) Class 1 Class 3	5ms to update all 8 channels 10ms to update all 8 channels
Output Resolution Current Outputs—NO8i Voltage Outputs—NO8v	16-bit 366 nA/count 320 μ V/count
Overall Accuracy Current Outputs—NO8i Voltage Outputs—NO8v	0.1% of full scale @ 25 °C 0.2% of full scale @ 60 °C 0.1% of full scale @ 25 °C 0.2% of full scale @ 60 °C

Table 4. Physical specifications

LED Indicators	Eight green channel status indicators, one for each channel One green module status indicator
Recommended Cable	Belden 8761 (shielded, twisted-pair) or equivalent
Wire Size (maximum)	Two 14–24 AWG wire per terminal
Terminal Block	Removable (supplied)

Table 5. Environmental specifications

Operating Temperature	0 to 60 °C (32 to 140 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Relative Humidity	5 to 95% non-condensing
Certifications	UL/CUL and CE
Hazardous Environment Classifications	Class I Division 2 Groups ABCD



Table 6. Backplane current consumed

Catalog Number	5Vdc	24 Vdc *	
		w/o ext. supply	w/ ext. supply
1746-sc-NO8i	120 mA	250 mA	0 mA
1746sc-NO8v	120 mA	160 mA	0 mA

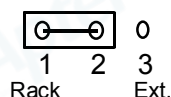
* The 1746sc-NO8i and 1746sc-NO8v output modules can use an external 24 Vdc power supply to reduce backplane loading. To use an external 24 Vdc power supply, you must set your module's jumper J4 as indicated in the following subsection. To comply with the U.L. regulation the external supply must be rated N.E.C. Class 2.

Use Table 6 to calculate the total load on the system power supply. For more information, see the Allen-Bradley system *Installation and Operation Manual*.

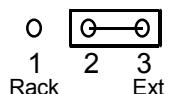
Setting The Jumper J4

The 1746sc-NO8i and 1746sc-NO8v output modules have an external 24 Vdc power jumper, J4, giving you the option of using an external power supply:

- With the jumper in the **1-2 Shorted** position, the module draws all its power from the backplane of the SLC system.



- With the jumper in the **2-3 Shorted** position, the module draws its 24 Vdc power from an external power source; however, the module still draws its 5 Vdc power from the backplane.

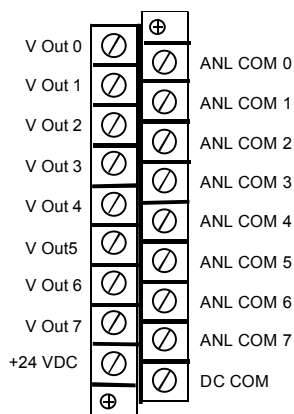


The jumper, J4, is located in the bottom right corner of the module's circuit board next to the power supply.

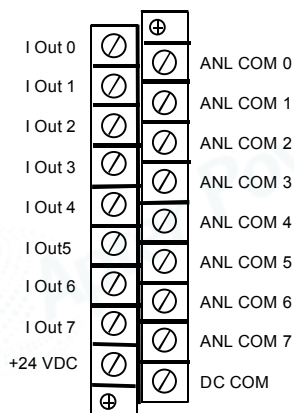
Note: Before setting J4 all system power must be turned off. This includes the rack power as well as the optional 24V external supply.

Note: If the module is configured to use an external +24V supply, the supply must be turned on for the module to operate. If the external +24V supply is turned off, the module's outputs will be turned off, and the module's processor will be reset until power is restored. The module's LEDs will blink the 24v failure blink code. See the error blink code descriptions in the troubleshooting section of this manual

Figure 2. Wiring diagrams



1746sc-NO8v



1746sc-NO8i

Labeling And Re-Installing The Terminal Block (if it is removed)

The supplied terminal cover has a write-on label. Using this label helps ensure that the terminal block is installed on the correct module.

Once you have wired your module and properly labeled the terminal cover, install the terminal block on your module:

1. Align the terminal block with the receptacle.
2. Insert the terminal block and press firmly at the top and bottom until it is properly seated.
3. Screw in the two retaining screws on the top and bottom of the terminal block.

Chapter 4

Channel Configuration, Data, and Status

Read this chapter to:

- enter your output module's ID code
- configure each output channel
- set the optional features
- control each output channel's signal
- monitor each output channel
- check each output channel's configuration and status

To use your module, you need:

- programming equipment
- Allen-Bradley RSLogix 500

Entering Your Module's ID Code

Before using your module, you must configure the slot your module is in by entering your module's ID code in RSLogix.

When using RSLogix simply select your module from the list of modules on the system I/O configuration display to automatically enter the ID code.

With earlier versions of RSLogix you must manually enter the ID code. To enter your module's ID code, select "other" from the list of modules on the system I/O configuration display, and enter your module's ID code at the prompt. The module ID code for your module is:

Table 8. Output module ID code

Catalog Number Module ID Code

1746sc-NO8i	3527	Class 1 Mode (8 inputs / 8 outputs)
	12727	Class 3 Mode (16 inputs, 32 outputs)
1746sc-NO8v	3528	Class 1 Mode (8 inputs / 8 outputs)
	12728	Class 3 Mode (16 inputs / 32 outputs)

Output Clamping

For added safety, the 1746sc-NO8i and 1746sc-NO8v output modules let you define limits for the values in the output data words individually for all eight channels. These data limits, in turn, limit the output signals that your module provides. When an output data word exceeds the data limit, the output value is truncated to the limit.

You can use output data limiting to prevent PID loops from exceeding safety limits, to prevent operators from inadvertently setting incorrect values, etc.

The low clamping limit (output data parameter 1) is the value which the output signal will not go below. The high clamping limit (output data parameter 2) is the value which the output signal will not go above.

For some ranges and formats the clamp alarms will occur a few counts from the set clamping values. This means you may need to command an output value lower or higher than the output clamping limits in order to get output at low/high clamp alarms.

The low clamp limit value must be lower than the high clamp limit value.

Example – Suppose you have a valve connected to channel 0 with a ± 10 V operating range, and you want to use the Engineering Units data format. For this application, you would use the following bit settings for the channel configuration bytes:

Address	15	Channel 0 Configuration Word												0	
O:e.8	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1

Suppose, also, that you would like to set the output limits to -2 V and +8 V. You would enter the following for channel 0 data parameters 1 and 2:

O:e.16 Value = -2000 decimal (-2V)
O:e.24 Value = 8000 decimal (+8V)

Now, by setting bit 8 and 10 in the Channel 0 configuration word, the output will be clamped to -2 to +8 volts.

Address	15	Channel 0 Configuration Word																0
O:e.8		0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	

Monitor bit 1 of the channel input status word 2 (I:e.8). When the bit is 1 (clamping values set) then set the channel 0 configuration back to its original value.

Address	15	Channel 0 Configuration Word												0
O:e.8	0	0	0	0	0	0	0	0	0	1	0	0	0	1