

DVP-EH

DVP04AD-H Analog Input Module Instruction Sheet

1 WARNING

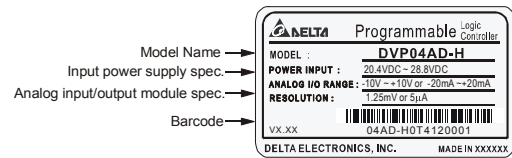
- Please carefully read this instruction thoroughly prior to use the DVP04AD-H.
- The DC input power must be OFF before any maintenance.
- This is an OPEN-TYPE built-in DVP04AD-H, and the DVP04AD-H is certified to meet the safety requirements of IEC 61131-2 (UL 508) when installed in the enclosure to prevent high temperature, high humidity, excessive vibration, corrosive gases, liquids, airborne dust or metallic particles. Also, it is equipped with protective methods such as some special tool or key to open the enclosure, in order to prevent the hazard to users and the damage to the DVP04AD-H.
- Do not connect the AC power to any of the input/output terminals, or it may damage the DVP04AD-H. Make sure that all the wiring is well conducted prior to power on.
- Do not touch the internal circuit for at least 1 minute after the power OFF.
- Make sure that the DVP04AD-H is properly grounded to prevent any electromagnetic noise.

2 INTRODUCTION

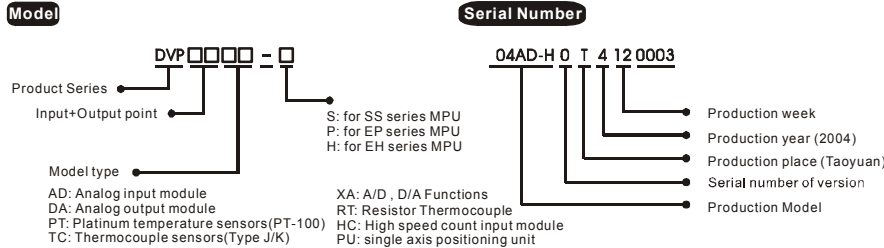
2.1 Model Explanation and Peripherals

- Thank you for choosing DELTA's PLC DVP Series. The analog input module receives external 4-point analog signal input (voltage or current) and converts it into 14 bits digital signal. The analog input module of DVP04AD-H series can read/write the data of analog input module by using instructions FROM / TO via DVP-PLC EH Series MPU program. There are 49 CR (Control Register, each register has 16-bit) in each module.
- Software version of DVP04AD-H analog input module can be updated via RS-485 communication.
- Users can select input from voltage or current via wiring. Voltage input range is $\pm 10V$ DC (resolution is 1.25 mV). Current input range is ± 20 mA (resolution is 5 μA).

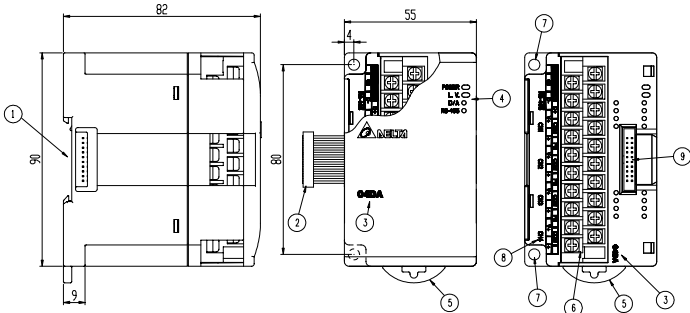
■ Nameplate Explanation



■ Model Explanation

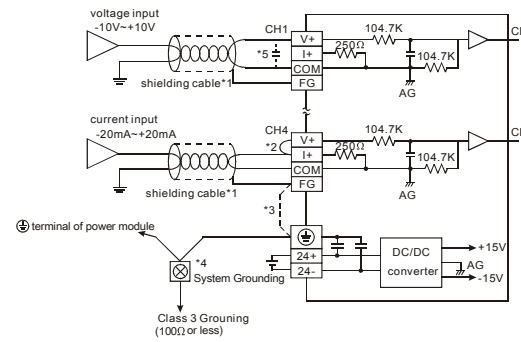


2.2 Product Profile and Outline



- | | |
|--|---|
| 1. DIN rail track (35mm) | 6. Terminals |
| 2. Mounting hole for wire to connect extension unit/extension module | 7. Mounting hole |
| 3. Model name | 8. Terminal layout |
| 4. Indicator for power, error and run status | 9. Mounting port to connect extension unit/extension module |
| 5. DIN rail clip | |

2.3 External wiring



- Note 1: Please isolate analog input and other power wiring.
- Note 2: If connect to current signal, please short out between V+ and I+ terminals.
- Note 3: If noise is significant, please connect FG to ground.
- Note 4: Please connect terminal of power module and terminal of analog input module to system earth point and make system earth point be grounded or connects to machine cover.
- Note 5: If the noise interference from loaded wire input terminal is significant, please connect a capacitor with 0.1~0.47 μF 25V for noise filtering.

Warning: DO NOT wire to the No function terminal.

3 STANDARD SPECIFICATIONS

3.1 Function Specifications

Analog/ Digital (4A/D) module	Voltage input	Current input
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (-15%~+20%)	
Analog input channel	4 channel / each module	
Analog input range	$\pm 10V$	± 20 mA
Digital conversion range	± 8000	± 4000
Resolution	14 bits($1_{LSB}=1.25$ mV)	13 bits ($1_{LSB}=5$ μA)
Input impedance	200 K Ω or above	250 Ω
Overall accuracy	$\pm 0.5\%$ of full scale of 25 $^{\circ}C$ (77 $^{\circ}F$) $\pm 1\%$ of full scale during 0~55 $^{\circ}C$ (32~131 $^{\circ}F$)	
Response time	3 ms \times channels	
Isolation Method	It has isolation between digital area and analog area. There is no isolation among channels.	
Absolute input range	± 15 V	± 32 mA
Digital data format	2's complementary of 16-bit, 13 Significant Bits	
Average function	Yes (CR#2~CR#5 can be set and setting range is K1~K4096)	
Self diagnose function	Upper and lower bound detection / channels	
Communication mode (RS-485)	Either in ASCII or in RTU mode, communication rate can be 4800 /9600 /19200 /38400 /57600 /115200. Communication format of ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1). Can't use RS-485 if the connection to PLC MPU is in series.	
Connect to DVP-PLC MPU in series	If DVP04AD-H modules are connected to MPU, the modules are numbered from 0 - 7. 0 is the closest and 7 is the furthest to the MPU. 8 modules is the max and they do not occupy any digital I/O points of the MPU.	

3.2 Other Specification

Power Specification	
Max. Rated Consuming Power	24 VDC(20.4VDC~28.8VDC) (-15%~+10%), 2W, supply from external power
Environment Condition	
Environment Condition	Follow the DVP-PLC MPU
Spec. of Prevent Static Electricity	All places between terminals and ground comply with the spec.

4 CR (Control Register)

DVP04AD-H analog signal input module				Explanation															
CR No.	RS-485 Parameter address	Latched	Register name	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
#0	H 4000	<input type="radio"/>	Model type	System used. DVP04AD-H model code =H 400															
#1	H 4001	<input type="radio"/>	Input mode setting	Reserved CH4 CH3 CH2 CH1 Input mode setting: factory setting is H0000. Mode 0: input voltage mode (-10V~+10V). Mode 1: input voltage mode (-6V~+10V). Mode 2: input current mode (-12mA~+20mA) Mode 3: input current mode (-20mA~+20mA) Mode 4: none use.															
#2	H 4002	<input type="radio"/>	CH1 average times	The number of readings used for calculating "average" temperature on channels CH1~CH4. Setting range is K1~K4096 and factory setting is K10.															
#3	H 4003	<input type="radio"/>	CH2 average times																
#4	H 4004	<input type="radio"/>	CH3 average times																
#5	H 4005	<input type="radio"/>	CH4 average times																
#6	H 4006	<input checked="" type="radio"/>	average value of CH1 input signal																
#7	H 4007	<input checked="" type="radio"/>	average value of CH2 input signal	Display average value of CH1~CH4 input signal															
#8	H 4008	<input checked="" type="radio"/>	average value of CH3 input signal																
#9	H 4009	<input checked="" type="radio"/>	average value of CH4 input signal																
#10 ~ #11	Reserved																		
#12	H 400C	<input checked="" type="radio"/>	present value of CH1 input signal	Display present value of CH1~CH2 input signal															

DVP04AD-H analog signal input module				Explanation															
CR No.	RS-485 Parameter address	Latched	Register name	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
#13	H 400D	<input checked="" type="radio"/>	Present value of CH2 input signal	Display the present value of CH3~CH4 input signal															
#14	H 400E	<input checked="" type="radio"/>	Present value of CH3 input signal																
#15	H 400F	<input checked="" type="radio"/>	Present value of CH4 input signal																
#16 ~ #17	Reserved																		
#18	H 4012	<input type="radio"/>	To adjust OFFSET value of CH1	Offset setting of CH1~CH4. Factory setting is K0 and unit is LSB. Voltage input: setting range is K-4000 ~K4000 Current input: setting range is K-4000 ~K4000															
#19	H 4013	<input type="radio"/>	To adjust OFFSET value of CH2																
#20	H 4014	<input type="radio"/>	To adjust OFFSET value of CH3																
#21	H 4015	<input type="radio"/>	To adjust OFFSET value of CH4																
#22 ~ #23	Reserved																		
#24	H 4018	<input type="radio"/>	To adjust GAIN value of CH1	GAIN setting of CH1~CH4. Factory setting is K4000 and unit is LSB. Voltage input: setting range is K-3200 ~K16000. Current input: setting range is K-3200 ~K10400.															
#25	H 4019	<input type="radio"/>	To adjust GAIN value of CH2																
#26	H 401A	<input type="radio"/>	To adjust GAIN value of CH3																
#27	H 401B	<input type="radio"/>	To adjust GAIN value of CH4																
#28 ~ #29	Reserved																		
#30	H 401E	<input checked="" type="radio"/>	Error status	The data register used to save all error status. Please refer to fault code chart for details.															
#31	H 401F	<input type="radio"/>	Communication address setting	Setting RS-485 communication address. Setting range is 01~255 and factory setting is K1															
#32	H 4020	<input type="radio"/>	Communication baud rate setting	It is used to set communication baud rate (4800, 9600, 19200, 38400, 57600, 115200bps). Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1). b0: 4800 bps (bit/sec). b1: 9600 bps (bit/sec). (factory setting) b2: 19200 bps (bit/sec). b3: 38400 bps (bit/sec). b4: 57600 bps (bit/sec). b5: 115200 bps (bit/sec). b6-b13: reserved. b14: exchange low and high byte of CRC check code (only for RTU mode) b15: ASCII / RTU mode selection															
#33	H 4021	<input type="radio"/>	Reset to factory setting and set characteristics adjustable priority	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
				Reserved CH4 CH3 CH2 CH1 Factory setting is H0000. Give CH1 setting for example: 1. When b0=0, user can set OFFSET and GAIN value of CH1 (CR#18, CR#24). When b0=1, inhibit user to adjust OFFSET and GAIN value of CH1 (CR#18, CR#24). 2. b1 means if characteristic register is latched. b1=0 (factory setting, latched), b1=1 (not latched). 3. When b2 is set to 1, all settings will reset to factory setting.															
#34	H 4022	<input type="radio"/>	Software version	It is hexadecimal to display software version. For example: H 010A means 1.0A.															
#35~#48	System used																		

Explanation:

- CR#0: The content of CR#0 is model type, user can read the data from program to know if there is extension module.
- CR#1: CR#1 is used to set 4 internal channels working mode of analog input module. Every channel has four modes to set and can be set individually. For example: if setting CH1 to mode 0 (b2~b0=000), CH2 to mode 1 (b5~b3=001), CH3: mode2 (b8~b6=010), CH4: mode 3(b11~b9=011). It needs to set CR#1 to H0688 and the upper bit (b12~b15) will be reserved. The factory setting of CR#1 is H0000.
- CR#2 ~ CR#5: it is used to set average times of CH1~CH4. Setting range is K1~K4096 and factory setting is K10.
- CR#6 to CR#9 are the average value that calculates according to the value that is set in CR#2~CR#5 (average time of CH1~CH4 input signal). For example, if CR#2 (the average times of CH1) is 10, it will calculate the average of CH1 input signal every 10 times.
- CR#10, CR#11, CR#16, CR#17, CR#22, CR#23, CR#28, CR#29 reserved.
- CR#12 ~ CR#15: display present value of CH1~CH4 input signal.
- CR #18~ CR #21: the content is the value of adjusting OFFSET value of CH1~CH4 if analog input voltage or current is 0 after it transfers from analog to digital. Voltage setting range: -5V~+5V(-4000 $_{LSB}$ ~+4000 $_{LSB}$). Current setting range: -20mA~+20mA (-4000 $_{LSB}$ ~+4000 $_{LSB}$).
- CR #24~ CR #27: means analog input voltage or current when conversion value from analog signal to digital is 4000. Voltage setting range: -4V~+20V(-3200 $_{LSB}$ ~+16000 $_{LSB}$). Current setting range: -16mA~+52mA(-3200 $_{LSB}$ ~+10400 $_{LSB}$). But please be noticed GAIN VALUE - OFFSET VALUE = +800 $_{LSB}$ ~+12000 $_{LSB}$ (voltage) or +800 $_{LSB}$ ~+6400 $_{LSB}$ (current). When this value under this range, the resolution of the input signal will be thin and the variation of value will be larger. When this value exceeds this range, the resolution of input signal will be thick and the variation of value will be smaller.
- CR#30 is the fault code. Please refer to the chart below.

Fault description	Content	b15~b8	b7	b6	b5	b4	b3	b2	b1	b0
Power source abnormal	K1(H1)	0 0 0 0 0 0 0 0 1								
Analog input value error	K2(H2)	0 0 0 0 0 0 0 1 0								
Setting mode error	K4(H4)	0 0 0 0 0 0 1 0 0								
Offset/Gain error	K8(H8)	0 0 0 0 1 0 0 0 0								
Hardware malfunction	K16(H10)	0 0 0 1 0 0 0 0 0								
Digital range error	K32(H20)	0 0 1 0 0 0 0 0 0								
Average times setting error	K64(H40)	0 1 0 0 0 0 0 0 0								
Instruction error	K128(H80)	1 0 0 0 0 0 0 0 0								

Note: Each fault code will have corresponding bit (b0~b7). Two or more faults may happen at the same time. 0 means normal and 1 means having fault.

