

2017-03-15



5011669908-T408

DVP04TC-S

Instruction Sheet
Bilgi Dökümanı

安 裝 說 明
安 装 说 明

Temperature Measurement Module
Sıcaklık Ölçüm Modülü

溫度量測模組

溫度量測模块



Thank you for choosing Delta DVP series PLC. DVP04TC-S is able to receive 4 points of external thermocouple temperature sensors and convert them into 14-point digital signals. Besides, through FROM/TO instructions in DVP Slim series MPU program, the data in the module can be read and written. There are many 16-bit control registers (CR) in DVP04TC-S. The power unit is separate from it and is small in size and easy to install.

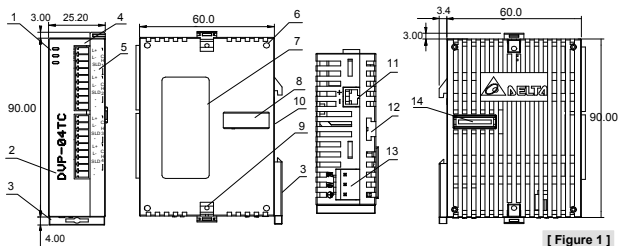
EN ✗ DVP04TC-S is an OPEN-TYPE device. It should be installed in a control cabinet free of airborne dust, humidity, electric shock and vibration. To prevent non-maintenance staff from operating DVP04TC-S, or to prevent an accident from damaging DVP04TC-S, the control cabinet in which DVP04TC-S is installed should be equipped with a safeguard. For example, the control cabinet in which DVP04TC-S is installed can be unlocked with a special tool or key.

EN ✗ DO NOT connect AC power to any of I/O terminals, otherwise serious damage may occur. Please check all wiring again before DVP04TC-S is powered up. After DVP04TC-S is disconnected, Do NOT touch any terminals in a minute. Make sure that the ground terminal (⚡) on DVP04TC-S is correctly grounded in order to prevent electromagnetic interference.

FR ✗ DVP04TC-S est un module OUVERT. Il doit être installé que dans une enceinte protectrice (boîtier, armoire, etc.) saine, dépourvue de poussière, d'humidité, de vibrations et hors d'atteinte des chocs 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 nécessaire pour ouvrir a protection).

FR ✗ Ne pas appliquer la tension secteur sur les bornes d'entrées/Sorties, ou l'appareil DVP04TC-S pourra être endommagé. Merci de vérifier encore une fois le câblage avant la mise sous tension du DVP04TC-S. Lors de la déconnection de l'appareil, ne pas toucher les connecteurs dans la minute suivante. Vérifier que la terre est bien reliée au connecteur de terre (⚡) afin d'éviter toute interférence électromagnétique.

■ Product Profile & Dimension



[Figure 1]

Unit: mm

1. Status indicator (POWER, RUN and ERROR)	2. Model name
3. DIN rail clip	4. I/O terminals
5. I/O point indicator	6. Mounting holes
7. Specification label	8. I/O module connection port
9. I/O module clip	10. DIN rail (35mm)
11. RS-485 communication port	12. I/O module clip
13. DC power input	14. I/O module connection port

■ I/O Terminal Layout



■ External Wiring

DVP04TC-S	Celsius (°C)	Fahrenheit (°F)
	500VDC between analog circuits and Ground 500VDC between analog circuits and digital circuits 500VDC between 24VDC and Ground	
Digital data format	2's complement of 16-bit	
Average function	Yes (CR#2 ~ CR#5)	
Self diagnostic function	Yes	
Communication mode (RS-485)	Supported, including ASCII/RTU mode. Default communication format: 9600, 7, E, 1, ASCII; refer to CR#32 for details on the communication format. Note1: RS-485 cannot be used when connected to CPU series PLCs. Note2: The communication format can only be changed via RS-485 and cannot be changed via the instruction TO when connected to CPU series PLCs. Refer to Communication Format Setup in the appendix of the DVP programming manual for more details.	

■ Control Register

CR#	Address	Save		Register content	Description										
#0	H'4096	O	R	Model name	Set up by the system: DVP04TC-S model code=H'8B										
#1	H'4097	O	R/W	Thermocouple type	<table border="1"> <tr> <td>b15~b12</td> <td>b11~b9</td> <td>b8~b6</td> <td>b5~b3</td> <td>b2~b0</td> </tr> <tr> <td>Reserved</td> <td>CH4</td> <td>CH3</td> <td>CH2</td> <td>CH1</td> </tr> </table>	b15~b12	b11~b9	b8~b6	b5~b3	b2~b0	Reserved	CH4	CH3	CH2	CH1
					b15~b12	b11~b9	b8~b6	b5~b3	b2~b0						
Reserved	CH4	CH3	CH2	CH1											
Example: Setting of CH1 1. (b2, b1, b0) set to (0, 0, 0), use J-type. 2. (b2, b1, b0) set to (0, 0, 1), use K-type. 3. (b2, b1, b0) set to (0, 1, 0), use R-type. 4. (b2, b1, b0) set to (0, 1, 1), use S-type. 5. (b2, b1, b0) set to (1, 0, 0), use T-type.															
CR#1: Used to set the working mode of four channels. There are 5 modes (J-type, K-type, R-type, S-type, and T-type) for each channel and can be set individually. For example, if you want to set CH1~CH4 as following: CH1: mode 0 (b2 ~ b0=000), CH2: mode 1 (b5 ~ b3=001), CH3: mode 0 (b8 ~ b6=000) and CH4: mode 1 (b11 ~ b9=001), you should set CR#1 to H'0208. The higher bits (b12 ~ b15) will be reserved and the default setting is H'0000.															
#2	H'4098	O	R/W	CH1 average number	Number piece of readings used for the calculation of "average" temperature on channels CH1 ~ CH4. Setting range: For versions prior to V3.04: K1 ~ K4,095. For versions after V3.05: K1 ~ K20. Default setting is K10.										
#3	H'4099	O	R/W	CH2 average number											
#4	H'409A	O	R/W	CH3 average number											
#5	H'409B	O	R/W	CH4 average number											
CR#2 ~ CR#5: Please be noticed that when PLC sets average times via TO/DTO instructions, please use rising-edge/falling-edge detection instruction (such as LDP and LDF) to get correct average times.															
#6	H'409C	X	R	CH1 average degrees	Average degrees for channels CH1 ~ CH4. (Unit: 0.1°C).										
#7	H'409D	X	R	CH2 average degrees											
#8	H'409E	X	R	CH3 average degrees											
#9	H'409F	X	R	CH4 average degrees											
#10	H'40A0	X	R	CH1 average degrees	Average degrees for channels CH1 ~ CH4. (Unit: 0.1°F).										
#11	H'40A1	X	R	CH2 average degrees											
#12	H'40A2	X	R	CH3 average degrees											
#13	H'40A3	X	R	CH4 average degrees											
#14	H'40A4	X	R	Present temp. of CH1	Present temperature of channels CH1 ~ CH4. (Unit: 0.1°C).										
#15	H'40A5	X	R	Present temp. of CH2											
#16	H'40A6	X	R	Present temp. of CH3											
#17	H'40A7	X	R	Present temp. of CH4											
#19	H'40A9	X	R	Present temp. of CH1											

CR#	Address	Save		Register content	Description										
#20	H'40AA	X	R	Present temp. of CH2	CH2. (Unit: 0.1°F).										
#21	H'40AB	X	R	Present temp. of CH3	Present temperature of channels CH3 ~ CH4. (Unit: 0.1°F).										
#22	H'40AC	X	R	Present temp. of CH4											
#24	H'40AE	O	R/W	CH1 OFFSET Value	Adjust offset value of channels CH1 ~ CH4. The range is -1,000 ~ +1,000 and default setting is K0. (Unit: 0.1°C).										
#25	H'40AF	O	R/W	CH2 OFFSET Value											
#26	H'40B0	O	R/W	CH3 OFFSET Value											
#27	H'40B1	O	R/W	CH4 OFFSET Value											
#29	H'40B3	X	R/W	PID mode setting	Set H'5678 to enable PID mode, other set values are invalid. Default: H'0000.										
#30	H'40B4	X	R	Error status	Data register stores the error status. Refer to the error code chart for details.										
#31	H'40B5	O	R/W	Communication address setting	RS-485 communication address. Setting range is 1 ~ 254 and default setting is K1.										
#32	H'40B6	O	R/W	Communication baud rate setting	Communication baud rate. For ASCII mode, date format is 7 bits, even, 1 stop bit (7, E, 1), while RTU mode, date format is 8 bits, even, 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: switch between low bit and high bit of CRC code (RTU mode only). b15: RTU mode.										
#33	H'40B7	O	R/W	Reset to default setting	<table border="1"> <tr> <td>b15~b12</td> <td>b11~ b9</td> <td>b8~b6</td> <td>b5~b3</td> <td>b2~b0</td> </tr> <tr> <td>ERR LED</td> <td>CH4</td> <td>CH3</td> <td>CH2</td> <td>CH1</td> </tr> </table> <p>Example: Setting of CH1</p> <ol style="list-style-type: none"> b0 ~ b1: Reserved. b2: Set to 1 and PLC will be reset to default settings. <p>Definition of ERR LED: b12~b15=1111 (default settings)</p> <ol style="list-style-type: none"> b12 corresponds to CH1: when b12=1, scale exceeds the range, ERR LED flashes. b13 corresponds to CH2: when b13=1, scale exceeds the range, ERR LED flashes. b14 corresponds to CH3: when b14=1, scale exceeds the range, ERR LED flashes. b15 corresponds to CH4: when b15=1, scale exceeds the range, ERR LED flashes. 	b15~b12	b11~ b9	b8~b6	b5~b3	b2~b0	ERR LED	CH4	CH3	CH2	CH1
b15~b12	b11~ b9	b8~b6	b5~b3	b2~b0											
ERR LED	CH4	CH3	CH2	CH1											
#34	H'40B8	O	R	Software version	Display the software version in hexadecimal. Example: H'010A = version 1.0A										
#35 ~ #48				System used											
<p>Symbols: O: means latched. X: means not latched. (Support when using RS-485 communication, not support when connecting with MPU)</p> <p>R: able to read data by using FROM instruction or RS-485.</p> <p>W: able to write data by using TO instruction or RS-485.</p>															

1. Function code: 03'H - read data from register. 06'H - write one word to register. 10'H - write multiple words to registers.

2. CR#30 is the error code register. Refer to the chart below:

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
Wiring to empty external contact	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.

3. When CR#29 is set to H'5678, CR#0 ~ CR#34 can be used for PID settings in DVP04TC-S V3.08 and versions above.

PID Mode Content Description			
CR#0	Model name	CR#6	CH1 average degrees (°C)
CR#1	Thermocouple type	CR#7	CH2 average degrees (°C)
CR#2	PID Output % at CH1	CR#8	CH3 average degrees (°C)
CR#3	PID Output % at CH2	CR#9	CH4 average degrees (°C)
CR#4	PID Output % at CH3	CR#6~CR#9: Unit: 0.1°C	
CR#5	PID Output % at CH4		
CR#2~CR#5: 0~1000; Unit: 0.1%			

PID Mode Content Description			
CR#10	Set temperature at CH1	CR#28	Run/Stop & Auto tuning
CR#11	Set temperature at CH2		Bit0: CH1 PID runs/stops
CR#12	Set temperature at CH3		Bit1: CH2 PID runs/stops
CR#13	Set temperature at CH4		Bit2: CH3 PID runs/stops
CR#10~CR#13: Set the PID target value (SV)			Bit3: CH4 PID runs/stops
CR#14	CH1 K _p		0=PID stops; 1=PID runs
CR#15	CH2 K _p		Bit4 : CH1 Auto tuning
CR#16	CH3 K _p		Bit5 : CH2 Auto tuning
CR#17	CH4 K _p		Bit6 : CH3 Auto tuning
CR#19	CH1 K _i		Bit7 : CH4 Auto tuning
CR#20	CH2 K _i	1: The auto tuning function is enabled. After the auto tuning is complete, the value becomes 0.	
CR#21	CH3 K _i	CR#29	Enter PID mode(H'5678) K0: Exit the PID mode
CR#22	CH4 K _i	CR#30	Error Code
CR#24	CH1 K _D	CR#31	CH1 Sampling time
CR#25	CH2 K _D	CR#32	CH2 Sampling time
CR#26	CH3 K _D	CR#33	CH3 Sampling time
CR#27	CH4 K _D	CR#34	CH4 Sampling time
		CR#31~CR#34: 1~30; Unit: 1s	

Note: Users have to enter the PID mode (CR#29=H'5678) before setting other control registers.