Newsletter

Industrial Automation Products

Edition 2023-Q2

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1 News

1.1 FTP-Site Link & Update

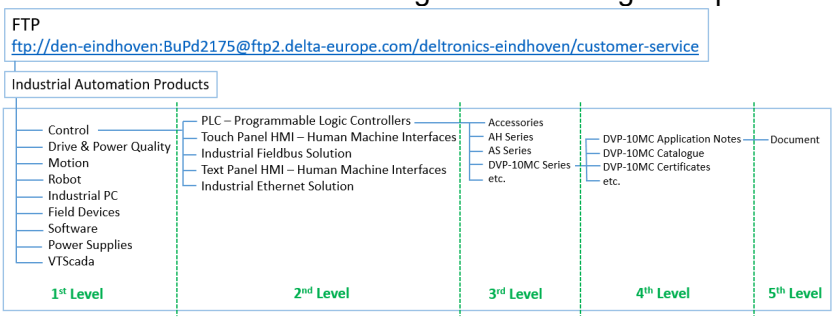
Our FTP server provides product information that is not available in Delta's Download Center on the global website, e.g. datasheets, technical notes, presentations, software, etc. Please visit our FTP site with below account info.

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

Name and password are included in the link.
Name: den-eindhoven
Password: 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.



1.2 2023 Annual Delta IA EMEA ASP Training and Spare Parts for Large drives

On June 12-16, Delta EMEA have hosted its first physical ASP Training in Helmond, Netherlands Office that's joined by Head Quarters Global Service team since CoVID-19 outbreak, where we had over 11 regions of ASP partners joining us in a 5 day knowledge-filled event, that not only saw the collective growth within the Delta network, but also connected faces to emails.

With Delta's ever-growing portfolio, it is more and more apparent that the after-sales service would prove again to be a focus to build strong collaboration with our partners and at the same time put trust in our customers that they are purchasing more than the product itself.

During the event filled 5 days, we covered our Drive, Motion, Control, and Robotic products with both in class presentations on product specifications and issue analysis guide, but also the whole list of products that should be quite familiar with our partners, where they can dissemble as well as put the repair knowledge they had just obtained in the class and put them into action.

We are more than excited to see the growth not just in numbers of our partners, but also the focus we see within the Delta network to truly develop the service capabilities, and we will look forward to an even stronger turnout next year.

Below is the large drive repairing spare part list and instruction, please help to download if you need them, in case of any question, please reach out to

1. Large Drive Spare part list

a. Please refer to [Spare part material number look up] on how to use/request spare parts from Delta

b. Link

c. Password: xC4kbWTILLS9

2. The spare part list is also stored in the location indicated spare part material number guide, will be updated for any new part numbers that we will track and keep inventory.

a. Link

b. Password: WhzoJpXKN4o4

DELTA

2 Product update

2.1 UPDATE - RTU-ECAT Firmware V1.04

Object:

RTU-ECAT Firmware Update

Purpose:

The functions which are modified, and the functions which are added are described.

Series	Applicable model	Firmware version change	Release date
DVP	RTU-ECAT	V1.03 → V1.04	2022.05.30 (W2322)

New instructions and functions:

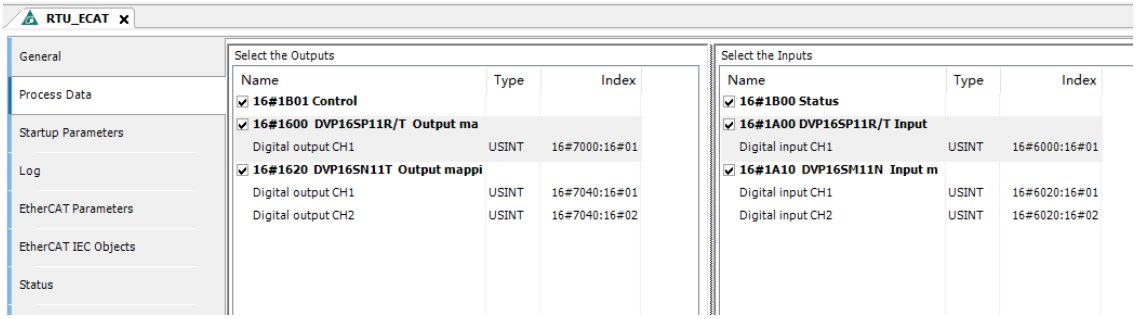
To use the following new features, it is required for RTU-ECAT to obtain the latest ESI (EtherCAT Slave Information).

No.	Functions/ Instructions	Descriptions	Remark
1	DI / DO modules support bit type PDP mapping	Bit type data can be used in PDO transmission for DI /DO modules. One bit is mapped to one address.	Note A-1
2	Supports FOE firmware update	ECAT master can use Firmware Over Ethernet (FOE) update function to update the firmware of RTU-ECAT.	Note A-2
3	Supports self-defined output statuses	When the communication of RTU-ECAT is disconnected from AX-3 Series PLC, the output statuses of the connected right-side modules of RTU-ECAT can output as user-defined.	Note A-3
4	Supports new module	DVP08NTC-S is now supported.	

Note A-1

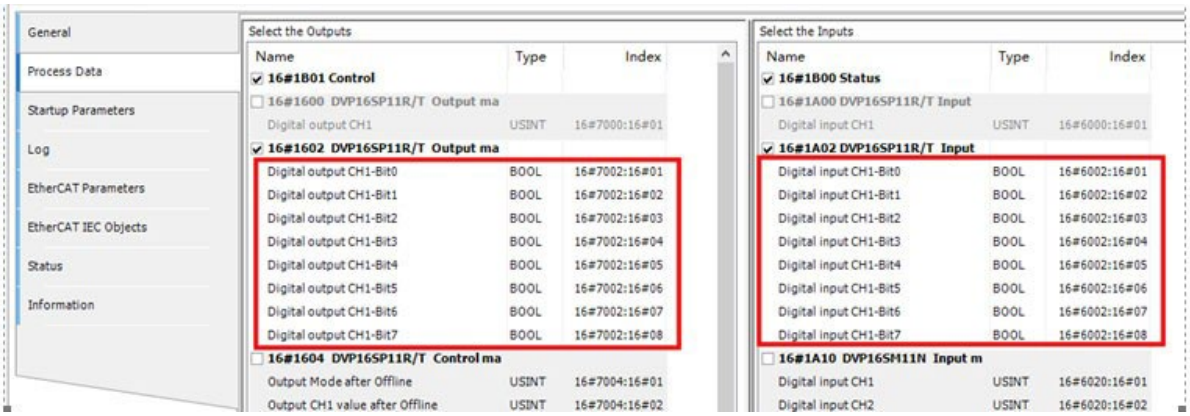
Older firmware versions (V1.03 or previous version)

When the right-side of RTU-ECAT is installed with a DI / DO module, the PDO transmission is only available for byte type data. One address is mapped to 8 bits, not one address to one bit.



New firmware versions (V1.04 or later versions)

Bit type data can be used in PDO transmission for DI /DO modules. One address is mapped to one bit.



Note A-2

Older firmware versions (V1.03 or previous version)

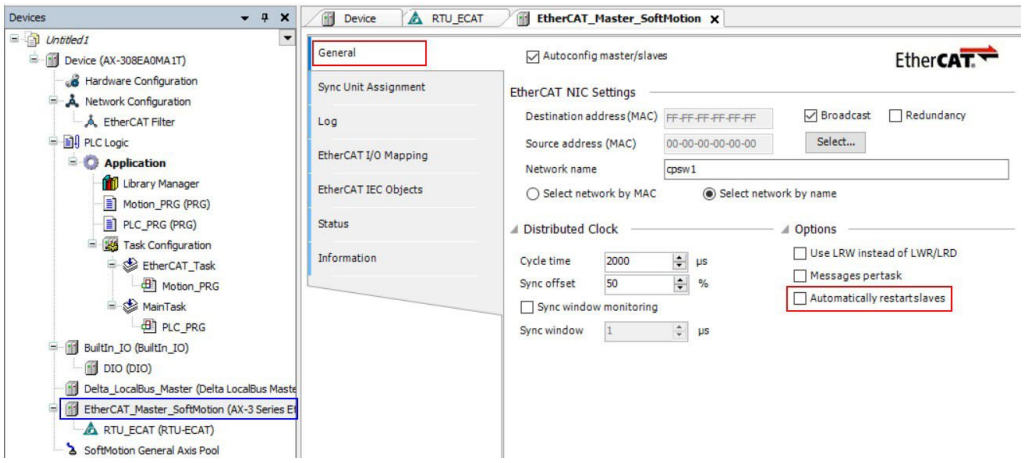
When updating the firmware of RTU-ECAT, a fixture and specific software are required.

New firmware versions (V1.04 or later versions)

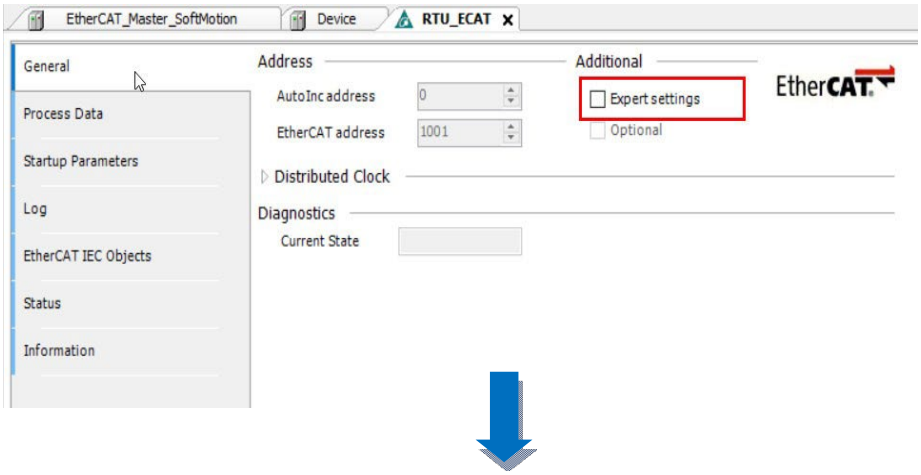
Firmware update can be complete via FOE protocol. Through DIADesigner-AX, you can use ECAT master (FOE function supported) to switch the module to Bootstrap mode to update the firmware. Once completed, switch it back to operation mode or power off and then power on the device to have the new firmware take effect.

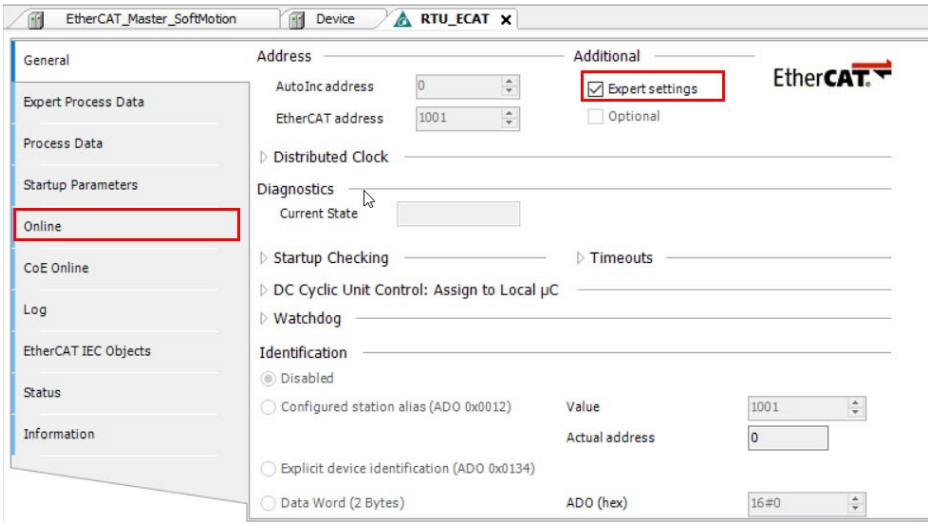
The method for updating the firmware is as follows, using DIADesigner-AX and AX-3 PLC CPU as an example:

1. Open DIADesigner-AX, create a new project and configure RTU-ECAT to the AX3 EtherCAT network. Double-click “EtherCAT_Master_SoftMotion”, as it is shown in the blue box of the figure below. Go to General > “Options”: Deselect “Automatically restart slaves”.

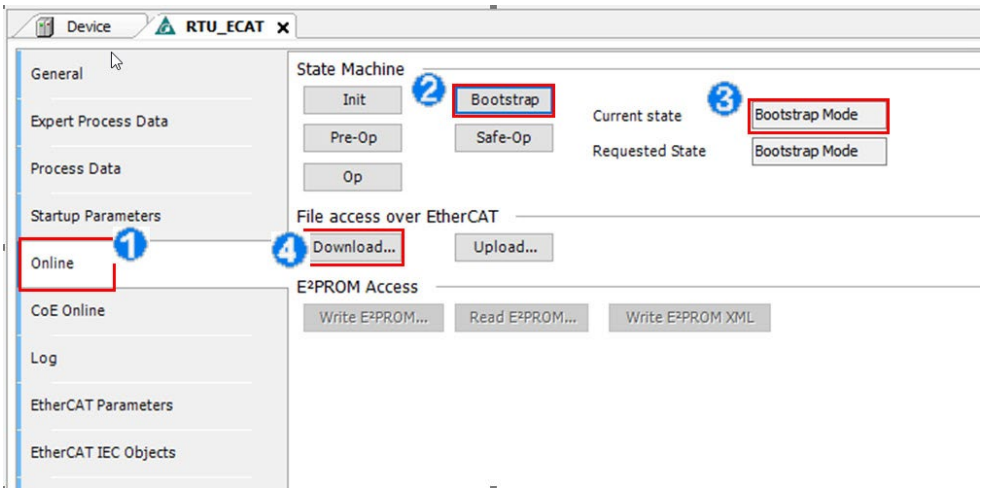


2. Make sure the RTU-ECAT is connected and in operation mode. Open the RTU-ECAT setting page, go to General and select “Expert settings” and then you will find the Online tab on the left.

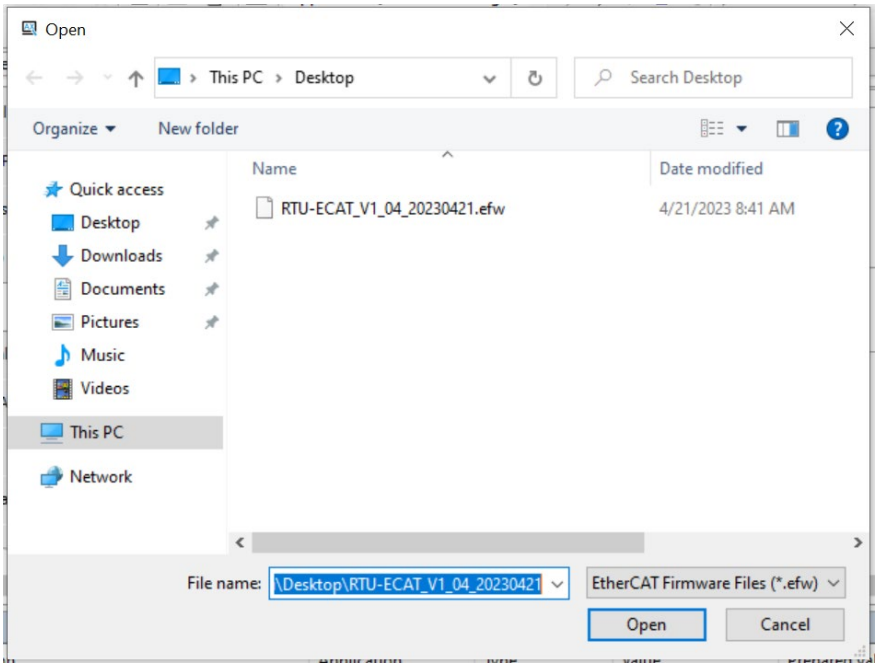




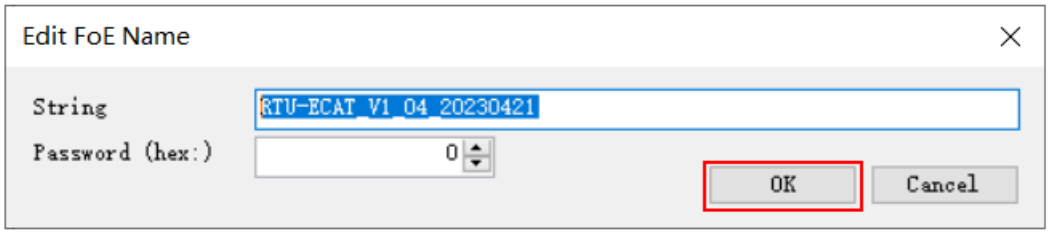
3. Click Online to open the setting page and then select “Bootstrap”. After that select “Bootstrap Mode” and then click “Download”.



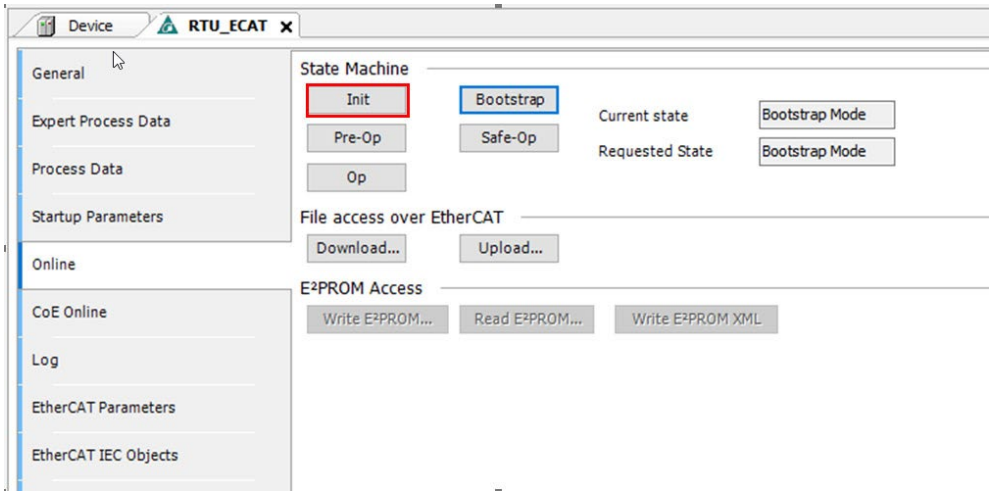
4. Select the latest .efw firmware file from the prompted window.



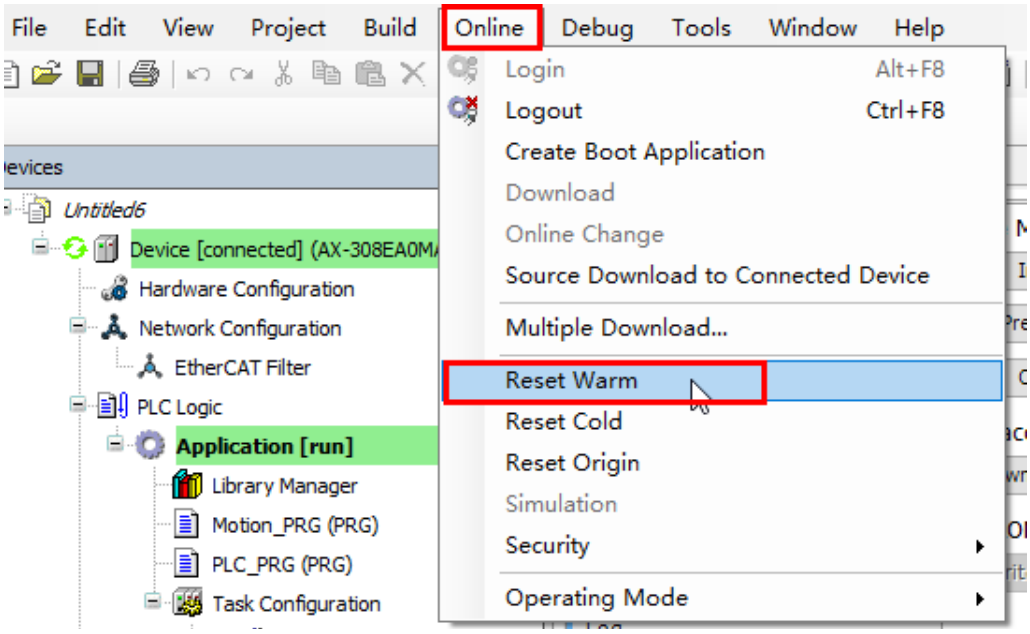
5. Click ‘OK’ to start updating the firmware



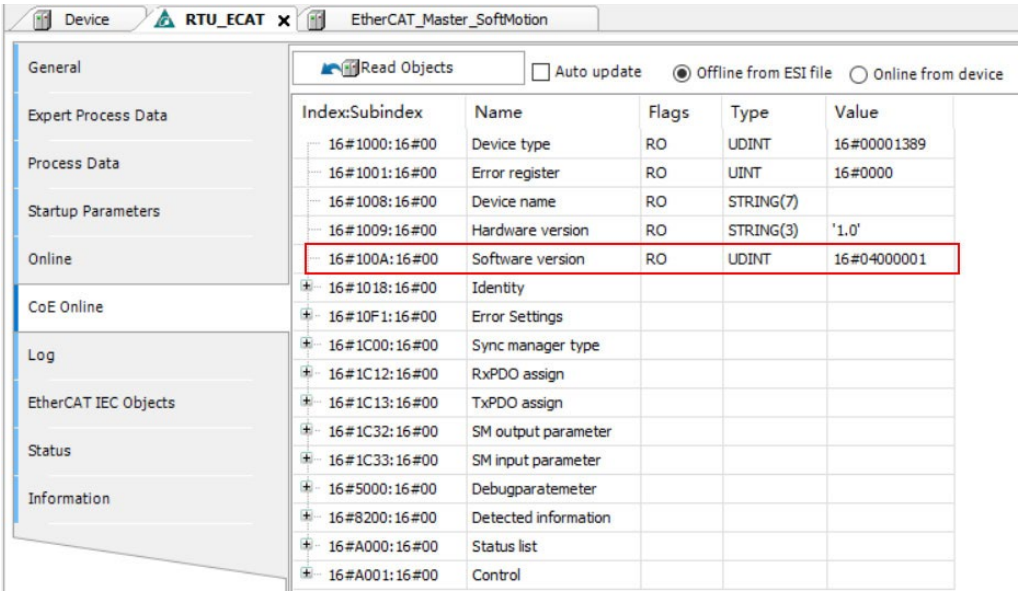
6. After firmware update is complete, RTU-ECAT will not restart automatically. Click “Init” to initialize RTU-ECAT.



7. Go to Online on the toolbar and then select “Reset Warm” to have AX-3 Series PLC Connected to RTU-ECAT.



8. Open CoE setting page to check if the firmware is updated to version 1.04.00 as it is shown in the red box of the figure below. The value 16#04000001 indicates version 1.04.00. (Example: the value 16#03020001 indicates V1.03.02.)



Note A-3

Older firmware versions (V1.03 or previous version)

When the communication of RTU-ECAT is disconnected from AX-3 Series PLC, the output status of the connected right side modules are determined by the value of the parameter “Control Word” to clear all or to keep all. It is NOT possible to have various output statuses for the connected right-side modules.

New firmware versions (V1.04 or later versions)

Self-defined output statuses are possible for the connected right-side modules of RTU-ECAT, If the communication of RTU-ECAT is disconnected from AX-3 Series PLC.

1. The value of Bit1 in the parameter of “Control Word” is 0.

When the communication of RTU-ECAT is disconnected from AX-3 Series PLC, the output statuses of the right-side modules are kept as they are last connected.

2. The value of Bit1 in the parameter of “Control Word” is 1 and the value of “Output mode after EtherCAT offline” for the connected right-side module is 0. The output status of the connected right-side modules can be set individually.

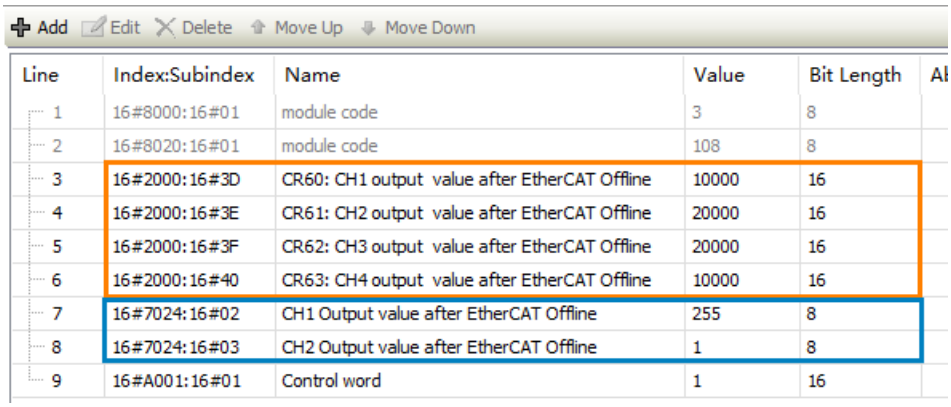
The following examples are for reference.

DVP04DA-S:

If the communication of RTU-ECAT is disconnected, the output status of CH1 is determined by the value set in “CR60：CH1 output value after EtherCAT Offline”.

DVP16SN11T:

If the communication of RTU-ECAT is disconnected, the output statuses of output statuses of output points 0~7 are determined by the value set in “CH1-7 Output value after ECAT Offline”.



Line	Index:Subindex	Name	Value	Bit Length	Al
1	16#8000:16#01	module code	3	8	
2	16#8020:16#01	module code	108	8	
3	16#2000:16#3D	CR60: CH1 output value after EtherCAT Offline	10000	16	
4	16#2000:16#3E	CR61: CH2 output value after EtherCAT Offline	20000	16	
5	16#2000:16#3F	CR62: CH3 output value after EtherCAT Offline	20000	16	
6	16#2000:16#40	CR63: CH4 output value after EtherCAT Offline	10000	16	
7	16#7024:16#02	CH1 Output value after EtherCAT Offline	255	8	
8	16#7024:16#03	CH2 Output value after EtherCAT Offline	1	8	
9	16#A001:16#01	Control word	1	16	

2.2 UPDATE – DIAInstaller Version 2.0.0

System requirements

DIAInstaller works within the system requirements of all Delta Electronics® software products.

Hardware requirements

- Processor: Intel® Celeron® 540 1.8 GHz (min.), Intel Core i5 M520 2.4GHz (min.)
- RAM: 2 GB or above
- Hard Disk Drive: 200 MB free for DIAInstaller, and 10 GB free for otherDIAStudio software
- Resolution: 1920 x 1080 Pixels

Software requirements

- Windows® 10—requires .NET Framework 4.6.2 to be installed
- Windows 11—requires .NET Framework 4.6.2 to be installed

New features:

- Provide a new user interface and layout to give an overview of theavailable software, installed software, and available updates.
- Support viewing the required disk space to install the software or patch.

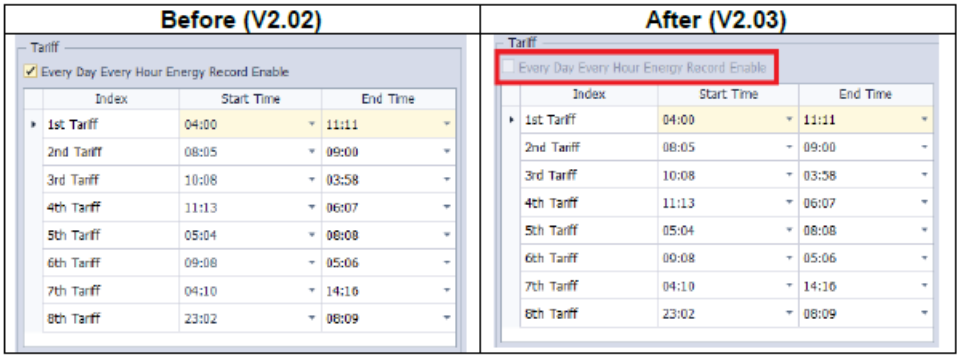
Enhanced features:

- Support downloading patch.
- Support viewing Release Notes of each software version.
- Improve the efficiency of updating software.

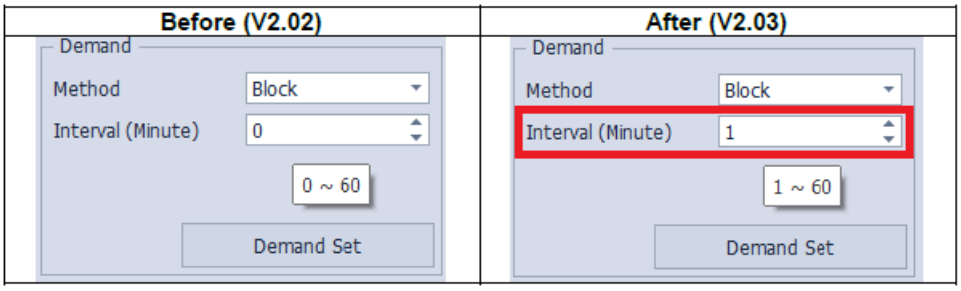
2.3 UPDATE – DPMSoft version 2.03

Modified functions

1. D520I: Removed the function of supporting “Every Day Every Hour Energy Record Enable” in the setting section of Tariff, to be the same as what the manual stated.

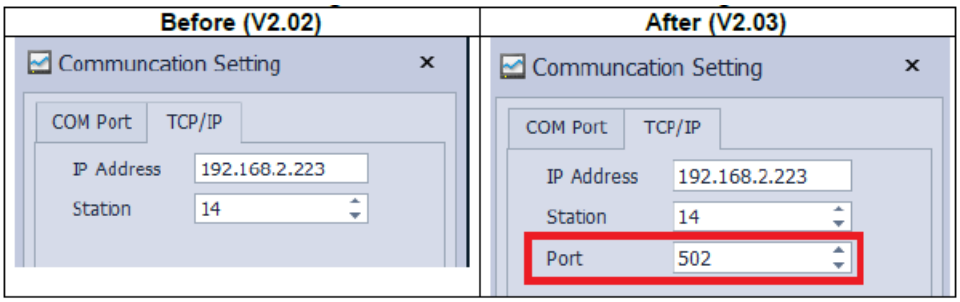


2. All series: The minimum value for the setting of Interval (minute) is changed from 0 to 1 in the setting section of Demand.



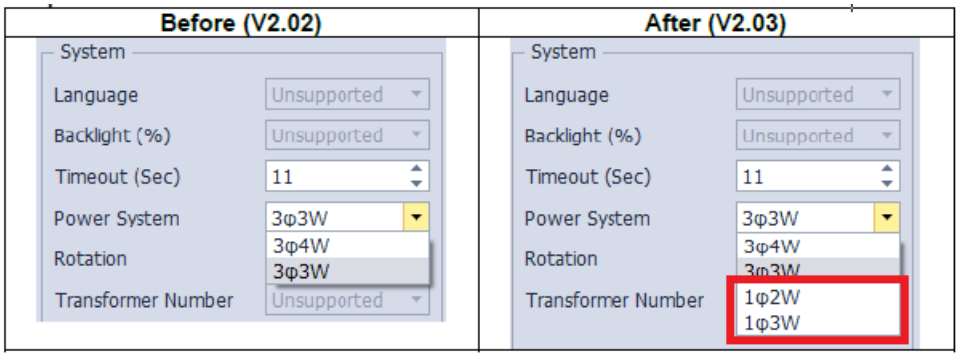
New Features

1. DPMSoft now supports DPM-C510E, DPM-D510, DPM-D532I and DPM-D533I.
2. DPMSoft: Communication Setting > TCP/IP: Port is added for editing and the default is 502.

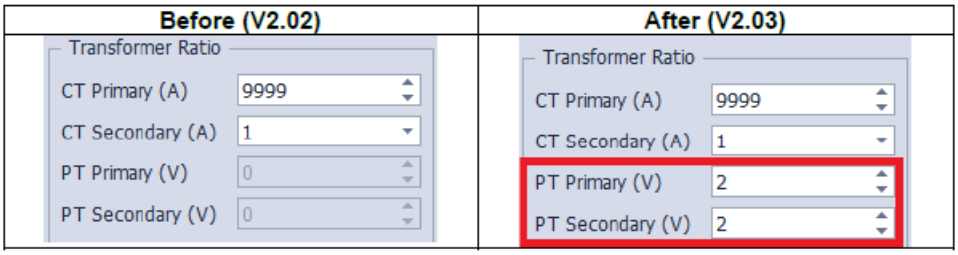


3. DPM-C510 (FW V2.00 or later)

1) New options 1P2W and 1P3W are added in Transformer Number for selection.

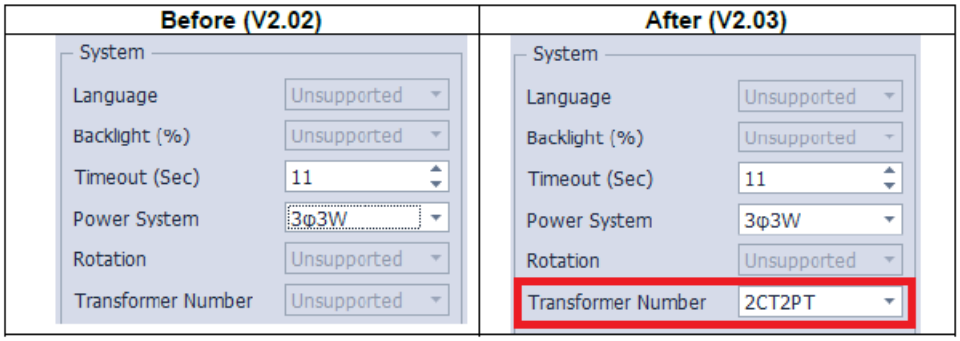


2) Settings of PT Primary and PT Secondary are available in the setting section of Transformer Ratio.

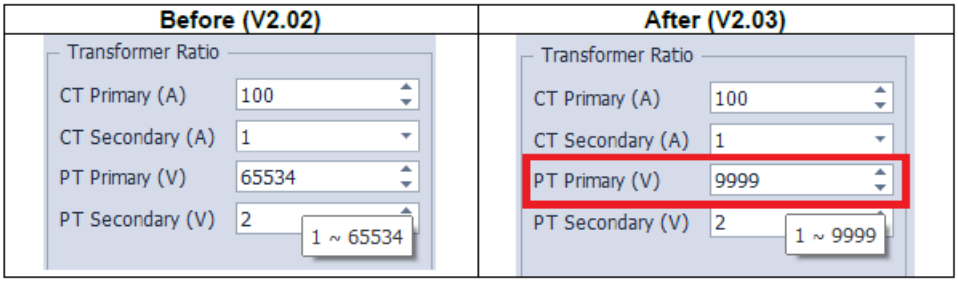


4. DPM-C510 (FW: V2.01 or later)

1) Setting of Transformer Number is available in the setting section of System.

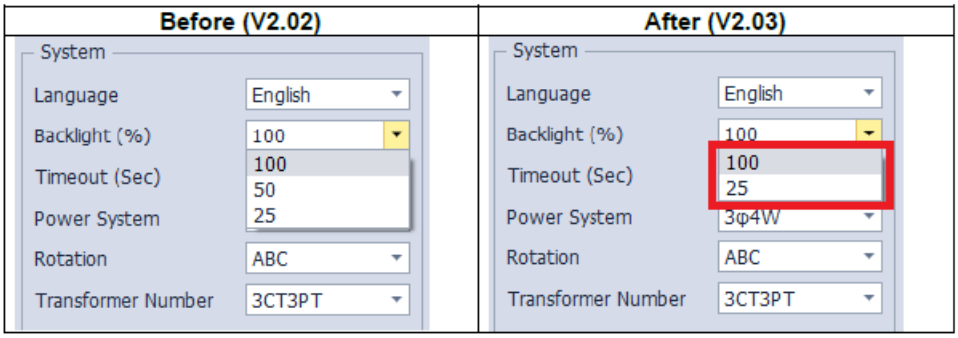


2) All series: The maximum value for the PT Primary (V) is changed from 65534 to 9999 in the setting section of Transformer Ratio.



5. DPM-C530 (FW: V2.100 or later)

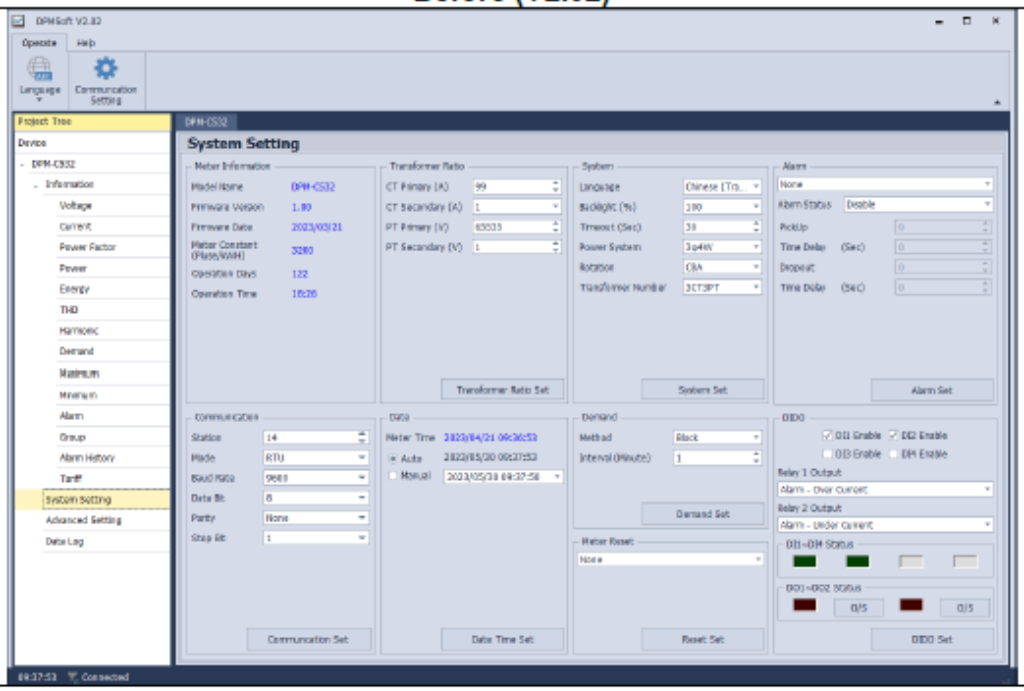
Removed the option “50%” from the setting of Backlight (%) in the setting section of System.



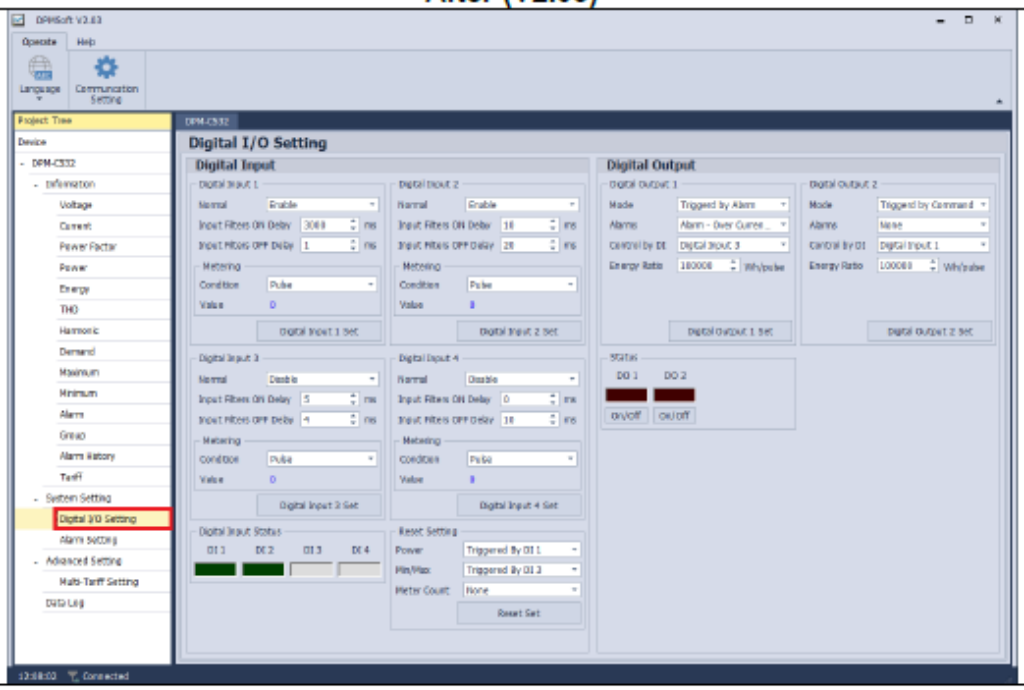
6. DPM-C532 (FW: V1.00 or later)

1) Added the “Digital I/O Setting” node to the “System Setting”. Unfold the “System Setting” on the Project Tree to see “Digital I/O Setting”. Click it to open the Digital I/O Setting page.

Before (V2.02)

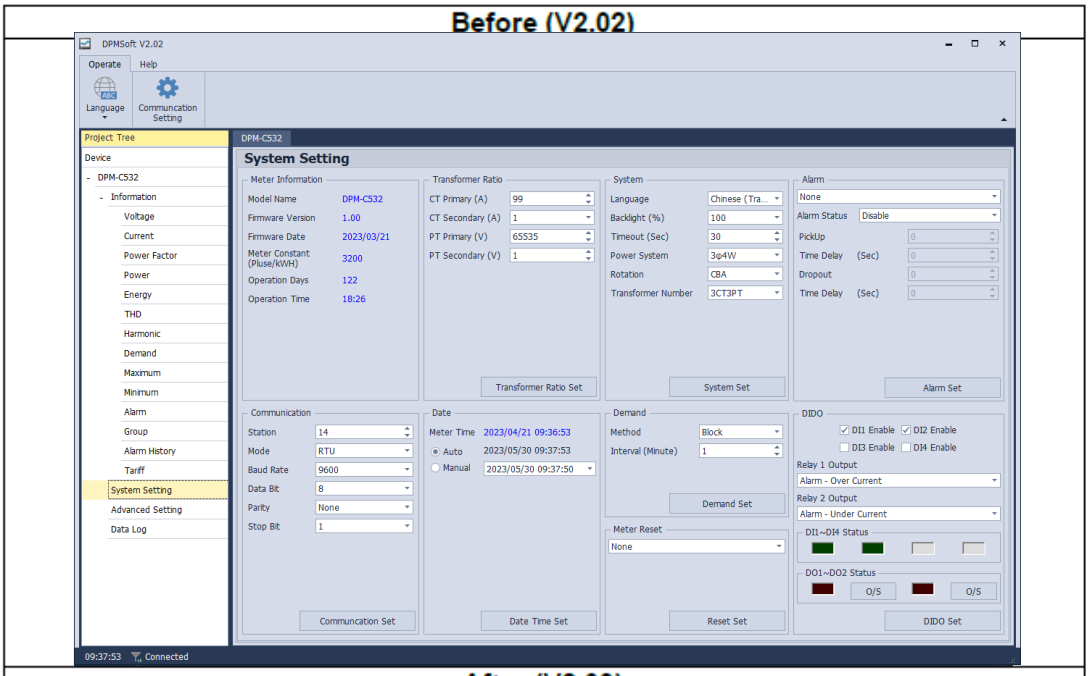


After (V2.03)

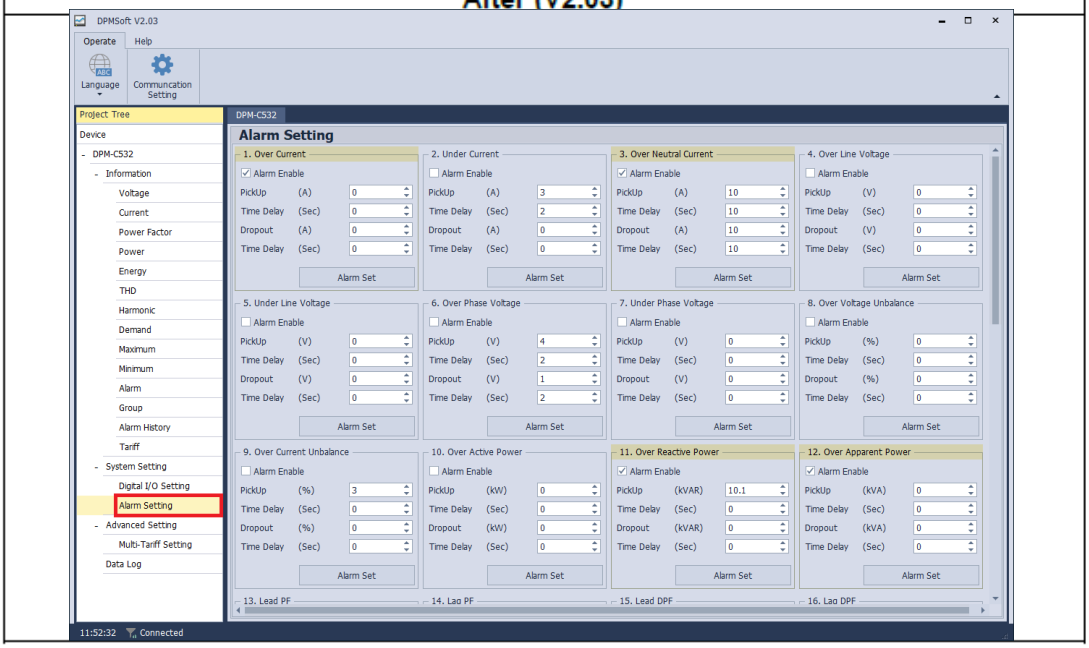


2) Added the “Alarm Setting” node to the “System Setting”. Unfold the “System Setting” on the Project Tree to see “Alarm Setting”. Click it to open the Alarm Setting page.

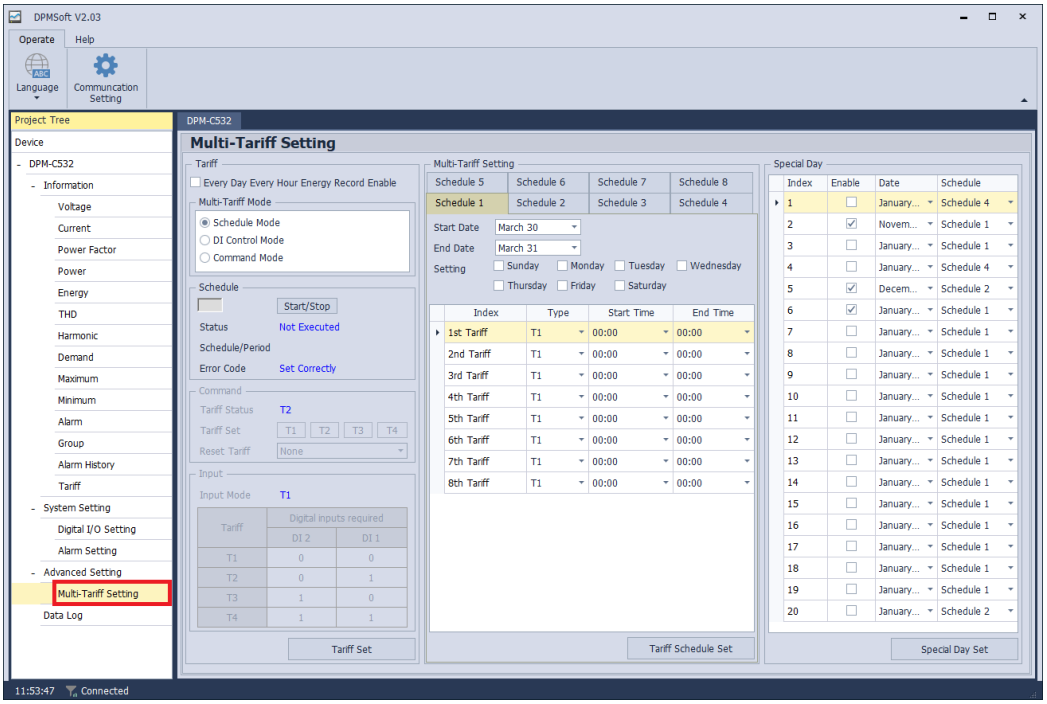
Before (V2.02)



After (V2.03)



3) Added the “Multi-Tariff” node to the “Advanced Setting”. Unfold the “Advanced Setting” on the Project Tree to see “Multi-Tariff”. Click it to open the Multi-Tariff Setting page.



2.4 UPDATE – DIAView software version 3.9.1

Optimized Functions

1. Optimized the communication performance between the Web client and DIAViewServer.
2. Binding the project ID with the user information to optimize the configuration structure of the user information and to prevent the user information from being tampered.
3. Optimized the window and scroll bar of the script editor so that users can use a scroll bar to scroll down and see the script contents fully.

Fixed Bugs

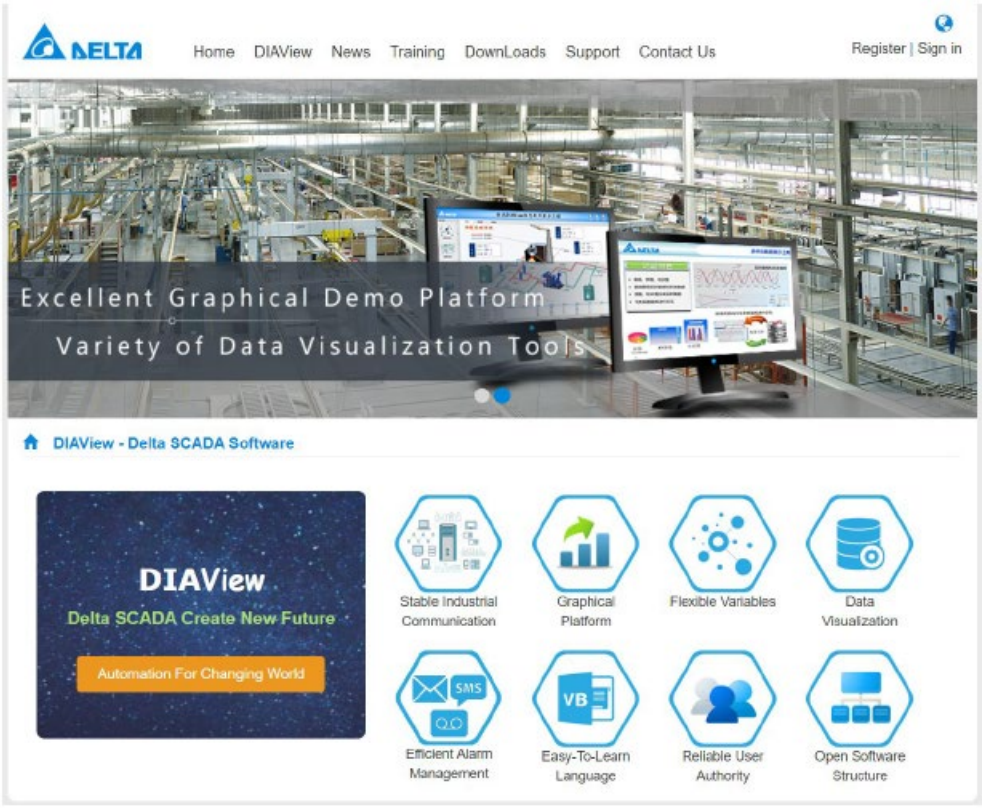
1. Fixed the issue that the Web page cannot be redirected if the web window is in a group structure.
2. Updated and corrected the errors found in DIAView English Manual.
3. Removed the register V from the driver register list of Mitsubishi FX5U, since the register V is not supported by this PLC.

Websites and Resources:

Delta | Download Center: Delta | Download Center (deltaww.com)
DIAView website: Delta DIAView SCADA Software-Index (deltaww.com.cn)

The DIAView website provides the following services:

- Software Introduction: Product Description, Success Cases
- Online Learning: Training Videos
- Downloads: Software Installation Package, Teaching Materials, Application Template
- Technical Support: FAQ
- User Registration: Files can be downloaded and questions can be submitted after registration.



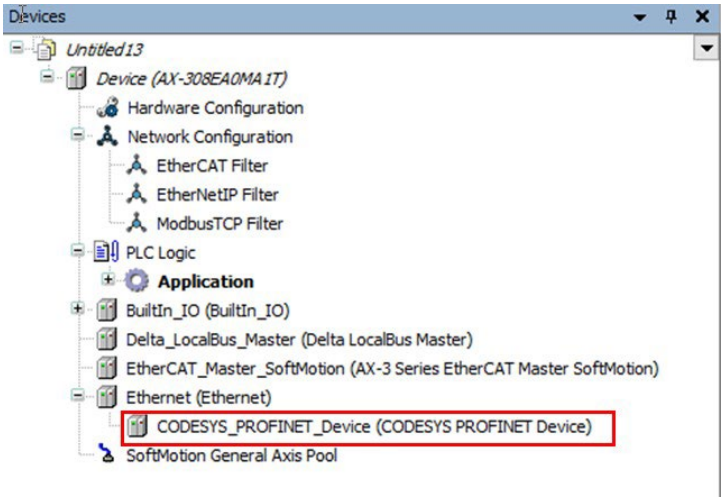
2.5 UPDATE – AX-3 firmware version V1.00.05

Related Models

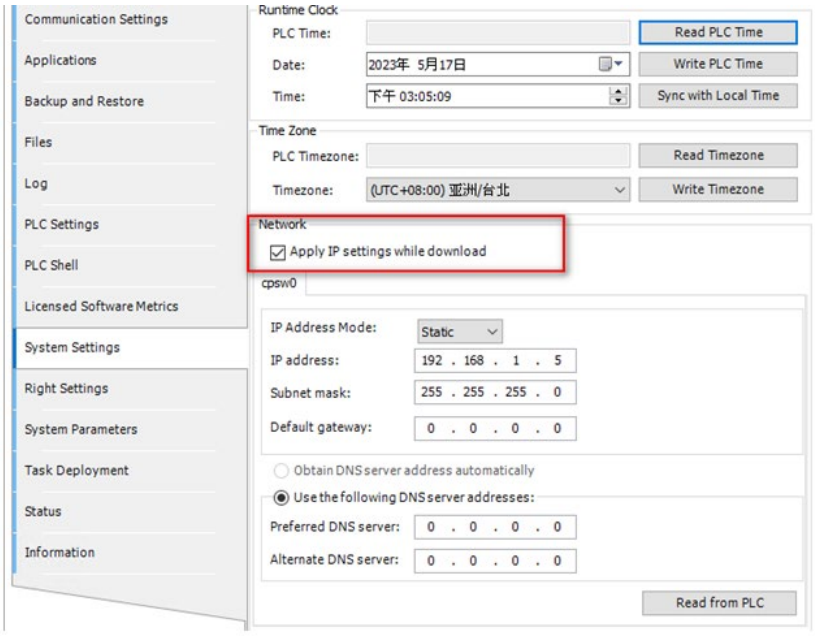
Series	Models	Firmware Version	Release Date
AX-3	AX-308EA0MA1T AX-300NA0PA1 AX-304ELA0PA1T AX-304ELA0PA1P AX-308EA0MA1P AX-316EA0MA1T AX-324NA0PA1P AX-364ELA0MA1T AX-364ELA0MA2T	V1.00.05	May. 22, 2023 (W2321)

New Functions

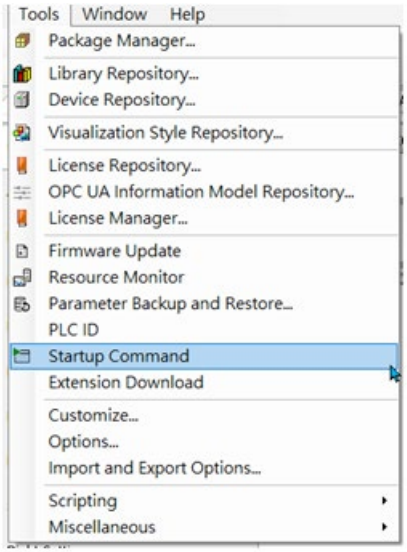
1. PROFINET Device is supported on DIADesigner-AX V1.4.

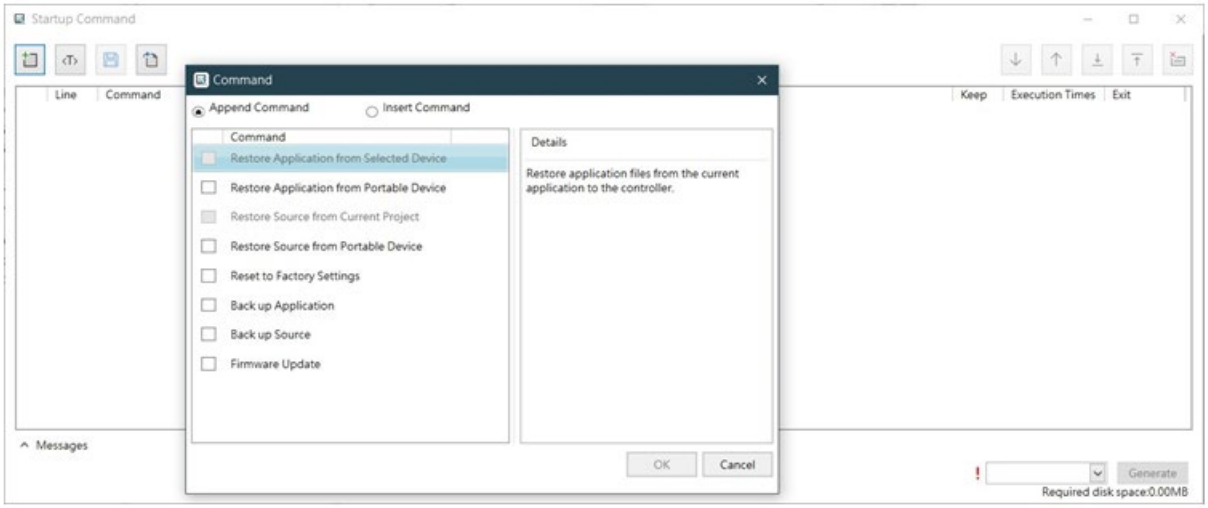


2. After the program is downloaded, the Ethernet IP address can still be edited.



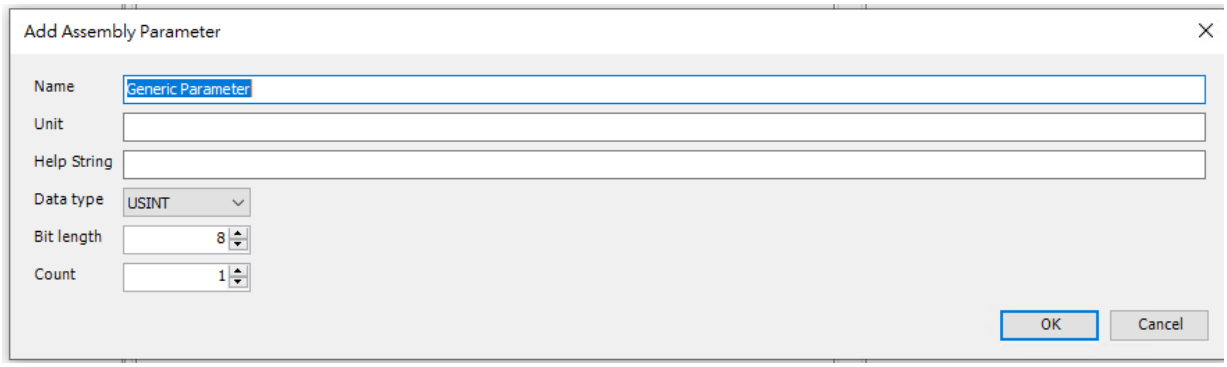
3. Startup Command, providing users with quick access to update firmware, back up source, reset to factory settings and many more. (available for DIADesigner-AX V1.4)





Improvements

1. The initialization execution time of EtherCAT startup command can be optimized when using IODrvETherCAT V4.1.0.0 library on DIADesigner V1.4.
2. If the AX-3 is configured as an adapter, you can use IODrvEthernetIP V4.4.0.0 library on DIADesigner V1.4 to set the data length according to the data type.



3. After the correction, the value of the encoder (DFB_HCnt) can be quickly updated once the PLC is powered on."
4. After the correction, the data refreshing for AS AIO and DIO modules is updated by each PLC scan cycle.
5. After the correction, when the Modbus TCP Master detects the error code “DFB_REQUEST_FAILED_TO_SEND”, the status of the Slave will be changed to Error.
6. After the correction, even if more than 31 slaves are ModbusTCP timeout, the PLC can still operate normally.

7. After the correction, even there are some Modbus TCP disconnections and the Master can still determine the connection status of the Slaves correctly.
8. Optimized the procedure of program downloading to ensure a complete backup of the user program, in order to avoid CRC mismatch errors after power on.
9. Fixed an issue that if all the 32 connections of Modbus TCP Slaves are established and each one is with a set IP, once disconnected from the Master, DIADesigner-AX is unable to use scan to find the Master.
10. Fixed an issue that if using the function block DFB_DMPID on channel 3 and 4 and deactivate the pin “ENABLE” and then activate it again, the function block “ERR_CHANNEL_IS_EXECUTING_PID” which is NOT the right one will report error.
11. Fixed an issue that it may take a while for the PLC CPU to detect dip switches, Run & Stop.

Library Related Notes

1. DL_MotionControl V1.3.0.0

- Compatible with Codesys SM3_Basic V4.10.0.0 library.
- New function blocks for a single axis: DMC_Home_E, DMC_MoveModulo, and DMC_GetCamSlaveData.
- New function blocks for axis group: DMC_MoveDirectAbsolute, DMC_MoveDirectRelative, DMC_GroupSetOverride, DMC_GroupReadParameter, DMC_GroupWriteParameter, DMC_GroupInterrupt, DMC_GroupContinue, DMC_GroupPower.
- New function added for DMC_GroupCircularAbsolute, DMC_GroupCircular: to draw a circular arc in space.
- DMC_CamKeyPointWrite: Added two new harmonic curves, one cure with two different harmonic motions_elevate (Harmonic2_Direct) and one curve with two different harmonic motions_descent (Harmonic2_Inverse).
- DMC_Groupcontinue: Fixed an “Exception” issue that is caused by checking for the position of a non-existent axis.
- Fixed an issue that in the axis group function, if a linear interpolation was followed by a circular interpolation, uneven continuity and speed fluctuations may occur.
- Fixed an issue that when the PLC CPU switches from RUN to STOP, the axis movement does NOT stop during the execution of DMC_TorqueControl or DMC_VelocityControl.
- Fixed an issue that due to servo overflow, the value captured by DMC_TouchProbeCyclically was mistakenly judged to be in Windows.
- Fixed an “Exception” issue that occurs in some function blocks that are used by AX Series.

2. DL_MotionControlLight V1.3.0.0

- Compatible with Codesys SML_Basic V4.10.0.0 library.
- Supports the tension control function block of MH300.
- Fixed an issue that without connected to a physical feedback pulse wire, when R1-EC5621 executes the function block MC_MoveAbsolute_DM or MC_MoveRelative_DML, before the execution is complete, the pin of Done will switch to ON.
- After the correction, when the servo motor ASDA-B3-E executes the function block MC_MoveVelocity_DML, the velocity actual value (servo motor: OD 16#606C) can be correctly shown.

3. DL_BuiltInIO V1.1.0.2

- DL_BuiltInIO_AX3, the library name, has changed to DL_BuiltInIO. Now the library can be used for all AX series PLCs.
- DFB_Compare: Added a pin of OutputAction for users to set the condition to output (ON) or not to output (OFF).
- DFB_Capture:
  - Added a pin of bEdgeSelect to support the falling-edge trigger function to capture the value.
  - The input value of the pin “Mask” has increased from DINT (0~2147483647) to IDINT (0 ~ 4294967295).
- After the correction, when using the encoder axis to execute DMC_ENCODER_AXIS_REF, its direction of motion can be displayed.
- After the correction, when setting the axis mode to “Reverse On” on the Pulse Output Setting of DIADesigner-AX, the motor will act as it is set.
- After the correction, when setting the mode to “Pulse and Direction” on the Pulse Output Setting of DIADesigner-AX, the pulse output axis will NOT jitter in the final phase of deceleration (around 200 kHz).

2.6 UPDATE – Upgrading firmware of C2000 Plus Firmware version 3.07.02

No.	V3.07.01	V3.07.02
1	IMFOCPG mode, to set up Pr05-00 for motor parameter auto tuning and drive trip up by CK10 error before press Run.	IMFOCPG mode, set up Pr05-00 will not cause CK10 error.
2	Position mode, the drive will sometime happen a issue that given run command without output frequency.	The position control can operate normally after given run command.
3	PMFOC mode, PGF5 error occurs when the PG card is installed but PG related parameters are not set yet.	PMFOC mode, the drive will not trip up an error when the PG card is installed without setting PG card related parameters.
4	When operating with the CMC-EC01 card, the parameter copy function cannot be performed correctly.	The parameter copy function can be performed normally
5	When using an EtherCAT card, the SE2 warning occurs when performing parameter copying, and parameter copying fails	The parameter copy function can be performed normally

New Functions

1. Add new parameter 06-88 software oc protection level

✓	**06-88**	software oc protection level	
			Default: 0.0
		Settings	0.0~6553.5 A

- This parameter only applies to PM motor.
- The software oc protection function enables when 06-88 is set to non-0.0, and function will disable if 06-88 is set to 0.0.
- The software oc protection level setting shall not be less than the Pr05-34. If the setting is less than Pr05-34, the Pr05-34 setting will be used as the protection level.

2. Add Modbus status monitor address 224AH、224BH、224CH、224DH for IdRef、IqRef、IdFdb、IqFdb.

3. Add Modbus status monitor address 223FH for estimated Ke.

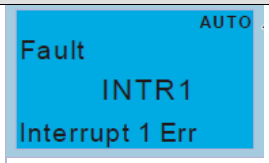
Status monitor read only (22xx)

Modbus address	RW	Function
2200H	R	Display output current (A). When current is higher than 655.35, it shifts the decimal as (XXX.X A). The decimal can refer to High byte of 211F.
2201H	R	Display counter value (c)
2202H	R	Actual output frequency (XXXXX Hz)
2203H	R	DC bus voltage (XXX.X V)
2204H	R	Output voltage (XXX.X V)
2205H	R	Power angle (XXX.X)
2206H	R	Display actual motor speed kW of U, V, W (XXXX.X kW)
2207H	R	Display motor speed in rpm estimated by the drive or encoder feedback (XXXXX rpm)
2208H	R	Display positive/negative output torque in %, estimated by the drive (t0.0: positive torque, -0.0: negative torque) (XXX.X %)
2209H	R	Display PG feedback (see NOTE 1 in Pr.00-04)
220AH	R	PID feedback value after enabling PID function (XXX.XX %)
220BH	R	Display signal of AVI analog input terminal, 0–10 V corresponds to 0.00–100.00% (1.) (see NOTE 2 in Pr.00-04)
220CH	R	Display signal of ACI analog input terminal, 4–20 mA / 0–10 V corresponds to 0.00–100.00% (2.) (see NOTE 2 in Pr.00-04)
220DH	R	Display signal of AUI analog input terminal, -10 V–10 V corresponds to -100.00–100% (3.) (see NOTE 2 in Pr.00-04)
220EH	R	IGBT temperature of drive power module (XXX.XºC)
220FH	R	The temperature of capacitance (XXX.XºC)

Modbus address	RW	Function	
2210H	R	The status of digital input (ON/OFF), refer to Pr.02-12 (see NOTE 3 in Pr.00-04)	
2211H	R	The status of digital output (ON/OFF), refer to Pr.02-18 (see NOTE 4 in Pr.00-04)	
2212H	R	The multi-step speed that is executing (S)	
2213H	R	The corresponding CPU pin status of digital input (d.) (see NOTE 3 in Pr.00-04)	
2214H	R	The corresponding CPU pin status of digital output (O.) (see NOTE 4 in Pr.00-04)	
2215H	R	Number of actual motor revolution (PG1 of PG card) (P.) it starts from 9 when the actual operation direction is changed or the keypad displays at stop is 0. The maximum is 65535	
2216H	R	Pulse input frequency (PG2 of PG card) (XXX.XX Hz)	
2217H	R	Pulse input position (PG card PG2), the maximum setting is 65535.	
2218H	R	Position command tracing error	
2219H	R	Display times of counter overload (XXX.XX %)	
221AH	R	GFF (XXX.XX%)	
221BH	R	DCBUS voltage ripples (XXX.X V)	
221CH	R	PLC register D1043 data (C)	
221DH	R	Number of poles of a permanent magnet motor	
221EH	R	User page displays the value in physical measure	
221FH	R	Output Value of Pr.00-05 (XXX.XX Hz)	
2220H	R	Number of motor turns when drive operates (saves when drive stops, and resets to zero when operating)	
2221H	R	Operating position of the motor (saves when drive stops, and resets to zero when operating)	
2222H	R	Fan speed of the drive (XXX%)	
2223H	R	Control mode of the drive 0: speed mode 1: torque mode	
2224H	R	Carrier frequency of the drive (XX kHz)	
2225H	R	Reserve	
2226H	R		00b: No direction 01b: Forward 10b: Reverse

Modbus address	RW	Function	
		bit3–2	01b: Drive ready 10b: Error
		bit4	0b: Motor drive did not output 1b: Motor drive did output
		bit5	0b: No alarm 1b: Alarm
2227H	R	Drive's estimated output torque (positive or negative direction) (XXXX Nt-m)	
2228H	R	Torque command (XXX.X%)	
2229H	R	kWh display (XXXX.X)	
222AH	R	PG2 pulse input in Low Word	
222BH	R	PG2 pulse input in High Word	
222CH	R	Motor actual position in Low Word	
222DH	R	Motor actual position in High Word	
222EH	R	PID reference (XXX.XX%)	
222FH	R	PID offset (XXX.XX%)	
2230H	R	PID output frequency (XXX.XX Hz)	
2231H	R	Hardware ID	
223FH	R	Estimated Ke	
224AH	R	Id reference	
224BH	R	Iq reference	
224CH	R	Id feedback	
224DH	R	Iq feedback	

4. Add new error code: 88 INTR1

ID*	Display on LCD Keypad	Fault Name	Fault Descriptions
88		Interrupt 1 Err (INTR1)	MCU loading too heavy and the control loop is interrupted and the execution is not performed normally
Action and Reset			
Action level	N/A		
Action time	Act immediately		
Fault treatment parameter	N/A		
Reset method	Manual reset		
Reset condition	N/A		
Record	Yes		
Cause	Corrective Actions		
The PWM carrier frequency setting is too high, resulting in the control calculation not being completed	Reduce PWM carries frequency		

2.7 DISCONTINUATION ANNOUNCEMENT – E200 & DIALink mini

	Discontinuation Model	Discontinuation Description	Recommended Substitute	Recommended Substitute Description	Discontinuation Date
IPC-E200	IPC-E200-N31202000	IPC-E200(2G), hardware only	IPC-E200-N32202000	IPC-E200(4G), hardware only	2023/05/01
	IPC-E200-N31202E00	IPC-E200(2G), Win10 IOT- English edition	IPC-E200-N32202E00	IPC-E200(4G), Win10 IOT- English edition	
DIALink mini	DIAL-C33020001E	Supports 1 CNC and 2 PLCs (100 I/O points), English edition	None		2023/05/01

3 Application

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

https://www.youtube.com/c/DeltaIndustrialAutomationEMEA

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

4 FAQ

4.1 AC Motor Drives

Q **Is there a maximum limit for the cable length that can be installed between the VFD and motor? If yes, then is there any way that I can increase that length?**

A *There is a maximum length and you must be very careful not to exceed this limit. This limit is specified for every VFD model in its corresponding user manual at chapter "7-4 AC/DC Reactor".*

There are a couple of ways to increase the maximum cable length. The most popular ones are to connect an output reactor or a sinusoidal filter at the VFD output. When you use such filters, you do have to be aware that they could have some requirements regarding the maximum output frequency and carrier frequency under which they can be operated. Below is one example from TDK:

Rated inductance L_R	See table "Characteristics and ordering codes"
Rated capacitance C_R	Based on star connection independent of the real used circuit; see table "Characteristics and ordering codes"
Converter output frequency f_M	0 ... 100 Hz
Pulse frequency f_P	See table "Characteristics and ordering codes"
Overload capability (thermal)	1.5 · I_R for 1 min per hour
Voltage drop ΔV (Input to output)	At I_R and 50 Hz
Max. dv/dt on filter input	5 kV/µs (higher values can be approved individually)
Climatic category (IEC 60068-1)	Filters 4 A ... 33 A: 25/90/21 Filters 50 A ... 95 A: 25/55/21 Filters 132 A ...320 A: 25/70/21
Insolation class	155 (F)
Approvals	Insulation system class 155 (F)

Characteristics and ordering codes

I_R* A	Terminal cross section mm²	R_{typ} mΩ	L_R mH	C_R µF	ΔV %	f_P[1] min. kHz	f_P max. kHz	P_L[2] W	Approx. weight kg	Ordering code
V_R = 520 V AC										
4	4	390	12.0	2.2	5	3	16	40	3.3	B84143V0004R227
6	4	290	8.5	2.2	5	3	16	45	3.5	B84143V0006R227
11	4	70	4.5	3.3	5	3	16	55	5.3	B84143V0011R227
16	6	37	3.0	5.6	7	3	10	60	8.5	B84143V0016R227
25	10	28	2.5	10	7	3	10	100	16	B84143V0025R227
33	10	20	1.8	10	8	3	10	150	20	B84143V0033R227
50	35	12	1.2	12	8	3	10	190	25	B84143V0050R227
66	35	9	0.95	18	8	3	8	250	26	B84143V0066R227
75	35	7	0.86	27	9	3	8	320	38	B84143V0075R227
95	35	6.3	0.75	27	10	3	8	330	52	B84143V0095R227
132	95	3.7	0.52	60	10	3	8	380	67	B84143V0132R227

1. The fundamental output frequency

This is the frequency that determines the maximum motor speed.

You can set this in pr01-00

When you are using standard induction motors which are rated at 50 or 60Hz then this is not normally a problem unless the application requires running in field weakening.

2. The carrier (switching) frequency

This is the frequency on which the fundamental frequency is built on.

You can set it in pr00-17

A common function that you see in drives is to lower the actual carrier frequency in some conditions.

2.1. The VFD lowers the carrier frequency when is overloaded and running at a high temperature (which is usually the result of the high overload)

The idea of this function is to prevent the drive from tripping on "oL" or "oH" fault (overload or over-temperature). So depending on loading and temperature the carrier frequency is gradually lowered from the pr00-17 setting down to as low as 2kHz. When using a sinusoidal filter that does not support 2kHz you have to disable this function by setting pr06-55=1

2.2. The VFD uses 66% of pr00-17 when running at low output frequencies (<20Hz).

This is because below 20Hz fundamental frequency the drive uses a more demanding PWM method.

*For example, if you set pr00-17=6kHz then below 20Hz output frequency the actual carrier frequency will be 66%*6=4kHz*

If the sinusoidal filter does not support this then you can either use a higher carrier frequency (which is also supported) or you can disable this function by accessing some hidden parameters in the drive. You can get in touch with us with the application details (load type, duty cycle) and we will support you with the correct setting.