

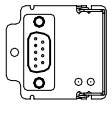
DVP-EH Function Card Instruction Sheet

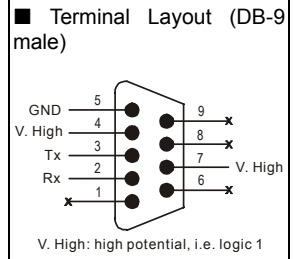
1 WARNING

- Always read this manual thoroughly before using **Function Extension Card**.
- This instruction provides electrical specification, function specification, wiring and basic program design. For detail program design and instruction explanation information refer to PLC Application Manual (programming).
- This is an OPEN-TYPE. When installing, you should turn MPU power off and have static electricity protection, such as wear antistatic gloves, to avoid damage those components on function extension card caused by statics.
- This instruction is for DVP series function extension card. Please find out your order model in the following for correct usage.

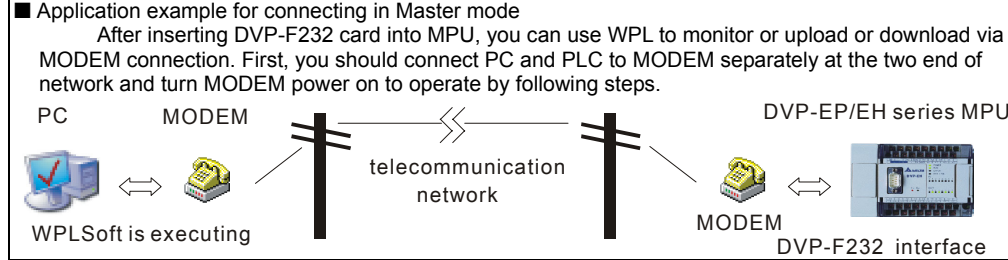
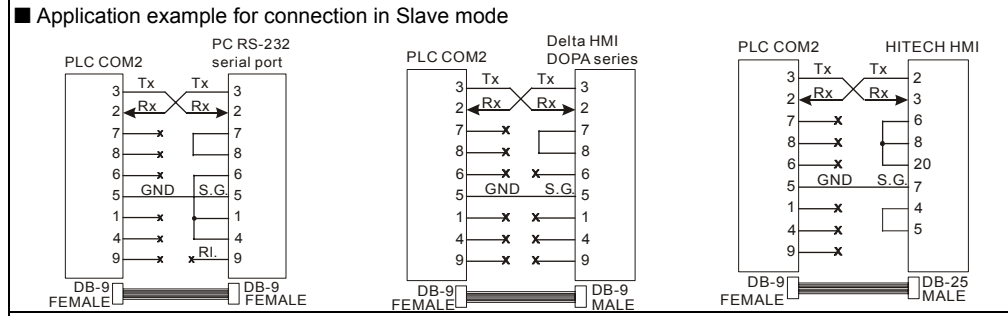
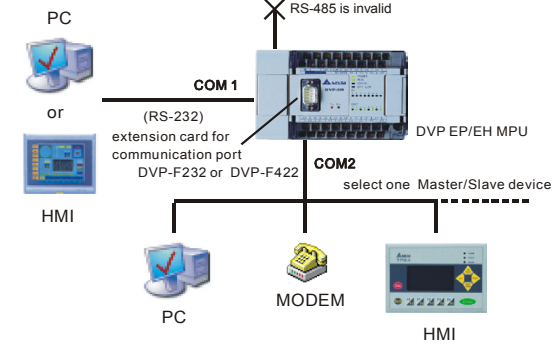
2 INTRODUCTION

Thank you for choosing DELTA's PLC extension card of DVP-EP/EH Series. There are analog input/output card (AI/AO), digital input/output card (DI/DO), extension card for communication port and memory card. Refer to following table for detail.

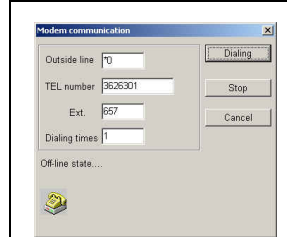
Model Name	Outline	Function Explanation	Applicable Model	
			EP	EH
DVP-F232 (RS-232 card)		MPU built in COM1(RS-232) and COM2(RS-485). When connecting RS-232 to PC or other peripheral, such as MODEM, by using COM2, you can use this extension card. The communication function is the same as COM2 except communication interface, i.e. there are Slave mode and Master mode for you to choose. Note: PLC will set that COM2 is occupied by RS-232 card and built-in COM2 (RS-232) function will be invalid after inserting this card. Refer to following for system connection.		



Note: Please pay attention for pin 2 and pin 3 when connecting this communication port to PC or HMI.



STEP 1: Setting M1184=On on PLC side (start-up MODEM)
 STEP 2: Setting M1185=On (start-up PLC's MODEM initialization)
 STEP 3: Check the result of MODEM initialization: M1186=On means succeed to initial. M1187=On means fail to initial.
 STEP 4: After initializing successful, WPL software can be ready for connection on remote PC side. WPL connection method: setting -> modem connection (you need to install modem's driver first) -> to get dial connection dialog box and then fill in dial information as following.



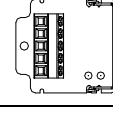
If you dial a number to access an outside line, what is it? Please fill in this field when it is necessary.
Telephone number: if there is any area code or city code, you don't need to put anything for distinction. Only key the figure one by one directly. For example: 88633626301
Extension number: Please fill in the field when it is necessary.
Dialing times: setting redial times when it is fail to connect. After finishing input, execute dialing to start connection.

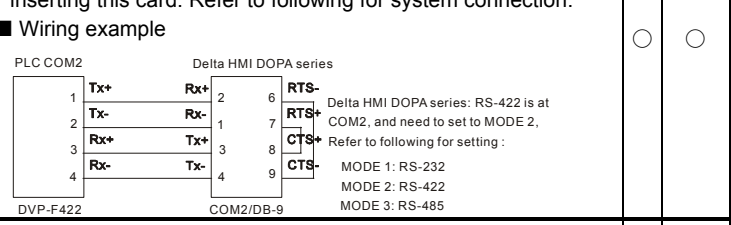
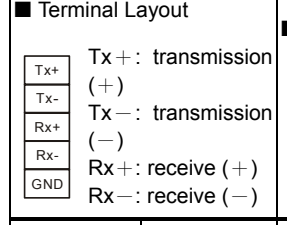
After dialing connection successfully, dial connection dialog box will disappear automatically. Now, you can monitor remote PLC via WPL. If there is remote control signal detected on PLC side, M1188 will be On and user can know if PLC is monitored by remote control via this special M.

- Note:
- Communication baud rate can't be changed during MODEM connection. MODEM connection baud rate on PLC side is fixed to 9600bps and can't be modified.
 - The MODEM that connected to PLC must provide Auto Answer (AA) function. Communication baud rate for MODEM at two end should be 9600bps and higher.
 - EP/EH series special M definition for MODEM connection: (following special M is valid when PLC is RUN/STOP.

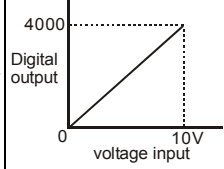
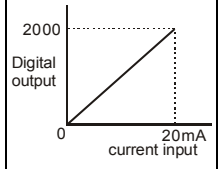
Device	Function Explanation	Remark
M1184	Start-up MODEM	When M1184=On, following actions are valid.
M1185	Start-up MODEM initialization	This flag will be Off after finishing initialization.
M1186	Fail to initial MODEM	When M1185=On, M1186=Off.
M1187	Succeed to initial MODEM	When M1185=On, M1187=Off.
M1188	Display if MODEM is connected or not	On means in connection

- Additional explanation on PLC side:
 - It must use with RS-232 card when connecting MODEM on PLC side. If not, above special M are invalid.
 - You must set M1185=On to initial MODEM after MODEM start-up (M1184=On). If not, it can't start-up MODEM auto dial function on PLC side.
 - MODEM will enter auto dial mode after initialization.
 - MODEM will enter to ready for dial mode on PLC side after remote PC stops connection. If user turn MODEM power off now, it should need to initial at the next time when turning on MODEM.
 - The initial format that used to MODEM on PLC side are ATZ and ATSO=1.

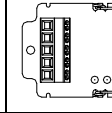
Model Name	Outline	Function Explanation	Applicable Model
DVP-F422 (RS-422 card)		User can use COM2 to connect RS-422 and HMI or other peripheral for long distance connection. The communication function is the same as COM2 except communication interface. Note: PLC will set that COM2 is occupied by RS-422 card and built-in COM2 (RS-485) function will be invalid after inserting this card. Refer to following for system connection.	

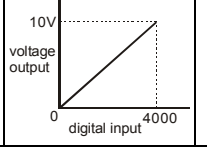
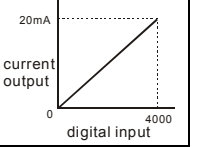


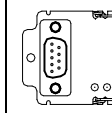
There are 2 analog input points supported by F2AD card and their characteristics are shown in the following:

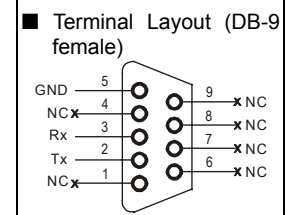
Item	Voltage input	Current input
Analog signal	DC 0~+10V	DC 0~20mA
Resolution (12bit)	2.5mV (10/4000)	10uA (20/2000)
Input impedance	40KΩ	250Ω
update time for conversion	D1118 setting (≥K5, unit: ms)	
Characteristic cure		
Digital value output	Current value D1056 (CH0) D1057 (CH1)	Average value D1110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

User can get A/D conversion value saved in special D by reading special D that corresponds to current value or average value. D1118 setting is every update time of current value of digital value output.

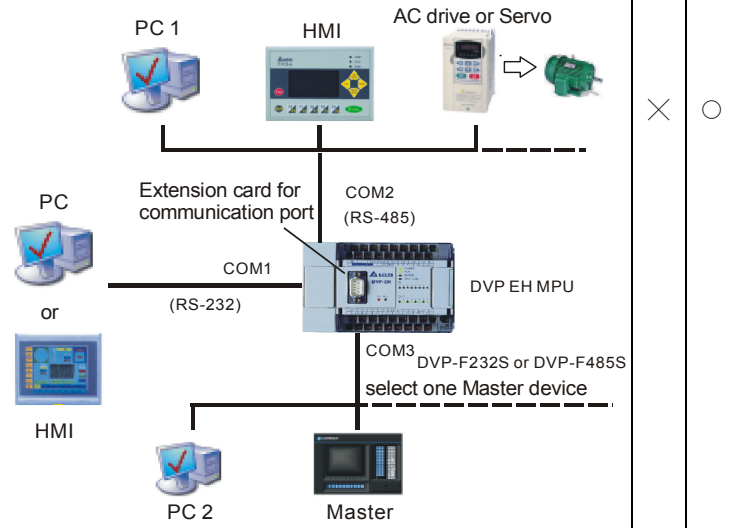
Model Name	Outline	Function Explanation	Applicable Model
DVP-F2DA		There are 2 analog output points supported by F2DA card and their characteristics are shown in the following:	

Item	Voltage output	Current output
Analog signal	DC 0~+10V	DC 4~20mA
Output impedance	Less than 0.5Ω	Less than 0.5Ω
Resolution (12bit)	2.5mV (10/4000)	5uA (20/4000)
Update time for conversion	D1118 setting (≥K5, unit: ms)	
Digital value input	D1116 (CH0)	D1117 (CH1)
Characteristic cure		

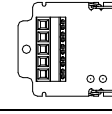
Model Name	Outline	Function Explanation	Applicable Model
DVP-F232S (RS-232 card)		When two built-in COM1(RS-232) and COM2 (RS-485) are not enough for use, you can add one COM by this card (number is 3 and is called COM3. There are two interfaces, RS-232 and RS-485, for you to use. Its general function is the same as COM1 but communication baud rate is 9600/19200/38400 bps. PLC scan time will be added at least 0.8ms ~ 2ms due to COM3.	

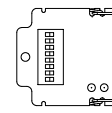


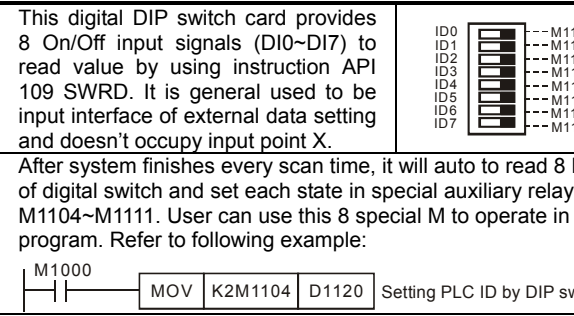
Usage limit: PC1 and PC2 can't execute ladder diagram monitor function simultaneously when COM2 is slave mode and connect to PC1 with executing WPLSoft and COM3 also connects to PC2 with executing WPLSoft. But other communication function is normal. COM1 is out of this limit.

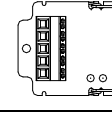


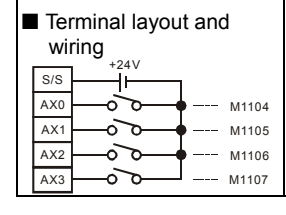
Note: Please pay attention to signal of pin2 and pin3 when this communication port is connected to PC or HMI. Especially that this definition is different from DVP-F232 card.

Model Name	Outline	Function Explanation	Applicable Model
DVP-F485S (RS-485 card)		D + : signal (+) D - : signal (-)	

Model Name	Outline	Function Explanation	Applicable Model
DVP-F8ID		This digital DIP switch card 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.	



Model Name	Outline	Function Explanation	Applicable Model
DVP-F4IP		F4IP card provides 4 digital input points with photo coupler 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.	



Item	Input Spec.
Input type	DC (SINK or SOURCE)
Input signal current	About 5mA/DC24V
Action level	Off→On, 16VDC and higher On→Off, 14.4VDC and lower

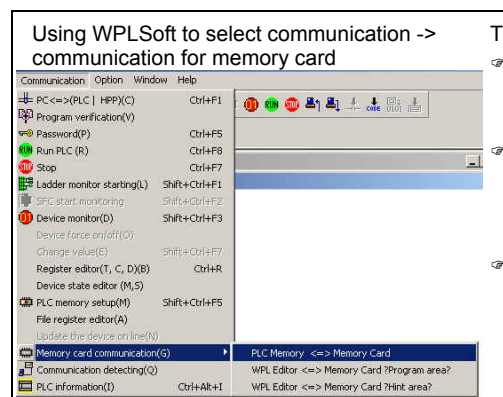
Model Name	Outline	Function Explanation	Applicable Model	
			EP	EH
DVP-F2OT		There are 2 digital output points that provided by F2OT card. Output type is transistor and user can driver output points by using M1112 and M1113. 		
DVP-F6VR		There are two built-in analog knob VR0 and VR1 in EP/EH MPU. You can expand analog input equip to VR2~VR7 by using this VR card. Refer to API85 VRRD and API86 VRSC in application manual (programming) for detail. 		
DVP-256FM		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.		

It will check password during date copy. If there is password in memory card, it will also be copied to PLC and PLC will be locked. See flowchart at the right side.

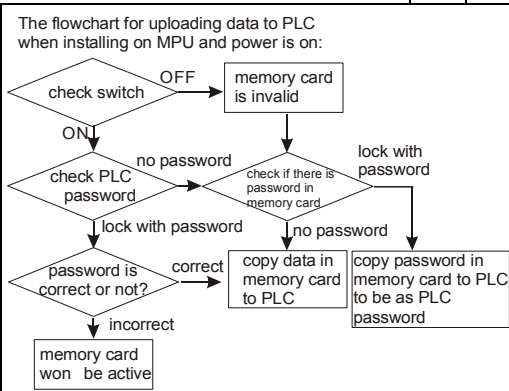
There are several sections for copy data in memory to PLC as shown in the following.

Data block	Setting range	Default
Program area	15872 Steps	All are NOP instruction
Data register	D0~D999	K0
	D1035, D1038	K0
	D1101	K0
	D1102	K1600
	D1103	K2000
	D1200	K500
	D1201	K999
	D1202	K2000
	D1203	K4095
	D1204~D1207	K-1
	D1208	K100
	D1209	K199
	D1210	K220
	D1211	K234
	D1212	K235
D1213	K255	
D1214	K500	
D1215	K899	
D1216	K200	
D1217	K999	
D1218	K2000	
D1219	K9999	
D2000~D9999	K0	
File register	0~4999	K0
Auxiliary relay	M0~M999	Off
	M1035, M1101	Off
	M2000~M4095	Off
Step point	S0~S1023	Off
Timer	T0~T255	K0
Counter	C0~C255	K0
Password	4 words	Off

When inserting memory card in PLC, you can read/write data in memory card by using WPL. The operations are in the following: (please confirm that switch on memory card is On before PLC is power on. And also confirm that connection is successful to read/write data in memory card.)



There are three modes:
 - PLC memory ↔ memory card
 - WPL working area ↔ memory card [program]
 - WPL working area ↔ memory card [commentary]
 It can copy program that edited by WPL to memory card or copy PLC program in memory card to WPL working area.
 It can copy commentary in WPL to memory card or read commentary from memory card (commentary in memory card can be only loaded in WPL working area. It can't be loaded in PLC EH MPU and there is no area for saving commentary in EH MPU.)



Therefore, 256FM card can be used for data backup and PLC copy. It can write PLC major data block (according to left table) into memory card according to following two steps. Step 1: finish setting program parameters, file register parameters or other relative latched parameters by using WPLSoft or HPP02. Step 2: choose communication -> communication for memory card in WPLSoft software. You can insert this memory card into other EH MPU to finish PLC copy function quickly. After this PLC MPU is power on, the data in memory card will upload to PLC relative data area. (only for DVP-EH MPU (32 points and more))

Those data in 256FM card can be read/wrote by using WPLSoft or HPP02 but there is limit for editing or read/write data. For HPP02, it can only read/write the DATA in program area and file register area.

Following is the operation for each item and relative cautions:

Memory card setup
 PLC ↔ Memory card
 Function selection
 • PLC => memory card
 a) If password in PLC is unlocked but password in memory card is locked, data will be write into memory card and password in memory card will be disable after executing PLC => memory card.
 b) If password in PLC is locked and no matter password in memory card is locked or not, data and password in PLC will be write into memory card after executing PLC => memory card.
 • memory card => PLC (PLC must be in STOP mode)
 It will compare password in memory to password in PLC before executing. If passwords are not the same, it can't read data.
 Note: "Lock state" means password in memory card is locked.

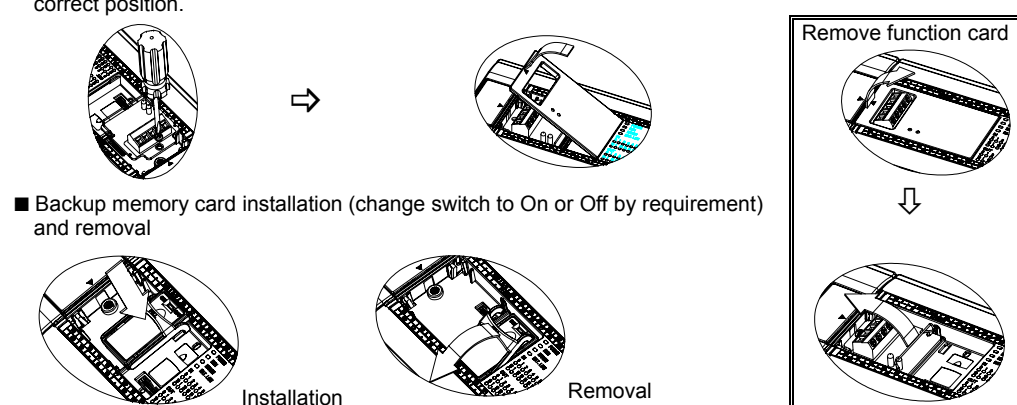
Memory card setup
 WPL Editor ↔ Memory card transmission
 Function selection
 • WPL working area => memory card
 a) If you don't input any words in password field (password field is blank), password in memory card will be clear after pressing Enter button (no matter it has password or not before).
 b) If you input new password in password field, password in memory card will be protected by this new password.
 • memory card => WPL working area
 If there is password for memory card, you will be asked to input password when executing this function. If you don't input password or input error password, it will have error message and can't read data.
 Note: "Lock state" means password in memory card is locked.

Memory card setup
 WPL Editor ↔ Memory card transmission
 Option/Hint area?
 • WPL Editor => Memory card
 • Memory card => WPL Editor
 Device Selection
 X Y M S
 T C D
 P I
 Note: "Lock state" means password in memory card is locked.

3 Installation and Maintenance

Please make sure that PLC is power off and open extension slot cover before installing or removing function card or memory card. The installed position of function card and memory card are shown at the right side. Please attach terminal label shipped with package on correct terminal to avoid error wiring.

Function card installation – Please put function card into slot vertically and tighten accessory screws into correct position.



Check for finishing installation
 After PLC is power on, connect PLC to WPLSoft at PC side. In WPLSoft, select view -> working area and then select connected model to connect. At this time, WPLSoft will detect configuration of PLC MPU system and show the result, including categories of function card and state of memory card (On or Off), in working area. Refer to WPLSoft user manual for detail.

4 Application

All kinds of function card provided by DVP series solve the problem that happened in PLC application. For example:

Usage timing and application requirement	solution (correspond to function card model name)
When system specification is modified, there are not enough points for use. And you need only 1~4 input points or 1~2 output points.	Use DVP-F4IP or DVP-F2OT
Output point of MPU is relay and you need 1~2 points more with transistor type.	Use DVP-2OT
There is space limit for installing and need to deal with analog signal.	Use DVP-F2AD or DVP-F2DA
You need 1~2 analog output points to control AC drive speed.	Use DVP-F2DA
Small control system and need 1~2 analog input points.	Use DVP-F2AD
You need to connect PLC to PC and HMI and also control AC drive.	Use DVP-F232S or DVP-F485S
There are many PLCs and need to download program quickly. (copy PLC)	Use DVP-256FM
When parameters want to set by DIP switch without occupy any input points.	Use DVP-F8ID
When built-in COM 2 is RS-485, but what you need is RS-232 or RS-422.	Use DVP-F232 or DVP-F422
When remote control PLC is by MODEM.	Use DVP-F232
When there are 3~8 variables needed to modify by requirement very often.	Use DVP-F6VR

Following is application for DI/DO card and AI/AO card:

DVP-F4IP application:

Terminal Layout

Program

Explanation

① The input terminals AX0~AX3 correspond to devices M1104~M1109

② Adding input points AX3. External switches 1~3 and detector control M10, M11, Y0 and T0 separately according to program.

DVP-F2OT application:

Terminal Layout

Program

Explanation

① The output terminals AY0~AY1 correspond to devices M1112~M1113.

② Adding output points AY0 and AY1 and connect to load 1 and load 2 to be controlled by X10 and M10.

DVP-F2AD application:

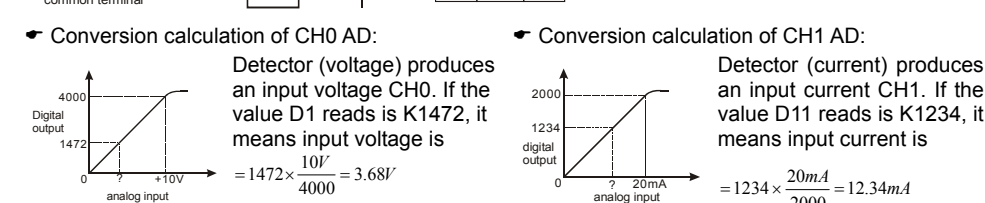
Terminal Layout

Program

Explanation

① CH0 AD is variable. Current value is D0 and average value is D1.

② CH1 AD is variable. Current value is D10 and average value is D11.



DVP-F2DA application:

Terminal layout

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