

# DVP04AD-S

# DVP04AD-S2

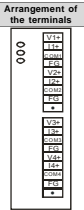
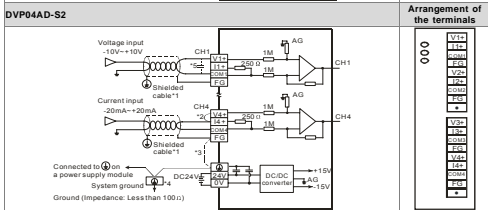
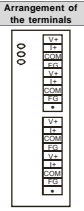
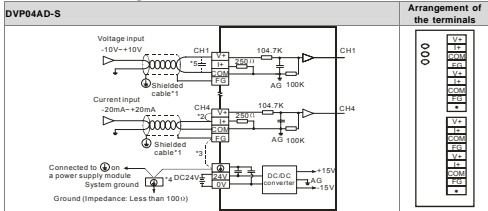


## Instruction Sheet

## 安裝說明

Analog Input Module  
類比輸入模組  
模組輸入板塊

### External Wiring



Note 1: Please isolate the analog input cable from other power cables.  
Note 2: If current is connected, the connection between V+ and I+ is the connection between V+ and I+ needs to be a short circuit.  
Note 3: If there is a much noise, please connect the terminal FG to the ground terminal.  
Note 4: Please connect the power supply module and the analog input module to the system ground, and then ground the system ground or connect the system ground to a distribution box.  
Note 5: If ripple voltage results in interference with the wiring, please connect a 0.1-0.47 μF and 25 V capacitor.  
Warning: DO NOT force the terminal!

### Specifications

Functions	
Analog/Digital (4A/D) module	Voltage input
Power supply voltage	24VDC (20.4VDC ~ 28.8VDC); (-15% ~ +20%)
Analog input channel	4 channels/each module
Analog input range	±10V
Digital conversion range	±8,000
Resolution	14 bits (LSB=1.25mV) / 13 bits (LSB=5μA)
Input impedance	> 200K / 250K
Overall accuracy	±0.5% of full scale @ 25°C (77°F); ±1% of full scale during 0 ~ 55°C (32 ~ 131°F)
Response time	3ms × Number of channels
Isolation method	The analog circuit is isolated from the digital circuit by an optocoupler, but the analog channels are not isolated from one other.
Absolute input range	±15V

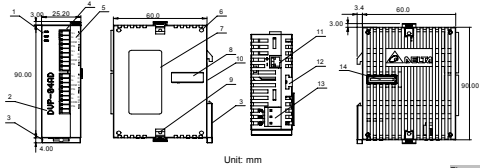
### Warning

EN # DVP04AD-S/DVP04AD-S2 is an OPEN-TYPE device. It should be installed in a control cabinet free of airborne dust, humidity, electric shock and vibration. To prevent non-maintenance staff from operating DVP04AD-S/DVP04AD-S2, or to prevent an accident from damaging DVP04AD-S/DVP04AD-S2, the control cabinet in which DVP04AD-S/DVP04AD-S2 is installed should be equipped with a safeguard. For example, the cabinet should be locked in order to prevent electromagnetic interference.  
EN # DO NOT connect AC power to any of I/O terminals, otherwise serious damage may occur. Please check all wiring again before DVP04AD-S/DVP04AD-S2 is powered up. After DVP04AD-S/DVP04AD-S2 is disconnected, DO NOT touch any terminals in a minute. Make sure that the ground terminal FG on DVP04AD-S/DVP04AD-S2 is correctly grounded in order to prevent electromagnetic interference.  
FR # DVP04AD-S/DVP04AD-S2 est un module OUVERT. Il doit être installé que dans une enceinte protectrice (boîtier, armoire, etc.) sans, dépourvue de poussière, d'humidité, de vibrations et hors d'atteinte des choc électriques. La protection doit éviter que les personnes non habilitées à la maintenance puissent accéder à l'appareil (par exemple, une clé ou un outil doivent être nécessaires pour ouvrir la protection).  
FR # Ne pas appliquer la tension secteur sur les bornes d'entrées/Sorties, ou l'appareil DVP04AD-S/DVP04AD-S2 pourra être endommagé. Lors de la déconnexion de l'appareil, ne pas toucher les connecteurs dans la minute suivante. Vérifier que la terre est bien reliée à un connecteur de terre FG afin d'éviter toute interférence électromagnétique.

### Introduction

Model Explanation & Peripherals  
Thank you for choosing the Delta DVP series PLC. The analog input module DVP04AD-S/DVP04AD-S2 receives external 4-point analog signal input (voltage or current) and converts it into 14-bit digital signals. A DVP-SS/SA/SX/SC/SV series PLC can read data from DVP04AD-S/DVP04AD-S2 or write data to DVP04AD-S/DVP04AD-S2 by means of the instruction FROM/TO. There are 49 CRs (control registers) in the module, and each register has 16 bits.  
Users can select input from voltage or current via wiring. Voltage input range is ±10VDC (resolution is 1.25mV). Current input range is ±20mA (resolution is 5μA).

### Product Profile & Outline



- |  |   |
|--|---|
| 1. POWER_RUN and ERROR indicators      | 8. Extension port                         |
| 2. Model name                          | 9. Extension unit clip                    |
| 3. DIN rail clip                       | 10. DIN rail groove (35mm)                |
| 4. I/O terminals                       | 11. RS-485 communication port             |
| 5. I/O point indicators                | 12. Mounting groove of the extension unit |
| 6. Mounting hole of the expansion unit | 13. DC power input                        |
| 7. Nameplate                           | 14. Extension port                        |

Analog/Digital (4A/D) module	
Digital data format	16-bit 2's complement
Average function	Yes (CR#2 ~ CR#5 can be set and setting range is K1 ~ K20)
Self diagnose function	Upper and lower bound detection/channel error
Communication mode (RS-485)	Module ASCII/RTU Mode. Communication baud rate of 4,800/9,600/19,200/38,400/57,600/115,200. For ASCII mode, data format is 7 bits, even, 1 stop bit (7, E, 1), while RTU mode, data format is 8 bits, even, 1 stop bit (8, E, 1). RS-485 is disabled when DVP04AD-S/DVP04AD-S2 is connected in series to a PLC.
Connecting to a DVP series PLC	If DVP04AD-S/DVP04AD-S2 modules are connected to a PLC, the modules are numbered from 0 ~ 7, 0 is the closest to the PLC. If the module is 8 modules it is the middle and they do not occupy any digital I/O points of the PLC.

### Others

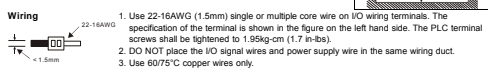
Power specification	
Max. rated consuming power	24VDC (20.4VDC ~ 28.8VDC); (-15% ~ +20%), 2W, supply from external power.
Environment condition	
Operation/storage	1. Operation: 0°C ~ 55°C (temperature), 5 ~ 95% (humidity), pollution degree 2 2. Storage: -25°C ~ 70°C (temperature), 5 ~ 95% (humidity)
Vibration/shock immunity	Standard: EC61131-2, EC61132-2, IEC60068-2-13, IEC60068-2-27 (TEST Ea)

### Installation and Wiring

#### Mounting Arrangements and Wiring Notes

**DIN Rail Installation**  
The DVP-PLC can be secured to a cabinet by using the DIN rail that is 35mm high with a depth of 7.5mm. When mounting the PLC on the DIN rail, be sure to use the end bracket to stop the PLC on the side motion of the PLC, thus to reduce the chance of the wires being pulled loose. On the bottom of the PLC is a small retaining clip. To secure the PLC to the DIN rail, place it onto the rail and gently push up on the clip. To remove it, it pulls down on the retaining clip and gently pull the PLC away from the DIN rail. Please see the figure on the right.

**For heat dissipation.** Make sure to provide a minimum clearance of 50mm between the unit and all sides of the cabinet, (shown as below)



### CR (Control Register)

CR#	parameter address	Latched	Register name	Reserved	CH4	CH3	CH2	CH1
#0	H4000	○	R	Model type				
#1	H4001	○	R/W	Input mode setting				

CR#1: CR#1 is used to set 4 internal channels working mode of analog input module. Every channel has four modes to set that can be set individually. For example: If set K1 to mode 0 (b2 ~ b0 = 000), CH2 mode 1 (b5 ~ b3 = 001), CH3 mode 2 (b8 ~ b6 = 010), CH4 mode 3 (b11 ~ b9 = 011). Then CR#1 is set to H0688 and the upper bit (b12 ~ b15) will be reserved. The factory setting of CR#1 is H0000.

#0 H4002 ○ R/W CH1 average times  
#1 H4003 ○ R/W CH2 average times  
#4 H4004 ○ R/W CH3 average times

Average times setting of channel CH1 ~ CH2. Setting range is K2 ~ K20 and factory setting is K10.

Average times setting of channel CH3 ~ CH4.

CR#	parameter address	Latched	Register name	Reserved	CH4	CH3	CH2	CH1
#5	H4005	○	R/W	CH4 average times				
#6	H4006	×	R	Average value of the CH1 input signal				
#7	H4007	×	R	Average value of the CH2 input signal				
#8	H4008	×	R	Average value of the CH3 input signal				
#9	H4009	×	R	Average value of the CH4 input signal				
#12	H400C	○	R	present value of CH1 input signal				
#13	H400D	×	R	present value of CH2 input signal				
#14	H400E	×	R	present value of CH3 input signal				
#15	H400F	×	R	present value of CH4 input signal				
#18	H4012	○	R/W	To adjust OFFSET value of CH1				
#19	H4013	○	R/W	To adjust OFFSET value of CH2				
#20	H4014	○	R/W	To adjust OFFSET value of CH3				
#21	H4015	○	R/W	To adjust OFFSET value of CH4				
#24	H4018	○	R/W	to adjust GAIN value of CH1				
#25	H4019	○	R/W	to adjust GAIN value of CH2				
#26	H401A	○	R/W	to adjust GAIN value of CH3				
#27	H401B	○	R/W	to adjust GAIN value of CH4				

CR#18~CR#27: Please be noticed that GAIN value = OFFSET value+800<sub>LSB</sub> ~ +12,000<sub>LSB</sub> (voltage) or +800<sub>LSB</sub> ~ +5,400<sub>LSB</sub> (current). If the value difference comes up small (within range), the output signal resolution is then slim and the variation is definitely larger. On the contrast, if the value difference exceeds the range, the output signal resolution becomes larger and the variation is definitely smaller.

CR#30	Error status (see the table below)											
Error description	b15 ~ b12	b11	b10	b8	b7	b6	b5	b4	b3	b2	b1	b0
Abnormal power	K1 (H1)	0	0	0	0	0	0	0	0	0	0	1
Mode error	K4 (H4)	0	0	0	0	0	0	0	0	0	1	0
Offsignal error	K6 (H6)	0	0	0	0	0	0	1	1	0	0	0
Hardware malfunction	K16 (H10)	0	0	0	0	0	0	0	1	0	0	0
Abnormal digital value	K32 (H20)	0	0	0	0	0	0	1	0	0	0	0
Incorrect number of values averaged	K64 (H40)	0	0	0	0	1	0	0	0	0	0	0
Instruction error	K128 (H80)	0	0	0	1	0	0	0	0	0	0	0
The input received by CH1 is out of the range.	K256 (H160)	0	0	0	1	0	0	0	0	0	0	0
The input received by CH2 is out of the range.	K512 (H320)	0	0	1	0	0	0	0	0	0	0	0
The input received by CH3 is out of the range.	K1024 (H640)	0	1	0	0	0	0	0	0	0	0	0
The input received by CH4 is out of the range.	K2048 (H1280)	1	0	0	0	0	0	0	0	0	0	0

Note: Each error code corresponds to a bit (b0 ~ b11). Two or more errors may happen at the same time. 0 means there is an error, and 1 means there is an error.

#31 H401F R/W Communication address setting  
Setting RS-485 communication address. Setting range is 01 ~ 254 and factory setting is K1.

#32 H4020 R/W Communication baud rate setting  
Setting range is 01 ~ 254 and factory setting is K1. It is used to set communication baud rate (4,800, 9,600, 19,200, 38,400, 57,600, 115,200 bps). Communication format: ASCII mode is 7 bits, even bit, 1 stop bit (7, E, 1), while RTU mode is 8 bits, even bit, 1 stop bit (8, E, 1), b0: 4,800 bps (bit/sec), b1: 9,600 bps (factory setting), b2: 19,200 bps (bit/sec), b3: 38,400 bps (bit/sec), b4: 57,600 bps (bit/sec), b5: 115,200 bps (bit/sec), b6 ~ b13: reserved, b14: exchange low and high byte of CRC check code only (only for RTU mode), b15: ASCII/RTU mode selection.

CR#	parameter address	Latched	Register name	Reserved	CH4	CH3	CH2	CH1
#33	H4021	R/W	Reset to factory setting and set characteristics adjustable priority					
#34	H4022	○	R	Firmware version				
#35 ~ #48			System used					

CR#33 is used to set the internal function priority. For example: If setting CR#33 to 1, the internal function will save output setting in the internal memory before power loss. In hexadecimal to display software version. For example: H010A means 1.0A.

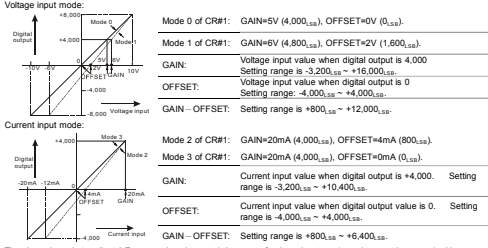
CR#34: #34 is used to set the internal function priority. For example: If setting CR#34 to 1, the internal function will save output setting in the internal memory before power loss.

CR#35 ~ CR#48: #35 ~ #48 are reserved for system use.

Symbol: ○ means latched, × means not latched, R means can be read by using FROM instruction or RS-485. W means can write data by using TO instruction or RS-485. LSB (Least Significant Bit): 1. Voltage input: 1<sub>LSB</sub>=10V/8,000=5mV. 2. Current input: 1<sub>LSB</sub>=20mA/4,000=5μA.

Explanation:  
① The corresponding parameters address H4000 ~ H4022 of CR#0 ~ CR#34 are provided for user to read/write data via RS-485.  
A. Communication baud rate: 4,800, 9,600, 19,200, 38,400, 57,600, 115,200 bps.  
B. Communication format: ASCII mode is 7 bits, even bit, 1 stop bit (7, E, 1), while RTU mode is 8 bits, even bit, 1 stop bit (8, E, 1).  
C. Function code: 03H - read data from register; 06H - write one word into register; 10H - write multiple words into register.

### Adjusting A/D Conversion Characteristic Curves



The chart above is to adjust A/D conversion characteristic curve of voltage input mode and current input mode. Users can adjust conversion characteristic curve by changing OFFSET value (CR#18 ~ CR#21) and GAIN value (CR#24 ~ CR#27) according to application.

### 注意事項

- 請在使用之前，詳細閱讀本使用說明書。
- 請勿在上電時觸摸任何端子，實際配線，務必關閉電源。
- 本機為開放型 (OPEN TYPE) 機殼，因此使用者使用本機時，必須將之安裝於具防塵、防潮及免于電擊/雷擊意外之外殼配線櫃內，另必須具備保護措施 (如：特殊之工具與保護蓋才可打開) 防止非維護人員操作或意外衝擊本機，造成危險及損壞。
- 交流輸入電源不可連接於輸入信號端，否則可能造成嚴重的損壞，因此需在上電之前再次確認電源線。
- 輸入電源斷後，一分鐘之內，請勿觸摸內部電路。
- 本機上之接地端子 ○ 務必正確的接地，可提高產品抗雜訊能力。

### 產品簡介

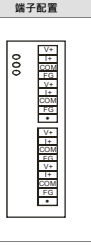
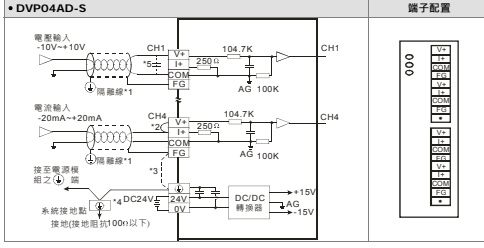
- #### 說明及週邊裝置
- 謝絕採用台端 DVP 系列產品-DVP04AD-S/DVP04AD-S2 類比信號輸入模組可使外部 4 點類比信號輸入/電壓或電流皆可) 將之轉換成 14 位元之數位信號，透過 DVP-PLC SS/SA/SX/SC/SV 主機程式以指令 FROM/TO 來讀寫模組內之資料，模組內共有 49 個 CR (Control Register) 寄存器，每個寄存器有 16 位元。
  - 使用者可能由板載選擇電輸入或電輸出，電壓輸入範圍 ±10VDC 解析度為 1.25mV，電流輸入範圍 ±20mA (解析度為 5μA)。

### 產品外觀及各部介紹

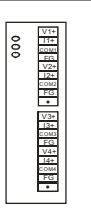
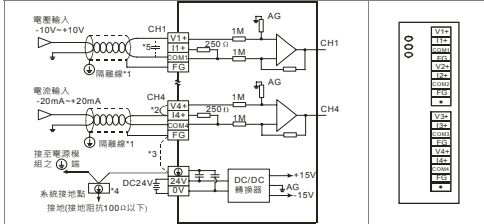
請參考英文之 Figure 1 (尺寸單位: mm)。

1. 電源、接線及運行指示燈	8. 擴充槽擴充模組連接埠
2. 樂機型號	9. 擴充槽擴充模組固定扣
3. DIN 軌固定扣	10. DIN 軌槽 (35mm)
4. 端子	11. RS-485 通訊端口
5. 端子配置	12. 擴充槽擴充模組固定槽
6. 擴充槽擴充模組固定扣	13. 電源輸入口
7. 接線	14. 擴充槽擴充模組連接埠

### 外部配線



### DVP04AD-S2



- 註 1: 類比輸入請與其他電線隔離。  
註 2: 如連接電線接線時，V+ 及 I+ (V+ 及 I+ 端子) 請務必短路。  
註 3: 如連接大線請將 FG 及接地端子連接。  
註 4: 請電線電源線之 ○ 端子及類比信號輸入模組之 ○ 端子系統接點至系統接地點，再將系統接點至第三種接點或接到配電之接點上。  
註 5: 如連接輸入電壓或電流造成配線錯誤請與工程師，請提供 0.1 ~ 0.47μF 25V 之電容。  
注意: 空端子 ○ 請勿配線。

### 規格

#### 功能規格

類比數位 (4A/D) 模組	電壓輸入 (Voltage input)	電流輸入 (Current input)
電源電壓	24VDC (20.4VDC ~ 28.8VDC); (-15% ~ +20%)	
類比訊號輸入通道	4 通道/槽	
類比輸入範圍	±10V	±20mA
數位轉換範圍	±8,000	±4,000
解析度	14 bits (1LSB=1.25mV)	13 bits (1LSB=5μA)
輸入阻抗	200K 以上	250K
線和精度	±0.5% (在 25°C, 77°F) 範圍內滿刻度時。	
準確度	±1% (在 0 ~ 55°C, 32 ~ 131°F) 範圍內滿刻度時。	
響應時間	3ms × 通道數	
隔離方式	類比與數位皆使用光耦隔離器。類比通道未隔離。	
數位輸入範圍	±15V 二線制	±32mA
數位資料格式	有 (CR#2 ~ CR#5 可設定，範圍 K1 ~ K20)	
平均功能	有 (CR#2 ~ CR#5 可設定，範圍 K1 ~ K20)	
自我診斷功能	有 (CR#2 ~ CR#5 可設定，範圍 K1 ~ K20)	
通訊模式 (RS-485)	有 (包含 ASCII/RTU 模式，通訊速率可選 (4,800/9,600/19,200/38,400/57,600/115,200) bps)。 ASCII 模式資料格式即定為 7 bits，偶位元，1 stop bit (7, E, 1)；RTU 模式資料格式即定為 8 bits，偶位元，1 stop bit (8, E, 1)；業界 PLC 主機接時，RS-485 通訊線使用，請參考說明書。	

與 DVP-PLC 主機接說明  
模組編號以最近主機之順序自動編碼由 0 到 7，最大可連接 8 台且不佔用數位 I/O 點數

