

Industrial Automation Products

Edition 2022-Q4

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1 News

1.1 FTP-Site Link & Update

Our FTP server provides product information that is not available in Delta's Download Center on the global website, e.g. datasheets, technical notes, presentations, software, etc. Please visit our FTP site with below account info.

ftp://den-eindhoven:BuPd2175@ftp2.delta-europe.com/deltronics-eindhoven/customer-service

Name and password are included in the link.Name:den-eindhovenPassword:BuPd2175

- **NOTE** It is only possible to access our FTP via TCP port 22/23. Therefore, please use common FTP clients such as FileZilla, Win SCP or Total Commander. Access with standard web browsers, like Edge, Chrome, Opera, etc. is not possible.
- **Update** To align the data categories with Delta's official Download Center, we adjusted the folder structure according to the following example.

ftp://den-eindhoven:Bu Industrial Automation Pro	uPd2175@ftp2.delta-europe.com/deltro	onics-eindhoven/o	customer-service	
Control Drive & Power Quality Motion Robot Industrial PC Field Devices Software Power Supplies VTScada	 PLC – Programmable Logic Controllers Touch Panel HMI – Human Machine Interfaces Industrial Fieldbus Solution Text Panel HMI – Human Machine Interfaces Industrial Ethernet Solution 	Accessories AH Series AS Series DVP-10MC Series - etc.	DVP-10MC Application Notes- DVP-10MC Catalogue DVP-10MC Certificates etc.	— Document
1 st Level	2 nd Level	3 rd Level	4 th Level	5 th Level

1.2 NEW IABG EMEA HQ Officially Inaugurated

In October, Delta inaugurated a new facility at the Automotive Campus in Helmond, the Netherlands in the presence of Delta's top management and the Mayor of Helmond. The building will eventually house over 150 employees to support the expansion of Delta's industrial automation, industrial power supply and automotive business development, product testing and technical service in Europe, the Middle East & Africa (EMEA). Through the implementation of Delta's smart energy-saving solutions and innovative eco-friendly design, the new 4,055-square meter facility will consume an expected 56.84% less electricity than traditional buildings. In recognition of those efforts, the U.S. Green Building Council has awarded a LEED Gold green building certificate to the Delta Helmond office.







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2 **Product update**

2.1 NEW – AX-3 Controllers, Programmable with CoDeSys

The AX-3 series is a range of professional PLCs and PLC-based motion controllers. It provides an advanced EtherCAT motion solution, based on the established AS PLC hardware platform. That allows expanding the system with AS series IO modules. The CoDeSys-based DIADesigner-AX software provides a convenient development environment and excellent product experience.







The AX-3N possesses the prevalent Ethernet/IP and Modbus

TCP fieldbuses as well as integrated OPC UA server functionality. The results are easy system integration and high-speed communication.

CPUs with or without built-in IO ensure that you always encounter the best matching controller for any application scenario.

Features

AX-3N logic controller

- Min. execution time of basic instruction: 5 ns
- Built-in communication ports: Ethernet, RS-232, RS-485
- Ethernet port supports Ethernet/IP and Modbus TCP
- OPC UA server
- Serial ports support Modbus
- Built-in 16 DI (4 x high-speed 200 kHz) and 8 DO (4 x high-speed 200 kHz for pulsetrain support up to 6 /15 axes), except AX-300N

Electrical Specifications

Operating Temperature	-20 – +55 °C
Storage Temperature	-40 – +80 °C
Operating & Storage Humidity	5 – 95%, non-condensing
Vibration	IEC 61131-2, IEC 60068-2-6 (TEST Fc);
	5 Hz \leq f \leq 8.4 Hz, constant amplitude 3.5 mm;
	$8.4 \le f \le 150$ Hz, constant acceleration 1 g
Shock	IEC 61131-2, IEC 60068-2-6 (TEST Ea);



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	15 g peak, 11 ms duration, half-sine
Operating Environment	Non-corrosive gas
Installation	Inside of control panel
Pollution Degree	2
Protection Rating	IP 20
Conformal Coating	Yes
Conformity	CE, UL

Dimensions

(Unit: mm)





(Unit: mm)



Ordering Information

Model	Description		
AX-308EA0MA1T	AX-3 series EtherCAT motion controller, 8-axis, built-in		
	16DI/8DO, NPN output, CODESYS		
AX-324NA0PA1P NEW!	AX-3 series logic controller, built-in 16DI/8DO, PNP		
AX-300NA0PA1 NEW!	AX-3 series logic controller, no built-in IO, CODESYS		



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2.2 UPDATE – AX3 Firmware Upgraded to Version 1.00.04

Related Models

Series	Model	Firmware Version	Release Date
AX-3	AX-308EA0MA1P AX-308EA0MA1T AX-316EA0MA1T AX-304ELA0MA1P AX-304ELA0MA1T AX-364ELA0MA1T AX-364ELA0MA1T AX-324NA0PA1P AX-300NA0PA1	1.00.04	October 28, 2022 (Week 44/2022)



Compatibility

Since the built-in memory card on the PCB board has been replaced with an eMMC IC, the hardware version is updated and the compatibility between the hardware and firmware is described below.

Series	Model	Hardware Version ^{*1}	Firmware Version ^{*2}
AX-3	AX-308EA0MA1T	A0	V1.00.00 or later
			Shown as 1.0.0 in DIADesigner-AX
		A1	V1.00.02.05 or later
			Shown as 1.0.2.5 in DIADesigner-AX
		B1	V1.00.04 or later
			Shown as 1.0.4.1 in DIADesigner-AX
	AX-300NA0PA1	AO	V1.00.00 or later
	AX-304ELA0PA1T		Shown as 1.0.0 in DIADesigner-AX
	AX-304ELA0PA1P	A1	V1.00.03 or later
	AX-308EA0MA1P		Shown as 1.0.3.0 in DIADesigner-AX
		B1	V1.00.04 or later
			Shown as 1.0.4.2 in DIADesigner-AX
	AX-324NAUFATF		
	AX-364ELA0MA1T		

*1 Since the built-in memory card has been replaced with an eMMC IC on the PCB board, the hardware version is updated from A1 to B1.

*2 Old hardware version A0 is compatible to all firmware versions, new and old. The hardware version A1 is only compatible to firmware version 1.00.03 or later. The hardware version B1 is only compatible to firmware version 1.00.04 or later. Use Firmware Package Upgrade function from DIADesigner-AX to upgrade your firmware.



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☑ Firmware Download X		Firmware Download	×
Server: China 🗸	Refresh	Server: Global 🗸	Refresh
AX-300NA0PA1	^	AX-308EA0MA1T	^
1.0.1.3	🛨 🗁	1.0.0.1	1
1.0.3.0	🛨 🗁	1.0.1.3	1
1.0.4.2	🛨 🗁	1.0.2.0	1
AX-324NA0PA1P		1.0.2.5	🛨 🗁
1.0.1.3	🛨 🗁	1.0.3.0	🛨 🕋
1.0.3.0	🛨 🕋 📃	1.0.4.2	🛨 🗁
1.0.4.2	1	AX-308EA0MA1P	
AX-304ELA0PA1T		1.0.2.0	+
1.0.2.0	🛨 🗁	1.0.3.0	1
1.0.3.0	🛨 🕋	1.0.4.2	🛨 🗁
1.0.4.2	1	AX-364ELA0MA1T	
AX-304ELA0PA1P		1.0.1.3	1
1.0.2.0	🛨 🗁	1.0.3.0	1
1.0.3.0	🛨 🗁	1.0.4.2	🛨 🕋
1.0.4.2	1	AX-316EA0MA1T	
AX-308EA0MA1T	~	1.0.2.0	🛓 🚔 🗸

New functions

- 1. Now AS00SCM can be installed on the right side of AX-3 series PLC CPU. (works with DIADesigner-AX V1.4)
- 2. New memory mode, the device type "%M" is available for DDF V1.04.0 or later. Users can set a range for %M. and the variable type can be defined by the setting range of the %M. (works with DIADesigner-AX V1.4)

Variable and %M	Memory Mode = Retain	Memory Mode = %M	
	%M	%M in the setting	%M out of the
		range	setting range
VAR (@ %M)	VAR	Persistent retain	VAR
Retain (@ %M)	Retain	Persistent retain	Retain
Persistent retain (@ %M)	Persistent retain	Persistent retain	Persistent retain
@ %M	Persistent retain	Persistent retain	Persistent retain

See the table below to check if the values for different types of variables are retainable after certain action is taken.

Action	VAR	Retain	Persistent retain
Online change	•	•	•
Reboot PLC	0	•	•
Reset Warm	0	•	•
Reset Cold	0	0	•
Download	0	0	•
Reset Origin	0	0	•

• = Value retained*; • = Clear to zero

* If the value is not retainable, default values will be used instead



Improvements

- 1. Modified the RAM checking mechanism to minimize the chance of not able to turn the AX-3 series PLC CPU ON
- Fixed an issue that if the option "Automatics slave restart" is selected, it is possible that Ethernet connection may be lost and the connection to PLC cannot be established. Updated the procedures of turning on AX-308E CPU to eliminate the chance of NOT being able to turn AX-308E CPU on



2.3 UPDATE – AS02LC-A Firmware Update to Version 1.06

Modified Functions

1. Fixed an issue that when the calibration curve goes into other direction, there is no error detected. The curve should go either upward or downward. If the calibration curve goes up and down as the image shown below, an error will occur



Digital value

- 2. Fixed an issue that with no sensor connected to a channel, after closing and then opening the channel, there is no error detected. Error codes (16#1808 or 16#180B) should be generated, stating the signal received by channel 1 / 2 exceeds the range of analog inputs or the SEN voltage is abnormal
- 3. Fixed an issue that if executing the following commands on a closed channel, including calibration, tare weight measurement, net weight measurement, and clearing the weight to zero, after closing and then opening the channel, the values of the channel will be incorrect. Now you cannot execute the above-mentioned commands on a closed channel
- 4. Lower the sensitivity of reporting the driver board failure (16#1807)

2.4 UPDATE – DVP-ES3 Series CPU Firmware Update to Version 1.06.00

API No. Functions / Description No. Instructions 1 0709 XCMP When using the built-in X input points as trigger input points, it is possible that the software misjudges stable trigger signals as unstable and triggers no execution. 2701 2 DPLSR Fixed an issue that for the even-numbered axes, when the number of pulses to output is set to 0, there is no limit on the number of pulses, but the pulse may stop output after a long time. The time the pulse stops outputting is different for different target output frequency. Some cases show that if the target output frequency is 200kHz, the pulse output may stop after around 12-hours of output. 3 2704 DZRN Before: If the following conditions co-exist at the same time, the motion will not continue in the negative direction after reaching the positive limit. With zero return mode selected to leaving the zero point in the positive direction and then stops DOG point (contact A) is always ON due to a fault Reaching the positive limit

Possible Issue and Solutions



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			After: If the above-mentioned conditions co-exist at the same time, the motion will continue in the negative direction after reaching the positive limit.
4	2718	TPO	 Fixed an issue that when in the single-axis point-to-point motion or 2-axis linear interpolation mode, if the same output axis and output parameters are set for the next segment, the actual output frequency will become abnormal Fixed an issue that when the 2-axis linear interpolation is in the absolute mode, if the output is resumed after a pause, the direction of the X axis will be inverted.
5	2719 2720 2721	DTPWS DTPWL DTPWC	Fixed an issue that when Symbol / Address is selected as the address mode of the position planning table, the target positions in the position planning table cannot be correctly modified via DTPWS / DTPWL / DTPWC.
6	2809	RSTD	Fixed an issue that when the RSTD instruction is frequently used, it is possible that the PLC stops for no reason and the error code 0x200A (invalid instruction) is recorded in the error log.
7	2817 2818	DTQC DTQLC	Fixed an issue that other CAN positioning instructions cannot be executed after using online editing during the execution of DTQC or DTQLC instructions.
8		COMMGR	Fixed an issue that if using the COMMGR Ethernet broadcast search function to search, the PLC name consisting of non-ASCII codes cannot be correctly displayed. (Should work with COMMGR V1.13.03 or later.)
9		SFC	Fixed an issue that if the ACTIONs in the SFC program are written in the ST programming language, when the TMR instruction is used, the values in timer will not be cleared while STEPs are being converted.

New Instructions and Functions

No.	API No.	Functions / Instructions	Description	Reference
1		DVP02PU-E2	New instructions for PU modules	Attachment B- 1_PU Modules
2	1016 1017 1018	ATMR ATMRH ATMRM	Added new timer instructions, available for ISPSoft V3.16 or later	Attachment B- 2_Timers
3		Error Log	 Added relevant codes for CAN masters and slaves Added an RTC-related error code 	Attachment B- 3_ErroLog
4		Status Log	Any RTC related changes will be added in the status log (Action No. 8).	
5		HWCONFIG	 New 25 kbps baud rate option added for built-in CAN communication of AS-COPM card Added the position parameters for the execution of SFC STEP when PLC changes from STOP to RUN Available for ISPSoft V3.16 or later 	



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6	MODBUS/TCP COM Port No.	Added following new SRs and SM flags. - SR1092: COM port number of	Attachment B- 6_PORT
		(when PLC acts as a slave) - SR1093: COM port number of	
		Modbus TCP data exchange table; Default: 502 (when PLC acts as a	
		- SM1092: Error flag; Wrong COM port number of Modbus slave	

Modified Instructions and Functions

No.	API No.	Functions / Instructions	Descriptions	Reference
1	1100 1101	SFTR SFTL	Increase the maximum length of the data to be shifted from 1024 to 4096.	
2	1516	FPOW	The base (source value) can be a negative number. When the base is a negative value, the exponent must be an integer number.	
3	0600	REF	 Supports refreshing the Ethernet communication Supports refreshing the PDO communication when acting as a slave 	Attachment C- 3_REF
4	2712 2713 2714 2715	DCICR DCICA DCICCR DCICCA	Added options 20/21/22 in the function setting; users can use the basic angle of 10°, 5°, or 1° and the target coordinates X and Y to have a movement in a fixed 90° arc.	
5	2720	DTPWL	Supports using SM585 to modify the acceleration and deceleration time.	Attachment C- 5_DTPWL
6	2704 2724	DZRN DZRN2	 Users can set alarm flags of positive and negative limits for the output axis; alarm flags appear, once positive and negative limits are reached during the search for the zero point 	Attachment C- 6_DZRN_DZRN2
7	1821	DESO	Now Ethernet communication is supported. (COM1, COM2 and function card communications are already supported.)	

List of New PU Module Instructions

API	Instruction	Code	Pulse	Function
	16-Bit	32-Bit	Instruction	
1402		DPUCONF	✓	Setting output control parameters of PU module
1403	PUSTAT		-	Reading PU module output state
1404		DPUPLS	-	PU module pulse output (no acceleration)
1405		DPUDRI	-	Relative position output of PU module (with acceleration and deceleration)
1406		DPUDRA	-	Absolute addressing output of PU module



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				(with acceleration and deceleration)
1407		DPUZRN	-	PU module homing
1408		DPUJOG	-	PU module jog output
1409		DPUMPG	-	PU module MPG output
1410		DPUCNT	-	High-speed counter function of PU module
1411	PUX		✓	Setting PU module input point mode
1412		DPULS	✓	Setting PU module software limits



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B-1_PU Module

API		In	struc	ction c	ode			Oper	and			Function					
1402		D	PU	ICONF	Ρ		Module	e ∼Er	ror, Er	rCode		Setting output control parameters of PU module				rs of	
Device	Х		Y	м	S	Т	С	HC	D	FR	SM	SR	Е	к	16#	"\$"	F
Module									•					0	0		
Axis									٠					0	0		
Mode									٠					0	0		
SSpeed									•					0	0		
Atime									٠					0	0		
Dtime									•					0	0		
MSpeed									٠					0	0		
Z_no									•					0	0		
Offset									•					0	0		
Done			•	•	•				•								
Error			•	•	•				٠								
ErrCode									٠								
Data type	BOOL		WORD			LWORD	UINT	INT		DINT	LINT	REAL	LREAL	IMK	5	CNT	STRING
Module			٠					•									
Axis			•					•						_			
Mode		_	•					•									
SSpeed		_		_				-	_					_			
Atime		+															
Msneed		-	-	-	•			-									
Z no		-	•	<u> </u>				•	+	-				_			
Offset			٠					•									
Done	•																
Error	•																
ErrCode			٠					•									
				-		Γ	Pul	se Instr	uction		16-b	it instru	ction		32-bit	instruct	ion
						ł	ES3			_				ES3			



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Symbol

DPUC	DNF	DPUG	CONFP				
En		En					
Module	Done	Module	Done.				
Axis	Error	Axis	Error.				
Mode	EnrCode	Mode	EnCode.				
SSpeed		SSpeed					
Atime		Atime					
Dtime		Dtime					
MSpeed		MSpeed					
Z_no		Z_no					
Offset		Offset					

Module:	Module number
Axis:	Output axis number
Mode:	Output mode
SSpeed:	Speed for starting / ending frequency
Atime:	Acceleration time
Dtime:	Deceleration time
MSpeed:	Maximum output frequency
Z_no:	Number of Z phases to look for after
	returning to the original point
Offset:	Specify the number of outputs after returning
	to the original point
Done:	Completion flag
Error:	Error flag
ErrCode:	Error code

Explanation

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. The timing to set this instruction is when En changes from OFF to ON
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag **Error** will change to ON
- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2
- 4. Axis sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag Error will change to ON See the following combination of axes numbers and corresponding output points of PU modules

PU Module Name	Axis 1	Axis 2
DVP02PU-E2	Y0 / Y1	Y2 / Y3

5. Mode sets the output mode of an output axis and the setting values are explained in the following table

Output Mode Value	Description	Remark
0	Single-point pulse output (An even- number point for output only)	Y0 or Y2 for output
1	Pulse (An even-number point) + direction (An odd-number point)	Y0 is for the pulse and Y1 is for the direction. Y1: ON, negative direction; Y1: OFF, positive direction
2	CW (An even-number point) + CCW (An odd-number point)	Y0 is for CW (positive direction) and Y1 is for CCW (negative direction)
3	Phase A (An even-number point) + Phase B (An odd-number point)	Y0 is for phase A and Y1 is for phase B. When phase A is leading phase B: positive direction; when phase B is leading phase A: negative direction
Others	Automatically switch to mode 1 (default value)	

6. SSpeed~ Offset



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See the explanation of the following non-latched parameters and setting values. If the setting values exceed the range, the instruction will automatically be executed at the minimum or maximum value

Parameter	Function	Range	Default	Remark
SSpeed	Starting/ending	0 ~ 10,000 [Hz]	100	
	frequency			
Atime	Acceleration time	0 ~ 10,000 [ms]	100	
Dtime	Deceleration time	0 ~ 10,000 [ms]	100	
MSpeed	Maximum output	100 ~ 200,000	100,000	A 32-bit value
	frequency	[Hz]		
Z_no	Number of Z phase	-100 ~ +100	0	0: disabled
	signals to seek			
	after returning to			
	origin			
Offset	Outputs the offset	-10,000 ~	0	0: disabled
	position after the	+10,000 [pulses]		
	homing is finished			
	and Z phase			
	seeking is done.			

- 7. **Done**, an output of the specified PU module has been set as the completion flag. When **Done** is On, it indicates that the parameter setting is successful. You can continue to perform positioning output based on the On state of the completion flag. The clearing of the **Done** flag need be conducted by manual. The **Done** flag changes to ON only when the setting is completed
- 8. **Error**, an output of the specified PU module is a parameter error flag. Most parameter ranges are filtered automatically by the PLC. Thus if the error flag is ON, it means that there is no specified PU module or the PU module number is wrong or the output axis number is incorrect
- 9. The instruction is a pulse instruction. Even if the A contact is adopted as the condition contact, PU module parameters are also set only when the instruction is started. Therefore, if a parameter value is to be updated, restart the instruction to make the parameter set again
- 10. Since the set parameters are delivered through the module communication command, confirm the state of the output **Done** or **Error** before a parameter value is modified and then proceed with relevant operations
- 11. **ErrCode** shows error codes. See the description as follows

Error Code	Description
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.

Programming Example

Refer to the description of DPUDRI instruction (API1405) for more information.



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API Instruction code					Operand						Function						
1403 PUSTAT				Module ~ ErrCode					Reading PU module output state								
Device	х		Y	М	S	Т	С	HC	D	FR	SM	SR	Е	К	16#	"\$"	F
Module									•					0	0		
Axis									•					0	0		
ZeroS	•		•	•	•				•								
C_Posi									•								
Execute			•	•	•				•								
Pause			•	•	٠				•								
Error			•	•	•				•								
ErrCode									•								

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
Module		•				٠							
Axis		•				٠							
ZeroS	٠												
C_Posi			•				•						
Execute	٠												
Pause	٠												
Error	•												
ErrCode		•				•							
					P	ulse Instr	uction	16-ł	oit instruc	tion	32-	bit instru	ction
						_			ES3		-		

Symbol

PU	STAT	Module:	Module number
En		Axis:	Output axis number
Module	C_Posi	ZeroS:	Clear present output position to 0
Axis	Execute	C_Posi:	Current output position
ZeroS	Pause	Execute:	Execution flag
	Error	Pause:	Pause flag
	ErrCode	Error:	Error flag
L		ErrCode:	Error code

Explanation

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. The En setting must be set to ON so as to update the status of the specified axis continuously
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag Error will change to ON

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- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2
- 4. Axis sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. **ZeroS** clears the present output position to 0. If the present axis position is to be cleared to 0, set **ZeroS** from OFF to ON when the instruction is started
- 6. **C_Posi** sets the present position of the output axis for the specified PU module. The parameter value is a latched value and stored in the PU module
- 7. **Execute** is an read-only flag which means the output axis of the specified PU module is outputting or not. When **Execute** is On, it means the output is being conducted. When **Execute** is Off, it means the output axis is unused and can accept the next output command
- 8. Pause is an read-only flag to control the output axis of the specified PU module to pause its output. When Pause is On, it means the output is paused, the present velocity is 0 and the present output has not reached the specified target output position. If you restore the output, the flag will be cleared automatically. Note: While Pause is On, Execute is constantly On as well
- 9. Error is an read-only error flag which means an error occurs during the reading of the specified PU module. Refer to the explanation of error codes in ErrCode
- 10. After the PUSTAT instruction gives the pause command, the flags **Execute**, **Pause and Error** become readonly flags and at the moment, their states cannot be modified. The **Execute**, **Pause and Error** flags can be set or cleared only when the PUSTAT instruction is turned off
- For PU module state, check out the data exchange function of the special extension module through SM228. Refer to Section 2.2.16 Additional Remarks on Special Auxiliary Relays and Special Data Registers in the DVP-ES3 Series Programming Manual for details
- 12. ErrCode shows error codes and the explanations are seen in the following table.

Error Code	Description
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.
16#1403	There is no such output axis number in the PU module.

Programming Example

Refer to the description of DPUDRI (API1405) for more information.



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API		In	struc	tion co	ode	Operand							Function							
1404		D	PI	JPLS			Module ~ ErrCode						PU module pulse output (no acceleration)							
Device	х		Y	м	s	т	С	HC	D	FR	SM	SR	E	К	16#	"\$"	F			
Module									•					0	0					
Axis									٠					0	0					
TarPulse									•					0	0					
TarSpeed									•					0	0					
Done			•	•	٠				•											
Error			• • •					•												
ErrCode									•											

32-bit instruction

Symbol

DPU		Module:	Module number
En	120	Axis:	Output axis number
Module	Done	TarPulse:	Target number of output pulses
Avis	Error	TarSpeed:	Target output frequency
TarPulse	ErrCode	Done:	Done flag
TarSpeed	LITOUUE	Error:	Error flag
raiopeeu		ErrCode:	Error code

Explanation

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would be terminated immediately
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag **Error** will change to ON
- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2



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- 4. Axis sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. **TarPulse** sets the number of output pulses. The pulse number is a positive signed 32-bit value. When the value is 0, it means the output is always being performed, the number of output pulses is not limited and the output is not stopped until the instruction is disabled. When the value is less than 0, the PLC automatically uses 2's complement to transform the value into a positive integer as the number of output pulses
- 6. TarSpeed sets the target output speed (Unit: Hz). The input value is a signed 32-bit value within the range of -200,000 (-200K) ~ 200,000 (200K). You can modify the target frequency any time after the instruction is enabled and the PU module will automatically switch to the newly set target frequency after outputting a full pulse
- 7. When **TarSpeed** is a positive number (>0), it means that the "positive direction" output point is Off. When **TarSpeed** is a negative number (<0), it means that the "negative direction" output point is On. When **TarSpeed** is 0, it means that the output will be paused after the being executed pulse is output fully
- 8. The instruction does not support the function of acceleration and deceleration. Use the DPUDRI instruction instead if you need the function of acceleration and deceleration
- 9. The instruction can be used for the speed change. While the instruction is being executed, you can change the value of **TarSpeed** so as to change the output speed. When the setting value exceeds the maximum frequency, the instruction would be executed at the maximum frequency. But changing the speed would not change the direction. If the direction is to be changed, set the value of **TarSpeed** to 0 first and then modify the target speed
- 10. When the outputs have reached the pulse number specified by **TarPulse**, the **Done** flag changes to ON. The **Done** flag need be cleared by manual. The instruction sets the completion flag to ON only when the output is completed
- 11. The instruction can be used with the software and hardware limit points. When the limits are triggered, the output stops immediately and the **Error** flag changes to ON
- 12. If any error occurs as the instruction is in process of the output, the **Error** flag changes to ON. Refer to the error codes **ErrCode** shows for the trouble shooting

The error codes that **ErrCode** shows are listed in the following table.

Description
The module does not support the function.
There is no response from the module; communication timeout occurs.
There is no such output axis number in the PU module.
The output axis specified by the PU module is outputting data. It is not allowed to specify the output repeatedly.
DI I module stops Output pulse when the positive limit is reached
PLI module stops Output pulse when the positive limit is reached.

Programming Example:

- When M0 is ON, the DPUCONF instruction for axis 1 is executed to modify the parameters by setting Mode to 1 (Pulse Y0 + direction Y1), SSpeed to 200Hz, Atime to 200ms, Dtime to 200ms and MSpeed to 100kHz. After the output of Done is completed, M1 is ON
- When M10 is ON, the DPUPLS instruction for axis 1 starts to output 20,000 pulses from Y0 at the frequency of 2KHz (without acceleration and deceleration). Y1 is OFF, which indicates the positive direction and M11 is ON after the pulse output is finished



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PI	stru	ction c	ode	Operand							Function								
1405		D	Ρ	UDRI		Module ~ ErrCode							Relative position output of PU module (with acceleration and deceleration)						
Device	X Y M S		S	Т	С	HC	D	FR	SM	SR	E	K	16#	"\$"	F				
Module									•					0	0				
Axis									•					0	0				
RTarPosi									•					0	0				
TarSpeed									•					0	0				
Done			•	•	٠				•										
Error			•	•	٠				٠										
ErrCode									•										

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
Module		•				•							
Axis		•				•							
RTarPosi			•				•						
TarSpeed			•				٠						
Done	•												
Error	•												
ErrCode		•				٠							
					P	ulse Instr	ruction	16-k	oit instruc	ction	32-	bit instru	ction

Symbol

DPUE	DRI	Module:	Module number
En		Axis:	Output axis number
Module	Done	RTarPosi:	Number of output pulses for relative positioning
Axis	Error	TarSpeed:	Target output frequency
RTarPosi	ErrCode	Done:	Completion flag
TarSneed	Enoode	Error:	Error flag
Talopeeu		ErrCode:	Error code

Explanation

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would decelerate until it stops
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag **Error** will change to ON
- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is



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numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2

- 4. **Axis** sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. **RTarPosi** sets the position for relative positioning. The pulse number is a signed 32-bit value. When the value is greater than 0, the output will go in the positive direction (and the direction output point is off). When the value is less than 0, the output will go in the negative direction (and the direction output point is on). When the value is 0, the output completion flag **Done** changes to ON
- 6. TarSpeed sets the target output frequency (Unit: Hz). The frequency value is a positive signed 32-bit integer. When the value is less than 0, the instruction will automatically use 2's complement to transform the value into a positive integer. When the value is 0, the instruction will notify the module to enter the pause mode. The actual output is decelerated at the deceleration rate till the output speed is equal to 0 and the pause flag changes to ON. Refer to PUSTAT instruction for more details. See the setting range of TarSpeed for the module in the following table

Module Name	TarSpeed Setting Range
DVP02PU-E2	-200,000(-200K)~ 200,000(200K)

- 7. After the output is started, the target frequency is allowed to change any time. In the actual frequency change, the PLC will automatically change the frequency based on the set acceleration and deceleration rate in the DPUCONF instruction. When the modified speed exceeds the allowed maximum frequency, the output will be performed at the maximum frequency
- 8. When the outputs have reached the pulse number for relative positioning specified by **RTarPosi**, the **Done** flag changes to ON. The **Done** flag need be cleared by manual. The instruction sets the completion flag to ON only when the output is completed
- 9. The instruction can be used with the software and hardware limit points. The output stops immediately and the **Error** flag changes to ON when the limits are triggered
- 10. If any error occurs as the instruction is in process of the output, the **Error** flag changes to ON. Refer to the error codes that **ErrCode** shows for the trouble shooting
- 11. The error codes that ErrCode shows
- 12. Illustration of the acceleration and deceleration curve of the DPUDRI instruction



① : Maximum output frequency value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG.



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②: The target frequency specified by the PU module output instruction. The target frequency output must not exceed the maximum output frequency. If the maximum output frequency is exceeded, the maximum output frequency is regarded as the output frequency.

③: Starting/ending output frequency value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG.

④: The acceleration time value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG.

©: The deceleration time value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG.

The acceleration and deceleration that the PU module controls is performed according to the fixed slope. So the actual acceleration time and deceleration time change based on the output target frequency. The formula for calculation of acceleration rate and deceleration rate are respectively shown as follows. (Max. output frequency - starting frequency)/acceleration time; (Max. output frequency - ending frequency)/deceleration time.

Programming Example:

- When M0 is ON, the PUX instruction is executed to set the input parameters of DVP02PU-E2 module with "Axis 1, DOG, Rising-edge triggered" for input point X0, "Axis 1, Z phase, Rising-edge triggered" for input point X1 and "15m" for X0 / X1 filter time. When the output of **Done** is completed, M1/M3 changes to ON
- 2. When M10 is ON, the DPULS instruction for axis 1 is executed to set the software limit points with "-50000" for LSN and "50000" for LSP. When the output of **Done** is completed, M11 changes to ON
- 3. When M20 is ON, the DPUCONF instruction for axis 1 is executed to change the parameters by setting Mode to 1 (Pulse Y0+ Direction Y1), SSpeed (start speed) to 200Hz, Atime (acceleration time) to 200ms, Dtime (deceleration time) to 200ms, MSpeed (maximum speed) to 100kHz, Z_NO (Number of Z phases to look for after returning to the home position) to 1 and Offset (number of outputs after homing is finished) to -100. And M21 changes to ON as the output of Done is completed
- 4. When M30=ON, the PUSTAT instruction for axis 1 is executed to read the PU module output state. To clear current output position, you can set M31 to ON so that the current position of axis 1 (rising-edge triggered) in D30 would be cleared to 0
- 5. When M40 is ON, the DPUZRN instruction for axis1 starts to perform homing and the PUSTAT instruction displays the current position in D30. The output point Y0 outputs pulses at the frequency of 1kHz and the search for the home starts in positive direction. Once the near home signal (DOG) is reached and X0 is ON, the axis starts to decelerate and then moves at the **Jogspeed** of 100Hz in the negative direction. When X0=OFF, the axis moves in the positive direction to search for Z phase until the first rising-edge triggered signal at X1 (Z phase) is detected, then it moves toward negative direction after 100 output pulses are completed. Finally, M41 changes to ON after the output of **Done** is finished
- 6. When M50 is ON, the DPUDRI instruction for axis 1 starts to perform relative positioning output. The PUSTAT instruction displays the current position in D0 and the output point Y0 outputs 20,000 pulses at the frequency of 2kHz (relative addressing). Y1 is OFF, which indicates that the direction is positive and the PUSTAT instruction displays the current position in D30. Finally, M51 changes to ON after the output of **Done** is completed.



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API		In	stru	ction c	ode	Operand							Function						
1406 D PUDRA						Module ~ ErrCode							Absolute addressing output of PU module (with acceleration and deceleration)						
Device	X Y M S				S	Т	С	HC	D	FR	SM	SR	Е	к	16#	"\$"	F		
Module									•					0	0				
Axis									•					0	0				
ATarPosi									•					0	0				
TarSpeed									•					0	0				
Done			•	•	٠														
Error			•	•	٠														
ErrCode	ode						•												
	-		-		- F	-						_	_				S		

Data type	BOOL	WORD	DWORD	LWORD	UINT	IN	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
Module		•				•							
Axis		•				•							
ATarPosi			•				•						
TarSpeed			•				٠						
Done	٠												
Error	٠												
ErrCode		•				•							
					P	ulse Inst	ruction	16-k	pit instruc	tion	32-	bit instru	ction
						_			_			ES3	

Symbol

DPU		Module:	Module number
En		Axis:	Output axis number
Module	Done	ATarPosi:	Number of output pulses for absolute positioning
Avis	Error	TarSpeed:	Target output frequency
ATarPosi	ErrCode	Done:	Completion/pause flag
TarSpeed	LIIOUde	Error:	Error flag
Taropeeu		ErrCode:	Error code

Explanation

- This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software 1. version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would decelerate until it stops
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag Error will change to ON
- 3. Module sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and



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the module numbered as 2 is 02PU-E2

- 4. Axis sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. **RTarPosi** sets the position for relative positioning. The pulse number is a signed 32-bit value. When the value is greater than 0, the output will go in the positive direction (and the direction output point is off). When the value is less than 0, the output will go in the negative direction (and the direction output point is on). When the value is 0, the output completion flag **Done** changes to ON
- 6. TarSpeed sets the target output frequency (Unit: Hz). The frequency value is a positive signed 32-bit integer. When the value is less than 0, the instruction will automatically use 2's complement to transform the value into a positive integer. When the value is 0, the instruction will notify the module to enter the pause mode. The actual output is decelerated at the deceleration rate till the output speed is equal to 0 and the pause flag changes to ON. Refer to PUSTAT instruction for more details.

See the setting range of **TarSpeed** for the module in the following table

Module Name	TarSpeed Setting Range
DVP02PU-E2	-200,000 (-200K) ~ 200,000 (200K)

- 7. After the output is started, the target frequency is allowed to change any time. In the actual frequency change, the PLC will automatically change the frequency based on the set acceleration and deceleration rate in the DPUCONF instruction. When the modified speed exceeds the allowed maximum frequency, the output will be performed at the maximum frequency
- 8. When the outputs have reached the pulse number for relative positioning specified by RTarPosi, the Done flag changes to ON. The Done flag need be cleared by manual. The instruction sets the completion flag to ON only when the output is completed
- 9. The instruction can be used with the software and hardware limit points. The output stops immediately and the **Error** flag changes to ON when the limits are triggered
- 10. If any error occurs as the instruction is in process of the output, the **Error** flag changes to ON. Refer to the error codes that **ErrCode** shows for the trouble shooting
- 11. The error codes that **ErrCode** shows are listed in the following table

Error Code	Description
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.
16#1403	There is no such output axis number in the PU module.
16#1405	The output axis specified by the PU module is outputting data. It is not allowed to specify
	the output repeatedly.
16#1406	PU module stops Output pulse when the positive limit is reached.
16#1407	PU module stops Output pulse when the negative limit is reached.

12. Illustration of the acceleration and deceleration curve of the DPUDRI instruction

① : Maximum output frequency value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG.

②: The target frequency specified by the PU module output instruction. The target frequency output must not exceed the maximum output frequency. If the maximum output frequency is exceeded, the maximum output frequency is regarded as the output frequency.

③: Starting/ending output frequency value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG

③: The acceleration time value. Refer to the setting in the DPUCONF instruction for the parameter setting.



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Alternatively, set the parameter value through HWCONFIG

©: The deceleration time value. Refer to the setting in the DPUCONF instruction for the parameter setting. Alternatively, set the parameter value through HWCONFIG The acceleration and deceleration that the PU module controls is performed according to the fixed slope. So the actual acceleration time and deceleration time change based on the output target frequency. The formula for calculation of acceleration rate and deceleration rate are respectively shown as follows. (Max. output frequency - starting frequency)/acceleration time; (Max. output frequency - ending frequency)/deceleration time.

Programming Example:

- When M0 is ON, the PUX instruction is executed to set the input parameters of DVP02PU-E2 module with "Axis 1, DOG, Rising-edge triggered" for input point X0, "Axis 1, Z phase, Rising-edge triggered" for input point X1 and "15m" for X0 / X1 filter time. When the output of **Done** is completed, M1/M3 changes to ON
- 2. When M10 is ON, the DPULS instruction for axis 1 is executed to set the software limit points with "-50000" for LSN and "50000" for LSP. When the output of **Done** is completed, M11 changes to ON
- 3. When M20 is ON, the DPUCONF instruction for axis 1 is executed to change the parameters by setting Mode to 1 (Pulse Y0+ Direction Y1), SSpeed (start speed) to 200Hz, Atime (acceleration time) to 200ms, Dtime (deceleration time) to 200ms, MSpeed (maximum speed) to 100kHz, Z_NO (Number of Z phases to look for after returning to the home position) to 1 and Offset (number of outputs after homing is finished) to -100. And M21 changes to ON as the output of Done is completed
- 4. When M30=ON, the PUSTAT instruction for axis 1 is executed to read the PU module output state. To clear current output position, you can set M31 to ON so that the current position of axis 1 (rising-edge triggered) in D30 would be cleared to 0
- 5. When M40 is ON, the DPUZRN instruction for axis1 starts to perform homing and the PUSTAT instruction displays the current position in D30. The output point Y0 outputs pulses at the frequency of 1kHz and the search for the home starts in positive direction. Once the near home signal (DOG) is reached and X0 is ON, the axis starts to decelerate and then moves at the **Jogspeed** of 100Hz in the negative direction. When X0=OFF, the axis moves in the positive direction to search for Z phase until the first rising-edge triggered signal at X1 (Z phase) is detected, then it moves toward negative direction after 100 output pulses are completed. Finally, M41 changes to ON after the output of **Done** is finished
- 6. When M50 is ON, the DPUDRI instruction for axis 1 starts to perform relative positioning output. The PUSTAT instruction displays the current position in D0 and the output point Y0 outputs 20,000 pulses at the frequency of 2kHz (relative addressing). Y1 is OFF, which indicates that the direction is positive and the PUSTAT instruction displays the current position in D30. Finally, M51 changes to ON after the output of **Done** is completed.



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API		In	struc	ction c	ode		Operand Function										
1406		D	Pl	JDRA			Module ~ ErrCode Absolute addressing output of PU module (with acceleration and deceleration)							PU ion)			
Device	Х		Y	м	s	т	С	HC	D	FR	SM	SR	Е	к	16#	"\$"	F
Module									•					0	0		
Axis									•					0	0		
ATarPosi									•					0	0		
TarSpeed									•					0	0		
Done			•	•	•												
Error			•	•	•												
ErrCode									•								

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
Module		•				•							
Axis		•				•							
ATarPosi			•				•						
TarSpeed			•				•						
Done	٠												
Error	٠												
ErrCode		•				•							
					P	ulse Instr	ruction	16-b	oit instruc	ction	32-	oit instru	ction
						_			_			ES3	

Symbol

DPUD	RA	Module:	Module number
En		Axis:	Output axis number
Module	Done	ATarPosi:	Number of output pulses for absolute positioning
Avis	Error	TarSpeed:	Target output frequency
ATarPosi	ErrCode	Done:	Completion/pause flag
TarSpood	LILOUGE	Error:	Error flag
Talopeeu		ErrCode:	Error code

Explanation

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would decelerate until it stops
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag **Error** will change to ON
- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and



the module numbered as 2 is 02PU-E2

- 4. **Axis** sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. **ATarPosi** is the position for absolute addressing. The input pulse number is a signed 32 bit value. The PU module will automatically compare it with the present position. If the comparison result is greater than 0, the output will be conducted in the positive direction (and the direction output point is off). If the comparison result is less than 0, the output will be conducted in the negative direction and the direction output point is on). When the value is 0, the instruction sets the **Done** flag to ON
- 6. Refer to the DPUDRI instruction for the explanation of other parameters.

Programming Example:

- When M0 is ON, the DPUCONF instruction for axis 1 is executed to modify the parameters by setting Mode to 1 (Pulse Y0+ Direction Y1), SSpeed (the speed for starting) to 200Hz, Atime (acceleration time) to 200ms, Dtime (deceleration time) to 200ms and MSpeed (maximum output frequency) to 100kHz. And M1 changes to ON as the output of Done is completed
- When M10 is ON, the DPUDRA instruction for axis 1 is executed to output pulses from Y0 at the frequency of 2kHz until the current position reaches 20,000 (absolute addressing). When Y1 is OFF, the direction is positive. And M11 changes to ON as the output of **Done** is completed





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API		Ins	struc	ction c	ode		Operand						Function					
1407		D	Pl	JZRN			Мо	dule ~	ErrCo	de		PU module homing						
Device	Х		Y	М	S	Т	С	HC	D	FR	SM	SR	Е	к	16#	"\$"	F	
Module									٠					0	0			
Axis									٠					0	0			
Mode									٠					0	0			
TarSpeed									٠					0	0			
JogSpeed									٠					0	0			
Done			•	•	٠													
Error			•	•	٠													
ErrCode									٠									

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
Module		•				•							
Axis		•				•							
Mode		•				•							
TarSpeed			•				•						
JogSpeed		•				•							
Done	•												
Error	•												
ErrCode		•				•							
					PI	ilse Instr	uction	16-ł	oit instruc	tion	32-	bit instru	rtion

ES3

Symbol

DPL	IZRN	Module: Module number
En		Axis: Output axis number
Module	Done	Mode: Homing mode selection
Axis .	Error	TarSpeed: Maximum output frequency for the homing
Mode	EnCode	JogSpeed: The jog frequency for the homing
. TarSpeed		Done: Completion flag
JogSpeed		Error: Error flag
		ErrCode: Error code

Explanation

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would decelerate until it stops
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag **Error** will change to ON
- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is



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numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2

- 4. **Axis** sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. **Mode** sets a homing mode. The explanation of modes is shown in the following table

Mode Value	Function	Use matching input points by PUX instruction	Remark
0	Directly clear the current position to 0.	None	
1	The axis starts to go toward the negative direction and then stops after leaving the DOG point position	DOG	
2	The axis starts to go toward the positive direction and then stops after leaving the DOG point position	DOG	
3	After Mode 1 is finished, seek the set number of Z phases.	DOG and Z phase input	Use DPUCONF instruction to set up the
4	After Mode 2 is finished, seek the set number of Z phases.	DOG and Z phase input	number of Z phases.
5	After Mode 1 is finished, output the offset position.	DOG	Use DPUCONF instruction to set up the
6	After Mode 2 is finished, output the offset position.	DOG	offset position.
7	After Mode 1 is finished, seek the set number of Z phases and then output the offset position.	DOG and Z phase input	Use DPUCONF instruction to set up the number of Z phases and
8	After Mode 2 is finished, seek the set number of Z phases and then output the offset position.	DOG and Z phase input	offset position.
255	Modify the current output position for the axis.	None	Use the setting value of TarSpeed
Other	Reserved		

- TarSpeed sets the maximum output frequency for the homing. The setting value is a signed 32-bit value. When Mode value is between 1~8, the range of the setting value is -200,000 ~ -100 (Hz) and 100 ~ 200,000 (Hz). If Mode value is 255, TarSpeed value will become the present output position value of the PU module
- 7. **JogSpeed** is the jog frequency for reaching the home position and also represents the start/end frequency for homing. The setting value is a signed 16-bit value within the range of 1~10,000 (Hz)
- 8. When the specified home position is reached during the instruction is executed, the **Done** flag changes to ON. The **Done** flag need be cleared by manual. The instruction sets the completion flag to ON only when the output is completed
- 9. The instruction does not support software limit points. It can be used with hardware limit points only. When a hardware limit point is triggered during the output, the **Error** flag will be set to ON. The following cases and corresponding axis actions occur when a hardware limit point is triggered

Case	Action
DOG is not entered	The axis stops immediately, then speeds up toward the opposite direction from the frequency specified by JogSpeed until the frequency specified by TarSeed is reached and continues to seek the DOG signal.
At DOG	The axis stops immediately, then moves toward the opposite direction at the frequency specified by JogSpeed and continues to seek the DOG signal.
DOG is moved away from.	The axis stops immediately.



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- 10. If any error occurs as the instruction is in process of the output, the Error flag changes to ON. Refer to the error codes that ErrCode shows for the trouble shooting
- 11. The error codes that ErrCode shows are listed in the following table

Error Code	Description	
16#1400	The module does not support the function.	
16#1402	There is no response from the module; communication timeout occurs.	
16#1403	There is no such output axis number in the PU module.	
16#1405	The output axis specified by the PU module is outputting data. It is not allowed to specify the output repeatedly.	
16#1406	PU module stops Output pulse when the positive limit is reached.	
16#1407	PU module stops Output pulse when the negative limit is reached.	

12. Explanation of DOG (A) and DOG (B) signals

Contact Type		
DOG(A)	The DOG signal emerges and the axis enters DOG when the contact switches from OFF to ON. The DOG signal disappears and the axis leaves DOG when the contact switches from ON to OFF.	DOG DOG(A)
DOG(B)	The DOG signal emerges and the axis enters DOG when the contact switches from ON to OFF. The DOG signal disappears and the axis leaves DOG when the contact switches from OFF to ON.	DOG(B) OFF

13. Explanation of homing modes

Mode 0: Directly clear the position to 0.



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Mode 1: The axis starts to go toward the negative direction and then stops after leaving the DOG point position

Description of cases under mode 1		
Case A	The motion starts in the negative direction. As the DOG point is encountered, The axis starts to decelerate until the JOG speed is reached and then the axis stops while leaving the DOG point.	B Positive direction
Case B	The motion starts in the positive direction; the deceleration time is less than the duration for the DOG signal.	
Case C	The motion starts in the positive direction; the deceleration time is greater than the duration for the DOG signal.	



(1) The DPUZRN instruction is started; the axis accelerates from the speed specified by JogSpeed to the target speed specified by TarSpeed (positive direction: the value > 0 or negative direction: the value < 0) and then the axis keeps moving at the target speed.

(2) After the DOG signal appears, the DOG signal is left in the following directions according to the selected mode.

- In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.
- In the positive direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then stops. After that, it moves at the JOG speed in the opposite direction and prepares for moving away from the DOG signal.

(3) The DOG signal is moved away from and meanwhile the axis stops immediately.



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Mode 2: The axis starts to go toward the positive direction and then stops after leaving the DOG point position.

Descriptio	on of cases under mode 2	
Case A	The motion starts in the positive direction. As the DOG point is encountered, the axis starts to decrease its speed until the JOG speed is reach and then stops after leaving the DOG point.	A Positive direction Negațive direction
Case B	The motion starts in the negative direction, the deceleration time is less than the duration for the DOG signal.	
Case C	The motion starts in the negative direction; the deceleration time is greater than the duration for DOG signal.	le
	Done	Done



① The DPUZRN instruction is started and the axis accelerates from the speed specified by JogSpeed to the target speed specified by TarSpeed (positive direction: the value > 0 or negative direction: the value < 0) and then the motion continues at the target speed.</p>

② After the DOG signal appears, the DOG signal is left in the following directions according to the selected mode.

In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.

In the negative direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then stops. After that, it goes at the JOG speed in the opposite direction and prepares for leaving the DOG signal.

(3) The DOG signal is left and meanwhile the axis stops immediately.



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Mode 3: After Mode 1 is finished, seek the set number of Z phases.

Description of cases under mode 3				
Case A The motion starts in the negative direction. As the DOG point is encountered, the axis starts to decelerate until the JOG speed is reached and then the search for a set number of Z phases begins before the axis stops immediately.		B Positive direction		
Case B	The motion starts in the positive direction; the deceleration time is less than the duration for the DOG signal.			
Case C	The motion starts in the positive direction; the deceleration time is greater than the duration for the DOG signal.			
	Done	Done		
D	OG(B)	DOG(B)		
D	OG(A)	DOG(A)		
	Z1N	Z <u>1N</u>		
	+	=t		
		TarSpeed		
	Mode 3-Case A	JogSpeed		
	+Z Time	+Z Time		
logSpeed -Z		- Z		
TarSpeed		Mode 3-Case B		
	Speed 1 2 3 4 5	Speed (1) (2) (3)(4) (5)		
D	Done OG(B)			
Ь	OG(A)			
_	Z 1N			
Tor	Speed			
ian.	Speed			
Jog	Speed			
	0 +2 Time			
	-2			
	Mode 3-Case C			
Speed 1 2 34 5				
(1) The DPUZRN instruction is started and the axis accelerates from the speed specified by JogSpeed to the target				
speed specified by TarSpeed (positive direction: the value > 0 or negative direction: the value < 0) and then the				

(2) After the DOG signal appears, the DOG signal is left in the following directions according to the selected mode.

In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.

- In the positive direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then the axis stops. After that, the axis goes at the JOG speed in the opposite direction and prepares for leaving the DOG signal.
- ③ After the DOG signal is moved away from, the search for the set number of Z phase pulses begins (positive direction: the value > 0 or negative direction: the value < 0).</p>
- (4) The first Z phase pulse is counted from.
- (5) When counting to the Nth Z phase pulse, the axis stops immediately.



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Mode 5: After Mode 1 is finished, output the offset position.

Descriptio	n of cases under mode 5	
Case A	The motion starts in the negative direction. As the DOG point is encountered, the axis starts to decelerate until the JOG speed is reached, and then the offset position is output. When the offset outputs are completed, the axis stops right away.	DOG Negative direction Offset B Positive direction
Case B	The motion starts in the positive direction; the deceleration time is less than the duration for the DOG signal.	C Offset
Case C	The motion starts in the positive direction; the deceleration time is greater than the duration for the DOG signal.	



- ① The DPUZRN instruction is started and the axis accelerates from the speed specified by JogSpeed to the target speed specified by TarSpeed (positive direction: the value > 0 or negative direction: the value < 0) and then the motion goes on at the target speed.</p>
- (2) After the DOG signal appears, the DOG signal is left in the following directions according to the selected mode.
- In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.
- In the positive direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then stops. After that, the axis continues at the JOG speed in the opposite direction and prepares for leaving the DOG signal.
- ③ After the DOG signal is moved away from, the pulses of the number specified by Offset are output (positive direction: the value > 0 or negative direction: the value < 0).</p>
- ④ The first offset pulse is output.
- (5) When the Nth offset pulse output is completed, the axis stops immediately.



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Descriptio	on of cases under mode 6	DOC
Case A	The motion starts in the positive direction. As the DOG point is encountered, the axis starts to decelerates until the JOG speed is reached and then the offset position is output. When the offset outputs are completed, the axis stops right away.	A Positive direction Offset Negative direction
Case B	The motion starts in the negative direction; the deceleration time is less than the duration for the DOG signal.	Offset
Case C	The motion starts in the negative direction; the deceleration time is greater than the duration for the DOG signal.	Offset



① The DPUZRN instruction is started and the axis accelerates from the speed specified by JogSpeed to the target speed specified by TarSpeed (positive direction: the value > 0 or negative direction: the value < 0) and then the motion goes on at the target speed.</p>

(2) After the DOG signal appears, the DOG signal is left in the following directions according to the selected mode.

- In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.
- In the negative direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then it stops. After that, the axis continues at the JOG speed in the opposite direction and prepares for leaving the DOG signal.

(3) After the DOG signal is moved away from, the pulses of the number specified by Offset are output (positive direction: the value > 0 or negative direction: the value < 0).</p>

- ④ The first offset pulse is output.
- (5) When the Nth offset pulse output is completed, the axis stops immediately.



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Mode 7: After Mode 1 is finished, seek the set number of Z phases and then output the offset position.

Descriptio	on of cases under mode 7	DOG
Case A	The motion starts in the negative direction. As the DOG point is encountered, the axis starts to decelerates until the JOG speed is reached and then the search for Z phases starts. After the last Z phase is counted to, the offset position output begins. When offset outputs are completed, the axis stops right away.	Negative direction A Positive direction Offset Z
Case B	The motion starts in the positive direction; the deceleration time is less than the duration for the DOG signal.	C Offset Z
Case C	The motion starts in the positive direction; the deceleration time is greater than the duration for the DOG signal.	



- ① The DPUZRN instruction is started and the motion accelerates from the speed specified by JogSpeed to the target speed specified by TarSpeed (positive direction: the value > 0 or negative direction: the value < 0) and then the motion goes on at the target speed.</p>
- (2) After the DOG signal appears, the DOG signal is left in the following directions according to the selected mode.
- In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.
- In the positive direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then stops. After that, the axis continues at the JOG speed in the opposite direction and prepares for moving away from the DOG signal.
- (3) After the DOG signal is moved away from, the search for a set number of Z phases (positive direction: the value > 0 or negative direction: the value < 0).</p>
- ④ The first Z phase pulse is counted from.
- (5) When counting to the Nth Z phase pulse, the first offset pulse output starts (positive direction: the value > 0 or negative direction: the value < 0).</p>
- 6 When the Nth offset pulse output is completed, the axis stops immediately.



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Mode 8: After Mode 2 is finished, seek the set number of Z phases and then output the offset position.

Case A The motion starts in the positive direction. As the DOG point is encountered, the axis starts to decelerates until the JOG speed is reached and then the search for Z phases starts. After the last Z phase is counted to, the offset position output begins. When offset outputs are completed, the axis stops right away. Case B The motion starts in the negative direction; the deceleration time is less than the duration for the DOG signal. Case C The motion starts in the negative direction; the deceleration time is greater than the duration for the DOG signal.	Descripti	on of cases under mode 2	
Case B The motion starts in the negative direction; the deceleration time is less than the duration for the DOG signal.	Case A	The motion starts in the positive direction. As the DOG point is encountered, the axis starts to decelerates until the JOG speed is reached and then the search for Z phases starts. After the last Z phase is counted to, the offset position output begins. When offset outputs are completed, the axis stops right away.	A Positive direction Z Offset Negative direction
The motion starts in the negative direction; the Case C deceleration time is greater than the duration for the	Case B	The motion starts in the negative direction; the deceleration time is less than the duration for the DOG signal.	Z Offset
DOG signal.	Case C	The motion starts in the negative direction; the deceleration time is greater than the duration for the DOG signal.	Z Offset



- In the previous direction as Case A shows, the axis decelerates to the JOG speed and then prepares for leaving the DOG signal.
- In the negative direction as CaseB/CaseC shows, the axis decelerates to the JOG speed and then stops. After that, the axis continues at the JOG speed in the opposite direction and prepares for moving away from the DOG signal.
- ③ After the DOG signal is moved away from, the search for a set number of Z phases (positive direction: the value > 0 or negative direction: the value < 0).</p>
- ④ The first Z phase pulse is counted from.
- (5) When counting to the Nth Z phase pulse, the first offset pulse output starts (positive direction: the value > 0 or negative direction: the value < 0).</p>
- 6 When the Nth offset pulse output is completed, the axis stops immediately.



Programming Example

Refer to the description of DPUDRI instruction (API 1405) for more information.

API		Ins	struc	tion c	ode	Operand								Function						
1408		D	Pl	JJOG			I	Modu	ıle - E	rrCod	le		PU module jog output							
Device	Х		Y	М	S	Т	С	: 1	HC	D	FR	SM	SR	Е	К	16#	"\$"	F		
Module										•					0	0				
Axis										•					0	0				
JogSpeed										•					0	0				
Busy			•	•	٠					٠										
Error			•	•	٠					•										
ErrCode										•										
										_										
Data type	BOOL		WORD	DWORD		LWORD	UINT		INT	DINT		LINT	REAL	LREAL	IMR	5	CNT	STRING		
Module		Г	•						•											
Axis			•						•											
JogSpeed				•						•)									
Busy	٠																			
Error	•																			
ErrCode			•						•											
							Γ	Puls	e Ins	tructio	n	16-b	it instru	tion		32-bit instruction				
									_				_			ES3				

Symbol

Module:	Module number
Axis:	Output axis number
JogSpeed:	The jog frequency for the homing
Busy:	Output in execution
Error:	Error flag
ErrCode:	Error code

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would decelerate until it stops
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag **Error** will change to ON
- 3. **Module** sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and



the module numbered as 2 is 02PU-E2

- 4. Axis sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag **Error** will change to ON
- 5. JogSpeed sets the jog output frequency. The setting value is a signed 32 bit value within the range of -200,000 (-200K) ~200,000 (200K) (Hz). When the value is greater than 0, the output will go in the positive direction (and the direction output point is off). When the value is less than 0, the output will go in the negative direction (and the direction output point is on). When the value is 0, the output will stop
- 6. The instruction can be used for the speed change. While the instruction is being executed, you can change the value of **TarSpeed** so as to change the output speed. When the setting value exceeds the maximum frequency, the instruction would be executed at the maximum frequency. But changing the speed would not change the direction. To change the direction, set the value of **TarSpeed** to 0 first and then modify the target speed
- 7. The instruction can be used with the software and hardware limit points. When the limits are triggered, the output stops immediately and the **Error** flag changes to ON
- 8. If any error occurs as the instruction is in process of the output, the **Error** flag changes to ON. Refer to the error codes that **ErrCode** shows for the trouble shooting
- 9. The error codes that **ErrCode** shows are listed in the following table

Error Code	Description
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.
16#1403	There is no such output axis number in the PU module.
16#1605	The output axis specified by the PU module is outputting data. It is not allowed to specify the
	output repeatedly.
16#1606	PU module stops Output pulse when the positive limit is reached.
16#1607	PU module stops Output pulse when the negative limit is reached.

10. See the output timing diagram as below. (Jog_in is the switch to start the instruction and the Busy flag is the **Busy** flag.)



11. After the PUJOG instruction is disabled and the **Busy** flag is off, other output control can be carried out

Programming Example

- When M0 is ON, the DPUCONF instruction for axis 1 is executed to modify the parameters by setting Mode to 1 (Pulse Y0 + direction Y1), SSpeed to 200Hz, Atime to 200ms, Dtime to 200ms and MSpeed to 100kHz. After the output of Done is completed, M1 is ON
- 2. When M10 is ON, the DPUJOG instruction for axis 1 starts to perform jog outputs. The pulses are output from Y0 at the frequency of 2KHz. If Y1 is OFF, the direction is positive. And M11 is ON during the instruction



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execution





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API		Ins	struc	tion c	ode			Ope	rand		Function							Function					
1409		D	PL	JMPG			Ν	/lodule ~	ErrCo	de			PU n	nodule	MPG	output							
Device	Х		Y	М	S	Т	т с		D	FR	SM	SR	E	к	16#	"\$"	F						
Module									•					0	0								
Axis									•					0	0								
InMode									•					0	0								
InPulse									•														
InSpeed									•														
Rate									•								0						
OPulse									•														
OSpeed									•														
Error			•	•	•				•														
ErrCode									•														
Data type	BOOL		WORD		DWORD	LWORD	UNIT	, A		DINT	LINT	REAL	LREAL	MR	1	CNT	STRING						
Module			۲					•															
Axis			٠					•															
InMode			٠					•						_									
InPulse		\rightarrow			•					•				_									
InSpeed		+			•					•		-		_									
Rate		+								•		•		_									
OFuse		+		_				_															
Error	•	+			-					-													
ErrCode		+	•					•															
I]	Pulse I	nstruct	ion	16-b	it instru	ction		32-bit	instruct	tion						
						-						-					ES3						

Symbol

DPUI	/IPG
En	
Module	OPulse
Axis	OSpeed
InMode	Error
InPulse	ErrCode
InSpeed	
Rate	

Module:	Module number
Axis:	Output axis number
InMode:	Encoder input mode and frequency multiplication
	for counting
InPulse:	Number of pulses which have been input
InSpeed:	Detected input frequency
Rate:	Input/output rate (floating point number)
OPulse:	Number of pulses which have been output
OSpeed:	Frequency at which pulses are being output
Error:	Error flag
ErrCode:	Error code



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- 1. This instruction is available for PLC CPU with FW V1.06.00 or later and module with FW V1.04.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, Output pulse would decelerate until it stops
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag Error will change to ON
- 3. Module sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2
- 4. Axis sets the output axis number for the specified PU module. The setting values 1~2 represent the axis1~axis2 output of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag Error will change to ON
- 5. InMode sets the input mode of the encoder source and the frequency multiplication for counting. See the explanation of InMode value in the following table
- 6. **InPulse** displays the number of already input pulses, which is a signed 32-bit value. Every time the instruction is started, the PU module will automatically clear the value to 0 and then starts counting
- 7. **InSpeed** displays the already detected input frequency which is a 32-bit value. The basic time for the frequency detection is 20ms. Therefore, the detected input frequency is 0 if there is no counting value within 20ms. If there is a counting value within 20ms, the output starts at the minimum frequency of 50Hz. Even if **OSpeed** value is lower than 50Hz through the **Rate**-value-based conversion, the output is still conducted at 50Hz
- 8. **Rate** is the input / output rate and the value is a floating point number. The number of actual output pulses and frequency are respectively equal to the input pulse number and frequency multiplied by the rate value
- 9. OPulse shows the number of pulses which have been output. OSpeed displays the frequency at which the output is being conducted. They are signed 32-bit values
- 10. When the DPUMPG instruction is disabled, check the frequency at which the output is being conducted and see if it has reached 0. If the instruction is disabled before the frequency reaches 0, the PU module will stop the output immediately and the output of the pulses which are counted based on the conversion rate will not continue any more
- 11. The error codes that ErrCode shows are listed in the following table
- 12. When the DPUMPG instruction is enabled or disabled, the PLC will have to notify the module to enable or disable the high-speed counter function. Thus the instruction can not be used with API1410 DPUCNT together. Otherwise it may occur that the two instructions enable or disable the counting of the module with each other



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ES3

API		In	struc	tion co	ode			Opera	and		Function						
1410		D	Pl	JCNT			Mo	dule ~	ErrCod	le	High-speed counter function of PU module						
Device	х		Y	М	s	т	С	HC	D	FR	SM	SR	Е	К	16#	"\$"	F
Module									٠					0	0		
InMode									٠					0	0		
Period									•					0	0		
ZeroS	•		•	•	٠				•								
InPulse									•								
InSpeed									٠								
Error			•	•	٠				•								
ErrCode									٠								

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
Module		•				•							
InMode		•				•							
Period		•				•							
ZeroS	٠												
InPulse			•				•						
InSpeed			•				•						
Error	٠												
ErrCode			•				•						
					16-bit instruction 32-bit instruction					rtion			

Symbol

		Module:	Module number
DPU	CNT	InMode:	Encoder input mode and frequency multiplication
En			for counting
Module	InPulse	Period:	Period time for capturing the frequency
InMode Period	InSpeed	ZeroS:	Clear the counter to 0
ZeroS	ErrCode	InPulse:	Number of pulses which have been input
		InSpeed:	Detected input frequency
		Error:	Error flag
		ErrCode:	Error code

- 1. This instruction is available for PLC with FW V1.06.00 or later. For ISPSoft, we recommend using software version 3.16 and above. When En setting is set to ON, this instruction would be effective. Once the setting changes to OFF, the counting would be stopped immediately
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag Error will change to ON



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- 3. Module sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2
- InMode sets the input mode of the encoder source and the frequency multiplication for counting See the explanation of InMode value in the following table.
 Note: Phase A leads phase B, indicating counting in the positive direction.
 Phase B leads phase A, indicating counting in the negative direction

Value	Input Modes
	Set as the following values, otherwise the module will use defaults
16#0000	Reserved
16#0001	Onefold frequency A/B phase input
16#0002	Twofold frequency A/B phase input
16#0003	Reserved
16#0004	Fourfold frequency A/B phase input (default)
16#0005	Pulse + directional input (A+/A-: pulse input; B+/B-: directional input)
	Phase B ON: counting in the negative direction
	Phase B OFF: counting in the positive direction
	Phase A: counting is started by rising-edge trigger
16#0006	Pulse + directional input (A+/A-: pulse input; B+/B-: directional input)
	Phase B ON: counting in the positive direction
	Phase B OFF: counting in the negative direction
	Phase A: counting is started by rising-edge trigger
16#0007	Single phase pulse input (A+/A-: pulse input)
	Phase A: counting is started by rising-edge trigger.
Others	Reserved

- Period is the setting value of a cycle time for capturing the frequency within the range of 10ms ~ 1000ms. If the setting value exceeds the range, the maximum value or minimum value will be automatically taken as the setting value by the PLC
- 6. ZeroS clears the present output position to 0. If the present axis position is to be cleared to 0, set ZeroS from OFF to ON when the instruction is started
- 7. InPulse is the number of already input pulses, which is a signed 32-bit value. The counting value is a latched value. If the value need be cleared to 0, just set ZeroS from Off to ON while the instruction is running
- 8. InSpeed displays the counting value for every Period time, which is a signed 32-bit value. If you need convert it into the value with the unit of Hz, use the calculation formula for conversion by yourself
- 9. The error codes that ErrCode shows are listed in the following table

Error Code	Description
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.

10. When the DPUCNT instruction is enabled or disabled, the PLC will have to notify the module to enable or disable the high-speed counter function. Thus the instruction can not be used with API1409 DPUMPG together. Otherwise it may occur that the two instructions enable or disable the counting of the module with each other



Programming Example

- 1. When M0 is ON, the DPUCNT instruction is executed and InMode is set to "twofold frequency A/B phase input"
- 2. When M1 is ON, the counted number of pulses on axis 1 in InPulse is cleared
- 3. When the input number of pulses is 100 and frequency is 10Hz, InPulse and InSpeed show 200 pulses and 20Hz respectively





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Symbol

DU	v	DI	VD	Module:	Module number
En	^	En	AF	Xno:	Input point number
Module	Done	Module	Done	XMode:	Input point mode
Xno	Error	Xno	Error	Xfilter:	Input point filter time
XMode	ErrCode	XMode	ErrCode	Done:	Completion flag
Xfilter		Xfilter		Error:	Error flag
				ErrCode:	Error code

- 1. This instruction is available for PLC with FW V1.06.00 or later and the firmware for the module must be V1.00.00 or above. For ISPSoft, we recommend using software version 3.16 and above. The timing to set this instruction is when the En setting changes from OFF to ON
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag Error will change to ON
- 3. Module sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module



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numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2

4. Xno sets the input point number for the PU module with one of the input values 0~4 which respectively represent the input points X0~X4. If there is no corresponding input point in the PU module, the error flag Error will change to ON. The value in Xno and the corresponding input point are listed in the following table

Setting in Xno	0	1	2	3	4	Others
DVP02PU-E2	X0	X1	X2	X3	X4	No input point

5. XMode selects an input mode for input points. Setting values are explained in the following table:

Setting in XMode	DVP02PU-E2
0	General input (Default)
1	Axis 1, Z phase, Rising-edge triggered
2	Axis 2, Z phase, Rising-edge triggered
3	Axis 1, Z phase, Falling-edge triggered
4	Axis 2, Z phase, Falling-edge triggered
5	Axis 1, DOG, Rising-edge triggered
6	Axis 2, DOG, Rising-edge triggered
7	Axis 1, DOG, Falling-edge triggered
8	Axis 2, DOG, Falling-edge triggered
9	Axis 1, LSN, Rising-edge triggered
10	Axis 2, LSN, Rising -edge triggered
11	Axis 1, LSN, Falling-edge triggered
12	Axis 2, LSN, Falling-edge triggered
13	Axis 1, LSP, Rising-edge triggered
14	Axis 2, LSP, Rising-edge triggered
15	Axis 1, LSP, Falling-edge triggered
16	Axis 2, LSP, Falling-edge triggered
Others	Automatically switch to mode 0 (default)

6. Xfilter is explained in the following table. The value in Xfilter is the default value if the setting is out of the allowed range

Parameter	Function	Range	Default
Xfilter	Input point filter time	0 ~ 25 [ms]	10

- 7.
- 8. Done, an output of the specified PU module has been set as the completion flag. When Done is On, it indicates that the parameter setting is successful. You can continue to perform positioning output based on the state of the completion flag (ON). The clearing of the Done flag need be conducted by manual. The Done flag changes to ON only when the setting is completed. 8. Error, an output of the specified PU module is a parameter error flag. Most parameter ranges are filtered automatically by the PLC. Thus if the error flag is ON, it means that there is no specified PU module or the PU module number is wrong or the output axis number is incorrect
- 9. The instruction is a pulse instruction. Even if the A contact is adopted as the condition contact, PU module parameters are also set only when the instruction is started. Therefore, if a parameter value is to be updated, restart the instruction to make the parameter set again
- 10. Since the set parameters are delivered through the module communication command, confirm the state of the output Done or Error before a parameter value is modified and then proceed with relevant operations



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- 11. For the state of PU module input points, check the data exchange function of the special extension module, SM228. Refer to Section 2.2.16 Additional Remarks on Special Auxiliary Relays and Special Data Registers in DVP-ES3 Series Programming Manual for details on SM228
- 12. The error codes that ErrCode shows are listed in the following table

Error Code	Description
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.

Programming Example

Refer to the description of DPUDRI instruction (API 1405) for more information.



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API		In	struc	tion o	ode			Oper	and			Function					
1412		D	P	ULS	Ρ		Modu	le ~ Erro	or • Er	rCode		Setting PU module software limits				nits	
Device	х		Y	М	S	Т	С	HC	D	FR	SM	SR	Е	к	16#	"\$"	F
Module									•					0	0		
Axis									•					0	0		
LSN									•					0	0		
LSP									•					0	0		
Done			•	٠	•				•								
Error			•	٠	•				•								
ErrCode		Τ							•								
· · · ·		_														·	
Data type	BOOL		WORD		DWORD	LWORD	UINT	NT			LINT	REAL	LREAL	INIK	5	CNT	STRING
Module			٠					•									
Axis			•					•									
LSN					•					•				_			
LSP					•				-	•							
Done	•																
Error	•																
ErrCode			•					•									
							Γ	Pulse In	structi	on	16-b	it instru	ction		32-bit	instruct	ion
								E	S3			-				ES3	

Symbol

DB		D		Module:	Module number
En	013	En	ULSP	Axis:	Output axis number
Module	Done	Module	Done	LSN:	Software negative limit
Axis	Error	Axis	Error	LSP:	Software positive limit
LSN	ErrCode	LSN	ErrCode	Done:	Completion flag
LSP		LSP		Error:	Error flag
		L		ErrCode:	Error code

- 1. This instruction is available for PLC with FW V1.06.00 and later and the firmware for the module must be V1.00.00 or above. For ISPSoft, we recommend using software version 3.16 and above. The timing to set this instruction is when the En setting changes from OFF to ON
- 2. The instruction is exclusive to the PU modules at the right of the PLC. If the specified module is not a PU module, the error flag Error will change to ON
- 3. Module sets the serial number of non-DIO modules at the right of the PLC. Only non-DIO modules at the right of the PLC will be numbered. The first non-DIO module is numbered as 1, the second non-DIO module is numbered as 2 and so forth. The maximum number is 8. For example, when a 32ES3 PLC CPU connects to modules 16XP2 + 08XM2 + 04AD-E2 + 02PU-E2 at its right size, the module numbered as 1 is 04AD-E2 and the module numbered as 2 is 02PU-E2. 4. Axis sets the output axis



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number for the specified PU module. The setting values 1~2 represent the axis1~axis2 of the specified PU module respectively. If the PU module has no corresponding axis number for output, the error flag Error will change to ON

4. See the following combination of axis numbers and corresponding output points of PU modules

PU Module Name	Axis 1	Axis 2
DVP02PU-E2	Y0/Y1	Y2/Y3

5. See the explanation of LSN and LSP and setting values in the following table. If the setting value is outside the range, the instruction will automatically be executed at the minimum or maximum value

Parameter	Function	Range	Default	Remark
LSN	Software negative	-2,147,483,648 ~	0	Inactive when
	limit	+2,147,483,647		both are set to 0
LSP	Software positive	-2,147,483,648 ~	0	
	limit	+2,147,483,647		

- 6. Done, an output of the specified PU module has been set as the completion flag. When Done is On, it indicates that the parameter setting is successful. You can continue to perform positioning output based on the state of the completion flag (ON). The clearing of the Done flag need be conducted by manual. The Done flag changes to ON only when the setting is completed
- 7. Error, an output of the specified PU module is a parameter error flag. Most parameter ranges are filtered automatically by the PLC. Thus if the error flag is ON, it means that there is no specified PU module or the PU module number is wrong or the output axis number is incorrect
- 8. The instruction is a pulse instruction. Even if the A contact is adopted as the condition contact, PU module parameters are also set only when the instruction is started. Therefore, if a parameter value is to be updated, restart the instruction to make the parameter set again
- 9. Since the set parameters are delivered through the module communication command, confirm the state of the output Done or Error before a parameter value is modified and then proceed with relevant operations
- 10. The error codes that ErrCode shows are listed in the following table

Error	Description
Code	
16#1400	The module does not support the function.
16#1402	There is no response from the module; communication timeout occurs.

Programming Example

Refer to the description of DPUDRI instruction (API 1405) for more information.

Data Exchange of PU Modules

1. SM228 and D2800 - D28079 When SM228 is ON, it is to disable the data exchange among the CPU and its connected modules.

When SM228 is OFF, data exchange among the CPU and its connected modules is enabled and data is stored in D2800 - D28079. If the PLC is connected with a special extension module, the PLC uses registers in D28000-D28079 and the registers in this area correspond to CRs to update data. If you need to use this area, you need to pay attention not to use the same area repeatedly. See the example below to learn how this works.



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Order Number	1	2	3	4	5	6
Model	DVP02PU- E2	DVP06XA- E2	DVP04DA- E2	DVP04TC- E2	DVP04PT- E2	DVP06PT- E2
Reading data	Reading values from D28000: the input value of X point and D28001: the code of the axis state	Reading values from AD channels 1- 4 (D28010 - D28013)	N(A	Reading values from TC channels 1- 4 (D28030 - D28033)	Reading values from PT channels 1- 4 (D28040 - D28043)	Reading values from PT channels 1- 6 (D28050 - D28055)
Writing data	N/A	Writing values into DA channels 1- 2 (D28014 - D28015)	Writing values into DA channels 1- 4 (D28020 - D28023)	N/A	N/A	N/A

When SM228 is ON, the PLC CPU will disable the data exchange function with the module.

State Code Byte #	Description	Axis
0	Error flag	1
1	The output is active.	
2	The output has stopped working.	
3	The instruction execution is complete.	
4	The positive limit is reached.	
5	The negative limit is reached.	
6	Current position value overflow	
7	Pulse direction (positive or negative)	
8	Error flag	2
9	The output is active.	
10	The output has stopped working.	
11	The instruction execution is complete.	
12	The positive limit is reached.	
13	The negative limit is reached.	
14	Current position value overflow]
15	Pulse direction (positive or negative)	

The corresponding error flag will be ON when the above mentioned incidents happened: 4/12, 5/13, 6/14. Once the error flag is ON, you need to use instruction to clear the shown error codes.

2. Descriptions of the values in SR1560-SR1568

SR	Description
SR1560	Number of the right-side modules connected to the CPU module
SR1561-	Model code of the 1 st – 8 th right-side module connected to the CPU module
SR1568	

Number of modules and the device codes

Model	Device Code
DVP04AD-E2	16#0080
DVP04DA-E2	16#0081



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DVP02DA-E2	16#0041
DVP06XA-E2	16#00C4
DVP04PT-E2	16#0082
DVP04TC-E2	16#0083
DVP06PT-E2	16#00C2
DVP02PU-E2	16#0045

List of Timer and Counter Instructions

The following table lists new Timer instructions.

API	Instruction	n Code	Pulse	Function
	16-Bit	32-Bit	Instruction	
1016	ATMR	-	-	16-bit contact timer (Unit: 100ms)
1017	ATMRM	-	-	16-bit contact timer (Unit: 1ms)
1018	ATMRH	-	-	16-bit contact timer (Unit: 10ms)



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BU-2_Timers

API		Ins	truct	tion co	de			Оре	erand				Function					
1016			AT	MR		Tno - Tsv							16-bit contact timer (Unit: 100ms)					
Device	X		Y	М	S	Т	С	HC	D	FR	SM	SR	E	К	16#	" \$"	F	
Tno						0												
Tsv									0				0	0	0			
Data type		BOOL		WORD	DWORD	LWORD	LWORD					LINT	REAL	LREAL	TMR	CNT	STRING	
Tno															•			
Tsv				•					٠									
						Pulse instruction						10	6-bit instr	uction	32	-bit instru	iction	
						-							ES3/SV3	/SX3		-		

Symbol



Tno: Timer number

Tsv: Setting value for the timer

- 1. The instruction is available for ES3 with firmware V1.06.00 and later and for SV3/SX3 with firmware V1.00.00 or later
- 2. The ATMR instruction uses 100ms as the timing unit in the timer. Refer to the explanation of the ATMRH instruction (API 1018) for details



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API		Ins	struc	tion co	de			Оре	erand				Function				
1017			ATI	MRM		Tno,Tsv							16-bit contact timer (Unit: 10ms)				
Device	Х	(Y	М	S	Т	С	HC	D	FR	SM	SR	E	к	16#	"\$"	F
Tno						0											
Tsv									0				0	0	0		
Data type		BOOL		WORD	DWORD	LWORD		UINT	IN			LINT	REAL	LREAL	TMR	CNT	STRING
Tno															•		
Tsv				•					٠								
								F	Pulse in	structi	on	16	-bit instr	uction	32	-bit instru	iction
										-		E	ES3/SV3	/SX3		-	

Symbol



Tho: Timer number

Tsv: Setting value for the timer

- 1. The instruction is available for ES3 with firmware V1.06.00 and later and for SV3/SX3 with firmware V1.00.00 or later
- 2. The ATMRM instruction uses 10ms as the timing unit in the timer. Refer to the explanation of the ATMRH instruction (API 1018) for details



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API		Ins	struc	tion co	ode			Оре	erand				Function					
1018			AT	MRH			Tno,Tsv							16-bit contact timer (Unit: 1ms)				
Device	X	(Y	М	S	Т	С	HC	D	FR	SM	SR	E	К	16#	"\$"	F	
Tno						0												
Tsv									0				0	0	0			
Data type		BOOL		WORD	DWORD	LWORD		UINT	INT			LINT	REAL	LREAL	TMR	CNT	STRING	
Tno															•			
Tsv				•					٠									
								F	Pulse ir	nstructi	on	16	6-bit instr	uction	32	-bit instru	iction	
										-		E	ES3/SV3	/SX3		-		

Symbol



Tno: Timer number

Tsv: Setting value for the timer

Explanation

- 1. The instruction is available for ES3 with firmware V1.06.00 and later and for SV3/SX3 with firmware V1.00.00 or later
- 2. The ATMRH instruction is the same as the combination of AND and TMRH instructions. If the conditional contact is met, the coil for the specified timer is ON and the timer starts timing. When the specified timing value is reached (timing value >= setting value), its contact will act as the following table shows. If the condition for the AND contact action is met but the conditional contact is not met, the ATMRH instruction automatically clears the timing value in the timer.

NO (Normally Open) contact	Continuity
NC (Normally Closed) contact	Discontinuity

Example

The program executes as the following shows:

When the normally open contact M0 is ON, T0 timer starts timing, when the timing value is greater than or equal to K1000, the normally open contact M100 is ON.

Ladder diagram (Using TMRH instruction)





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Ladder diagram (Using ATMRH instruction)





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B-3_Errorlog

Error Code	Description	Solution	Flag	Log
16#0026	RTC cannot keep track of the	If the problem persists, contact	SM218	\checkmark
	current time	the local authorized distributors.		
16#0028	No response from reading or	If the problem persists, contact	SM217	\checkmark
	writing RTC data	the local authorized distributors.		
16#19B0	Heartbeat timeout occurred in	Check if the CANopen	-	\checkmark
	the slave of the CANopen	connection cable is well		
40//4054	communication module.	connected.		1
16#19B1	The data length of PDO	Revise the PDO data length	-	V
	(process data object) in the	download the setting again		
	the setting	download the setting again.		
Note: Check	the values in SR830-SR893 to see	e which slave (1-64) experiences a	an error ai	nd refer
to the followi	and error codes $19E1 - 19E8$ to chec	e which slave (1 \sim 04) experiences a		
		k the details.		
16#19E1	The data length of PDO	Revise the PDO data length	-	\checkmark
	(process data object) in the	setting in the slave mode and		
	slave mode is not matched with	download the setting again.		
	the configuration in the scan	6 6		
	list.			
	Refer to CANopen			
	communication related			
	descriptions in AS Series			
	Hardware and Operation			
	Manual for more details on the			
40//4050	error codes 19E1 to 19E8.			
16#19E2	PDO In the slave mode is not	Check if the configurations are	-	v
16#1052	The function of auto	Check if the SDO contents for		1
10#19E3	downloading SDO fails at the	auto downloading	-	•
	first start-up	are correct		
16#19F4	PDO configurations are set	Make sure to set the PDO	_	\checkmark
10#1324	incorrectly	configurations correctly		
16#19E5	The main settings are not	Make sure the connected	-	✓
10111020	consistent	slaves are the ones configured		
	with the ones set in connected	in ISPSoft.		
	slave.			
16#19E6	The slave does NOT exist in	Make sure the power supply of	-	\checkmark
	the network.	the slave is normal and the		
		slave is correctly connected to		
		the network.		
16#19E7	Timeout on the slave error	Make sure the power supply of	-	\checkmark
	control	the slave is normal and the		
		slave is correctly connected to		
16#1059	The node IDe of the mester and	Set the node ID of the moster		1
10#19E0	slave are duplicated	Set the hode ID of the master	-	v
	slave are duplicated.	their node IDs are unique		
16#19F3	Error in the configuration	1 Download the parameter	_	✓
10#1313		configuration again		
		2. If the problem persists.		
		contact the local authorized		
		distributors		
16#19F4	CANopen communication is in	1. Check if the start and end	-	✓
	the BUS-OFF state.	of the network cable are		



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		 both connected with a 121Ω terminal resistor Check if all the node devices run at the same baud rate on the network 		
16#19FB	Transmission of the to-be-sent data can NOT be complete during the set synchronization time.	Modify the synchronization time; suggested to prolong the time.	-	~
16#19FC	Transmission of the to-be- received data can NOT be complete during the set synchronization time.	Modify the synchronization time; suggested to prolong the time.	-	~



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B-6_PORT

New Special Auxiliary Relay SM1092

SM	Function	ES3 Series	SV3/SX2	OFF ↓ ON	STOP ↓ RUN	RUN ↓ STOP	Latched	Attribute	Default
SM1092	Error flag for the COM port number of Modbus TCP slave Available for ES3 with firmware V1.04.30 and later and for SV3/SX3 with firmware V1.00.00 or later.	0	0	OFF	-	-	Ν	R/W	OFF

New Special Data Registers SR1092 & SR1093

SR	Function	ES3 Series	SV3/SX2	OFF ↓ ON	STOP ↓ RUN	RUN ↓ STOP	Latched	Attribute	Default
SR1092	COM port number of Modbus TCP slave (PLC acts as a slave) Available for ES3 with firmware V1.04.30 and later and for SV3/SX3 with firmware V1.00.00 or later.	0	0	502	-	-	Ν	R/W	502
SR1093	COM port number of Modbus TCP for the data exchange table (PLC works as a master) Available for ES3 with firmware V1.04.30 and later and for SV3/SX3 with firmware V1.00.00 or later.	0	0	502	-	-	N	R/W	502

Additional Remarks

Special registers for storing the settings of data exchange via Ethernet communication port and a new special auxiliary relay is shown below. Available for ES3 with firmware V1.04.30 and later and for SV3/SX3 with firmware V1.00.00 or later.

SM	Attribute	Description
SM1092	R/W	Error flag for the COM port number of Modbus TCP slave

SR	Description
SR1092	COM port number of Modbus TCP slave (PLC acts as a slave.)
SR1093	COM port number of Modbus TCP for the data exchange table (PLC acts as a master.)



- 1. When PLC CPU acts as Modbus TCP slave
 - a. The default communication port number 502 is activated to connect to the remote master. According to the Modbus TCP specifications, the required default communication port number of the remote slave is 502
 - b. If the target communication port of the remote master cannot use the port number 502, you should modify the value in SR1092 as the desired communication port number
 - c. SR1092 is not a latched register and the value in the register will automatically change back to 502 once the power is ON again. Use ISPSoft to set the value in the PLC program
 - If the communication port number set via SR1092 has been occupied by other functions (e.g. Socket or Web), the setting in SR1092 will not take effect and SM1092 will automatically change to ON
- 2. A data exchange table created for PLC CPU to use when it works as Modbus TCP master
 - a. According to the Modbus TCP specifications, the required default communication port number of the remote slave is 502
 - b. If the remote slave cannot use 502 as the communication port number, modify the value in SR1093 as the required communication port number
 - c. SR1093 is not a latched register and the value in the register will automatically change back to 502 once the power is ON again. Use ISPSoft to set the value in the PLC program
 - d. The setting value in SR1093 is the required communication port of the remote slave and it does not affect PLC CPU's own communication port



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C-3_REF

API	h	nstruct	ion co	de	Operand							Fu	nction			
0600		RE	F	Ρ	D · n							Refreshing the I/O				
Device	Х	Y	М	S	Т	С	HC	D	FR	SM	SR	E	К	16#	"\$"	F
D	0	0														
n								٠	٠		0	0	0	0		
Data type	BOOL	WORD		DWORD	LWORD	UINT	INT		DINT	LINT	REAL	LREAL	TMR		CNT	STRING
D	۲															
n		•					•									
					Pulse instruction16-bitES3/SV3/SX3ES3/				oit instr 3/SV3/	uction SX3		32-bit	instruc -	tion		

Symbol



- **D:** Start device for I/O state refresh
- n: Number of I/O points for state refresh

- The I/O states are normally not refreshed until the PLC executes the END instruction. When the PLC starts scanning the program, it reads and stores the states of the external inputs in memory. After executing the END instruction, the PLC sends the states of the outputs in the memory to the output terminals. Therefore, when you need the latest I/O data during the operation process, you can use this instruction, or use the device DX/DY to refresh the input/output
- 2. The operand n must be a multiple of eight, e.g. 8, 16, 24 and so on. The maximum value is 256. If the value here is less than a multiple of eight, it will be seen as the next multiple of eight. For example, the value 20 will be seen as its next multiple of eight, 24
- 3. The number of the high-speed output point is stored in D device. If n is 1, it indicates to refresh the high-speed output value of the corresponding SR immediately. If n is 0, it indicates to stop high-speed output and refresh the SR current value For example, during the execution of this instruction, if n is 0 and the external interrupt input is received through X0, it indicates an external interrupt occurs in X0 and high-speed outputting through Y0 should be stopped immediately. The PLC sets the stop flag SM463 to ON and refresh the current corresponding output position in SR. Note: if the output completion auto-reset flag is set to ON, the PLC sets the output completion auto-reset flag to OFF and refresh the current corresponding output position in SR. But the PLC does not set the stop flag SM463 to ON.
- 4. Explanation of n and D operands

Value in n	Device in D	Action Description
n = a multiple of 8	X0 or Y0	Refresh I/O immediately See Example 1 and 2



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	-	
n = 1	High-speed output point	Refresh new pulse positon immediately See Example 3
n = 0	High-speed output point Without output completion auto- reset flag	Stop high-speed outputting, set the stop flag SM463 to ON and refresh the current corresponding output position. Set the output completion auto- reset flag to OFF and refresh the current corresponding output position. See Example 3
n = -1 ^{*1}	Any X input point	Refresh the mapped area DS301 TxPDO (Master <= Slave)
$n = -1^{*1}$	Any Y output point	Refresh the mapped area DS301 RxPDO (Master => Slave)
n = -2*2	Any X input point	Make a response to Modbus TCP command which is well received. (PLC is Server.)

*1: This function is available for Master mode: ES3 with firmware V1.02.00 or later and SV3/SX3 with firmware V1.00.00 or later and for Slave mode: ES3 with firmware V1.06.00 or later and SV3/SX with firmware V1.00.00 or later. The function does not shorten the PDO data mapping time and so it is suggested to use this function when the PLC scan time is larger than the PDO refreshing time of DS301.

*2: This function is available for ES3 with firmware V1.06.00 or later and SV3/SX with firmware V1.00.00 or later. When the PLC program scan time is too long, using this function plus the time interrupt program, the PLC can regularly make a response to the Modbus TCP communication command which is received from the upper computer so as to speed up the communication between the upper computer and the PLC. It is suggested that the shortest time for an interrupt is 5ms. If the time for an interrupt is too short, it may slow down the speed of the PLC program scanning.

Note: The communication response function can process all data in real time, which means in one cycle of PLC program scan, reading or writing data may be interrupted.



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C-5_DTPWL

API	Ir	nstruct	ion co	de	Operand							Function					
												Sett	ing line	ear inte	rpolatio	on	
2720	D	TP\	WL	Р		$S_1 + S_2 + S_3 + S_4$						aramete	ers in t	he pos	ition pla	anning	
												table					
Device	х	Y	М	S	Т	С	HC	D	FR	SM	SR	E	К	16#	"\$"	F	
S 1								•	٠				0	0			
S ₂								•	•				0	0			
S 3								•	•				0	0			
S4								•	•				0	0			
					-	•				·	•					•	
Data type	BOOL	WORD		DWORD	LWORD	UINT	INT		DINT	LINT	REAL	LREAL		TMR	CNT	STRING	
Data type S ₁	BOOL	WORD		DWORD	LWORD	UINT	TNI			LINT	REAL	LREAL		TMR	CNT	STRING	
Data type S ₁ S ₂	BOOL	WORD		DWORD •	LWORD	UINT	INT			LINT	REAL	LREAL		TMR	CNT	STRING	
Data type S ₁ S ₂ S ₃	BOOL	WORD		DWORD •	LWORD	UINT	INT		DINT	LINT	REAL	LREAL		TMR	CNT	STRING	
Data type S ₁ S ₂ S ₃ S ₄	BOOL	WORD		DWORD •	LWORD	UINT	T			LINT	REAL	LREAL		TMR	CNT	STRING	
Data type S ₁ S ₂ S ₃ S ₄	BOOL	WORD		DWORD 0	LWORD		Pulse	instruc	DZ O O tion		-bit ins	Truction		32-bi	C I I I I I I I I I I I I I I I I I I I	STRING	
Data type S ₁ S ₂ S ₃ S ₄	BOOL	WORD		DWORD •	LWORD		Pulse ES3/	instruc SV3/S)	DZ T O O O O O O O O O O O O O O O O T O		-bit ins	truction		32-bi	C Z T	STRING ction	

Symbol



- **S₁:** A number listed in the position planning table
- S2: Target position of the X axis
- S₃: Target position of the Y axis
- S4: Target speed

- 1. This instruction sets the 2-axis linear interpolation parameters in the position planning table. S1 is the number listed in the position planning table. If the number does not exist in the table or the output of the number does not belong to the 2-axis linear interpolation, the instruction is not executed, SM0 is ON and the error code is SR0=16#2027
- 2. S2 and S3 are respectively the target positions of the X and Y axes, which can only be 32-bit integers. If you use the mechanical unit conversion when editing the position planning table in ISPSoft, use the conversion instruction for modification first
- 3. S4 is the target speed. The range is between 1~200,000Hz. (Note: if the setting value is out of the range, the instruction automatically changes the setting into the minimum or maximum value.)
- 4. When the instruction executes the linear interpolation, the target frequency S4 automatically corresponds to the output of the axis which is farthest from its target position. If X axis and Y axis cannot simultaneously reach the target positions, the PLC automatically decelerates the frequency to make the two axes reach the target positions simultaneously

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- 5. When the instruction is executed to modify parameters for the two axes (either of which is outputting), the modified parameters of the two axes are kept in the table and are not effective until the next 2-axis output starts
- 6. The parameters modified by the instruction can be modified only while the PLC is running. The last written parameter is not saved when the power turns OFF. The table that you edit in ISPSoft and download to the PLC is processed as the default position planning table when the power is ON
- 7. To modify the acceleration/deceleration time, you should modify the acceleration/deceleration time in SR that the specified output axis of X axis corresponds to, set the flag SM585 to ON, and then execute this instruction. When changing relevant parameters is complete, SM585 will be automatically cleared and change to OFF For example, if Y0 output axis is designated for X axis, you should modify the value in SR464 (acceleration time of Y0 output) to modify the acceleration/deceleration time. For details on operation steps, please refer to Example 1 of the TPWS instruction. Note:
 - a. The acceleration and deceleration time is only for the PLC operation of the 2-axis synchronized motion. If the simultaneous arrival to the target positions cannot be achieved after calculation, the PLC will automatically execute the instruction with the most proper acceleration/deceleration time and no error information will occur
 - b. The function is available for ES3 with firmware V1.06.00 or later and SV3/SX3 with firmware V1.00.00 or later
- 8. During the execution of TPO instruction, if you need to modify parameters through this instruction, it is suggested to avoid modifying the used number for the output that is being performed or is to be performed soon



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C-6_DZRN_DZRN2

API		Instru	uction		Operand							Description					
2704	D	ZR	2N		S1 + S2 + S3 + S4 + D							Zero return					
Device	х	Y	М	S	Т	С	HC	D	FR	SM	SR	E	к	16#	"\$"	F	
S ₁							•	•	٠		0		0	0			
S ₂							•	•	٠		0		0	0			
S ₃							•	•	•		0		0	0			
S4	0																
D		0															

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
S1			•				•						
S ₂			•				•						
S 3			•				•						
S 4	•												
D	•												

Pulse Instruction	16-bit instruction	32-bit instruction
-	-	ES3/SV3/SX3

Symbol



- S1: Target frequency for zero return
- S2: JOG frequency for DOG
- S₃: Zero return mode
- S4: Input device for DOG
- **D:** Pulse output device

- This instruction causes the machine to return to the zero point. The range of the target frequency for zero return S1 is between 1 Hz–200 kHz. The JOG frequency S2 should be less than the target frequency S1. The JOG frequency S2 is the start frequency. If S1 is less than S2, S1 is automatically revised processed as equal to S2
- 2. The input point for S4 and output point for D must match. Do not change them during instruction execution. The input point for S4 is suggested to use the 16 high-speed input points X0–X7 and X10–X17. They will not be affected by PLC instruction scan time. If you use X20 successive input points or M devices, they will be affected by the PLC instruction scan time. Refer to the following table for the selection of D output point and direction output point. If D is not the preset Pulse+direction output (default: 0), change the mode to A/B phase output by setting SR to 1

Axis Number	Axis 1	Axis 2	Axis 3	Axis 4
Input point for S4	Can be any one of the input points X0–X7 and X10–X17. But the same input			
	point cannot be selected for different axis output. If the DOG point shakes or the switch bounces, set the input point filter time in HWCONFIG.			
Output point for D	Y0	Y2	Y4	Y6



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Direction output	Y1	Y3	Y5	Y7
Output mode	SR462	SR482	SR502	SR522
Buys flag	SM460	SM480	SM500	SM520
Completion flag	SM461	SM481	SM501	SM521
Present output	SR460	SR480	SR500	SR520
position	SR461	SR481	SR501	SR521

3. Use S3 to select the zero return mode. The function code is set by the two high and low16-bit parameters. See the following table for details.

S3: select the zero return mode				
High 16-bit	Low 16-bit			
b31~b16	b15~b6	b5	b4	b3~b0
Number of pulses for motion		Direction setting*1	Setting DOG	
Number of Z phases	Reserved	direction	signal 0: contact A 1: contact B	Mode setting 0~15 (F)
		1: in the positive		
		direction		

See the diagram below for mode setting



4. Use S3 to select the zero return mode. The function code is set by the two high and low16-bit parameters. See the following table for details

Function	Code		Explanation	
	High 16-bit	Low 16-bit		
Leaves the zero point in the negative direction and then stops (Mode 0)	0	0	When the instruction is executed, the search for the zero point is in the negative direction with the target frequency. When the zero point is ON	



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			(the zero point signal changes from OFF to ON), the frequency is decreased to the JOG speed and the motion in the negative direction continues, and does not stop until the zero point signal changes from ON to OFF.
Leaves the zero point in the positive direction and then stops (Mode 1)	0	1	When the instruction is executed, the search for the zero point is in the negative direction with the target frequency. When the zero point is ON (the zero point signal changes from OFF to ON), the frequency decreases to 0 immediately, and then the motion is in the positive direction at the JOG speed, and does not stop until the zero point signal changes from ON to OFF.
Mode 0 Moves again after returning to the zero point	Number of pulses for motion	2	Returning to the zero point is the same as that for the low 16-bit code. After the zero point is ON, the motion continues according to the number of specified pulses. When the high 16-bit code is a positive number, the search is in the positive direction. A negative value means that the search is in the negative direction.
Mode 0 Searches Z phase after returning to the zero point (Z phase input point is set in HWCONFIG)	Number of Z phases	3	Returning to the zero point is the same as that for the low 16-bit code. After returning to the zero point, the motion continues according to the number of Z phases. When the high 16-bit code is a positive number, the search is in the positive direction. A negative value indicates that the search is in the negative direction. Suppose you specified that the rising-edge trigger of X0 as the condition for the Z phase input in HWCONFIG. The counting is performed once whenever the rising- edge trigger for X0 occurs.
Mode 0 Outputs the clear signal after returning to the zero point. (Output clear point is set in HWCONFIG)	Number of pulses for motion or number of Z phases	4+0=4 4+1=5 4+2=6 4+3=7 (bit 2=ON)	Choosing a value between 4–7 means selecting the functions codes 0–3 respectively, and the specified output point sends an ON signal that is about 20ms wide when the function execution completes. The range of the output point is Y14–Y17 and Y20–Y27. For example, if you specify Y22 as the output point in HWCONFIG, it indicates Y22 is for the output of clear signals.
Leaves the zero point in the positive direction and then stops (Mode 1)	0	8+0=8 8+1=9 (bit 3=ON)	The operation for zero point return is the same as that for code 1 (mode 1).
Mode 1 outputs the number of pulses after returning to the zero point	Number of pulses for motion	8+2=10 (bit 3=ON)	The operation for zero point return is the same as that for low 16-bit code 1. After returning to the zero point, the motion continues in accordance with the number of specified pulses. When the



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Mode 1 Searches for Z phase after returning to the zero point (Z phase input point is set in HWCONFIG)	Number of Z phases	8+3=11 (bit 3=ON)	 value of the high 16-bit code is a positive number, the motion is in the positive direction. A negative number indicates that the motion is in the negative direction. The operation for zero point return is the same as that for low 16-bit code 1. After returning to the zero point, the motion continues in accordance with the number of Z phases to seek. When the value of the high 16-bit code is a positive number, the motion is in the positive direction. A negative number indicates that the motion is in the negative direction. If the rising edge trigger for X1 is the condition for Z phase input, counting is performed once when the rising-edge trigger for X1 occurs
Mode 1 Outputs the clear signal after returning to the zero point (Output clear point is set in HWCONFIG)	0 or number of pulses or number of Z phases	12–15 (bit 3=bit 2 =ON)	After returning to the zero point in mode 1, the 20ms-width clear signal is output.
DOG point is B point		+16 (bit 4=ON)	When in the low 16-bit code, bit 4 is ON, it means the zero point is ON as the DOG point changes from ON to OFF and the zero point is left as the DOG point changes from OFF to ON.

- 5. The execution sequence is based on the value of the low 16-bit code in the table above, and described below
 - \rightarrow The direction of DOG signal is determined by the value of bit 5
 - \rightarrow The DOG signal is determined by the value of bit 4
 - \rightarrow Mode 0 or mode 1 for the zero point return, selected according to the value of bit 3
 - → The operation of the zero point return is performed according to the values of bit 1 and bit 0
 - \rightarrow The operation of the clear signal specified by bit 2 is performed
- 6. Set the input point and the rising/falling edge trigger condition in HWCONFIG, when the position control system needs positive and negative limit input points. Note that the limit input points must not be the same as the zero point or Z phase input points For ES3 with firmware V1.04 or earlier, when the zero return motion is in process and the limit point check function is activated, the limit alarm flag is not set to ON once the limit point is reached. For ES3 with firmware V1.06 or later and SV3/SX3 with firmware V1.00.00 or later, the limit alarm flag will automatically set to ON for a reminder, and then you can decide the follow-up operation based on the alarm flag. (Note: After the limit alarm flag is ON, it must be cleared by yourself.)
- 7. The Completion flag is set to ON after the instruction finishes performing the specified function. For example, for function code 6, the PLC sets the Completion flag to ON only when the Z phases seeking completes
- 8. After the DZRN instruction is executed, an interrupt service program is not executed till the DZRN instruction is disabled, if the specified input point for the zero point is the same as that for the



external input interrupt in the program

- 9. When the limit switch is specified in HWCONFIG, and there is an external input interrupt service program, the interrupt program will be executed at the same time
- It is not suggested to use this instruction in the ST programming language, interrupt tasks or function block which is called only once
 For ES3 with firmware V1.06 or later and SV3/SX3 with firmware V1.00.00 or later, the ST programming language is supported. For details, refer to the description in the example
- 11. The steps for performing the functions are as below Function code 0:

① The DZRN function is executed and the search for the zero point is in the negative direction with the target frequency.

^② After the DOG signal is received, the output frequency decreases to the JOG frequency. The output continues in the negative direction and does not stop until the zero point signal changes from ON to OFF.

③ The output stops when the signal changes from ON to OFF and the axis moves away from the DOG signal.



① The DZRN function is executed and the search for the zero point is in the negative direction with the target frequency.

② After the DOG signal is received, the output is in the positive direction with the JOG frequency after the output frequency decreases, and the motion direction reverses. The output does not stop until the zero point signal changes from ON to OFF.

③ The axis moves away from the DOG signal and PLC stops when the signal changes from ON to OFF.

Function code 2:

① The DZRN function is executed and the search for the zero point is in the negative direction with the target frequency.

② After the DOG signal is received, the output decreases the frequency to the JOG frequency and continues in the negative direction.


^③ When the DOG signal is left and the signal changes from ON to OFF, the specified number of pulses are output.

- ④ The first pulse output starts.
- ^⑤ When the 100th pulse output completes, the PLC stops and the Completion flag is ON.



Function code 3:

① DZRN function is executed and the search for the zero point is in the negative direction with the target frequency.

② After the DOG signal is received, the output frequency decreases to the JOG frequency and the motion continues in the negative direction.

^③ The motion goes on according to the number of Z phases when the signal changes from ON to OFF after the axis moves away from the DOG signal.

- ④ The first Z phase pulse
- ^⑤ The motion stops after the 2nd Z phase completes and the Completion flag is ON.



Function code 4:

① DZRN function is executed and the search for the zero point is in the negative direction with the



target frequency.

[©] After the DOG signal is received, the output frequency decreases to the JOG frequency and continues in the negative direction. The output does not stop until the zero point signal changes from ON to OFF.

^③ After the axis moves away from the DOG signal, the output stops when the signal changes from ON to OFF and the clear signal is ON for about 20 milliseconds.



Function code 0+ the negative limit function enabling:

[®] Set the negative limit input point in HWCONFIG, and then download the setting to the PLC. The PLC automatically calculates the negative limit function when the instruction is executed.

① DZRN function is executed and the search for the zero point is in the negative direction with the target frequency.

② After the negative limit switch is ON, the motion stops and then goes in the positive direction after reversing direction.

③ The motion continues in the positive direction after leaving the negative limit switch.

④ The output frequency ramps down after receiving the DOG signal. The reverse output is performed with the JOG frequency after reversing direction.

⑤ The output stops when the signal changes from ON to OFF after the axis moves away from the DOG signal.



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Example 1

When M0 is ON, outputting the pulse from Y0 with a frequency of 20 kHz to search for the zero point in the negative direction. When the DOG signal is received and X4 is ON, it keeps moving in the negative direction with the JOG frequency of 1 kHz. The output stops immediately after X4 changes from ON to OFF.



Explanation

S3 is set to 0.

High 16-bit [0000] is to disable the function to move a number of pulses or to search for Z phases.

Low 16-bit [0000] is Mode 0; when the DOG signal is received, the axis moves in the negative direction; after the axis moves away from the DOG signal, it stops immediately.

Example 2

When M0 is ON, outputting the pulse from Y0 with a frequency of 20 kHz to search for the zero point in the negative direction. When the DOG signal is received and X4 is ON, the PLC decreases the frequency to the JOG frequency of 1 kHz and keeps moving in the positive direction with the JOG frequency of 1 kHz. When X4 is OFF, the PLC starts to seek the Z phase pulse in the positive direction. When X5 receives two pulses, the PLC stops and Y14 outputs a 20ms-width pulse.



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Explanation

- 1. If you specify the rising-edge trigger at X5 as the condition for Z phase input in HWCONFIG, the count is incremented once whenever the rising-edge trigger at X5 occurs
- 2. Y14 is specified as the output point for outputting the clear signal in HWCONFIG
- S3 is set as 16#00020007. High 16-bit [0002] is to search for the Z phase twice, once the axis moves away from the DOG signal. Low 16-bit [0007] is Mode 7; when the DOG signal is received, the axis moves in the negative direction; after the axis moves away from the DOG signal, and found the Z phase, a clear signal is outputted (20ms).

Example 3

When M0 is ON, outputting the pulse from Y0 with a frequency of 20 kHz to search for the zero point in the negative direction. When the DOG signal is received and X4 is ON, the PLC decreases the frequency to the JOG frequency of 1 kHz and keeps moving in the positive direction with the JOG frequency of 1 kHz. When X4 is OFF, the axis starts to move after 500 pulse output completes in the negative direction. Y14 outputs a 20ms-width pulse and then stops outputting.



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Explanation

- 1. Y14 is specified as the output point for outputting the clear signal in HWCONFIG
- 2. S3 is set as 16#FE0C000E. High 16-bit [FE0C=-500] once the axis moves away from the DOG signal. The axis starts to move after 500 pulse output completes in the negative direction. Low 16-bit [000E] is Mode 14; when the DOG signal is received, the axis moves in the positive direction; after the axis moves away from the DOG signal, a clear signal is outputted (20ms).

Example 4 (in ST programming language)

Generally, it is suggested to use the ladder diagram language to edit the program when using this instruction. If you use ST language (which is only available for ES3 with firmware V1.06.00 or later and SV3/SX3 with firmware V1.00.00), you must wait until the zero-return motion is completed (SM461 completion flag is ON) and then disable the instruction. Besides, you must use the auto reset flag together to notify the PLC to release the high-speed output control right.

Taking Y0 output for example, the program writing is shown in the figure below

```
0001 IF MO THEN

0002 DZRN(1000,100,0,X0,Y0);

0003 M1:=TRUE;

0004 ELSIF M1 AND SM461 THEN

0005 SM470 := TRUE;

0006 M1 := FALSE;

0007 END_IF;
```



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C-6_DZRN_DZRN2

API		Instru	uction		Operand					Description						
2724	D	ZRI	N2		TFreq [,]	Freq,JFreq,Mode,DOG,NL,Pulse, Dir				e, (Zero return 2 (directional output can be defined)				fined)	
Device	Х	Y	м	s	Т	С	HC	D	FR	SM	SR	E	К	16#	"\$"	F
TFreq							•	•	•		0		0	0		
JFreq							•	•	•		0		0	0		
Mode							•	•	•		0		0	0		
DOG	0		0													
NL	0		0													
Pulse		0														
Dir		0	0													

Data type	BOOL	WORD	DWORD	LWORD	UINT	INT	DINT	LINT	REAL	LREAL	TMR	CNT	STRING
TFreq			•				•						
JFreq			•				•						
Mode			•				•						
DOG	•												
NL	•												
Pulse	•												
Dir	•												

	Pulse Instruction	16-bit instruction	32-bit instruction
ſ	-	-	ES3/SV3/SX3

Symbol

DZRN2 En TFreq Pulse JFreq Dir Mode DOG NL TFreq: Target frequency for zero return
JFreq: JOG frequency for DOG
Mode: Zero return mode
DOG: Input device for DOG
NL: Input device for Negative Limit point
Pulse: Pulse output device
Dir: Output direction device

Explanation

- This instruction causes the machine to return to the zero point. The range of the target frequency (TFreq) for zero return is between 1 Hz–200 kHz. The JOG frequency (JFreq) should be less than the target frequency (TFreq). The JOG frequency (JFreq) is the start frequency. If the target frequency (TFreq) is less than (JFreq), the target frequency (TFreq) is automatically revised processed as equal to (JFreq)
- Do not change the operands DOG, NL, Pulse, or Dir during instruction execution. The input point for DOG and NL is suggested to use the 16 high-speed input points X0–X7 and X10–X17. They will not be affected by PLC instruction scan time. If you use X20 successive input points or M devices, they will be affected by the PLC instruction scan time



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3. See the below descriptions for DOG, NL and Dir

DOG point	You can use X or M device but do NOT choose the same input point for different axis. When the DOG point uses X0–X7 and X10–X17 for inputs, go to HWCONFIG to set up the filtering time for the inputs if the switch starts to rattle.
NL point	You can use X or M device but do NOT choose the same input point for different axis.
Dir contact	You can use Y or M device but do NOT choose the same input point for different axis.

For ES3 with firmware V1.04 or earlier, when the zero return is in process and the limit point check function is activated, the limit alarm flag is not set to ON once the limit point is reached. For firmware ES3 with firmware V1.06.00 or later and SV3/SX3 with firmware V1.00.00, the limit alarm flag will automatically set to ON for a reminder, and then you can decide the follow-up operation based on the alarm flag. (After the alarm flag is ON, it must be cleared by yourself.) Note: DZRN2 does not support the positive limit function.

4. See the below SR and SM table for pulse outputting.

Pulse Output Points	Y0	Y2	Y4	Y6
Setting up the time for directional outputting goes first before pulse outputting (unit: 1 ms)	SR640	SR642	SR644	SR646
Busy flag	SM460	SM480	SM500	SM520
Completion flag	SM461	SM481	SM501	SM521
Present output	SR460	SR480	SR500	SR520
position	SR461	SR481	SR501	SR521

Pulse Output Points	Y1	Y3	Y5	Y7
Setting up the time for directional outputting goes first before pulse outputting (unit: 1 ms)	SR641	SR643	SR645	SR647
Busy flag	SM472	SM492	SM512	SM532
Completion flag	SM473	SM493	SM513	SM533
Present output	SR474	SR494	SR514	SR534
position	SR475	SR495	SR515	SR535

*1: Not available for SX3 series PLC CPU

5. Select the zero return mode. The function code is set by the two high and low16-bit parameters. See the following table for details

Select the zero return mode							
High 16-bit	Low 16-bit						
b31~b16	b15~b7	b6	b5	b4	b3~b0		



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Number of	Reserved	Setting DOG	Setting NL	Setting DOG	Mode setting
pulses for		signal mask	signal	signal	0~2;
motion		0: disabled	0: contact A	0: contact A	8~10
		1: enabled	1: contact B	1: contact B	

6. The function code is set by the two high and low 16-bit parameters. See the following table for details

Function	Code		Description
	High 16-bit	Low 16-bit	
Leaves the zero point in the negative direction and then stops (Mode 0)	0	0	When the instruction is executed, the search for the zero point is in the negative direction with the target frequency. When the zero point is ON (the zero point signal changes from OFF to ON), the frequency is decreased to the JOG speed and the motion in the negative direction continues, and does not stop until the zero point signal changes from ON to OFF.
Leaves the zero point in the positive direction and then stops (Mode 1)	0	1	When the instruction is executed, the search for the zero point is in the negative direction with the target frequency. When the zero point is ON (the zero point signal changes from OFF to ON), the frequency decreases to 0 immediately, and then the motion is in the positive direction at the JOG speed, and does not stop until the zero point signal changes from ON to OFF.
Mode 0 Moves again after returning to the zero point	Number of pulses for motion	2	Returning to the zero point is the same as that for the low 16-bit code. After the zero point is ON, the motion continues according to the number of specified pulses. When the high 16-bit code is a positive number, the search is



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			in the positive direction. A negative value means that the search is in the negative direction.
Leaves the zero point in the positive direction and then stops (Mode 1)	0	8+0=8 8+1=9 (bit3=ON)	Refer to mode 1. The operation for zero point return is the same as that for code 1 (mode 1).
Mode 1 outputs the number of pulses after returning to the zero point	Number of pulses for motion	8+2=10 (bit3=ON)	The operation for zero point return is the same as that for low 16-bit code 1. After returning to the zero point, the motion continues in accordance with the number of specified pulses. When the value of the high 16-bit code is a positive number, the motion is in the positive direction. A negative number indicates that the motion is in the negative direction.
DOG point is B point		+16 (bit4=ON)	When in the low 16-bit code, bit 4 is ON, it means the zero point is ON as the DOG point changes from ON to OFF and the zero point is left as the DOG point changes from OFF to ON.
NL point is B point		+32 (bit5=ON)	When in the low 16-bit code, bit 5 is ON, it means the zero point is ON as the NL point changes from ON to OFF and the zero point is left as the DOG point changes from OFF to ON.

- 7. The execution sequence is based on the value of the low 16-bit code in the table above, and described below
 - \rightarrow The direction of DOG signal is determined by the value of bit 5
 - ightarrow The NL negative limit and DOG signal are determined by the value of bit 5 and bit 4
 - \rightarrow Mode 0 or mode 1 for the zero point return, selected according to the value of bit 3
 - \rightarrow The operation of the zero point return is performed according to the values of bit 1 and bit 0



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8. The DOG signal mask function is only available for ES3 with firmware V1.06.00 or later and SV3/SX3 with firmware V1.00.00 or later. When the mask function is enabled (setting bit6 to 1), Mode+1 is the number of DOG signals to be masked. When the value is less than or equal to 0, the DOG point mask function is regarded as disabled Task section is determined by the number of output pulses (regardless of the direction positive or negative) after the DZRN2 instruction is executed. Since the start position for the search for the zero position may be different each time, the setting of the mask section may lead to the case that the zero position is missed. So be sure to evaluate whether to set the mask function or set the negative limit function based on the actual application For example, set Mode to D0=64 (bit6 set to 1) and set D2=120000 (the number of pulses to be masked). After DZRN2 is executed, the DOG signals for the number of output pulses less than 120,000 will all be masked and thus the DOG signals are not functioning

- 9. The Completion flag is set to ON after the instruction finishes performing the specified function. For example, for function code 2, the PLC sets the Completion flag to ON only when the specified number of pulses completes outputting
- 10. After the DZRN2 instruction is executed, an interrupt service program is not executed till the DZRN2 instruction is disabled, if the specified input point for the zero point is the same as that for the external input interrupt in the program
- 11. It is not suggested to use the instruction in the ST programming language, interrupt tasks or function block which is called only once
- 12. ST programming language is supported for ES3 with firmware V1.06.00 or later and SV3/SX3 with firmware V1.00.00 or later. For details, refer to the description in the example
- 13. The steps for performing the functions are as below

Function code 0:

 ${\rm I}$ The DZRN2 function is executed and the search for the zero point is in the negative direction with the target frequency TFreq

[©] After the DOG signal is received, the output frequency decreases to the JOG frequency JFreq. The output continues in the negative direction and does not stop until the zero point signal changes from ON to OFF

^③ The output stops when the signal changes from ON to OFF and the axis moves away from the DOG signal.



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Function code 1:

① The DZRN2 function is executed and the search for the zero point is in the negative direction with the target frequency TFreq

[©] After the DOG signal is received, the output frequency decreases until the output stops. After that, the output is in the positive direction with the JOG frequency JFreq. The output does not stop until the DOG signal changes from ON to OFF

③ The axis moves away from the DOG signal and the output stops when the signal changes from ON to OFF



Function code 2:

① The DZRN2 function is executed and the search for the zero point is in the negative direction with the target frequency TFreq

② After the DOG signal is received, the output frequency decreases to the JOG frequency JFreq and continues in the negative direction

^③ When the DOG signal is left and the signal changes from ON to OFF, the specified number of pulses are output

The first pulse output starts



^⑤ When the 100th pulse output completes, the output stops and the Completion flag is ON



Example

When M0 is ON, outputting the pulse from Y0 with a frequency of 20 kHz to search for the zero point in the negative direction. When the DOG signal is received and X4 is ON, it keeps moving in the negative direction with the JOG frequency of 1 kHz. The output stops immediately after X4 changes from ON to OFF.



Explanation

Mode is set to 0. High 16-bit [0000] is to disable the function to move a number of pulses.. Low 16-bit [0000] is Mode 0; when the DOG signal is received, the axis moves in the negative direction; after the axis moves away from the DOG signal, it stops immediately.

Example 2 (in ST programming language)



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Generally, it is suggested to use the ladder diagram language for editing the program when using this instruction. If you use ST language (which is available for ES3 with firmware V1.06.00 or later and SV3/SX3 V1.00.00 or later), you must wait until the zero-return motion is completed (SM461 completion flag is ON) and then disable the instruction. Besides, you must use the auto reset flag together to notify the PLC to release the high-speed output control right. Taking Y0 output for example, the program writing is shown in the figure below

```
0001 IF M0 THEN

0002 DZRN2(1000,100,0,X0,X20,Y0,Y1);

0003 M1:=TRUE;

0004 ELSIF M1 AND SM461 THEN

0005 SM470 := TRUE;

0006 M1 := FALSE;

0007 END IF;
```

2.5 UPDATE – MS300 Firmware Update to Version 2.01

Function Correction

Version 2.00 Issue	Version 2.01
When copying parameters, the maximum	When copying parameters, the maximum
operating frequency (Pr.01-00) will be	operating frequency (Pr.01-00) will be
copied abnormally.	copied normally.
When the instantaneous power failure	When the instantaneous power failure
restart (Pr.07-06) or abnormal restart action	restart (parameter 07-06) or abnormal
selection (Pr.07-10) is set, when the Reset	restart action selection (parameter 07-10) is
command is triggered continuously, it will	set, when the Reset command is triggered
cause abnormal action.	continuously normally.
When PTC motor overheating (OH3) error	When the PTC motor overheat (OH3) error
is triggered, there is a chance that it cannot	is triggered, it can be reset normally
be reset (Reset).	(Reset).
When the multi-function display chooses to	When the multi-function display chooses to
set the main frequency value display (00-	set the main frequency value display (00-
04=47) or the frequency value display after	04=47) or the frequency value display after
the addition and subtraction of the main and	the addition and subtraction of the main and
auxiliary frequencies (00-04=48), the	auxiliary frequencies (00-04=48), the
numerical display is abnormal.	display is normal.
After the Jog command is executed in the	After the Jog command is executed in the
FOC torque mode, it will stay in the speed	FOC torque mode, the torque mode is
mode.	maintained.
Use MS300 Keypad, MODE left shift key	Using MS300 Keypad, MODE left shift key
function, input minus sign invalid.	function, input minus sign is normal.
Using the MI external terminal (Pr.00-21=1),	Using the MI external terminal (Pr.00-21=1),
the running function may fail.	the running function is normal.

Function Modification

1. External terminal signal optimization



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- 2. IMSVC slip compensation calculation optimization: Correct the power calculation sequence to make the slip calculation correct
- 3. OC Stall optimizes the processing method of the power generation area to avoid triggering overvoltage

Switching Period

Firmware Version	Switching Period	
	Taoyuan	T2226
V2 04	Wujiang (Frame A-C)	W2218
VZ.UI	Wujiang (Frame D-F)	W2217
	Hosur	H2220

Note: S/N code T2226 means Taoyuan plant, year 2022, week 26.

2.6 UPDATE – VFD-EL Firmware Update to Version 1.18

New Functions

New function to identify the analog conversion chip as main material or the substitute material.

Note:

There is no material shortage on analog conversion chip material, so the action of the substitute material will not be executed in short term.

If there is a need to switch to replacement material in the future, another notification will be issued. Although the firmware has been upgraded to V1.18 in this revision, its functions and performance can be regarded as the same as firmware version V1.17

Switching Period

Firmware Version	Switching Period						
	Taoyuan	T2314					
V1 10	Wujiang	W2238					
V1.10	Dongguan	D2238					
	Hosur	H2240					

Note: S/N code T2314 means Taoyuan plant, year 2023, week 14.

2.7 UPDATE – DVP-S Load Cell Modules Firmware Update to Version 1.14

Related Products

Series	Model
DVP-S Slim PLC	DVP201LC-SL
	DVP202LC-SL
	DVP211LC-SL



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New Functions

CR#	Address	Attribute		Register Name	Description			
#43	H102B	0	R/W	Filtering mode setting for channel 1	K0: No filtering (default) K1: Filtering out the maximum weight measured K2: Averaging weights K3 : LPF 5Hz			
#44	H102C	0	R/W	Filtering mode setting for channel 2	K4 : LPF 10HZ K5 : LPF 20Hz K6 : LPF 50/60Hz Note: K3-K6 is only available for modules with firmware V1.14 or later. The transition time for low pass filter modes is fixed to 10 ms			

- The number behind LPF indicates the cut-off frequency point. For example, the mode **K3** is LPF 5 Hz and that means the low pass filter only allows low frequency signals from 0 Hz to 5 Hz to pass. Any frequencies applied above this cut-off point will be attenuated. The higher the frequency signals applied, the greater the attenuated will be. The mode **K6**, LPF 50/60 Hz, is designed specifically for filtering out the frequency of 50/60 Hz which is often seen as disturbance
- The transition time (CR3) in the low pass filter modes is fixed to 10 ms. Once it is not in the low pass filter mode, the transition time 10 ms can be modified
- The input delay times and output values in various low pass filter modes are shown below

• Example of using mode K6, LPF 50/60

Input signal: Signals received from the load cell and a frequency of 50 Hz is also attached. See the blue sinusoidal waveform below.

After applying the filtering mode, K6, LPF 50/60Hz, the frequency of 50 Hz is significantly attenuated, as shown in the red sinusoidal waveform below



Methods to set the low pass filter



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• When the module is connected to the left side of the PLC CPU, you can use To instruction to write the setting values K3-K6 into CR43 for channel 1 or CR44 for channel 2.

The programming example below shows how to set the filtering mode K3, LPF 5 Hz, for the channel 1 of the first connected module on the left side



- Whether the module is connected to the left side of the PLC CPU or NOT, you can use the software, LCSoft V1.14 to set up the low pass filter mode and download the parameters through the RS-485 or RS-232 serial communication ports. LCSoft V1.14 will be available from November 2022.
- Whether the module is connected to the left side of the PLC CPU or NOT, with the remote PLC CPU or HMI, you can use Modbus protocols to write the setting values K3-K6 into CR43 for channel 1 or CR44 for channel 2 through the RS-485 or RS-232 serial communication ports.

2.8 UPDATE – DVW-W01I2-E1 Wireless Access Point Firmware Update to Version 1.20

Description

1. To minimize the risk of triggering RESET by mistake, increased the pressing button time for the RESTART and RESET to get started. And updated the corresponding DI/ALARM LED status

	Restart	Reset
OLD	Press the RESET button for <3 seconds and the DI/ALARM LED will be ON for 3 seconds and then OFF again. Wait for 120 seconds and the device restarts.	Press the RESET button for >3 seconds and the DI/ALARM LED will be ON for 10 seconds and then OFF again. Wait for 120 seconds and the device resets to its default values.
NEW	Press the RESET button for <=5 seconds and the DI/ALARM LED starts blinking. After releasing the button for 5 seconds, the DI/ALARM LED goes OFF. Wait for 120 seconds and the device restarts.	Press the RESET button for >5 seconds and the DI/ALARM LED will be ON. After releasing the button for 5 seconds, the DI/ALARM LED goes OFF. Wait for 120 seconds and the device resets to its default values.



2. Added updating information for the execution of firmware update

OLD	No updating information during firmware update.
NEW	No updating information during firmware update. Added updating information to inform users how long it will take for the firmware update to complete. After the firmware update is complete, a message of "Upgrade success" shows up. Firmware Upgrade File : /tmp/TempUpgrade.bin Upgrading, about surplus 310 s Checksum : 03b0d7f5b2c921da157b233145eb7b2d Image: Dygrade 192.168.1.5 顯示 Upgrade success
	Opgrade success 確定

3. Updated the APR packet transmission rules for a FIT AP

OLD	For a FIT AP, if the MAC address belongs to the DVW device, but the IP address does NOT belong to the DVW device, the APR packets will be dropped.
NEW	For a FIT AP, even if the MAC address belongs to the DVW device, but the IP address does NOT belong to the DVW device, the APR packets will still be transmitted to the LAN port.

Download Link

DVW-W01I2-E1 V1.20



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2.9 UPDATE – DVW-W02W2-E2, DVW-W02W2-E2-EU Wireless Access Points Firmware Update to Version 2.5.2

Description

 Added Fast Roaming function in the Basic Wireless Configuration section. You can enable or disable this function. The default value is Disable Basic Wireless Configuration

Busic micicas c	oninguration			
Cancel	Apply			
Operation Mode		Client		
RF Type		B v		
Channel		1 ~		
SSID			Site Survey	
SSID Broadcast		Enable Disable	e	
Security Mode		None	~	
Connection Options : Rc	ng paming V			
Roaming AP1 RSSI (-	95 ~ 0) :			- 60
Difference RSSI (0 ~ 9	95) :			10
Roaming AP2 RSSI (-	95 ~ 0) :			- 75
Scan Period (10 ~ 655	535 s) :			10
Note: If current AP (AP1) Only support not NONE) RSSI < Roaming AP1 RSSI, Security Mode	start scanning, find new AP (AP2).	If AP1 MAX RSSI - AP1 current RSSI > Difference RSSI and AP2 RSSI > Roaming AP2 RSSI, start roamin	ng.

 Added AMPDU function in the Advanced Wireless Configuration section. You can enable or disable this function. The default value is Disable Advanced Wireless Configuration

Cancel	Apply	
IGMP Snooping		Enable Disable
CTS/RTS Threshold (1-2	2347)	2347
Fragmentation Length(2	56-2346)	2346
Beacon Interval(100-100	0)	100
Aggregation Length(102	4-65535)	50000
AMPDU		O Enable 🖲 Disable
DTIM Interval(1-255)		2
Preamble Mode		Automatic 🗸

3. Added IGMP Snooping function in the Advanced Wireless Configuration section. You can enable or disable this function. The default value is Disable



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Advanced Wireless Configuration				
Cancel Apply				
IGMP Snooping	Enable O Disable			
CTS/RTS Threshold (1-2347)	2347			
Fragmentation Length(256-2346)	2346			
Beacon Interval(100-1000)	100			
Aggregation Length(1024-65535)	50000			
AMPDU	O Enable 🖲 Disable			
DTIM Interval(1-255)	2			
Preamble Mode	Automatic 🗸			

4. Added Operation Configuration page and users can enable or disable the MODBUS Gateway function. The default value is Disable

OLD	No Operation Configuration setting page. MODBUS Gateway is enabled by default and users cannot change this setting.						
NEW	Added Operation Configuration of MODBUS Gateway. The default	setting page. Users value is Disable. Operation Config Cancel	can enable or disable puration Apply				

- 5. Fixed the security vulnerability issue of the special language input method for the webpage
- 6. Fixed an issue that the Modbus Slave App crashed from time to time



7. Removed the ONLINE button (no function) on the MODBUS Cache page

	The Onlin	e butt	on is (on t	he l	owe	r ri	igł	nt corr	her but	with no	func	tion.
	✓ Enable												
	Cycle time 100	ms	Available	e size	104855	6 E	Bytes	-	Timeout Calibi	ration 3000	ms	De	etect
	Coil Device W	/ord Device											
	# Station Address	MODBUS (Hex.)	MODBUS (Dec.)	Account	t Format	Online	<		Station Address	MODBUS (Hex.)	MODBUS (Dec.)	Present Value	Format 🔷
	01 1	1000	404097	10	Hex		1	1	1	1000	404097	3754	Hex
510	1-11						-	2	1	1001	404098	3754	Hex
								3	1	1002	404099	3754	Hex
								5	1	1003	404100	3754	Hex
								6	1	1005	404102	3754	Hex
								7	1	1006	404103	3754	Hex
							2	8	1	1007	404104	3754	Нех 💟
	Add	Edit	Dele	ete									Online
	Cancel	Function - I Apply	Port1										
	MODBUS Cache F Cancel	Function - I Apply	Port1					_					
	Cancel	Apply	Port1 Available	Size	104857	76	Bytes		Timeout Calil	bration 3000	0 ms		Detect
	Cancel Cancel Cycle time Cycle time Coll Device Woo	Manager Apply ms	Port1 Available	Size	104857	76	Bytes		Timeout Calil	bration <u>3000</u>	D ms		Detect
NEW	Cancel Cancel Cycle time Cycle ti	Market Ma	Available MODBUS(Dec	Size	104857	76	Bytes	tation	Timeout Calil	bration 3000 MODBUS(Hex.)	0 ms MODBUS(Dec	.) State	Detect
NEW	Cancel Cancel Cycle time Cycle ti	ms ms md Device	Port1 Available MODBUS(Dec	Size	104857	76	Bytes	tation	Timeout Calil Address	MODBUS(Hex.)	0 ms MODBUS(Dec	.) State	Detect
NEW	MODBUS Cache F Cancel Denable Cycle time 10 Coil Device Wo # Station Address M	ms rd Device KODBUS(Hex.)	Available MODBUS(Dec	Size	104857	76	Bytes	tation	Timeout Calil Address	MODBUS(Hex.)	0 ms MODBUS(Dec	.) State	Detect
NEW	Add	Function - I Apply ms rd Device KODBUS(Hex.)	Available MODBUS(Dec	Size	104857	76 □ All ^ ▼	Bytes	tation	Timeout Calil Address	MODBUS(Hex.)	0 ms MODBUS(Dec	.) State	Detect
NEW	MODBUS Cache F Cancel Denable Cycle time 10 Coll Device Wo # Station Address N	Apply ms rd Device KODBUS(Hex.) Edit	Available MODBUS(Dec	Size .) Accour	104857 at Online (76 All *	Bytes	tation	Timeout Calil Address	MODBUS(Hex.)	0 ms MODBUS(Dec	.) State	Detect

- 8. Improved the stability of FT Roaming
- 9. Fixed an issue that if trying to power off the device while it is in the process of turning on, the parameters will be restored back to default values

Download Link

DVW-W02W2-E2(-EU) V2.5.2

2.10 UPDATE – DX2100L1-CN Cloud Router Firmware Update to Version 1.5.0.12

Description

1. Fixed the security vulnerability issue of the special language input method for the webpage



Industrial Automation Products

Edition 2022-Q4

2. To minimize the risk of triggering RESET by mistake, increased the pressing button time for the RESTART and RESET to get started. And updated the corresponding READY LED status

	Restart	Reset
OLD	Press the RESET button for <=3 seconds and then release the button. The device restarts and then the READY LED is ON.	Press the RESET button for >3 seconds and then release the button. All the LEDs start blinking. The device resets and then the READY LED is ON.
NEW	Press the RESET button for <=5 seconds and the READY LED starts blinking. After releasing the button, the READY LED goes OFF. The device restarts and then the READY LED is ON.	Press the RESET button for >=5 seconds and then release the button. The READY LED goes OFF. The device resets and then the READY LED is ON.



Edition 2022-Q4

3. Changed the default value of Trouble Shooting function from Enable to Disable and an explanation message will be prompted to inform users how this function works if users select Enable

OLD	The default value of Trouble Shooting function is Enable.					
	The default value of Trouble Shooting function is Disable. Once this function is enabled, a					
	prompt message informs users that error logs will be uploaded automatically to DIACloud.					
	Trouble Shooting Trouble Shooting					
	Trouble Shooting Setting					
	Trouble Shooting Disabled V					
	Save Trigger Trouble Shooting					
	Contents of the prompt message:					
	www.diadevice.com 說					
	Customer Privacy Practice:					
	By means of Trouble shooting feature error logs (including logs of					
	system, Dialup internet service, cloud service, port and so on.)					
	would be uploaded automatically to DIACloud servers when					
	cloud service fail, so as to facilitate rapid resolution of					
NEW	server issues or device errors with our customer supports. If you are unwilling to upload log data to DIACloud servers, click "Cancel" directly and this feature will be disabled					
	確定取消					
	Troubleshooting Setting Page:					
	I Trouble Shooting Setting					
	Trouble shooting function has been enabled, error logs (including logs of system, Dialup internet service, cloud service, port					
	and so on.) would be uploaded automatically to DIACloud servers when cloud service fail, so as to facilitate rapid resolution					
	of server issues or device errors with our customer supports.					
	If you are unwilling to upload log data to DIACloud servers, you can disable this function.					
	Trouble Shooting Enable ~					
	Trigger Times 30 Mins					
	Min Upload Interval 30 Mins					
	Save Trigger Trouble Shooting					

Download Link

DX-2100L1-CN V1.5.0.12



Edition 2022-Q4

2.11 UPDATE – DX2300LN-WW, DX2300LN-CN Cloud Router Firmware Update to Version 1.5.2.0

Description

- Added internal registers \$900~\$914 (the communication status of the lower device) as the ones to be uploaded to DIACloud. So that users can check the communication status of the lower device on DIACloud
- 2. This series supports MODBUS and MODBUS TCP function code 16
- 3. Added setting options Specified Server and Server List on the Cloud Configuration page. Once the Specified Server option is enabled, users can select a specific DIACloud Server from the Server List to establish a connection with DX-2300LN

oud Conngulations			
ons			
jackfung220@gmail.com			
······ Verify			
111111 ~			
DX3021_EB8B			
Available			
HCP server is available, and the IP address is allocated by the DHCP server in secure tunne			
of this device can be found in the cloud portal			
Yes 🗸			
Yes 🗸			
China-Guangdong (57 ms)			

Bind



Added a check mechanism to verify the permission to visit DIACloud SSL/TLS Server when executing the Diagnosing and Cloud Service Diagnose on the Network Diagnosis page

 [▲] SYSTEM > Network Diagnosis

Network Diagnosis			
Diagnosing Method	Noud Service Diagnose 🗸		
Host Name/IP Address	/ww.diacloudsolutions.com ~	Start	
- 139.159.143.242:22013	52 ms		
- 40.126.120.34:22013	61 ms		
- 36.133.38.136:22013	96 ms		
- 36.134.193.98:22013	106 ms		
- 13.232.11.214:22013	147 ms		
- 52.12.232.222:22013	157 ms		
- 51.105.105.168:22013	209 ms		
- 15.161.64.75:22053	243 ms		
- 52.28.176.236:22013	288 ms		
- 54.94.192.194:22013	317 ms		
- 13.244.105.100:22013	422 ms		
Connect to tunnel server	Success		
Connect to data collection se	rver Start		
- 119.91.137.218:22015	38 ms		
- 120.78.15.160:22015	43 ms		
- 52.12.232.222:22015	157 ms		_
- 119.91.137.218:22015	SSL/1	FLS Failed	
- 120.78.15.160:22015	SSL/1	FLS Failed	
- 52.12.232.222:22015	SSL/1	FLS Failed	
Connect to data collection se	rver Faile	≥d	
•			

- 5. Fixed an issue that if the delay time of the DIACloud connection exceeds 1000 ms, the delay time record on DX-2300LN will be incorrect
- 6. Fixed an issue that the NTP synchronization cannot succeed
- 7. To minimize the risk of triggering RESET by mistake, increased the pressing button time for the RESTART and RESET to get started. And updated the corresponding READY LED status

	Restart	Reset
OLD	Press the RESET button for <=3 seconds and then release the button. The device restarts and then the READY LED is ON.	Press the RESET button for >3 seconds and then release the button. All the LEDs start blinking. The device resets and then the READY LED is ON.
NEW	Press the RESET button for <=5 seconds and the READY LED starts blinking. After releasing the button, the READY LED goes OFF. The device restarts and then the READY LED is ON.	Press the RESET button for >=5 seconds and then release the button. The READY LED goes OFF. The device resets and then the READY LED is ON.



Edition 2022-Q4

8. Changed the default value of Trouble Shooting function from Enable to Disable and an explanation message will be prompted to inform users how this function works if users select Enable

OLD	The default value of T	ouble Shooting function is Enable.					
	The default value of Trouble Shooting function is Disable. Once this function is enabled, a						
	prompt message inform	ns users that error logs will be uploaded automatically to DIACloud.					
	Trouble Shooting Troub	le Shooting					
	$\hat{\pi}$ SYSTEM > Trouble Shooti	na					
	🔳 Trouble Shooting Se	tting					
	Trouble Shooting	Disabled 🗸					
		Save Trigger Trouble Shooting					
	Contonto of the promp	t maaaaga:					
	Contents of the promp	t message.					
	www.diadevice.com	說					
	Customer Privacy Practi	Ce.					
	By means of Trouble sh	poting feature, error logs (including logs of					
	system, Dialup internet	service, cloud service, port and so on.)					
	would be uploaded aut	omatically to DIACloud servers when					
	cloud service fail, so as to facilitate rapid resolution of server issues or device errors with our customer supports.						
NEW							
	If you are unwilling to upload log data to DIACloud servers, click "Cancel" directly and this feature will be disabled. 確定 取消						
	Trouble Shooting Setti	ng Page:					
	🔳 Trouble Shooting Setti	ıg					
	Tranklashari'na Gwaian haa baar	and a second					
	and as an a second be unlessed and	enabled, error logs (including logs of system, Diatup internet service, cloud service, port					
	and so on.) would be uploaded aut	I contraction with device, please check the network 1.					
	of server issues or device errors wi	in our customer supports.					
	If you are unwitting to upload log o	ata to DIACiond servers, you can disable this function.					
	Trouble Shooting	Enable V					
	Trigger Times	30 Mins					
	Min Upload Interval	30 Mins					
		Save Trigger Trouble Shooting					



Industrial Automation Products

Edition 2022-Q4

9. Increased the maximum number of port forwards to 20

OLD	Up to 10 sets of port	forward c	an be used.				
	Up to 20 sets of port	Up to 20 sets of port forward can be used.					
					Add A	Port Forward Rule	
	ID Service Name	Protocol	Public Port	Server Port	Server IP Address		
	1 PL1	TCP/UDP	78:78	502:502	192.168.5.55	Edit Delete	
	☆ FIREWALL > Por I Add A Port Fo						
NEW	Network Services	Customized					
	Service Name		rvice Name PL1				
	Protocol		TCP/UDP 🗸				
	Public Port		Single Port ~	78 (1~65534)		
	Server Port		Single Port ~	502 (1~65534)		
	Server IP Address		192.168.5. 5	5			
				Save	e Back		

Download Link

DX-2300LN-WW, DX2300LN-CN V1.5.2.0

2.12 UPDATE – DX3021L9 Cloud Router Firmware Update to Version 1.24

Description

 Added internal registers \$900~\$914 (the communication status of the lower device) as the ones to be uploaded to DIACloud. So that users can check the communication status of the lower device on DIACloud



Industrial Automation Products

Edition 2022-Q4

2. Added more communication statuses on Router Status page for users to check, including RS-232 Mode, RS485 Mode, MODBUS TCP Mode and Siemens TCP Mode

 \hat{m} STATUS > Device Information

🖩 Router Status			
Device Name	DX3021_EB8B		
Network Status	Offline	Cloud Service	Unbound
CPU Usage	54%	Memory Usage	55%
Total Memory	251964KB	Memory Used	140596KB
RS-232 Mode	Close	Status	N/A
RS-485 Mode	Close	Status	N/A
Modbus TCP Mode	Modbus TCP Server+Client	Client Status	Normal
Siemens TCP Mode	Client	Status	Normal



- Edition 2022-Q4
- 3. Added more connection information on Uplink Network Status page, including information concerning Connection Priority, Network Signal and Network Record

Connectio	n Priority	v							
Users can	see the	, connectior	n priori	ty and the	connectio	n status	in this se	ection. Clie	ck View to see
more deta	ils.			,					
🔳 Conne	ction Prio	ority							
Primary Con	inection	Cellular Lir	nk1	Enable		View	Current Cor	nnection	
Secondary (Connection	Disabled				View			
Tertiary Con	nection	Disabled				View			
Network S	ianal								
The netwo minutes of	ork signa	ll strength c work signal	of the in streng	nstalled Sl ath are sho	IM card is own in the	recorde network	d per min signal cl	ute. And t nart.	he last 120
I Network	Signal 1	20 points per link,	one point	per minute			U		
			Si	gnal Streng	th				
-40 -									
	٨	\		Μ Λ	Λ	_	. 1		
-60	√∖∖∕∖∕	31 • SIM1: -5	W	/'W VV	WW	v W	^√√		
표 8월 -80 -								 ➡ SIM1 ➡ SIM2 	
-100 -									
-120 -	<u></u>	20	40	50	80	100	120		
,	J	20	40	ου	00	100	120		
Network R	ecord								
Network r	ecord in	cludes MA	C addr	ess, IP ad	ldress, DN	IS serve	r, proxy a	nd so fort	h.
I Networ	k Records	2		,	,	-	, , ,		
		, 	- ·						
Nov 3 Nov 3	16:32:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2]. mode[2].		A
Nov 3	16:12:20	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	16:02:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	15:52:22	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	15:42:21	<0x02100001>	[Irace]	[cellular1]	Link detect	success,	mode[2].		
NOV 3	15:32:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2]		
Nov 3	15:12:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	15:02:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	14:52:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	14:42:22	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	14:32:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	14:22:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
Nov 3	14:12:21	<0x02100001>	[Trace]	[cellular1]	Link detect	success,	mode[2].		
NOV 3	13:52:21	<0X02100001>	[Trace]	[cellular1]	LINK detect	success,	mode[2].		
Nov 3	13:52:13	<0x02100003>	[Trace]	[cellular1]	Update the	value of [cellular1_d	Ins2] to [61	.31.233.1] 🗸



Industrial Automation Products

Edition 2022-Q4

4. Added setting options Data Channel Status and Secure Tunnel Status on the Cloud Configuration page. You can enable or disable the functions

Cloud Configurations Configure cloud service

 \hat{m} CLOUD SERVICE > Cloud Configurations

User Name:	jackfung220@gmail.com	l			
Registration Status	Registered	Unbind			
Data Channel Status	Enabled	Disable			
Secure Tunnel Status	Enabled Disable				
Secure Tunnel:	111111				
Device Name:	DX3021_EB8B				
Secure Tunnel DHCP:	Available				
Get IP From Cloud:	Yes				
Network Protocol:	UDP				
Current Server:	Auto				
Specified Server:	No 🗸	Save			



5. Added setting options Specified Server and Server List on the Cloud Configuration page. Once the Specified Server option is enabled, users can select a specific DIACloud Server from the Server List to establish a connection with DX-3021L9

Cloud Configurations Configure cloud service				
$\hat{\pi}$ CLOUD SERVICE > Cloud C	Configurations			
Cloud Configurations				
User Name:	jackfung220@gmail.com			
Password:	Verify			
Secure Tunnel:	111111 ~			
Device Name:	DX3021_EB8B			
Secure Tunnel DHCP:	Available			
When secure tunneling DHCP	server is available, and the IP address is allocated by the DHCP server in secure tunnel			
network, the IP address of this	s device can be found in the cloud portal			
Get IP From Cloud:	Yes 🗸			
Network Protocol:				
Specified Server:	Yes 🗸			
Server List:	China-Guangdong (57 ms)			

 Added a check mechanism to verify the permission to visit DIACloud SSL/TLS Server when executing the Diagnosing and Cloud Service Diagnose on the Network Diagnosis page

 [▲] SYSTEM > Network Diagnosis

🗏 Network Diagnosis			
Diagnosing Method	Cloud Service Diagnose ~		
Host Name/IP Address	www.diacloudsolutions.com \checkmark	Start	
- 139.159.143.242:22013	52 ms		
- 40.126.120.34:22013	61 ms		
- 36.133.38.136:22013	96 ms		
- 36.134.193.98:22013	106 ms		
- 13.232.11.214:22013	147 ms		
- 52.12.232.222:22013	157 ms		
- 51.105.105.168:22013	209 ms		
- 15.161.64.75:22053	243 ms		
- 52.28.176.236:22013	288 ms		
- 54.94.192.194:22013	317 ms		
- 13.244.105.100:22013	422 ms		
Connect to tunnel server	Success		
Connect to data collection	server Start		
- 119.91.137.218:22015	38 ms		
- 120.78.15.160:22015	43 ms		
- 52.12.232.222:22015	157 ms		
- 119.91.137.218:22015	SSL/TLS	Failed	
- 120.78.15.160:22015	SSL/TLS	Failed	
- 52.12.232.222:22015	SSL/TLS	Failed	
Connect to data collection	server Failed		
4			



- 7. Fixed the security vulnerability issue of the special language input method for the webpage
- 8. Fixed an issue that if the delay time of the DIACloud connection exceeds 1000 ms, the delay time record on DX-2300LN will be incorrect
- 9. Fixed an issue that the Siemens TCP Mode on the Router Status page cannot be shown correctly
- 10. To minimize the risk of triggering RESET by mistake, increased the pressing button time for the RESTART and RESET to get started. And updated the corresponding READY LED status

	Restart	Reset
OLD	Press the RESET button for <=3 seconds and then release the button. The device restarts and then the READY LED is ON.	Press the RESET button for >3 seconds and then release the button. All the LEDs start blinking. The device resets and then the READY LED is ON.
NEW	Press the RESET button for <=5 seconds and the READY LED starts blinking. After releasing the button, the READY LED goes OFF. The device restarts and then the READY LED is ON.	Press the RESET button for >=5 seconds and then release the button. The READY LED goes OFF. The device resets and then the READY LED is ON.



Edition 2022-Q4

11. Changed the default value of Trouble Shooting function from Enable to Disable and an explanation message will be prompted to inform users how this function works if users select Enable

OLD	The default value of Trouble Shooting function is Enable.							
	The default value of Trouble Shooting function is Disable. Once this function is enabled, a							
	prompt message informs users that error logs will be uploaded automatically to DIACloud.							
	Trouble Shooting Trouble Shooting							
	- STSTEM > Houble Shooting							
	Trouble Shooting Setting							
	Trouble Shooting Disabled V							
	Save Ingger Houble Shooling							
	Contents of the prompt message:							
	ununu diadovico com 的							
	Customer Privacy Practice:							
	By means of Trouble shooting feature, error logs (including logs of							
	system, Dialup internet service, cloud service, port and so on.)							
	would be uploaded automatically to DIACloud servers when							
	cloud service fail, so as to facilitate rapid resolution of							
NEW	server issues or device errors with our customer supports.							
	"Cancel" directly and this feature will be disabled							
	Troubleshooting Setting Page:							
	I Trouble Shooting Setting							
	Irouble shooting function has been enabled, error logs (including logs of system, Dialup internet service, cloud service, port							
	and so on.) would be uploaded automatically to DIACloud servers when cloud service fail, so as to facilitate rapid resolution							
	of server issues or device errors with our customer supports.							
	If you are unwilling to upload log data to DIACloud servers, you can disable this function.							
	Trouble Shooting Enable V							
	Trigger Times 30 Mins							
	Min Upload Interval 30 Mins							
	Save Trigger Trouble Shooting							



Industrial Automation Products

Edition 2022-Q4

12. Updated the default value of the Detect Interval from 60 to 600 seconds. And the setting range has changed from 30~300 seconds to 30~1200 seconds

OLD	Default value: 60 seconds; setting range: 30~300s						
	Default value: 600 seconds; setting range: 30~1200s						
	Connection Priority Settin	g the internet connection priority					
	$\hat{\mathbf{x}}$ NETWORK > Connection Priority						
	Connection Priority						
	Primary Connection	Cellular Link1 🗸					
	Secondary Connection	Disabled V					
NEW	Tertiary Connection	Disabled ~					
	Auto Detect	Cloud Service V					
	Dial Failed To Restart	Disabled ~					
	Detect Interval	600 (30~1200s)					
	Default SMS SIM	SIM1 ~					
	Save	Cancel					

13. Updated the options under the Local Log

OLD	Log Type: Informative log, Warning log, Debug log					
NEW	Updated Log Typ Added Log Modu sTATUS > Local Log Local Log Log Type Log Module	be: Debug, Tra ile: System, Ne ✓ ^{Debug} ✓ ^{System}	Ce etwork, Interfac Trace Network	Refresh C	ice	



Industrial Automation Products

Edition 2022-Q4

14. Updated the content on the Traffic Statistics page

	Only traffics of cellular network and LAN are shown.								
	III Traffic Of Cellul	ar Network							
	Cellular Link1 Sent	0 bytes	Cellular Link1 Recei	ved 0 bytes					
	Cellular Link2 Sent	0 bytes	Cellular Link2 Recei	ved 0 bytes					
	WIFI Sent	0 bytes	WIFI Received	0 bytes					
ULD	WAN Sent	2654336 bytes	WAN Received	8391035 bytes					
	Traffic Of LAN								
	Data Sent:	2719891 bytes	Data Receive	d: 589405 bytes		5			
				·····					
	The traffics are categorized to 4G, Wi-Fi, WAN and LAN. And the traffics are calc according to the groups, Today, Yesterday. This Week and This Month.								
	Traffic Of Cell	ular (Bytes)							
			Today	Yesterday	This Week	This Month			
	Cellular Lin	k1 Sent	7340522	0	7340522	7340522			
	Cellular Link1	Received	3946706	0	3946706	3946706			
	Cellular Lin	k2 Sent	0	0	0	0			
	Cellular Link2	Received	0	0	0	0			
	Total		11287228	0	11287228	11287228			
	Traffic Of WAN (Bytes)								
			Today	Yesterday	This Week	This Month			
NEW	WAN S	ent	0	0	0	0			
	WAN Rec	eived	0 0		0 0				
	I Traffic Of Wi-Fi (Bytes)								
			Today	Yesterday	This Week	This Month			
	WIFI S	ent	0	0	0	0			
	WIFI Rec	eived	0	0	0	0			
	Traffic Of LAN (Bytes)								
			Today	Yesterday	This Week	This Month			
	LAN Se	ent	10326264	4708900	15035164	15035164			
	LAN Received								



Industrial Automation Products

Edition 2022-Q4

15. Updated the items shown on the Cloud Status page

	Only Registration Status, Service Status, Activated Time are shown.						
	I Cloud Status						
OLD	Registration Status:	Not registered					
	Service Status:	Disabled					
	Activated Time:	N/A					
	 The following statuses a Cloud Records. Deleted Activated Time. 	re added, Data Channel Status, Secure Tunnel Status and					
	 						
		ed					
		ed					
NEW	 ✿ STATUS > Cloud Status ■ Cloud Status ■ Registration Status Not register Registration Time N/A Data Channel Status Disabled Secure Tunnel Status Disabled 	ed					
NEW		ed					
NEW		ed [Debug] Vidagrid disabled. [Debug] Data channel not connected. [Debug] Data channel not connected.					
NEW	☆ STATUS > Cloud Status IIII Cloud Status Registration Status Not register Registration Time N/A Data Channel Status Disabled Secure Tunnel Status Disabled IIIII Cloud Records IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	ed [Debug] Vidagrid disabled. [Debug] Data channel not connected. [Debug] Secure tunnel not connected. [Debug] Join domain failed. [Debug] User logout.					
NEW		ed [Debug] Vidagrid disabled. [Debug] Data channel not connected. [Debug] Secure tunnel not connected. [Debug] Join domain failed. [Debug] User logout. [Debug] Data channel connected. [Debug] Data channel not connected. [Debug] Data channel not connected. [Debug] Data channel not connected. [Debug] Data channel not connected.					
NEW	✿ STATUS > Cloud Status IIII Cloud Status Registration Status Not register Registration Time N/A Data Channel Status Disabled Secure Tunnel Status Disabled IIIII Cloud Records Nov 3 14:08:26 <0x05010004> Nov 3 14:08:26 <0x05010004> Nov 3 14:08:08 <0x05010002> Nov 3 14:08:08 <0x05010002> Nov 3 13:58:10 <0x05020001> Nov 3 13:58:10 <0x05020001> Nov 3 13:57:35 <0x05010001>	ed [Debug] Vidagrid disabled. [Debug] Data channel not connected. [Debug] Secure tunnel not connected. [Debug] Join domain failed. [Debug] Join domain failed. [Debug] Data channel connected. [Debug] Data channel not connected. [Debug] Data channel not connected. [Debug] Secure tunnel connected. [Debug] Secure tunnel connected. [Debug] Join domain success, register time: 2022-11-03 05:57:35 UTC.					



16. Updated options under DO Setting

OLD	When the System Event is detected, the option Triggering DO1 is triggered and DO LED is ON. After the System Event is restored, the DO LED stays ON								
	1. Removed the setting option, DO OFF, under Triggering DO1 and Triggering DO2.								
	☆ INTERFACE > DI/D	Disabled	~	Triggering Event	Disabled	~			
	DI2	Disabled	~	Triggering Event	Disabled	~			
	🔳 DO Setting								
	System Event	Internet Disconnected	~	Triggering DO1	DO Off	~			
	System Event	Internet Connected	~	Triggering DO2	DO Off	~			
NEW	2. When the Syst is ON. After the S INTERFACE > DI/DO DI Setting	em Event is deteo System Event is re	cted, the operation of	otion Triggering DO LED is OF	DO1 is triggere F.	d and DO LED			
	DI1	Disabled	~	Triggering Event	Disabled	~			
	DI2	Disabled	~	Triggering Event	Disabled	~			
	DO Setting								
	System Event	Internet Disconnected	~	Triggering DO1	DO On	~			
	System Event	Internet Connected	~	Triggering DO2	DO On	~			
			Save	Cancel					

17. Removed the Cloud SMS Gateway funciton from the Send Short Message on Event Management page

☆ SYSTEM > Event Management									
Event Manager	🔳 Event Management								
Event Type Alarm Event 🗸									
iii									
Send Short Message E	Send Short Message By Device SIM Card - Save								
Please ensure the data traffic of your SIM card is available if you choose send short messge by device SIM card, or it will									
affect the functionality !									
	Add	Export Configure L	.ist	Import Configure	List	選擇檔案沒有選擇	檔案		
Alarm Name	Alarr	n Description	A	Alarm Criteria	Та	arget Receiver	Status	Operation	


18. Removed the Communication verification funciton from the Event Type on Event Management page

📕 Event Management	:				
Event Type	Alarm Event	~			
=					
Send Short Message By	Device SIM Card ~	Save			
Please ensure the data tra	affic of your SIM card is	available if you choose	send short messge by de	vice SIM card	d, or it will
affect the functionality !					
A	dd Export Configure I	List Import Configure	List 選擇檔案 沒有選擇	檔案	
Alarm Name	Alarm Description	Alarm Criteria	Target Receiver	Status	Operation

Download Link

DX-3021L9 V1.24

☆ SYSTEM > Event Management

2.13 UPDATE – DCT-MV Wiring Length Increase

Objective

The wiring length of DCT-MV series has changed from 1,200 mm to 2,000 mm to meet more application requirements.



Related Products

DCT-MV005-3 DCT-MV060-3 DCT-MV100-3 DCT-MV200-3 DCT-MV300-3 DCT-MV400-3

With production dates after week 42, 2022. The information can be obtained from the serial number on the product label, e.g. IDCTxxxxW2242xxxx was produced in 2022, week 42.

2.14 UPDATE – DIAVH Core-i IPC/PPC Upgrade to 7th Generation Core[™] i CPU

Description

Item	Before	After
Core-i3 CPU Number	i3-6100U	i3-7100U
Core-i5 CPU Number	i5-6200U	i5-7200U



Edition 2022-Q4

Applicable Models

DIAVH-IPC0031xx
DIAVH-IPC0051xx
DIAVH-IPC0031xxA
DIAVH-IPC0051xxA
DIAVH-PPC1531xx
DIAVH-PPC1551xx
DIAVH-PPC1531xxA
DIAVH-PPC1551xxA
DIAVH-PPC1731xx
DIAVH-PPC1751xx
DIAVH-PPC1731xxA
DIAVH-PPC1751xxA
DIAVH-PPC1931xx
DIAVH-PPC1951xx
DIAVH-PPC1931xxA
DIAVH-PPC1951xxA
DIAVH-PPC2131xx
DIAVH-PPC2151xx
DIAVH-PPC2131xxA
DIAVH-PPC2151xxA

Release Date: Around September 05, 2022 (Week 2236), stock-dependent, running change.

You can find the serial number on the Core-i series product label of the IPC/PPC. If the serial number is IPCxxxxxxW2236xxxx or PPCxxxxxW2236xxxx (indicating year 2022, week 36) or later, it means the package is equipped with Intel® 7th Gen Core™ i CPU.

2.15 UPDATE – DIAVH Core-i IPC/PPC Upgrade to 8th Generation Core[™] i CPU

Description

Item	Before	After
Core-i3 CPU Number	i3-6100U	i3-8145U
Core-i5 CPU Number	i5-6200U	i5-8265U

Changed I/O placement on IPC/PPC series accordingly

- 1. Changed the placement of USB ports
- 2. Removed MIC IN port



Industrial Automation Products

Edition 2022-Q4

Before



After



Applicable Models

IPC/PPCDIAVH-PPC1751xx DIAVH-PPC1731xxA DIAVH-PPC1931xx DIAVH-PPC1931xx DIAVH-PPC1951xx DIAVH-PPC1931xxA DIAVH-PPC1951xxA DIAVH-PPC1951xxA DIAVH-PPC2131xx DIAVH-PPC2131xx DIAVH-PPC2151xx DIAVH-PPC2131xx		DIAVH-IPC0031xx DIAVH-IPC0051xx DIAVH-IPC0031xxA DIAVH-IPC0051xxA, DIAVH-PPC1531xx DIAVH-PPC1551xx DIAVH-PPC1551xxA DIAVH-PPC1551xxA
DIAVH-PPC2151xx	IPC/PPC	DIAVH-IPC0051xxA, DIAVH-PPC1531xx DIAVH-PPC1551xx DIAVH-PPC1551xxA DIAVH-PPC1551xxA DIAVH-PPC1731xx DIAVH-PPC1751xx DIAVH-PPC1751xxA DIAVH-PPC1931xx DIAVH-PPC1951xx DIAVH-PPC1951xxA DIAVH-PPC1951xxA DIAVH-PPC1951xxA DIAVH-PPC1951xxA DIAVH-PPC1951xxA
		DIAVH-PPC2151xx DIAVH-PPC2131xxA DIAVH-PPC2151xxA

Release Date: Around September 12, 2022 (Week 2237), stock-dependent, running change.

You can find the serial number on the Core-i series product label of the IPC/PPC. If the serial number is IPCxxxxxxW2237xxxx or PPCxxxxxW2237xxxx (indicating year 2022, week 37) or later, it means the package is equipped with Intel® 8th Gen Core™ i CPU.



Industrial Automation Products

Edition 2022-Q4

2.16 UPDATE – EIP Builder Version 1.09 Release

Corrections

Delta releases the newest version of the EIP Builder software. This software tool supports Ethernet/IP network planning, data exchange planning, data upload and download as well as diagnosis for networks that include Delta products. It facilitates IP address setting and import of EDS files.



Description

1. EIP Builder added "Clear Rapid Faults" button; with one click, users can clear rapid faults of the network status by employing the explicit message "Clear_Rapid_Faults" (code: 16#4C)

Network View # ×			
Network_0			
		a nan ang man ang man kan ang man ang man	
	253 20000-D.		
	B		
	8		
Information EIP Paramete	Device Parameter		>
Module Status	(t) t)		
Connection	Name	Value	
Port Status	v DLR Network Information		
DLR	Network Topology	Linear	
	Network Status	Normal	Clear Rapid Faults
	Active Supervisor Address	IP: 0.0.0.0 MAC: 00:00:00:00:00:00	
	Active Supervisor Precedence	0	
	 DLR Network Diagnostics 		
	Ring Fault Count	0	Clear
	Ring Supervisor Active Status	Non-DLR Topology	
	Last Active Node on Port 1	IP: 0.0.0.0 MAC: 00:00:00:00:00:00	
	Last Active Node on Port 2	IP: 0.0.0.0 MAC: 00:00:00:00:00:00	

- 2. The Merge AIO Module function is available, when AHCPU5X1-EN (FW: V2.04 or later) or AHCPU560-EN2 (FW V1.10 or later) works with the remote modules, e.g. AHRTU-ETHN-5A (FW V1.04.0 or later) and AS00SCM-RTU (AS-FEN02) (FW V1.00.0 or later); all the data exchange connections can be combined to one connection. The number of CPU data exchange connections can be reduced and the number of remotely connected modules can be increased
 - 2.1. When working with the remote module AHRTU-ETHN-5A (FW V1.04.0 or later): The combined connection for data exchange (CIP) can be used by AHRTU-ETHN-5A and its connected right-side AIO modules on the extension backplanes.



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Example: The AIO modules AH04AD-5A and AH08AD-5A are connected to the right-side backplane of AHRTU-ETHN-5A for data exchange.



Previous versions allocated separate data exchange areas to the AIO modules.

	HCPU531 (P0)										
₽ S	CP connection used: 3 TCP connection used: 1 Assume scan time: 5 EP theoretical rate: 455 packets per second (pps)										
	Enable	TAG	IP Address	Adapter Name	CPU Address/TAG	<>>	Adapter Address/Parameter/TAG		Length (Byte)	Property	
1			192.168.1.1 *	AHRTU-ETHN-5A(Dev_1)	D + X	-			32		
					D + Y	-			32		
▶ 2			192.168.1.1	AHRTU-ETHIN-5A (R:1 S:1)	D72	+	Input		16		
						-	Output		0		
3			192.168.1.1	AHRTU-ETHN-5A (R:1 S:2)	D80	-	Input		32		
						-	Output		0		
4			•			-					
						-					



Version 1.09 provides the "Merge AIO Module" option.

Dev_1(AH	RTU-ETHN-5A) - RT	U CONFIG	
🖪 X 🗈	n / / / .	🗊 🎇 Scanner:	AHCPU531 (P0)
🚰 File Edit	Option		_
Product List	Pload Upload	Ctrl+F9	
+Extension I	🛄 Download	Ctrl+F8	
	TA I/O Scan	Ctrl+N	
Analog I/O	🖉 Online Mode	Ctrl+F4	RTU
Temperatu	Monitor Table		
+INETWORK IN			
	Search	Ctrl+F	
	Alter Overall Fin	mware Version	
	PO List		
	 Merge AIO Mod 	lule	

After activating that function, the AIO modules work like a single, larger module

<									>
🔵 AHO	PU531 (P0)								
P位址	LIMPS CIP (#	用連線數::	2 TCP 使用速線數: 1	假說掃描時間: S EIP 理	論速率: 405 packets per second (pps)				
	数用	TAG	19 位址	從站名稱	CPU 暫存器地址/TAG	<>>	Adapter 暫存器位址/參數/TAG	長度(Byte)	屬性
1			192.168.1.1	AHRTU-ETHN-5A(Dev_1)	D + X	+		32	
					D + Y	-		32	
▶ 2			192.168.1.1	AHRTU-ETHN-5A(Dev_1)All AIO Module	ref RTU CONFIG	+	Input	48	
					ref RTU CONFIG	-	Output	0	
3						+			
						-			

2.2. When working with the remote module AS00SCM-RTU(AS-FEN02) (FW V1.00.0 or later): The combined connection for data exchange (CIP) can be used by AS00SCM-RTU & AS-FEN02 and its connected right-side AIO modules





Example: The AIO modules AS04AD-A and AS08AD-C are connected to the right side of AS00SCM-RTU & AS-FEN02 for data exchange.



Previous versions allocated separate data exchange areas to the AIO modules.

🔴 AH	CPU531 (PO)										
IP So	P Sotting CP connection used: 3 TCP connection used: 1 Assume scan time: 5 EP theoretical rate: 455 packets per second (pps)										
	Enable	TAG	IP Address	Adapter Name	CPU Address/TAG	<>>	Adapter Address/Parameter/TAG		Length (Byte)	Property	
1			192.168.1.1	AS00SCM-RTU(AS-FEN02)(Dev_1)	D + X	+			60		
					0 + Y	-			40		
▶ 2			192.168.1.1	AS005CM-RTU(AS-FEN02) (R:1 S:1)	D90	+	Input		40		
						-	Output		0		
3			192.168.1.1	AS005CM-RTU(AS-FEN02) (R:1 5:2)	D110	+	Input		40		
						•	Output		0		
4						+					

Version 1.09 provides the "Merge AIO Module" option.



After activating that function, the AIO modules work like a single, larger module

	PU531 (PO)				· · · · · ·					
IP Sort	tting CIP co	onnection use	ed: 1 TCP (connection used: 1	Assume scan time: 5	EIP theoretical rate: 2	205 packets pe	second (pps)		
	Enable	TAG	IP Address		Adapter Name	CPU Address/TAG	<->	Adapter Address/Parameter/TAG	Length (Byte)	Property
▶ 1			192.168.1.1	 AS00SCM-RTU 	(AS-FEN02)(Dev_1) + Al AIO Module	D + X	+		140	
						D + Y	-		40	
2				*			+			
							-			



- Edition 2022-Q4
- 3. Added IP Manager Tool, available for the following Ethernet/IP devices. You can broadcast search, download and edit the Ethernet basic settings, including IP address, description, password, and IP configuration (Static/DHCP)

Series	Modules
DVP	DVP-ES2-E, DVP-SE, DVP-MC, DVPEN01-SL, DVP-FEN01, RTU-EN01
AS	AS500, AS-FEN02, AS-FOPC02, AS-FFTP01
Others	IFD9506, DVS-103I02C-DLR, DTM-E, CMC/CMM communication cards



- Edition 2022-Q4
- 3.1. After selecting the corresponding adapter, you can use broadcast search to find a suitable Ethernet/IP device

Beinnet Description Descript	Element Count In Progress Result IndeR(F) Element Connection [217-LM 0.0.0 PSearch Count IN Broadcast Search IndeR(F) Element Connection [217-LM 0.0.0 MAC Address Progress Result IndeR(F) Element Adapter for VMmetB Element Adapter for VMmetB 0.0.0 MAC Address Progress Result IndeR(F) Dual Band Wreises-XC 7255 0.00 0.0.2 0.0.	ection	Setup							Communic	ation Setting		
Intel(F) Ethernet Connection (217-LM United(F) Ethernet Connection (217-LM United(F) Ethernet Connection (217-LM Whware Virtual Ethernet Adapter for VMnet1 United(F) Ethernet Adapter for VMnet1 Ethernet Adapter for VMnet1 Ethernet Adapter for VMnet1 192:168.2.200 DVF50MC11TLA. DVP MC DHCP 255.255.255.0 192.168.1.1 00.18.23.30.4. 0% 192:168.2.203 DVF50MC11TLA. DVP MC DHCP 255.255.255.0 0.0.0.0 04.82.33.0.4. 0% 192:168.2.203 DVF15MC11TLA. DVP MC DHCP 255.255.255.0 0.0.0.0 04.82.33.0.4. 0% 192:168.2.203 DVF15MC11TLA. DVP MC DHCP 255.255.255.0 0.0.0.0 04.82.33.0.4. 0% 192:168.2.203 DVF15MC11TLA. DVP MC DHCP 255.255.255.0 0.0.0.0 04.82.33.0.4. 0% 192:168.2.204 DVF50MC11TLA. DVP MC DHCP 255.255.255.0 0.0.0.0 04.82.33.0.4. 0% 192:168.2.205 DVF50MC11TLA. DVP MC DHCP 255.255.255.0	Intel®(Ethemet Connection (217-LM Control (217-LM Control (217-LM) What is Ethemet Adapter for VM-tell Control (217-LM) Control (217-LM) What is Ethemet Adapter for VM-tell Control (217-LM) Control (217-LM) What is Ethemet Adapter for VM-tell Control (217-LM) Control (217-LM) Impl(R) Dial Band Wreless-AC 7255 DHCP 255 255 255.0 192.168.1.1 0018233:04. 0% Impl(R) 192.168.2.207 DVP50MC11TLA. DVP MC State< 255 255.55.0 100.0 001823:31.0. 0% Impl(R) 192.168.2.209 DVP50MC11TLA. DVP MC DHCP 255 255.55.0 100.0 01823:31.0. 0% Impl(R) 192.168.2.203 DVP1SMC11TLA. DVP MC DHCP 255 255.55.0 100.0 01823:31.0. 0% Impl(R) 192.168.2.203 DVP1SMC11TLA. DVP MC DHCP 255 255.55.0 100.0 01823:31.0. 0% Impl(R) 192.168.2.20 DVPDC DHCP 255 255.55.0 100.0 01823:31.0. 0% Impl(R)<	Et	nemet						-	0.0.0.0	IP Sear	h Count 11	Broadcast Search
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Marce Visual Ellement Adapter for VMest Galeway MAC Address Progress Result 1 192:168.2.207 DVP50MC11T-0. DVP 50MC11T-0. DVP 60MC DHCP 255.255.255.0 192:168.1.1 00:18.23:310.2. 0% 1 192:168.2206 DVP50MC11T-E. DVP MC DHCP 255.255.255.0 192:168.1.1 00:18.23:3DE. 0% 1 192:168.2206 DVP50MC11T-E. DVP MC DHCP 255.255.255.0 192:168.1.1 00:18.23:3DE. 0% 1 192:168.2206 DVP50MC11T-E. DVP MC DHCP 255.255.255.0 192:168.1.1	Universe Universe Otherwy MAC Address Progress Result 192168.2207 DVP50MC11T-06 DVP 50MC-06 DHCP 265255250 192.168.1.1 0018233G4 0% 192168.2207 DVP50MC11T-06 DVP MC State 255255250 0.0.0 84.E818C68. 0% 192168.2207 DVP50MC11TLA. DVP MC DHCP 255255250 0.0.0 0.01823313D. 0% 192168.2203 DVP50MC11TLA. DVP MC DHCP 255255250 102.168.1 0.1823312D. 0% 192168.2203 DVP50MC11TLA. DVP MC DHCP 255255250 0.0.0 0.1823312D. 0% 192168.2204 DVP50MC11TE. DVP MC DHCP 255255250 0.0.0 0.1823312D. 0% 192168.2205 ASFENO2 DHCP 255255250 100.0 0.1823312D. 0% 192168.2204 IPFBMC11TLE. OVP MC State 255255250 100.0 0.18231302. 0% <	Int VM	el(R) Ethernet Connect	tion I217-LM Adapter for VMnet1									
Intellify Dual Band Wireless AC 2265 DVP 50MC117 LA. DVP 50MC117 LA. DVP MC State 255 255 255 0 102 168.11 0018 23 30 c 0% Image: State 2007 DVP50MC117 LA. DVP MC DHCP 255 255 255 0 0.0.0 64 EB 18 C8 E 0% Image: State 2007 DVP50MC117 LA. DVP MC DHCP 255 255 255 0 0.0.0 0018 23 30 L 0% Image: State 2007 DVP50MC117 LA. DVP MC DHCP 255 255 255 0 0.0.0 0018 23 31 D 0% Image: State 2007 DVP50MC117 LA. DVP MC DHCP 255 255 255 0 0.0.0 0018 23 30 E 0% Image: State 2007 DVP50MC117 LA. DVP MC DHCP 255 255 255 0 0.0.0 0018 23 30 E 0% Image: State 2007 DVP50MC117 Eb DVP MC DHCP 255 255 255 0 0.0.0 0018 23 30 E 0% Image: State 2006 DVP50MC117 Eb DVP MC DHCP 255 255 255 0 0.0.0 0018 23 30 E 0% Image: State 2007 IPVFMC DHCP 255 255 255 0 0.0.0 0018 23 1001 0% <	Interf. Dual Band Wirelews AC 7265 DVP 50MC-06 DHCP 255 255 255 0 192 (168.11 01/18.23.3C.4. 0% I 192 168.2.207 DVP50MC11T-G. DVP MC DHCP 255 255 255 0 192 (168.11 01/18.23.3C.4. 0% I 192 168.2.209 DVP50MC11T-LL DVP MC DHCP 255 255 255 0 0.0.0 01/18.23.3C.4. 0% I 192 168.2.133 AS532EST LM UNKnown Dwce(_ DHCP 255 255 255 0 192 168.1.1 01/18.23.37L.0. 0% I 192 168.2.030 DVP5MC11T-LL DVP MC DHCP 255 255 255 0 192 168.1.1 01/18.23.37L.0. 0% I 192 168.2.205 DVP5MC11T-LL DVP MC DHCP 255 255 255 0 0.0.0.0 00.182.33.302.0. 0% I 192 168.2.204 DVP5MC1TT-LL DVP MC DHCP 255 255 255 0 10.0.0 01/18.23.302.0. 0% I 192 168.2.204 DVP5MC1TT-LL DVP MC DHCP 255 255 255 0 10.0.0 01/18.23.302.0. 0%	VM	Iware Virtual Ethernet /	Adapter for VMnet8						Gateway	MAC Address	Progress	Result
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Instrume Instrume DVP SOMC11T LA DVP MC DHOP 255 255 255.0 0.0.0 0018 23:13.D. 0% Instrume AS532EST LAN Unknown Device(. DHOP 255 255 255.0 192 168.1.1 0018 23:13.D. 0% Instrume DVP ISMC11T LA DVP MC DHOP 255 255 255.0 0.0.0 0018 23:13.D. 0% Instrume DVP ISMC11T LA DVP MC DHOP 255 255 255.0 0.0.0 0018 23:3D.E. 0% Instrume DVP SOMC11T EM DVP MC DHOP 255 255 255.0 0.0.0 0018 23:3D.E. 0% Instrume DVP SOMC11T EM DVP MC DHOP 255 255 255.0 0.0.0 0018 23:31.00. 0% Instrume DVFSOMTIT LA DVP MC Static 255 255 255.0 0.0.0 0018 23:13.00. 0% Instrume DFSOT DHOP 255 255 255.0 0.0.0 0018 23:10.01. 0% Instrume Instrume Instrume 255 255 255.0 0.0.0 0018 23:10.01. 0% <tr< td=""><td>Image: Probability of the probability o</td><td></td><td>192.168.1.1</td><td>DVP15MC11T LA</td><td>DVP MC</td><td>Static</td><td>Ŧ</td><td>255.255.255.0</td><td>0.0.0</td><td>0.0</td><td>84:EB:18:C8:E</td><td>0%</td><td></td></tr<>	Image: Probability of the probability o		192.168.1.1	DVP15MC11T LA	DVP MC	Static	Ŧ	255.255.255.0	0.0.0	0.0	84:EB:18:C8:E	0%	
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3.2. Enter an IP address to search for the specific one

借 IP Se	etting T	ool											- 🗆 ×
Conne	ction Se	tup							- Communicat	tion Setting			
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Adapter	: Intel(R) Ethernet Connectio	on I217-LM					Ŧ	192.100.2.32	IP Sear	cn Count I	broadci	ist Search
- Comm	unicatio	n Setting											
		IP Address	Description	Device	Passwo	IP Configuration	Netmask		Gateway	MAC Address	Progress	Res	ult
•		192.168.2.52	AS-FEN02	AS-FEN02		DHCP -	255.255.255.0	192.	168.1.1	00:18:23:13:02	0%		
													Download



Industrial Automation Products

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3.3. Select the one you'd like to download and then click the Download button. After clicking the button, the result will be shown

Intell(R) Ethermet Connection 1217-LM Image: Connection 1217-LM	Intellify Ethermet Connection 1217-LM 00.00 IP Beach Count: 10 Broadcast Search Imministation Setting IP Address Description Device Passwo. IP Configuration Netmask Gateway MAC Address Progress Result Imministation Setting 192168.252 AS-FEN02 AS-FEN02 DHCP 255.255.255.0 192.168.11 0.18.23.13.02. 100% Successfull Imministation Setting July 1582.133 ASS32EST LAN Unknown Device(. DHCP 255.255.255.0 102.168.11 0.18.23.13.02. 0% Official 0% Imministation 0% Imminist		Ethernet														
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3.4. If the one you selected is protected by a password, you will need to enter the password before downloading

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	c		C-W										
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	[192.168.2.206	DVP50MC11T Eth	DVP MC		DHCP -	255.255.255.0	0.0.0	.0	00:18:23:3E:2	0%	
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	[192.168.0.1	DVP15MC11T LA	DVP MC		Static +	255.255.255.0	0.0.0	.0	D0:FF:50:0B:1	0%	
	[192.168.2.222	IFD9507	IFD9507		DHCP -	255.255.255.0	0.0.0	.0	00:18:23:10:01	0%	
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	[192.168.2.205	50mc	Unknown Device(DHCP -	255.255.255.0	192.1	168.1.1	00:18:23:72:33	0%	
													Download

Download Link

EIP Builder 1.09



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2.17 UPDATE – DIAEnergie Version 1.9 Release

Added Functions

- Tag Mapping -> Modbus Device -> Modbus Device Tag Add Dialog And Edit Dialog: added 4
 Properties: Enable AFDD (Automated Fault Detection and Diagnosis), AFDD Classification, AFDD
 Suggestion, and AFDD Abnormal Condition
- 2. UI Design -> Real-time Data: added a new tool "AFDD Display"
- 3. UI Design -> Graph -> Comprehensive Chart Types: added a new tool "Single Bar"
- 4. UI Design -> Basic: added a new tool "Rectangle"
- 5. UI Design -> Real-time Data -> Meter: added a new property "Enable Disconnection Condition Status"
- Device Topology -> Field device -> Gauge -> DELTA Power Meter: added more models, including DPM-DA510 and DPM-DA530
- Device Topology -> Control device -> Programmable Logic Controller -> DELTA PLC: added one more model, AS-200

Fixed Issues

- 1. Fixed the security vulnerability issues -ICS-VU-806371
 - a. Clear text HTTP
 - b. Cross-Site Request Forgery
- 2. Fixed the security vulnerability issues -ICS-VU-521908
 - a. Arbitrary File Upload Remote Code Execution (ZDI-CAN-15580)
 - b. SQL Injection Information Disclosure (ZDI-CAN-15581)
- 3. Fixed the security vulnerability issues ICS-VU-032369
 - a. Incorrect Default Permissions
 - b. Blind SQL Injection #5 (unauthenticated)
 - c. Blind SQL Injection #7 (unauthenticated)
 - d. Blind SQL Injection #10 (unauthenticated)
 - e. Blind SQL Injection #12 (unauthenticated)
 - f. Blind SQL Injection #18 (unauthenticated)
 - g. Blind SQL Injection #21 (unauthenticated)
 - h. Blind SQL Injection #24 (unauthenticated)
 - i. Blind SQL Injection #28 (unauthenticated)



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- j. Blind SQL Injection #29 (unauthenticated)
- k. Blind SQL Injection #30 (unauthenticated)
- I. Blind SQL Injection #31 (unauthenticated)
- m. Blind SQL Injection #32 (unauthenticated)
- UI Design → Right Click Context Menu: fixed the display issue found in align top, align bottom, align left, and align right
- 5. UI Design \rightarrow Real-time Data \rightarrow Alarm List: the updated data is incorrect
- 6. UI Design \rightarrow Real-time Data \rightarrow Event List: the updated data is incorrect
- 7. UI Design → Graph → Comprehensive Chart Types → Item Comparison: after sorting, the data shown is incorrect
- 8. Alarm \rightarrow Alarm Group \rightarrow Line notification: the notification cannot be sent

Download Link

DIAEnergie 1.9

2.18 TECHNICAL ANNOUNCEMENT – Avoidance of overheating EMI filters of REG2000

Description

The capacitors in REG2000's EMI filter may heat up abnormally due to aging after exceeding its service life, resulting in the risk of fire. To avoid that risk, follow the instructions below to deal with different filter types

Production period and service life of REG2000 EMI filter

If the EMI filter exceeds the service life, there may be safety problems. Please notify the customer to replace the filter with a new one immediately



Serial number is explained as follows:

xxxxxxxW1915xxxx

19: Year, 2019

15 : Week, 15th week



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Туре	Production Period	Service Life
Туре А	Produced before W1812	4 Years
Type B	Already recalled and changed to Type D	
Туре С	RG-EF300A4, RG-EF550A4: W2009 ~ W2123 RG-EF150A4: W2013 ~ W2123 RG-EF110A2, RG-EF220A2, RG-EF370A2: W2050 ~ W2123	5 Years
Type D	Produced after W2124	8 Years

Suggested modification for REG2000 & EMI Filter in existing installations

After confirming the Type of the EMI filter on the site, please follow the suggestions below to improve the situation

1) Type A (already out of warranty):

Type A has exceeded its service life and the capacitor has begun aging. Please replace it with type D filter as soon as possible. And follow the suggested scheme from (3) below for improvement

- Type C (under warranty): When Type B end of service life is approaching, it should be replaced with Type D according to the suggested scheme from (3) below for improvement
- 3) Type D (under warranty) installation mechanisms:
 - 1. Install a contactor at the position MC2 in the figure below, to ensure that as long as the REG2000 detects an external fault (EF), REG2000 and filter remain disconnected



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2. Connect contactor MC2 to the internal relay, set to Pr02-07 = 4





Suggested schematic for new installation

<Option-1>

Connect the EIM filter's TH contact to the elevator controller. As long as the TH signal is high, the contactor (MC1 or MC2) should remain open. If MC1 is open, the elevator might shut down. Therefore, we suggest using MC2 instead.

<Option-2>

1. Add Contactor (MC2) like in the diagram below. As long as REG2000 detects the TH signal, it will show EF (External Fault) and shut down. The power to EMI Filter won't turn on again





2. Connect contactor MC2 to the internal relay, set to Pr02-07 = 4



3 Application

3.1 **NEW – Technical Notes**

Drives

DEN_IA_VFD_Control_by_Physical_Unit_TN_EN_20220915.pdf DEN_IA_VFD_Motor_Control_Modes_TN_EN_20220914.pdf DEN_IA_VFD_Sleep_Mode_TN_EN_20220915.pdf DEN_IA_VFD_Tank_Level_Control_TN_EN_20220912.pdf

3.2 Update – Technical Videos, Tips and Trainings on Our YouTube Channel



Subscribe and enable notifications in order to get notifications on all our new videos.



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4 FAQ

4.1 AC Motor Drives

Variable Frequency Drives

- Q How to match the technical data of a solar panel with a variable frequency drive?
- Multiply the AC voltage specifications of the drive with √2 to find the voltage specification of the solar panel. E.g. a 230 V drive has an operating range of 170 265 V AC, which means the solar panel needs to provide a nominal 240 V 375 V DC peak voltage.

Find out the required maximum AC current of the motor at the available voltage. Since it is 3-phase AC current, multiply it with $\sqrt{3} \times \sqrt{2}$, i.e. ~2.45, to find the required DC current. E.g. if a motor draws 5 A of AC current, the panel needs to be able to provide ~12.3 A of DC current.

Assuming that the panel provides 325 V DC, which corresponds to 230 V AC, the calculation above leads to a 4 kW solar panel to drive a typical 0.75 kW motor.

Most of the time, the panel will operate at a fraction of its nominal power. This seems to be an exaggerated over-dimensioning. However, it is necessary due to the need to provide the peak DC voltage and DC current that corresponds to the required AC amplitudes, while the motor actually uses rms voltage and rms current.

It is possible to reduce the size of the solar panel by

- 1. Employing a DC/DC boost inverter with MPPT between solar panel and drive. While this may reduce the solar panel size, it adds cost and introduces losses into the system. It is necessary to assess whether the MPPT's positive effects and the reduced solar panel size level those disadvantages out
- Adding batteries or large capacitors to buffer the difference between peak and rms current. However, such a battery or capacitor pack with its management system and additional maintenance requirement may cost more than the savings of the smaller solar panel. They need to be calculated beforehand

4.2 Servo Systems

ASDA-A2 and ASDA-A3/B3 Series

- Q How to maintain all parameter settings after power cycling?
- A Set bit Z of parameter 3-12 in the –A2 series or 3.012 in –A3/B3 series to 1, i.e.

3-12 or 3.012 = x1xx

Then cycle the power and change the parameters you require for the application.