



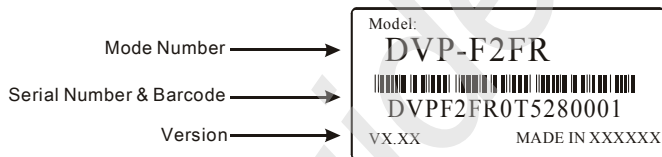
DVP Peripheral Series Frequency Measurement Card Instruction Sheet

1 WARNING

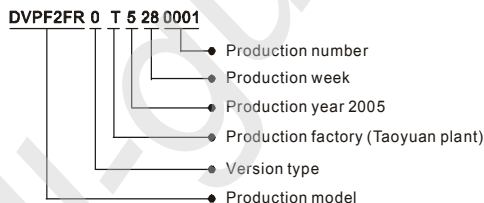
- This frequency measurement card is a specific function card for DVP-EH PLC, please use this card with DVP-EH MPU.
- Frequency measurement card is an OPEN TYPE without any mechanical shield. When installing this card, user is supposed to power off the MPU and take precaution against static (anti-static glove) to prevent the surface parts of the card from being damaged.
- Do NOT connect the AC power line to any of the input/output terminals, or it will damage the PLC. Make sure all the wiring is correct before power on.
- To enhance the anti-interference performance of product, please make sure terminal **FG** is properly grounded.
- Frequency measurement card is only workable for the DVP-EH with the version greater than 1.1.

2 INTRODUCTION

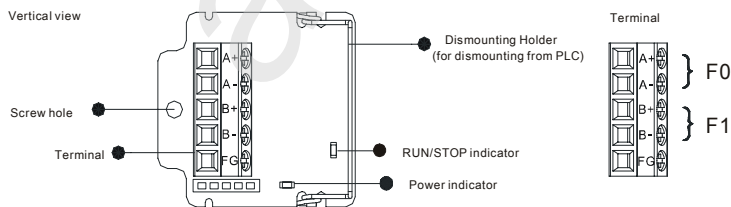
- Thank you for choosing Delta DVP series product. The frequency measurement card (DVP-F2FR) is the function card with 2 external inputs that accept digital signals. By using FROM-TO instruction, PLC can read/write the data or parameter in the frequency measurement card.
- There are 255 built-in CRs (Control Register) in DVP-F2FR with 16 bits for each register. DVP-EH MPU can control the function of DVP-F2FR by programming the CRs.
- Nameplate Explanation:



Serial Number Explanation:



Product Outline:



3 SPECIFICATION

3.1 Basic Specification:

Input Signal	Electric Level	Terminals [A+] & [A-], [B+] & [B-]: DC22~30V, 8~12mA. SINK or SOURCE	
	Pulse Type		t1: rising/falling time ≤ 0.8us t2: ON/OFF pulse bandwidth ≥ 2.5us t3: phase difference of A, B phase ≥ 1us
Storage and Environment	Storage	-25°C~70°C (Temperature), 5~95% (Humidity)	
	Operation	Operation: 0°C~55°C (Temperature), 50~95% (Humidity), Pollution degree: 2	

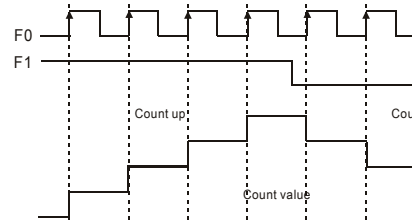
3.2 Operation mode:

There are 3 types of operation mode for the frequency measurement card setting CR1. Detail information as follows:

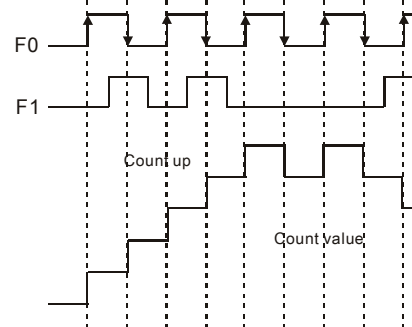
- Mode 1: Pulse Interval Length Measurement (CR1=K1)
 - Measurement method of pulse interval:
 - Inputs of pulse interval measurement: F0, F1.
 - Time unit of pulse interval measurement: 50ns.
 - Interrupt function: I180 will be executed after frequency measurement. The interrupt edge in F0 and F1. And bit 0 of CR9 will inform information, please see section 6.1.
 - Input frequency range: 1Hz~1kHz.
 - Accuracy: ±0.01% (max.)

- Mode 2: High-speed Counter (CR1=K2)
 - There are 3 types for mode 2 the high-speed counter up to 200kHz. Explanation as follows:

- Pulse/Direction: F0 is pulse input point. F1 is the direction input. Counting method is shown as diagram as follow:

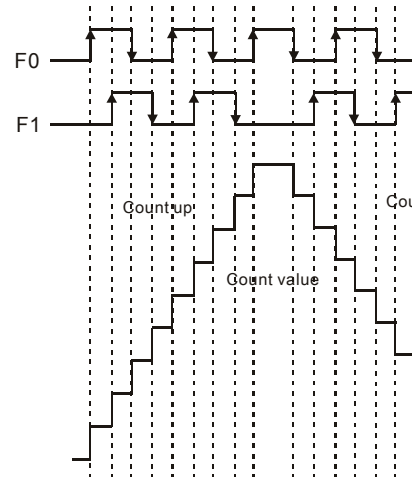


- A/B-phase two times frequency: F0 is the input point. Counting method is shown as follow:



Value	F0	
		Rising-edge
F1 (B phase)	High	Count-down
	Low	Count-up

- A/B-phase four times frequency: F0 is the input point. Counting method is shown as follow:



CR NO.		Attribute	Factory setting	Latched	Mode	Function explanation
HW	LW					
						V1.00 version.
#35~#49						Reserved
#50	R	K51	×	1,3	The index of F0 record value (record the number from CR51~130)	
#51~#130	R	K0	×	1,3	F0 record value (each value occupy 2 group CR)	
#131	R	K132	×	1,3	The index of F1 record value (record the number from CR132~211)	
#132~#211	R	K0	×	1,3	F1 record value (each value occupy 2 group CR)	
#222~#255						Reserved

- The usage of CR varies based on operation mode. Please follow the table above to read or write CR.
- In column Attribute, "*" means writing is allowed when frequency measurement card is not working.
- When the writing value is out of available range, the value of upper/lower bound shall prevail to write once the value is out of upper/lower bound.
- The CR28 and CR29 are the time-out setting for F0 and F1. When setting them to a non-zero value in mode 1, it will monitor the signal input from F0 or F1 and start a time-out counting. If no signal detected in F0 and F1 with the time-out counter reaching the setting, it will clear the CR10~CR11 or CR12~CR13 and inform the PLC by I180 interrupt. Moreover, when CR28 and CR29 are set to zero, the time-out counter will not work anymore.
- CR50~CR211 will record the value according to the operation mode. Explanation as follows:

	Mode 1	Mode 2	Mode 3
CR51~CR130	To record F0 pulse interval (CR10, CR11)	N/A	N/A
CR132~CR211	To record F1 pulse interval (CR12, CR13)	N/A	To record F1 pulse interval (CR25, CR26)

- The index number of each record is plus 2 for CR50 and CR131 after both registers record on next. Once the index number reaches to the maximum, it will back to the 1st index number.
- It takes about 125us for instruction FROM/TO to read or write a CR of the frequency measurement card. One more read/write item of CR, 30us more for register.

5 INSTRUCTION EXPLANATION

5.1 Instruction Explanation for Frequency Measurement Card

API 78	D	FROM	P	(m1) (m2) (D) (n)	Read Special Module CR Data
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- Instruction Explanation
- (m1): Number of special module (m1=0~7). Number of frequency measurement card, m1=200.
 - (m2): Number of CR of special module that will be read.
 - (D): Location to save reading data.
 - (n): Data number of reading one time.

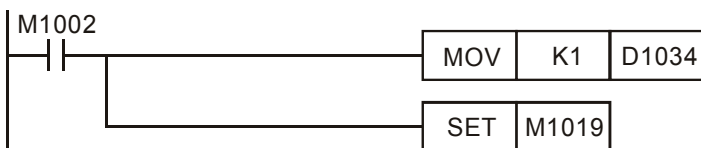
API 79	D	TO	P	(m1) (m2) (S) (n)	Special Module CR Data Write In
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- Instruction Explanation
- (m1): Number of special module (m1=0~7). Number of frequency measurement card, m1=200.
 - (m2): Number of CR of special module that will be read.
 - (S): Location to save writing data.
 - (n): Data number of reading one time

5.2 Explanation of special D, M and Interrupt:

Device	Explanation	Range
D1034	Mode setting of frequency measurement card	D1034 = K1~K3 (Mode 1~Mode 3)
M1019	Flag of mode setting	
I180	Frequency measurement card trigger interrupt	

- After PLC run at the first scan time, PLC will detect flag M1019 is ON or OFF. If M1019 is ON, PLC will modify the frequency measurement card's operation mode based on D1034 setting. Program example as follow is operation mode 1:

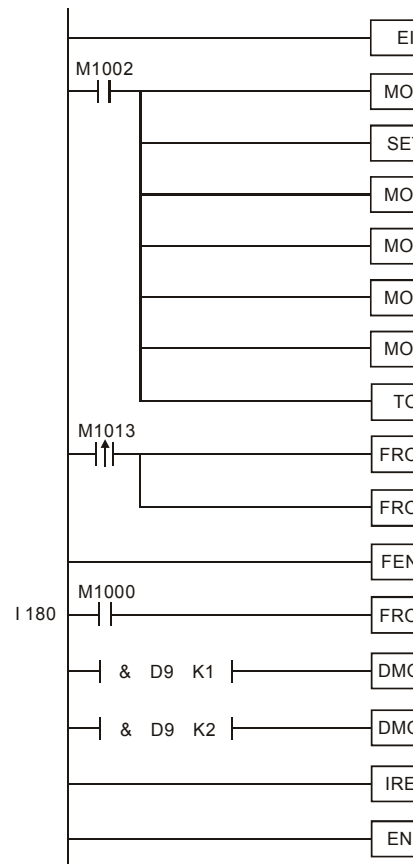


- PLC can use M1019 (flag of operation mode setting for frequency measurement card) and D1034 (flag of operation mode setting for frequency measurement card) to set operation mode 1 (measurement of pulse interval) and operation mode 2 (measurement of pulse number) to support Interrupt function I180.

6 APPLICATION

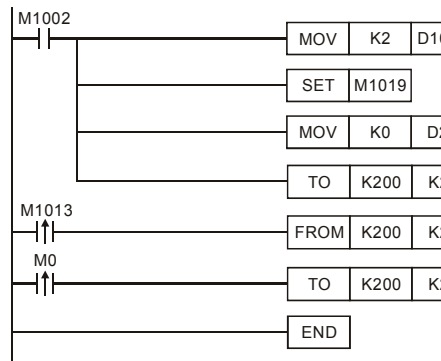
6.1 Pulse Interval Length Measurement

- Following the program example of setting operation mode 1. For F0 and F1, set the time unit of sampling rate is 1 (mode 1, D4). Moreover, I180 will be triggered when F0 or F1 instruction FROM to decide which channel to detect



6.2 High-speed Counter

- The setting for the following program example:
 - Operation mode: Mode 1.
 - Counting method: Pulse/Direction.
 - Set M0=ON to start counting.



6.3 Pulse Number Capture

- The following program example is Mode 3 for frequency measurement card detects the rising-edge in F1, it will trigger Interrupt I180, it will read the content of CR25, 26 of