

Part Number: AI-040 Kit (UTC000015 Card) (formerly AI-14B2).

Applicability: F7, G7, GPD515/G5.

Note: If used in a GPD503/G3, refer to Instruction Sheet 02Y00025-0431.

Introduction: The AI-040 isolated analog input option board is mounted on the drive's control board and enables the user to employ precision isolated analog signals to interface three separate high resolution analog input signals, each of which may be either current or voltage (13-bit + sign). These signals are isolated from ground and the drive, but NOT from each other. These signals can act as a direct replacement for the three existing analog inputs available on the drive (3-channel individual mode), or the signals can be added together and used as a single frequency reference (3-channel addition mode). Gain and bias are adjustable for both modes using drive parameters. The polarity (sign) of the analog input can be used to control items such as motor direction and torque direction.

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:

1. 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 2CN on the drive's control board and TC1 – TC4 on the AI-040 option card.
2. 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.

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. Position the option card above the control board's 2CN connector and gently press the card into place.
6. **Wiring:** Refer to Figure 3 and Tables 1 & 2. Make wire connections between the AI-040 card and the drive as well as all peripheral devices. Observe the following:
 - a) Determine whether a voltage or current signal will be used for each of the channels of the AI-040 card. Set selection jumpers accordingly. See Figure 2.
 - b) Keep the AI-040 (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.
 - c) To prevent erroneous operation caused by noise interference, use shielded cable for control signal wiring. Limit the distance to 10m (33 feet) or less.

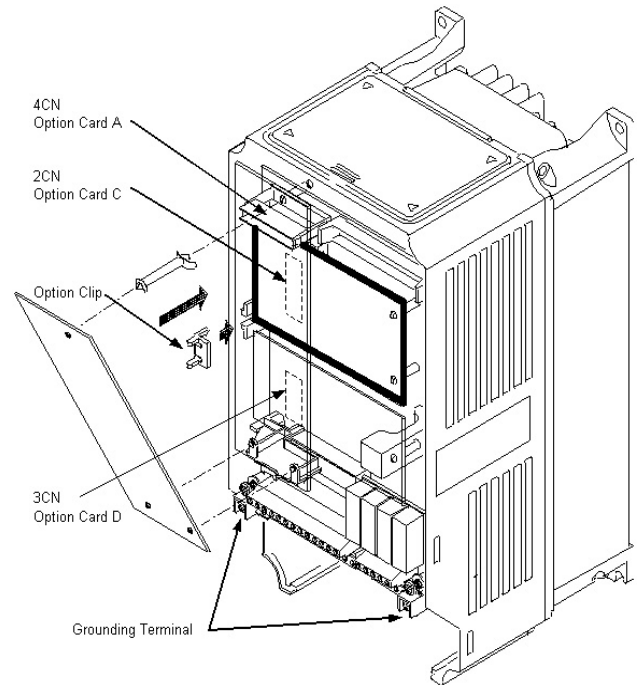


Figure 1. AI-040 Option Card installation

Table 1. Specifications	
Parameter	Value
Input Signal Level	0 to +/- 10VDC (Input Impedance: 20Kohms) 0 to 20mA (Input Impedance: 500ohms)
Input Resolution	Voltage: 13 bit (1/8192) + sign Current: 1/6554

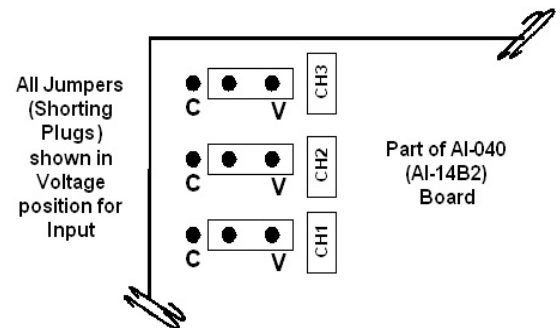


Figure 2. Voltage/Current Selection Jumpers

- d) If any of the control signal input terminals (TC1-TC3) are NOT used, jumper them to 0V Terminal (TC4).
- e) Route wires from the drive and connect to the peripheral device. Refer to the drive technical manual for further information on use of shielded cable.
- f) Connect the option card ground wire (G1) to the drive's ground terminal TB3 (12 for G5).

Important: Because the analog input is high-resolution, the voltage source accuracy of the analog input must be considered. To ensure accuracy, use a high-precision power supply for the voltage source.

- 7. **Adjustment.** There are no adjustments to be made on the AI-040 option; however, the drive will have to be programmed for the input requirement(s) of the remote device and the reversing or non-reversing requirement of the specific application. Refer to Figures 4 and 5, and Table 3.
- 8. Reinstall and secure the drive's front cover.
- 9. Place this instruction sheet with the drive's technical manual.

Table 2. Terminal Functions of the AI-040			
Terminal	Function	Signal Level	Notes
TC1	Analog Voltage/Current Input	Voltage Input: Input Voltage: 0 to +/-10V/0 to +/-100% Input Impedance: 20Kohms	- Input Resolution: Voltage: 1/8192 (13bit) + sign Current: 1/6554 - Signal Linearity: +/-0.1% - Terminal screws are metric size M3
TC2	Analog Voltage/Current Input		
TC3	Analog Voltage/Current Input	Current Input: Input Current: 0 to 20mA/0 to 100% Input Impedance: 500ohms	
TC4	Signal Common	0V	

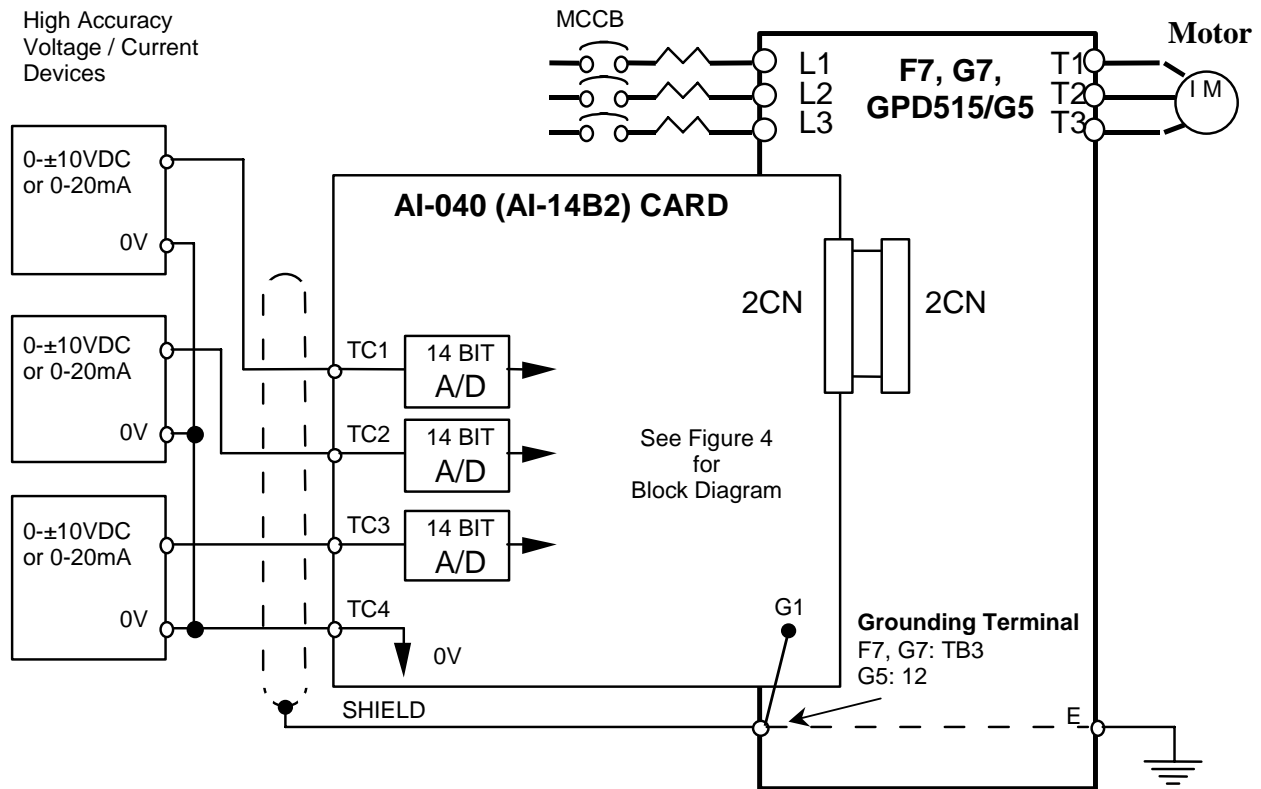


Figure 3. AI-040 Interconnection Diagram

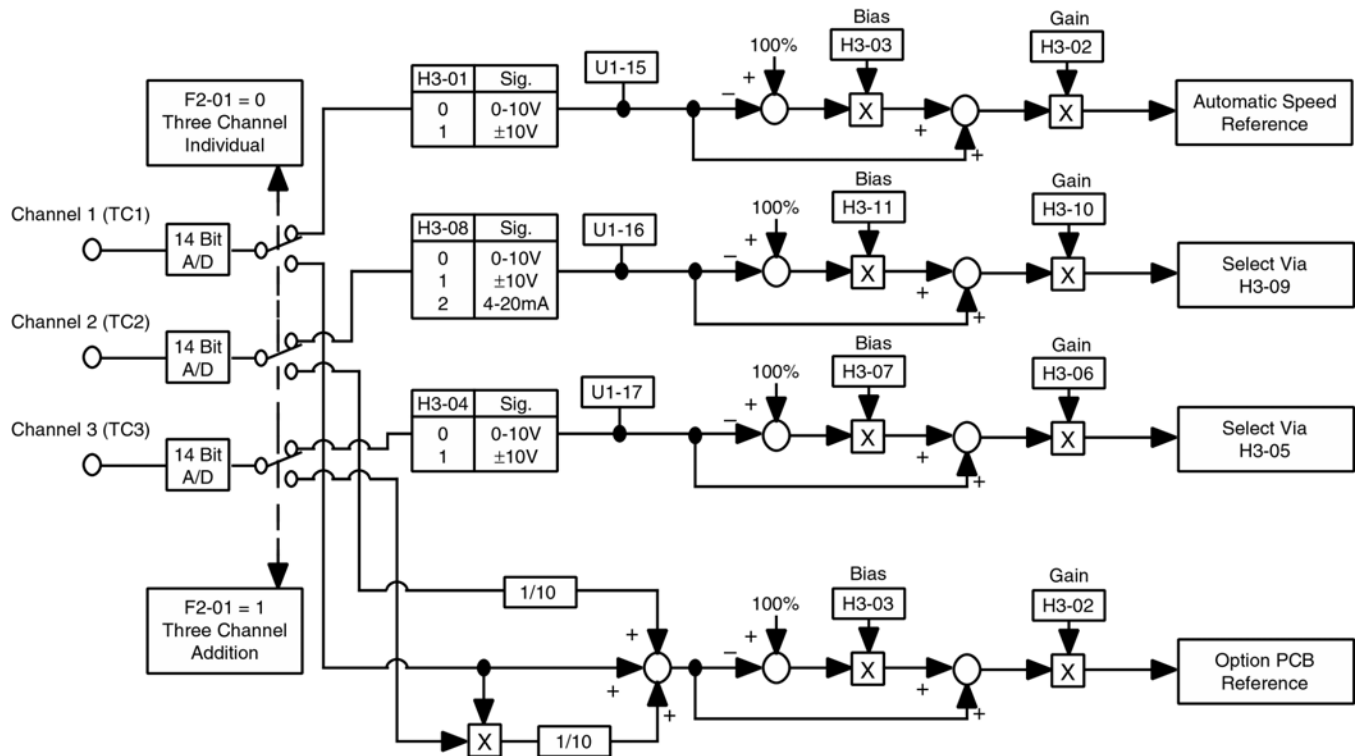


Figure 4. AI-040 Block Diagram

Figure 4 shows two possible modes of operation for the AI-040 option board when installed in the drive. These modes are selected by drive parameter F2-01 (Input Selection). When F2-01 is set to "0", 3-channel individual mode is selected. In this mode, the AI-040 option replaces the analog inputs on the drive's main control board. See Table 3.

When F2-01 is set to "1", 3-channel addition mode is selected. In this mode, the AI-040 option adds the three channels together as shown above. This composite signal becomes the primary speed reference when the reference source parameter is set to "Option PCB" (b1-01 = 3).

Model	AI-040 Terminal	F7/G7 Control Board Terminal	GPD 515/G5 Control Board Terminal	Gain Parameter ⁽³⁾	Bias Parameter ⁽³⁾
3-Channel Individual ⁽¹⁾	TC1	A1	13	H3-02	H3-03
	TC2	A2	14	H3-10	H3-11
	TC3	A3	16	H3-06	H3-07
3-Channel Addition ⁽²⁾	TC1	Speed Reference when b1-01=3	Speed Reference when b1-01=3	H3-02	H3-03
	TC2				
	TC3				

- (1) When using the 3-Channel Individual Mode,
 Channel 1 (TC1) becomes the primary speed reference.
 Channel 2 (TC2) can be configured using parameter H3-09.
 Channel 3 (TC3) can be configured using parameter H3-05.

- (2) To use the 3-Channel Addition Mode, parameter b1-01 (Reference Source) must be set to "3" (Option PCB)
 Frequency Reference = $TC1 + \frac{TC2}{10} + \frac{TC3}{10} \times TC1$

- (3) See Figure 5.

- (4) **Warning:** If the application requires that reverse motor rotation be prohibited, Parameter b1-04 must be set to "1" so the motor will stop whenever the polarity of the input signal becomes negative.

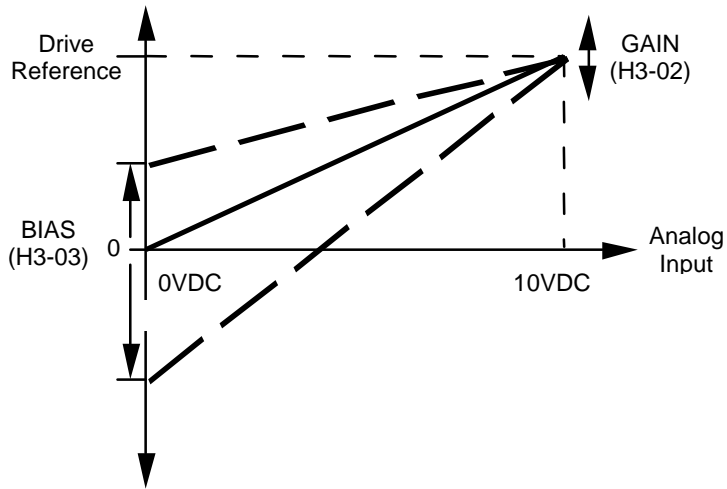


Figure 5. Gain & Bias Adjustments – Shown for Channel 1 (TC1)