

DVP-SX

Multi-function, Built-in Analog I/O, Multiple Commands PLC Instruction Sheet

1 WARNING

⚠ This Instruction Sheet only provides descriptions for electrical specifications, general specifications, installation & wiring, troubleshooting and peripherals. Other detail information about programming and commands is compatible with SA/SC/SX series; please see PLC Application Manual. For more information about the optional peripherals, please see individual product manual.

⚠ This is an OPEN TYPE PLC. The PLC should be kept in an enclosure away from airborne dust, humidity, electric shock risk and vibration. Also, it is equipped with protective methods such as some special tools or keys to open the enclosure, so as to avoid the hazard to users and the damage to the PLC.

⚠ Never connect the AC main circuit power supply to any of the input/output terminals, as it will damage the PLC. Check all the wiring prior to power up. To avoid any electromagnetic noise, make sure the PLC is properly grounded. Do NOT touch terminals when power on.

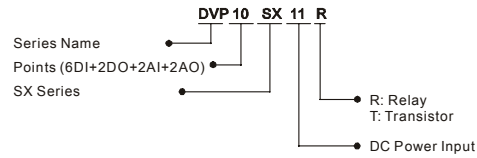
2 INTRODUCTION

2.1 Model Name Explanation and Peripherals

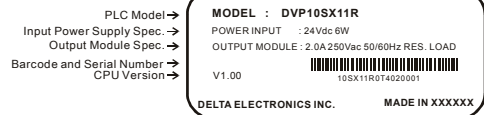
Thank you for choosing DELTA's PLC DVP series. The DVP-SX series is a 10-point (4DI+2DO+2AI+2AO) special main processing unit. Besides the same commands and functions as DVP-SA/SX/SC series, 2-CH 12-bit analog voltage/current input and 2-CH 12-bit analog voltage/current output are all bipolar.

There is built-in 2-digit 7-segment display corresponds to internal register directly to display PLC station or user-defined code.

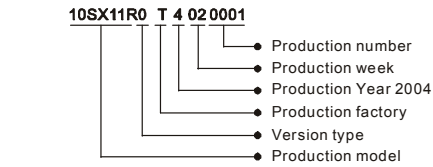
Model Name



Nameplate Explanation



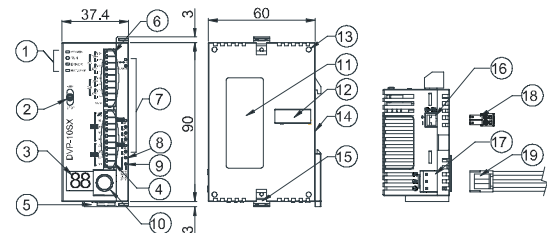
Serial Number



Peripherals

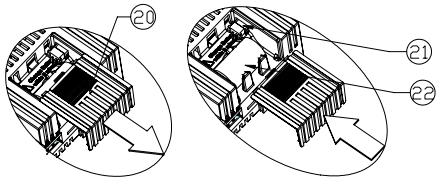
- ⊙ DVPHP02: Handheld Programming panel
- ⊙ WPLSoft: Windows Ladder Logic Programming Software
- ⊙ DVPACAB115: 1.5M Cable (HPP ⇄ PLC, included in DVPHP02)
- ⊙ DVPACAB215: 1.5M Cable (PC (DB9+DB25) ⇄ PLC)
- ⊙ DVPACAB230: 3.0M Cable (PC (DB9+DB25) ⇄ PLC)
- ⊙ DVPACAB2A30: 3.0M Cable (PC (DB9) ⇄ PLC)

2.2 Product Profile and Outline



Units: mm

※ Battery replacement: Please change the battery within 3 minutes, or the internal data of the PLC (including the program area, RTC and latched registers) could be lost or destroyed.



18	2 pin removable terminal (standard accessory)	21	Battery socket connection
19	Power input cable (standard accessory)	22	Battery mount
20	Battery Cover		

3 FUNCTION SPECIFICATIONS

Items	Specifications	Remarks
Control Method	Stored program, cyclic scan system	
I/O Processing Method	Batch processing method (when END command is executed)	I/O refresh command is available
Execution Speed	Basic commands (several us)	Application Commands (10~hundreds us)
Program language	Commands + Ladder Logic + SFC	Including the Step commands
Program Capacity	7920 STEPS	SRAM + Battery
Commands	32 Basic sequential commands (including STL/RET)	168 Application commands
X External input relay	X0~X177, octal number system, 128 points	Total 256 points Correspond to external input point
Y External output relay	Y0~Y177, octal number system, 128 points	Total 256 points Correspond to external output point
M Auxiliary Relay	General: M0~M511, 512 points (*1) Latched: M512~M999, 488 points (*3) Special: M2000~M4095, 2096 points (*3) M1000~M1999, 1000 points (some are latched)	Total 4096 points Contacts can switch to On/Off in program
T Timer	T0~T199, 200 points (*1) T192~T199 for Subroutine T250~T255, 6 points Accumulative (*4) T200~T239, 40 points (*2) T240~T245, 6 points Accumulative (*4) T246~T249, 4 points Accumulative (*4)	Total 256 points When the timer that set by TMR command reaches the preset value, the T contact with the same number will be On.
C Counter	C0~C95, 96 points (*1) C96~C199, 104 points (*3) C200~C215, 16 points (*1) C216~C234, 19 points (*3) C235~C245, 1 phase 1 input, 9 points (*3) C246~C250, 1 phase 2 inputs, 3 points (*3) C251~C254, 2 phase 2 inputs, 3 points (*3)	Total 250 points When the counter that set by CNT (DCNT) command reaches the preset value, the C contact with the same number will be On.
S Step point	Initial step point: S0~S9, 10 points (*1) Zero point reset: S10~S19, 10 points (use with IST command) (*1) General: S20~S511, 492 points (*1) Latched: S512~S895, 384 points (*3) Alarm: S896~S1023, 124 points (*3)	Total 1024 points Usage device of step ladder diagram (SFC) Latched Range: Start: D1214 (K512) End: D1215 (K895)
T Current value of the timer	T0~T255, 256 points	When the timer reaches the preset value, the contact of timer will be On.
C Current value of the counter	C0~C199, 16-bit counter, 200 points C200~C254, 32-bit counter, 50 points	When the counter reaches the preset value, the contact of counter will be On.
D Data register	General: D0~D199, 200 points (*1) Latched: D200~D999, 800 points (*3) Special: D2000~D4999, 3000 points (*3) Index: D1000~D1999, 1000 points E0~E3, F0~F3, 8 points (*1)	Total 5000 points Can be memory area for storing data. E and F can be used as the special purpose of index indication.
None	File register	0~1599 (1600 points) (*4)
N For master control nested loop	N0~N7, 8 points	Control point of master control nested loop
P For CJ, CALL commands	P0~P255, 256 points	The location point of CJ, CALL.
I Interrupt Service	External interrupt: I001 (X0), I101 (X1), I201 (X2), I301 (X3), I401 (X4), I501 (X5); 6 points (all are rising-edge trigger) Time interrupt: I6□□ (1ms), I7□□ (1ms), (□□ = 1~99ms) Hi-speed counter: I010, I020, I030, I040, I050, I060; 6 points Communication: I150, 1 point	The location pointer of interrupt subroutine
K Decimal	K-32,768 ~ K32,767 (16-bit operation) K-2,147,483,648 ~ K2,147,483,647 (32-bit operation)	
H Hexadecimal	H0000 ~ HFFFF (16-bit operation), H00000000 ~ HFFFFFFF (32-bit operation)	
Programming port	COM1: RS-232, COM2: RS-485 (Master/Slave). They can be used at the same time.	
Analog Volume / RTC	MPU built-in bipolar 2-CH A/D, D/A, 12 bits, 2-digital 7-segment display, built-in RTC	
Special Expansion Module	Use the same modules (AD, DA, PT, TC, XA, RT) of SS series. (Max. 8 Expansion Unit points)	

*1: The non-latched area is fixed, and can't be changed.

*2: The non-latched area can be changed to a latched area with parameter setting.

*3: The latched area can be changed to a non-latched area with parameter setting.

*4: The latched area is fixed, and can't be changed.

M Auxiliary Relay	General	Latched	Special auxiliary relay	Latched
	M0~M511	M512~M999	M1000~M1999	M2000~M4095
	Non-latched (fixed)	Latched (default) Start: D1200 (K512) End: D1201 (K999)	Some are latched and can't be changed	Latched (default) Start: D1202 (K2000) End: D1203 (K4095)
T Timer	100 ms T0~T199	10 ms T200~T239	10ms T240~T245	1 ms T246~T249 100 ms T250~T255
	Non-latched (fixed)	Non-latched (fixed)	Accumulative Latched (fixed)	
C Counter	16-bit count up C0~C95	C96~C199	32-bit count up/down C200~C215	C216~C234 C235~C245 C246~C255
	Non-latched (fixed)	Latched (default) Start: D1208 (K96) End: D1209 (K199)	Non-latched (fixed)	Latched (default) Start: D1210 (K216) End: D1211 (K234) Latched (default) Start: D1212 (K235) End: D1213 (K255)
S Step relay	For general S0~S9	Latched S10~S19	Special register S20~S511	Latched S512~S895 For general S896~S1023
	It is fixed to be non-latched		Factory setting is latched Start: D1214 (K512) End: D1215 (K895)	It is fixed to be latched
D Register	General D0~D199	Latched D200~D999	Special registers D1000~D1999	Latched D2000~D4999
	Non-latched (fixed)	Factory setting is latched. Start: D1216 (K200) End: D1217 (K999)	Some are latched and can't be changed.	Factory setting is latched. Start: D1218 (K2000) End: D1219 (K4999)
File Register	K0~K1599, Latched (fixed)			

※ When switching between power On/Off or MPU RUN/STOP modes:

Memory Type	POWER Off⇒On	STOP⇒RUN	RUN⇒STOP	Clear all M1031 non-latched area	Clear all M1032 latched area	Factory Setting
Non-latched	Clear	Unchanged	M1033=Off, clear M103=On, unchanged	Clear	Unchanged	0
Latched	Unchanged			Unchanged	Clear	0
Special M, Special D, Index register	Initial value	Unchanged		Unchanged		Initial value
File register	Unchanged					0

4 BUILT-IN ANALOG I/O AND 7-SEGMENT DISPLAY

Built-in 2-CH 12-bit A/D and 2-CH 12-bit D/A are bipolar. It can read A/D converted digital value and get designated analog output by reading special D or writing into special D. Refer following table for corresponding special D.

Device No.	Function
D1056	Present value of AD card channel 0 (CH0)
D1057	Present value of AD card channel 1 (CH1)
D1110	Average value of AD card channel 0 (CH0)
D1111	Average value of AD card channel 1 (CH1)
D1116	DA card channel 0 (CH0)
D1117	DA card channel 1 (CH1)
D1118	Conversion sampling time (ms)



This built-in display corresponds to special D directly. User can use it to display error code or station when executing PLC LINK. It is great convenience for system maintenance. Refer following table for corresponding special D.

Device No.	Function
M1196	Number system setting for display (Off: Decimal, On: Hexadecimal)
M1197	The decimal point setting between the middle and the right-most numbers
M1198	The decimal point setting after the right-most number
D1196	Display content

5 ELECTRICAL SPECIFICATIONS

Item	Model	DVP10SX11R/T	DVP08SM11N	DVP08SN11R/T	DVP08SP11R/T	DVP16SP11R/T
Power supply voltage	MPU: 24VDC (-15%~20%) (with DC input reverse polarity protection), Expansion Unit: supplied by the MPU					
Fuse	2A / 250VAC					
Power Consumption	5W	1W	1.5W	1.5W	2W	
Insulation Resistance	> 5 MΩ at 500 VDC (Between all inputs / outputs and earth)					
Noise Immunity	ESD: 8KV Air Discharge EFT: Power Line: 2KV, Digital I/O: 1KV, Analog & Communication I/O: 250V Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS: 26MHz~1GHz, 10V/m					
Grounding	The diameter of grounding wire cannot be smaller than the wire diameter of terminals L and N (All DVP units should be grounded directly to the ground pole).					
Environment	Operation: 0℃~55℃ (Temperature), 50~95% (Humidity), Pollution degree 2; Storage: -25℃~70℃ (Temperature), 5~95% (Humidity); D/A output operation: 0℃~50℃ (Temperature)					
Vibration / Shock Resistance	Standard: IEC1131-2, IEC 68-2-6 (TEST Fc) / IEC1131-2 & IEC 68-2-27 (TEST Ea)					
Weight (approx.) (g)	158	128	154 / 146	141 / 136	162 / 154	
Approvals						

Electrical Specification of Input Point		Electrical Specification of Output Point			
Input Type	DC (SINK or SOURCE)	Output Type	Relay-R	Transistor-T	
Input Current	24VDC 5mA	Current Specification	1.5A/1 point (5A/COM)	0.3A/1 point @ 40℃; When the output of Y0 and Y1 is high-speed pulse, Y0 and Y1 = 30mA	
Active Level	Off→On, above 16VDC On→Off, below 14.4VDC	Voltage Specification	Below 250VAC, 30VDC	30VDC	
Responding Time	About 10ms (An adjustment range of 0~20 ms could be selected through D1020 and D1021)	Maximum Loading	75VA (Inductive) 90 W (Resistive)	9W/1 point	When the output of Y0 and Y1 is high-speed pulse, Y0 and Y1 = 0.9W (Y0 = 32kHz, Y1 = 10kHz)
		Responding Time	About 10 ms	Off→On 20us On→Off 30us	Y0 and Y1 are specified points for high-speed pulse

6 MODEL NAME & I/O CONFIGURATION

Model	Power	Input				Output			
		Point		Type		Point		Type	
		DI	AI	DI	AI	DO	AO	DO	AO
DVP10SX11R	24VDC +20%	4	2	DC24V/5 mA Sink or Source	-20~20mA range(-1000~+1000) +10~+10V range(-2000~+2000)	2	2	Relay	-20~20mA (range:-2000~+2000) +10~+10V (range:-2000~+2000)
DVP10SX11T	-15%	4	2			2	2	Resistor	

7 INSTALLATION & WIRING

7.1 PLC Mounting Arrangements and Wiring Notes

