

Allen-Bradley
1397-L11
I/O Expansion Card
Cat. No. 1397-L11

What This Option Provides

The I/O Expansion Card is a drive mounted board that provides these additional I/O signals.

- (5) Digital Inputs
- (2) Analog Inputs
- (1) Frequency Input
- (2) Digital Outputs
- (2) Analog Outputs
- (1) Frequency Output

These I/O signals are configured and programmed by (5) jumpers and (27) parameters, detailed in the **Setup** section.

Where This Option Is Used

This option may be used with all 1397 Drives.

What These Instructions Contain

These instructions contain the necessary information to install and configure a 1397 I/O Expansion Card. For additional information on I/O signals, cable and wire recommendations, I/O programming and function block diagrams, refer to the 1397 User Manual — Publication 1397-5.0.

Specifications

Digital Inputs	Input Voltage:	+24V DC
	Input Current Draw:	9mA at +24V DC
	Common:	All Inputs Share the Same Common
Digital Outputs	Operating Voltage:	+30V DC/250V AC Max.
	Switching Current:	2A Max. Resistive/1A Max. Inductive
Analog Input 3	Potentiometer:	5k Ω Min.
	Input Voltage:	\pm 10V DC
	Input Current:	4-20mA or 10-50mA (Jumper Selectable)
	Reference	
Analog Input 4	Potentiometer:	5k Ω Min.
	Input Voltage:	\pm 10V DC Max.
Analog Output 3	Output Voltage:	\pm 10V DC
	Max. Load:	4mA
	Current Output:	4-20mA
	External Supply:	5-32V DC, 0-1.3k Ω Max. Load (4-20mA Output)
Analog Output 4	External Supply:	\pm 10V DC
	Max. Load:	4mA
Frequency Input	Max. Frequency:	250kHz
	Min. Duty Cycle:	25% at 250kHz/20% at 100kHz (Time On-to-Time Off)
	Min. Pulse Width:	2 μ S
	Input:	Differential A and \bar{A}
	Input Voltage:	50V Maximum Differential 25V to Common 1.5V Min. Differential Voltage Swing
	Input Impedance:	22k Ω Differential 11k Ω to Isolated +15V Common
	Signal Common:	100 Ω to Isolated +15V Common
Frequency Output	Max. Frequency:	250kHz
	Duty Cycle:	50%
	Output Voltage:	5V Differential
	Max. Output Offset:	0.4V
	Max. Load:	5mA
	Signal Common:	100 Ω to Isolated +15V Common
	Signal Termination:	100 Ω to with 3900 pf

Installation

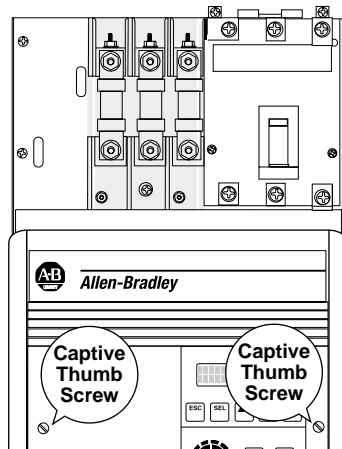


ATTENTION: This board contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control precautions are not followed. If you are not familiar with static control procedures, reference AB publication 8000-4.5.2, “Guarding against Electrostatic Damage” or any other applicable ESD protection handbook.

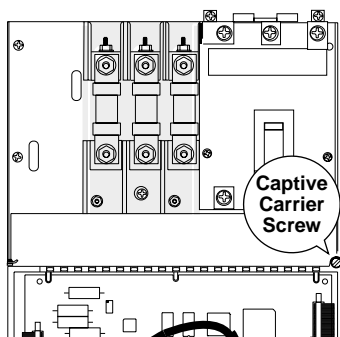


ATTENTION: Electric Shock can cause injury or death. Remove all power before working on this product.

The drive is at line voltage when connected to incoming AC power. Before proceeding with any installation or troubleshooting activity, disconnect, lock out, and tag all incoming power to the drive. Verify with a voltmeter that no voltage exists at terminals L1, L2 and L3 on the drive input power terminal block.



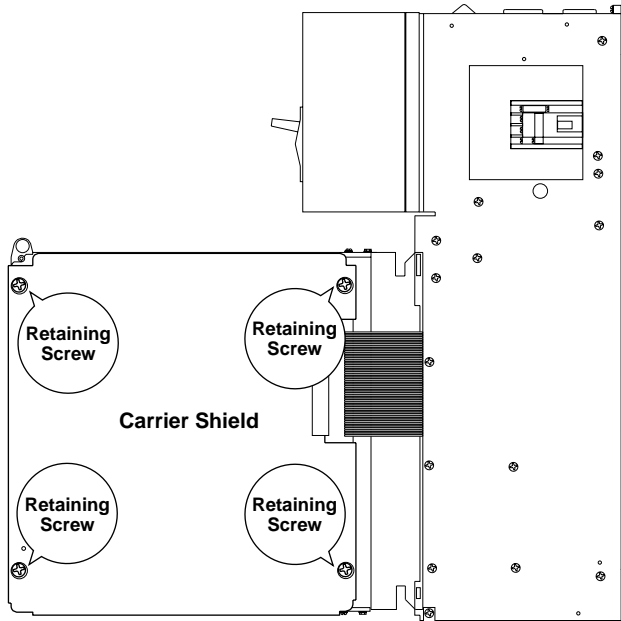
- 1** Remove and lock-out all incoming power to the drive. Loosen the (2) captive retaining screws and remove the drive cover.



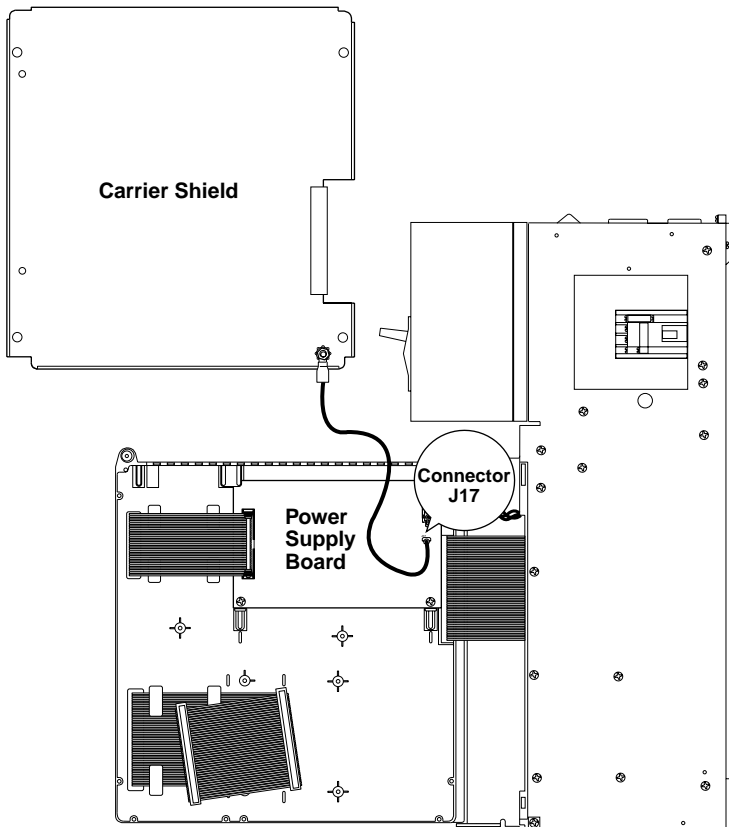
- 2** Loosen the captive carrier retaining screw and swing the carrier door open.

Installation Requirements

(continued)



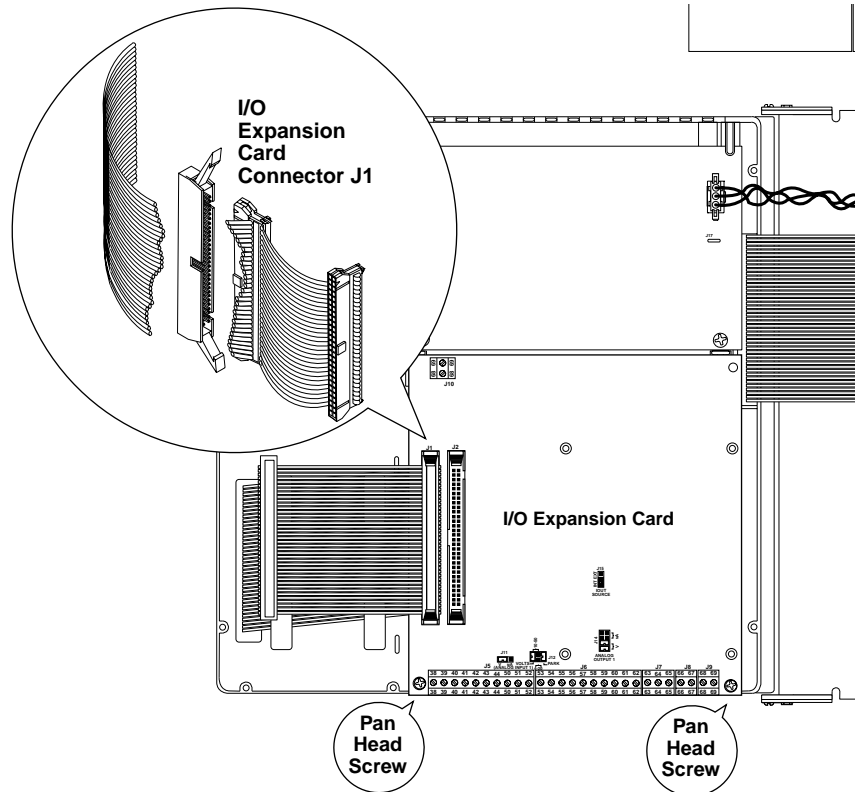
-
- ❑ **3** To remove the carrier shield, remove the (4) retaining screws and unplug the ground wire at the Power Supply Board.
-



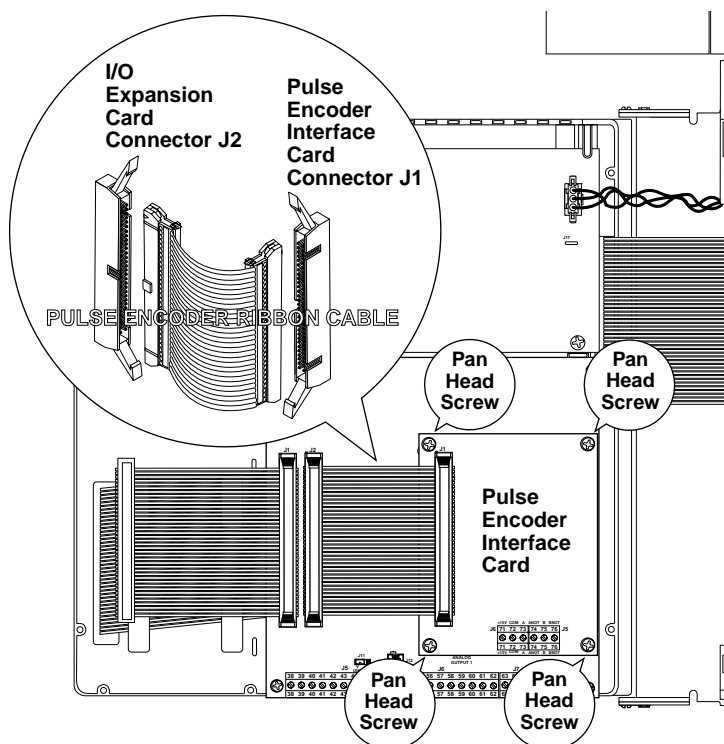
Installation Requirements

(continued)

If a Pulse Encoder Interface Option is also required, complete both steps 4 and 5.



- ❑ **4** Install the I/O Expansion Board in the drive carrier using the (2) pan head screws provided, then plug the middle ribbon cable connector into J1.



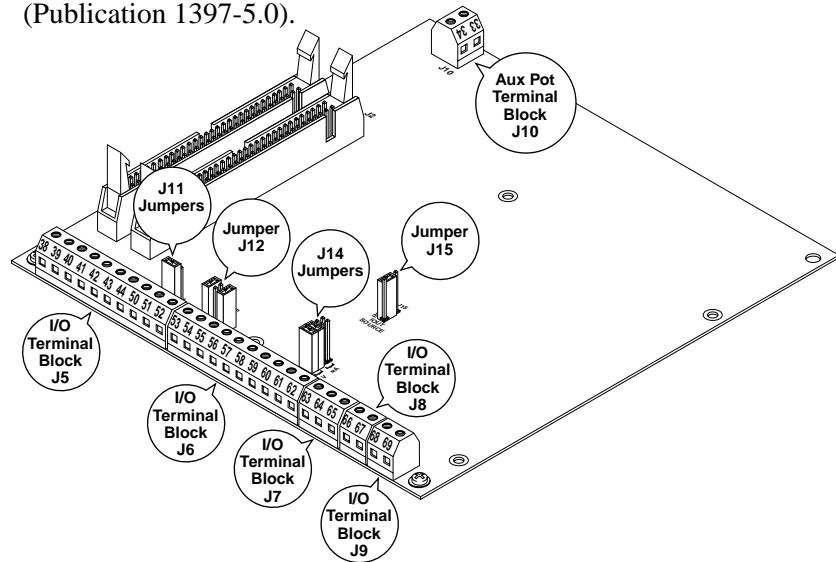
- ❑ **5** If a Pulse Encoder Interface Board is used, it is mounted piggy-back on the I/O Expansion Board and connected using hardware included with the Pulse Encoder Interface kit.

Setup

Depending upon the application, jumpers as well as parameters are used to configure the I/O Expansion Card.

- 1 to 4 jumpers on the card may have to be changed from their factory settings to accommodate I/O signals.
- (19) input and (8) output parameters are dedicated to program the card's I/O signals.

For a detailed description of I/O Expansion parameters, refer to the parameter descriptions in the 1397 User Manual (Publication 1397-5.0).



I/O TERMINAL BLOCK Wiring Specifications

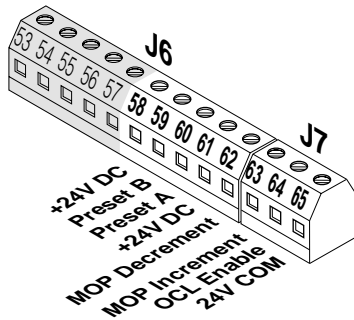
J5	38	UNUSED
	39	FREQ IN A
	40	FREQ IN \bar{A}
	41	COM
	42	FREQ OUT A
	43	FREQ OUT \bar{A}
	44	COM
	50	ANLG IN 3 +
	51	ANLG IN 3 -
	52	ANLG IN 4 +
J6	53	ANLG IN 4 -
	54	ANLG OUT 3 +
	55	ANLG OUT 3 -
	56	ANLG OUT 4 +
	57	ANLG OUT 4 -
	58	+24V DC
	59	PRESET SPEED B
	60	PRESET SPEED A
	61	+24V DC
	62	MOP DECREMENT
J7	63	MOP INCREMENT
	64	OCL ENABLE
	65	24V COM
J8	66	DIG OUT 1
	67	DIG OUT 1 COM
J9	68	DIG OUT 2
	69	DIG OUT 2 COM

(5) terminal blocks are available for I/O connections to the I/O Expansion Card. Refer to the **Cable and Wire Recommendations** in the 1397 User Manual for I/O wiring specifications

AUXILIARY POTENTIOMETER TERMINAL BLOCK

J10	33	10V DC
	34	GND

Setup (continued)



Digital Input Settings

To configure the I/O Expansion Card's digital inputs, only parameters ¹ must be set. Each of the card's (5) digital inputs is fixed and listed below. The drive will recognize a change of state (e.g. 0-to-24V DC or 24-to-0V DC) if it is applied for longer than 20mS.

Terminal 60²

Terminal 60 ²	Terminal 59 ²	
Preset Speed A	Preset Speed B	Speed Reference Selected ³
0	0	Determined by Standard Terminal Block Input 6 (Reference Select)
0	1	Preset Speed 1 (P.087)
1	0	Preset Speed 2 (P.088)
1	1	Preset Speed 3 (P.089)

Terminal 63²

Terminal 63 ²	Terminal 62 ²	
MOP Increment	MOP Decrement	Effect of MOP Output (P.015) ⁴
0	0	No Change
0	1	Decrement at MOP Decel Time Rate (P.085)
1	0	Increment at MOP Accel Time Rate (P.084)
1	1	No Change

Terminal 64²

Terminal 64 ²	
OCL Enable	Turns Outer Control Loop (OCL) on or off based on the drive's running state and P.121 — OCL Enable Src. ⁵

¹ For a detailed description of these Digital Input Parameters, refer to the parameter descriptions in the 1397 User manual.

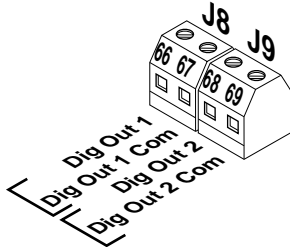
² Depending upon the application, terminal 58 (+24V DC), 61 (+24V DC), or 65 (24V COM) is used with this digital input terminal.

³ Refer to the **Speed/Trim Reference Select** Firmware Block Diagram in Appendix A of the 1397 User Manual for additional information.

⁴ Refer to the **I/O Expansion Inputs** Firmware Block Diagram in Appendix A of the 1397 User Manual for additional information.

⁵ Refer to the **Outer Control Loop** Firmware Block Diagram in Appendix A of the 1397 User Manual for additional information.

Setup (continued)



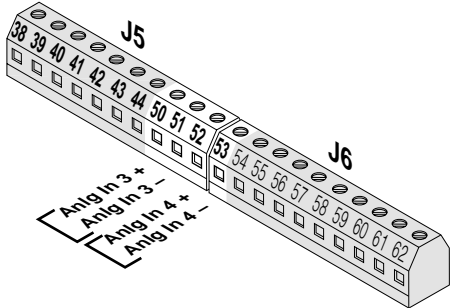
Digital Output Jumper and Parameter Settings

To configure the I/O Expansion Cards digital outputs, only parameters must be set¹. The cards (2) digital outputs can be sourced from various drive functions and will hold their state for a minimum of 20mS.

Parameter No.	Parameter Name	Terminal Nos.
P.155	Dig Out 1 SRC	66 and 67
P.157	Dig Out 2 SRC	68 and 69
P.156	Dig Out 1 Type ²	
P.158	Dig Out 2 Type ²	

¹ For a detailed description of these Digital Output Parameters, refer to the parameter descriptions in the 1397 User manual.

² If Parameters 156 and/or 158 are configured as normally closed contacts, they will act as normally open contacts during a drive power cycle.



Analog Input Settings

The I/O Expansion Card supports two analog inputs — Anlg In 3 and Anlg In 4.

Anlg In 3 has (4) parameter settings¹ and can be jumpered to accept (4) types of input signals^{3, 4, 5}.

Anlg In 4 has (3) parameter settings¹ and only accepts a bipolar DC voltage.

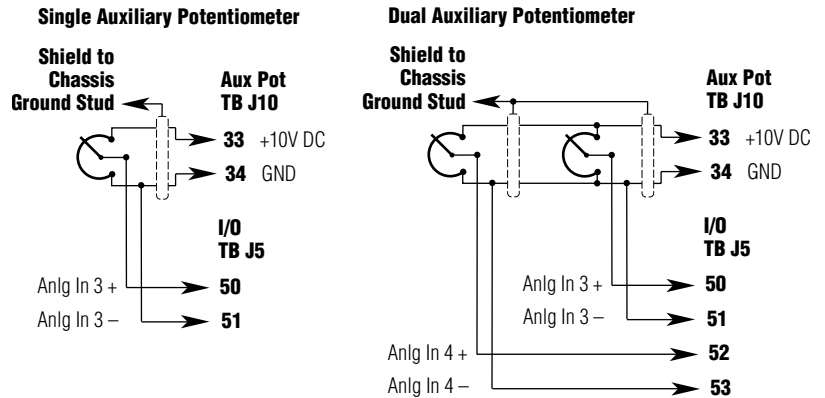
Analog inputs can be scaled to use DC voltage signals as low as 4.5V DC (5V DC $\pm 10\%$), but the maximum resolution of 0.024% is only obtained when a full scale input signal is used. Analog inputs are read every 20mS.

Parameter No.	Parameter Name	Terminal Nos.
P.003	Anlg In 3	50 and 51 ²
P.004	Anlg In 4	52 and 53 ²
P.133	Anlg In 3 Type	
P.134	Anlg In 3 Zero	
P.132	Anlg In 3 Gain	
P.136	Anlg In 4 Zero	
P.135	Anlg In 4 Gain	

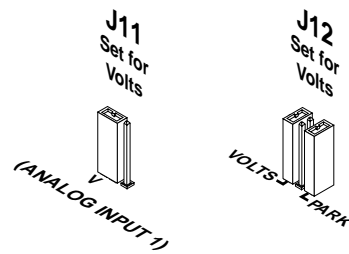
¹ For a detailed description of these Analog Input Parameters, refer to the parameter descriptions in the 1397 User manual.

Setup (continued)

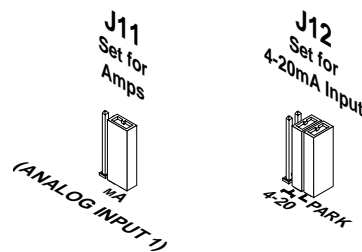
- 2 Aux Pot Terminal Block J10** is used to connect up to (2) 5kΩ auxiliary potentiometers to the I/O Expansion Card.



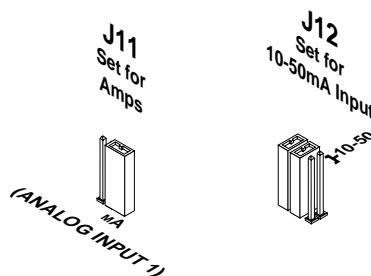
- 3 For A Bipolar or Unipolar DC Input Voltage** — Set analog input jumpers J11 to V and J12 to Volts & Park.



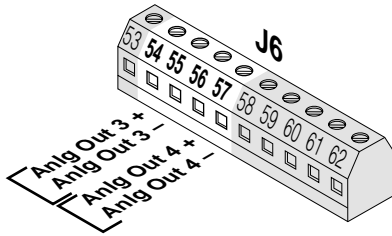
- 4 For A 4-20mA Input** — Set analog input jumpers J11 to mA and J12 to 4-20 & Park.



- 5 For A 10-50mA Input** — Set analog input jumpers J11 to mA and J12 to Volts & 10-50mA.



Setup (continued)



Analog Output Settings

The I/O Expansion Card supports two analog outputs — Anlg Out 3 and Anlg Out 4. Both I/O Expansion Card outputs are unfiltered, where as standard analog outputs are averaged.

Anlg Out 3 has (2) parameter settings¹ and can be jumpered to supply (2) types of output signals.

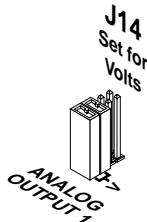
Anlg Out 4 has (2) parameter settings¹ and can only supply a bipolar DC voltage.

Analog outputs can be scaled to supply DC voltage signals as low as 5V DC, but the maximum resolution of 0.025% is only obtained when a full scale output signal is used. Analog outputs are updated every 20mS.

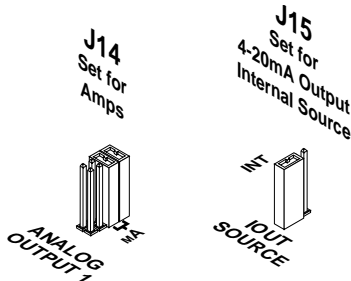
Parameter No.	Parameter Name	Terminal Nos.
P.151	Anlg Out 3 SRC	54 and 55 ^{2, 3, 4, 5}
P.150	Anlg Out 3 Gain	
P.154	Anlg Out 4 SRC	56 and 57 ¹
P.153	Anlg Out 4 Gain	

¹ For a detailed description of these Analog Output Parameters, refer to the parameter descriptions in the 1397 User manual.

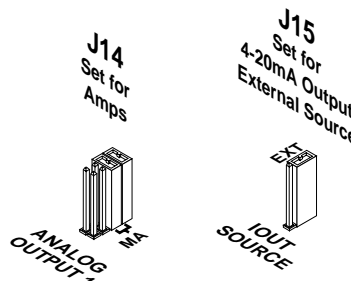
² **For A Bipolar DC Output Voltage** — Set analog output jumper J14 to V.



³ **For A 4-20mA Output Internal Source** — Set analog output jumpers J14 to mA and J15 to INT.

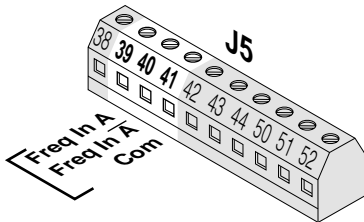
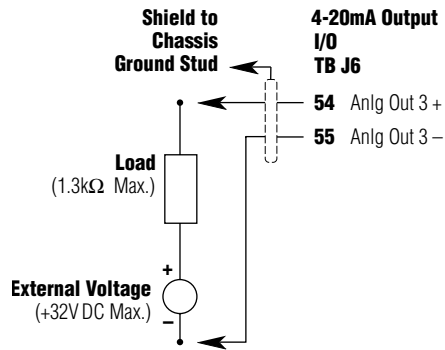


⁴ — Set analog output jumpers J14 to mA and J15 to EXT.



Setup (continued)

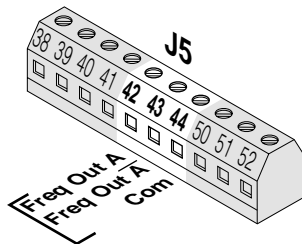
- ⁵ Wiring an external supply for 4-20mA output.



Frequency Input Setting

To configure the I/O Expansion Card's single unipolar frequency input, only parameters ¹ must be set. The frequency input signal is read every 20mS.

Parameter No.	Parameter Name	Terminal Nos.
P.011	Frequency In	39, 40 and 41
P.138	Freq In Zero	
P.137	Freq In Scale	



Frequency Output Setting

To configure the I/O Expansion Card's single unipolar frequency output, only parameters ¹ must be set. The output signal is unfiltered and read every 20mS. The full scale value is based on their selected parameter group — Load, Speed, Voltage, Power, Field or other.

Parameter No.	Parameter Name	Terminal Nos.
P.160	Freq Out SRC	42, 43 and 44
P.161	Freq Out Zero	
P.159	Freq Out Scale	

¹ For a detailed description of these Frequency I/O Parameters, refer to the parameter descriptions in the 1397 User manual.

Reach us now at www.rockwellautomation.com

Wherever you need us, Rockwell Automation brings together leading brands in industrial automation including Allen-Bradley controls, Reliance Electric power transmission products, Dodge mechanical power transmission components, and Rockwell Software. Rockwell Automation's unique, flexible approach to helping customers achieve a competitive advantage is supported by thousands of authorized partners, distributors and system integrators around the world.

Americas Headquarters, 1201 South Second Street, Milwaukee, WI 53204, USA, Tel: (1) 414 382-2000, Fax: (1) 414 382-4444
European Headquarters SA/NV, avenue Herrmann Debroux, 46, 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40
Asia Pacific Headquarters, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846



**Rockwell
Automation**