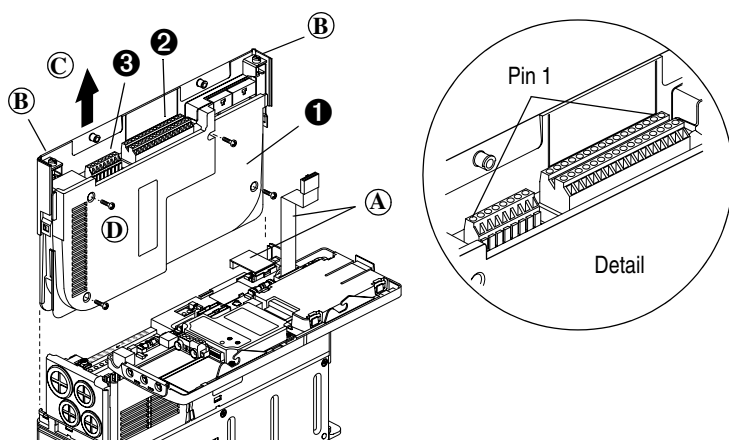


The I/O Control Cassette

[Figure 1](#) shows the I/O Control Cassette and terminal block locations. The cassette provides a mounting point for the various PowerFlex 700 I/O options. To remove the cassette, follow the steps below. Cassette removal will be similar for all frames (0 Frame drive shown).

Step	Description
Ⓐ	Disconnect the two cable connectors shown in Figure 1 .
Ⓑ	Loosen the two screw latches shown in Figure 1 .
Ⓒ	Slide the cassette out.
Ⓓ	Remove screws securing cassette cover to gain access to the boards.

Figure 1 PowerFlex 700 Typical Cassette & I/O Terminal Blocks



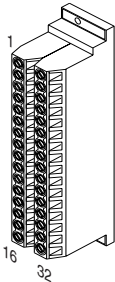
I/O Terminal Blocks

Table A I/O Terminal Block Specifications

No.	Name	Description	Wire Size Range ⁽¹⁾		Torque	
			Maximum	Minimum	Maximum	Recommended
Ⓐ	I/O Cassette	Removable I/O Cassette				
Ⓑ	I/O Terminal Block	Signal & control connections	2.1 mm ² (14 AWG)	0.30 mm ² (22 AWG)	0.6 N-m (5.2 lb.-in.)	0.6 N-m (5.2 lb.-in.)
Ⓒ	Encoder Terminal Block	Encoder power & signal connections	0.75 mm ² (18 AWG)	0.196 mm ² (24 AWG)	0.6 N-m (5.2 lb.-in.)	0.6 N-m (5.2 lb.-in.)

⁽¹⁾ Maximum/minimum that the terminal block will accept - these are not recommendations.

Figure 2 I/O Terminal Designations



No.	Signal	Factory Default	Description	Related Param.
1	Analog In 1 (-) ⁽¹⁾	(2)	Isolated ⁽³⁾ , bipolar, differential, $\pm 10V/4-20mA$, 11 bit & sign, 88k ohm input impedance. For 4-20mA, a jumper must be installed at terminals 17 & 18 (or 19 & 20).	320 - 327
2	Analog In 1 (+) ⁽¹⁾			
3	Analog In 2 (-) ⁽¹⁾			
4	Analog In 2 (+) ⁽¹⁾			
5	Pot Common	-	For (+) and (-) 10V pot references.	
6	Analog Out 1 (-)	(2)	Bipolar (current output is not bipolar), $\pm 10V/4-20mA$, 11 bit & sign, voltage mode - limit current to 5 mA. Current mode - max. load resistance is 400 ohms.	340 - 347
7	Analog Out 1 (+)			
8	Analog Out 2 (-)			
9	Analog Out 2 (+)			
10	HW PTC Input 1	-	1.8k ohm PTC, Internal 3.32k ohm pull-up resistor	238 - 259
11	Digital Out 1 – N.C. ⁽⁴⁾	Fault	Max. Resistive Load: 240V AC/30V DC – 1200VA, 150W Max. Current: 5A, Min. Load: 10mA Max. Inductive Load: 240V AC/30V DC – 840VA, 105W Max. Current: 3.5A, Min. Load: 10mA	380 - 391
12	Digital Out 1 Common			
13	Digital Out 1 – N.O. ⁽⁴⁾	NOT Fault		
14	Digital Out 2 – N.C. ⁽⁴⁾	NOT Run		
15	Digital Out 2/3 Com.			
16	Digital Out 3 – N.O. ⁽⁴⁾	Run		
17	Current In Jumper ⁽¹⁾ – Analog In 1		Placing a jumper across terminals 17 & 18 (or 19 & 20) will configure that analog input for current.	
19	Current In Jumper ⁽¹⁾ – Analog In 2			
20				
21	-10V Pot Reference	-	2k ohm minimum load.	
22	+10V Pot Reference	-		
23	HW PTC Input 2	-	See above	
24	+24VDC ⁽⁵⁾	-	Drive supplied logic input power. ⁽⁵⁾	
25	Digital In Common	-		
26	24V Common ⁽⁵⁾	-	Common for internal power supply.	
27	Digital In 1	Stop - CF	115V AC, 50/60 Hz - Opto isolated Low State: less than 30V AC High State: greater than 100V AC 24V DC - Opto isolated Low State: less than 5V DC High State: greater than 20V DC 11.2 mA DC	361 - 366
28	Digital In 2	Start		
29	Digital In 3	Auto/Man.		
30	Digital In 4	Speed Sel 1		
31	Digital In 5	Speed Sel 2		
32	Digital In 6/Hardware Enable, see pg. 3	Speed Sel 3		

(1) **Important:** 4-20mA operation requires a jumper at terminals 17 & 18 (or 19 & 20). Drive damage may occur if jumper is not installed.

(2) These inputs/outputs are dependant on a number of parameters (see "Related Parameters").

(3) Differential Isolation - External source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.

(4) Contacts in unpowered state. Any relay programmed as Fault or Alarm will energize (pick up) when power is applied to drive and deenergize (drop out) when a fault or alarm exists. Relays selected for other functions will energize only when that condition exists and will deenergize when condition is removed.

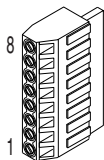
(5) 150mA maximum Load. Not present on 115V versions.

Encoder Terminal Block

Table B Encoder Terminal Designations

No.	Description (refer to User Manual for encoder specifications)	
8	+12V ⁽¹⁾ DC Power	Internal power source 250 mA.
7	+12V ⁽¹⁾ DC Return (Common)	
6	Encoder Z (NOT)	Pulse, marker or registration input. ⁽²⁾
5	Encoder Z	
4	Encoder B (NOT)	Quadrature B input.
3	Encoder B	
2	Encoder A (NOT)	Single channel or quadrature A input.
1	Encoder A	

See "Detail" in
[Figure 1](#)



- (1) Jumper selectable +5/12V is available on 20B-ENC-1 Encoder Boards.
 (2) Z channel can be used as a pulse input while A & B are used for encoder.

Figure 3 Sample Encoder Wiring

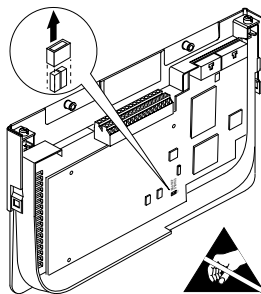
I/O	Connection Example	I/O	Connection Example
Encoder Power – (1)Internal Drive Power Internal (drive) 12V DC, 250mA		Encoder Power – External Power Source	
Encoder Signal – Single-Ended, Dual Channel		Encoder Signal – Differential, Dual Channel	

- (1) SHLD connection is on drive chassis.

Hardware Enable Circuitry

By default, the user can program a digital input as an Enable input. The status of this input is *interpreted by drive software*. If the application requires the drive to be disabled *without* software interpretation, a “dedicated” hardware enable configuration can be utilized. This is done by removing a jumper and wiring the enable input to “Digital In 6.”

1. Remove the I/O Control Cassette & cover as described on [page 1](#).
2. Locate & remove Jumper J10 on the Main Control Board (see diagram).
3. Re-assemble cassette.
4. Wire Enable to “Digital In 6” (see [Figure 2](#)).
5. Verify that [Digital In6 Sel], parameter 366 is set to “1, Enable.”

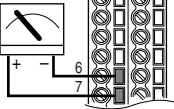
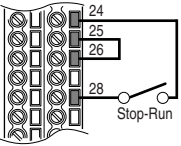
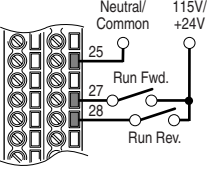
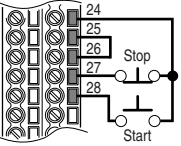
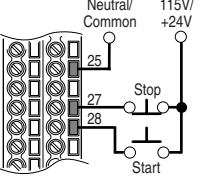
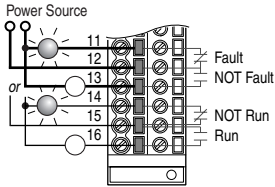
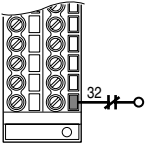


I/O Wiring Examples

Input/Output	Connection Example	Required Parameter Changes
Potentiometer Unipolar Speed Reference ⁽¹⁾ 10k Ohm Pot. Recommended (2k Ohm Minimum)		<ul style="list-style-type: none"> Adjust Scaling: Parameters 91/92 and 325/326 View Results: Parameter 002
Joystick Bipolar Speed Reference ⁽¹⁾ ±10V Input		<ul style="list-style-type: none"> Set Direction Mode: Parameter 190 = "1, Bipolar" Adjust Scaling: Parameters 91/92 and 325/326 View Results: Parameter 002
Analog Input Bipolar Speed Reference ±10V Input		<ul style="list-style-type: none"> Set Direction Mode: Parameter 190 = "1, Bipolar" Adjust Scaling: Parameters 91/92 and 325/326 View Results: Parameter 002
Analog Voltage Input Unipolar Speed Reference 0 to +10V Input		<ul style="list-style-type: none"> Configure Input with parameter 320 Adjust Scaling: Parameters 91/92 and 325/326 View results: Parameter 002
Analog Current Input Unipolar Speed Reference 4-20 mA Input		<ul style="list-style-type: none"> Configure Input for Current: Parameter 320 and add jumper at appropriate terminals Adjust Scaling: Parameters 91/92 and 325/326 View results: Parameter 002
Analog Input, PTC PTC OT set > 5V PTC OT cleared < 4V PTC Short < 0.2V		<ul style="list-style-type: none"> Set Fault Config 1: Parameter 238, bit 7 = "Enabled" Set Alarm Config 1: Parameter 259, bit 11 = "Enabled" View Status Drive Alarm 1: Parameter 211, bit 11 = "True"
HW PTC Input PTC OT set > 5V PTC OT cleared < 4V PTC Short < 0.2V		<ul style="list-style-type: none"> Set Fault Config 1: Parameter 238, bit 13 = "Enabled" Set Alarm Config 1: Parameter 259, bit 18 = "Enabled" View Status: Drive Alarm 1: Parameter 211, bit 18 = "True"

(1) Refer to the Attention statement User Manual for important bipolar wiring information.

I/O Wiring Examples (continued)

Input/Output	Connection Example	Required Parameter Changes
Analog Output ±10V, 4-20 mA Bipolar +10V Unipolar (shown)		<ul style="list-style-type: none"> • Configure with Parameter 340 • Select Source Value: Parameter 380, [Digital Out1 Sel] • Adjust Scaling: Parameters 343/344
2-Wire Control Non-Reversing⁽¹⁾ 24V DC internal supply		<ul style="list-style-type: none"> • Disable Digital Input:#1: Parameter 361 = "0, Unused" • Set Digital Input #2: Parameter 362 = "7, Run" • Set Direction Mode: Parameter 190 = "0, Unipolar"
2-Wire Control Reversing⁽¹⁾ External supply (I/O Board dependent)		<ul style="list-style-type: none"> • Set Digital Input:#1: Parameter 361 = "8, Run Forward" • Set Digital Input #2: Parameter 362 = "9, Run Reverse"
3-Wire Control Internal supply		<ul style="list-style-type: none"> • No Changes Required
3-Wire Control External supply (I/O Board dependent). Requires 3-wire functions only ([Digital In1 Sel]). Using 2-wire selections will cause a type 2 alarm.		<ul style="list-style-type: none"> • No Changes Required
Digital Output Relays (two at terminals 14-16) shown in powered state with drive faulted.		<ul style="list-style-type: none"> • Select Source to Activate: Parameters 380/384
Enable Input		<ul style="list-style-type: none"> • Configure with parameter 366 For dedicated hardware Enable: Remove Jumper J10 (see 3)

(1) **Important:** Programming inputs for 2 wire control deactivates all HIM Start buttons.