

Part Numbers: AO-08, AO-12.

Applicability: F7, G7, GPD515/G5, G5 HHP.

Note: If used in a GPD503/G3, refer to Instruction Sheet 02Y00025-0297.

Introduction: The AO-08 and AO-12 analog output option cards are mounted on the drive's control board and enables the user to employ precision analog signals to monitor drive outputs (U1-XX) as indicated in tables 4 and 5.

Receiving: All equipment is tested against defect at the factory. Report any damages or shortages evident when the equipment is received to the commercial carrier who transported the equipment.

Warning: Hazardous voltage can cause severe injury or death. Lock all power sources feeding the drive in the "OFF" position.

Caution: This option card uses CMOS IC chips. Use proper electrostatic discharge (ESD) protective procedures when handling the card to prevent I.C. damage or erratic drive operation.

Important:

- a) If this option is being installed in a drive with an encoder (PG) feedback option card, that card will need to be temporarily removed to allow access to connector 3CN on the drive's control board and TD1-TD3 on the AO-08 / AO-12 option card.
- b) Before installing this option, a technically qualified individual, who is familiar with this type of equipment and the hazards involved, should read this entire installation guide.

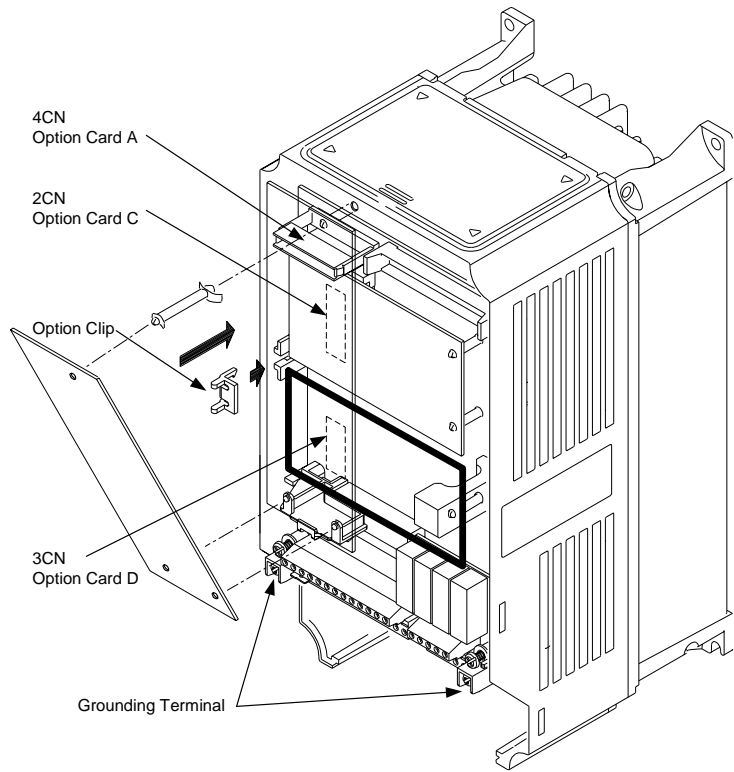


Figure 1. AO-08 / AO-12 Option Card Installation

Installation and Wiring:

1. Disconnect all electrical power to the drive.
2. Remove the drive's front cover.
3. Check that the "CHARGE" indicator lamp inside the drive is off.
4. Use a voltmeter to verify that the voltage at the incoming power terminals (L1, L2, L3) has been disconnected.
5. **Option Card Installation:** See Figure 1.
 - a) Position the option card above the control board's 3CN connector and gently press the card into place.
 - b) Connect the green ground wire to the grounding terminal on the main control board.
6. **Wiring:** Refer to Figure 2 and Table 2. Make wire connections between the AO-08 / AO-12 card and the drive as well as all peripheral devices. Observe the following:
 - a) Keep the option card (i.e. control circuit) wiring separate from main circuit input/output wiring. A separate metallic grounded conduit with only the option card's wiring running through it is preferred.
 - b) To prevent erroneous operation caused by noise interference, use shielded cable for control signal wires. Limit the distance to 50m (165 feet) or less.
 - c) Connect the option card ground wire (E) to the drive's ground terminal TB3 (12 for G5).
7. **Adjustment:** There are no adjustments to be made on the AO-08 / AO-12 options; however, the drive must be programmed for the output requirements of the peripheral devices. See Tables 3-5.
8. Reinstall and secure the drive's front cover.
9. Place this instruction sheet with the drive's technical manual.

Table 1. Specifications		
Parameter	AO-08 Card	AO-12 Card
Output Resolution	8 bit (1/256)	11 bit + sign (1/2048)
Output Voltage	0 to +10VDC (non-Isolated)	-10 to +10VDC (non-Isolated)
Output Channels	2	2

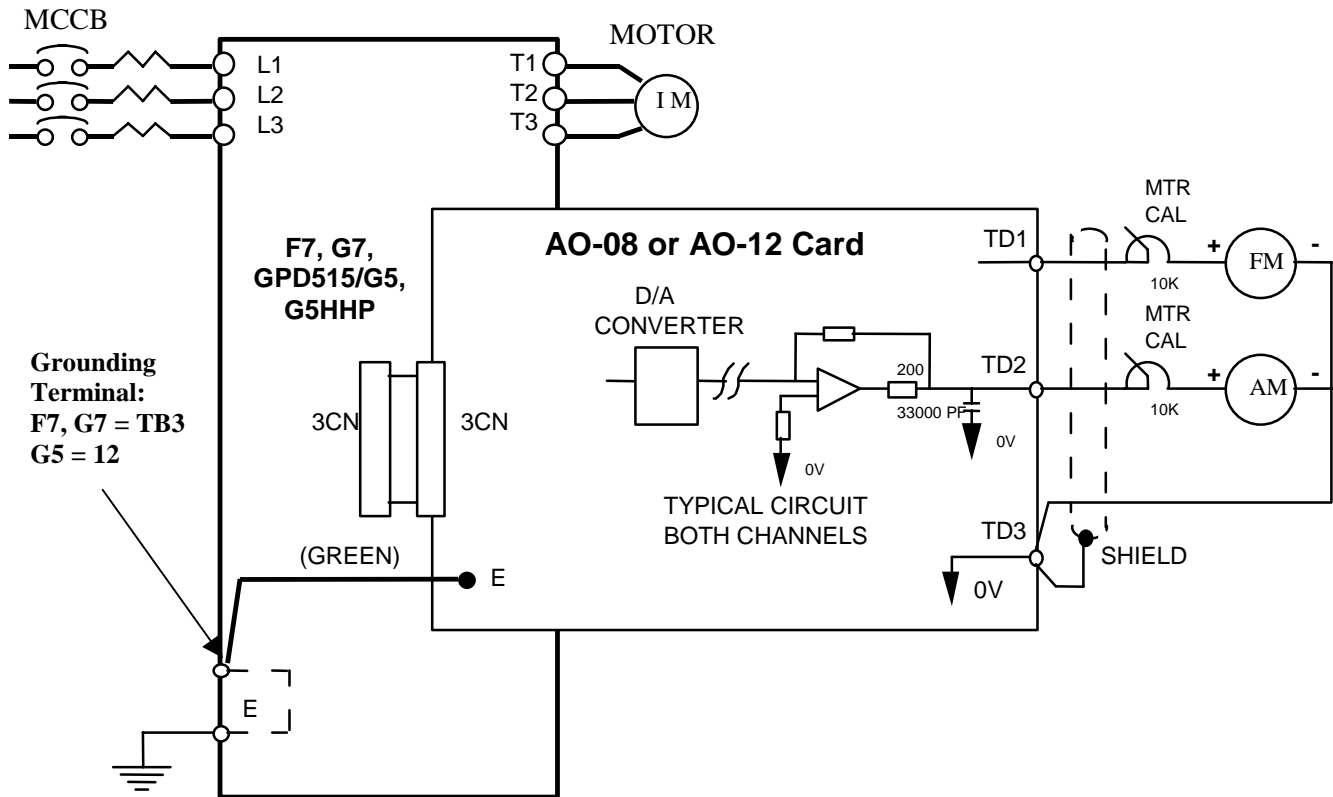


Figure 2. AO-08 / AO-12 Interconnection Diagram

Table 2. Terminal Functions of the AO-08 and AO-12					
Terminal	Functions	Signal Level ⁽¹⁾			
		F7/G7		GPD515/G5	
		AO-08	AO-12	AO-08	AO-12
TD1	Analog signal output channel 1	0-10VDC	0-10VDC or +/-10VDC	0-10VDC	0-10VDC or +/-10VDC
TD2	Analog signal output channel 2				
TD3	Output Common	0V			

(1) F7/G7: Selectable by setting of drive parameters F4-07 (TD1) and F4-08 (TD2).
GPD515/G5: Selectable by setting of drive parameter H4-07.

Table 3. Adjustment of Output Signal Scaling						
Drive	Terminal	Gain Parameter ⁽¹⁾	Setting Range	Increment	Factory Setting	Remarks
F7/G7	TD1	F4-02	0.0-1000.0%	0.1%	100%	10VDC / 100 % ⁽²⁾
	TD2	F4-04	0.0-1000.0%	0.1%	50%	
GPD 515/G5	TD1	F4-02	0.00 to 2.50	0.01	1.00	10VDC / 1.00 ⁽²⁾
	TD2	F4-04	0.00 to 2.50	0.01	0.50	

(1) A gain of 0.5 will set 5VDC = 100%; a gain of 2.0 will set 10VDC = 50%.
(2) Maximum output signal level is +11VDC.

Table 4. Selecting the Monitored Output (GPD515/G5)

Terminal	Parameter	Set Value	Control Method ⁽¹⁾	Output Monitor	Scaling
TD1 or TD2	F4-01 or F4-03	1	0, 1, 2, 3	Frequency Reference	10V/100%
		2	0, 1, 2, 3	Output Frequency	10V/100%
		3	0, 1, 2, 3	Output Current	10V/drive rated current
		5	1, 2, 3	Motor Speed	10V/100%
		6	0, 1, 2, 3	Output Voltage	10V/200VAC (400VAC)
		7	0, 1, 2, 3	DC Bus Voltage	10V/400VDC (800VDC)
		8	0, 1, 2, 3	Output Power (kW)	10V/100%
		9	2, 3	Torque Reference	10V/100%
		15	0, 1, 2, 3	Terminal 13 Input	10V/10V
		16	0, 1, 2, 3	Terminal 14 Input	10V/10V (20mA)
		17	0, 1, 2, 3	Terminal 16 Input	10V/10V
		18	0, 1, 2, 3	Motor Secondary Current (I _q)	10V/motor rated current
		19	2, 3	Motor Exciting Current (I _d)	10V/motor rated current
		20	0, 1, 2, 3	Output Frequency After Soft-Start (SFS)	10V/100%
		21	1, 3	ASR Input	10V/100%
		22	1, 3	ASR Output	10V/motor rated current
		23	1, 3	Speed Deviation / Speed Regulator Input	10V/100%
		24	0, 1, 2, 3	PID Feedback	10V/100%
		26	2, 3	Output Voltage Reference (V _q)	10V/230V (460V)
27	2, 3	Output Voltage Reference (V _d)	10V/230V (460V)		

(1) Output available only when using one of the listed control methods (A1-02 setting):

0: V/Hz Mode, 1: V/Hz with Encoder (PG), 2: Open Loop Vector, 3: Closed Loop Flux Vector

Table 5. Selecting the Monitored Output (F7/G7)

Terminal	Parameter	Set Value	Control Method ⁽¹⁾	Output Monitor	Scaling
TD1 or TD2	F4-01 or F4-03	1	0,1,2,3,4	Frequency Reference	10V: Maximum output frequency (0 ~ ± 10V possible)
		2	0,1,2,3,4	Output Frequency	10V: Maximum output frequency (0 ~ ± 10V possible)
		3	0,1,2,3,4	Output Current	10V: Drive rated output current (0 ~ 10V, absolute value)
		5	1,2,3,4	Motor Speed	10V: Maximum output frequency (0 ~ ± 10V possible)
		6	0,1,2,3,4	Output Voltage	10V: 200VAC (400VAC)
		7	0,1,2,3,4	DC Bus Voltage	10V: 400VDC (800VDC)
		8	0,1,2,3,4	Output Power	10V: Drive capacity kW (0 ~ ± 10V possible)
		9	2,3,4	Torque Reference	10V: Motor rated torque (0 ~ ± 10V possible)
		15	0,1,2,3,4	Terminal A1 Input	10V: 100% (at 10V input) (0 ~ ± 10V possible)
		16	0,1,2,3,4	Terminal A2 Input	10V: 100% (at 10V input) (0 ~ ± 10V possible)
		17	0,1,2,3,4	Terminal A3 Input	10V: 100% (at 10V input) (0 ~ ± 10V possible)
		18	0,1,2,3,4	Motor Secondary Current (Iq)	10V: Motor rated secondary current (0 ~ ± 10V possible)
		19	2,3,4	Motor Excitation Current (Id)	10V: Motor rated secondary current (0 ~ ± 10V possible)
		20	0,1,2,3,4	Output Frequency after Soft-Starter (SFS)	10V: Maximum output frequency (0 ~ ± 10V possible)
		21	1,3,4	ASR Input	10V: Maximum output frequency (0 ~ ± 10V possible)
		22	1,3,4	ASR Output	10V: Motor rated secondary current (0 ~ ± 10V possible)
		24	0,1,2,3,4	PID Feedback	10V: Maximum output frequency (0 ~ ± 10V possible)
		26	2,3,4	Output Voltage Reference (Vq)	10V: 200VAC (400VAC) (0 ~ ± 10V possible)
		27	2,3,4	Output Voltage Reference (Vd)	10V: 200VAC (400VAC) (0 ~ ± 10V possible)
		32	2,3,4	ACR (q) Output	10V: 100% (0 ~ ± 10V possible)
		33	2,3,4	ACR (d) Output	10V: 100% (0 ~ ± 10V possible)
		36	0,1,2,3,4	PID Input (Error)	10V: 100% (0 ~ ± 10V possible)
		37	0,1,2,3,4	PID Output	10V: Maximum output frequency (0 ~ ± 10V possible)
		38	0,1,2,3,4	PID Setpoint	10V: Maximum output frequency
		42 ⁽²⁾	4	Estimated Motor Flux	10V: Rated motor flux
43 ⁽²⁾	4	Motor Flux Current Compensation	10V: Motor rated secondary current (0 ~ ± 10V possible)		
44	3,4	ASR Output without Filter	10V: Motor rated secondary current (0 ~ ± 10V possible)		
45	3,4	Feed Forward Control Output	10V: Motor rated secondary current (0 ~ ± 10V possible)		

(1) Output available only when using one of the listed control methods (A1-02 setting):

0: V/Hz, 1: V/Hz with Encoder (PG), 2: Open Loop Vector, 3: Closed Loop Flux vector, 4: Open Loop Vector 2 ⁽²⁾

(2) G7 only.