



For GPD 515 and GPD 503  
Adjustable Frequency Drives  
and VCD 703  
Vector Control Drives

## ANALOG MONITOR (8-BIT) (AO-08)

MODEL DS390

## ANALOG MONITOR (12-BIT) (AO-12)

MODEL DS391

Before installing this option, a **TECHNICALLY QUALIFIED INDIVIDUAL**, who is familiar with this type of equipment and hazards involved, should **READ** this **ENTIRE INSTRUCTION SHEET**.

### IMPORTANT

This option may have been installed by the factory. However, certain steps can only be completed at the installation site. Therefore, review and then perform those steps which complete the installation process.

### INTRODUCTION

When installed, either of these options allows the user to employ precision analog signals to monitor outputs of the GPD 515 (U1-01, 02, 03, 05-09, 15-24, 26 & 27), the GPD 503 (output frequency, output current, output voltage, or DC voltage), or the VCD 703 (Un-03, 04, 05, 21-41, 44).

### CAUTION

**The option card uses CMOS IC chips. If proper electrostatic discharge (ESD) protective procedure is not used when handling the card, the ICs may be damaged, resulting in erratic performance of the drive.**

### INSTALLATION

1. Disconnect all electrical power to drive.
2. Remove drive front cover. Check that CHARGE indicator lamp inside drive is off.
3. Verify voltage has been disconnected by using a voltmeter to check for voltage at incoming power terminals (L1, L2, L3).

### WARNING

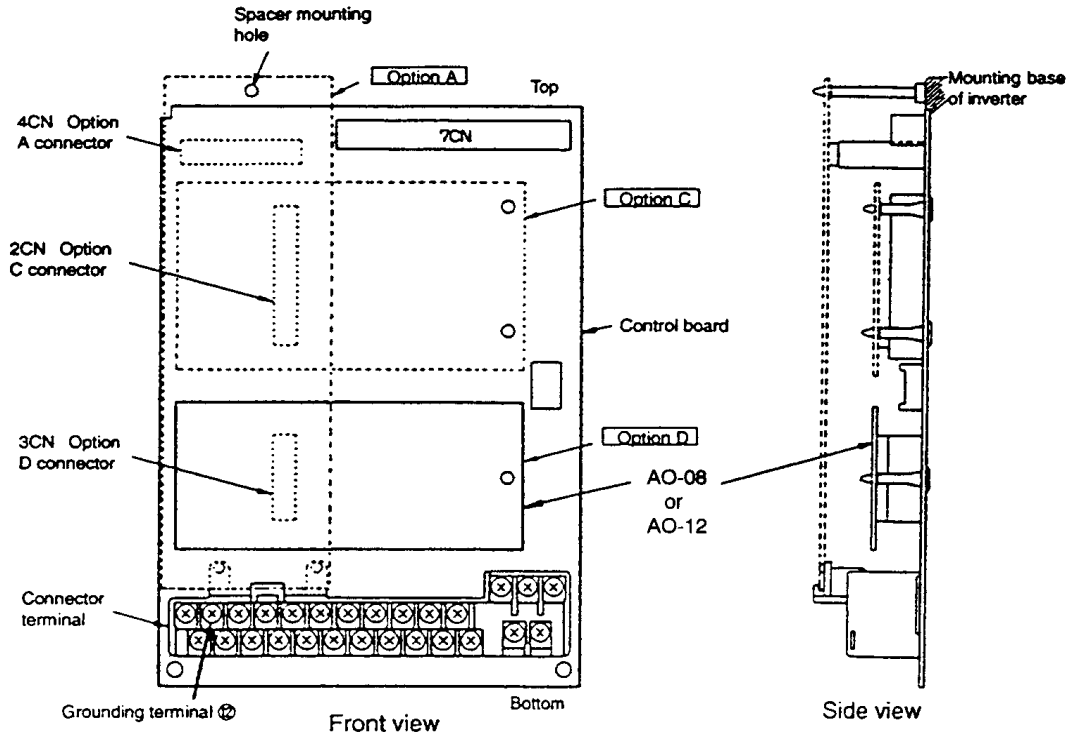
**HAZARDOUS VOLTAGE CAN CAUSE SEVERE INJURY OR DEATH. LOCK ALL POWER SOURCES FEEDING DRIVE IN "OFF" POSITION.**

CHANGE	RECORD		
1	STD-4687 3-1-91	4	STD-6155 8-9-95
2	STD-4852 6-19-91	5	STD-6491 4-16-96
3	STD-5872 8-23-94		

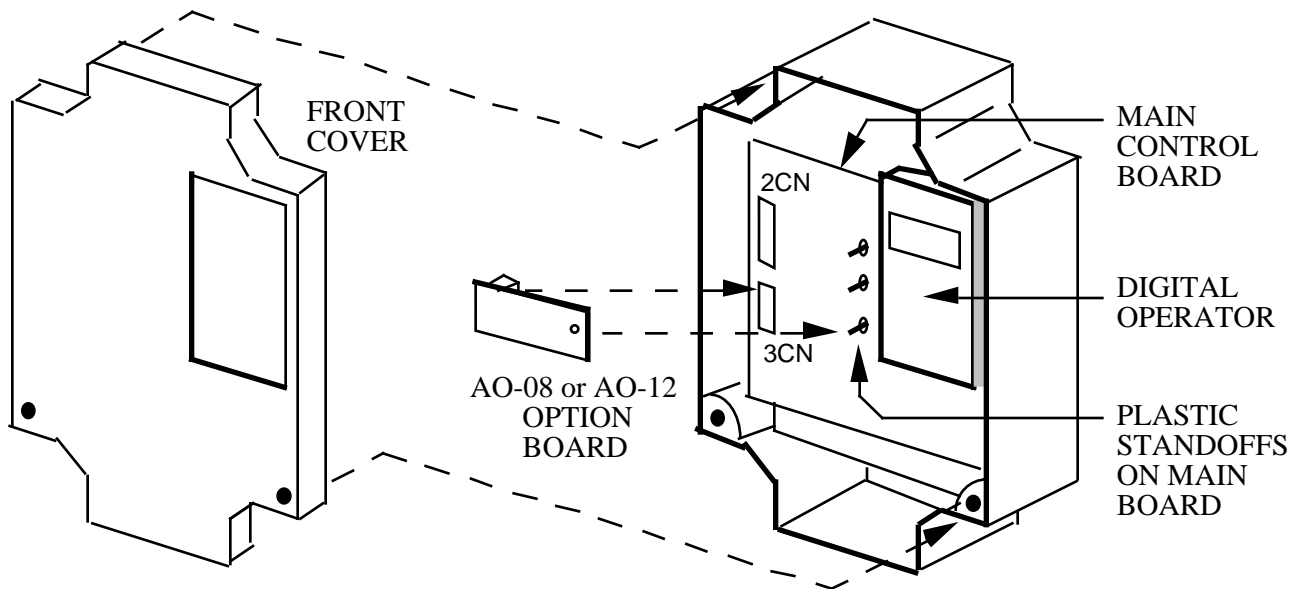
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NOTE: If this option is being installed on a GPD 515 with speed feedback, the speed feedback card needs to be temporarily un-installed to allow access to the connector 2CN on the Drive's Control Board and TD1, TD2 & TD3 on the AO-08 or AO-12 option card.

4. See Figure 1 (GPD 515) or Figure 2 (GPD 503 or VCD 703). Install the option on the Main Control Board, 1PCB, and ensure 3CN is properly connected. Make sure Electrostatic procedure is followed.



**Figure 1. Installation of Analog Monitor (AO-08) or (AO-12) in GPD 515**



**Figure 2. Installation of Analog Monitor (AO-08) or (AO-12) in GPD 503 or VCD 703**

Refer to Sheet 1 for latest change.

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**Table 1. Specifications**

Parameter	Analog Monitor (AO-08)	Analog Monitor (AO-12)
Output Resolution	8 Bits (1/256)	11 Bits + sign (1/2048)
Output Voltage	0 to +10V (non-isolated)	-10V to +10V (non-isolated)
Output Channels	2	2

Control voltage input (from GPD 515, GPD 503 or VCD 703): 24V (isolated)

5. Connect the Analog Monitor's grounding (green) wire to terminal 12 of the drive.
6. Wiring. See Figure 3 for Analog Monitor connections. See Table 2 for terminal functions.

**Table 2. Terminal Functions of AO-08 and AO-12**

Terminal	Function	Signal Level						Notes
		GPD 515		GPD 503		VCD 703		
		A0-08	A0-12	A0-08	A0-12	A0-08	A0-12	
TD1	Analog signal output channel 1	0 - 10V	0 - 10V or ±10V (1)	0 - 10V	0 - 10 V	0 - 10V	0 - 10 V or ±10V (2)	— Output impedance: 200  — Terminal screws are metric size M3.
TD2	Analog signal output channel 2							
TD3	Output Common	0V						

(1) Selectable by setting of drive parameter **H4-07**.

(2) Selectable by setting of drive constant **Sn-28** digit X X X X .

**CAUTION**

ANALOG MONITOR (I.E. CONTROL CIRCUIT) WIRING MUST REMAIN SEPARATE FROM MAIN CIRCUIT INPUT/OUTPUT WIRING.

**CAUTION**

TO PREVENT ERRONEOUS OPERATION CAUSED BY NOISE INTERFERENCE, USE SHEILDDED CABLE FOR CONTROL SIGNAL WIRING, AND LIMIT DISTANCE TO 50M (165 FEET) OR LESS.

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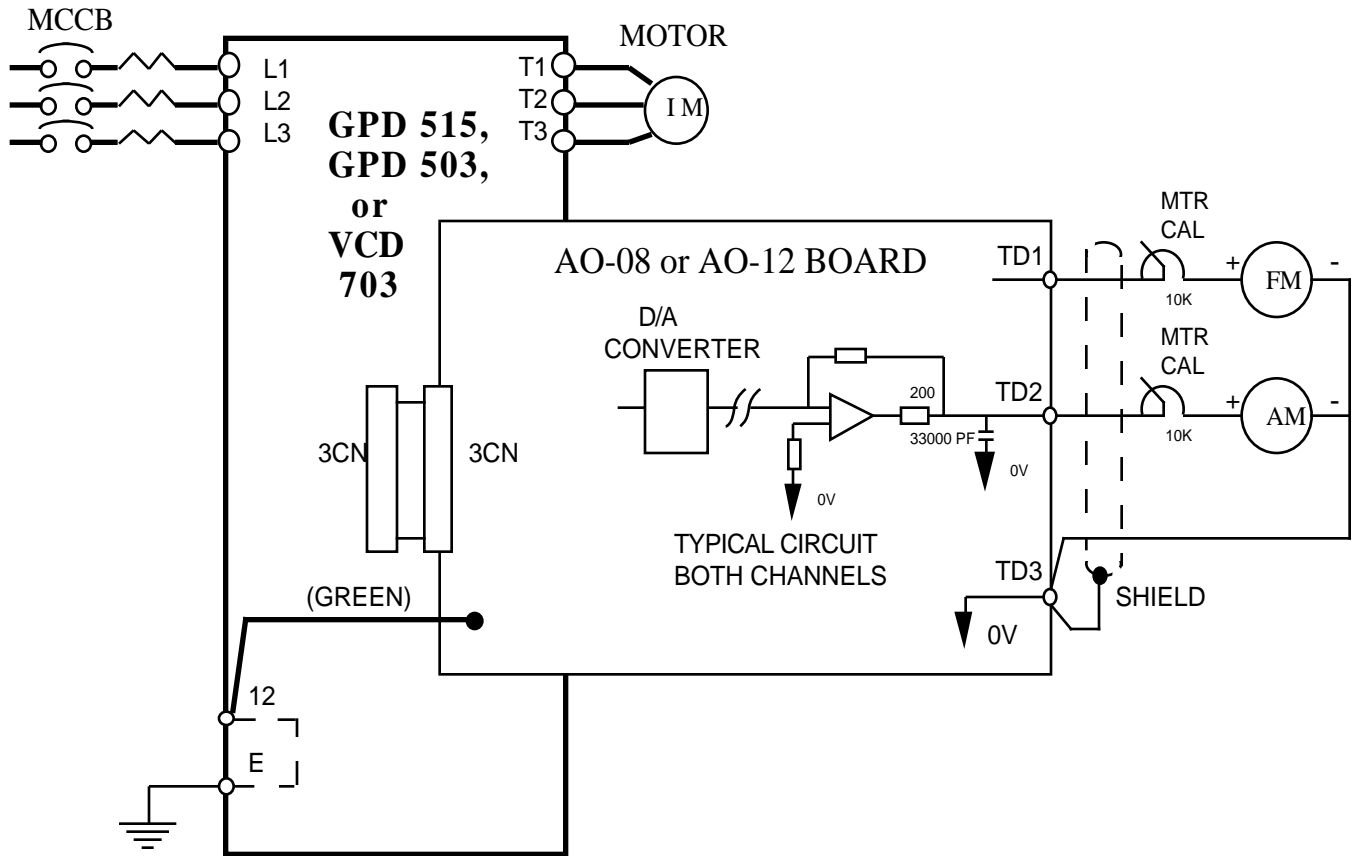


Figure 3. Interconnection for Analog Monitor (AO-08 or AO-12) Circuit

Table 3. Programming For Output Signal Scaling

Drive	Terminal	Gain <sup>(2)</sup> Parameter/ Constant	Setting Range	Increment	Factory Setting	Remarks
GPD 515	TD1	F4-02	0.00 to 2.50	0.01	1.00	10V / 1.00 <sup>(1)</sup>
	TD2	F4-04	0.00 to 2.50	0.01	0.50	10V / 1.00 <sup>(1)</sup>
GPD 503	TD1	bn-11	0.01 to 2.55	0.01	1.00	10V / 1.00 <sup>(1)</sup>
	TD2	bn-12	0.01 to 2.55	0.01	0.50	10V / 1.00 <sup>(1)</sup>
VCD 703	TD1	bn-23	0.0 to 10.000	0.001	1.000	10V / 1.000 <sup>(1)</sup>
	TD2	bn-25	0.0 to 10.000	0.001	1.000	10V / 1.000 <sup>(1)</sup>

<sup>(1)</sup> Output signal level can be up to +11V by setting program parameters/constants.

<sup>(2)</sup> A gain of 0.5 will set 5V = 100%; a gain of 2.0 will set 10V = 50%.

7. Adjustments. There are no adjustments to be made on the Analog Monitor option; however, the drive must be reprogrammed for the output requirements of the peripheral devices. See Tables 4 – 6.

**Table 4. Selecting Monitored Output (GPD 515)**

Terminal	Program Parameter	Set Value	Control Method *	Output Monitored	Output
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/200V or 10V/400V
		7	0, 1, 2, 3	DC Bus Voltage	10V/400V or 10V/800V
		8	0, 1, 2, 3	Output power (kW)	10V/100%
		9	2, 3	Torque Reference (internal)	10V/100%
		15	0, 1, 2, 3	Terminal 13 Input Voltage	10V/10V
		16	0, 1, 2, 3	Terminal 14 Input Voltage or Current	10V/10V or 10V/20mA
		17	0, 1, 2, 3	Terminal 16 Input Voltage	10V/10V
		18	0, 1, 2, 3	Motor Secondary Current (Iq)	10V/motor rated current
		19	2, 3	Motor Exciting Current	10V/motor rated current
		20	0, 1, 2, 3	Output Frequency After Soft-Start	10V/100%
		21	1, 3	Automatic Speed Regulator Input	10V/100%
		22	1, 3	Automatic Speed Regultaor Output	10V/motor rated current
		23	1, 3	Speed Deviation Regulator Output	10V/100%
24	0, 1, 2, 3	PID Feedback Amount	10V/100%		
26	2, 3	Output Voltage Reference Vq	10V/230V or 10V/460V		
27	2, 3	Output Voltage Reference Vd	10V/230V or 10V/460V		

\* Output available only when using one of the listed control methods  
( **A1-02** setting)  
0 : V/Hz mode  
1 : V/Hz mode with pulse generator (speed feedback)  
2 : Open Loop Flux Vector  
3 : Flux Vector

**Table 5. System Constant Sn-28 – Selecting Monitored Output (GPD 503)**

<b>Terminal</b>	<b>Sn-28 * Digits</b>	<b>Set Value</b>	<b>Output Monitored</b>	<b>Output Accuracy</b>
TD1 Channel 1	X X <u>X X</u>	00	Output frequency (Max frequency/100%)	0.5%
		01	Output current (GPD 503 rated current/100%)	3.0%
TD2 Channel 2	<u>X X</u> X X	10	Output voltage ref. (Input voltage/100%)	1.5%
		11	DC voltage ( $V_{pn}$ ) (400V/100% [230V drives]) (800V/100% [460V drives])	1.5%

\* Factory setting of Sn-28 is 0100.

**Table 6. Selecting Monitored Output (VCD 703)**

Terminal	Program Constant	Set Value	Output Monitored	Output
TD1 or TD2	bn-22 or bn-24	3	Output current	10V/CT rating
		4	Output voltage	10V/dn-04
		5	DC Bus voltage (Vpn)	10V/200V (230V rated) 10V/400V (460V rated)
		21	Speed reference (SFS input)	10V/100%
		22	Speed reference (SFS output)	10V/100%
		23	Speed feedback (Nfb)	10V/100%
		24 *	External torque reference	10V/100%
		25	Torque compensation	10V/100%
		26	Torque reference	10V/100%
		27 **	Torque feedback	10V/100%
		28	ASR input (speed deviation)	10V/100%
		29	ASR output (after filter)	10V/100%
		30	Slip frequency reference	10V/100%
		31	Primary frequency reference	10V/100%
		32	Motor temperature	10V/200°C
		33	Zero servo moving pulse count	10V/32767
		34	Auto speed reference voltage (terminal 13 or 14)	10V/10V
		35	Analog input voltage (terminal 16)	10V/10V
		36	AI-14B input voltage (CH1)	10V/10V
		37	AI-14B input voltage (CH2)	10V/10V
38	AI-14B input voltage (CH3)	10V/10V		
39	Magnetic flux feedback (phase )	10V/100%		
40	Magnetic flux feedback (pahse )	10V/100%		
41	ACR compensation	10V/100%		
44	Output power (kW)	10V/100%		

\* When in Torque Control mode.

\*\* When TRQ-A card is used.

8. Reinstall and secure drive cover.
9. Place this instruction sheet with the drive technical manual.

THIS COMPLETES INSTALLATION OF THIS OPTION.