



DVP-PLC

DVP-14SS 11R2/11T2 Programmable Logic Controller Instruction Sheet

WARNING

- Always read this manual thoroughly before using the DVP PLC.
- A The AC input power must be disconnected before any maintenance.
- This is an OPEN-TYPE built-in PLC, and the PLC is certified to meet the safety requirements of IEC 61131-2 (UL 508) when installed in the enclosure to avoid high temperature, high humidity, exceessive vibration, corrosive gases, liquids, airbome dust or metallic particles. Also, it is equipped with protective methods such as some special tool or key to open the enclosure, so as to avoid the hazard to users and the damage to the PLC.
- A Do not connect the AC power to any of the input/output terminals, as it might cause damage to the PLC. Make sure that all the wiring is well conducted prior to power on.
- A Do not touch the internal circuit for at least 1 minute after the power supply is disconnected.
- \triangle Make sure that the PLC is properly grounded (\downarrow) , to avoid any electromagnetic noise. INTRODUCTION

2 2.1 Model Explanation and Peripherals

Thank you for choosing DELTA's PLC DVP Series. The DVP-SS series provides the 14-point Main Processing Unit and the expansion unit with 8~16 points, and the maximum input/output points could be extended up to 128 points. Since the power supply unit is independent of the main unit, and with the volume of the device being smaller, the installation is thus easier

Nameplate Explanation



2. I/O port for program communication (RS-232)	9. Expansion unit clip
3. DIN rail clip	10. DIN rail (35mm)
4. I/O terminals	11. RS-485 Communication port
5. I/O point indicator	12. Mounting rail of the expansion unit
6. Mounting hole of the expansion unit	13. DC Power input
7. Nameplate	14. RUN/STOP switch

			input/Output			
Model	Dowor		Input Unit	Output Unit		Profile F
	Fower	Point	Туре	Point	Туре	
DVP14SS11R2		8	DC Type	6	Relay	
DVP14SS11T2	24VDC	8	Sink or Source	6	Transistor	

Input/Output

Type

DC Type

Sink or Source

Input/Output

Specification

Stored program, cyclic scan system

Instructions + Ladder Diagram + SFC

Basic commands: 32 (including the

13 Points 1-Phase 10KHz, 2-Phase

Basic command (several μ s)

Batch I/O (refresh)

3792 Steps

10 Points

118 Points

256 Points

280 Points

64 Points

63 Points

1 Point

112 Points

16 Points

408 Points

192 Points

144 Points

64 Points

16 bit: -32768~+32767

16 bit: 0000~FFFF

7KHz

STL commands)

512+232 Points

Input Unit

Poin

0

0

4

4

8

Output Unit

Type

None

Relay

Transisto

Relay

Transistor

Relay

Transistor

Point

0

8

4

4

8

8

Output Power

Output voltage: 24VDC

Output current (max.): 1A

Output voltage: 24VDC

Output current (max.): 2A

STANDARD SPECIFICATIONS

Standard Function MPU

Digital I/O Expansion Unit

Power

24VDC

Analog/temperature module expansion unit

Power Supply Module

Please refer to user manuals that put with machines.

Input Power

100~240\/AC

(50/60Hz)

100~240VAC

(50/60Hz)

Model

DVP08SM11N

DVP08SN11R

DVP08SN11T

DVP08SP11R

DVP08SP11T

DVP16SP11R

DVP16SP11T

Model

DVPPS01

DVPPS02

3.1 Function Specifications

I/O Processing Method

Control Method

Execution Speed

Program Language

Program Capacity

Instructions

Step Relay

(Latched)

Auxiliary

Relav

Timer

Counter

Data

Reaister

Pointer

Index Relav

Constant

Item

Primary step point

General step poin

General

.atched

Special

Digital

General

Latched

General

atched

Special

Decimal K

Hexadecimal H

High-Speed

3

M Ca Su Po lm W (a

eference

Profile Reference

un l

Profile Reference

ALED

Remark

mmediate refresh command available

Application command (10~hundreds μ s)

C235~C254 (all of which are latched type

only with I/O of the MPU

Step instructions included

Application commands: 107

M000~M511 + M768~M999

T0~T63 (100 ms time base) T64~T126 (10 ms time base, when

T127 (1 ms time base)

E (=D1028), F (=D1029)

32 bit: 0000000~FFFFFFF

32 bit: -2147483648~+2147483647

Built-in EEPROM

S0~S9

S10~S127

M512~M767

M1000~M1279

M1028 is On)

C0~C111

C112~C127

D0 ~ D407

P0~P63

Program write/read communication port: RS-232C. General function

nverter-specific drive commands are included as well.

* Additional remark: Refer to the PLC Technique Application Manual for relevant special relays and data registers.

D408~D599

D1000~D1143

h

Input Type	DC (SIN
Input Current	24VDC 5
Matterial	Off→On,
Motion Level	On→Off,
Responding Time	About 10

Output Type	Relay-R
Current Specifications	1.5A/1 p
Voltage Specifications	Below 25
Maximum Loading	75 VA (Ir
Responding Time	About 10

			1						
m Mode	DVPPS01	DVP14SS 11R2/T2	DVP08	SM11N	DVP08SN1	11R/T	DVP08SP11R	T DVP16S	211R/T
ower Supply Voltage	100~240VAC (50/60Hz)	24VDC (-15%~2 power polarity is	20%) (the counter-connection protection towards the DC ir s included)			the DC inpu	١t		
otion Specifications	Specifications Within 5ms of the momentary power loss, the device will keep on operating								
apacity of the Power opply Fuse	2A/2	250VAC							
ower Consumption			5	ŚW				8W	
sulation Resistance		Above 5 M Ω (50	00VDC	between	the ground	d and	all the I/O poin	ts)	
bise Immunity	ESD: 8KV Air EFT: Power Li Damped-Osci RS: 26MHz~1	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							
ounding	The diameter PLCs are use ground poles)	of the grounding d at the same tin	wire ca ne, mak	annot be te sure th	smaller tha at each PL	IN that .C is g	of terminals L rounded respe	and N (if nui ctively to the	nerous ?
nbient	For operation:	0°C∼55°C (temp	perature	e), 50~95	i% (humidit	ty), the	e 2 nd degree po	llution.	
mperature/Humidity	Storage: -25°C	c∼70°C (tempera	ture), 5	5∼95% (h	umidity)				
pration/Shock munity	International S (TEST Ea)	Standard Regulat	ions: IE	C1131-2	, IEC 68-2-	-6 (TE	ST Fc) / IEC11	31-2 & IEC (38-2-27
eight oproximation)	210(g)	214(g)/208(g)	12	8(g)	154(g)/14	6(g)	141(g)/136(g) 162(g)/	l 54(g)
		Input Poin	t Electri	ic Specifi	cations				
nput Type	DC (SINK or	SOURCE)							
put Current	24VDC 5mA								
lotion Level	vel Off→On, above 16VDC On→Off, below 14.4VDC								
esponding Time	About 10ms	(An adjustment r	ange o	f 0~15ms	s could be s	selecte	ed through D10	20 and D10	21)
	Output Point Electric Specifications								
Output Type	Relay-R				Transistor	r-T			
Current Specification	ns 1.5A/1 point	(5A/COM)			55℃ 0.1/ 45℃ 0.2/	A/1poi 4/1 po	nt, 50℃ 0.15A int, 40℃ 0.3A	/1point 1 point (2A/	COM)
oltage	Below 250V/	AC, 30VDC			30VDC			r x	
laximum Loading	75 VA (Induc	tive)	90 W (Resi	stive)	9W				
Responding Time	About 10 ms				Off→On 1	15us		On→Off	25us
4		INS	TALLA	TION &	WIRING				
4.1 Terminal Wiring	of the Standard	Function MPU ar	nd the D	Digital I/O	Expansior	<u>n Unit</u>			
Power Module	MPU			Di	gital I/O Ex	pansi	on Unit		
DVPPS01	DVP14SS	DVP08S	М	DVP	08SN	D	VP08SP	DVP16S	P
DVP-PS01				0		00			
			- 1	L		L		L	-

4.2 Mounting Arrangements and Wiring Notes allow heat dissipation.

Installation of the DIN Rail

The DVP-PLC can be secured to a cabinet by using the DIN rail. This DIN rail should be 35mm high with a depth of 7.5mm, and when mounting the PLC on the DIN rail, be sure to use the end bracket to stop any side-to-side motion of the PLC, which will reduce the chance of the wires being pulled loose. At 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 the clip. To remove it, pull down the retaining clip and gently pull the PLC away from the DIN rail. Wiring



Points of Attention

Environment

- communication port: RS-485 (controlled by the RS command). The DELTA's
 - 2 DO NOT install the PLC in an environment with high temperature or high condensation 3. DO NOT install the PLC in an environment with immediate vibration and shock.

3.2 General Specifications

Serial Communication Port

2.3 Model Numbers

When installing the DVP series PLC, make sure that it is installed in an enclosure with sufficient space (as shown in the right diagram) to its surroundings so as to

	\$0mm o	r more	
50mm •	DVP MPU	50mm	
or more	tra	or more	
	L DOWL OI	more	

- Use the 22-16AWG (1.5mm) single-core bare wire or the multi-core wire for the I/O wiring, and the specifications of the terminal are shown in the left diagram. The twisting power of the screw for the PLC terminal is 5~8 kgf-cm (4.3~6.9 in-lbs).
- Be sure not to place power wires such as the input point signal wire and the output point wire at the same conduit or to use the same multi-core wire. Be sure not to place power wires such as the input point signal wire and the
- output point wire, or the power supply, at the same conduit during wiring.
- 1. DO NOT install the PLC in a dusty, smoky, or corrosive atmosphere.

☑ Construction

- 1. Avoid the accidental drop of conductive debris into the PLC during screwing and wiring.
- 2. Allow a minimum space of 50mm between the PLC and other control components, and keep the PLC away from the high-voltage lines and the power equipment.
- Wiring and Specifications of the Power Terminals 43

This PLC model is of the DC power input, and when the power is supplied, and make sure that it is connected to terminals 24VDC and 0V (power range 20.4VDC~28.8VDC). And when the power voltage is lower than 20.4VDC, the PLC will stop the operation and the output will be Off, and consequently, the ERROR LED will blink swiftly



Safety Guidelines

Since the PLC is in control of numerous devices, motion of either one device could affect the motion of other devices, and the breakdown of either one device would consequently be detrimental to the whole auto control system, and danger will thus be resulted. What follow is the recommended wiring for the power input:



Wiring of the Input Point

The input signal of the input point is of the DC power DC input, and there are two types of wiring to the DC type: SINK and SOURCE

The DC Type, there are two types of wiring to the DC type: SINK and SOURCE, and they are defined as follows:



O Wiring





A Overload Capacity of the Output Terminal

Every output contact possesses the overload capacity that is twice the rated current within 5 minutes, and as for the common contact, the overload capacity is 1.5 times the rated current within 2 minutes. And if the range is exceeded, it might result in the contact's malfunctioning, or even cause internal wire burnt. There are two types of output modules for the DVP-S Series PLC: the relay and the transistor. Refer to Functions & Specifications for relevant electric specifications



Fig. A When actual wiring is conducted at the output terminal, pay special attention to the wiring at the common end. Take DVP14SS11R2 as an example, the output terminal Y0 utilizes the common end C0, and Y2 uses C1, whereas Y2~Y5 use C2, as shown in Fig. C.

Isolation Circuit: the photocoupler is utilized as the signal isolation between the internal circuit of the PLC and input module



Power Indication 1. At the front of the MPU or the expansion unit, there is a "POWER" LED. When the MPU is powered On, the LED (in green) will be on. If the indicator is not on when the MPU is powered up, it means that there is some problem with DC power supply of the PLC, and it is thus important to check whether the wirings of the +24V and the 0V terminals are properly conducted. If the ERROR LED is blinking swiftly, it means that the +24V power supply to the PLC is insufficient

TRIAL RUN

2 If the other indicator "I V" that locates at the front of the expansion unit is on, it means that the input power voltage to the expansion unit is insufficient, and the output from the expansion unit should be prohibited

Preparation

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- 1. Make sure that the power wiring and the I/O wiring are both conducted properly before the power is turned On. And be advised not to supply AC110V or AC220V into the I/O terminals, or it might short circuit the wiring and would cause direct damage to the PLC.
- 2. After using the peripheral devices to write the program into the MPU and that the ERROR LED of the MPU is not on, it means that the program in use is legitimate, and it is now waiting for the user to give the RUN command. 3. Use HPP to execute the forced On/Off test of the output contact.

Operation & Test

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- 1. If the ERROR LED of the MPU is not blinking, use the peripheral device to give the RUN command, and the RUN indicator will then be on.
- 2. HPP could be utilized to monitor the settings and the registered values of the timer, the counter and the data register during operation, and moreover, to force the I/O contacts to conduct the On/Off motion. If the ERROR LED is on (but not blinking), it means that the setting of the user's program has exceeded the preset overtime limit, and users have to double check the program and perform the On/Off function again. (The PLC is then back at STOP automatically)

The PLC I/O Responding Time:

The total responding time of the PLC from the input signal to the output motion is calculated as follows:

"Responding Time" = "input interface delay time" + "user's program scan time" + "output motion delay time" nut interface delay time 10ms (factory setting), 0~15ms adjustable. Refer to the usage on special

input interface delay time	registers D1020~1021 for detail.
User's program scan time	Refer to the usage on special register D1010 for detail.
Output motion delay time	The relay module is about 10ms. The transistor module is about 20~30 μ s.

Basic Commands and Application Commands of the PLC:

- ◎ The basic commands and the application commands of the MPU of this series are totally applicable to the DELTA DVP-PLC ES Series MPU. Refer to the DELTA PLC Technique Application Manual for relevant basic commands and application commands.
- ◎ The DVPHPP hand-held programming panel, the DPLSoft (the DOS version) ladder diagram editing program or the WPLSoft (the Windows version) ladder diagram editing program are all good for use with the DELTA DVP-PLC, also the PLC could connect with the DVP14SS MPU through specific transmission wire, and then the program transmission, the MPU control and the program monitoring could all be executed.

FAULT CHECK & MAINTENANCE

6.1 Judge the Error through the Indicator at the Front Panel When error occurred for the DVP PLC, please check:

"POWER" LED

repaired at a dealer near you.

"RUN" I FD

"STOP" "ERROR" LED $\mathbf{\nabla}$

- or not.
- $\mathbf{\nabla}$ "Input" LED

\mathbf{N}

"Output" LED

conditions should be attended to:

whether the screw is tightened or not 6.2 Error Code Table

Error CodeExplanationError CodeExplanation0001Device S exceeds the usage limit0F05Misused Operand DXXX of DCNT0002Label P has been used repetitively or exceeds the usage limit0F06Misused SFTR operands0003KnSm exceeds the usage limit0F07Misused SFTL operands0102Interrupt Pointer, I, has been used repetitively or exceeds the usage limit0F07Misused SFTL operands0202Instruction MC exceeds the usage limitC400Misused ZRST operands0303KnSm exceeds the usage limitC400General circuit error0401Device X exceeds the usage limitC401General circuit error0403KnXm exceeds the usage limitC402LD / LD commands have been us more than 9 times consecutively0501Device Y exceeds the usage limitC403MPS has been used for more than 9 consecutively0604T register exceeds the usage limitC404FOR-NEXT over 6 steps and above exceeds the usage limit0604T register exceeds the usage limitC403STL/RST used between FOR-NEXT END / FEND used between FOR-NEXT0803KnMm exceeds the usage limitC407STL has been used for more than 9 consecutively0D01Misused DECO operandsC408MC/MCR used within STL U/P used within STL0D03Misused DHSCS operandsC409STL/RET used within the Interrupt S Routine0D04Misused PLSY operandsC404MC/MCR used within the Interrupt S Routine0D05Misused PLO oper				
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0D07 Misused FROM/TO operands MC/MCR used within the Interrupt S Routine 0D08 Misused PID operands C400 MC/MCR does not start from N0 nor discontinuous status 0E01 Component C exceeds the usage limit C40C The relative N value of MC/MCR is diff 0E04 C register exceeds the usage limit C40D I/P not used properly 0E05 Misused Operand CXXX of DCNT C40E IRET should not appear following th FEND command. 0E18 BCD conversion error SRET should not appear following th FEND command	0D06	Misused PWM operands	C40A	MC/MCR used within the Subroutine,
0D08 Misused PID operands C40B MC/MCR does not start from N0 nor discontinuous status 0E01 Component C exceeds the usage limit C40C The relative N value of MC/MCR is diff 0E04 C register exceeds the usage limit C40D I/P not used properly 0E05 Misused Operand CXXX of DCNT C40E IRET should not appear following th FEND command. 0E18 BCD conversion error SRET should not appear following th FEND command	0D07	Misused FROM/TO operands		MC/MCR used within the Interrupt Service Routine
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0E04 C register exceeds the usage limit C40D I/P not used properly 0E05 Misused Operand CXXX of DCNT IRET should not appear following th FEND command. 0E18 BCD conversion error SRET should not appear following th FEND command	0E01	Component C exceeds the usage limit	C40C	The relative N value of MC/MCR is different
0E05 Misused Operand CXXX of DCNT C40E IRET should not appear following th FEND command. 0E18 BCD conversion error SRET should not appear following th FEND command	0E04	C register exceeds the usage limit	C40D	I/P not used properly
0E18 BCD conversion error SRET should not appear following the FEND command	0E05	Misused Operand CXXX of DCNT	C40E	IRET should not appear following the last FEND command.
	0E18	BCD conversion error		SRET should not appear following the last FEND command
0E19 Division error (divisor=0) C41C I/O points of the expansion unit excer limit.	0E19	Division error (divisor=0)	C41C	I/O points of the expansion unit exceed the limit.
0F04 D register exceeds the usage limit C4EE END command not existed within program	0F04	D register exceeds the usage limit	C4EE	END command not existed within the program

- 6.3 Periodic Inspection

There is a "POWER" LED at the front of the MPU. When the MPU is powered On, the green LED light will be on. If the indicator is not on when the MPU is powered up and with the input power being normal, it is an indication that the PLC is out of order. Please have this machine replaced or have it

Identify the status of the PLC. When the PLC is in operation, this light will be on, and users could thus use HPP or the ladder diagram editing program to give commands to make the PLC "RUN" or

• If illegitimate program is input to the MPU, or that the commands and devices of the program exceed the allowable range, the indicator will thus be blinking. At the moment, the user should inquire about the error code from the special data register D1004 in the MPU and look it up in the Error Code Table. After the error is found and the program is revised, send the revised version to the MPU. If not being able to be connected with the PLC, and that the LED is blinking swiftly, it is an indication

that the 24VDC power supply is insufficient. To check whether the power supply of 24VDC is normal

• When the ERROR LED is on (not blinking), it is an indication that the execution time of the program circuit has exceeded the preset overtime limit (setting of D1000). To check the program circuit or use the "WDT" command when this occurred. If the light is still on, conduct the On/Off function of the DVP MPU again and then check whether the RUN LED is off. If it is not off, check whether there are interferences or are there resistive objects in the interior of the PLC.

The On/Off signals of the input point could be displayed through the "Input" LED, or to monitor the status of the input point through the device monitoring function of HPP. And once the motion of the input point is valid, the LED is on. Therefore, if errors are detected, use HPP, the LED and the input signal circuits to check whether the status is normal. Especially when the electronic switch of great electric leakage is utilized, the input point is usually witnessed with unexpected motions

The "Output" LED is designed especially for displaying the On/Off status of the output signals. And when the "Output" LED is On or Off and that the loading is of an opposite motion, the following

For the output contact, the contact might be melted down and blocked up due to overload or loading short-circuit, and would consequently be defected

If the output contact is functioning undesirably, be sure to check the output wiring circuit and

Since the DVP series PLC does not utilize disposable components, there is thus no need to replace most of the components. However, if the output relay is turned on/off frequently, or that it is often used in driving up great current load, life of the output contact will thus be decreased. Under a condition like this, periodic inspection is then needed to check whether the contact is of the "Permanently Open" status or of the short-circuit status, and moreover, the following precautions should be noted:

P Do not mount the DVP under direct sunlight or near any heat-radiation objects.

P Do not install the DVP-PLC in places subject to high temperature, high humidity, excessive vibration, corrosive gasses, liquids, airborne dust and metallic particles

Check periodically whether the wiring and terminals are tightened and conducted properly.