DELTA ELECTRONICS, INC.

DVP SERIES PROGRAMMABLE LOGIC CONTROLLER

DELTA

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Functionality

Ultra slim series → **Superior functionality** → **Cost effective**

SA SERIES

MPU: 12 points (8DI+4DO)
Share extension module with SS series
Double larger capacity than SS series
Five times more data registers than SS series
Dual-port, abundant instructions
high-speed pulse output/input.....

SS SERIES

Ultra slim series
MPU: 14 points (8DI+6DO)
Extension unit: 8 and 16 points
Complete analog input/output module
Dual communication port, abundant instructions, high-speed pulse input/output
Cost effective

SX SERIES

MPU: 10 points (4DI+2DO+2AI+2AO)
Major function spec.: same as SA series
(Built-in numerical display(correspond to internal register)
Additional 2CH analog voltage/current inputs in MPU (Bipolar/12-bit)
Additional 2CH analog voltage/current outputs in MPU (Bipolar/12-bit)

EH SERIES

MPU: 16, 20, 32, 48, 64, 80 points
Extension units: 8, 16, 32 and 48 points
Program capacity: 16K, 10000 words for data register...
CPU+ASIC (dual CPU), high-speed algorithm (up to 0.24us)
ASIC design to support high-speed pulse input (4CH, up to 200KHz)
ASIC design to support high-speed pulse output (2CH, up to 200KHz)
Abundant peripherals and instructions
Additional variety extension cards (AD, DA, COM)
Built-in convenient instructions for PLC LINK, position control, communication control, etc.

ES SERIES

MPU: 14, 24, 32 and 60 points
Variety combination extension units (8, 16, 24 and 32 points)
Dual communication port, abundant instructions,
high-speed pulse input/output
Cost effective

EX SERIES

MPU: 20 points (8DI+6DO+4AI+2AO)
Built-in 4CH analog inputs and 2CH analog outputs
Dual communication port, abundant instructions,
high-speed pulse input/output
Cost effective

- **Abundant instructions** -- easy to program and reduce maintenance cost
- **Delta mechanical and electrical products** -- AC drive, Servo,HMI, encoder...Provide you economic/additional value solution
- **Specific instructions** -- possess communication instructions, Servo drive position instructions and variety special purpose instructions to save development cost
- **Integrate research and application** -- fast and useful technology service
- **UL/CE marking** -- excellent in quality assurance
- **ISO9001 certification** -- complete research management

Contents

Points

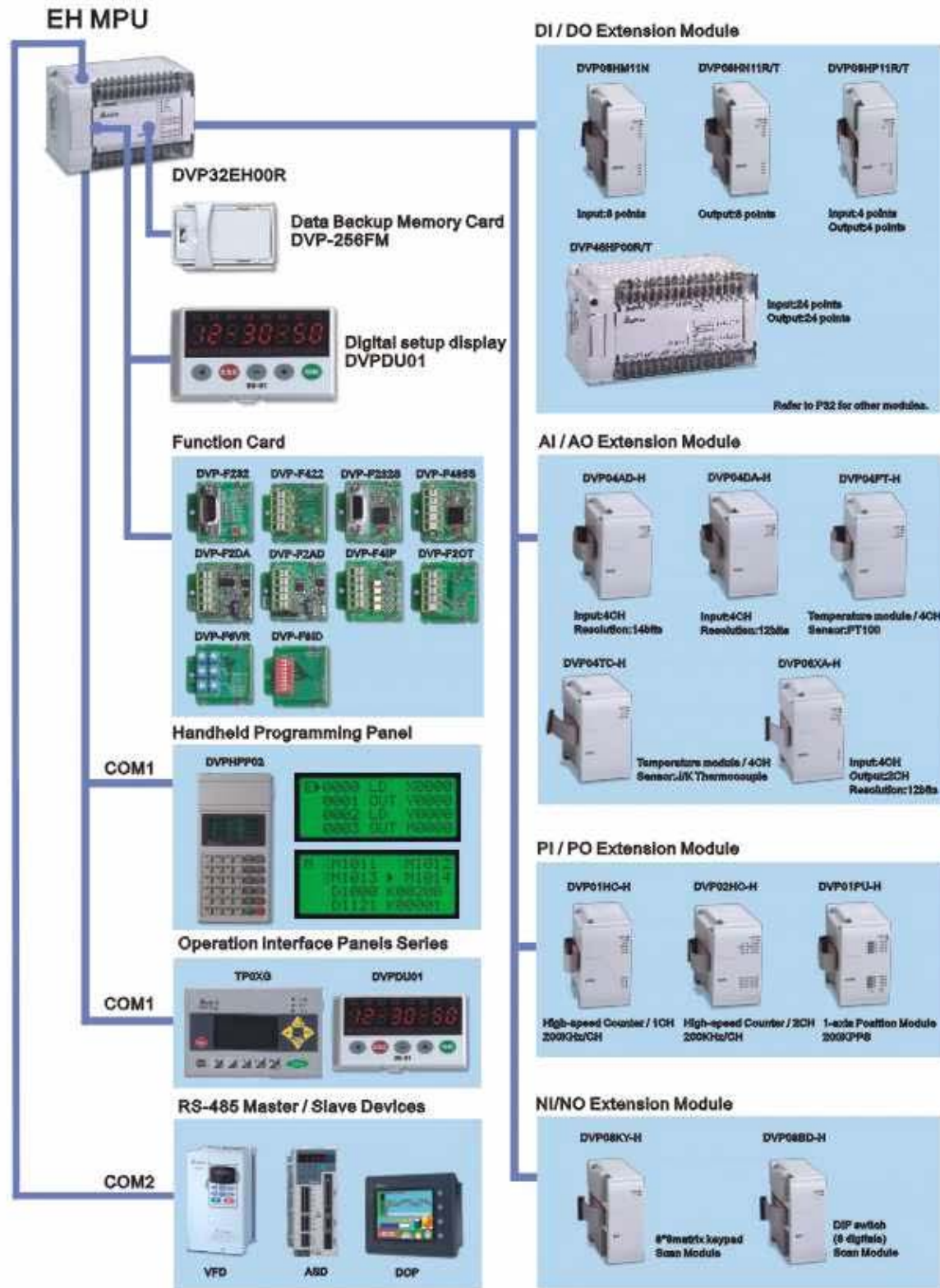| 256	256	256	512

Spec. \ Model	AC Input	DC Input	Potentiometer input point	RUN/STOP switch	MPU built-in analog I/O point	Built-in high-speed I/O unit	File register (words)	PLC LINK	Removable terminal
ES	○	○	—	— *	—	○	—	—	— *
EX	○	○	—	—	○	○	—	—	—
SS	—	○	—	○	—	○	—	—	○
SA	—	○	○	○	—	○	1,600	○	○
SX	—	○	—	○	○	○	1,600	○	○
EH	○	—	○	○	Optional	○	10,000	○	○

Spec. \ Model	Built-in display screen (2 digitals with hexadecimal)	Date backup memory card	Real time clock	Memory type	Program capacity (Steps)	Digital I/O module (DI/DO)	Analog I/O module (AI/AO)	Pulse I/O module (PI/PO)	Numeric I/O module (NI/NO)
ES	—	—	—	EEPROM	4K	○	—	—	—
EX	—	—	—	EEPROM	4K	○	—	—	—
SS	—	—	—	EEPROM	4K	○	○	—	—
SA	—	—	○	SRAM+battery	8K	○	○	—	—
SX	○	—	○	SRAM+battery	8K	○	○	—	—
EH	—	Optional	○	SRAM+battery	16K	○	○	○	○

* There is RUN/STOP switch and removal terminals for 60 points MPU of ES series.

EH MPU

DVP32EH00R

Data Backup Memory Card
DVP-256FM

Digital setup display
DVPDU01

Function Card

DVP-F232 DVP-F422 DVP-F232S DVP-F485S

DVP-F2DA DVP-F2AD DVP-F4IP DVP-F2OT

DVP-F6VR DVP-F6ID

Handheld Programming Panel

DVPHPP02

EH-0000 LD 50000
0001 OUT V0000
0002 LD V0000
0003 OUT M0000

M M1011 M1012
M1013 M1014
D10000 K000000
D1121 K000001

Operation Interface Panels Series

TP0XG DVPDU01

RS-485 Master / Slave Devices

VFD ASD DOP

COM1

COM1

COM2

DI / DO Extension Module

DVP08HM11N DVP08HN11R/T DVP08HP11R/T

Input:8 points Output:8 points Input:4 points Output:4 points

DVP48HP00R/T

Input:24 points Output:24 points

Refer to P32 for other modules.

AI / AO Extension Module

DVP04AD-H DVP04DA-H DVP04PT-H

Input:4CH Resolution:14bits Input:4CH Resolution:12bits Temperature module / 4CH Sensor:PT100

DVP04TC-H DVP06XA-H

Temperature module / 4CH Sensor:J/K Thermocouple Input:4CH Output:2CH Resolution:12bits

PI / PO Extension Module

DVP01HC-H DVP02HC-H DVP01PU-H

High-speed Counter / 1CH 200KHz/CH High-speed Counter / 2CH 200KHz/CH 1-axis Position Module 200KPPS

NI/NO Extension Module

DVP08KY-H DVP08BD-H

8*8matrix keypad Scan Module DIP switch (8 digitals) Scan Module

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ES/EX Series

DVP32ES00R2

Handheld programming panel /
Operation Interface Panels Series /
Digital setup display

COM1

DVPHPP02 TP0XG

DVPDU01

RS-485 Master / Slave Devices

COM2

VFD ASD DOP

DI/DO Extension Module

DVP08XM11N DVP08XN11R/T DVP04XP11R/T

Input : 8 points Input : 8 points Input : 4 points Output : 4 points

DVP24XP11R/T DVP32XP00R/T

Input : 16 points Output : 8 points Input : 16 points Output : 16 points

Refer to P28 for other modules

SS/SA/SX Series MPU

DVP12SA11R

Handheld programming panel /
Operation Interface Panels Series/
Digital setup display

COM1

DVPHPP02 TP0XG

DVPDU01

RS-485 Master / Slave Drive

COM2

VFD ASD DOP

DI/DO Extension Module

DVP08SM11N DVP08SN11R/T DVP08SP11R/T DVP16SP11R/T

Input:8 points Output:8 points Input:4 points Output:4 points Input:8 points Output:8 points

AI/AO Extension Module

DVP04AD-S DVP02DA-S DVP04DA-S DVP06XA-S

Input:4CH Resolution:14bits Input:2CH Resolution:12bits Input:4CH Resolution:12bits Input:4CH Output:2 CH Resolution:12bits

DVP04PT-S DVP04TC-S DVP06RT-S

Temperature Module / 4CH Sensor:PT100 Temperature Module / 4CH Sensor:J,K Thermocouple Temperature Module / 6CH Sensor:Resistor Thermocouple

PLC(1-7)curve.jpg (1611 x 1090 x 24)

ES/EX/SS Functional Specification

Item			Function		Remarks
Control Method			Store program, cyclic scan system		
I/O Processing Method			Batch processing (when END instruction is executed), I/O refresh instruction is available		
Execution Speed			Basic instruction (several us)		Application instructions (10 ~ hundreds us)
Program Language			Instruction + ladder diagram + SFC		Including the Step instructions
Program Capacity			3792 STEPS		Built-in EEPROM
Instructions			32 basic sequential instructions (Including the Step ladder instruction)		107 application instructions
X	External input relay		X0~X177 in octal, 128 points	Total is 256 points	Correspond to external input point
Y	External output relay		Y0~Y177 in octal, 128 points		Correspond to external output point
M	Auxiliary	For general	M0~M511, M768~M999, 744 points	Total is 1280 points	
		For latched	M512~M767, 256 points		
		For special	M1000~M1279, 280 points (some are latched)		
S	Step point	Initial step point (for latched)	S0~S9, 10 points	Total is 128 points	Usage device of step ladder diagram (SFC)
		Zero point return (for latched)	S10~S19, 10 points (use with IST instruction)		
		latched	S20~S127, 108 points		
T	Timer	100ms timer	T0~T63, 64 points	Total is 128 points	When the timer indicated by TMR instruction attains the setting, the T contact with the same number will be ON.
		10ms timer (M1028=On)	T64~T126, 63 points (when M1028=On, it is 10ms, M1028=Off, it is 100ms)		
		1ms timer	T127, 1 points		
C	Counter	16-bit count up for general	C0~C111, 112 points	Total is 128 points	When the counter indicated by CNT (DCNT) instruction attains the setting, the C contact with the same number will be ON.
		16-bit count up (for latched)	C112~C127, 16 points		
		32-bit count up/down high-speed counter (for latched)	1-phase 1 input	C235~C238, C241, C242, C244, 7 points	Total is 13 points	
			1-phase 2 inputs	C246, C247, C249, 3 points		
			2-phase 2 inputs	C251, C252, C254, 3 points		
D	Data register	For general	D0~D407, 408 points	Total is 600 points	It can be memory area for storing data. E and F can be used as index indication
		For latched	D408~D599, 192 points		
		For special	D1000~D1311, 312 points	Total is 312 points	
		For index indication	E(=D1028)、F(=D1029), 2 points		
N	For master control nested loop		N0~N7, 8 points		Control point of master control nested loop
P	For CJ, CALL instructions		P0~P63, 64 points		The location point of CJ, CALL
I	Interrupt	External interrupt	I001、I101、I201、I301, 4 points		The location pointer of interrupt subroutine
		Time interrupt	I6□□, 1 point (□□=10~99, time base =1ms)		
		Communication interrupt	I150, 1 point		
K	Decimal number system		K-32,768 ~ K32,767（16-bit operation）K-2,147,483,648 ~ K2,147,483,647（32-bit operation）		
H	Hexadecimal number system		H0000 ~ HFFFF(16-bit operation)；H00000000 ~ HFFFFFFFF (32-bit operation)		
Serial Communication port (program read/write)			COM1 : RS-232, COM2 : RS-485(can be master or slave), COM1 and COM2 can be used simultaneously		
DI/DO, AI/AO Extension Module			ES/EX series have DI/DO extension unit (8~32 points) SS series has complete DI/DO and AI/AO module (AD, DA, PT, TC, XA, RT) Note: 8 AI/AO modules (max.) and it doesn't occupy digital I/O points		

SA/SX/EH Functional Specifications

Items			SA/SX Series	EH Series
Control Method			Stored program, cyclic scan system	
I/O Processing Method			Batch processing (when END instruction is executed)	I/O refresh instruction is available
Execution Speed	Basic Instruction		several us	Basic Instructions (0.24 us Min.)
	Application Instructions		10~hundreds us	10 ~ hundreds us
Program Language			Instruction, ladder diagram, SFC	
Program Capacity			7920steps (SRAM + Battery)	15872steps (SRAM + Battery)
Instructions			32 basic sequential instructions (Including the Step instructions)	32 basic sequential instructions (Including the Step instructions)
			168 application instruction	187 application instruction
X	External Input Relay		X0~X177 in octal, 128 points	X0~X377 in octal, 256 points
Y	External Output Relay		Y0~Y177 in octal, 128 points	Y0~Y377 in octal, 256 points
M	Auxiliary Relays	General	M0~M511, 512 points	M0~M499, 500 points
		Latched	M512~M999, 488 points	M500~M999, 500 points
			M2000~M4095, 2096 points	M2000~M4095, 2096 points
		Special	M1000~M1999, 1000 points(some are latched)	M1000~M1999, 1000 points(some are latched)
S	Step Points	Initial step points	S0~S9, 10 points	S0~S9, 10 points
		Zero return	S10~S19, 10 points (use with IST instruction)	S10~S19, 10 points (use with IST instruction)
		General	S20~S511, 492 points	S20~S499, 480 points
		Latched	S512~S895, 384 points	S500~S899, 400 points
		Alarm	S896~S1023, 124 points	S900~S1023, 124 points
T	Timers	100ms	T0~T199, 200 points (T192~T199 is for subroutine)	T0~T199, 200 points (T192~T199 is for subroutine)
			T250~T255, 6-point accumulative type	T250~T255, 6-point accumulative type
		10ms	T200~T239, 40 points	T200~T239, 40 points
			T240~T245, 6-point accumulative type	T240~T245, 6-point accumulative type
		1ms	T246~T249, 4-point accumulative type	T246~T249, 4-point accumulative type
C	Counters	16-bit count up	C0~C95, 96 points	C0~C99, 100 points
			C96~C199, 104 points (latched)	C100~C199, 100 points
		32-bit count high-speed up/down	C200~C215, 16 points	C200~C219, 20 points
			C216~C234, 19 points	C220~C234, 15 points
		32-bit count high-speed up/down	C235~C242, 1 phase 1 input, 8 points	C235~C244, 1 phase 1 input, 10 points
			C246~C249, 1 phase 2 inputs, 3 points	C246~C249, 1 phase 2 input, 4 points
			C251~C254, 2 phase 2 inputs, 3 points	C251~C254, 2 phase 2 input, 4 points
D	Data registers	General	D0~D199, 200 points	D0~D199, 200 points
		Latched	D200~D999, 800 points	D200~D999, 800 points
			D2000~D4999, 3000 points	D2000~D9999, 8000 points
		Special	D1000~D1999, 1000 points(some are latched)	D1000~D1999, 1000 points(some are latched)
		Index register	E0~E3, F0~F3, 8 points	E0~E7, F0~F7, 16 points

Item		SA/SX Series	EH Series
File registers (extension register for saving data)		0~1599 (1600 points)	0~9999 (10000 points)
N	For master control nested loop	N0~N7, 8 points (control point of master control loop)	
P	For CJ, CALL instructions	(location pointer of CJ and CALL)	
I Interrupt	External interrupt	I001(X0), I101 (X1), I201 (X2), I301 (X3), I401 (X4), I501 (X5); 6 points (all are rising-edge trigger)	I00☐ (X0), I10☐ (X1), I20☐ (X2), I30☐ (X3), I40☐ (X4), I50☐ (X5); 6 points (☐=1, rising-edge trigger, ☐=0, falling-edge trigger)
	Time interrupt	I6☐☐(1ms), I7☐☐(1ms) (☐☐=1~99)	I6☐☐(1ms), I7☐☐(1ms), I8☐☐(0.1ms) (☐☐=1~99)
	High-speed counter	I010, I020, I030, I040, I050, I060; 6 points	I010, I020, I030, I040, I050, I060; 6 points
	Pulse interrupt	—	I110, I120, I130, I140; 4 points
	Communication	I150, 1 point	I150, I160, 2 points
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 ~ HFFFFFFFF (32-bit operation)	
	Serial Communication (program read/write)	COM1: RS-232, COM2: RS-485(Master/Slave), COM1 and COM2 can be used simultaneously	
	Potentiometer	MPU is built in 2 points (with instruction to read settings)	
	RTC	MPU is built in RTC (Real time clock)(with instruction to read time and time reached comparison instruction)	
	High-speed pulse output (for EH series)	Max. output frequency is 200KHz (DVP20EH00T/DVP32EH00T)	
	Extension Card (for EH series)	Optional	RS-232 card, RS-422 card, Potentiometer/ DIP Switch card, Transistor Output (2OT)Card, 2AD Card, 2DA Card, COM3 card (RS-485), COM3 card (RS-232), digital input card (4 IP)
	Program Memory Card (for EH series)	Optional	Allow to backup PLC program and data or copy PLC; Program can be burned via HPP02 or WPLSoft
	Special Extension Module		Share modules AD, DA, PT, TC, XA, RT with SS series (Max. 8 Extension Units, not occupy digital I/O points)	AD, DA, PT, TC, XA, HC, PU (Max. 8 Extension Units, not occupy digital I/O points)

DVP Series PLC Special Function/ Specification Comparison

Spec. Model	Latched data register (Words)	Data backup memory card	MPU built-in analog I/O	High-speed pulse I/O	
				High-speed counter (PI unit)	Pulse generator(PO Unit)
ES	192	—	—	single phase (2 sets—X0/X1, 30KHz Max.) single phase (2 sets—X2/X3, 10KHz Max.) AB phase (1 set, 7KHz Max.) Total bandwidth of PI/PO is 30KHz.	2 CH (10KHz Max.) Acceleration/ deceleration control
EX	192	—	4 CH IN(resolution: 10-bit, bipolar input) 2 CH OUT(resolution: 8-bit, unipolar output)		
SS	192	—	—		
SA	3800	—	—	single phase (2 sets—X0/X1, 30KHz Max.) single phase (4 sets—X2-X5, 10KHz Max.) AB phase (1 set, 7KHz Max.) Total bandwidth of PI/PO is 30KHz.	1 CH (50KHz Max.) smooth acceleration/ deceleration control
SX	3800	—	2 CH IN(resolution: 12-bit, bipolar input) 2 CH OUT(resolution: 12-bit, bipolar output)		
EH	8800	copy PLC rapidly (Optional)	optional (use either 2 CH IN or 2 CH OUT at one time) 2 CH IN (resolution: 12-bit, unipolar input) 2 CH OUT (resolution: 12-bit, unipolar output)	Low-speed: single phase (6 sets, 20KHz Max.) High-speed: single phase (4 sets, 200KHz max.) AB phase (4 sets, 100KHz max.)	2 CH (200KHz Max.) smooth acceleration/ deceleration control instruction position instruction

ASIC Design Structure High-speed Calculation

EH series
+ Adopt dual processors with CPU+ASIC and distribution calculation
+ Speed of basic instructions is up to 0.24us
+ High-speed pulse output is up to 200KHz and built-in smooth acceleration/deceleration control
+ High-speed counter frequency could reach 200KHz per set and total is four sets.
+ I/O module refresh interface, not occupy program scan time
+ Built-in multi-group external interrupt function

Extension cards for EH Series

When designing system by PLC, following condition may occur. To avoid buying whole module for an analog output, following extension cards are provided for EH series.

Usage timing and application requirement	Solution (correspond to extension card model no.)	Installation
When system specification is modified, you don't have enough points for use and you need only 1~4 input points.	DVP-F4IP	+ Example: DVP-F232
Output point of MPU is relay and you need 1~2 points more with transistor type.	DVP-F2OT	
You need 1~2 analog output points to control AC drive speed.	DVP-F2DA	
There is space limit for installing and need to deal with analog signal.	DVP-F2AD	
You need to connect PLC to PC and HMI and also control AC drive.	DVP-F232S	
You need to connect PLC to PC and HMI and also control AC drive.	DVP-F485S	
When parameters are needed to set by DIP switch without occupying any input points.	DVP-F8ID	
When built-in COM2 is RS-485, but what you need is RS-232. You want to use MODEM to remote control PLC	DVP-F232	
When built-in COM2 is RS-485, but what you need is RS-422.	DVP-F422	
If there are 3~8 variables needed to modify by requirement very often.	DVP-F6VR	

PLC Program Copy Card

EH series (MPU with 32 points and more) with data backup memory card (optional)
+ Data backup for portability
+ Faster speed to download numerous PLCs (copy PLC)
+ Larger capacity to save variety data
+ Password protection

Installation   Removal

Force ON / OFF setting by MPU input point X

SA/SX/EH series MPU provides input points to force On/Off setting. When user tests program by WPLSoft in office or factory, user can simulate the action of input point X to meet application requirement without connecting the input point circuit or switch.

Built-in Two Serial Communication Ports

DVP-PLC is built in two serial communication ports. It can connect to PC and HMI simultaneously and also have variety communication instructions to simplify traditional programming process. Following is functional specification for each series communication port.

	PLC Type COM Spec.	ES/EX/SS		SA/SX		EH	
C O M 1	Communication Port	RS-232		RS-232		RS-232	
	Working Mode	Slave		Slave		Slave	
	Protocol	Modbus ASCII mode		Modbus ASCII / RTU mode		Modbus ASCII / RTU mode	
	Baud Rate (bps)	9600		9600, Max. is up to 115200		9600, Max. is up to 115200	
	Monitor	PC / HMI		PC / HMI		PC / HMI	
C O M 2	Communication Port	RS-485		RS-485		RS-485/It can be changed to RS-232 or RS-422	
	Working Mode	Master	Slave	Master	Slave	Master	Slave
	Protocol	Modbus instructions (user-defined format) Modbus	Same as COM1	Modbus instructions (user-defined format)	Same as COM1	Modbus instructions (user-defined format)	Same as COM1
	Baud Rate(bps)	9600 / 19200 / 38400	9600	9600, Max. is up to 115200		9600, Max. is up to 115200	
	Connection Device	PLC/AC drive...	Same as COM1	PLC/AC drive...	Same as COM1	PLC/AC drive/MODEM...	Same as COM1
C O M 3	Communication Port					RS-485, RS-232	
	Working Mode	N/A		N/A		Slave / Modbus	
	Protocol					9600 / 19200 / 38400	
	Monitor					PC / HMI	

Supports Modbus Serial Instructions (For all series)

DVP-PLC is not only built in RS-485 serial communication port but also provides variety instructions of Modbus serial communication with two modes (ASCII mode and RTU mode). User only needs to fill device's ID, parameter's address and data for read/write into instruction without understanding communication protocol or writing complicated checksum program. Besides, it also provides many state flags, including communication time-out, transmission data error and transmitted data is receiving. Each state in communication is in your hand and makes you finish communication programming easily.


PLC Easy Link (1:N) Function (For EH/SA/SX series)

DVP-PLC provides EASY LINK function. At the right figure, you only need to write parameters address and length into special register without programming. Master will auto exchange data between devices (16 words for read/write). 16 slave devices max. (not only for DVP-PLC, but also DELTA other mechanical and electrical products that has serial communication and only support Modbus protocol, such as AC drive, temperature, Servo, etc.)

PLC Easy Link (N : N) Function (For EH series)

Using PLC Link function, max. N for single level (1: N) is 16 devices. If you need more than 16 devices, you need to use multi-level (N:N) network. You need to choose one device in first level to be master (such as Master B at the right figure), and then insert COM3 extension card (DVP-F485S) into it to connect to the first level and using built-in COM2 (RS-485) to connect to the new level. Master A and Master B control data exchange in whole Network.
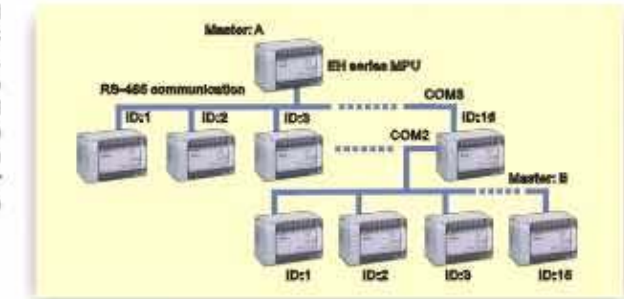

Variety Interrupt Source Requirement

1. External interrupt could reach 6 points
2. Timer interrupt
3. High-speed counter reached interrupt
4. Pulse output start or finish interrupt
5. Specific communication receiving word interrupt

• When received data length is not fixed, using specific character to show completed receive.
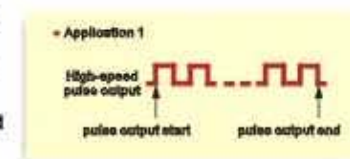
♦ There is correspondent interrupt number to execute relative action without effecting by scan time when high-speed pulse output start or end.
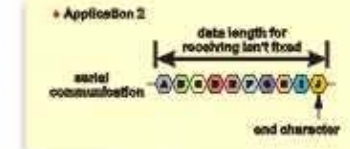
♦ In serial communication application, received data length is the signal to distinguish if it finishes receiving data or not. When the received length is not fixed, you can use specific character to be the end character and produce correspondent interrupt number to execute relative action.

Embedded Digital Setting Display DVPDU01

♦ DU-01 can be inserted into extension slot of EH series (32 points or more MPU). You can set start-up display, monitor specific device and power saving mode function. PLC internal devices, including real time clock, bit device (X, Y, M, S), word device (T, C, D) and internal CR in extension module, could read display or write settings.

♦ It could read/write to PLC internal program P, data register D and file register F. It also could be used to copy or transmit program data and support PLC password protection. DU-01 can be used for all DVP series.

## SX MPU Built-in A/D, D/A and 2-digital 7-segment Display Module

♦ SX MPU is built in 2CH A/D and 2CH D/A with 12-bit resolution and bi-polar input/output. It provides economic solution and read/write special D to get digital value of A/D conversion and specific analog voltage output without using FROM/TO instructions.

♦ Built-in 2 digitals 7-segment display and its content corresponds to special D for user display anything, such as error code or ID when using PLC Link function for network. System maintenance is fast and easy.

PID Control Instructions

DVP-PLC provides PID control instruction for automatic control speed or automatic control temperature application and it can be used repeat in program. Take the right figure for example, the algorithm method is: read actual speed parameter and acceleration/deceleration speed instruction (SV) from analog input (AI) and do PID calculate with user-defined P, I and D to get suitable output control value MV. To combine MV and speed instruction S to control output frequency of AC drive by analog output (AO) to make motor speed in the setting range of user expectation.

• Block diagram when using PID instruction to control speed
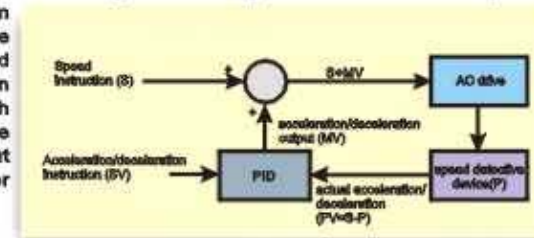
Fuzzy Temperature Control (For EH/SA/SX series)

User only needs to set (target value D0 (SV)) and present value D1 (PV)) to get an output instruction D10 (MV) after calculating by fuzzy logic algorithm to be the parameter for GPWM program to do On/Off control to Y10. No need to set other control parameters.

• Example for FTC application
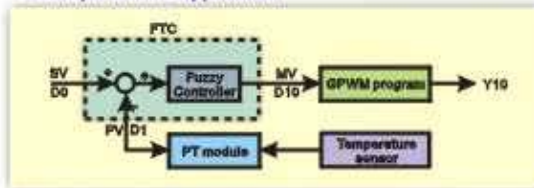
High-speed Counter

There are 4~6 points high-speed counter for all DVP-PLC series. And the features are:
1. Settings for counter value reached could be up to 4~8 sets
2. Could set interrupt number when counter value reached settings
3. Could set contact Y number to active immediately (ON/OFF) by counter value reached setting
4. Could set high-speed counter number to clear immediately by counter value reached setting
5. Possess counting mode of double frequency (1~4 times) Possess external input to control start or stop

• The Cutting Machine control with variable length
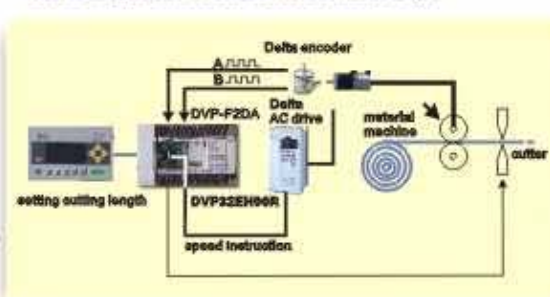
Spec. Model	1 phase 1 input		1 phase 2 inputs		2 phase 2 inputs	
	Points	Bandwidth	Points	Bandwidth	Points	Bandwidth
ES/EX/SS	4	30KHz	1	30KHz	1	7KHz
SA/SX	6	30KHz	1	30KHz	1	7KHz

Note: Bandwidth means total of input and output frequency. When counting 1 point by 1 phase 1 input high-speed counter, max. count frequency could be up to 30KHz.

Spec. Model	General		Hardware high-speed counter					
	1 phase 1 input		1 phase 1 input		1 phase 2 input		2 phase 2 input	
	Points	Bandwidth	Points	Count frequency	Points	Count frequency	Points	Count frequency
EH	6	20KHz	4(2/2)	200KHz/30KHz	4(2/2)	200KHz/30KHz	4(2/2)	200KHz/30KHz

Note: There are four groups of hardware high-speed counters for EH series. The count frequency of two points could reach 200 KHz per point and 30 KHz for the other two points.
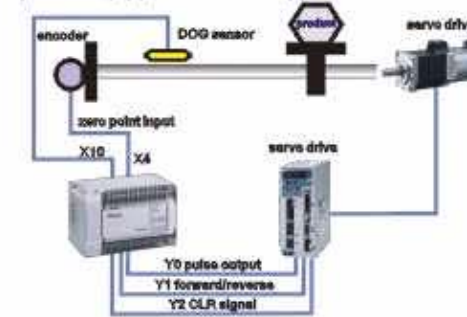
Pulse Output

There is 2-point high-speed pulse output for each DVP-PLC series. For EH series, each output channel could output 200KHz pulses individually and provides acceleration/deceleration control instruction to finish multi-segment, smooth end precision position control easily. It could control closed circuit by using with built-in hardware high-speed counters to compensate drive's components aging or other components' error to get long time steady control. Refer to following table for pulse output comparison of each series:

Spec. Model	Output points		Max. output frequency		Function Features
	Points	Y Output	Y0	Y1 (Y2)	
ES/EX/SS	2	Y0, Y1	10KHz	10KHz	Possess acceleration / deceleration control
SA/SX	2	Y0, Y1	50KHz	10KHz	Possess smooth acceleration / deceleration control
EH	2	Y0, Y2	200KHz	200KHz	Possess smooth acceleration / deceleration control

Position Control Instruction (For EH series)

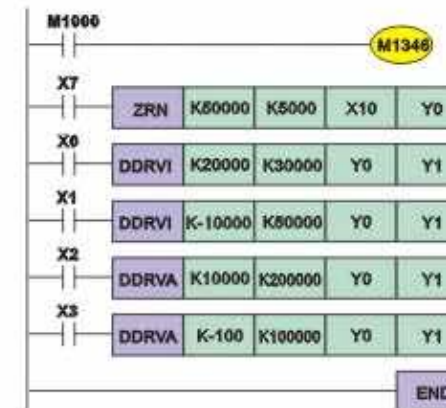• Example for simply position control application

For EH series, there are following simply position instruction, including zero return, acceleration / deceleration pulse output and position control instruction of relative/absolute position.

API	Instruction		Function
	16-bit	32-bit	
155	ABSR	DABSR	Read ABS current value
156	ZRN	DZRN	Zero return
157	PLSV	DPLSV	Pulse output
158	DRVI	DDRVI	Relative position
159	DRVA	DDRVA	Absolute position

DOG input: X10, zero return start: X7
Relative position (+) start: X0, Relative position (-) start: X1
Absolute position (+) start: X2, Absolute position (-) start: X3
Y0: pulse output, Y1: forward/reverse, Y2: clear signal

Explanation:

♦ When X7=On, the action of zero return will start and it will start to output pulse from Y0 with 50KHz frequency. When reaching DOG input (X10=On), it will output pulse from Y0 by JOG with 5KHz frequency and stop when X10=Off. When M1346=On (clear signal flag), the action of zero return will end and output Y2 clear signal to servo drive.

♦ When X0=On, it will output 20,000 pulses (relative position) from Y0 with 30KHz. Y1=On means forward.

♦ When X1=On, it will output -20,000 pulses (relative position) from Y0 with 50 KHz. Y1=Off means reverse.

♦ When X2=On, it will output 10,000 pulses (absolute position) from Y0 with 200 KHz. Y1=On means forward.

♦ When X3=On, it will output -100 pulses (absolute position) from Y0 with 100 KHz. Y1=Off means reverse.

Extension Card for RS-232/RS-422 Communication

MPU is built in COM1 (RS-232) and COM2 (RS-485). When user needs to connect to peripheral, such as PC or MODEM, by using COM2 to be RS-232 or RS-422, he could use this extension card. Besides communication inter face, its communication function is the same as original COM2 and it can use to be Slave mode or Master mode.

Caution: After inserting this card, original built-in COM2 (RS-485) will be invalid and PLC will set COM2 to be occupied by RS-232 card.

DVP-F232   **DVP-F422**

• Specifications

| Item	Explanation	
Model no.	DVP-F232	DVP-F422
COM port	Standard RS-232C	Standard RS-422
Insulation method	Non-insulation	
Transmission distance	15m	500m
Consumption method	30mA/DC5V (supply from PLC MPU)	
Communication protocol — Mode	Master/Slave, half-duplex, bidirection data transmission/receive	
Speed rate	110/150/300.../9600/19200/38400/57600/115200	
Data bits	7 or 8	
Stop bits	1 or 2	
Parity check	None, Even, Odd	
Communication indication	TX (transmission data), RX (receive data)	
Connection device	Possess RS-232C interface	Possess RS-422 interface

• System Connection
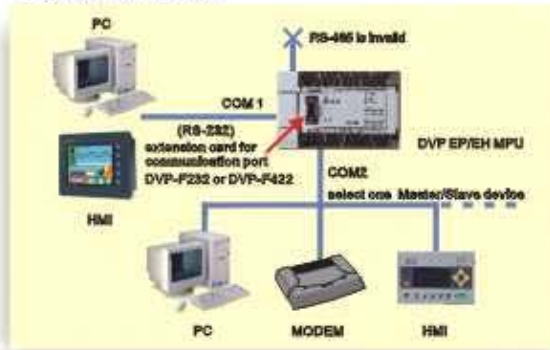
Additional RS-232 / RS-485 port

When two built-in COM1 (RS-232) and COM2 (RS-485) are not enough for use, you can add one COM by this card (number is 3 and called COM3). There are two interfaces, RS-232 and RS-485, for you to use. Its general function is the same as COM1 but communication baud rate is 9600/19200/38400 bps. Usage limit: PC1 and PC2 can't execute ladder diagram monitor function simultaneously when COM2 is slave mode and connect to PC1 with executing WPLSoft and COM3 also connects to PC2 with executing WPLSoft. But other communication function is normal. COM1 is out of this limit.

DVP-F485S   **DVP-F232S**

• Specifications

Item	Explanation	
Model no.	DVP-F232S	DVP-F485S
Com port	Standard RS-232C	Standard RS-485
Insulation method	Non-insulation	
Transmission distance	15m	500m
Consumption method	30mA/DC5V (supply from PLC MPU)	
Communication protocol — Mode	Slave, half-duplex, bidirection data transmission/receive	
Speed rate	9600/19200/38400	
Data bits	7	
Stop bits	1	
Parity check	Even	
Communication indication	TX (transmission data), RX (receive data)	
Connection device	Possess RS-232C interface	Possess RS-485 interface

• System Connection
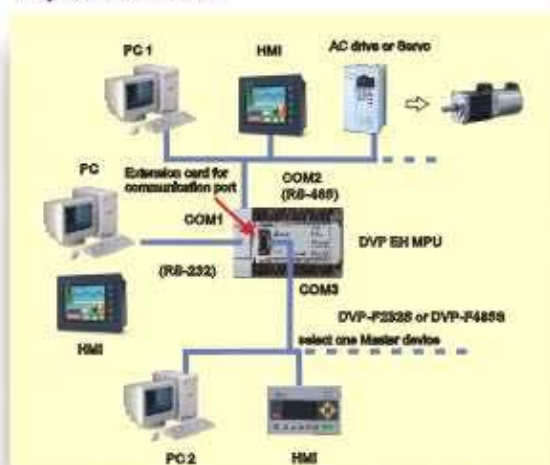
Additional analog voltage/current input device

DVP-F2AD

User can get A/D conversion value saved in special D by reading special D that corresponds to current value or average value.

There are 2 analog input points supported by F2AD card and their characteristics are shown in the following:

Item	Voltage output	Current output
Analog signal	DC 0~+10V	DC 0~20mA
Resolution (12bits)	2.5mV (10/4000)	10uA (20/2000)
Input impedance	40KΩ	250Ω
Reflash time for conversion	D1118 setting (≥K5, unit : ms)	
Digital input — Current value	D1056(CH0)	D1057(CH1)
Digital input — Average value	D1110(CH0)	D1111(CH1)
Characteristic curve		

Terminal Wiring

Program
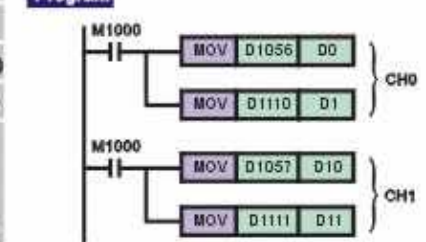
◆ Conversion calculation of CH0 AD :
Detector (voltage) produces an input voltage CH0. If the value D1 reads is K1472, it means input voltage is

$$=1472 \times \frac{10V}{4000}=3.68V$$

◆ Conversion calculation of CH1 AD:
Detector (current) produces an input current CH1. If the value D11 reads is K1234, it means input current is

$$=1234 \times \frac{20mA}{2000}=12.34mA$$

Additional analog voltage/current output device

DVP-F2DA

User can move value to D1116(CH0) or D1117(CH1) to get correspondent output voltage by using instruction MOV. Please connect I0+ or I1+ to COM to have a short circuit when cirult output is unused.

Item	Voltage output	Current output
Analog signal	DC 0~+10V	DC 0~+20mA
Output impedance	0.5Ω and less	0.5Ω and less
Resolution (12bits)	2.5mV (10/4000)	5uA (20/4000)
Reflash time	D1118 setting (≥K5, unit : ms)	
Digital input	D1116 (CH0)	D1117 (CH1)
Characteristic curve		

Terminal Wiring
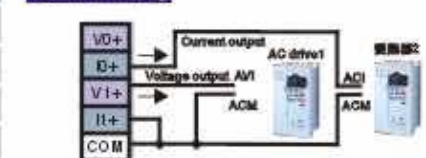
Program

◆ Conversion calculation of CH0 DA :
The current is outputted to ACI of AC drive to be speed control. If you need current 12.34mA, you should give D0:

$$=12.34mA \times \frac{4000}{20mA}=2468$$

◆ Conversion calculation of CH1 DA:
The voltage is outputted to AVI of AC drive to be speed control. If you need voltage 5.23V, you should give D1:

$$=5.23V \times \frac{4000}{10V}=2092$$

Digital input (4 points)

DVP-F4IP card provides 4 digital input points with photocoupler isolation between PLC. After system finishes scan every time, it will read 4 bits of these 4 digital input points automatically and set the states separately in M1104~M1107. User can operate this four special M in the program directly.

Terminal wiring

AX0	M1104
AX1	M1105
AX2	M1106
AX3	M1107

Digital output (2 points)

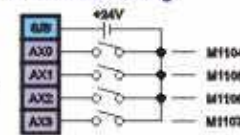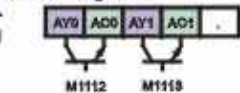There are 2 digital output points that provided by DVP-F2OT card. Output type is transistor and user can drive output points by using M1112 and M1113.

**I/O Diagram**

AY0 AO0 AY1 AO1

M1112   M1113

DIP switch

This digital DIP switch card (DVP-F8ID) provides 8 On/Off input signals (DI0~DI7) to read value by using instruction API 109 SWRD. It is general used to be input interface of external data setting and doesn't occupy input point X. After system finishes every scan time, it will auto to read 8 bits of digital switch and set each state in special auxiliary relay M1104~M1111.

I/O Diagram

DI0	M1104
DI1	M1105
DI2	M1106
DI3	M1107
DI4	M1108
DI5	M1109
DI6	M1110
DI7	M1111
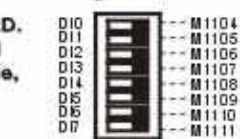
Potentiometer

DVP-F6VR card provides extension potentiometer VR2~VR7. Refer to API85 VRRD and API86 VRSC in application manual (programming) for detail. There are two built-in potentiometers VR0 and VR1 in EH MPU.

Data Backup Memory Card

DVP-256FM is a data backup memory card. There is a switch on it and PLC will check the state of this switch when PLC is power on. If this switch is Off, memory card will be invalid. And it is invalid to change the switch when PLC is power on. All memory data read/write action will be valid when switch is On.

Digital Setup Display (The switch for mode selection (TS-01 and TC-01) is at the back of the DU01.)

DVPDU01

TS-01 :

- Read/Write of both internal devices of PLC (eg. real time clock, bit devices (X, Y, M, S) and word devices (T, C, D)) and the Control Register (CR) inside of the extension units.
- Support the read/write of 32-bit data register.
- Set Start-up display and power save mode.
- Monitor the devices.
- If connected with accessory cable to ES-series without real time clock, the Time Display will start from 00-00-00 calculated by the microprocessor of DU01 (timing error may occur).

TC-01 :

- Read/write the program P, data register D and file register F from PLC.
- Copy program and data.
- Support the password protection of the PLC.

Analog Input Module -- DVP04AD-S (For SS/SA/SX Series)

Item	Voltage input	Current input
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog input channel	4 channels / each module	
Analog input range	±10V	±20 mA
Digital conversion range	±8000	±4000
Resolution	14 bits (1$_{LSB}$=1.25 mV)	13 bits (1$_{LSB}$=5 μA)
Input impedence	200 KΩ and above	250Ω
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	3 ms × channels	
Isolation method	Isolation between digital and analog circuitry. There is no isolation between channels.	
Absolute input range	±15 V	±32 mA
Digital data format	2's complementary of 16-bit, 13 significant bits, support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connect to DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7, 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

Analog Output Module--DVP04DA-S and DVP02DA-S(For SS/SA/SX Series)

Item	Voltage input	Current input
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog output channel	4 channels / each module, 2 channels / each module	
Analog output range	0~10V	0~20 mA
Digital data range	0~4000	0~4000
Resolution	12 bits (1$_{LSB}$=2.5 mV)	12 bits (1$_{LSB}$=5 μA)
Output impedance	0.5Ω or less	
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	3 ms × channels	
Output current	20 mA max.	—
Tolerance carried impedance	1KΩ~2MΩ	0~500Ω
Digital data format	2's complementary of 16-bit, 12 significant bits	
Isolation method	There is photocouple isolation between internal circuit and analog output and no isolation among analog channels.	
Protection	Voltage output has short circuit protection but short circuit for a long time may cause inner wiring damage and current output break.	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connect to DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

Temperature Module (PT100) DVP04PT-S (For SS/SA/SX Series)

Item	Centigrade (°C)	Fahrenheit (°F)
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog input channel	4 channels per module	
Sensors type	3-WIRE PT100Ω 3850 PPM/°C(DIN 43760 JIS C1604-1989)	
Temperature input range	-200°C~600°C	-328°F~1112°F
Digital conversion range	K-2000~K6000	K-3280~K11120
Resolution	14 bits (0.1°C)	14 bits (0.18°F)
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	200 ms × channels	
Isolation Method	Isolation between digital and analog circuitry. There is no isolation between channels.	
Digital data format	2's complementary of 16-bit, 13 significant bits, support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

■ Mixed Input/output Module -- DVP06XA-S (For SS/SA/SX series)

Item	Analog Input (A/D)		Analog Output (D/A)	
	Voltage	Current	Voltage	Current
Power Supply Voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)			
Analog Input/output channels	4 channels		2 channels	
Analog Input/Output range	±10V	±20 mA	0~10V	0~20 mA
Digital conversion range	±2000	±1000	0~4000	0~4000
Resolution	12 bits, 1_{LSB}≈5 mV	11 bits, 1_{LSB}≈20µA	12bits, 1_{LSB}≈2.5mV	12 bits, 1_{LSB}≈5 µA
Input impedance (A/D) output impedance (D/A)	200 KΩ and above	250Ω	0.5Ω or less	
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	3 ms × channels			
Isolation method	No Isolation			
Absolute input range	±15 V	±32 mA	—	
Digital data format	2's complement of 16-bit, 12 significant bits; support average function (average times: K1~K4096)			
Output current	—		20 mA max.	—
Self diagnostic function	Upper bound and lower bound detection per channel			
Tolerance carried impedance	—		1KΩ~2MΩ	0~500Ω
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.			
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.			

■ Temperature Module (Thermocouple) DVP04TC-S (For SS/SA/SX series)

Item	Centigrade (°C)	Fahrenheit (°F)
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog Input channels	4 channels per module	
Sensors type	J-type or K-type thermocouple	
Temperature input range	J: -100°C~700°C , K: -100°C~1000°C	J: -148°F~1292°F , K: -148°F~1832°F
Digital conversion range	J: K-1000~K7000 , K: K-1000~K10000	J: K-1480~K12920 , K: K-1480~K18320
Resolution	14 bits(0.1°C)	14 bits(0.18°F)
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	250 ms × channels	
Isolation method	Isolation between digital and analog circuitry. There is no isolation between channels.	
Digital data format	2's complement of 16-bit, 13 significant bits; support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

■ Temperature Module (NTC type) DVP08RT-S (For SS/SA/SX series)

Item	Centigrade (°C)	Fahrenheit (°F)
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog input channel	8 channels per module	
Sensors type	R25=10K; 1.B25/85=3977; effective range: -20°C~100°C(-4°F~212°F) 2. MF58-103-(B25/85-3630K); effective range : -20°C~150°C(-4°F~302°F)	
Digital conversion range	1.K-200~K1000 , 2.K-200~K1500	1.K-40~K2120 , 2.K-40~K3020
Resolution	12 bits(0.1°C)	12 bits(0.18°F)
Overall accuracy	0.5% of full scale of 25C(77F), 1% of full scale during 0~55C (32~131F)	
Response time	200 ms × channels	
Isolation method	No isolation	
Digital data format	2's complement of 16-bit, 12 significant bits; support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

■ Analog Input Module -- DVP04AD-H

Item	Voltage Input	Current Input
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog input channel	4 channels per module	
Analog input range	±10V	±20 mA
Digital conversion range	±8000	±4000
Resolution	14 bits(1_{LSB}≈1.25 mV)	13 bits (1_{LSB}≈5 µA)
Input impedance	200 KΩ and above	250Ω
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	3 ms × channels	
Isolation method	Isolation between digital and analog circuitry. There is no isolation between channels.	
Absolute input range	±15 V	±32 mA
Digital data format	2's complement of 16-bit, 13 significant bits; support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

■ Analog output module -- DVP04DA-H

Item	Voltage output	Current output
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog output channel	4 channels per module	
Analog output range	0~10V	0~20 mA
Digital data range	0~4000	0~4000
Resolution	12 bits (1_{LSB}≈2.5 mV)	12 bits (1_{LSB}≈5 µA)
Output impedance	0.5Ω or less	
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	3 ms × channels	
Output current	20 mA max.	—
Tolerance carried impedance	1KΩ~2MΩ	0~500Ω
Digital data format	2's complement of 16-bit, 12 significant bits	
Isolation method	Photocouple isolation between internal circuit and analog output. There is no isolation among analog channels.	
Protection	Voltage output has short circuit protection but short circuit for a long time may cause inner wiring damage and current output break.	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

■ Temperature Module (PT100) DVP04PT-H

Item	Centigrade (°C)	Fahrenheit (°F)
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog input channel	4 channels per module	
Sensors type	3-WIRE PT100Ω 3850 PPM/°C(DIN 43760 JIS C1604-1989)	
Input temperature range	-200°C~600°C	-328°F~1112°F
Digital conversion range	K-2000~K6000	K-3280~K11120
Resolution	14 bits(0.1°C)	14 bits(0.18°F)
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	200 ms × channels	
Isolation method	Isolation between digital and analog circuitry. There is no isolation between channels.	
Digital data format	2's complement of 16-bit, 13 significant bits; support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

Temperature Module (Thermocouple) DVP04TC-H

Item	Centigrade (°C)	Fahrenheit (°F)
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)	
Analog input channel	4 channels per module	
Sensors type	J-type or K-type thermocouple	
Input temperature range	J : -100°C~700°C , K: -100°C~1000°C	J : -148°F~1292°F , K : -148°F~1832°F
Digital conversion range	J: K-1000~K7000 , K: K-1000~K10000	J: K-1480~K12920 , K: K-1480~K18320
Resolution	14 bits(0.1°C)	14 bits(0.18°F)
Overall accuracy	0.5% of full scale at 25°C(77°F); 1% of full scale during 0~55°C (32~131°F)	
Response time	250 ms x channels	
Isolation method	Isolation between digital and analog circuitry. There is no isolation between channels.	
Digital date format	2's complement of 16-bit, 13 significant bits; support average function (average times: K1~K4096)	
Self diagnostic function	Upper bound and lower bound detection per channel	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.	
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.	

Mixed Analog Input/output Module DVP06XA-H

Item	Analog Input (A/D)		Analog Output (D/A)	
	Voltage	Current	Voltage	Current
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)			
Analog input/output channels	4 channels		2 channels	
Analog input/output range	±10V	±20 mA	0~10V	0~20 mA
Digital conversion range	±2000	±1000	0~4000	0~4000
Resolution	12 bits, 1_{LSB}=5 mV	11 bits, 1_{LSB}=20 uA	12bits, 1_{LSB}=2.5 mV	12 bits, 1_{LSB}=5 uA
Input impedance (A/D), output impedance (D/A)	200 KΩ and above	250Ω	0.5Ω or less	
Overall accuracy	0.5% of full scale at 25°C(77°F); 1% of full scale during 0~55°C (32~131°F)			
Response time	3 ms × channels			
Isolation method	Isolation between digital and analog circuitry.		Isolation between internal circuit and analog output circuitry.	
Absolute input range	±15 V	±32 mA	—	
Digital data format	2's complement of 16-bit, 12 significant bits; support average function (average times: K1~K4096)			
Output current	—		20 mA max.	—
Self diagnostic function	Upper bound and lower bound detection per channel			
Tolerance carried impedance	—		1KΩ~2MΩ	0~500Ω
Protection	—		Voltage output has short circuit protection.	
Communication mode (RS-485)	Yes, there are ASCII/RTU modes. Baud rate is selectable.			
Connection to a DVP-PLC MPU in series	When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.			

Single-axis Position Module -- DVP01PU-H

Item	Specifications
Power supply voltage	24 VDC(20.4VDC~28.8VDC) (15%~+20%)
Number of controlled axes	Connects up to 6 axes
Output-pulse frequency	200KHz max.
Pulse output type	Line output (DC5V, 20 mA and less)
Control input	Left/right bound (LSP/LSN), START/STOP, DOG input, zero point input (Pg0) Hand wheel input (A/B)
Output control	Pulse output: FP (forward pulses) and RP (reverse pulses), multi-function contacts (OUT)
Action mode	JOG/zero return/1-step operation/2-step operation/2-step operation insert/ various speed operation
Acceleration / deceleration	Acceleration and deceleration time can be set individually
Response time	When position is set, pulse will be output in 40ms after START signal is active.
	Trigger for left/right bound is 4ms

1CH High-speed Counter Module -- DVP01HC-H

Item		Specifications
Power supply voltage		24 VDC(20.4VDC~28.8VDC) (15%~+20%)
Input signal	Level	Three inputs: +5V, +12V, 24V
	Frequency	200KHz for 1 phase 1 input 200KHz for 1 phase 2 inputs 200KHz (counting mode: normal frequency, double frequency and four times frequency) for 2-phase 2 inputs
Counting range		16-bit unsigned number (0~#####). (##### can be set by controlled register and range is 1~65535) 32-bit signed number (range: -2,147,483,648~+2,147,483,647)
Counting mode		Cyclic counting method: • 16-bit: when it is 65535, the number it counts up will be 0. When it is 0, the number it counts down will be 65535. • 32-bit: when it is +2,147,483,64, the number it counts up will be -2,147,483,648. When it is -2,147,483,648, the number it counts down will be +2,147,483,647.
Output type (comparison reaches setting)		NPN open collector output DC5~24V 0.5A 2 points (YH0 and YH1)
Additional function		External input control: Enable/Disable and Preload (set start value to count)
Connection to a DVP-PLC MPU in series		When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.

2CH High-speed Counter Module DVP01HC-H

Item		Specifications
Power supply voltage		24 VDC(20.4VDC~28.8VDC) (15%~+20%)
Input signal	Level	24V
	Frequency	200KHz for 1 phase 1 input 200KHz for 1 phase 2 inputs 200KHz (counting mode: normal frequency, double frequency and four times frequency) for 2-phase 2 inputs
Counting range		16-bit unsigned number (0~#####). (##### can be set by controlled register and range is 1~65535) 32-bit signed number (range: -2,147,483,648~+2,147,483,647)
Counting mode		Cyclic counting method: • 16-bit: when it is 65535, the number it counts up will be 0. When it is 0, the number it counts down will be 65535. • 32-bit: when it is +2,147,483,64, the number it counts up will be -2,147,483,648. When it is -2,147,483,648, the number it counts down will be +2,147,483,647.
Output type (comparison reaches setting)		NPN open collector output DC5~24V 0.5A 2 points (YH0 and YH1)
Additional function		External input control: Enable/Disable and Preload (set start value to count)
Connection to a DVP-PLC MPU in series		When connecting to MPU, the modules are numbered from 0 to 7. 0 is the closest and 7 is the furthest to the MPU. Max is 8 modules and they do not occupy any digital I/O points.

NI/NO Module -- DVP08KY-H/DVP08BD-H

Item	DVP08KY-H	DVP08BD-H
Power supply voltage	24 VDC, supply from MPU	
External connection	Matrix keypad size could be up to 8*8	DIP switch could be up to 8 digitals
Read input value	Return key coordinate to special D	Return value to special D
	Auto scan by ASIC in MPU and won't use much scan time and no need to write program	
Characteristics	It won't waste PLC input/output points and save cost of wiring and PLC I/O points.	
Connection to a DVP-PLC MPU in series	Total of 2 modules are for these two modules to connect and it won't waste digital I/O points.	

DVP-PLC Programming Software Tool
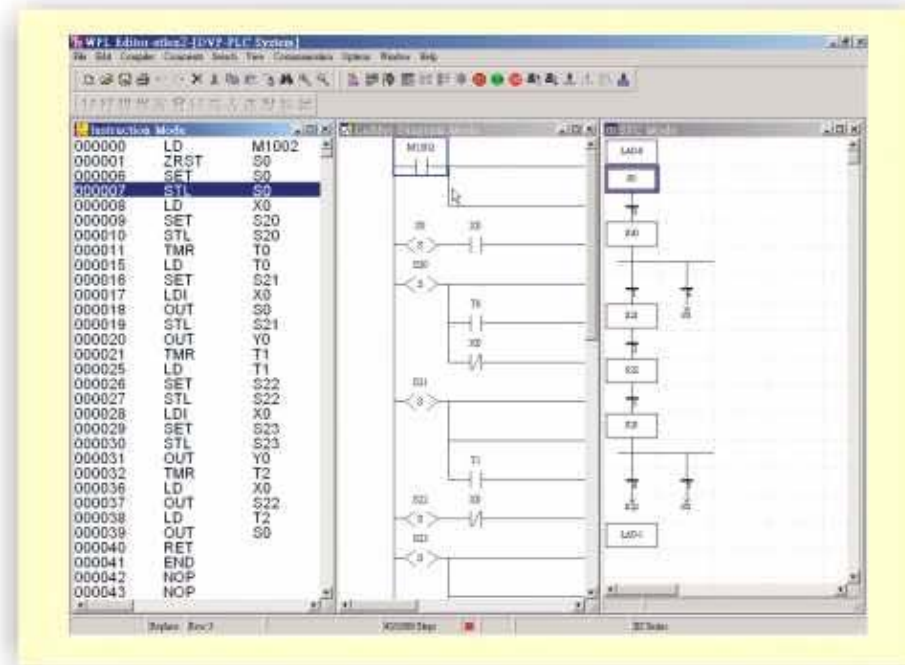
Features

1. Windows based software : It is easy to learn and use. You could use all functions with the help file provided by WPLsoft.

2. Complete comments : Including device comment, segment comment and row comment, to have great convenience to read ladder diagram program. Besides, device comment could be copied to Excel data for use. At the same time, you could also copy Excel data to comment area for programming easily.

3. Project concept : use hierarchical method to display PLC internal system information (including system parameters, connected peripheral, program area and settings) visually to make all PLC information clearly. It is a great convenience to program development and maintenance.

4. Communication response time setting : for user to set time-out and Retry times to monitor without disconnection by interference of working environment. It also could detect communication baud rate of scan time for auto connection rapidly.

5. Real time clock setting : for user-defined time or computer time setting.

6. Variety connections : It provides two connection methods : direct connection and Modem connection. The common use-direct connection provides different baud rate setting and could up to 115200 bps to shorten program upload / download time. It also provides real-time monitor function and on-line programming function to execute on-line update instruction immediately after compiling without stopping PLC/ downloading program/ running PLC again to shorten program development time and modified time.

7. Three program languages for input : Instruction (IL), ladder diagram (LAD) and sequential function chart (SFC). These three languages could convert to one another. Editor interface is the same as general editor and easy to learn and use. It could also input and save without successful compiler at any time.

ladder diagram editor mode	instruction mode	SFC mode
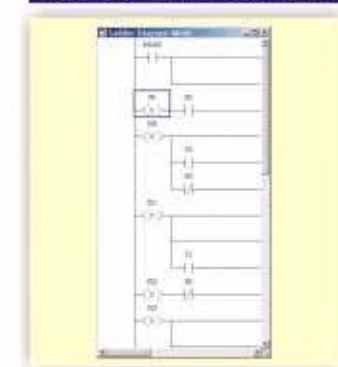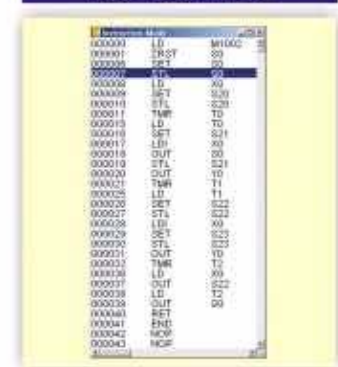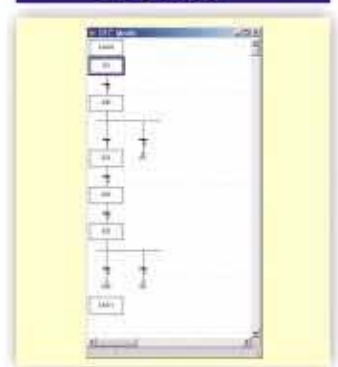
8. Built-in variety PLC device editors : Including devices M, S, T, C, D and file register. The content of device can be saved or downloaded to PLC or upload to provide great convenience for program development or maintenance.

9. On-line auxiliary function :

♦ **RS - 485 Protocol Setting** - you should set communication protocol control register D1120 before setting serial communication. Using this software, you can get the correspondent value that should set in D1120 easily.

♦ **LRC/CRCGenerator** - When designing Modbus serial communication, master must calculate checksum value of serial data. At development beginning, development schedule may be delay due to communication error that cause by error calculation checksum. Using this software, you can get checksum value easily.

♦ **Duplicate PLC Service** - It provides program package concept. And you can read PLC internal important information (system auto setting) and save to a file (it is called program package, including program and all important system parameters) or copy to other PLC after finishing reading.

♦ **Special instruction wizard** - provides settings of various special instructions, including PID control, high-speed I/O. User can finish program structure easily by filling table. For beginner, that is an easy and complete learning method. For programmer, that is easy method to set without miscellaneous setting of query and memory.

10. Variety number systems for monitor :

♦ 16/32 bits of binary number, decimal number and hexadecimal number input/ display with integers and floating points

♦ ASCII, binary number, decimal number, hexadecimal number and BCD display

Variety number systems interface

PLC(14-21)curve.jpg (1609 x 1090 x 24)

*Applicable models ES series below includes EX and SS series, EP includes SA series and SX series.

Instruction Code	Function	Ladder Diagram	ES	EP	EH
Contact					
LD	Load contact A	X,Y,M,S,T,C	O	O	O
LDI	Load contact B	X,Y,M,S,T,C	O	O	O
LDP	Rising-edge detection operation starts	X,Y,M,S,T,C	O	O	O
LDF	Falling-edge detection operation starts	X,Y,M,S,T,C	O	O	O
AND	Series connection with A contact	X,Y,M,S,T,C	O	O	O
ANI	Series connection with B contact	X,Y,M,S,T,C	O	O	O
ANDP	Rising-edge detection series connection	X,Y,M,S,T,C	O	O	O
ANDF	Falling-edge detection series connection	X,Y,M,S,T,C	O	O	O
OR	Parallel connection with A contact	X,Y,M,S,T,C	O	O	O
ORI	Parallel connection with B contact	X,Y,M,S,T,C	O	O	O
ORP	Rising-edge detection parallel connection	X,Y,M,S,T,C	O	O	O
ORF	Falling-edge detection parallel connection	X,Y,M,S,T,C	O	O	O
ANB	Series connects the circuit block		O	O	O
ORB	Parallel connects the circuit block		O	O	O
Coil					
OUT	Drive coil	Y,M,S	O	O	O
SET	Action latched (ON)	RST Y,M,S	O	O	O
RST	Clear the contacts or the registers	RST Y,M,S,T,C	O	O	O
TMR	16-bit timer	TMR T	O	O	O
CNT	16-bit counter	CNT C	O	O	O

Instruction Code	Function	Ladder Diagram	ES	EP	EH
DCNT	32-bit counter	DCNT C	O	O	O
Coil					
PLS	Rising-edge output	PLS Y,M,S	O	O	O
PLF	Falling-edge output	PLF Y,M,S	O	O	O
Master control					
MC	Connect the common series connection contacts	MC N	O	O	O
MCR	Disconnect the common series connection contacts	MCR N	O	O	O
Pointer					
P	Pointer	P0~P255	O	O	O
I	Interrupt pointer	I□□□	O	O	O
Contact					
MPS	Save the operation result		O	O	O
MRD	Read the operation result (the pointer not moving)		O	O	O
MPP	Read the result		O	O	O
Invert					
INV	Inverting operation		O	O	O
None					
NOP	No function	In IL mode, cover deleted program by NOP instruction to reserve program capacity.	O	O	O
End					
END	Program end	END	O	O	O

Step ladder Instruction STL / RET

Sequential control can be divided into several Steps or phases and there is action for each step. There is general transition to transfer to the next step. Once it goes to next step, next step's action will start and the previous step will be cleared. This is called sequential function chart (SFC). STL/RET are provided for SFC algorithm. Refer to Delta PLC application manual (programming) for detail.

	Function	Ladder Diagram	ES	EP	EH
STL	Step transition ladder start instruction		O	O	O
RET	Step transition ladder return instruction	RET	O	O	O

* Applicable models ES series below includes EX and SS series, EP includes SA series and SX series

Classification	API	Mnemonic Codes	D Instruction	P Instruction	Function	ES	EP	EH
Loop Control	00	CJ	–	O	Conditional jump	O	O	O
	01	CALL	–	O	Call subroutine	O	O	O
	02	SRET	–	–	Subroutine return	O	O	O
	03	IRET	–	–	Interrupt return	O	O	O
	04	EI	–	–	Enable interrupts	O	O	O
	05	DI	–	–	Disable interrupts	O	O	O
	06	FEND	–	–	First end	O	O	O
	07	WDT	–	O	Watchdog timer refresh	O	O	O
	08	FOR	–	–	Start of FOR-NEXT loop	O	O	O
	09	NEXT	–	–	End of FOR-NEXT loop	O	O	O
Transmission Comparison	10	CMP	O	O	Compare	O	O	O
	11	ZCP	O	O	Zone compare	O	O	O
	12	MOV	O	O	Data Move	O	O	O
	13	SMOV	–	O	Shift move	–	O	O
	14	CML	O	O	Compliment	O	O	O
	15	BMOV	–	O	Block move	O	O	O
	16	FMOV	O	O	Fill move	O	O	O
	17	XCH	O	O	Data exchange	O	O	O
	18	BCD	O	O	Convert BIN data into BCD	O	O	O
	19	BIN	O	O	Convert BCD data into BIN	O	O	O
Four Fundamental Operations of Arithmetic	20	ADD	O	O	Perform the addition of BIN data	O	O	O
	21	SUB	O	O	Perform the subtraction of BIN data	O	O	O
	22	MUL	O	O	Perform the multiplication of BIN data	O	O	O
	23	DIV	O	O	Perform the division of BIN data	O	O	O
	24	INC	O	O	Perform the addition of 1	O	O	O
	25	DEC	O	O	Perform the subtraction of 1	O	O	O
	26	WAND	O	O	Perform the logical product (AND) operation	O	O	O
	27	WOR	O	O	Perform the logical sum (OR) operation	O	O	O
	28	WXOR	O	O	Perform the exclusive logical add (XOR) operation	O	O	O
	29	NEG	O	O	Negation	O	O	O
Rotation and Displacement	30	ROR	O	O	Rotate to the right	O	O	O
	31	ROL	O	O	Rotate to the left	O	O	O
	32	RCR	O	O	Rotate to the right with the carry flag attached	O	O	O
	33	RCL	O	O	Rotate to the left with the carry flag attached	O	O	O
	34	SFTR	–	O	Shift the data of device specified to the right	O	O	O
	35	SFTL	–	O	Shift the data of device specified to the left	O	O	O
	36	WSFR	–	O	Shift the register to the right	–	O	O

Classification	API	Mnemonic Codes	D Instruction	P Instruction	Function	ES	EP	EH
Data Operation	37	WSFL	–	O	Shift the register to the left	–	O	O
	38	SFWR	–	O	Shift register write	–	O	O
	39	SFRD	–	O	Shift register read	–	O	O
	40	ZRST	–	O	Resets a range of device specified	O	O	O
	41	DECO	–	O	8 → 256 bits decoder	O	O	O
	42	ENCO	–	O	256 → 8 bits encoder	O	O	O
	43	SUM	O	O	Sum of ON bits	O	O	O
	44	BON	O	O	Check specified bit status	O	O	O
	45	MEAN	O	O	Mean value	O	O	O
	46	ANS	–	–	Alarm device output	–	O	O
	47	ANR	–	O	Alarm device reset	–	O	O
	48	SQR	O	O	Square root of BIN	O	O	O
	49	FLT	O	O	Convert BIN integer to binary floating point	O	O	O
High Speed Processing	50	REF	–	O	I/O refresh	O	O	O
	51	REFF	–	O	Refresh and adjust the response time of input filter	–	O	O
	52	MTR	–	–	Input matrix	–	O	O
	53	HSCS	O	–	High speed counter comparison SET	O	O	O
	54	HSCR	O	–	High speed counter comparison RESET	O	O	O
	55	HSZ	O	–	Zone comparison (High-speed counter)	–	O	O
	56	SPD	–	–	Speed detection	O	O	O
	57	PLSY	O	–	Pulse output	O	O	O
	58	PWM	–	–	Pulse width modulation output	O	O	O
	59	PLSR	O	–	Pulse wave output with acceleration/deceleration speed	O	O	O
Convenience Instruction	60	IST	–	–	Manual/Auto control	O	O	O
	61	SER	O	O	Search a data stack	–	O	O
	62	ABSD	O	–	Absolute drum sequencer	–	O	O
	63	INCD	–	–	Increment drum sequencer	–	O	O
	64	TTMR	–	–	Teaching timer	–	O	O
	65	STMR	–	–	Special timer	–	O	O
	66	ALT	–	O	On/Off alternate instruction	O	O	O
	67	RAMP	–	–	Ramp signal	–	O	O
	69	SORT	–	–	Data sort	–	O	O
External I/O Display	70	TKY	O	–	10-key keypad input	–	O	O
	71	HKY	O	–	16-key keypad input	–	O	O
	72	DSW	–	–	Digital Switch Input	–	O	O
	73	SEGD	–	O	Decode the 7-step display panel	O	O	O
	74	SEGL	–	–	7-step display scan output	O	O	O

PLC(22-29)curve.jpg (1609 x 1090 x 24)

* Applicable models ES series below includes EX and SS series, EP includes SA series and SX series

Classification	API	Mnemonic Codes	D Instruction	P Instruction	Function	Applicable models ES	EP	EH
External I/O Display	75	ARWS	–	–	Arrow keypad input	–	O	O
	76	ASC	–	–	ASCII code conversion	–	O	O
	77	PR	–	–	Print	–	O	O
	78	FROM	O	O	Read special module CR data	O	O	O
	79	TO	O	O	Special module CR data write in	O	O	O
Serial I/O	80	RS	–	–	Serial data communication	O	O	O
	81	PRUN	O	O	Octal number system transmission	–	O	O
	82	ASCI	–	O	Convert HEX to ASCII	O	O	O
	83	HEX	–	O	Convert ASCII to HEX	O	O	O
	84	CCD	–	O	Check code	–	O	O
	85	VRRD	–	O	Potentiometer read	–	O	O
	86	VRSC	–	O	Potentiometer scale	–	O	O
	87	ABS	O	O	Absolute value	O	O	O
	88	PID	O	–	PID calculation	O	O	O
Basic Instructions	89	PLS	–	–	Rising-edge output	O	O	O
	90	LDP	–	–	Rising-edge detection operation	O	O	O
	91	LDF	–	–	Falling-edge detection operation	O	O	O
	92	ANDP	–	–	Series connection instruction for the rising-edge detection operation	O	O	O
	93	ANDF	–	–	Series connection instruction for the falling-edge detection operation	O	O	O
	94	ORP	–	–	Parallel connection instruction for the rising-edge detection operation	O	O	O
	95	ORF	–	–	Parallel connection instruction for the falling-edge operation	O	O	O
	96	TMR	–	–	Timer	O	O	O
	97	CNT	O	–	Counter	O	O	O
	98	INV	–	–	Inverting operation	O	O	O
	99	PLF	–	–	Falling-edge output	O	O	O
Communication Instruction of Delta AC Motor Drive	100	MODRD	–	–	MODBUS data Read	O	O	O
	101	MODWR	–	–	MODBUS data write in	O	O	O
	102	FWD	–	–	VFD-A series drive forward instruction	O	O	O
	103	REV	–	–	VFD-A series drive reverse instruction	O	O	O
	104	STOP	–	–	VFD-A series drive stop instruction	O	O	O
	105	RDST	–	–	VFD-A series drive status read	O	O	O
	106	RSTEF	–	–	VFD-A series drive abnormal reset	O	O	O
	107	LRC	–	O	LRC error check	O	O	O
	108	CRC	–	O	CRC error check	O	O	O
	109	SWRD	–	O	Digital switch read	–	O	O
	110	ECMP	O	O	Binary floating point comparison	O	O	O
	111	EZCP	O	O	Binary floating point zone comparison	O	O	O

Classification	API	Mnemonic Codes	D Instruction	P Instruction	Function	Applicable models ES	EP	EH
Floating Operation	116	RAD	O	O	Degree Radian	–	O	O
	117	DEG	O	O	Radian Degree	–	O	O
	118	EBCD	O	O	Convert binary floating point to decimal floating point	O	O	O
	119	EBIN	O	O	Convert decimal floating point to binary floating point	O	O	O
	120	EADD	O	O	Binary floating point addition	O	O	O
	121	ESUB	O	O	Binary floating point subtraction	O	O	O
	122	EMUL	O	O	Binary floating point multiplication	O	O	O
	123	EDIV	O	O	Binary floating point division	O	O	O
	124	EXP	O	O	Perform exponent operation of binary floating point	O	O	O
	125	LN	O	O	Perform natural logarithm operation of binary floating point	O	O	O
	126	LOG	O	O	Perform logarithm operation of binary floating point	O	O	O
	127	ESQR	O	O	Square root of binary floating point	O	O	O
	128	POW	O	O	Perform power operation of binary floating point	O	O	O
	129	INT	O	O	Convert binary floating point to BIN integer	O	O	O
	130	SIN	O	O	Sine operation of binary floating point	O	O	O
	131	COS	O	O	Cosine operation of binary floating point	O	O	O
	132	TAN	O	O	Tangent operation of binary floating point	O	O	O
	133	ASIN	O	O	Arcsine operation of binary floating point	–	O	O
	134	ACOS	O	O	Arccosine operation of binary floating point	–	O	O
	135	ATAN	O	O	Arctangent operation of binary floating point	–	O	O
	136	SINH	O	O	Hyperbolic sine operation of binary floating point	–	–	O
	137	COSH	O	O	Hyperbolic cosine operation of binary floating point	–	–	O
	138	TANH	O	O	Hyperbolic tangent operation of binary floating point	–	–	O
Additional Instructions	143	DELAY	–	O	Delay Instruction	–	O	O
	144	GPWM	–	–	General pulse width modulation output	–	O	O
	145	FTC	–	–	Fuzzy temperature control	–	O	O
	147	SWAP	O	O	Swap high/low byte	O	O	O
	148	MEMR	O	O	Data backup MEMORY read	–	O	O
	149	MEMW	O	O	Data backup MEMORY write in	–	O	O
	150	MODRW	–	–	MODBUS data read/write in	O	O	O
	151	PWD	–	–	Input pulse width detection	–	–	O
	152	RTMU	–	–	Start to measure the execution time of I interrupt	–	–	O
	153	RTMD	–	–	End to measure the execution time of I interrupt	–	–	O
	154	RAND	–	O	Random value	–	O	O
Position Control	155	ABSR	O	–	ABS current value read	–	O	O
	156	ZRN	O	–	Zero point return	–	–	O
	157	PLSV	O	–	Variable speed pulse output	–	–	O

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* Applicable models ES series below includes EX and SS series, EP includes SA series and SX series

Classification	API	Mnemonic Codes	D Instruction	P Instruction	Function	Applicable models ES	EP	EH
Positioning Control	158	DRVI	O	–	Drive to increment	–	–	O
	159	DRVA	O	–	Drive to absolute	–	–	O
Perpetual Calendar	160	TCMP	–	O	Time compare	–	O	O
	161	TZCP	–	O	Time zone compare	–	O	O
	162	TADD	–	O	Time addition	–	O	O
	163	TSUB	–	O	Time subtraction	–	O	O
	166	TRD	–	O	Time data read	–	O	O
	167	TWR	–	O	Time data write in	–	O	O
	169	HOUR	O	–	Hour meter	–	O	O
Gray Code	170	GRY	O	O	Convert BIN to Gray code	–	O	O
	171	GBIN	O	O	Convert Gray code to BIN	–	O	O
Matrix Handling	180	MAND	–	O	Matrix AND	–	O	O
	181	MOR	–	O	Matrix OR	–	O	O
	182	MXOR	–	O	Matrix XOR	–	O	O
	183	MXNR	–	O	Matrix NOR	–	O	O
	184	MINV	–	O	Matrix inverse	–	O	O
	185	MCMP	–	O	Matrix compare	–	O	O
	186	MBRD	–	O	Matrix bit read	–	O	O
	187	MBWR	–	O	Matrix bit write	–	O	O
	188	MBS	–	O	Matrix bit shift	–	O	O
	189	MBR	–	O	Matrix bit rotate	–	O	O
	190	MBC	–	O	Matrix bit state count	–	O	O
	195	HST	–	O	High speed counter	–	–	O
Contact Type Logic Operation	215	LD&	O	–	Comparison contact is ON when S1 & S2 is true	–	O	O
	216	LD|	O	–	Comparison contact is ON when S1 | S2 is true	–	O	O
	217	LD^	O	–	Comparison contact is ON when S1 ^ S2 is true	–	O	O
	218	AND&	O	–	Comparison contact is ON when S1 & S2 is true	–	O	O
	219	AND|	O	–	Comparison contact is ON when S1 | S2 is true	–	O	O
	220	AND^	O	–	Comparison contact is ON when S1 ^ S2 is true	–	O	O
	221	OR&	O	–	Comparison contact is ON when S1 & S2 is true	–	O	O
	222	OR|	O	–	Comparison contact is ON when S1 | S2 is true	–	O	O
	223	OR^	O	–	Comparison contact is ON when S1 ^ S2 is true	–	O	O
	224	LD=	O	–	Comparison contact is ON when S1 = S2 is true	O	O	O
	225	LD>	O	–	Comparison contact is ON when S1 > S2 is true	O	O	O
	226	LD<	O	–	Comparison contact is ON when S1 < S2 is true	O	O	O
	228	LD<>	O	–	Comparison contact is ON when S1 ≠ S2 is true	O	O	O
	229	LD<=	O	–	Comparison contact is ON when S1 ≤ S2 is true	O	O	O

Classification	API	Mnemonic Codes	D Instruction	P Instruction	Function	Applicable models ES	EP	EH
Contact Type Compare Instructions	230	LD>=	O	–	Comparison contact is ON when S1 ≥ S2 is true	O	O	O
	232	AND=	O	–	Comparison contact is ON when S1 = S2 is true	O	O	O
	233	AND>	O	–	Comparison contact is ON when S1 > S2 is true	O	O	O
	234	AND<	O	–	Comparison contact is ON when S1 < S2 is true	O	O	O
	236	AND<>	O	–	Comparison contact is ON when S1 ≠ S2 is true	O	O	O
	237	AND<=	O	–	Comparison contact is ON when S1 ≤ S2 is true	O	O	O
	238	AND>=	O	–	Comparison contact is ON when S1 ≥ S2 is true	O	O	O
	240	OR=	O	–	Comparison contact is ON when S1 = S2 is true	O	O	O
	241	OR>	O	–	Comparison contact is ON when S1 > S2 is true	O	O	O
	242	OR<	O	–	Comparison contact is ON when S1 < S2 is true	O	O	O
	244	OR<>	O	–	Comparison contact is ON when S1 ≠ S2 is true	O	O	O
	245	OR<=	O	–	Comparison contact is ON when S1 ≤ S2 is true	O	O	O
	246	OR>=	O	–	Comparison contact is ON when S1 ≥ S2 is true	O	O	O

◆ Applicable models ES series above includes EX and SS series; EP includes SA/SX series.
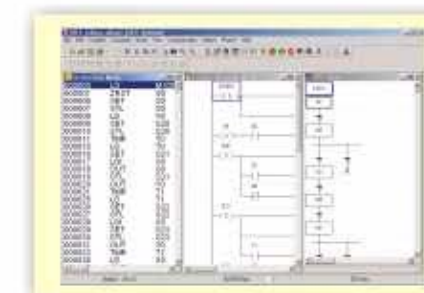
◆ Above Instruction for ES/EX/SS models don't possess pulse execution instruction (P Instruction).

◆ Refer to DVP-PLC application manual for complete instruction.

* Please contact distributor for purchasing

◆ Please contact your distributor for free WPLSoft (DVP-PLC programming software tool).

◆ There are three languages (IL, LAD and SFC) for input and they can convert to another. It is windows based for user to use and learn easily. It also provides PLC program package to copy PLC rapidly.

PLC(22-29)curve.jpg (1609 x 1090 x 24)

M :Read only relay; ES series EX/SS series and EP series include SA/SX series.

D :Read only register, ES series include EX/SS series and EP series include SA/SX series.

◆ PLC Running State

◆ Step Ladder State Indication

◆ Monitor High-speed Pulse Input

◆ High-speed Pulse Output Control

◆ Interrupt Enable/Disable Setting

◆ MODEM Startup/State Indication

◆ Set and Monitor PLC LINK

◆ Counting Mode of 32-bit Counter

◆ PLC Clock Pulse

◆ Matrix Calculation

◆ Monitor 32-bit Counter

◆ Instruction Auxiliary Function

◆ Function Card I/O

◆ Startup/Reset Hardware High-speed

◆ PLC System Control

◆ Communication Setting and State

◆ PLC Running State and System Information

◆ Extension Module Information

◆ MPU Built-in A/D and D/A Channels

◆ Communication Setting and State

◆ Auxiliary Instruction for Instruction Execution

◆ Monitor High-speed Pulse Output

◆ High-speed Counter

◆ PLC LINK Setting and Monitor

◆ Latched Setting

◆ Index Register

◆ Step Ladder State

◆ PLC System Control

◆ Real Time Clock

● MPU

DVP □□ ○○ □□□□
Series ① ② ③④⑤

1. Total points (output/input)
2. Model series
   - ES : ES MPU
   - EX : EX MPU
   - SS : SS MPU
   - SA : SA MPU
   - SX : SX MPU
   - EP : EP MPU
   - EH : EH MPU
3. Input power
   - 00 : AC power input
   - 01 : DC power input (L Type)
   - 11 : DC power input (H Type)
4. Output type
   - R : Relay
   - T : Transistor
5. Upgrade version code (only for ES/EX/SS MPU)
   - 2 : Upgrade version for ES/EX/SSMPU

● DI/DO Extension Unit

DVP □□ ○○ □□□□
Series ① ②③④ ⑤

1. otal points (output/input)
2. Applicable model
   - X : for ES/EX MPU
   - S : for SS/SX/SA MPU
   - P : for EP MPU
   - H : for EH MPU
3. I/O type
   - M : input point
   - N : output point
   - P : I/O mix
4. Input power
   - 00 : AC power input
   - 01 : DC power input (L Type)
   - 11 : DC power input (H Type)
5. Output type
   - R : Relay
   - T : Transistor
   ※ There are two types (L-Type and H-Type) in DC input type sorted by shape for ES/EX series. Refer to page 35 for detail.

● AI/AO Extension Unit

DVP □□ ○○ -□
Series ① ② ③

1. Total points (output/input)
2. Extension type
   - AD : analog/digital conversion module
   - DA : digital/analog conversion module
   - PT : temperature module - PT100 type
   - TC : temperature module - thermocouple
   - RT : temperature module resistor thermocouple
   - XA : AD and DA function
3. Applicable model
   - S : for SS/SA/SX MPU
   - P : for EP MPU
   - H : for EH MPU

● PI/PO Extension Unit

DVP □□ ○○ -H
Series ① ② ③

1. Total number of ouput/input channels
2. Extension type
   - HC : high-speed counter module
   - PU : single-axis positioning module
3. Applicable model
   - H : for EH MPU

● NI/NO Extension Unit

DVP □□ ○○ -H
Series ① ② ③

1. Number
2. Extension type
   - BD : BCD DIP switch module
   - KY : matrix keypad module
3. Applicable model
   - H : for EH MPU

● Peripheral Equipment

DVP □□□ ○○
Series ① ②

1. Equipment name
   - HPP: Handheld programming panel
   - DU: digital setup display
2. Type/ function
   - 01: Type 01
   - 02: Type 02

● Accessory cable

DVP A CAB □□□
Series ① ② ③④

1. Accessories
2. Type
   - CAB: Cable Connected type 1, 2, 3, 4,...
4. Length
   - 15 : 1.5m
   - 30 : 3.0m

● Accessory-others

DVP A BT □□
Series ① ② ③

1. Accessories
2. Type
   - BT: Battery
3. Battery type
   - 01, 02 ...

● Function Card

DVP − F ○○○
Series ① ② ③

1. Function card
2. Type
   - 232 : RS-232 card
   - 422 : RS-422 card
   - 2OT : 2DO card, transistor output...
3. connected function (special definition by function card)
   - S : Slave model (only for COM3)

☐ ES Standard MPU

Model	Power	Input / output Specification					Dimension
		Input Unit		Output Unit			
		Point	Type	Point	Type		
DVP14ES00R2	100~240VAC +10% -15%	8	DC24V/5mA Sink or Source	6	Relay AC250V/DC30V 2A/1point transistor DC5~30V 0.3A/1point@40°C		Fig. 1
DVP14ES00T2		8		6			
DVP24ES00R2		16		8			Fig. 2
DVP24ES00T2		16		8			
DVP32ES00R2		16		16			
DVP32ES00T2		16		16			
DVP60ES00R2		36		24			Fig. 3
DVP60ES00T2		36		24			

☐ EX Special Fucntion MPU

Model	Power	Input / output Specification								Dimension
		Input Unit				Output Unit				
		Point		Type		Point		Type		
		DI	AI	DI	AI	DO	AO	DO	AO	
DVP20EX00R2	100~240VAC +10% -15%	8	4	DC24V/5mA Sink or Source	-20~20mA or -10~+10V	6	2	Relay	0~20mA or 0~10V	Fig. 2
DVP20EX00T2		8	4			6	2	Transistor		
DVP20EX11R2	DC24V	8	4			6	2	Relat		

☐ Digital I/O Extension Unit for ES/EX Series

Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP08XM11N	DC24V +20% -15%	8	DC24V/5mA Sink or Source	0	None	Fig. 4
DVP16XM11N		16		0		Fig. 1
DVP08XN11R		0		8	relay AC250V/DC30V 2A/1Point transistor DC5~30V 0.3A/1point@40°C	Fig. 4
DVP08XN11T		0		8		
DVP16XN11R		0		16		
DVP16XN11T		0		16		
DVP24XN11R		0		24		Fig. 2
DVP24XN11T		0		24		
DVP08XP11R		4		4		Fig. 4
DVP08XP11T		4		4		
DVP24XP11R		16		8		
DVP24XP11T		16		8		
DVP32XP11R		16		16		Fig. 2
DVP32XP11T		16		16		

*Refer to page 35 for dimension of ES/EX series MPU/extension unit.

■ Digital I/O Extension Unit for ES/EX Series

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP24XN00R	100~240VAC +10% -15%	0	DC24V/5mA Sink or Source	24	relay AC250V/DC30V 2A/1point transistor DC5~30V 0.3A/1 point@40°C	Fig. 2
DVP24XN00T		0		24		
DVP24XP00R		16		8		
DVP32XP00R		16		16		
DVP32XP00T		16		16		

■ ES Standard MPU (L Type)

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP14ES01R2	DC24V +20% -15%	8	DC24V/5mA Sink or Source	6	Relay AC250V/DC30V 2A/1point transistor DC5~30V 0.3A/1point@40°C	Fig. 5
DVP14ES01T2		8		6		
DVP24ES01R2		16		8		Fig. 6
DVP24ES01T2		16		8		
DVP32ES01R2		16		16		
DVP32ES01T2		16		16		

■ Digital I/O Extension Unit for ES/EX Series (L Type)

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP16XM01N	DC24V +20% -15%	16	DC24V/5mA Sink or Source	0	None	Fig. 5
DVP16XN01R		0		16	Relay AC250V/DC30V 2A/1point transistor DC5~30V 0.3A/1point@40°C	Fig. 6
DVP16XN01T		0		16		
DVP24XN01R		0		24		
DVP24XN01T		0		24		
DVP24XP01R		16		8		
DVP24XP01T		16		8		
DVP32XP01R		16		16		
DVP32XP01T		16		16		

■ SS Standard MPU (module type)

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point(DI)	Type	Point(DO)	Type	
DVP14SS11R2	DC24V +20% -15%	8	DC24V/5mA Sink or Source	6	Relay	Refer to P36
DVP14SS11T2		8		6	Transistor	

■ Digital I/O Extension Unit for SS/SA/SX Series

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP08SM11N	DC24V +20% -15%	8	DC24V/5mA Sink or Source	0	None	Refer to P36
DVP08SN11R		0		8	relay AC250V/DC30V 1.5A/1Point transistor DC5~30V 0.3A/1Point@40°C	
DVP08SN11T		0		8		
DVP08SP11R		4		4		
DVP08SP11T		4		4		
DVP16SP11R		8		8		
DVP16SP11T		8		8		

■ Analog I/O Extension Module for SS/SA/SX Series

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Channel number	Explanation	Channel number	Explanation	
DVP04AD-S	DC24V +20% -15%	4	±10V or ±20 mA / 14bits	0	—	Refer to P36
DVP04DA-S		0	—	4	0~10V or 0~20 mA / 12bits	
DVP02DA-S		0	—	2	0~10V or 0~20 mA / 12bits	
DVP06XA-S		4	±10V or ±20 mA / 12bits	2	0~10V or 0~20 mA / 12bits	
DVP04PT-S		4	-200°C~600°C / 14 bits(0.1°C)	0	—	
DVP04TC-S		4	-100°C~1000°C / 14 bits(0.1°C)	0	—	
DVP08RT-S		8	-20°C~150°C / 12 bits(0.1°C)	0	—	

■ Power Output Module

Spec. / Model	Input / output Specification		Dimension
	Input Unit	Output Unit	
DVPPS01	100~240VAC, -15%~+10% , surge voltage can be to 320VAC	Output voltage : 24VDC, max. Is : 1A	Refer to P36
DVPPS02	100~240VAC, -15%~+10% , surge voltage can be to 320VAC	Output voltage : 24VDC, max. Is : 2A	

■ EH Standard MPU

Spec. / Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP16EH00R	100~240VAC +10% -15%	8	DC24V/5mA Sink or Source	8	Relay AC250V/DC30V 2A/1Poin transistor DC5~30V 0.3A/1Poin@40°C	Refer to P37
DVP16EH00T		8		8		
DVP20EH00R		12		8		
DVP20EH00T		12		8		
DVP32EH00R		16		16		
DVP32EH00T		16		16		
DVP48EH00R		24		24		
DVP48EH00T		24		24		

■ EH Standard MPU

Spec. Model	Power	Input / output Specification					Dimension
		Input Unit		Output Unit			
		Point	Type	Point	Type		
DVP64EH00R	100~240VAC +10% -15%	32	DC24V/5mA Sink or Source	32	Relay		Refer to P37
DVP64EH00T		32		32	transistor		
DVP80EH00R		40		40	Relay		
DVP80EH00T		40		40	transistor		

Note: For DVP20EH00T and DVP32EH00T, there are high-speed pulse output points Y0 and Y2.

■ EH Digital I/O Extension Unit

Spec. Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP08HM11N	DC24V +20% -15%	8	DC24V/5mA Sink or Source	0	None	Refer to P37
DVP16HM11N		16		0		
DVP08HN11R		0		8	relay AC250V/DC30V 2A/1Point	
DVP08HN11T		0		8		
DVP08HP11R		4		4		
DVP08HP11T		4		4		
DVP32HP00R	100~240VAC -15%~+10%	16		16	transistor DC5~30V 0.3A/1Point@40°C	
DVP32HP00T		16		16		
DVP48HP00R		24		24		
DVP48HP00T		24		24		

■ EH analog I/O Extension Unit

Spec. Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Channel number	Explanation	Channel number	Explanation	
DVP04AD-H	DC24V +20% -15%	4	±10V or ±20 mA / 14bits	0	—	Refer to P37
DVP04DA-H		0	—	4	0~10V or 0~20 mA / 12bits	
DVP04PT-H		4	-200°C~600°C / 14 bits(0.1°C)	0	—	
DVP04TC-H		4	-100°C~1000°C / 14 bits(0.1°C)	0	—	
DVP06XA-H		4	±10V or ±20 mA / 12bits	2	0~10V or 0~20 mA / 12bits	

■ EH Special Extension Unit

Spec. Model	Power	Input / output Specification		Dimension
		Input Unit	Output Unit	
DVP01PU-H	DC24V +20% -15%	—	200KHz /Line output/1CH	
DVP01HC-H		200KHz，+5V/+12V/+24 V input level/1CH	—	
DVP02HC-H		200KHz，+24V input level/2CH	—	
DVP08BD-H	DC24V (supply from MPU)	8-bit DIP Switch module	—	
DVP08KY-H		Matrix keypad input module(max. is 8*8)	—	

■ SA Standard MPU

Spec. Model	Power	Input / output Specification				Dimension
		Input Unit		Output Unit		
		Point	Type	Point	Type	
DVP12SA11R	DC24V +20% -15%	8	DC24V/5mA Sink or Source	4	Relay	Refer to P36
DVP12SA11T		8		4	transistor	

■ SX Special Function MPU

Spec. Model	Power	Input / output Specification								Dimension
		Input Unit				Output Unit				
		Point		Type		Point		Type		
		DI	AI	DI	AI	DO	AO	DO	AO	
DVP10SX11R	DC24V +20% -15%	4	2	DC24V/5mA Sink or Source	-20~20mA or -10~+10V	2	2	Relay	-20~20mA or -10~+10V	Refer to P36
DVP10SX11T		4	2			2	2	transistor		

■ Accessories
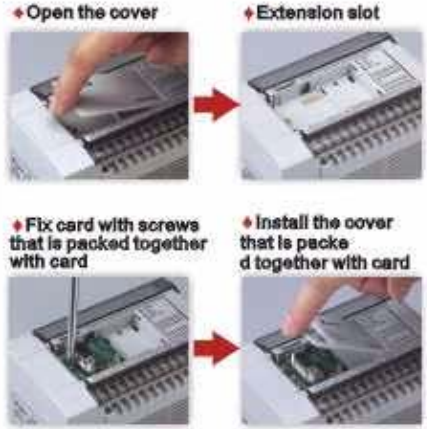
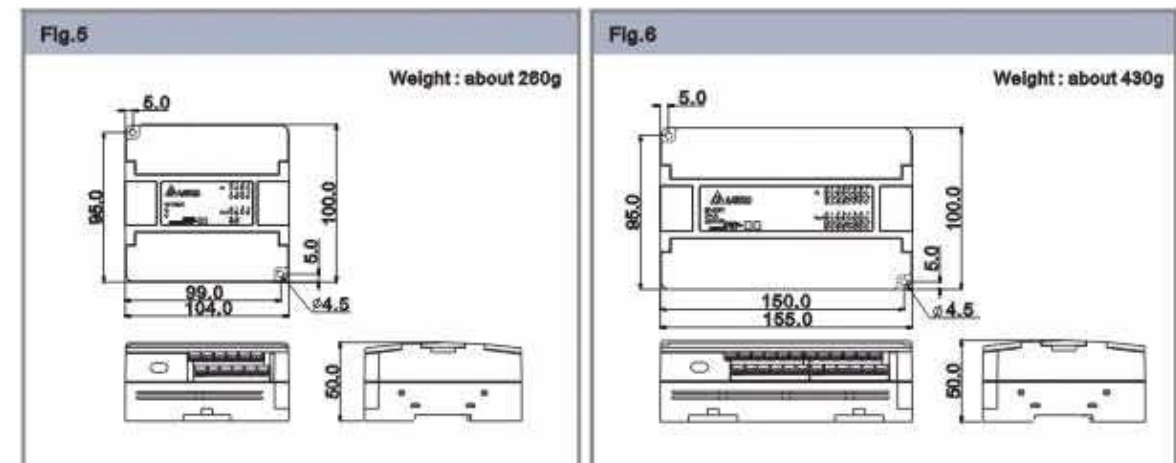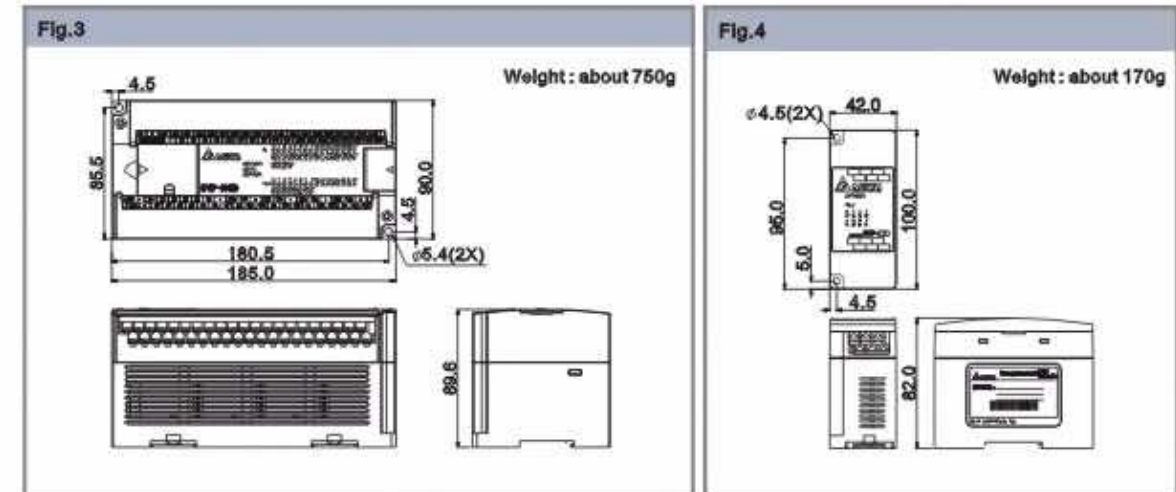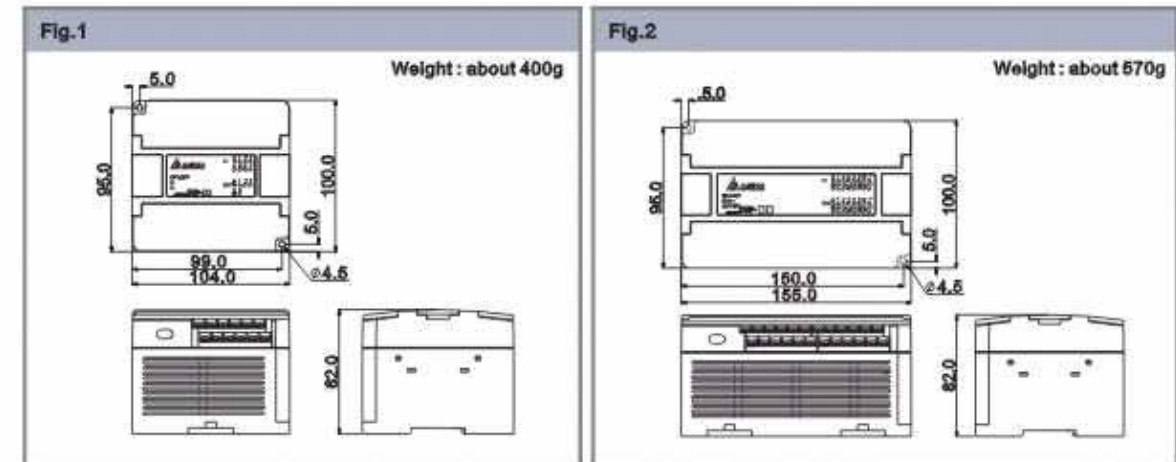| Model number	Type	Function	Remark
DVPACAB115	cable	HPP02⇔PLC / 1.5m	This cable is packaged with DVPHPP02
DVPACAB215	cable	PC(9 PIN & 25 PIN D-SUB) ⇔PLC / 1.5m	Could be connector for PLC to connect TP series or other HMI
DVPACAB2A30	cable	PC(9 PIN D-SUB) ⇔PLC / 3m	User also can use following wiring to make cable with suitable length
DVPACAB230	cable	PC(9 PIN & 25 PIN D-SUB) ⇔PLC / 3m	
DVPACAB315	cable	HPP02⇔PC / 1.5m	Use when HPP02 connects to PC
DVPACAB403	cable	I/O signal extension line，30cm	MPU⇔extension unit or extension unit extension unit (for ES/EX series)
DVPACAB530	cable	TP02/04G⇔PC/ 3m	TP02/04G program planning
DVPABT01	battery	3.6V Li battery	For EH/EP/SA/SX MPU
DVPABT02	battery	3.6V Li battery	For TP04G

DVPACAB215/ DVPACAB230

PC or TP02/04G — 25 PIN D-SUB — 8 PIN MINI DIN ON PLC
9 PIN D-SUB

Wiring

PC/HMI COM Port 25 PIN D-SUB female	PLC COM1 Port 8 PIN MINI DIN
Tx 2 ←→ 4 Rx	
Rx 3 ←→ 5 Tx	
GND 7 ←→ 8 GND	
6, 4, 8, 5, 20	1,2 5V

PC/HMI COM Port 9 PIN D-SUB female	PLC COM1 Port 8 PIN MINI DIN
Rx 2 ←→ 4 Rx	
Tx 3 ←→ 5 Tx	
GND 5 ←→ 8 GND	
1, 7, 4, 8, 6	1,2 5V

DVPACAB530

PC or TP02/04G
ON PC (RS-232) — ON TP04G
9 PIN D-SUB — 9 PIN D-SUB

Wiring

PC COM Port 9 PIN D-SUB female	TP02/04G COM Port 9 PIN D-SUB female
Rx 2 ←→ 3 Tx	
Tx 3 ←→ 2 Rx	
GND 5 ←→ 5 GND	

PLC(30-37)curve.jpg (1609 x 1090 x 24)

Peripheral Equipment

Model no.	Equipment	Function
DVPHPP02	Handheld programming panel	1.Supports program read/write and editor for all DVP-PLC series 2.Monitor and set all PLC internal devices 3.Built-in retentive memory. Once it connects to MPU more than 5 minutes, internal program will maintain for 3-7 days. 4.Built-in data backup memory card. It can save data permanently and also exchange data with EH MPU.
DVPDU01	Digital setup display	1.Embedded design: Could insert into extension slot of EH MPU (32 points and more). 2.Connect to RS-232 (COM1) of all DVP-PLC series MPU with accessory cable. 3.Monitor and set PLC device; copy program (for all series)
TP04G-AS2	Operation interface panel series	1.Resolution is 128*64 and max. is 8*4 Chinese characters, also support multilanguage 2.Built-in two communication ports (RS-232 and RS-485 can be used simultaneously) 3.Built-in real clock time and communication/alarm LED indication 4.Allow to external program copy, copy program rapidly, save download time 5.Built-in variety object shape
TP02G-AS1	Operation interface panel series	1.Resolution is 160*32 and max. is 10*2 Chinese characters, also support multilanguage 2.Built-in two communication ports (RS-232 and RS-485 can be used simultaneously) 3.Allow to external program copy, copy program rapidly, save download time 4.Built-in variety object shape and communication/alarm LED indication
TP-PCC	Program copy card	For TP series, copy program rapidly and save download time
WPLSoft	Program editor	DVP-PLC program editor software, supports multilanguage (traditional Chinese, simplified Chinese and English)
TPEdit		Program editor software for TP series, supports Multilanguage (traditional Chinese, simplified Chinese and English)

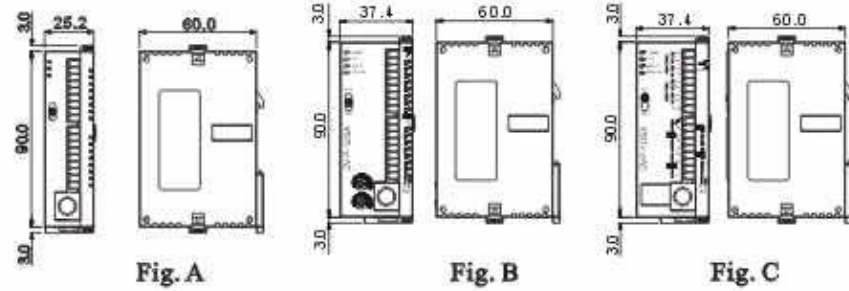## Extension card and data backup memory card (Only for EH MPU)

Model no.	Function	Connector	Installation
DVP-F232	Modify COM2 to RS-232	DB9 male	• Open the cover • Extension slot
DVP-F422	Modify COM2 to RS-422	5 PIN G type terminal	
DVP-F8ID	8-Input DIP switch (binary input)	—	
DVP-F4IP	Additional 4-digital input points (with photocoupler isolation)	5 PIN G type terminal	
DVP-F6VR	Additional 6-point input potentiometer value	—	• Fix card with screws that is packed together with card • Install the cover that is packed together with card
DVP-F2AD	Additional analog inputs (2 points, resolution 12-bit)	5 PIN G type terminal	
DVP-F2DA	Additional analog outputs (2 points, resolution 12-bit)	5 PIN G type terminal	
DVP-F485S	Additional COM port (COM3), type: RS-485	5 PIN G type terminal	
DVP-F232S	Additional COM port (COM3), type: RS-232	DB9 female	
DVP-F2OT	Additional 2-digital output points (output type: translstor)	5 PIN G type terminal	
DVP-256FM	Data backup memory card	—	

ES/EX MPU/Extension Unit (Refer to P.29 for model number)

Fig.1 — Weight : about 400g

Fig.2 — Weight : about 570g

Fig.3 — Weight : about 750g

Fig.4 — Weight : about 170g

Fig.5 — Weight : about 260g

Fig.6 — Weight : about 430g

• Install with/without 35mm DIN rail

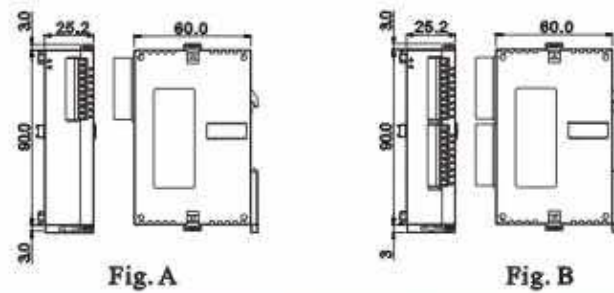• Besides fig. 3, they are all fixed terminal. Fig. 3 is removal terminal for DVP60ES00R2/T2.

SS/SA/SX Series MPU

Model number	Fig.	Weight (g)
DVP14SS11R2	A	104
DVP14SS11T2	A	98
DVP12SA11R	B	140
DVP12SA11T	B	130
DVP10SX11R	C	136
DVP10SX11T	C	133

Fig. A   Fig. B   Fig. C

- 35mm DIN rail for fixed installation
- Removal terminal

SS/SA/SX series -- DI/DO and Special Extension Module

Model number	Fig.	Weight (g)
DVP08SM11N	A	64
DVP08SN11R/T	A	88 / 68
DVP06SP11R/T	B	80 / 70
DVP16SP11R/T	B	96 / 76
DVP04AD-S	B	96
DVP04DA-S	B	96
DVP02DA-S	B	90
DVP06XA-S	B	88
DVP04PT-S	B	96
DVP06RT-S	B	88
DVP04TC-S	B	96

Fig. A   Fig. B

- 35mm DIN rail for fixed installation
- Removal terminal

Power Output Module
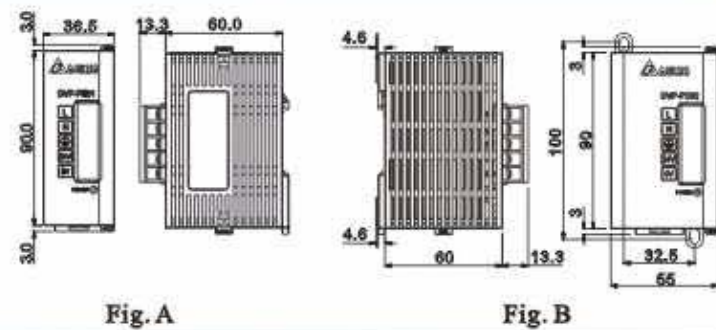
Model number	Fig.	Weight (g)
DVPPS01	A	156
DVPPS02	B	250

- 35mm DIN rail for fixed installation
- Removal terminal (with cover)
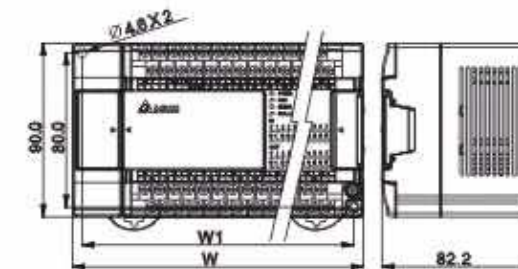- There is fixed installation hole for DVPPS02

Fig. A   Fig. B

TP02G/TP04G Operation Interface Panels Series

Cutout Dimension
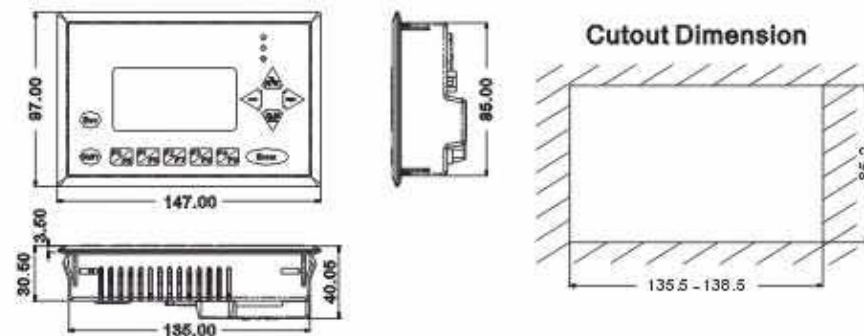
Model number	Weight (g)
TP02G-AS1	284
TP04G	282

- Removal terminal

EH Series MPU

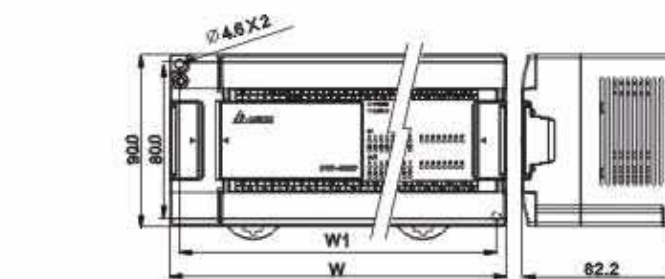| Model number	W(mm)	W1(mm)	Weight (g)
DVP16EH00R/T	113	103	500 / 460
DVP20EH00R/T	113	103	520 / 500
DVP32EH00R/T	143.5	133.5	652 / 612
DVP48EH00R/T	174	164	748 / 688
DVP64EH00R/T	212	202	836 / 756
DVP80EH00R/T	276	266	948 / 848

- Install with/witout 35mm DIN rail
- Removal terminal

EH Series -- DI/DO and NI/NO Extension Module
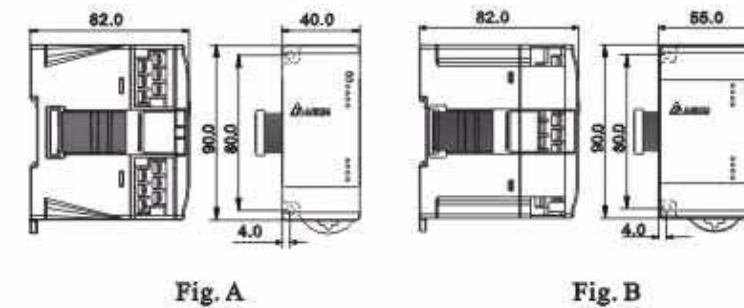
Model number	Fig.	Weight (g)
DVP08HM11N	A	124
DVP16HM11N	B	160
DVP08HN11R/T	A	130 / 120
DVP08HP11R/T	A	136 / 116
DVP06KY-H	A	98
DVP06SD-H	A	100

- Install with/witout 35mm DIN rail
- Fixed terminal
- DVP16HM11N: removal terminal

Fig. A   Fig. B

Model number	W(mm)	W1(mm)	Weight (g)
DVP32HP00R/T	143.5	133.5	438 / 398
DVP48HP00R/T	174	164	616 / 576

- Install with/witout 35mm DIN rail
- Removal terminal

EH Series Special Extension Module and Digital Display (DVPDU01)
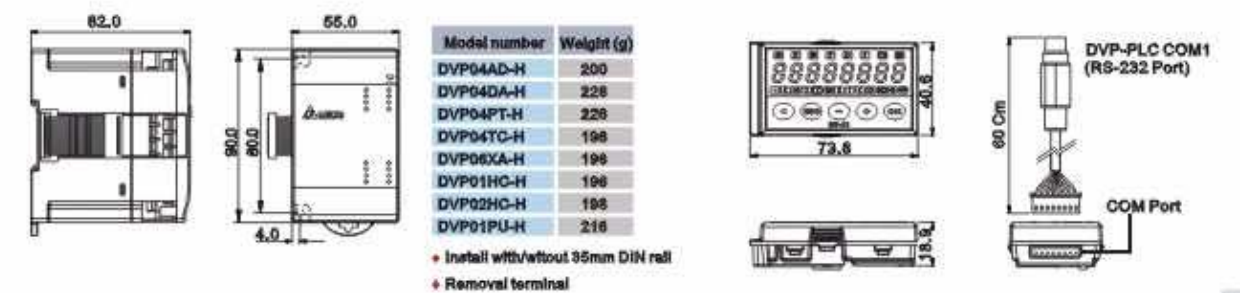
Model number	Weight (g)
DVP04AD-H	200
DVP04DA-H	226
DVP04PT-H	226
DVP04TC-H	198
DVP06XA-H	196
DVP01HC-H	196
DVP02HC-H	196
DVP01PU-H	216

- Install with/witout 35mm DIN rail
- Removal terminal

DVP-PLC COM1 (RS-232 Port)

60 Cm

COM Port

PLC(30-37)curve.jpg (1609 x 1090 x 24)