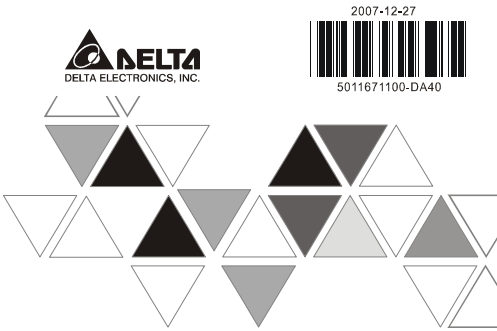




DVP04DA-S INSTRUCTION SHEET

安裝說明 安装说明

- ▲ Analog Output Module
- ▲ 類比輸出模組
- ▲ 模拟输出模块



Warning

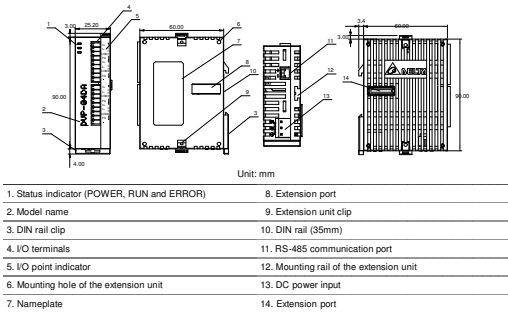
- ✓ Please read this instruction sheet carefully before use.
- ✓ The DC input power must be OFF before any maintenance.
- ✓ This is an OPEN-TYPE built-in DVP04DA-S, and the DVP04DA-S is certified to meet IEC 61131-2 (UL 508) safety requirements when installed in the enclosure to prevent high temperature, 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 or any damage to the DVP04DA-S.
- ✓ DO NOT connect the AC power to any of the input/output terminals, or it may damage the DVP04DA-S. 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 is OFF.
- ✓ Make sure that the DVP04DA-S is properly grounded ④ to prevent any electromagnetic noise.

1 Introduction

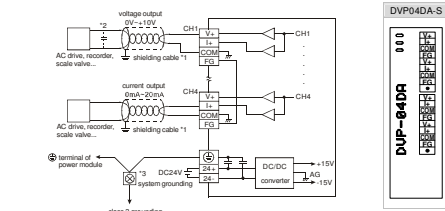
■ Model Explanation & Peripherals

- Thank you for choosing DELTA DVP PLC Series. The analog output module of DVP04DA-S series can read/write the data of analog output module by using instructions FROM/TO via DVP-PLC SS/SA/SX/SC/SV MPU program. The analog output module receives 12-bit digital data of 4 groups from PLC MPU and converts it into 4 points analog output signal either in voltage or in current.
- The software version of DVP04DA-S analog output module can be updated via RS-485 communication. Power unit and module are separate. Size is small and easy to install.
- Users can select output from voltage or current via wiring. Voltage output range is 0V ~ +10V DC (resolution is 2.5mV). Current output range is 0mA ~ 20mA (resolution is 5µA).

■ Product Profile & Outline



■ External Wiring



- Note 1: Please isolate analog output and other power wiring.
Note 2: If noise interference from loaded input terminal wiring is significant, please connect capacitor with 0.1 ~ 0.47µF 25V for noise filtering.
Note 3: Please connect ④ power module terminal and ④ analog output module terminal to system earth point and make system earth point be grounded or connects to machine cover.
Warning: DO NOT wire to the no function terminal ⑤.

2 Specifications

Digital/Analog (2D/A) module	Voltage output	Current output
Power supply voltage	24V DC (20.4V DC ~ 28.8V DC) (-15% ~ +20%)	
Analog input channel	2 channels/each module	
Analog output range	0 ~ 10V	0 ~ 20mA
Digital data range	0 ~ 4,000	0 ~ 4,000
Resolution	12 bits (1 _{LSB} =2.5mV)	12 bits (1 _{LSB} =5µA)
Output impedance	0.5Ω or lower	
Overall accuracy	±0.5% of full scale of 25°C (77°F) ±1% of full scale during 0 ~ 55°C (32 ~ 131°F)	
Response time	3ms × channels	
Max. output current	20mA (1KΩ ~ 2MΩ)	—
Tolerance carried impedance	—	0 ~ 500Ω
Digital data format	2's complementary of 16-bit, 13 significant bits.	
Isolation method	Isolation between digital area and analog area. But no isolation among channels.	
Protection	Voltage output has short circuit protection but a long period short circuit may cause internal wire damage and current output break.	
Communication mode (RS-485)	Yes, communication formats are (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). Communication format of RTU mode is 8 bits, even bit, 1 stop bit (8, E, 1). When connecting to PLC MPU in series, RS-485 can't be used.	

Connect to DVP-PLC MPU in series If DVP04DA-S 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.

■ Others

	Power supply
Max. rated power consumption	24V DC (20.4V DC ~ 28.8V DC) (-15% ~ +20%), 4W, supply from external power.
	Environment
Operation/storage	Operation: 0°C ~ 55°C (temperature); 50 ~ 95% (humidity); pollution degree 2. Storage: -25°C ~ 70°C (temperature); 5 ~ 95% (humidity). International standards: IEC 61131-2; IEC 68-2-6 (TEST Fc)/IEC 61131-2 & IEC 68-2-27 (TEST Ea)
Vibration/shock immunity	

3 CR (Control Register)

CR #	RS-485 parameters address	Latched	Register name	b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0
#0	H'4032	○ R	Model type	System used, data length is 8 bits (b7 ~ b0). DVP-04DA model code=H'89. User can read the data from program to check if there is extension module. Reserved CH4 CH3 CH2 CH1
#1	H'4033	○ R/W	Output mode setting	Output mode setting: default setting is H'0000. Mode 0: output voltage mode (0V ~ 10V). Mode 1: output voltage mode (2V ~ 10V). Mode 2: output current mode (4mA ~ 20mA). Mode 3: output current mode (0mA ~ 20mA). Mode 4: none use.
#6	H'4038	× R/W	CH1 output value	The output setting range of channel CH1 ~ CH4 is K0 ~ K4,000. Default setting is K0 and unit is LSB.
#7	H'4039	× R/W	CH2 output value	
#8	H'403A	× R/W	CH3 output value	
#9	H'403B	× R/W	CH4 output value	
#18	H'4044	○ R/W	To adjust OFFSET value of CH1	It is used to set the OFFSET value of CH1 ~ CH4. The default setting is K-2,000 ~ K2,000. The setting range is K0 and unit is LSB.
#19	H'4045	○ R/W	To adjust OFFSET value of CH2	
#20	H'4046	○ R/W	To adjust OFFSET value of CH3	
#21	H'4047	○ R/W	To adjust OFFSET value of CH4	
#24	H'404A	○ R/W	To adjust GAIN value of CH1	It is used to set the GAIN value of CH1 ~ CH4. The setting range is K0 ~ K4,000. The default setting is K2,000 and unit is LSB.
#25	H'404B	○ R/W	To adjust GAIN value of CH2	
#26	H'404C	○ R/W	To adjust GAIN value of CH3	
#27	H'404D	○ R/W	To adjust GAIN value of CH4	

CR#1 is used to set two internal channels working mode of analog output module. Every channel has four modes that can be set individually. For example: if setting CH1 to mode 2 (b2 ~ b0 = 010), CH2 to mode 1 (b5 ~ b3 = 001). It needs to set CR#1 to H'000A.

CR #	RS-485 parameters address	Latched	Register name	b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0						
CR#18 ~ CR#27: Please be noticed that GAIN VALUE – OFFSET VALUE=+400 _{LSB} ~ +6,000 _{LSB} (voltage or 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.										
#30	H'4050	×	R Error status	Data register to save all error status. Please refer to error code chart for detail.						
CR#30 is error code. Please refer to the following chart.										
Error description	Content	b15 ~ b8	b7	b6	b5	b4	b3	b2	b1	b0
Power source abnormal	K1 (H'1)	Reserved	0	0	0	0	0	0	0	1
Analog input value error	K2 (H'2)		0	0	0	0	0	0	1	0
Setting mode error	K4 (H'4)		0	0	0	0	0	1	0	0
Offset/gain error	K8 (H'8)		0	0	0	0	1	0	0	0
Hardware malfunction	K16 (H'10)		0	0	0	1	0	0	0	0
Digital range error	K32 (H'20)		0	0	1	0	0	0	0	0
Average times setting error	K64 (H'40)		0	1	0	0	0	0	0	0
Instruction error	K128 (H'80)		1	0	0	0	0	0	0	0
Note: Each error code will have corresponding bit (b0 ~ b7). Two or more errors may happen at the same time. 0 means normal and 1 means having error. EX: if the digital input exceeds 4,000, error (K2) will occur. If the analog output exceeds 10V, both analog input value error K2 and K32 will occur.										

#31	H'4051	○ R/W	Communication address setting	Used to set RS-485 communication address. The setting range is from 01 to 254 and the default setting is K1.
#32	H'4052	○ R/W	Communication baud rate setting	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). Communication format of RTU mode is 8 bits, even bit, 1 stop bit (8, E, 1). b0: 4,800 bps (bit/sec). b1: 9,600 bps (bit/sec) (default 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 (RTU mode only). b15: ASCII/RTU mode selection.
#33	H'4053	○ R/W	Reset to default setting and set characteristics adjustable priority	Output latched setting, default setting H'0000. 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 is used to check if characteristic register is latched. b1=0 latched (default setting), b1=1 not latched. 3. When b2 is set to 1, all settings are reset to default setting.

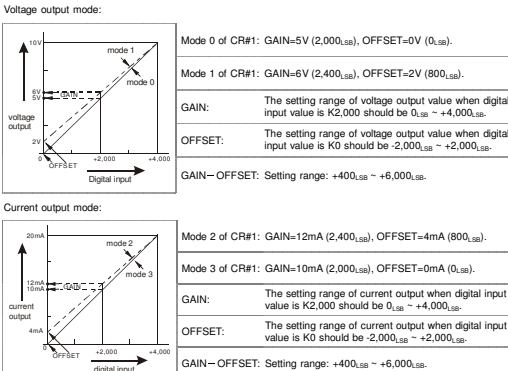
CR#33 is used to set the internal function priority. For example: characteristic register. Output latched function will save output setting to the internal memory before power loss.

#34	H'4054	○ R	Software version.	Show software version in hexadecimal. For example: H'010A means 1.0A.
#35 ~ #48	System used			

Symbols: ○ means latched.
× means not latched.
R means can read data by using FROM instruction via RS-485.
W means can write data by using TO instruction via RS-485.
LSB (Least Significant Bit): 1. Voltage output: 1_{LSB}=10V/0.004=2,500.
2. Current output: 1_{LSB}=20mA/4,000=5µA.

- ※ The corresponding parameters address H'4032 ~ H'4054 of CR#0 ~ CR#34 are provided for user to read/write data via RS-485.
- 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). Communication format of RTU mode is 8 bits, even bit, 1 stop bit (8, E, 1).
 - Function code: 03'H - read data from register. 06'H - write one word to register. 10'H - write multiple words to register.

4 Adjust A/D Conversion Curve



The charts above are D/A conversion characteristic curve of voltage input mode and current input mode. Users can adjust conversion characteristic curve by changing OFFSET values (CR#18 ~ CR#21) and GAIN values (CR#24 ~ CR#27) depend on application.

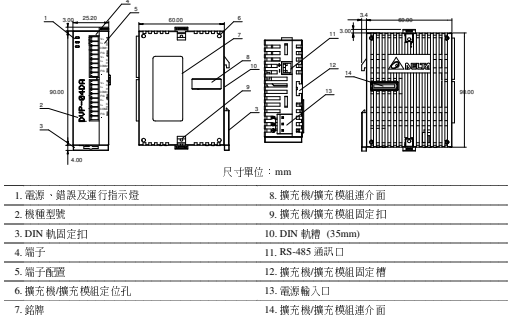
- ## ! 注意事項
- ✓ 請在使用之前，詳細閱讀本使用說明書。
 - ✓ 請勿在上電時觸碰任何端子，實施配線，務必關閉電源。
 - ✓ 本機為開放型 (OPEN TYPE) 機殼，因此使用時使用本機時，必須將之安裝於具防塵、防潮並避免電擊/衝擊意外之外殼配線箱內，另必須具備保護措施 (如：特殊之工具或鑰匙才可打開) 防止非專業人員操作或意外衝擊本體，造成故障及損壞。
 - ✓ 交流輸入電源不可連接於輸入/輸出信號，否則可能造成嚴重的損壞，因此請在上電之前再次確認電源配線。
 - ✓ 輸入電源切斷後，一分鐘之內，請勿觸摸內部電路。
 - ✓ 本體上之接地端子 ④ 務必正確的接地，可提升產品抗雜訊能力。

1 產品簡介

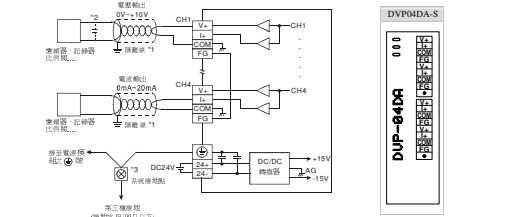
■ 說明及週邊裝置

- 謝謝您採用台灣 DVP 系列產品，DVP04DA-S 類比信號輸出模組可透過 DVP-PLC SS/SA/SX/SC/SV 主機程式以指令 FROM/TO 來讀寫 DVP04DA-S 類比信號輸出模組之資料，而類比信號輸出模組接受來自 PLC 主機的 4 組 12 位元數位資料，再將數位資料轉換為 4 點類比信號輸出 (電壓或電流皆可)，模組內具有 49 個 CR (Control Register) 暫存器，每個暫存器有 16 bits。
- DVP04DA-S 類比信號輸出模組可經由 RS-485 通訊更新軟體版本，電源單元與模組分離，體積小，安裝容易。
- 使用者可經由配線選擇電壓輸出或電流輸出，電壓輸出範圍 0V ~ +10V DC (解析度為 2.5mV)，電流輸出範圍 0mA ~ 20mA (解析度為 5µA)。

■ 產品外觀及各部介紹



■ 外部配線



- 註 1: 模擬輸出埠與其他電源線隔離。
註 2: 如果負載之輸入端接線太遠造成配線受雜訊干擾時，請連接 0.1 ~ 0.47µF 25V 之電容。
註 3: 請將電源模組之 ④ 端及 DVP04DA-S 類比信號輸出模組之 ④ 端連接於系統接地點，再將系統接點作接地點接到配電箱之接線處上。

注意: 空開器 ④ 請勿配線。

2 規格

數位類比 (4D/A) 模組	電壓輸出 (Voltage output)	電流輸出 (Current output)
電源電壓	24V DC (20.4V DC ~ 28.8V DC) (-15% ~ +20%)	
類比訊號輸入通道	4 通道/台	
模擬輸出範圍	0 ~ 10V	0 ~ 20mA
數位資料範圍	0 ~ 4,000	0 ~ 4,000
解析度	12 bits (1 _{LSB} =2.5mV)	12 bits (1 _{LSB} =5µA)
輸出阻抗	0.5Ω 或更低	
總和精密度	±0.5% 在 (25°C, 77°F) 範圍內滿刻度時。 ±1% 在 (0 ~ 55°C, 32 ~ 131°F) 範圍內滿刻度時。	
回應時間	3ms × 通道數	
最大輸出電流	10mA (1KΩ ~ 2MΩ)	—
容許負載阻抗	—	0 ~ 500Ω
數位資料格式	16 位二進數，有效位 11 bits。	
隔離方式	內部電路與類比輸出端以光耦合器隔離，模組通道間未隔離。	
保護	電壓輸出有短路保護但須注意長時間短路仍有可能造成內部線路損壞，電流輸出可開路。	
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)。ASCII 模式資料格式間定為 7 bits，偶位，1 stop bit (7, E, 1)。RTU 模式資料格式間定為 8 bits，偶位，1 stop bit (8, E, 1)，需與 PLC 主機串接時，RS-485 通訊無法使用。	

