

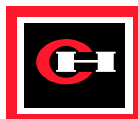
# ADJUSTABLE FREQUENCY DRIVES

SERIES 9000 AF DRIVES

SV9IOC105

120V Input Option Board  
with Analog Output

- Instruction Sheet



**Cutler-Hammer**

**EAT•N**



# 120 V Input Option Board Instruction Sheet

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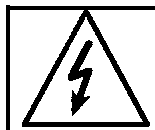
## 1. Introduction

The 120 Volt Input Board (SV9IOC105) for Series 9000 drives was designed for customers that wish to use 120 VAC digital inputs instead of 24 VDC digital input control signals. The 120V digital inputs replace the 24V inputs on the SV9000 control board. The analog output is in addition to the analog outputs on the control board.

The 120V I/O board provides:

- 6 digital inputs
- 1 analog output

The 120 Volt input board mounts inside Series 9000 drives, and should be installed according to the instructions below.



**WARNING: Equipment Damage Hazard.**

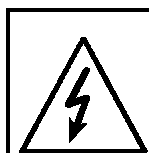
Failure to follow proper installation instructions may damage the 120 Volt input board, the variable frequency drive or both.

## 2. Specifications

<b>Electrical</b>	<i>Digital Inputs</i>	
	Maximum Input Voltage:	132V, 50/60Hz
	Minimum "ON" State (1) Voltage:	85V
	Maximum "OFF" (0) State Voltage:	24 VAC
	Maximum Power Draw:	5 VA
	<i>Analog Output</i>	
	Output:	0-20mA
<b>Environment</b>	Maximum Load Resistance:	500Ω
	Accuracy:	+/- 3%; 10-bit resolution
	Ambient Operating Temperature	-10 to +50 C° (drive ambient)
	Storage temperature	-40 to 60 C°
	Humidity	< 95%, no condensation allowed
<b>Certification</b>	Altitude	Max. 1000 meters
	Vibration	0.5G (9-200Hz), all axis. (IEC 721-3-3)
	CE, UL	EN50178 standard CE Mark and UL Listed

### 3. Installation

Installation must be performed by a licensed electrician.



**WARNING: Shock Hazard.**

Components and component boards inside the adjustable frequency drive may be at incoming voltage potential when the drive is connected to the supply voltage. Contact with live components may cause serious injury or death.

#### 3.1 Incoming Inspection

The 120 Volt Input Board Kit includes the following components (see figure 1 below):

Item	Quantity
1. SV9IOC105 board	1
2. Protective plastic board	1
3. Standoff	1
4. Terminal blocks (terminals 1–5 and 18–20)	1 each
5. Power cable	1
6. Data cable	1
7. Insulating sticker (only used with Compact NEMA1 drives)	1
8. Mounting plate (only used with NEMA 1, NEMA 12, and Protected Chassis drives)	1
9. Mounting screw	1
10. Software diskettes	2
11. SVDive Cable	1
12. 120V Input Option Board Instruction Manual	1
13. SVReadyE Supplements to the SV9000 Manuals	7

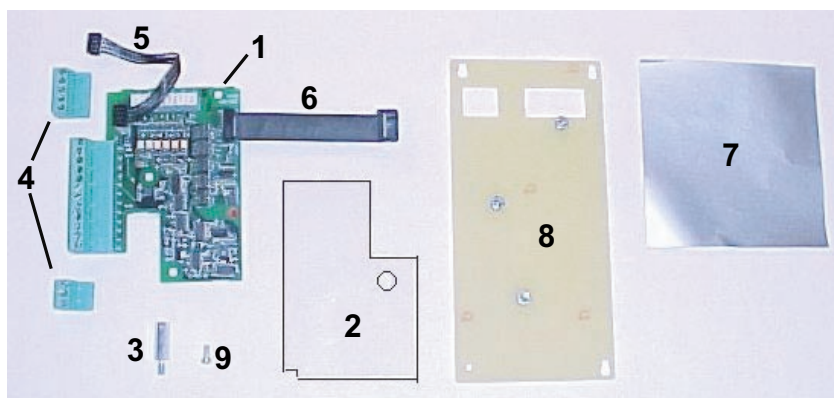


Figure 1: Parts Included in the 120 Volt Input Board Kit

## 3.2 Installation Procedure

There are two types of installation procedures depending on which type of drive enclosure you have. To determine the enclosure type, check the drive's nameplate.

For installation you will need:

- 120 Volt Input Board Kit with all parts listed on previous page
- Philips screwdriver




**Before beginning installation, disconnect the drive from the supply voltage. Wait 5 minutes before opening the cover of the drive. Verify, by measurement only, that no voltage is applied to the drive.**


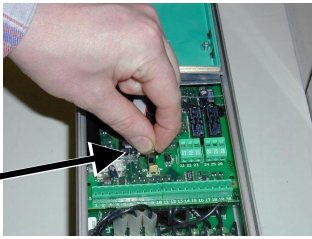
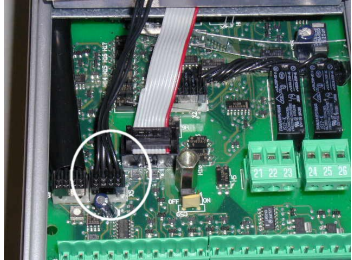

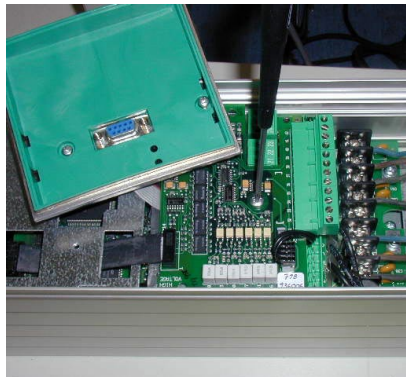
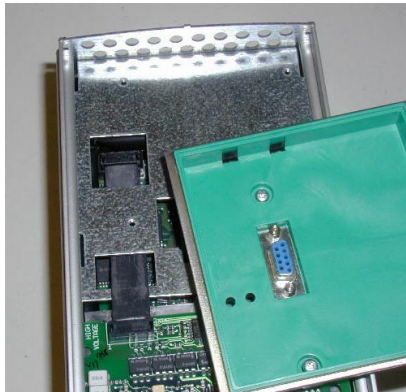




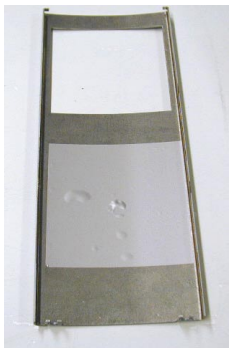

***WARNING: Shock Hazard.***

Control circuit connections may be connected to live voltage. Be certain power is disconnected from control circuits before beginning installation. Contact with live components may cause serious injury or death.

### 3.2.1 Installation of the SV9IOC105 in a Compact NEMA1 Drive

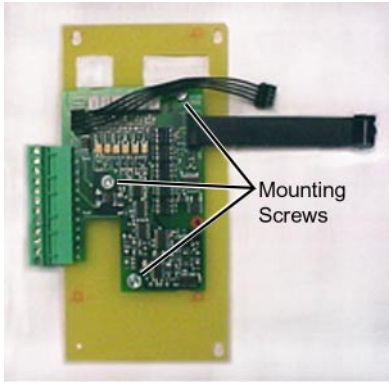



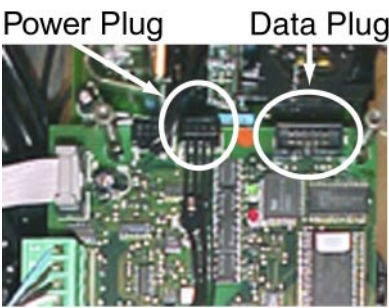
<b>A</b>	Remove the keypad by squeezing the two side tabs and pulling the keypad away from the drive.	
<b>B</b>	Remove the cover of the drive	 Cover screws
<b>C</b>	Detach the panel base from the frame. It is not necessary to unplug the panel cable	
<b>D</b>	Remove the control board terminals numbered 1 – 20	


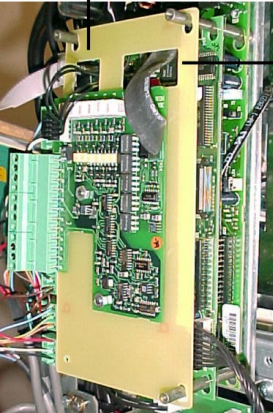
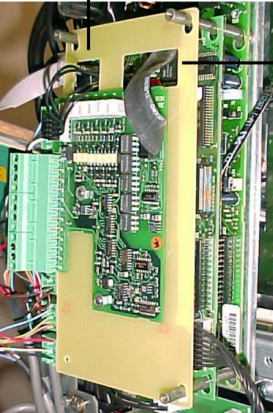
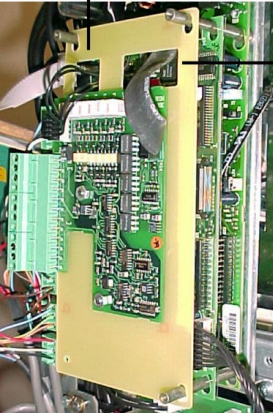
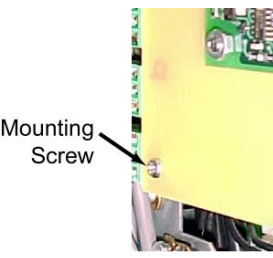
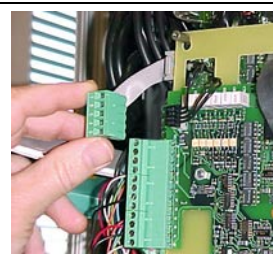
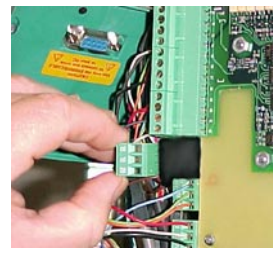
E	<p>Remove the screw from the control board and replace it with the standoff (3). DO NOT DISCARD THE SCREW.</p> <p>Standoff:</p> 	
F	<p>Connect the power cable (5) to terminal X5 of the control board.</p>	
G	<p>Install the protective plastic board (2), using the following guidelines:</p> <ul style="list-style-type: none"> <li>Place the plastic above the control board so that the hole in the plastic board aligns with the standoff.</li> <li>Push the plastic slightly down over the standoff.</li> <li>Bend the left edge (see picture) of the plastic board under the slit in the frame reserved for the option board.</li> </ul>	
H	<p>Place the SV9IOC105 option board (1) on top of the plastic board so that the edge aligns with the slit of the frame and the hole of the option board is in line with the standoff.</p> <p>Fasten the option board with the screw removed in Step E.</p>	
I	<p>Place the data cable (6) as shown in the picture and connect it to terminal X14 on the control board.</p> <p><b>NOTE! Be sure to feed the data cable down through the smaller opening. If the cable is not fed through the small opening, it will interfere with mounting the panel base.</b></p>	



<b>J</b>	Connect the power cable (5) to terminal X2 of the option board.	
<b>K</b>	Snap the two terminal blocks (4) into place, one each to the right and left of the I/O board terminals.	
<b>L</b>	Wire the terminals per application requirements.	
<b>M</b>	Re-attach the control panel base with the four screws.	
<b>N</b>	Attach the insulator sticker (7) on the inside of the drive cover as shown.	
<b>O</b>	Remove all foreign objects from inside the drive and fasten the cover to the drive.	 Cover screws
<b>P</b>	Replace the keypad.	



### 3.2.2 Installation of the SV9IOC105 into a NEMA 1, NEMA 12, or Protected Chassis Drive

<b>A</b>	Attach the SV9IOC105 board (1) to the mounting board (8) with the three screws supplied. Each screw has two nuts attached. Leave one nut between the mounting board and the IO board. The second nut is used to secure the IO board. Make sure that the installation is stable	
<b>B</b>	Remove the keypad by squeezing the two side tabs and pulling the keypad away from the drive.	
<b>C</b>	Remove the cover of the drive.	
<b>D</b>	Detach the panel base from the frame. It is not necessary to unplug the panel cable	
<b>E</b>	Connect the power cable (5) to terminal X5 of the drive's control board. (The power cable can also be connected to terminal X6 if terminal X5 is already in use.)	

<b>D</b>	Remove the drive's 24 Volt I/O terminals (terminal numbers 1 – 20) located on the control board.	 <p>Remove terminals 1 — 20</p>
<b>E</b>	Feed the power cable (5) through the smaller opening and connect it to terminal X1 on the I/O card.	 <p>Thread power cable through left hole.</p>
<b>F</b>	Thread the data cable (2) through the larger opening and connect it to terminal X14 of the control board.	 <p>Thread data cable through right hole.</p>
<b>G</b>	Place the mounting board (7) and I/O card above the control board on the three stand-offs in the corners and push so that the narrow parts of the holes in the board hit the slots on the stand-offs..	
<b>H</b>	Secure the mounting board (7) with a screw at the lower left corner.	 <p>Mounting Screw</p>
<b>I</b>	Snap the two terminal blocks (4) into place, one each to the top and bottom of the I/O board terminals. <ul style="list-style-type: none"> <li>Terminal block 1-5 is installed in the top position (analog inputs)</li> <li>Terminal block 18-20 is installed in the bottom position (terminals 18-19 are an analog output and terminal 20 is a digital output)</li> </ul>	 <p>Top terminal block installation</p>
<b>J</b>	Wire the terminals per application requirements.	 <p>Bottom terminal block installation</p>

<b>K</b>	Re-attach the control panel base with the four screws.	
<b>L</b>	Remove all foreign objects from inside the drive and fasten the cover to the drive.	
<b>M</b>	Replace the keypad.	

## 4. Commissioning

### 4.1 SVReadyE Software

In order for the drive to use the 120 V I/O card, the SVReadyE software must be loaded to the drive. The 120V digital inputs replace the 24V inputs on the SV9000 control board. The analog output is in addition to the analog outputs on the control board.

When the drive is ordered from the factory with a 120V I/O card installed, the SVReadyE system and application software are loaded to the drive at the factory.


When the 120V I/O option kit (SV9IOC105) is ordered for field installation, the SVReadyE version of each application is included. The desired application must be loaded to the drive using the SVLoad application (also included in the kit). After loading the SVReadyE application, it must be chosen as the active application. The name of the application that supports the 120 V I/O card is the same as the original application; however the new application will be the first application in the application list – application number 0. For more information on choosing the application, see the drive or application User's Manual.

Parameter values are changed and monitored in the same way as in the original application. Additional I/O board and application parameters are explained in the manual supplements included with the software.

### 4.2 Warning Codes

Code	Possible cause	Action
<b>A52</b>	Option board broken Option board missing	Check that the option board is intact. Check that the option board is installed.

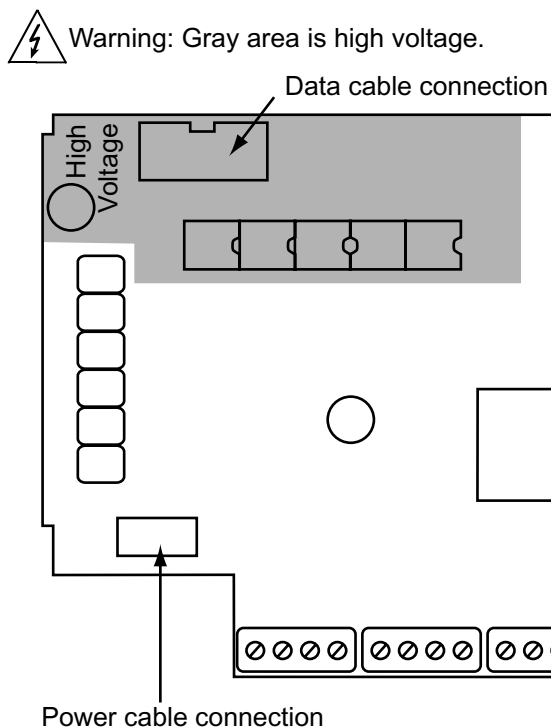
## 5. Technical data

	<p><b>WARNING: Shock Hazard.</b></p> <p>The components and component boards inside the drive, except for the galvanically isolated input and output terminals, are at mains potential when the drive is connected to mains. Contact with live components may cause death or severe injury.</p>
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### 5.1 Terminals

TERMINAL X5		SIGNAL	DESCRIPTION
31	DIC 1	Digital input	<50VAC = Logic State 0 >50VAC = Logic State 1
32	DIC 2	Digital input	
33	DIC 3	Digital input	
34	CMC	Common	
35	CMC	Common	
36	DIC 4	Digital input	<50VAC = Logic State 0 >50VAC = Logic State 1
37	DIC 5	Digital input	
38	DIC 6	Digital input	
39	CMC	Common	
40	CMC	Common	
41	GND	I/O Ground	Signal range 0 (4)—20 mA R1 max 500Ω
42	I <sub>out</sub> +	Analogue signal (output+)	

### 5.2 Board Layout



**Figure 1: SV9IOC105 120V I/O Board Layout**

For technical support contact your Cutler-Hammer distributor or the Cutler-Hammer AF Drives Product Integrity Center at 1-800-322-4986