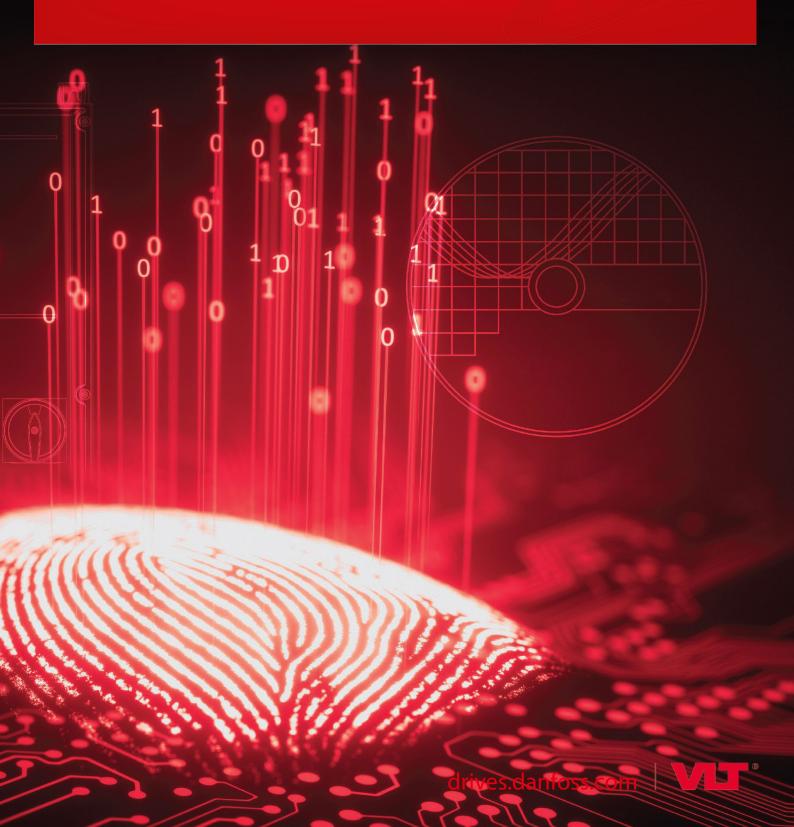


Danfoss DriveManager Plug-in for TwinCAT

VLT[®] AutomationDrive FC 301/FC 302, VLT[®] Decentral Drive FCD 302



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Contents

Contents

1	Inti	roduc	tion	3					
	1.1	Purpo	se of the User Guide	3					
	1.2	2 Qualified Personnel							
	1.3	1.3 Additional Resources							
	1.4	1.4 Document and TwinCAT [®] Version							
	1.5	1.5 Product Overview							
		1.5.1	Purpose of the Plug-in	3					
		1.5.2	Preconditions	4					
		1.5.3	Supported Drive Series	4					
			1.5.3.1 Supported Data Types	4					
		1.5.4	Limitations	4					
2	Inst	Installation and Deinstallation							
	2.1	2.1 Installing the Danfoss DriveManager Plug-in for TwinCAT [®]							
	2.2								
3	User Interface								
5	3.1		iption of the Danfoss DriveManager for TwinCAT [®] User Interface	7					
			·						
4	Usi	ng th	e Danfoss DriveManager Plug-in for TwinCAT®	9					
	4.1	Scanr	ing Devices	9					
	4.2	2 Modifying the Startup List with Danfoss DriveManager Plug-in for TwinCAT®							
		4.2.1	Grid Colors	15					
		4.2.2	Removing a Parameter from the Startup List	15					
		4.2.3	Adding a Default Value to the Startup List	16					
		4.2.4	Activating the Configuration	16					
	4.3	3 Working with an Online Drive							
	4.4	4 Modifying the Online Drive Parameters with Danfoss DriveManager Plug-in for TwinCAT®							
		4.4.1 Restricted Modification							
	4.5	Use C	ases for Manual Drive Identification	20					
		4.5.1	Drive Identified but not Created in Danfoss DriveManager Plug-in	20					
			4.5.1.1 Identifying the Device	21					
		4.5.2	The Drive is Created, but Has Been Changed Externally	21					



1 Introduction

1.1 Purpose of the User Guide

This User Guide provides:

- Step-by-step instructions on how to install the Danfoss DriveManager Plug-in for TwinCAT®.
- Description of the Danfoss DriveManager user interface.
- Use case examples of working with the Danfoss DriveManager.

The user guide is intended for use by qualified personnel.

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TwinCAT[®] is a registered trademark of Beckhoff Automation GmbH. Other designations used in this publication may be trademarks whose use by 3rd parties for their own purposes could violate the rights of the owners.

1.2 Qualified Personnel

Correct and reliable transport, storage, installation, operation, and maintenance are required for the trouble-free and safe operation of the drive. Only qualified personnel are allowed to install and operate this equipment.

Qualified personnel are defined as trained staff, who are authorized to install, commission, and maintain equipment, systems, and circuits in accordance with pertinent laws and regulations. Also, the qualified personnel must be familiar with the instructions and safety measures described in this manual.

1.3 Additional Resources

Resources available for the TwinCAT[®] software and for the drives in which the software can be installed:

- The Operating Guide of the relevant drive provides the necessary information for getting the drive up and running.
- The Design Guide of the relevant drive provides detailed information about capabilities and functionality to design motor control systems.
- The Programming Guide of the relevant drive provides greater detail on working with parameters.
- The Function Blocks with TwinCAT[®] User Guide provides instructions on how to integrate a Danfoss drive into a Beckhoff Twin-CAT[®] 3 system.

1.4 Document and TwinCAT[®] Version

This User Guide is regularly reviewed and updated. All suggestions for improvement are welcome.

The original language of this manual is English.

ΝΟΤΙΟΕ

This manual contains images from previous versions. The purpose of these images is merely showing and understanding how to use the software.

Table 1: Document and TwinCAT® Version

Revision	Remarks	TwinCAT [®] version	Danfoss DriveManager version
BC319549253561, version 0301	Update to Danfoss DriveManager software version.	3.1	1.47

1.5 Product Overview

1.5.1 Purpose of the Plug-in

The Danfoss Drive Manager Plug-in for TwinCAT simplifies the complete commissioning of Danfoss drives without using VLT® Motion Control Tool MCT 10.

User Guide



1.5.2 Preconditions

- Operating system: Windows 7 or later.
- TwinCAT 3.1 must be installed in the default folder C:\TwinCAT.

NOTICE

It is not necessary to install Danfoss ESI files separately as they are installed with the plug-in.

1.5.3 Supported Drive Series

The Danfoss DriveManager Plug-in for TwinCAT® supports the following drive series:

- VLT[®] AutomationDrive FC 301
- VLT[®] AutomationDrive FC 302
- VLT[®] Decentral Drive FCD 302

1.5.3.1 Supported Data Types

The Danfoss DriveManager plug-in for TwinCAT[®] supports the following data types:

- INTEGER8
- INTEGER16
- INTEGER32
- UNSIGNED8
- UNSIGNED16
- UNSIGNED32
- VISIBLE_STRING
- 4 byte BYTE_STRING
- NORMAL_VALUE_N2
- BIT_SEQUENCE
- TIME_DIFFERENCE_WITH_DATE_INDICATION
- TIME_DIFFERENCE_WITHOUT_DATE_INDICATION

1.5.4 Limitations

The limitations listed apply to Danfoss DriveManager Plug-in for TwinCAT[®] version 1.47. The plug-in does not support the following:

- Certain drive-specific data types:
 - TIMEOFDAY
 - TIMEOFDAY_WITHOUT_DATE
- Parameters in parameter group 19-** User-defined Parameters.
- Running automatic motor adaptation (AMA).
- Parameters in parameter group 12-2* Process Data.
- Configuring more than 1 out of 4 drive setups at a time via the plug-in.

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2 Installation and Deinstallation

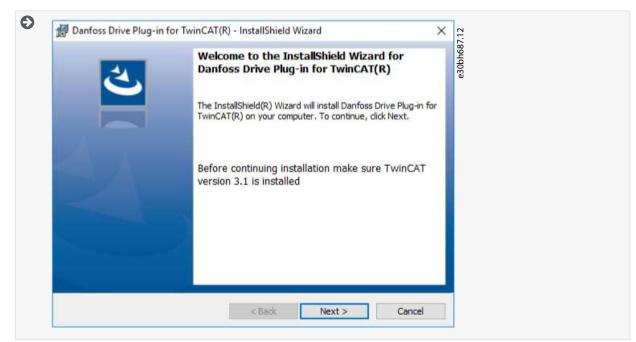
2.1 Installing the Danfoss DriveManager Plug-in for TwinCAT®

Follow the on-screen instructions for installing the plug-in.

Procedure

User Guide

1. Double-click the Danfoss DriveManager Plugin for TwinCAT file to start the Installshield Wizard.



2. Click Next.

Banfoss Drive Plug-in for TwinCAT(R)		eabh688.12	-
Ready to Install the Program		ph6	2
The wizard is ready to begin installation.		e30	
Click Install to begin the installation.			
If you want to review or change any of y exit the wizard.	our installation settings, click B	ack. Click Cancel to	
InstallShield			

3. Click Install.

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Denfoss Drive Plug-in for TwinCAT(R) - InstallShield Wizard Completed InstallShield Wizard Completed The InstallShield Wizard has successfully installed Danfoss Drive Plug-in for TwinCAT(R). Click Finish to exit the wizard.

4. Click Finish.

2.2 Deinstallation, Danfoss DriveManager Plug-in for TwinCAT[®] and VLT[®] Motion Control Tool MCT 10

If both the Danfoss DriveManager Plug-in for TwinCAT[®] and the VLT[®] Motion Control Tool MCT 10 are installed, they share a database.

Uninstalling either program affects the operation of the other.

After uninstalling 1 of the programs, reinstall the other to continue normal operation.

3 User Interface

3.1 Description of the Danfoss DriveManager for TwinCAT® User Interface

	1D	Name	Startup value	Default value	Unit	Value	
Online Drive Parameters Startup List Parameters	110	Motor Construction	[0] Asynchron	[0] Asynchron		Contraction of the second s	
Startup List Parameters	111	Motor Model	[1] Std. Asynchron	[1] Std. Asynchron		140	
- 0-** Operation / Display	D 114	Damping Gain	140	140	%	Min	Max
1-** Load and Motor 1-0* General Settings	115	Low Speed Filter Time Const.	1.00	1.00	s	0	250
- 1-1* Special Settings	116	High Speed Filter Time Const.	1.00	1.00	s		
- 1-2* Motor Data	117	Voltage filter time const.	0.500	0.500	5		
 1-3* Adv. Motor Data 1-5* Load Indep. Setting 	118	Min. Current at No Load	0	0	%		ences the dynamic PM machine. Low damping
- 1-7' Start Adjustments - 1-8' Stop Adjustments - 1-9' Motor Temperature - 2-** Brakes - 3-** Reference / Ramps - 4-** Limits / Warnings - 5-** Digital In:/Out - 6-*** Analog In/Out - 7-** Controllers - 8-** Comm. and Options - 12-** Ethernet							ted to the machine data and mping gain is too high or low

The interface is split into 3 views:

- The left view contains parameter groups and subgroups.
- The middle view contains the following parameter information:
 - ID (parameter number)
 - Name
 - Value
 - Default value
 - Unit
 - Data type
 - Index start-up list index
- The right view contains parameter values, its minimum and maximum values, and the description.

Parameter values are modified via the *Edit Parameter* dialog, which can be called through a mouse double-click, or by pressing either the spacebar or the Enter key.



User Interface

FC Edit Parameter	×
114: Damping Gain	
Min	Max
0	250
Parameter value	
140	
ОК	Cancel

Illustration 1: Edit Parameter Dialog

4 Using the Danfoss DriveManager Plug-in for TwinCAT®

4.1 Scanning Devices

This procedure is a use case for scanning devices.

Ensure that the hardware setup is correct.

Procedure

- 1. Open TwinCAT[®].
- 2. Create a new TwinCAT project.

New Project					?	\times
▶ Recent	.NET Frame	ework 4.5	* Sort by: Default	- # E	Search Installed Templates (Ctrl+E)	p-
Installed Templates Other Project Types TwinCAT Projects Samples Online	Π.		Project (XML format)	TwinCAT Projects	Type: TwinCAT Projects TwinCAT XAE System Manager Configuration	
cation: c:\us	ICAT Project146 sers\edvink\documents\vi ICAT Project146		Lick here to go online and find 2013\Projects	•	Browse ✓ Create directory for solution OK C	ancel

- 3. On the TwinCAT Project tab in the middle view, click Choose Target.
- 4. Select the target system and click OK.

1

Э	Microsoft	Visual Studio Active solution platform 'TwinCAT RT (x64)' differs from new target platform 'TwinCAT CE7 (ARMV7)'! Change solution platform?	×	e30bh963.11
		Yes No solution platform is not TwinCAT RT (x64), it has to be change		

- 5. Click Yes to change the solution platform.
- **6.** Select the tab *TwinCAT*.
- 7. Select Reset TwinCAT (Config Mode).

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Using the Danfoss DriveManager Plug-in for TwinCAT®

LE EDIT VIEW PROJECT BUILD DEBUG ♥ - ● 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10	TWINCAT TWINSAFE PLC TOOLS WINDOW Activate Configuration Restart TwinCAT System Restart TwinCAT System Restart TwinCAT System	TwinCAT CE7 (ARMV7) ↓ ▼ ↓ ▼ ↓ ▼ ↓ ▼ ↓ ♥ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
alution Explorer → ↓ × → ↓ ↓ → arch Solution Explorer (Clt+o) → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ → ↓ →	Restart TwinCAT (Config Mode) Reload Devices Scan Toggle Free Run State Show Online Data	Choose Target.
	Show Sub Items Security Management Management Update Irimware/EEPROM Show Realtime Ethernet Compatible Devices File Handling Selected Item EtherCAT Devices Target Browser	<pre>sal v3.1 (Build 4022.22) mion x x x x x x x x x x x x x x x x x x x</pre>
	About TwinCAT Description File	ear Search Error List Line Column Project

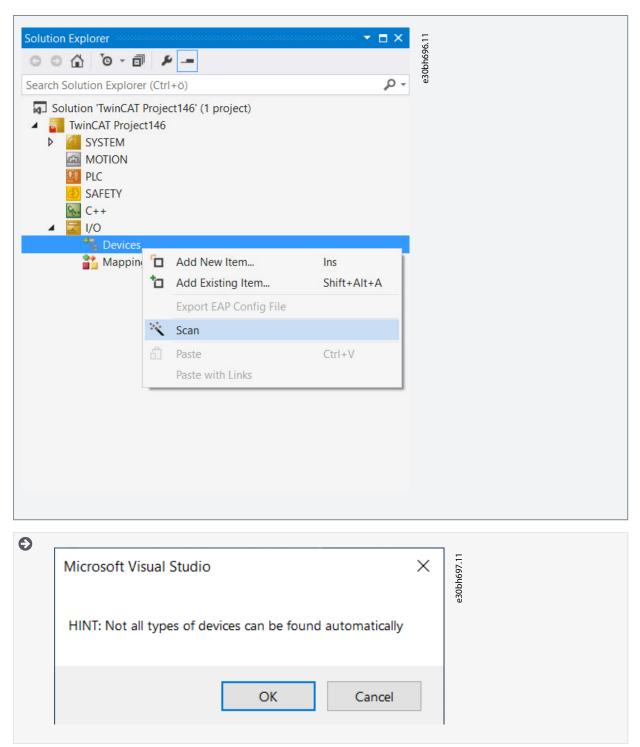
Ð	Microsoft Visual Studio	×	e30bh695.11
	Restart TwinCAT System in Config Mode		
	OK Cancel		

8. Click OK.

9. In the Solution Explorer window, right-click Devices and select Scan.

Using the Danfoss DriveManager Plug-in for TwinCAT®

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10. Click OK.

Using the Danfoss DriveManager Plug-in for TwinCAT®

2 new I/O devices found	×	98.11
Device 1 (Beckhoff CCAT) Device 2 (EtherCAT)	OK Cancel	e30bh698.11
	Select All Unselect All	

11. Click OK.

Ð	Microsoft Visual Studio	×	e30bh699.1 1
	? Scan for boxes		
	Yes	No	

12. Click Yes.

If the network was set up correctly, all drives are found and identified, and the Danfoss DriveManager Plug-in for TwinCAT[®] is ready to be used.

	Startup CoE - Online Online Drive Manager (V1.40)		
ch Solution Explorer (Ctrl+:) P - Solution TwinCAT Project3' (1 project) - AP Parameters - AP Parameters - AP Parameters		Drive Information	
	Drive Series	FC-302	
MOTION	Power Size	1.1kW (P1K1)	
Image: Second state	Voltage	PH 3 200-240 VAC (T2)	
Image: Set of the se	Software version	56.01	
	Option A	MCA124 EtherCAT	
Device 1 (Beckhoff CCAT) Device 2 (EtherCAT) Device 2 (EtherCAT) Device 2 (EtherCAT)	Option B	No option	
Image	Option C0/E0	No option	
SyncUnits I 6-** Data Readouts	Option C1/E1	No option	
Inputs Outputs Outputs Outputs	PUD File	FC-302P1K1T2V0455-00.pud	
▶ ■ Info@tat ⊕ 22.** The base Functions ▶ ■ Info@tat ⊕ 22.** The base Functions ▶ ■ Term 3 (£1300) ⊕ 32.** The base Functions ▶ ■ Term 3 (£13152) ⊕ 40.** Special Stepting ▶ ■ Term 3 (£13152) ⊕ -Startup List Parameters ▶ ■ Term 3 (£1120) ⊕ -Startup List Parameters	Ec	dit Drive Try to identify the Drive	

ΝΟΤΙΟΕ

If the drive software version is not supported (for example, if it is a new software version), the project drive can be created manually.

Solution Explorer 🔹 🖣 🗙	× TwinCAT Project3 ↔ ×			
0 0 🕼 🛱 - 10 - 5 🖉 🏓 🗕	General EtherCAT Process Data Slots Stz	artup CoE - Online Online Drive Manager (V1.40)		
Search Solution Explorer (Ctrl+;)	-			
Solution TwincAT Project3 (1 project) ■ TwincAT Project3 ■ Twincat Project3		Create a drive to start work	king with the Drive Manager Try to identify the Drive	

If the software version is not supported, contact Danfoss help desk to find the most compatible software version from the list of supported firmware, or to receive software support.

New Drive			-		×
ame					
Drive Name: Box 8 (FC-302 VLT® Automation Drive)	Software Version:	08.34		~	
	Voltage:	08.34		~	
	voltage.	08.33 08.23			
		08.12			
1.089.9		08.11			
elect Drive Type		08.04			
Series: FC-302	Power Size:	08.03 07.67			
		07.65			
PUD file: FC-302PK25T2	V0455-00.pud	07.64			
		07.62 07.52			
		07.51			
ptions		07.44 07.42			
Option A: MCA124 EtherCAT		07.31			
		07.27			
Option B: No Option	~	07.25			
Option C0/E0: No Option	~	07.11			
Option C1/E1: No Option		07.02 06.84			
Option C1/E1: No Option	~	06.82			
		06.81 06.72			
		06.66			
		06.65 06.64 06.58			

4.2 Modifying the Startup List with Danfoss DriveManager Plug-in for TwinCAT®

The startup list may already contain values that were configured by the system manager based on the ESI specifications. More application-specific entries can be created.

To edit the start-up list parameters, use either the Startup tab or the Drive Manager tab.

deneral Entercent Houses baka bios of anop CoE - Online Unite Enter Hanager (V1.40)	ෙ ට යු '⊙ - ≓ ම් ළ
Transton Petroci Idea Connent F 6:95 CcE 0.1456:0 02010/09.425100.04.4 0.4446.04.1456.04.04.1456.04.04.1456.04.04.04.1456.04.04.1456.04.04.1456.04.04.1456.04.04.1456.04.04.1456.04.04.04.04.04.04.04.04.04.04.04.04.04.	
C PS> CoE Dot1515 C 0 02:00:10:00:43:26:10:00 4, download pdo 0x1A15entr defS> CoE Dot151C 02:00:10:00:92:00:10:00:9. dewnload pdo 0x1515entr defS> CoE Dot1C12C 0:00:10:16:16 download pdo 0x1C12ndex defS> CoE Dot1C12C 0:00:10:16:14 download pdo 0x1C13ndex defS> CoE Dot1C12C 0:00:10:00:00 download pdo 0x1C13ndex defS> CoE Dot1C12C 0:00:00:00 download pdo 0x1C13ndex dot1C12C 0x1C1 download pdo 0x1C13ndex download p	Search Solution Explorer (Ctrl+ö)
2PS-CcE 0.1161/CC 02/01/00/03/81/00.9. dewreadapto/bu1fi/Evert. 0.1161/CD 01/01/10/01/10/16 0.11/12/CO 10/01/10/16 0.11/12/CO 10/01/10/16 0.11/12/CO 10/01/10/16 0.11/10/10/10/10/10/10/10/10/10/10/10/10/1	Solution 'TwinCAT Project1' (1 project)
CPSS CaE 0x1C12C0 01001616 download pd0 0x1C12 index CPS CaE 0x1C13C0 0100161A download pd0 0x1C13 index CPSS CaE 0x1013C0 01001610 download pd0 0x1C13 index	TwinCAT Project1
CoE 0x1C13 C 0 01 00 16 1A download pdo 0x1C13 index CPS> CoE 0xF030 C 0 01 00 00 00 download slot cfg	SYSTEM
I <ps> CoE 0xF030 C 0 01 00 01 00 00 00 download alot cfg</ps>	MOTION
	A III PLC
PS CoE 0x22A.00 0x00 (0) download Control Word Pr	A 🛄 Untitled1
	▶ ■

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User Guide

The Danfoss DriveManager Plug-in makes easy to work with parameters. The parameters are easily found, selections can be made from dropdown lists, and values can be entered directly.

Example

Example of selecting an option in a parameter via the Danfoss DriveManager:

	rCAT Proce	ess Data Slots		he Drive Manager (V1.40)
Transition	Protocol	Index	Data	Comment
C <ps></ps>	CoE	0x1A16 C 0	02 00 10 00 43 26 10 00 4	download pdo 0x1A16 entries
C <ps></ps>	CoE	0x1616 C 0	02 00 10 00 90 26 10 00 9	download pdo 0x1616 entries
C <ps></ps>	CoE	0x1C12C0	01 00 16 16	download pdo 0x1C12 index
C <ps></ps>	CoE	0x1C13C0	01 00 16 1A	download pdo 0x1C13 index
C <ps></ps>	CoE	0xF030 C 0	01 00 01 00 00 00	download slot ofg
C PS	CoE	0x219A:00	0x02 (2)	Motor Speed Direction (P410)
C PS	CoE	0x232A:00	0x00 (0)	download Control Word Profile (p.8-10)

Illustration 2: Parameter Selected in Startup List

E - Online Online Drive Manager (V1.40)

ID	Name	Startup value	Default value	Unit	Value
♦ 410	Motor Speed Direction	[2] Both directions	[0] Clockwise		E Contra
411	Motor Speed Low Limit [RPM]	0	0	RPM	[2] Both directions
412	Motor Speed Low Limit [Hz]	0.0	0.0	Hz	
413	Motor Speed High Limit [RPM]	3,600	3,600	RPM	
414	Motor Speed High Limit [Hz]	120.0	120.0	Hz	Not editable while motor is running
416	Torque Limit Motor Mode	160.0	160.0	%	
417	Torque Limit Generator Mode	100.0	100.0	%	Select the motor speed direction(s) required. Use this parameter to prevent unwanted
418	Current Limit	160.0	160.0	%	reversing. When par. 1-00 Configuration Mode is
419	Max Output Frequency	132.0	132.0	Hz	set to Process [3], par. 4-10 is set to Clockwise [0] as default.

e30bh706.11

Illustration 3: Option Selected for Parameter in Danfoss DriveManager

Example

Example of setting a value for a parameter via the Danfoss DriveManager:

Transiti	Protocol	Index	Data	Comment
C <ps></ps>	CoE	0x1A16 C 0	02 00 10 00 43 26 10 00 45 26	download pdo 0x1A16 entries
C <ps></ps>	CoE	0x1616 C 0	02 00 10 00 90 26 10 00 92 26	download pdo 0x1616 entries
C <ps></ps>	CoE	0x1C12 C 0	01 00 16 16	download pdo 0x1C12 index
C <ps></ps>	CoE	0x1C13 C 0	01 00 16 1A	download pdo 0x1C13 index
C <ps></ps>	CoE	0xF030 C 0	01 00 01 00 00 00	download slot cfg
C PS	CoE	0x219A:00	0x02 (2)	Motor Speed Direction (P410)
C PS	CoE	0x21EF:00	0x01F4 (500)	Positive Torque limit (P495)
C PS	CoE	0x232A:00	0x00 (0)	Control Word Profile (P810)

Illustration 4: Parameter Selected in Startup List

ID	Name	Startup value	Default value	Unit	Data type	Index	Value
490	Directional Limit Mode	[0] Disabled	[0] Disabled		UNSIGNED8	0x21EA:00	50.0
491	Positive Speed Limit [RPM]	3,600	3,600	RPM	UNSIGNED16	0x21EB:00	Min Max
492	Positive Speed Limit [Hz]	120.0	120.0	Hz	UNSIGNED16	0x21EC:00	0.0 100.0
493	Negative Speed Limit [RPM]	3,600	3,600	RPM	UNSIGNED16	0x21ED:00	
494	Negative Speed Limit [Hz]	120.0	120.0	Hz	UNSIGNED16	0x21EE:00	
▶ 495	Positive Torque limit	50.0	100.0	7.	UNSIGNED16	0x21EF:00	Enter the limit for the motor torque when the
496	Negative Torque limit	100.0	100.0	%	UNSIGNED16	0x21F0:00	torque direction is clockwise.

Illustration 5: Parameter Value Added in DriveManager

4.2.1 Grid Colors

In the *DriveManager* view, the values of the parameters are color-coded depending on whether they are default or non-default values, or if they have been added to the startup list with or without a default value.

-302 1.1kW (P1K1) 200-240 VAC (T2) - Online Drive Parameters	ID	Name	Startup value	Default value	Unit	Data type	Index
All Parameters	100	Configuration Mode	[3] Process	[0] Speed open		UNSIGNED8	0x2064:00
Startup List Parameters	101	Motor Control Principle	[1] VVC+	[1] VVC+		UNSIGNED8	0x2065:00
O-** Operation / Display	102	Flux Motor Feedback Source	[1] 24V encoder	[1] 24V encoder		UNSIGNED8	0x2066:00
1-** Load and Motor	103	Torque Characteristics	[0] Constant torque	[0] Constant tor		UNSIGNED8	0x2067:00
3.** Reference / Ramps	104	Overload Mode	[0] High torque	[0] High torque		UNSIGNED8	0x2068:00
H 4-** Limits / Warnings	▶ 105	Local Mode Configuration	[2] As mode par 1-00	[2] As mode par		UNSIGNED8	0x2069:00
⊕ 5** Digital In/Out ⊕ 6** Analog In/Out	106	Clockwise Direction	[0] Normal	[0] Normal		UNSIGNED8	0x206A:00
	107	Motor Angle Offset Adjust	[0] Manual	[0] Manual		UNSIGNED8	0x206B:00
B- 8-** Comm. and Options	110	Motor Construction	[0] Asynchron	[0] Asynchron		UNSIGNED8	0x206E:00
12-** Ethernet 13-** Smart Logic	111	Motor Model	[1] Std. Asynchron	[1] Std. Asynch		UNSIGNED8	0x206F:00
- 14-** Special Functions	114	Damping Gain	120	140	2	INTEGER16	0x2072:00
15-** Drive Information 16-** Data Readouts	115	Low Speed Filter Time Const.	1.00	1.00	\$	UNSIGNED16	0x2073:00
- 17-** Position Feedback	116	High Speed Filter Time Const.	1.00	1.00	5	UNSIGNED16	0x2074:00
18-** Data Readouts 2	117	Voltage filter time const.	0.500	0.500	s	UNSIGNED16	0x2075:00
22-** Appl. Functions 23-** Time-based Functions	118	Min. Current at No Load	0	0	2	UNSIGNED16	0x2076:00
	120	Motor Power [kW]	1.10	1.10	kW	UNSIGNED32	0x2078:00
40-** Special Settings	121	Motor Power [HP]	1.48	1.48	hp	UNSIGNED32	0x2079:00
	122	Motor Voltage	230	230	V	UNSIGNED16	0x207A:00
	123	Motor Frequency	50	50	Hz	UNSIGNED16	0x207B:00
	124	Motor Current	4 07	4.97		LINGIGNED 22	0-2020-00

Illustration 6: Example of Color-coded Values in the DriveManager View

Table 2: Grid Color Legend

Color	Description
White	The parameter has the default value and is not in the startup list.
Golden	If the parameter value is different from the default value, this parameter value, and all other parameters de- pending on that one, are added to the startup list and marked with a golden color.
Orange	By right-clicking, the parameter is added to the startup list whether it has a default value or not.
Gainsboro (dark gray)	The parameter is read-only.
Red	Occurs if an error takes place and a parameter value cannot be read from the drive.
Yellow	Occurs if a parameter value cannot be applied because the parameter depends on the values of other parame- ters.

4.2.2 Removing a Parameter from the Startup List

When removing a parameter, the context menu depends on whether the parameter value is default or not. If the parameter value is not default, the parameter is reset to default before it is removed from the startup list.

Procedure

- 1. Right-click the parameter to be removed from the startup list.
- 2. Click the context menu.

106	Clockwise Direction	0:Normal	0:Normal	9.11
107	Motor Angle Offset Adjust	0:Manual	0:Manual	e 30hh 709
110	Motor Construction	Remove param	neter 107 from startup list	30hl
Illustrati	ion 7: Example of Paramete	r with Default Value	0:Normal	= =
108		3:Off	0:Manual	0
110			nual' and remove from startup list	e30bh71
llustrati	ion 8: Example of Paramete	r with Non-default	: Value	

4.2.3 Adding a Default Value to the Startup List

To initialize drives, the parameters must have default values.

Procedure

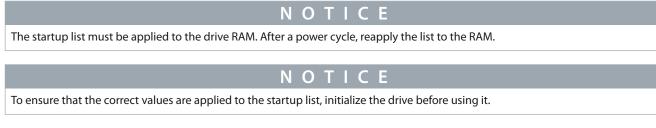
1. Right-click the parameter to be added to the startup list.

107 Motor Angle Offset Adjust 0:Manual 0:Manual	106 Clockwise Direction	0:Normal	0:Normal
	107 Motor Angle Offset	Adjust 0:Manual	0:Manual
110 Motor Construction Add parameter 107 to startup list	110 Motor Construction	Add parameter 107	to startup list

2. Select the parameter appearing in the context menu.

4.2.4 Activating the Configuration

To apply the startup list to the PLC, activate the configuration as described in this procedure.



Procedure

- 1. Select the *TwinCAT* tab.
- 2. Select Activate Configuration.

IvinCAT Project149 - Microsoft Visual Studio FILE EDIT VIEW PROJECT BUILD DEBUG TWINCAT TWINSAFE PLC TOOLS WINDOW F Build 4022.22 (Loaded) Image: State Solution Explorer Image: State Solution Explorer Image: State Solution Explorer (Ctrl+0) Image: Solution Expl	e30bh712:11	e30bh713.11
OK Cancel		
Click OK.		

3.

Microsoft Visual Studio
 Restart TwinCAT System in Run Mode
 OK
 Cancel

4. Click OK.

4.3 Working with an Online Drive

This procedure is a use case for working with online drives.

Ensure that the proper hardware setup is in place.

Procedure

- 1. Scan for devices (see <u>4.1 Scanning Devices</u>).
- 2. Select the scanned device and go to the DriveManager tab.
- 3. Select a parameter group under Online Drive Parameters.

02 1.1kW (P1K1) 200-240 VAC (T2) Online Drive Parameters	ID	Name	Online value	Default value	Unit	Data ty A	Value	.10
Al Parameters	100	and the second sec	[0] Speed open loop	[0] Speed open loop		UNSIGI	[0] High torque	Ś
- 0-** Operation / Display	101		[1] VVC+	[1] VVC+		UNSIGI	[a] . B . conden	82
⊕ 1-** Load and Motor ⊕ 2-** Brakes	102	Flux Motor Feedback Source	[1] 24V encoder	[1] 24V encoder		UNSIGI		Ę
- 2- Brakes - 3-** Reference / Ramps	103	Torque Characteristics	[0] Constant torque	[0] Constant torque		UNSIGI		90
- 4-** Limits / Warnings	▶ 104	Overload Mode	[0] High torque	(0) High torque		UNSIG	Not editable while motor is running	e30bh82
⊕-5-** Digital In/Out ⊕-6*** Analog In/Out	105	Local Mode Configuration	[2] As mode par 1-00	[2] As mode par 1-00		UNSIGI		Ψ
E 7-** Controllers	106	Clockwise Direction	[0] Normal	[0] Normal		UNSIGI	High torque [0] allows up to 160% over torque. Normal torque [1] is for oversized motors and	
- 8-** Comm. and Options	107	Motor Angle Offset Adjust	[0] Manual	[0] Manual		UNSIGI	allows up to 110% overtorque.	
12-** Ethernet 13-** Smart Logic	110	Motor Construction	[0] Asynchron	[0] Asynchron		UNSIGI		
- 13- "Smart Logic - 14-" Special Functions	111	Motor Model	[1] Std. Asynchron	[1] Std. Asynchron		UNSIGI		
⊕-15-** Drive Information	114	Damping Gain	140	140	%	INTEGE		
16-** Data Readouts 17-** Position Feedback	115	Low Speed Filter Time Const.	1,00	1,00	5	UNSIGI		
	116	High Speed Filter Time Const.	1.00	1.00	8	UNSIGI		
E-22-** Appl. Functions	117	Voltage filter time const.	0,500	0.500	s	UNSIGI		
 23-** Time-based Functions 30-** Special Features 	118	Min. Current at No Load	0	0	%	UNSIGI		
- 40-** Special Settings	120	Motor Power [kW]	1,10	1,10	kW	UNSIGI		
Startup List Parameters	121	Motor Power [HP]	1.48	1.48	hp	UNSIGI		
All Parameters	122	Motor Voltage	230	230	V	UNSIGI		
	123	Motor Frequency	50	50	Hz	UNSIGI		
	124	Motor Current	4,87	4.87	A	UNSIGI		
	125	Motor Nominal Speed	1 420	1.420	RPM	UNSIGI *	r	

4.4 Modifying the Online Drive Parameters with Danfoss DriveManager Plug-in for TwinCAT®

Parameters under Online Drive Parameters allow interaction with an online drive in a more convenient way so that the parameters in the parameter grid show the actual values read from the drive. Parameter values of an online drive can be edited in the same way as the parameters under Startup List Parameters.

C-302 1.1kW (P1K1) 200-240 VAC (T2)	ID	Name	Online value		Default value	Unit	Data ty A	Value
Online Drive Parameters All Parameters	100	Configuration Mode	[0] Speed oper	n loop	(0) Speed open loop		UNSIGI	
Oreration / Display	101	Motor Control Principle	[1] VVC+		[1] VVC+		UNSIGI	[0] High torque
- 1-** Load and Motor	102	Flux Motor Feedback Source	[1] 24V encode	er	[1] 24V encoder		UNSIGI	
⊕ 2.*** Brakes	103	Torque Characteristics	101 Constant to	(Club	(0) Constant tomus		UNSIGI	
 3-** Reference / Ramps - 4-** Limits / Warnings 	▶ 104	Overload Mode	101 High torgu	FC Edit Parameter	×		UNSIG	Not editable while motor is running
⊕ 5-** Digital In/Out	105	Local Mode Configuration	[2] As mode p				UNSIGI	Not editable while motor is running
⊕ 6-** Analog In/Out	105	Clockwise Direction	[0] Normal	104: Overload Mode			UNSIGI	High torque [0] allows up to 160% over torque. Normal torque [1] is for oversized motors and
⊕ 7-** Controllers				101 High torque				Normal torque [1] is for oversized motors and allows up to 110% over torque.
- 8-** Comm. and Options - 12-** Ethemet	107	Motor Angle Offset Adjust	[0] Manual	[1] Normal torque			UNSIGI	allows up to 110% over torque.
E-12** Smart Logic	110	Motor Construction	[0] Asynchron				UNSIGI	
B- 14-** Special Functions	111	Motor Model	[1] Std. Aayno				UNSIG	
III- 15-** Drive Information	114	Damping Gain	140			%	INTEGE	
16-** Data Readouts 17-** Position Feedback	115	Low Speed Filter Time Const.	1,00			8	UNSIGI	
⊕ 18-** Data Readouts 2	116	High Speed Filter Time Const.	1,00			5	UNSIGI	
. 22-** Appl. Functions	117	Voltage filter time const.	0.500			9	UNSIG	
23-** Time-based Functions 30-** Special Features	118	Min. Current at No Load	0			24	UNSIGI	
 ii) - 30-" Special Features iii) - 40-" Special Settings 	120	Motor Power IkWI	1.10			kW	UNSIGI	
- Startup List Parameters	121	Motor Power [HP]	1.48			hp	UNSIGI	
All Parameters	122	Motor Voltage	230	OK	Cancel	V	UNSIG	
	122	Motor Frequency	50		50	Hz	UNSIGI	
					4.87			
	124	Motor Current Motor Nominal Speed	4,87		4,87	A	UNSIGI	

Illustration 10: Example of a Parameter Modification From the Online Drive

4.4.1 Restricted Modification

Restrictions on the modification of online drive parameters often occur in the following situations:

• The parameter is read-only.

D	Name	Online value	Default value	Unit	Data type	Value Value
001	Language	[0] English	[0] English		UNSIGNED8	
002	Motor Speed Unit	[0] RPM	[0] RPM		UNSIGNED8	{0}
003	Regional Settings	[0] International	[0] International		UNSIGNED8	Min Max
004	Operating State at Power-u	[1] Forced stop, ref=old	[1] Forced stop, ref=old		UNSIGNED8	{ 0.1,2,3,4,5,6,7 }
010	Active Set-up	[1] Set-up 1	[1] Set-up 1		UNSIGNED8	Parameter is read-only
011	Edit Set-up	[9] Active Set-up	[9] Active Set-up		UNSIGNED8	
012	This Set-up Linked to	[0] Not linked	[0] Not linked		UNSIGNED8	View the set-ups linked by means of par. 0-12 This Set-up Linked to. Linked set-ups are
013.0	Readout: Linked Set-ups	{0}	(0)		UNSIGNED16	displayed as two digits separated by a comma.
013.1	Readout: Linked Set-ups	{1}	{1}		UNSIGNED16	
013.2	Readout: Linked Set-ups	{2}	{2}		UNSIGNED16	
013.3	Readout: Linked Set-ups	{3}	{3}		UNSIGNED16	
013.4	Readout: Linked Set-ups	{4}	{4}		UNSIGNED16	
014	Readout: Edit Set-ups / Ch	AAAAAAAhex	AAAAAAAhex		INTEGER32	
015	Readout: actual setup	1	1		UNSIGNED8	
020	Display Line 1.1 Small	[1617] Speed [RPM]	[1617] Speed [RPM]		UNSIGNED16	
021	Display Line 1.2 Small	[1614] Motor current	[1614] Motor current		UNSIGNED16	
022	Display Line 1.3 Small	[37] Display Text 1	[1610] Power [kW]		UNSIGNED16	
023	Display Line 2 Large	[1613] Frequency	[1613] Frequency		UNSIGNED16	
024	Display Line 3 Large	[1602] Reference %	[1602] Reference %		UNSIGNED16	
025.0	My Personal Menu	1	1		UNSIGNED16	
025 1	My Personal Menu	20	20		UNSIGNED16	*

Illustration 11: Examples of Read-only Parameters with Corresponding Label Shown in the Right View

- The parameter is not editable while the motor is running. An example of such a parameter is shown in <u>Illustration 9</u>. The corresponding label is shown in the right view.
- The parameter value is not read. Parameter polling is not instant and performed starting from the top row so that if a parameter is yet to be read, its value is shown as "???????.".

D	Name	Online value	Default value	Unit	Data type
410	Motor Speed Direction	[2] Both directions	[0] Clockwise		UNSIGNED8
411	Motor Speed Low Limit [RPM]	0	0	RPM	UNSIGNED16
412	Motor Speed Low Limit [Hz]	0.0	0.0	Hz	UNSIGNED16
413	Motor Speed High Limit [RP	3 600	3 600	RPM	UNSIGNED16
414	Motor Speed High Limit [Hz]	120,0	120.0	Hz	UNSIGNED16
416	Torque Limit Motor Mode	77777777	160.0	%	UNSIGNED16
417	Torque Limit Generator Mode	77777777	100,0	*	UNSIGNED16
418	Current Limit	77777777	160.0	%	UNSIGNED32
419	Max Output Frequency	77777777	132.0	Hz	UNSIGNED16
420	Torque Limit Factor Source	2222222	[0] No function		UNSIGNED8
421	Speed Limit Factor Source	222222	[0] No function		UNSIGNED8
423	Brake Check Limit Factor S	77777777	[0] DC-link voltage		UNSIGNED8
424	Brake Check Limit Factor	??????? ?	98	%	UNSIGNED8
425	Power Limit Motor Factor So	????????	[0] No function		UNSIGNED8
426	Power Limit Gener. Factor S	2222222	[0] No function		UNSIGNED8
430	Motor Feedback Loss Funct	77777777	[2] Trip		UNSIGNED8
431	Motor Feedback Speed Error	<u> </u>	300	RPM	UNSIGNED16
432	Motor Feedback Loss Time	2222222	0,05	s	UNSIGNED16
434	Tracking Error Function	????????	[0] Disable		UNSIGNED8
435	Tracking Error	<u> </u>	10	RPM	UNSIGNED16
436	Tracking Error Timeout	22222222	1.00	s	UNSIGNED16

Illustration 12: Example of Read and Unread Parameters in the Grid

• The parameter value cannot be read. Typically, such an issue occurs if there are network problems. A corresponding message is shown in the parameter grid indicating the exact cause for the issue.

)	Name	Online value	Default value	Unit	Data type	. 1
126	Motor Cont. Rated Torque	Ads-Error 0x712 : Server is in in	5.0	Nm	UNSIGNED32	
129	Automatic Motor Adaptation	Ads-Error 0x712 : Server is in in	[0] Off		UNSIGNED8	
130	Stator Resistance (Rs)	Ads-Error 0x712 : Server is in in	0.0384	Ohm	UNSIGNED32	
131	Rotor Resistance (Rr)	Ads-Error 0x712 : Server is in in	0,0327	Ohm	UNSIGNED32	
133	Stator Leakage Reactance	Ads-Error 0x712 : Server is in in	0,2182	Ohm	UNSIGNED32	
134	Rotor Leakage Reactance (Ads-Error 0x712 : Server is in in	0,2618	Ohm	UNSIGNED32	
135	Main Reactance (Xh)	Ads-Error 0x712 : Server is in in	6,7628	Ohm	UNSIGNED32	
136	Iron Loss Resistance (Rfe)	Ads-Error 0x712 : Server is in in	139,894	Ohm	UNSIGNED32	
137	d-axis Inductance (Ld)	Ads-Error 0x712 : Server is in in	0.0	mH	INTEGER32	
138	q-axis Inductance (Lq)	Ads-Error 0x712 : Server is in in	0,000	mH	INTEGER32	
139	Motor Poles	Ads-Error 0x712 Server is in in	4		UNSIGNED8	
140	Back EMF at 1000 RPM	Ads-Error 0x712 : Server is in in	230	V	UNSIGNED16	
141	Motor Angle Offset	Ads-Error 0x712 : Server is in	invalid state. (Ads-Err	ror 0x712 : Serve	er is in invalid state.)	
144	d-axis Inductance Sat. (LdS	Ads-Error 0x712 : Server is in in	0,000	mH	INTEGER32	
145	q-axis Inductance Sat. (LqS	Ads-Error 0x712 : Server is in in	0.000	mH	INTEGER32	
146	Position Detection Gain	Ads-Error 0x712 : Server is in in	120	%	UNSIGNED16	
147	Torque Calibration	Ads-Error 0x712 : Server is in in	[0] Off		UNSIGNED8	
148	Inductance Sat. Point	Ads-Error 0x712 : Server is in in	35	%	INTEGER16	
149	q-axis Inductance Sat. Point	Ads-Error 0x712 : Server is in in	100	%	UNSIGNED16	
150	Motor Magnetisation at Zero	Ads-Error 0x712 : Server is in in	100	%	UNSIGNED16	
151	Min Speed Normal Magnetis	Ads-Error 0x712 : Server is in in	15	RPM	UNSIGNED16	

Illustration 13: Example of a Situation Where a Parameter Cannot be Read

• The parameter has a dependency. It could be that a parameter depends on the values of other parameters that have not been read yet. In this case, the cell will be highlighted in yellow, and the mouse hover will trigger a tooltip message.

)	Name	Online value	Default value	Unit	Data type	A 1/-	lue
300	Reference Range	[1] -Max - +Max	[1] -Max - +Max		UNSIGNED8		
301	Reference/Feedback Unit	[4] Nm	[2] RPM		UNSIGNED8		397
302	Minimum Reference	0.0 Parameter cannot be s	tored. To solve the problem tr	y to read r	more parameters in the g	grid, e.g. p	parameters group 1-**. 🗴
303	Maximum Reference	7,397	1 500,000	RPM	INTEGER32	0.	000 999 999,999
304	Reference Function	[0] Sum	[0] Sum		UNSIGNED8		
310.0	Preset Reference	0,00	0.00	%	INTEGER16		
310.1	Preset Reference	0.00	0.00	%	INTEGER16	The	e Maximum Ref. is the highest value tainable by summing all references. The
310.2	Preset Reference	0.00	0,00	%	INTEGER16	Ma	aximum Ref. unit matches the choice of Infiguration in par. 1-00 Configuration Mode
310.3	Preset Reference	0.00	0.00	%	INTEGER16	an	d the unit in par. 3-01 Reference/Feedback
310.4	Preset Reference	0.00	0.00	%	INTEGER16	Ur	nt.
310.5	Preset Reference	0.00	0.00	%	INTEGER16		
310.6	Preset Reference	0.00	0,00	%	INTEGER16		
310.7	Preset Reference	0.00	0,00	%	INTEGER 16		
311	Jog Speed [Hz]	5,0	5.0	Hz	UNSIGNED16		
312	Catch up/slow Down Value	0.00	0.00	%	INTEGER16		
313	Reference Site	[0] Linked to Hand / Auto	[0] Linked to Hand / Auto		UNSIGNED8		
314	Preset Relative Reference	0.00	0,00	%	INTEGER32		
315	Reference Resource 1	[1] Analog Input 53	[1] Analog Input 53		UNSIGNED8		
316	Reference Resource 2	[20] Digital pot.meter	[20] Digital pot.meter		UNSIGNED8		
317	Reference Resource 3	[11] Local bus reference	[11] Local bus reference		UNSIGNED8		
318	Relative Scaling Reference	. 101 No function	[0] No function		UNSIGNED8	-	

Illustration 14: Example of a Situation Where a Parameter Cannot be Stored due to Being Dependent on Other Parameters

To handle restricted parameters, manually read the parameters of the drive.

4.5 Use Cases for Manual Drive Identification

4.5.1 Drive Identified but not Created in Danfoss DriveManager Plug-in

The problem in this use case is that, even though the devices are identified and created at the scanning, they may be unvisited after saving and closing the project. This can occur if, for example, many devices are connected. In these cases, the previously unvisited devices in the solution explorer do not have the project drives created automatically the next time the project is opened.

TwinCAT Project25 😐	×								Solution Explorer + A ×
General EtherCAT P	General EtherCAT Process Data Stots Startup CoE - Online Online Drive Manager (V1.40)								00000
									Search Solution Explorer (Ctrl+ö)
			drive to New FC-302		orking		e Drive Manaç	jer	Sector Solution Equipre (CI(1+c)) P - I MOTON P - <t< th=""></t<>
Name	Online	Туре	Size	>Addr	In/Out	User ID	Linked to		
7 1603. Status Word	3975	UINT	2.0	39.0	Input	0	10112201121		Box 7 (FC-302 VLT® Automation Drive) Box 8 (FC-302 VLT® Automation Drive)
 1605. Main Actu 	-114	INT	2.0	41.0	Input	0			Box 8 (FC-SU2 VLI © Automation Drive) Box 8 (FC-SU2 VLI © Automation Drive)
WcState	0	BIT	0.1	1522.1	Input	0			
		bri	-	r mader 1	put				v

Illustration 15: Resulting View of a Device Being Previously Identified, but not Created in the Danfoss DriveManager Plug-in

Solution

Try to identify the drive by clicking the *Try to identify the Drive* button. On a successful drive identification, the drive is created automatically as shown in <u>Illustration 16</u>. If the identification fails, a corresponding error message is shown with hints to troubleshooting.

General Burk/LT Process Data Bats Sana Cal: Color	vinCAT Project25 🕫 🔾	×							 Solut 	tion Explorer	▼ 9 ×	
Orien Dire Darenters Dire Information B: Al Paranters Dire Series B: Al Paranters Dire Series Dorber Size IBKW (P18K) Voltage PH 3 200-240 VAC (72) Software version 06.34 Option A, MCA124 EthericAT C++ Option COLED No Option Option COLED No Option Option CILET No Option Durb File F-0.302 P18KT2=====V0455-00 pud EditDrive Try to identify the Drive ImmageLindo C+1 Term 2 (R1000) ImmageLindo ImmageLindo Option Size ImmageLindo Option Size ImmageLindo ImmageLindo Term 3 (R100) ImmageLindo ImmageLindo ImmageLindo	General EtherCAT Pro	ocess Data Slots	Startup CoE - 0	Online Onlin	e Drive Mar	ager (V1.4	0		0	0 🔂 - 10 - 15 d 🖋 🗕		
Bits Jack Jack Presenters Drive Series Power Size TwinkAT ProjectSi Voltage Prover Size Option A McA124 EtherCAT Option Ci/E1 No Option Doption Ci/E1 No Option Edit Drive Try to identify the Drive Image Attributes	- FC-302 18kW (P18K) 200-240 VAC (T2) - Online Drive Parameters											
Power State Power State 154.W (P138) Voltage PH 3 200-240 VAC (T2) 54 Software version 003-44 54/EFT Option A MCA124 EtherCAT 54 Option Option A MCA124 EtherCAT 54 Option Option Option No Option 54 Option CI/E1 No Option 54 PUD File FC 326718KT2======_V0455-00 pud 54 Edit Drive Try to identify the Drive 54 MITON 11 Trom 16(200) 54 Trom 2611/300 54 54 MITON 11 Trom 16(200) 54	Startup List Parameters Drive Series Power Size				ve Series	FC-302				TwinCAT Project25		
Voltage PH 3 200-240 VAC (T2) Software version 0034 Option A MCA124 EtherCAT Option B No Option Option CQED No Option Option CQED No Option Option CUEI No Option PUD File FC-302P1BRT2=====_V0455:00 pud Edit Drive Try to identify the Drive Term 4 (EL120) Term 4 (EL120) Term 6 (EL12) Term 6 (EL120) Term 6 (EL120) Term 6 (EL120)					ower Size	18kW (1	P18K)					
Software version 08 34 Option A MCA124 Effer(AT Option B No Option Option CQ(E0) No Option Option CV(E1) No Option PUD File FC-302P18KT2=====_V0455:00 pud Edit Drive Try to identify the Drive Image Image Image					Voltage	PH 3 20	0-240 VAC (T2)			PLC		
Option A MCA124 EtherCAT Option B No Option Option CQUED No Option Option CQUED No Option Option CTUET No Option PUD File FC-302P18XT2=====_V0455:00 pud Edit Drive Try to identify the Drive Image Image Image <				Softwa	re version	08.34				6. C++		
Option 0 No Option Option CQED No Option Option CVET No Option PUD File FC-302P18KT2=====_V0455:00 pud Edit Drive Try to identify the Drive Edit Drive Try to identify the Drive Image Image Image <t< td=""><td></td><td></td><td>1</td><td></td><td>Option A</td><td>MCA12</td><td>EtherCAT</td><td></td><td>1</td><td></td><td></td></t<>			1		Option A	MCA12	EtherCAT		1			
Option CUET No Option > Syncthits PUD File FC-302P18KT2=====_V0455:00 pud > Outputs Edit Drive Try to identify the Drive > Try to identify the Drive Image: Info: Cue Info: C					Option B	No Opt	on					
Option C1/E1 No Option > 2 Spruchis PUD File FC-302P18KT2=	Option C0/E				ion C0/E0	No Opt	on					
Food real Food real Food real Food real Food real Edit Drive Try to identify the Drive Food real Food real Food real Edit Drive Try to identify the Drive Food real Food real Food real Food real Food real Food real Food real Food real Food real Food real Food real Food real Food real Food real Food real				Opt	ion C1/E1	No Opt	on					
Edit Drive Try to identify the Drive • •					PUD File	FC-302	P18KT2=====					
					E	lit Drive	Try to identify the Drive	1				
									1	Box 7 (FC-302 VLT® Au		
1 603. Status Word 3975 UINT 2.0 39.0 Input 0											tomation Drive)	
1605. Main Actu 118 INT 2.0 41.0 Input 0 WcState 0 BIT 0.1 1522.1 Input 0 WcState 0										Mappings		

Illustration 16: Device Created Successfully via the Manual Drive Identification Feature

4.5.1.1 Identifying the Device

Procedure

- 1. Scan for devices.
- 2. Select the scanned device and go to the DriveManager tab.
- 3. Click the *Try to identify the Drive* button.

4.5.2 The Drive is Created, but Has Been Changed Externally

The problem in this use case is that, while the project is open with previously scanned devices, some of the devices may have been changed externally. For example, a software version has been updated by VLT[®] Motion Control Tool MCT 10, which causes the drive information in the plug-in to stay outdated.

Solution

Try to identify the drive by clicking the *Try to identify the Drive* button on the drive information panel. The identification result is shown at the bottom of the panel. There are 4 possible outcomes:

- The configuration is identical. The project is up-to-date and no changes to the projects are done.
- The configuration is different.
 - The project update is possible. In such case, the *Danfoss DriveManager* updates the project to the up-to-date state. To see an example where the updated information text appears in green, refer to <u>Illustration 17</u>.
 - The project update is not possible. No changes to the project are done and an error message is shown.
- Identification has failed. No changes to the projects are done and an error message is shown.

- FC-302 18kW (P18K) 200-240 VAC (T2) - Online Drive Parameters - All Parameters		Drive Information
Startup List Parameters	Drive Series	FC-302
	Power Size	18kW (P18K)
	Voltage	PH 3 200-240 VAC (T2)
	Software version	08.34
	Option A	MCA124 EtherCAT
	Option B	No Option
	Option C0/E0	No Option
	Option C1/E1	No Option
	PUD File	FC-302P18KT2
	Ed	lit Drive Try to identify the Drive
	A new drive has been identified, the	project was updated

Illustration 17: Drive Information has been Successfully Identified and Updated

<u>Danfoss</u>

Index

Index

A	P
Activate configuration16	Preconditions
Active solution platform9	
Additional resources	Q
Apply startup list to PLC16	Qualified personnel
C	
	S
Color code15	Scanning9
E	Startup list13
ESI files	Т
	Target system9
L	
Limitations of the Danfoss DriveManager4	U
Ν	User interface7
New project9	
0	
0	
Online drive17	



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