SIEMENS

SIMATIC

S7 300 PLC
CPU 317T-2 DP: Controlling a SINAMICS S120

Getting Started

12/2005
A5E00480391-01

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

Danger

indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning

indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

Caution

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

Notice

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning

This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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1.1 Introduction

Introduction

This Getting Started contains a practical example guiding you through thirteen steps in commissioning a fully functional application, and showing you how to carry out motion commands. It is thus a valuable help in getting started with the basic functions of a CPU 317T-2 DP.

Depending on your degree of experience, working through the sample will take between two and three hours.

Note

This Getting Started presumes that you have connected a SINAMICS[SINAMICS] S120 drive to the DP (DRIVE) interface of the CPU 317T-2 DP In case you do not have a drive, we recommend you refer to the Getting started documentation "CPU 317T-2 DP: Controlling a virtual axis".

Preparation 2

2.1 Requirements

Requirements

The following requirements must be fulfilled:

- An S7-300 station, consisting of:
  - Power supply module (PS), for example, 6ES7 307-1EA00-0AA0
  - CPU 317T-2 DP with inserted MMC (4 MB or more).
  - Optional digital input module (DI) with bus connector, for example, 6ES7 321-1BH02-0AA0
  - Optional digital output module (DO) with bus connector, for example, 6ES7 322-1BH01-0AA0
  - Two optional front connectors for the digital modules
- A PG with MPI interface and properly installed software packages and commissioning tools as listed below:
  - STEP 7 V5.3 SP3 and higher
  - S7-Technology V3.0
- The PG is connected to the CPU via the MPI/DP interface (transmission rate up to 12 Mbps; default 187.5 kbps).
- A SINAMICS® S120 is connected to the CPU 317T-2 DP via the DP (DRIVE) interface.
- The SINAMICS® S120 comprises the following modules:
  - CU320 control unit with TB30 terminal board (6SL3040-0MA00-0AA1)
  - Smart line module, 5 kW (6SL3130-6AE15-0AA0-Z)
  - Single/double motor module, 3 A (6SL3120-2TE13-0AA0-Z)
  - 1 synchronous motor 1FK7022-5AK71-1AG3 with incremental encoder sin/cos 1 Vpp via SMC20 sensor module cabinet (6SL3055-0AA00-5BA1)
  - 1 synchronous motor 1FK7022-5AK71-1LG3 with DRIVE-CLiQ interface: Absolute encoder EnDat 512 pulses/revolution
  - Reference loops for position monitoring
  - Control box for setpoint/actual-value linkage via terminals
- You know the firmware version of your SINAMICS S120.

If you do not know the firmware version, then you can find the version on the supplied certificate. Alternatively, you can open the "content.txt" file on the CF card. The firmware version is in the "Internal Version" entry. You can find more detailed information on reading the firmware version in the SINAMICS S120 product information.

Note

For the example of a drive in Getting Started, we use a SINAMICS® S120 training case. The training case is available under the following order number:

- Axis version with 1FK7 motor

  6ZB2480-0AA00
- Axis version with 1FK7 motors

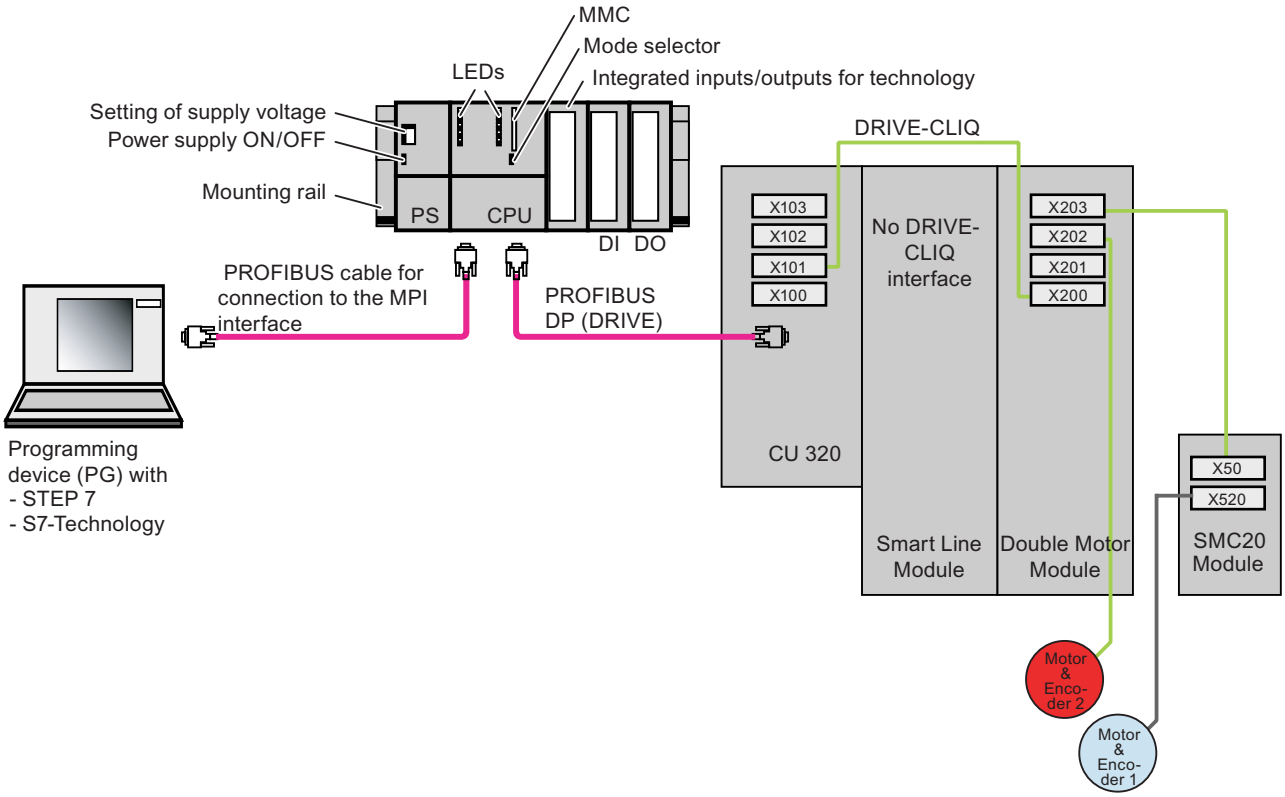
  6ZB2480-0BA00

- The system is completely installed and wired. For information, refer to *Getting Started CPU 31x: Commissioning*.
- You provided hardware limit switches and EMERGENCY-OFF switches for safe and reliable operation of the system.

Warning

Operation of an S7-300 as part of plants or systems is subject to special rules and regulations, based on its field of application. Please note the current safety regulations for the prevention of accidents, e.g. IEC 204 (EMERGENCY-OFF equipment). You risk severe injury, or damage to machines and equipment if you ignore these directives.

Example configuration



Task

Configuration of an axis using HW Config and S7T Config. You then operate this axis with the help of a STEP 7 user program.

Learning units

3

3.1 1. Step: Wiring

Warning

You may come into contact with live wires. Always switch off power before you start wiring the S7-300.

Procedure

A description of the installation and wiring of your 317T-2DP CPU is found in the *Getting Started Collection S7-300 PLC: CPU 31x: Commissioning*.

Set the PROFIBUS address of the SINAMICS® to PROFIBUS address 4. The setting of the PROFIBUS address on the CU230 directly via the hardware DIP switch, is performed in the following way:

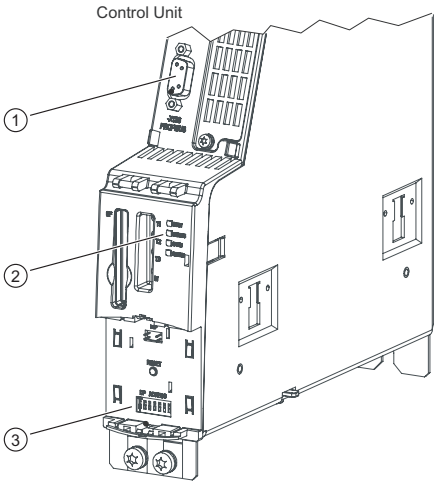
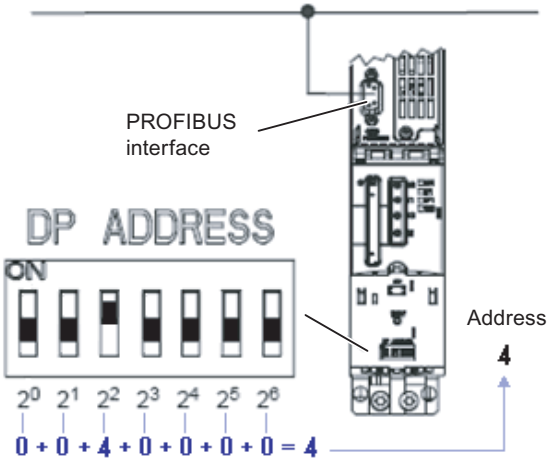


Figure 3-1 Schematic representation of the CU320 control unit

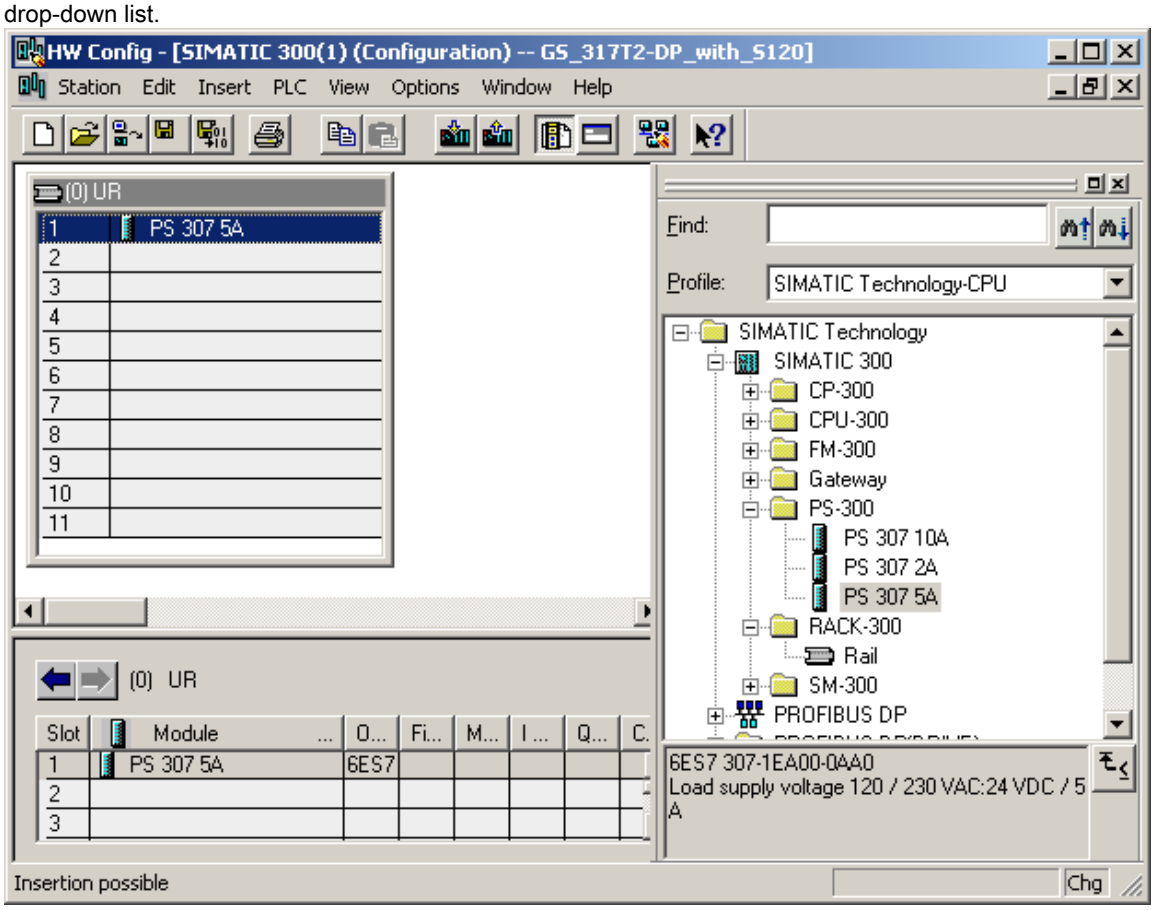
①	PROFIBUS interface
②	PROFIBUS diagnostics LED "DP1"
③	PROFIBUS address switch

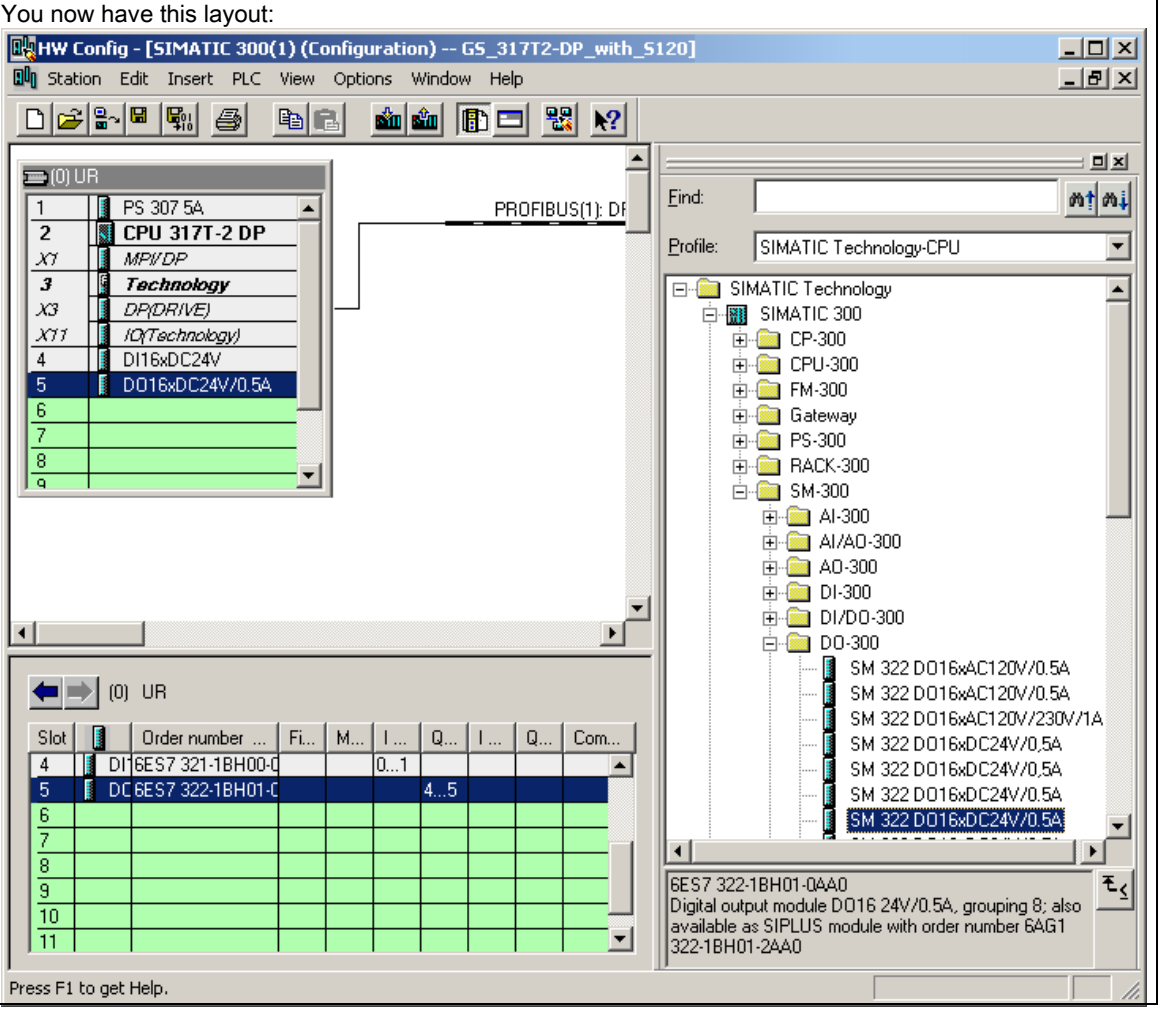


3.2 2. Step: Configuring CPU 317T-2 DP with HW Config

Procedure

Sequence	Activity	Result
1	Create a new project in the SIMATIC Manager (for example, "GS_317T2-DP_with_S120") and add a SIMATIC 300 station.	The SIMATIC 300 station appears in the SIMATIC Manager.
2	Open HW Config by selecting the "SIMATIC 300" station and double-clicking "Hardware".	HW Config opens.

Sequence	Activity	Result
3	Open the "Hardware Catalog" and select the "SIMATIC Technology CPU" hardware profile in the "Profile" drop-down list.  Result: The "SIMATIC Technology" directory is displayed.	
4	Insert a mounting rail using drag-and-drop in the station window of HW Config.	This creates a mounting rail.
5	Drag-and-drop the "PS 307 5A" power supply module onto the mounting rail.	The power supply module appears on the mounting rail.
6	Add the Technology CPU to the mounting rail by means of drag-and-drop.	A message box appears.
7	You change the transmission rate in the next step. Confirm the message box with "OK.“	In the next dialog box, you can set the PROFIBUS properties of the DP (DRIVE).
8	Confirm the default settings of the PROFIBUS configuration with "OK".	

Sequence	Activity	Result
9	Add a digital input module and a digital output module. You now have this layout:  	

3.3 3. Step: Changing the transmission rate at the MPI/DP interface

Procedure

Sequence	Activity	Result
1	Open the MPI/DP interface (X1) in HW Config with double-click.	The "Properties - MPI/DP" dialog box opens.
2	Click "Properties".	The "Properties – MPI interface MPI/DP" dialog box opens.
3	Click MPI(1), then click "Properties".	The "Properties - MPI" dialog box opens.

Sequence	Activity	Result
4	Select the "Network settings" tab and select a transmission speed of "1.5 Mbps".	
5	Confirm all open dialog boxes with "OK".	You have now increased the configured transmission speed of the MPI interface at the CPU in order to accelerate data transfer.
6	When the CPU is in STOP, select **PLC > Download** to download the configuration. Select the CPU and confirm with "OK".	The "Select node address" dialog box opens. The default transmission rate of the MPI interface is 187 kbps, i.e. the PG/PC interfaces must be set up as described earlier in the requirements section.
7	Confirm with "OK".	The data are now downloaded from the PG/PC to the CPU.

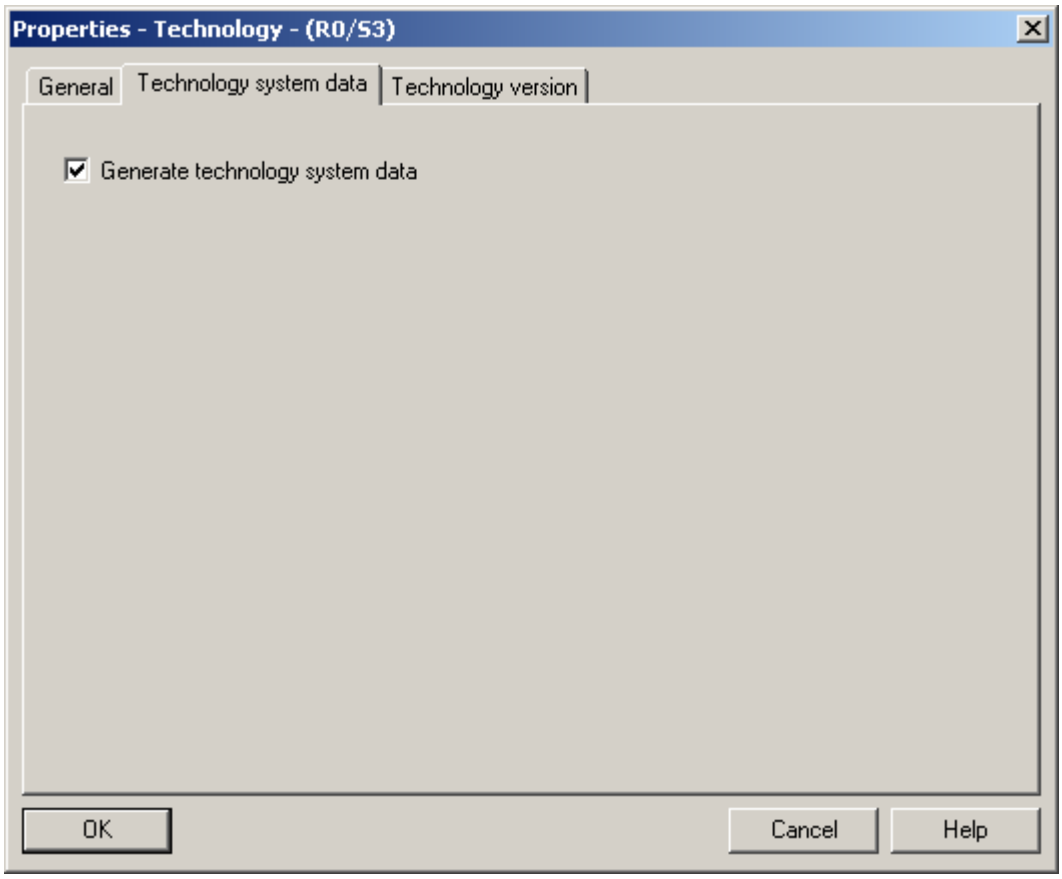
3.4 4. Step: Vital settings in your DP (DRIVE) configuration

Procedure

Sequence	Activity	Result
1	In HW Config, double-click X3 DP (DRIVE).	The "Properties – DP (DRIVE)" dialog box opens.
2	Click the "Properties" button.	The "Properties – PROFIBUS interface DP (DRIVE)" dialog box opens.
3	Enter PROFIBUS address "2".	
4	Click "New" to create a new PROFIBUS subnet.	The "Properties – New subnet PROFIBUS" dialog box opens.
5	In the "Network settings" tab of the next dialog box, set the transmission rate of the PROFIBUS network. Enter a rate of 12 Mbps. Maintain the "DP" profile setting of the subnet.	
6	Click "OK" to confirm all open dialog boxes of HW Config.	

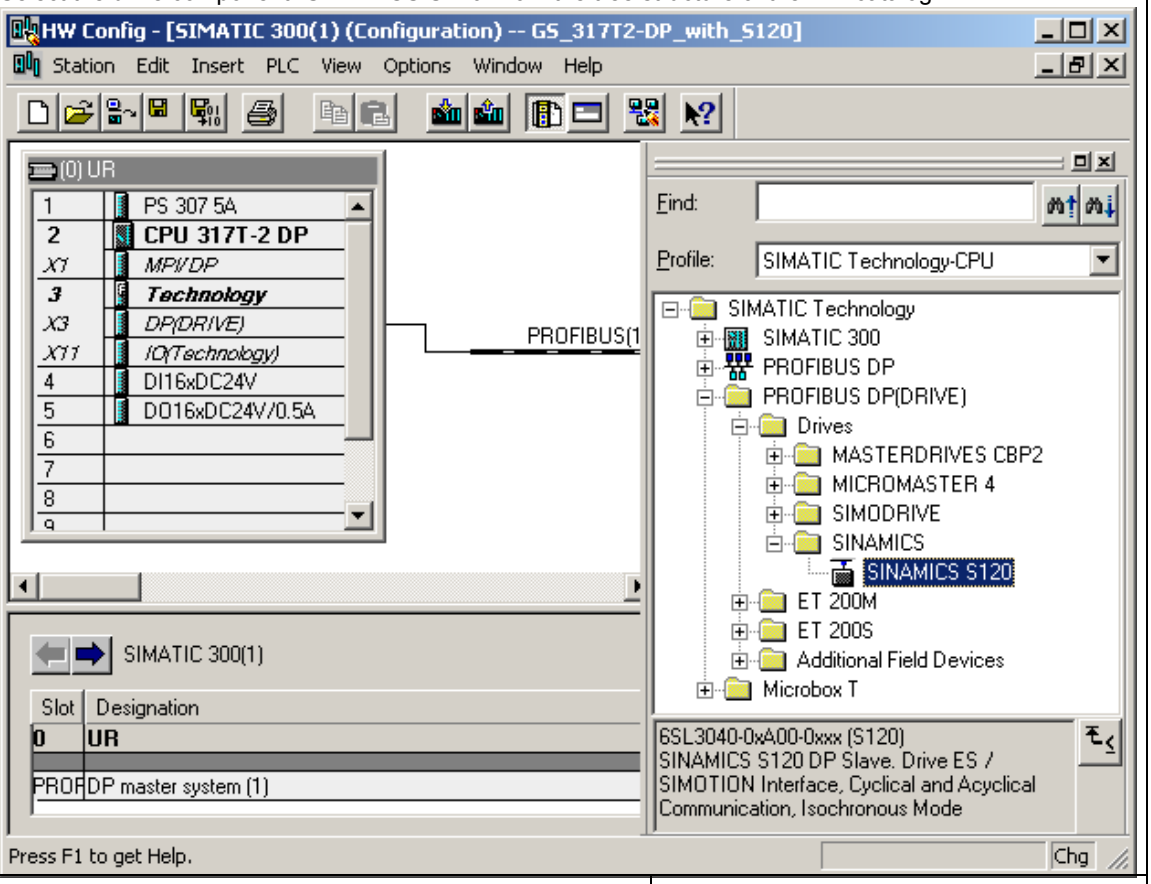
3.5 5. Step: Generating technology system data

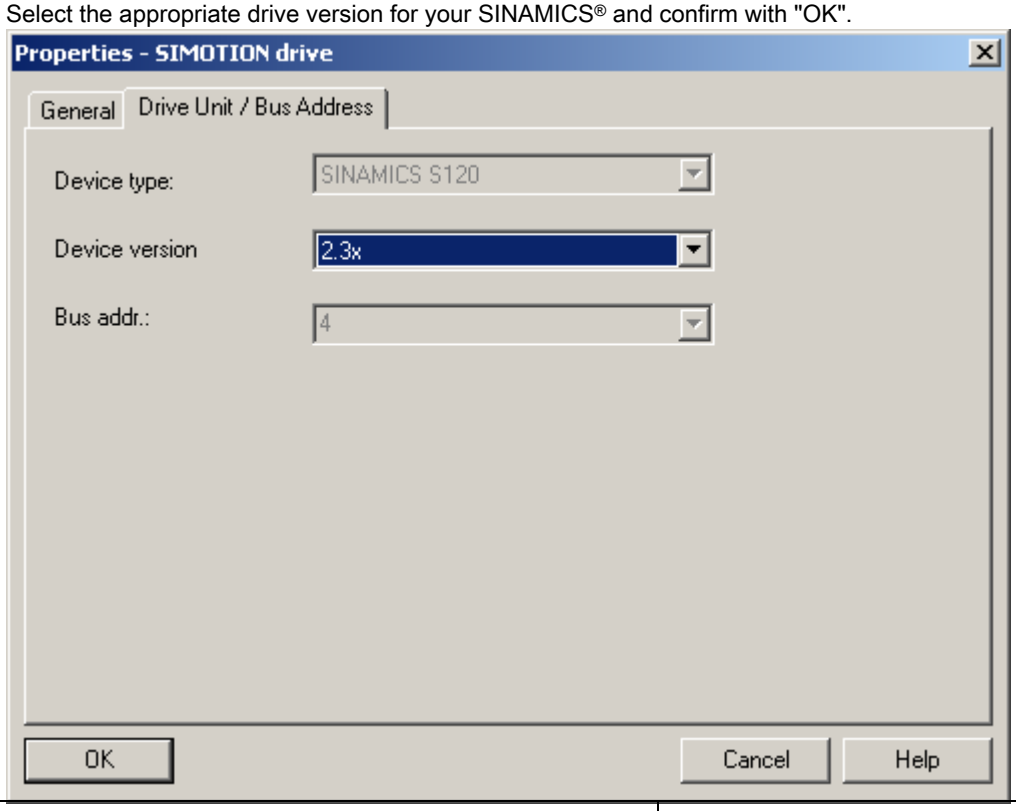
Procedure

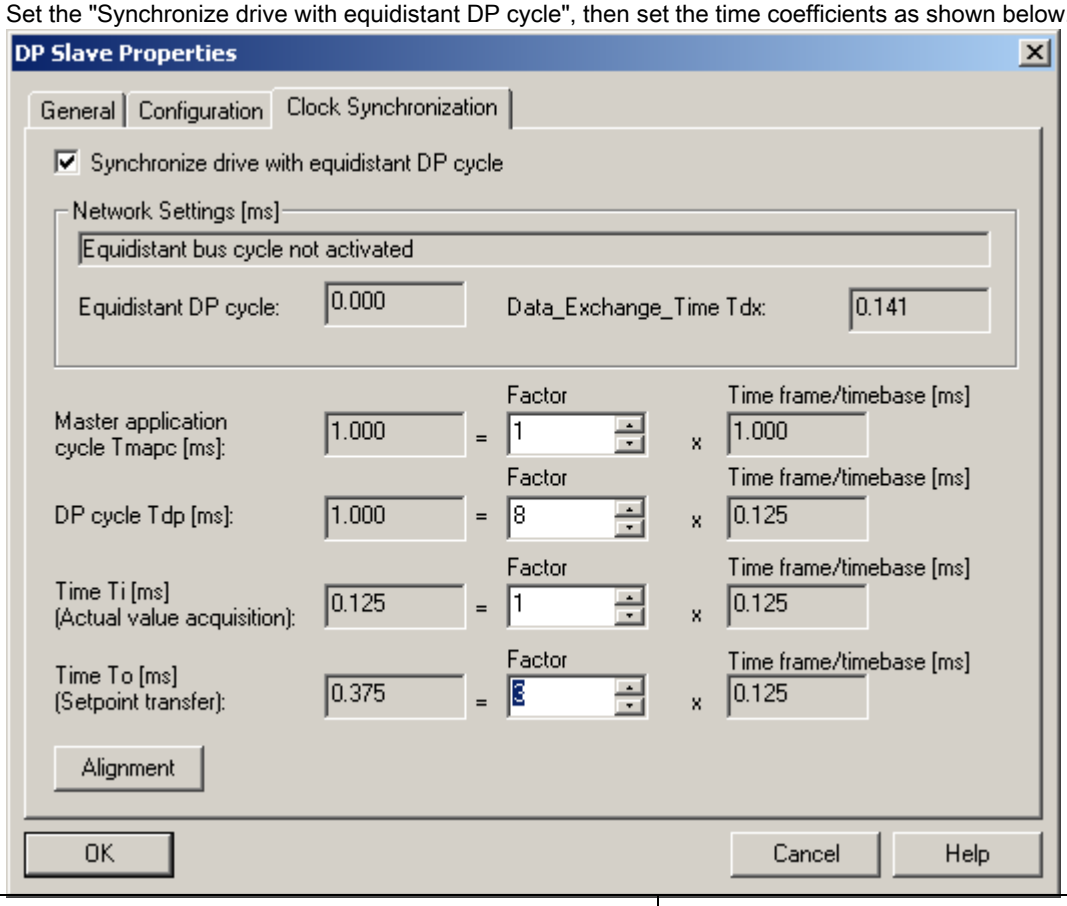
Sequence	Activity	Result
1	Double-click "Technology" on the mounting rail.	The "Properties - Technology" dialog box opens.
2	Select the "Technology system data" tab, then set the "Generate technology system data" check box. Confirm with "OK".  **Result:** When you download these data to the PLC later on in this Getting Started, the system also generates the technology system data and includes these in the download to your CPU 317T-2 DP. **Note:** If you do not activate the check box, then the technology system data is also not generated.	

3.6 6. Step: Configuring the drive in HW Config

Procedure

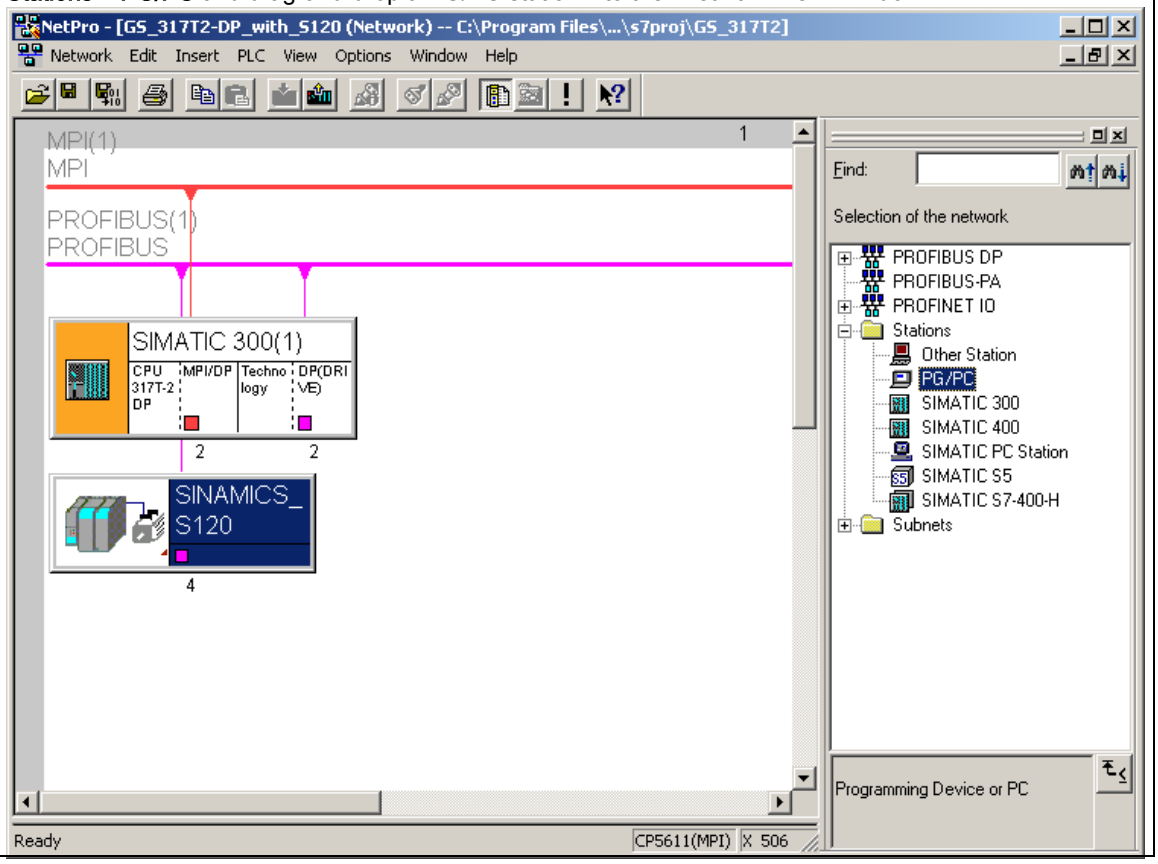
Sequence	Activity	Result
1	In the HW catalog, open the tree structure **SIMATIC Technology > PROFIBUS DP (DRIVE) > Drives > SINAMICS**.	
2	Select the drive component "SINAMICS S120" from the tree structure of the HW catalog. 	
3	Drag-and-drop this component to the master system of the DP (DRIVE).	The "Properties – PROFIBUS interface SINAMICS" dialog box opens.
4	Enter PROFIBUS address "4", then confirm with "OK".	The "Properties - SIMOTION Drive" dialog box opens.

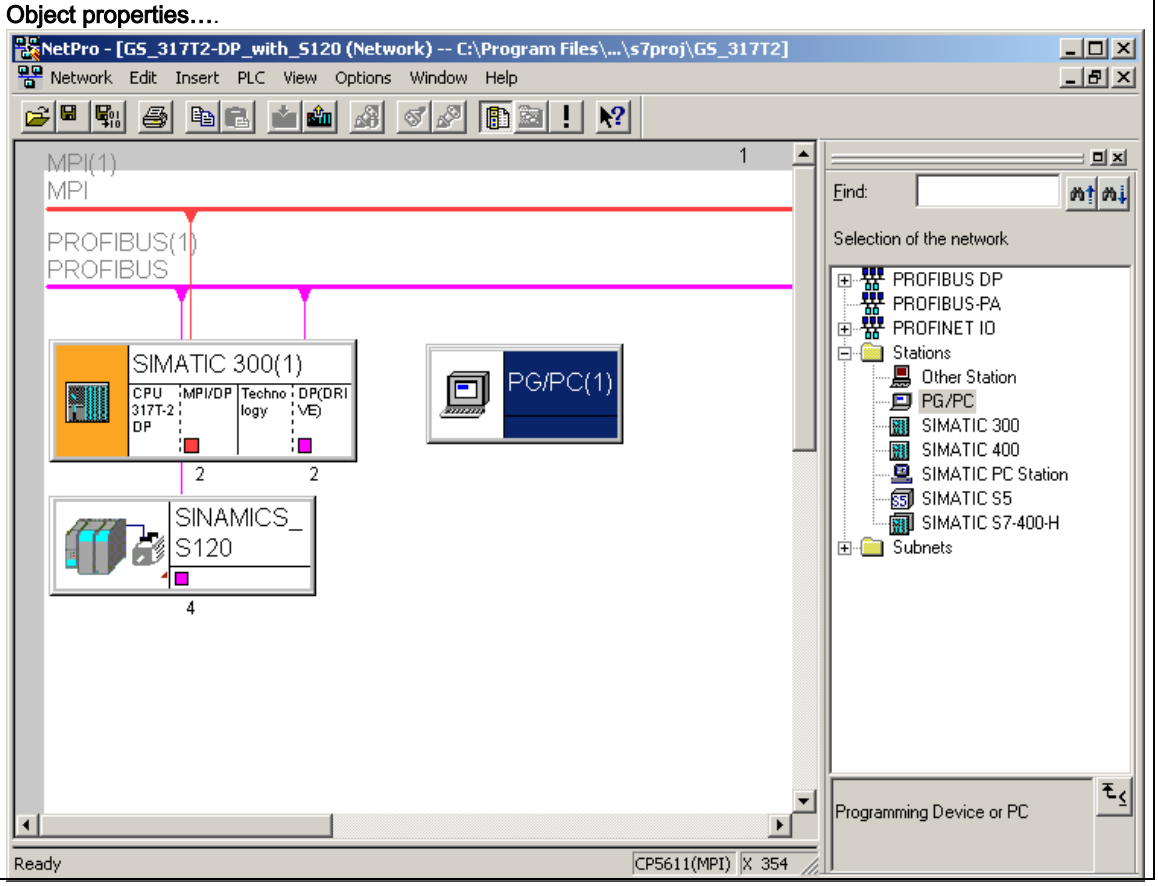
Sequence	Activity	Result
5	Select the appropriate drive version for your SINAMICS® and confirm with "OK". 	
6	The "DP Slave Properties" dialog box opens. Select the "Clock Synchronization" tab.	The "Clock Synchronization" dialog box opens.

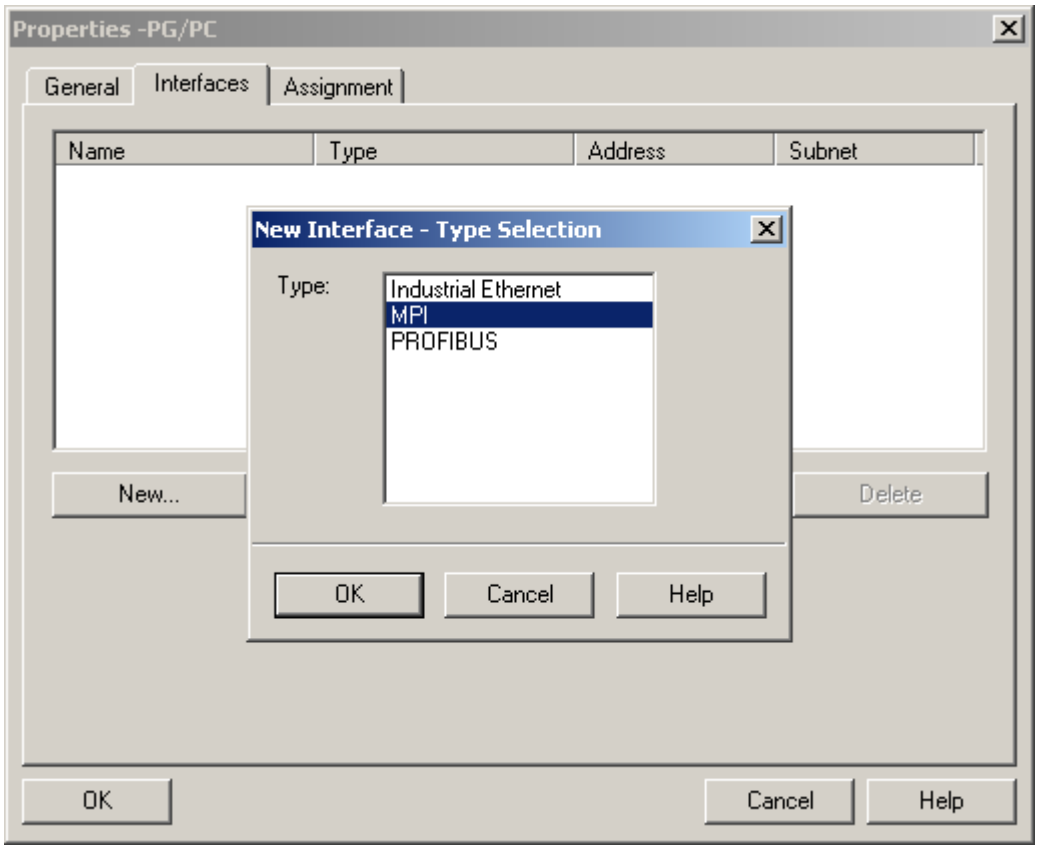
Sequence	Activity	Result
7	Set the "Synchronize drive with equidistant DP cycle", then set the time coefficients as shown below.  		
8	Click "Alignment".	The following components are aligned to the set values: • DP cycle in the DP master system • All drive components of the same family (here SINAMICS®) are aligned to the set values.
9	Confirm with "OK".	
10	Confirm the possible warning with "OK".	
11	Finalize your HW configuration by calling the **Station > Save and compile** command.	The system compiles your project, and adds the "Technology Objects" object to the project window in SIMATIC Manager.

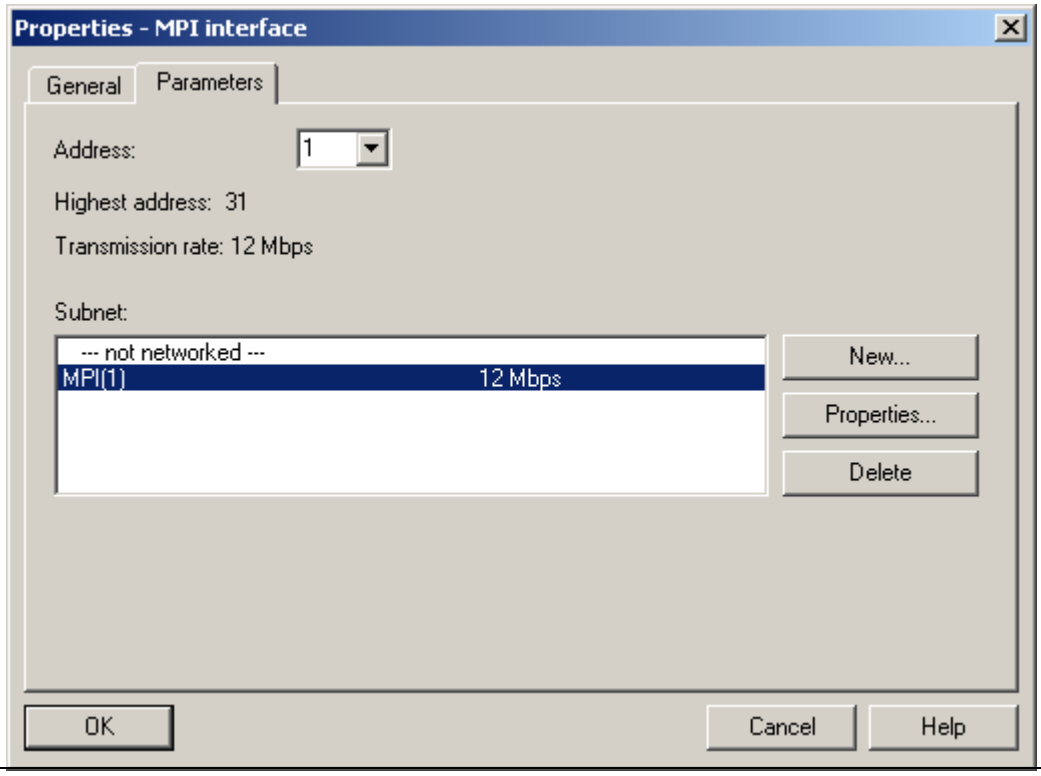
3.7 7. Step: Configuration of the PG/PC interface

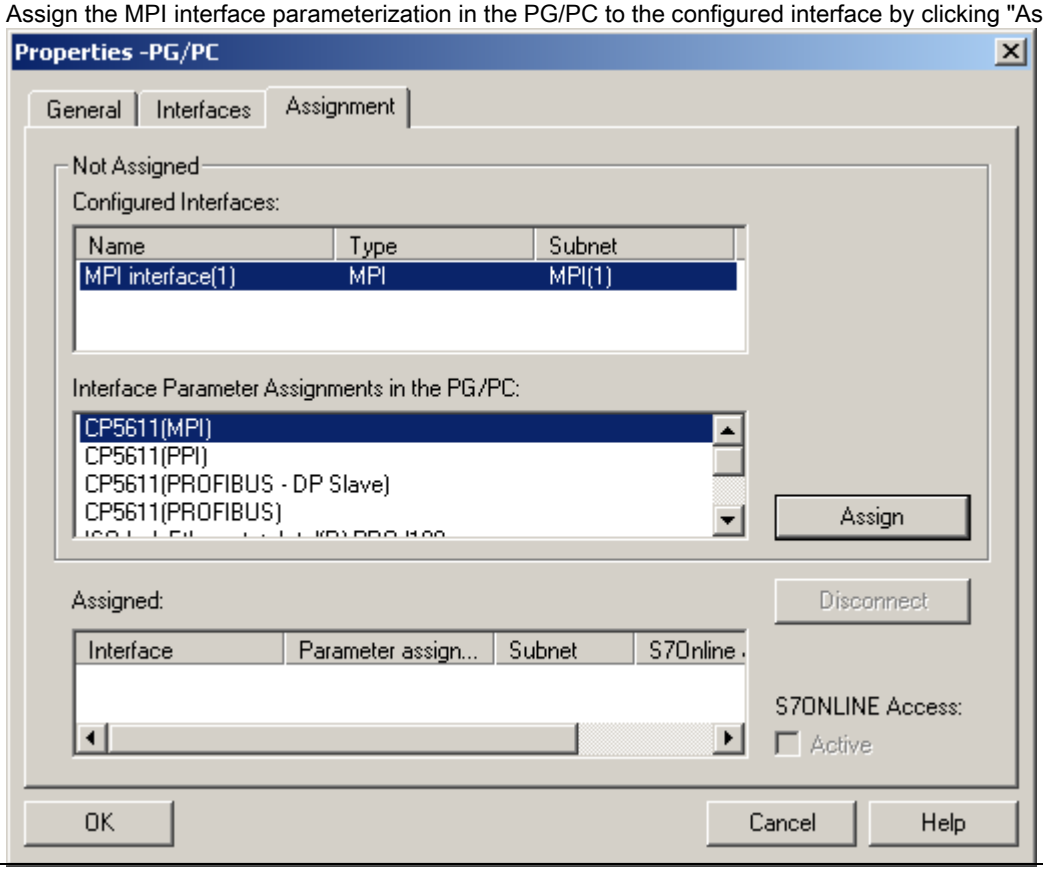
Procedure

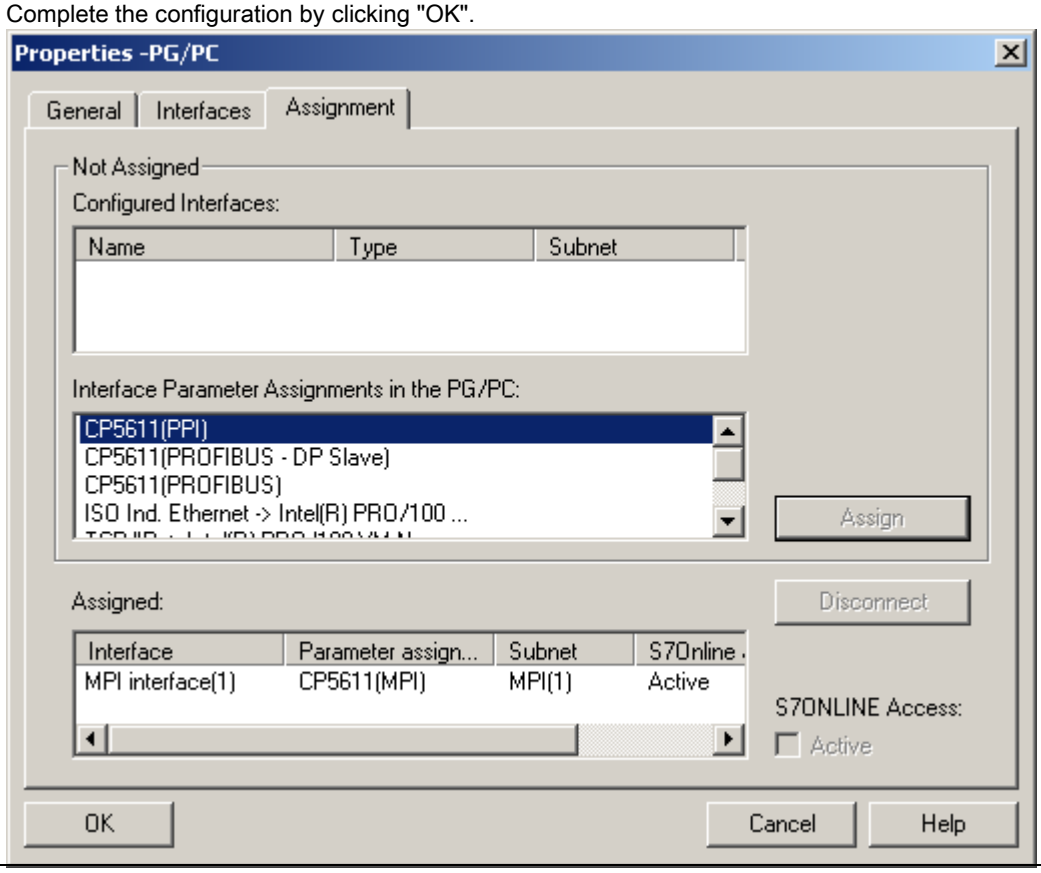
Sequence	Activity	Result
1	Start the NetPro network configuration program in HW Config with **Options > Configure network**.	NetPro is started
2	In the HW catalog, open the tree structure **Stations > PG/PC** and drag-and-drop a PG/PC station into the "Network View" window. 	

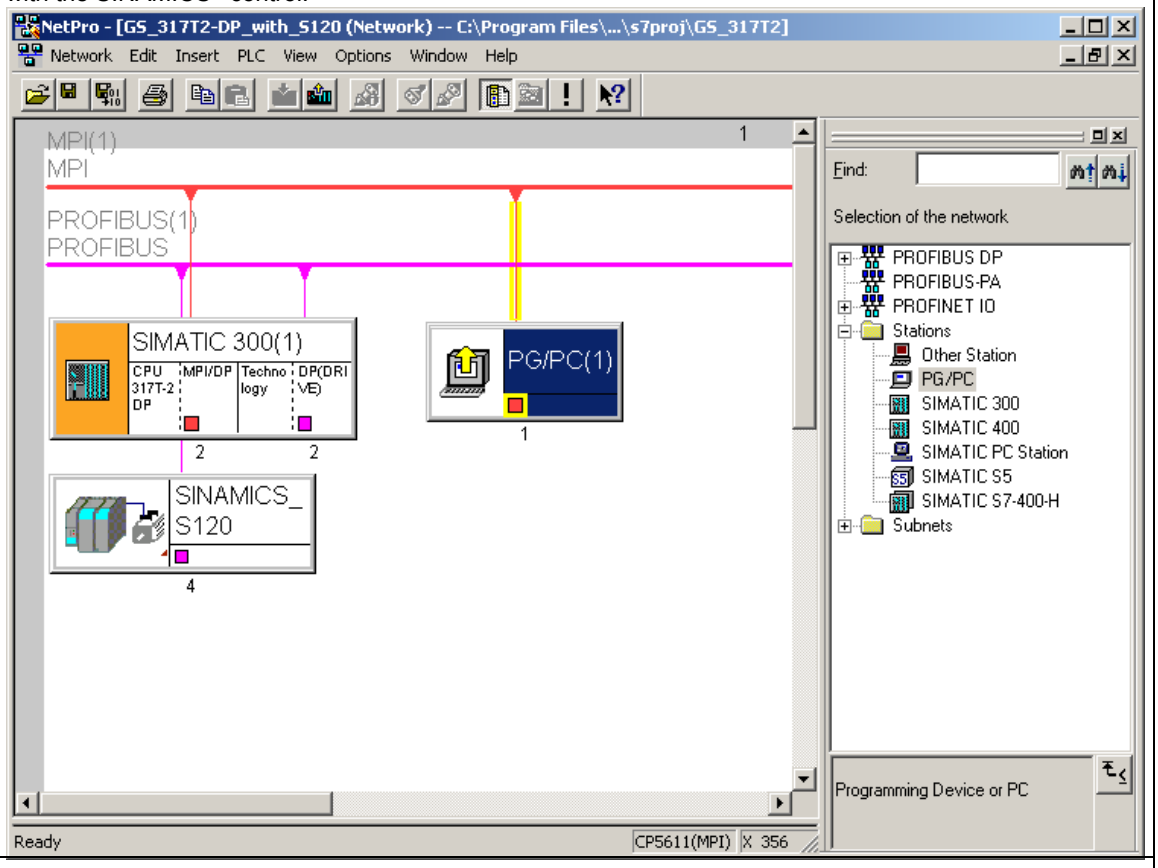
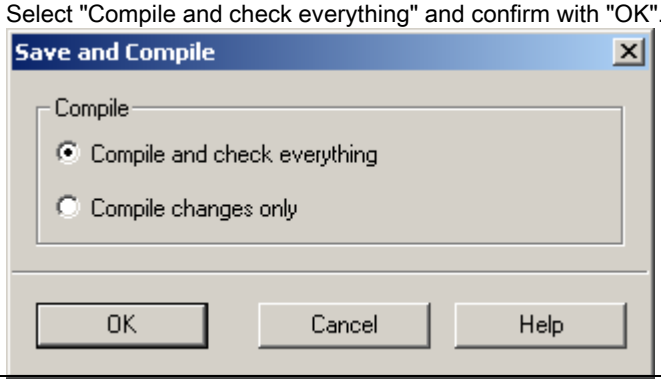
Sequence	Activity	Result
3	Select the newly inserted PG/PC component and open the "Properties – PG/PC" dialog box with **Edit > Object properties…**. 	

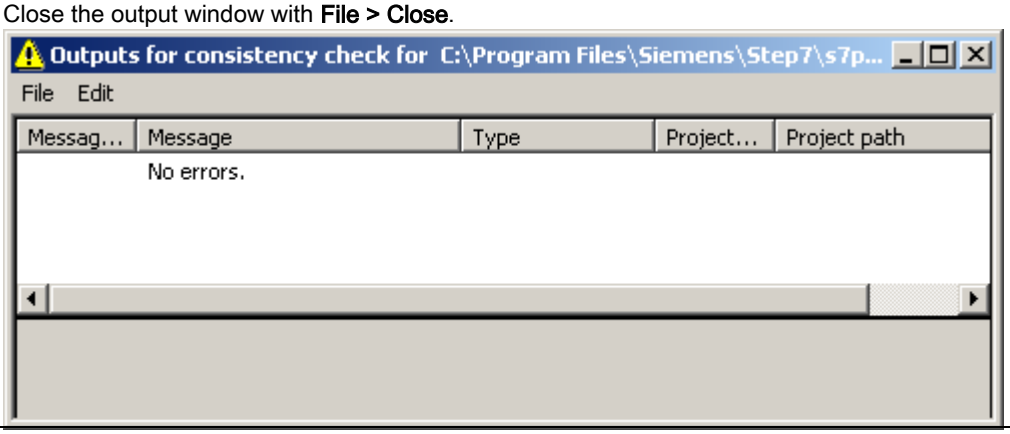
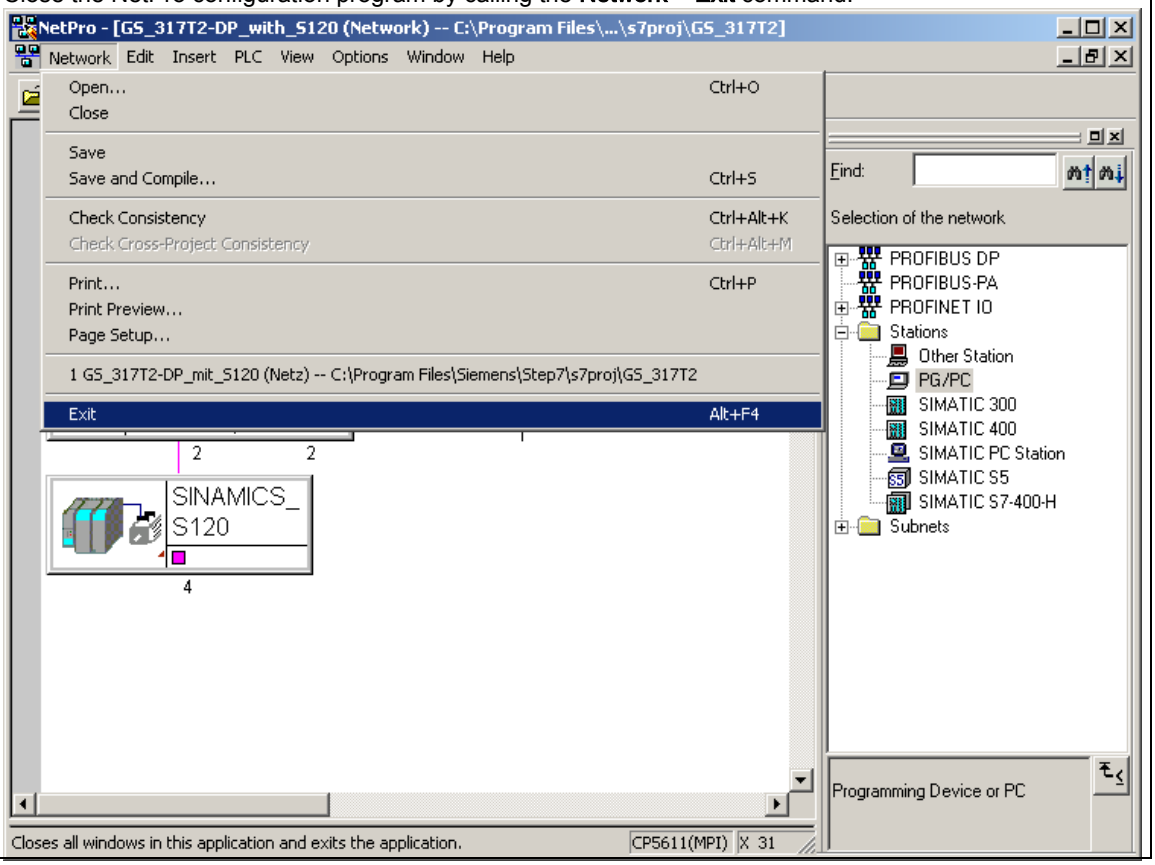
Sequence	Activity	Result
4	Select the "Interfaces" tab in the "Properties – PG/PC" dialog box. Click the "New…" button to open the "New Interface – Type Selection" dialog box. Select "MPI" and confirm with "OK".  Result: The "Properties - MPI Interface" dialog box opens.	

Sequence	Activity	Result
5	In the "Properties - MPI Interface" dialog box, select address "1" and the "MPI network". Confirm your input with "OK". 	

Sequence	Activity	Result
6	Select the "Assignment" tab in the "Properties – PG/PC" dialog box. Assign the MPI interface parameterization in the PG/PC to the configured interface by clicking "Assign".  	

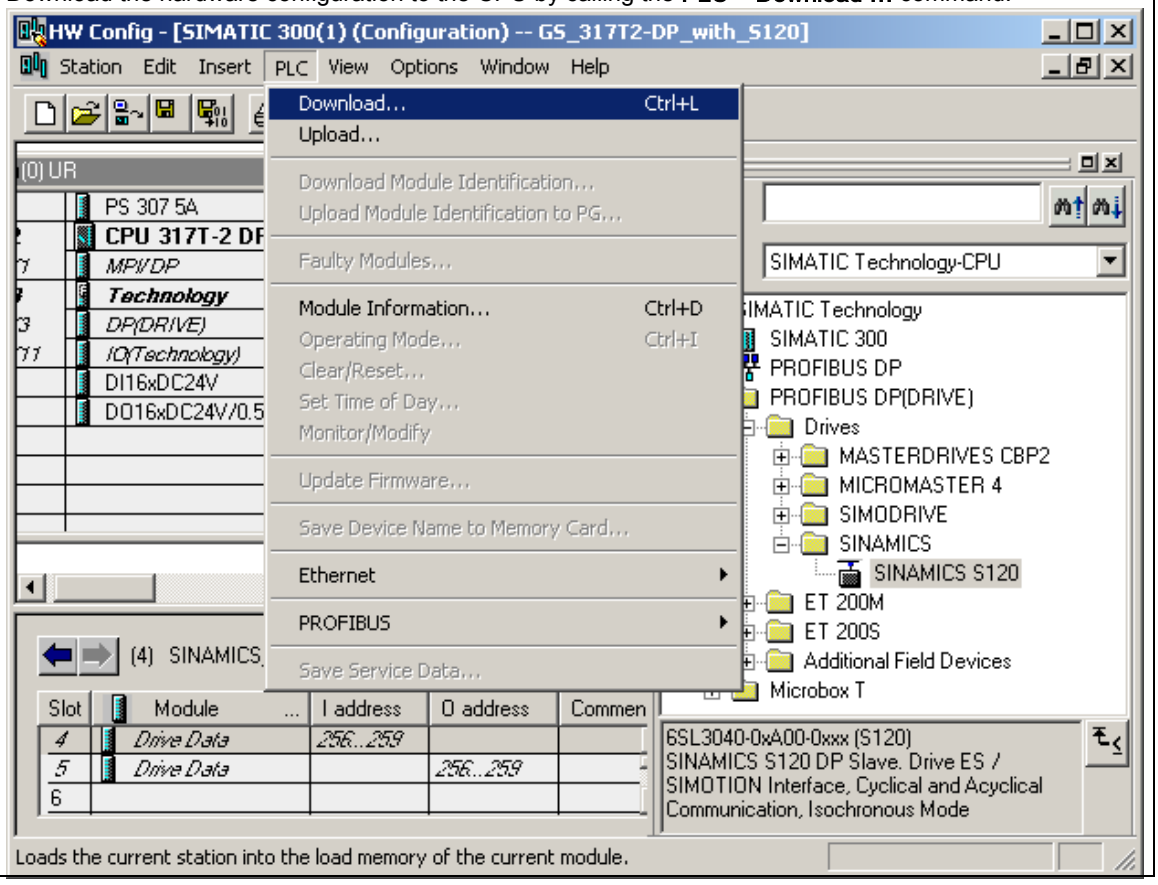
Sequence	Activity	Result
7	Complete the configuration by clicking "OK". 	

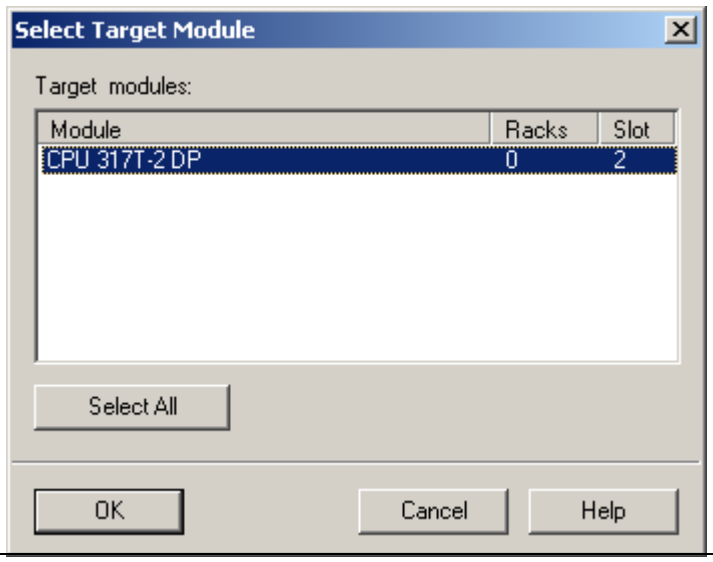
Sequence	Activity	Result
8	You have now inserted your PG/PC in the MPI network and established the condition to exchange data with the SINAMICS® control.  	
9	Complete the network configuration by calling the **Network > Save and compile** command. Select "Compile and check everything" and confirm with "OK".  	

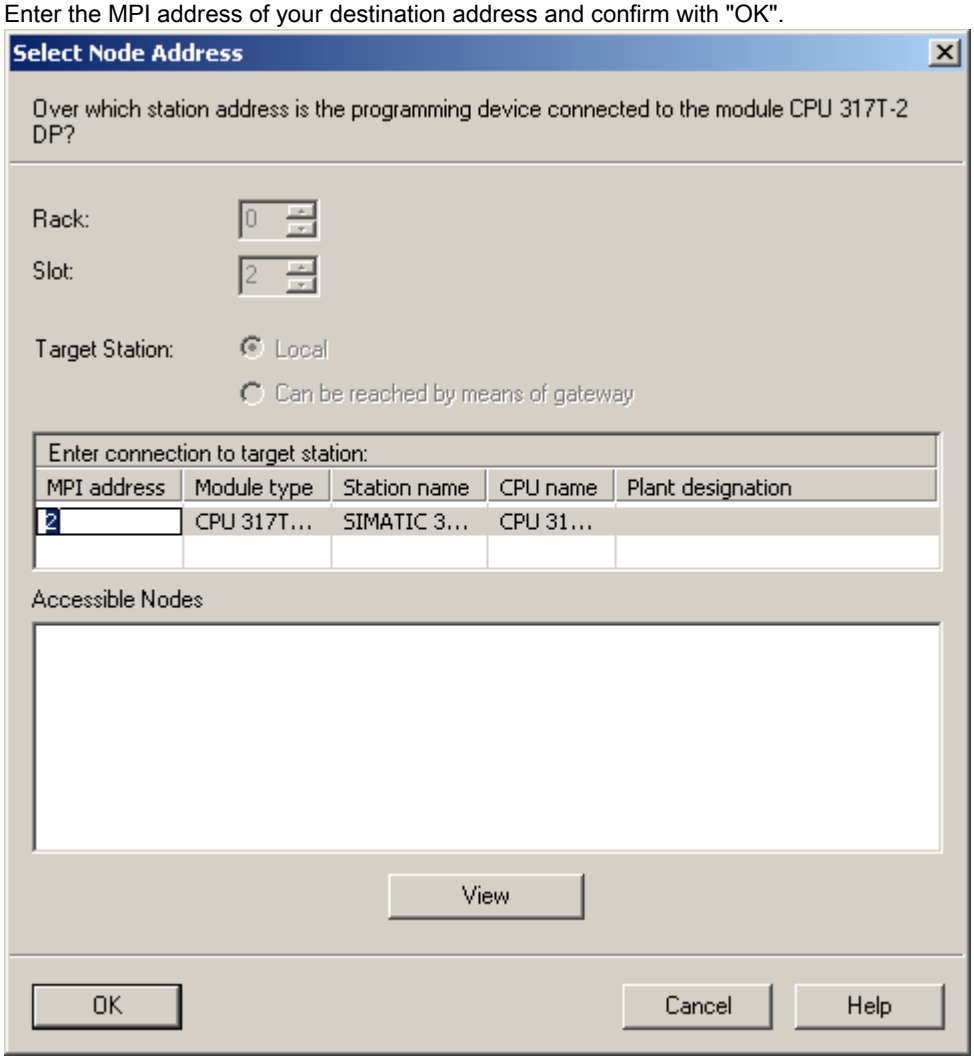
Sequence	Activity	Result
10	Close the output window with **File > Close**.  	
11	Close the NetPro configuration program by calling the **Network > Exit** command.  	

3.8 8. Step: Downloading the hardware configuration to the target hardware

Procedure

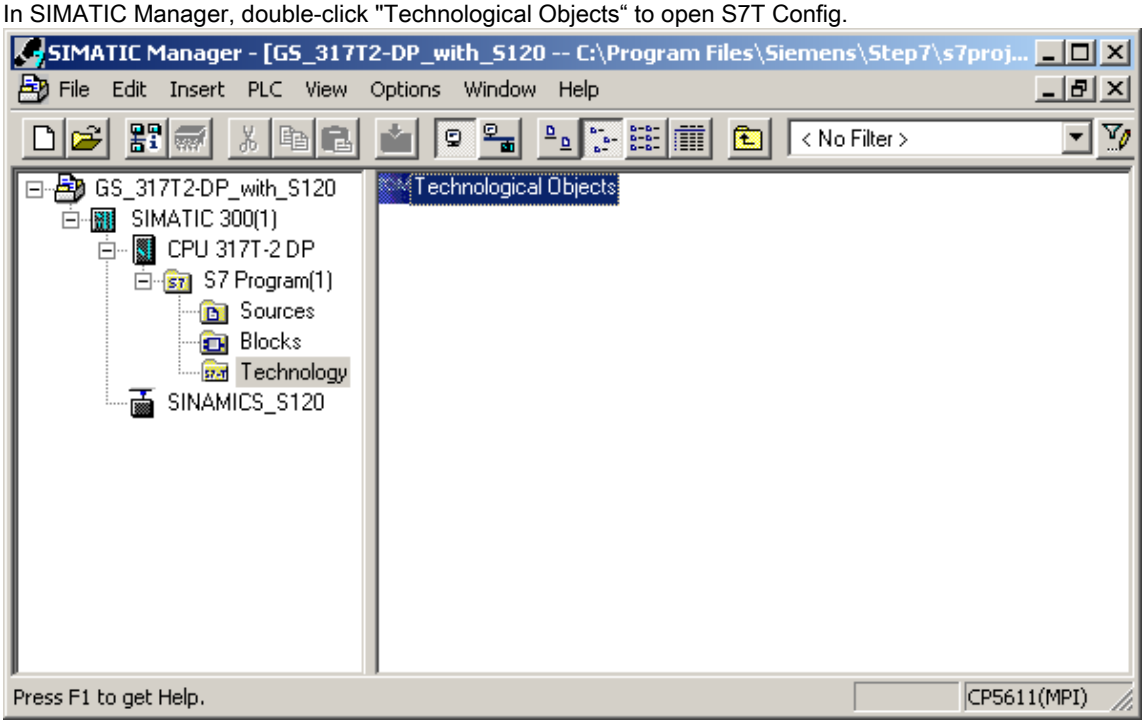
Sequence	Activity	Result
1	Switch back to HW Config Download the hardware configuration to the CPU by calling the **PLC > Download …** command.  	

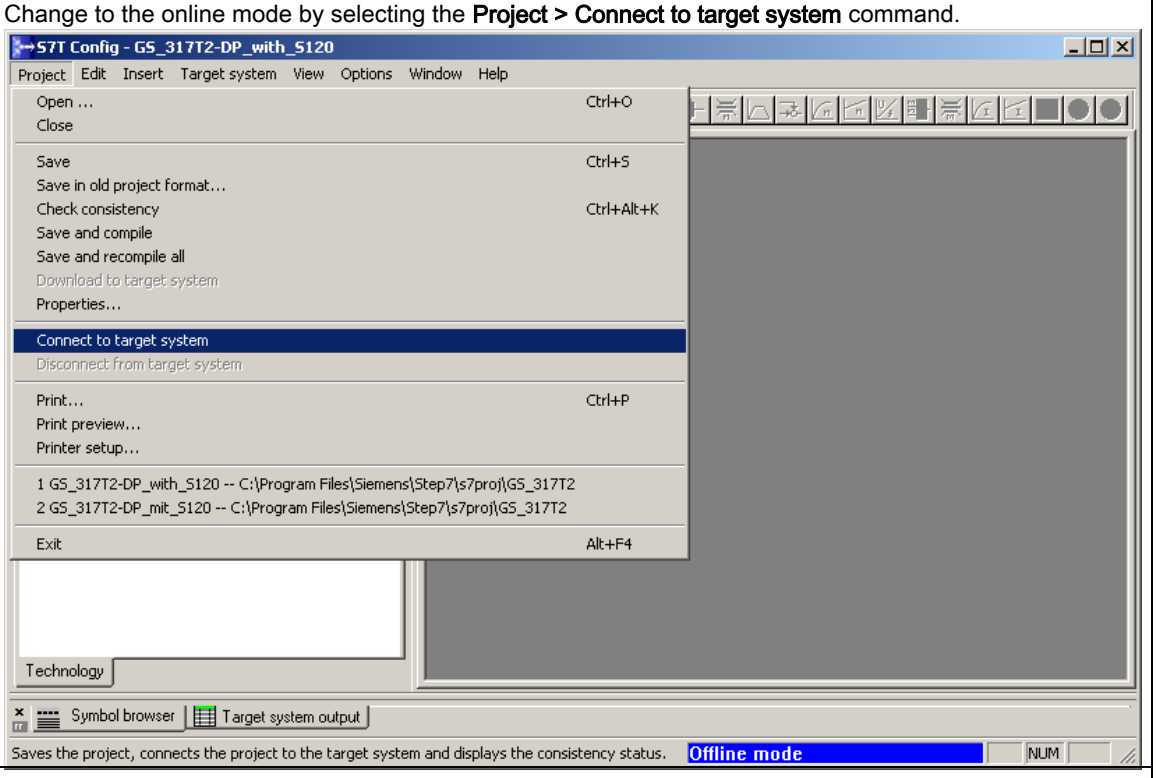
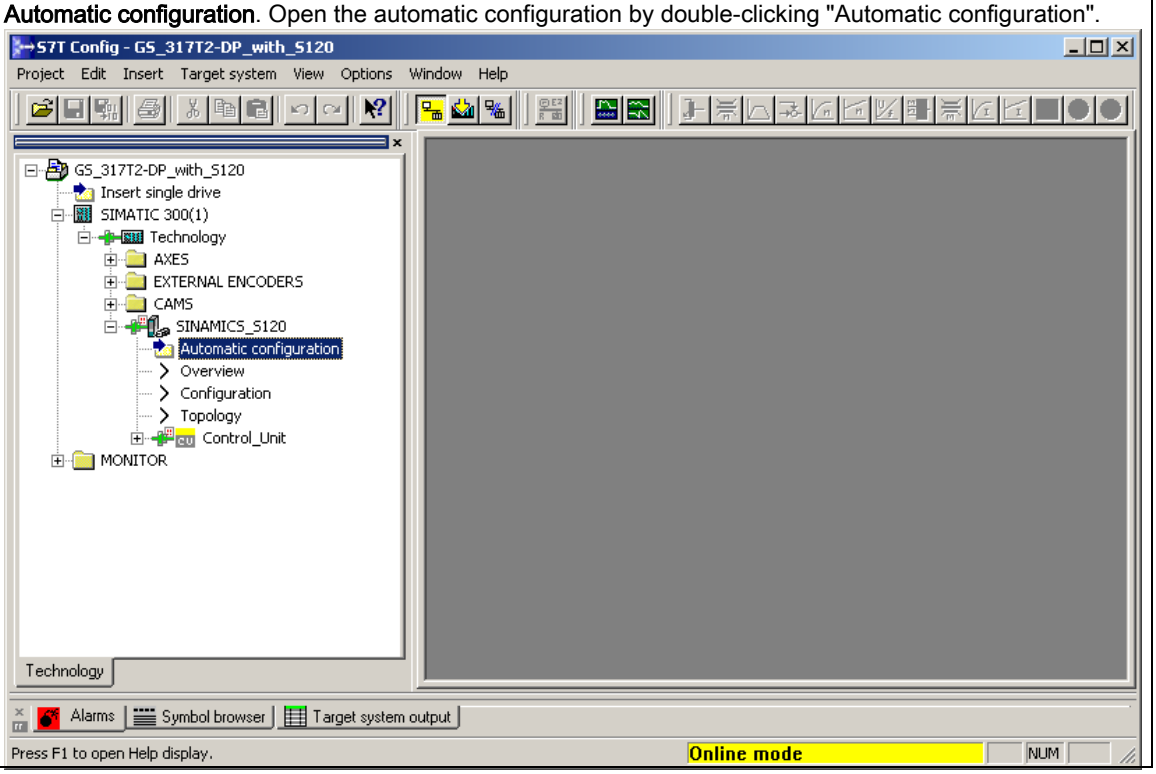
Sequence	Activity	Result
2	Select the "CPU317T-2DP" and confirm with "OK". 	

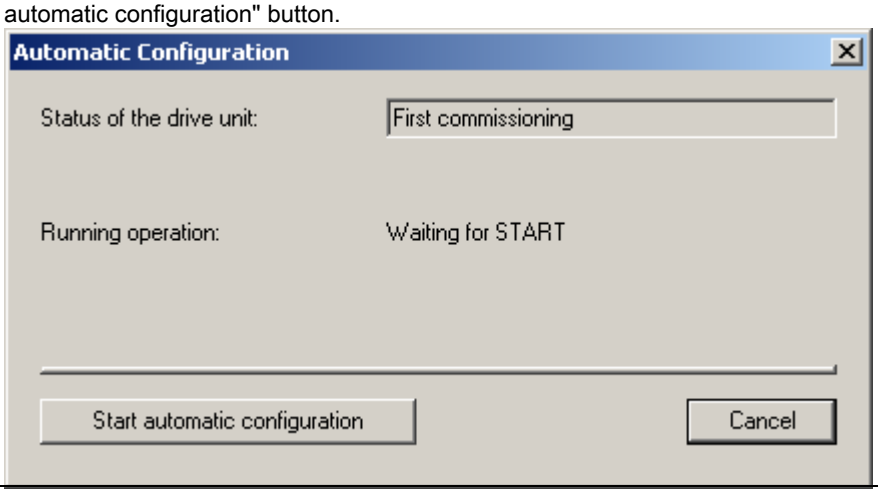
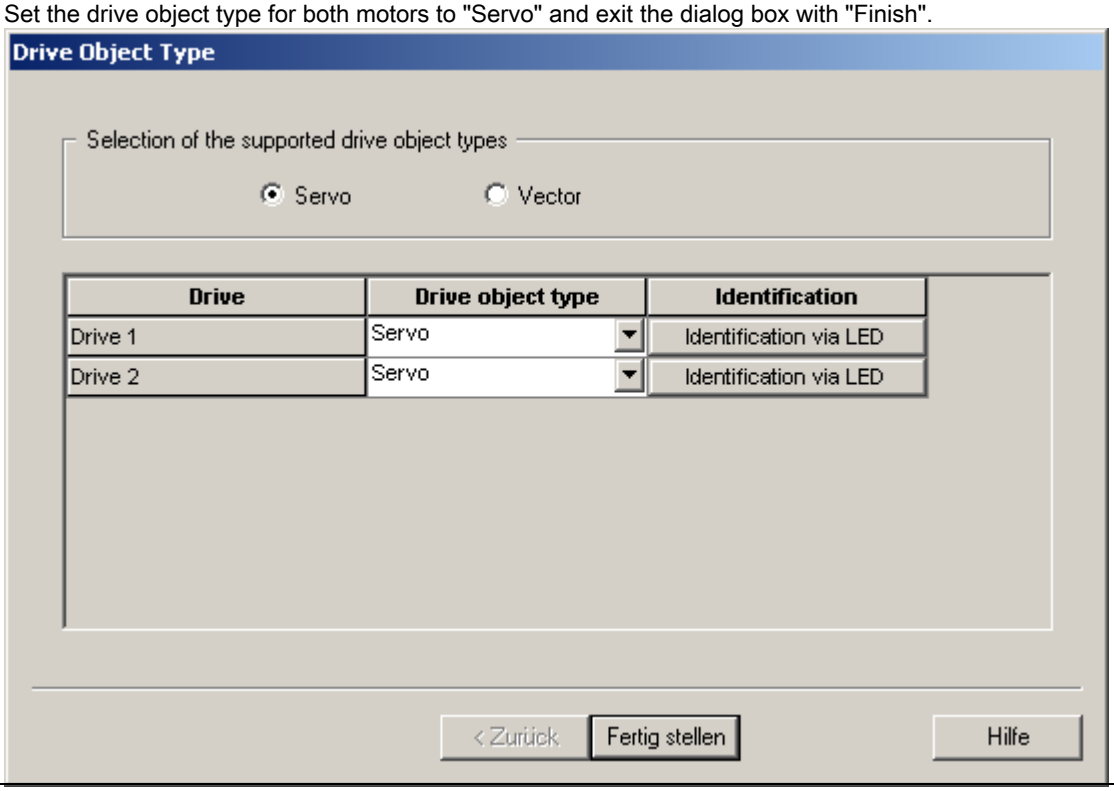
Sequence	Activity	Result
3	Enter the MPI address of your destination address and confirm with "OK".  Result: The data are now downloaded from the PG to the CPU.	
4	Also close the HW Config by calling the **Station > Exit** command.	

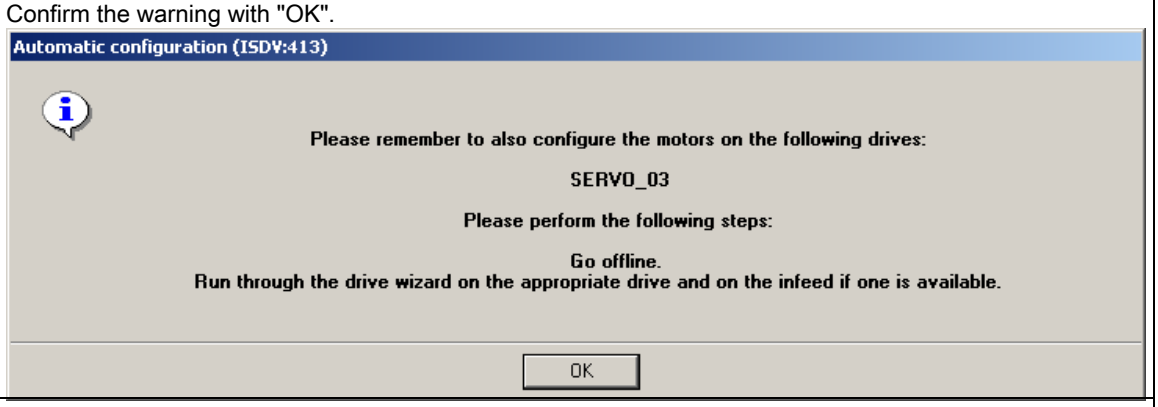
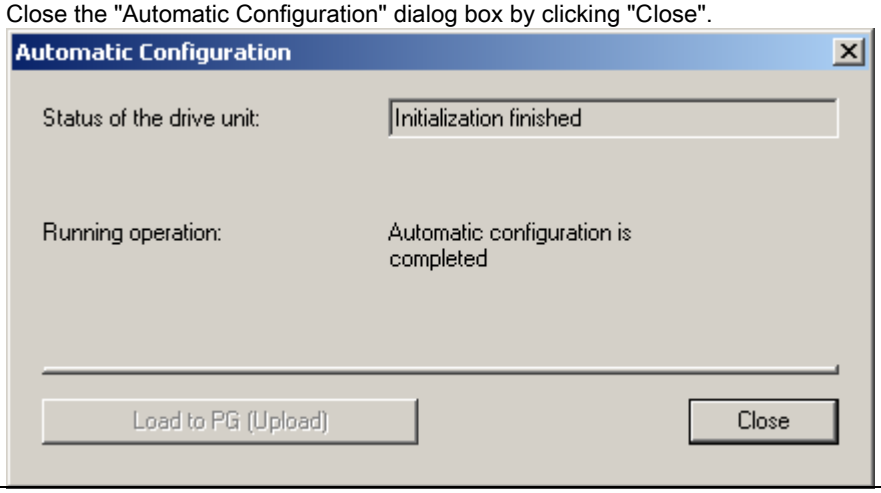
3.9 9. Step: Configuration of the SINAMICS drive with S7T Config

Procedure

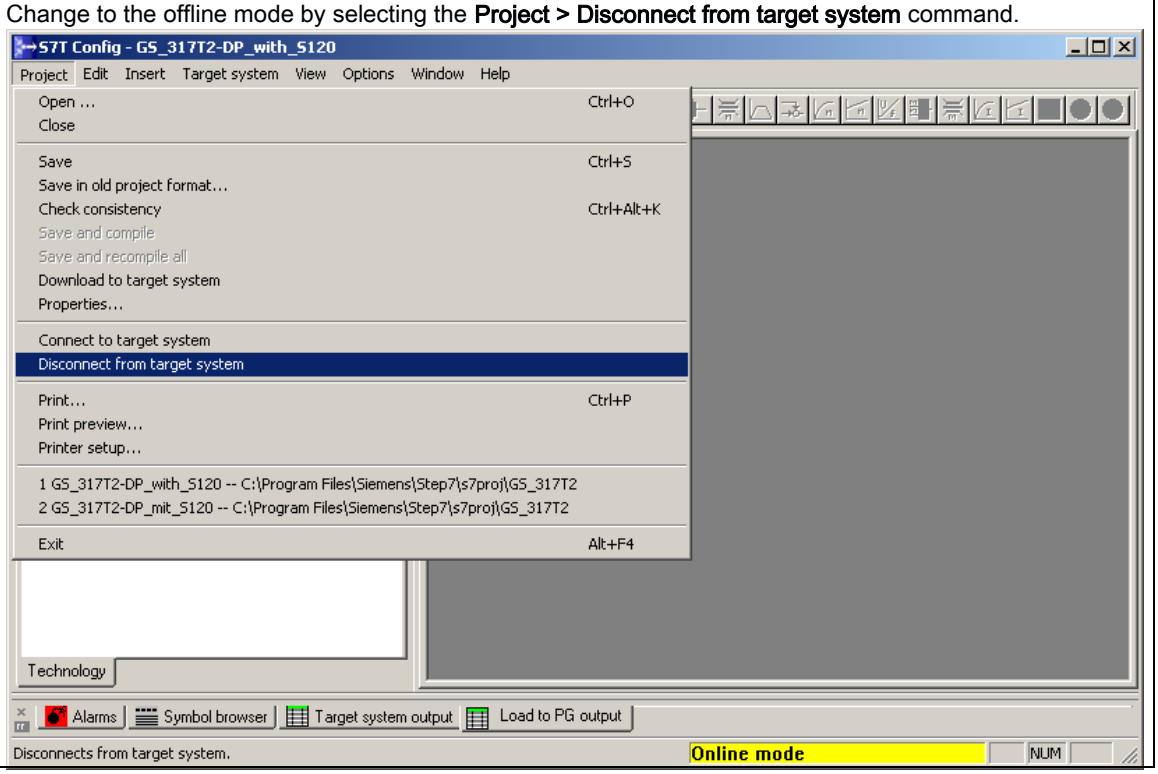
Sequence	Activity	Result
1	In SIMATIC Manager, double-click "Technological Objects“ to open S7T Config.  **Result:** "Technological Objects Management" opens. The system automatically runs S7T Config if you have not configured any technological objects yet, as in this example. You may also run S7T Config without using "Technological Objects Management". Select the "Technological Objects" object and then select the **Options > Configure the technology** command.	
2	Save the current project data by selecting the **Project > Save and recompile all** command.	

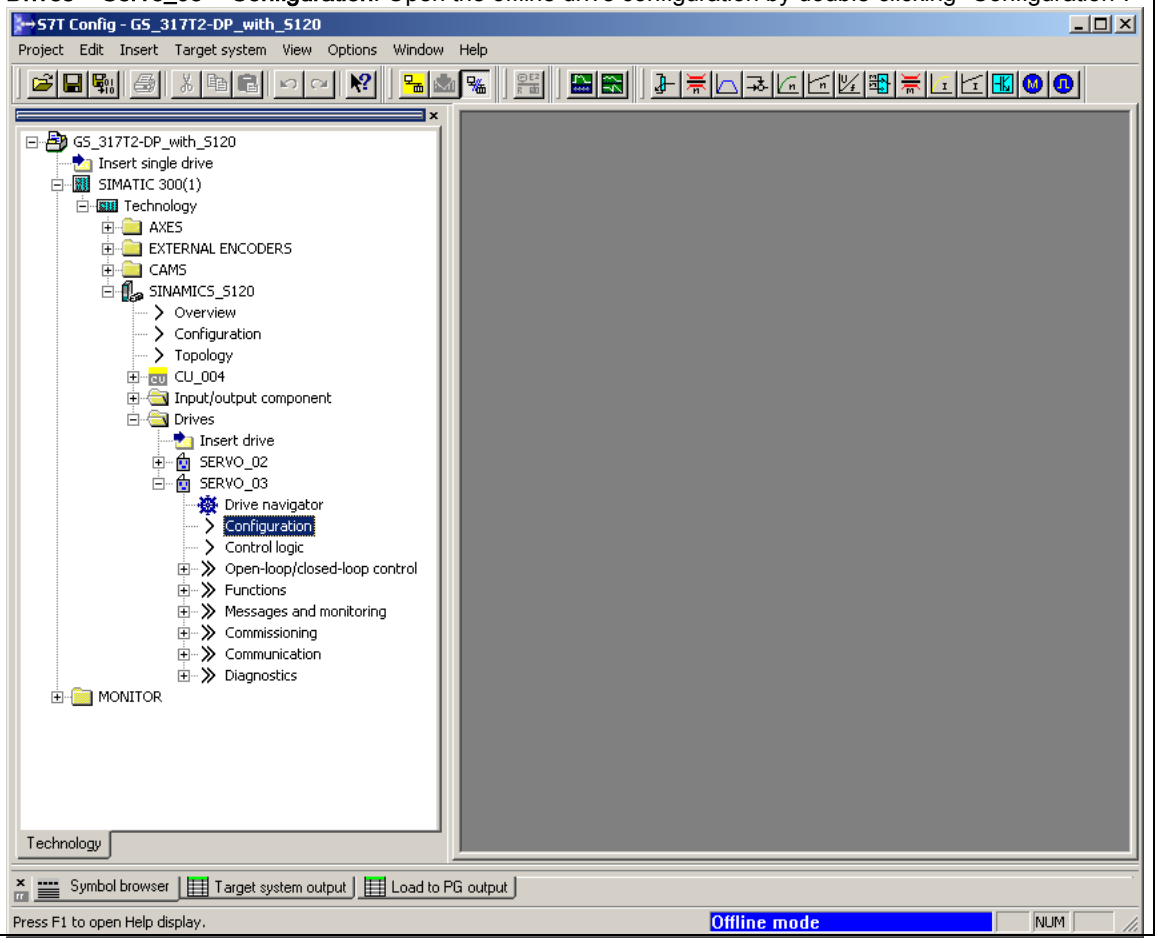
Sequence	Activity	Result
3	Change to the online mode by selecting the **Project > Connect to target system** command.  	
4	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > SINAMICS_S120 > Automatic configuration**. Open the automatic configuration by double-clicking "Automatic configuration".  	

Sequence	Activity	Result
5	Start the automatic configuration in the "Automatic Configuration" dialog box by clicking the "Start automatic configuration" button.  	
6	Set the drive object type for both motors to "Servo" and exit the dialog box with "Finish".  	

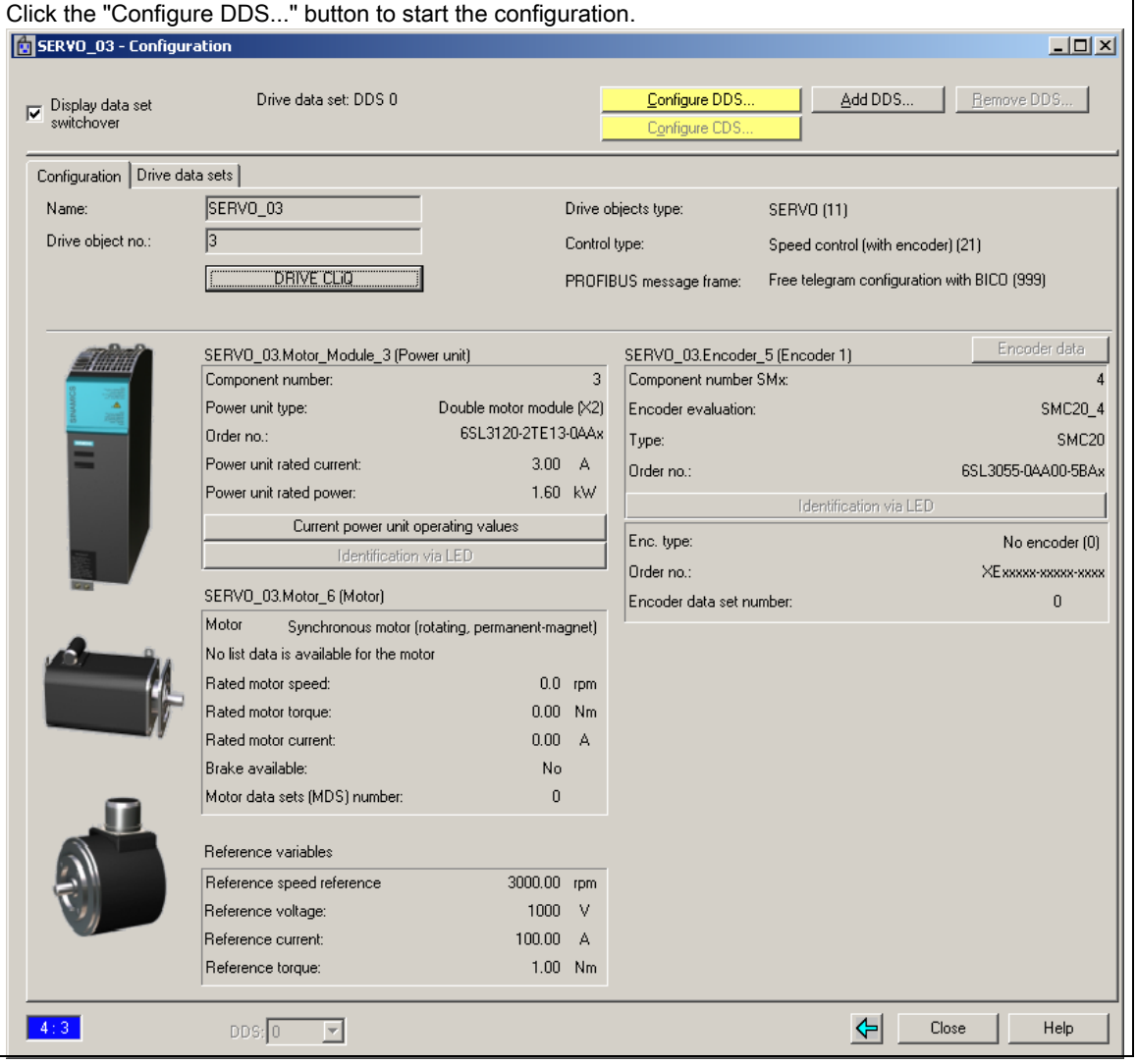
Sequence	Activity	Result
7	The SINAMICS® training case on which this document is based has two different motor types. One of the two motor types has DRIVE-CLIQ technology. The second motor/encoder is connected via SMC20, which is why DRIVE-CLiQ recognizes that a second motor/encoder is present and creates this, but cannot automatically configure it. Therefore, not all drive information can be completely configured automatically. Confirm the warning with "OK".  	
8	Close the "Automatic Configuration" dialog box by clicking "Close".  	

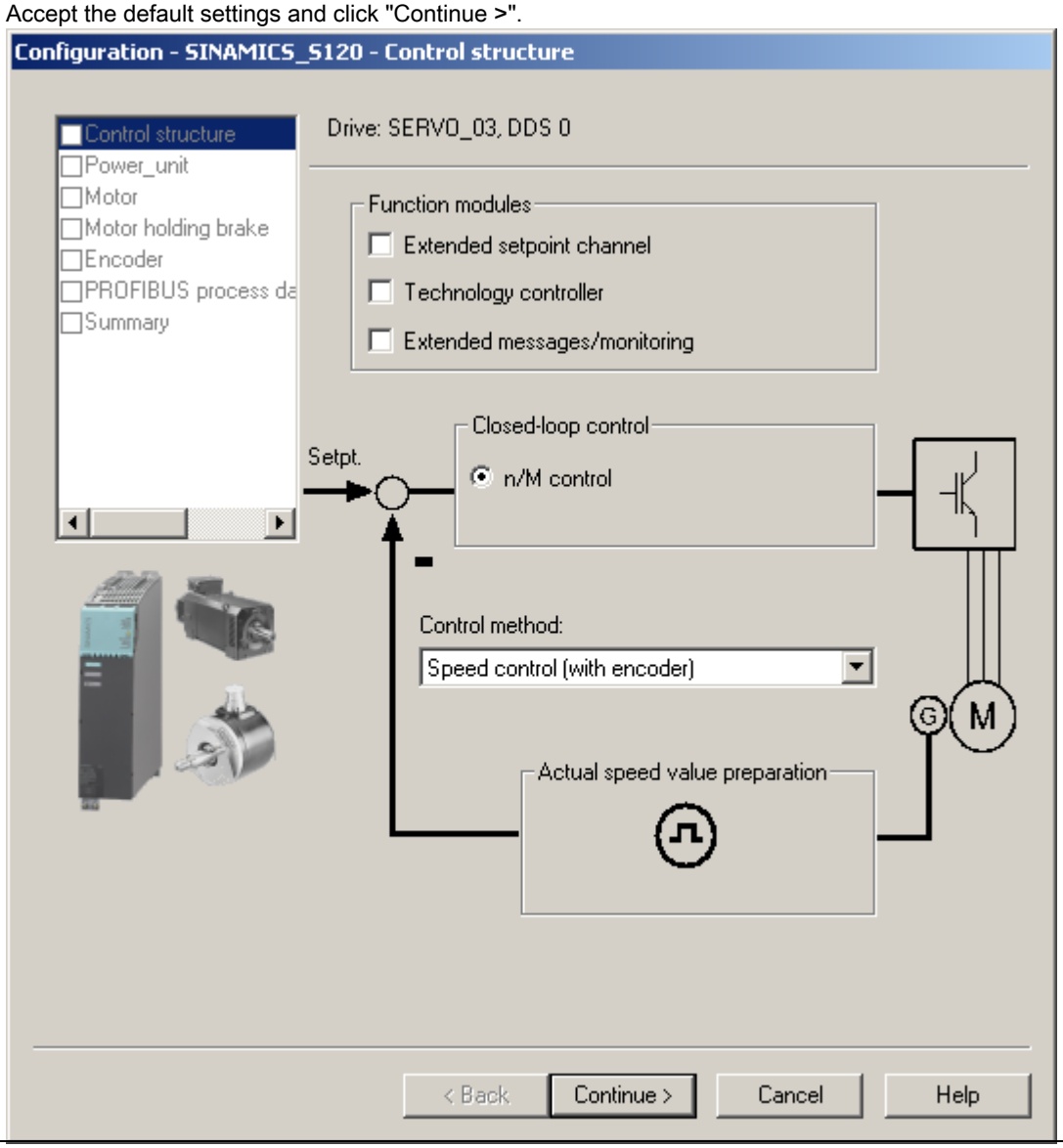
Sequence	Activity	Result
9	Change to the offline mode by selecting the **Project > Disconnect from target system** command.	



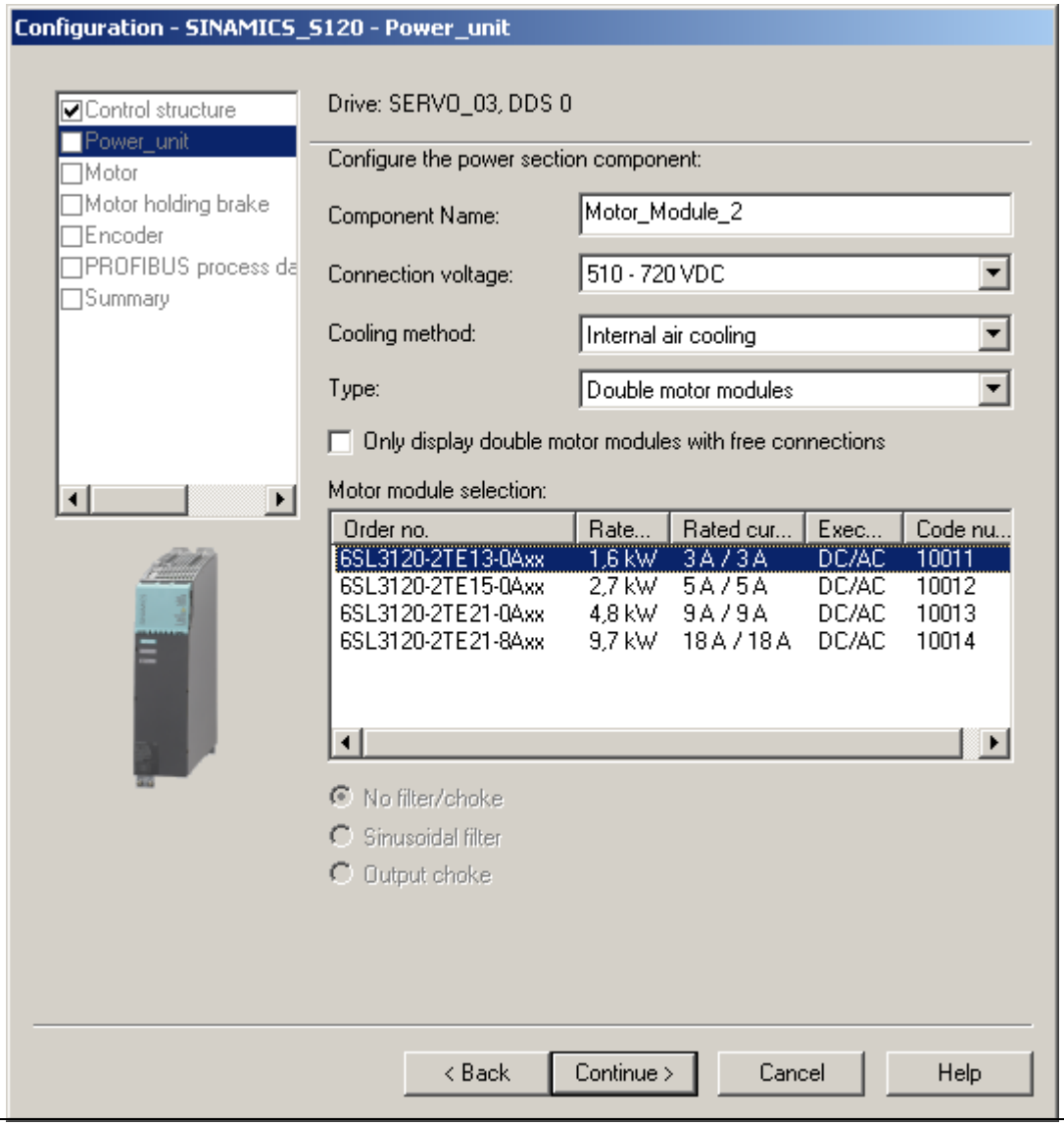
Sequence	Activity	Result
10	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > SINAMICS_S120 > Drives > Servo_03 > Configuration**. Open the offline drive configuration by double-clicking "Configuration". 	

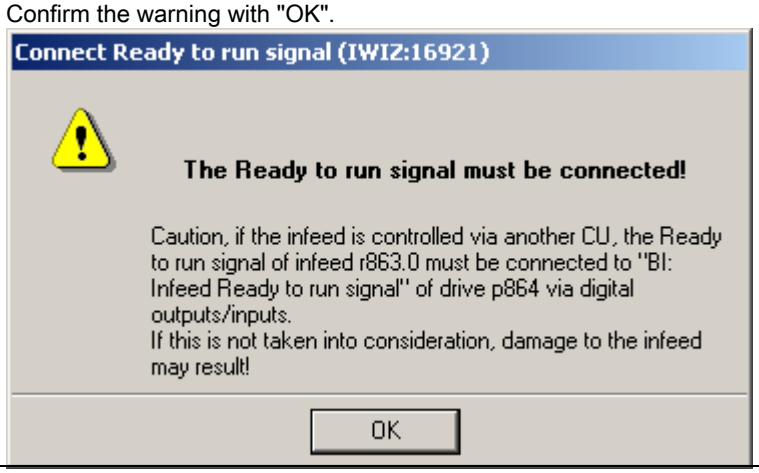
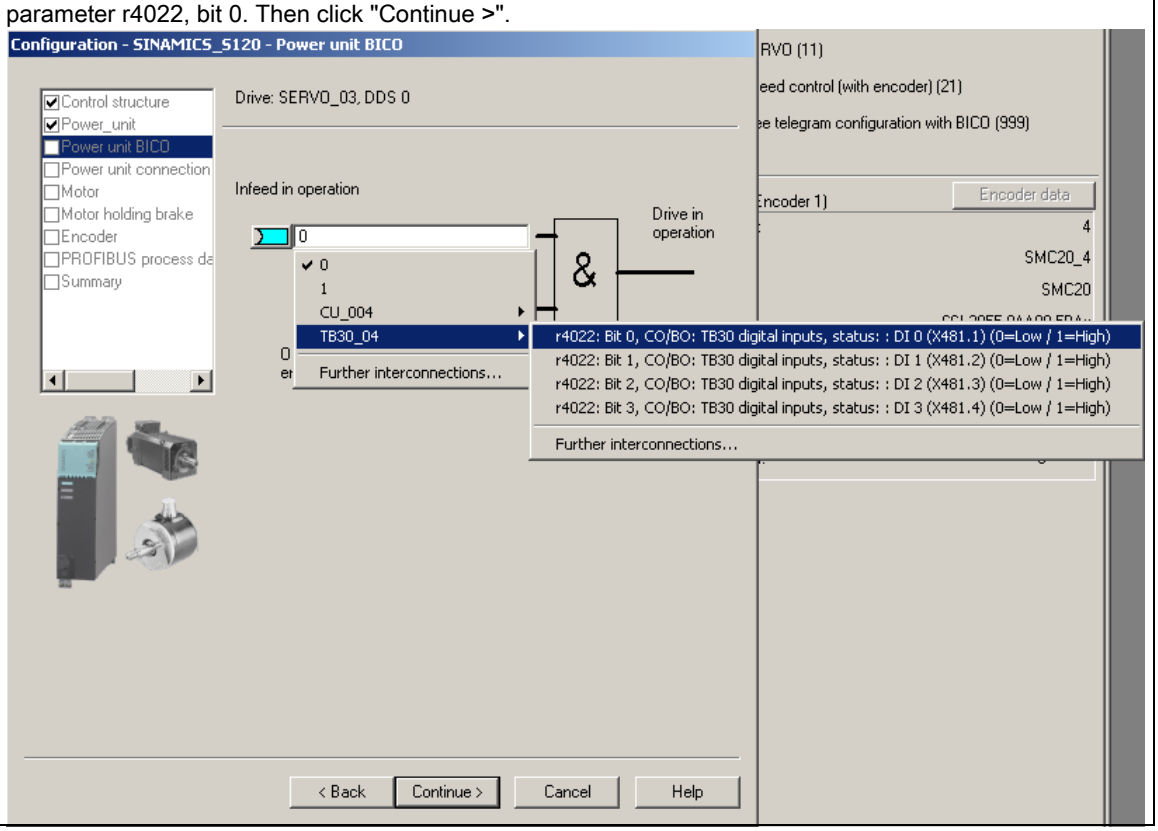
Sequence	Activity	Result
11	Click the "Configure DDS..." button to start the configuration.	

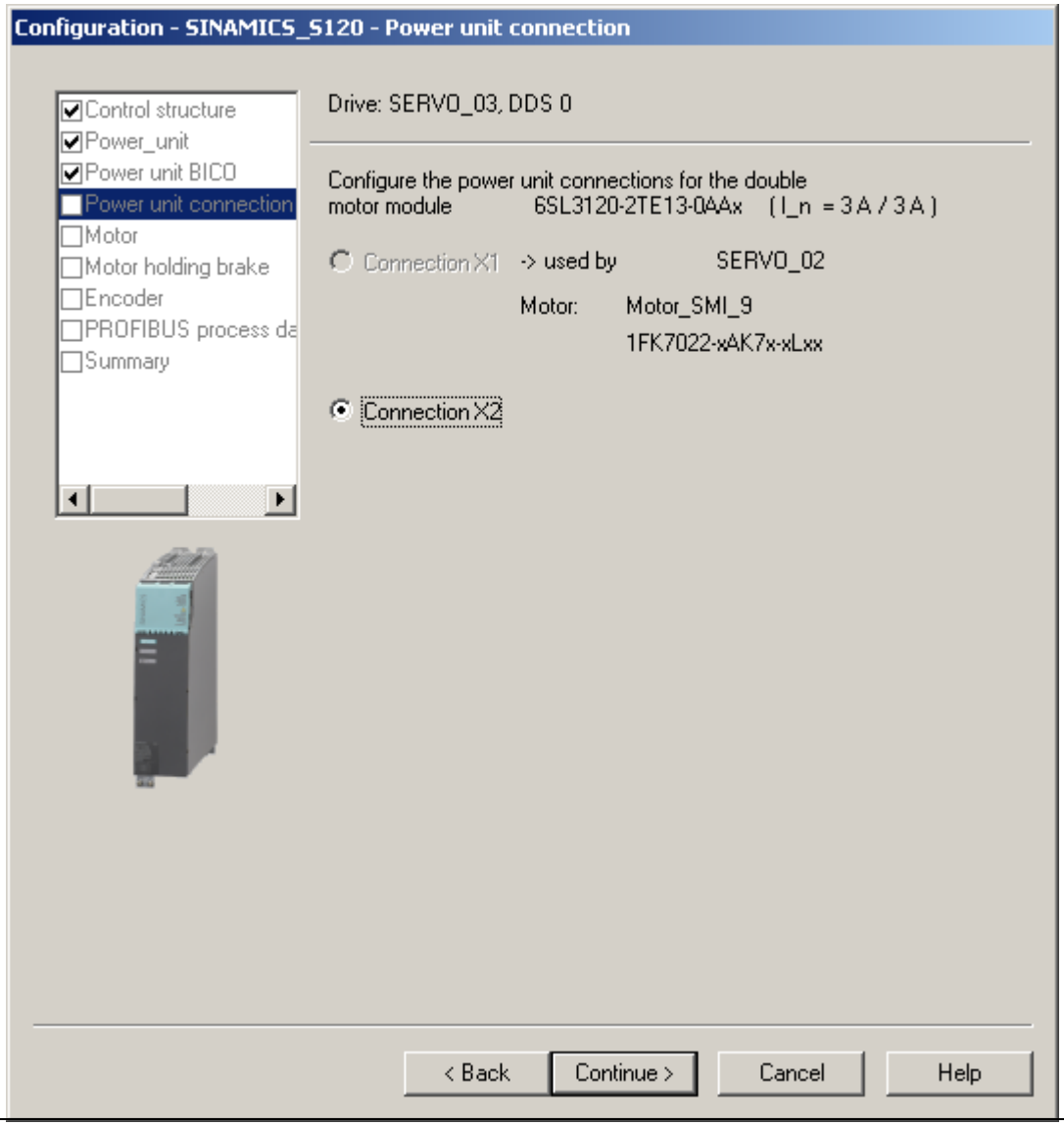


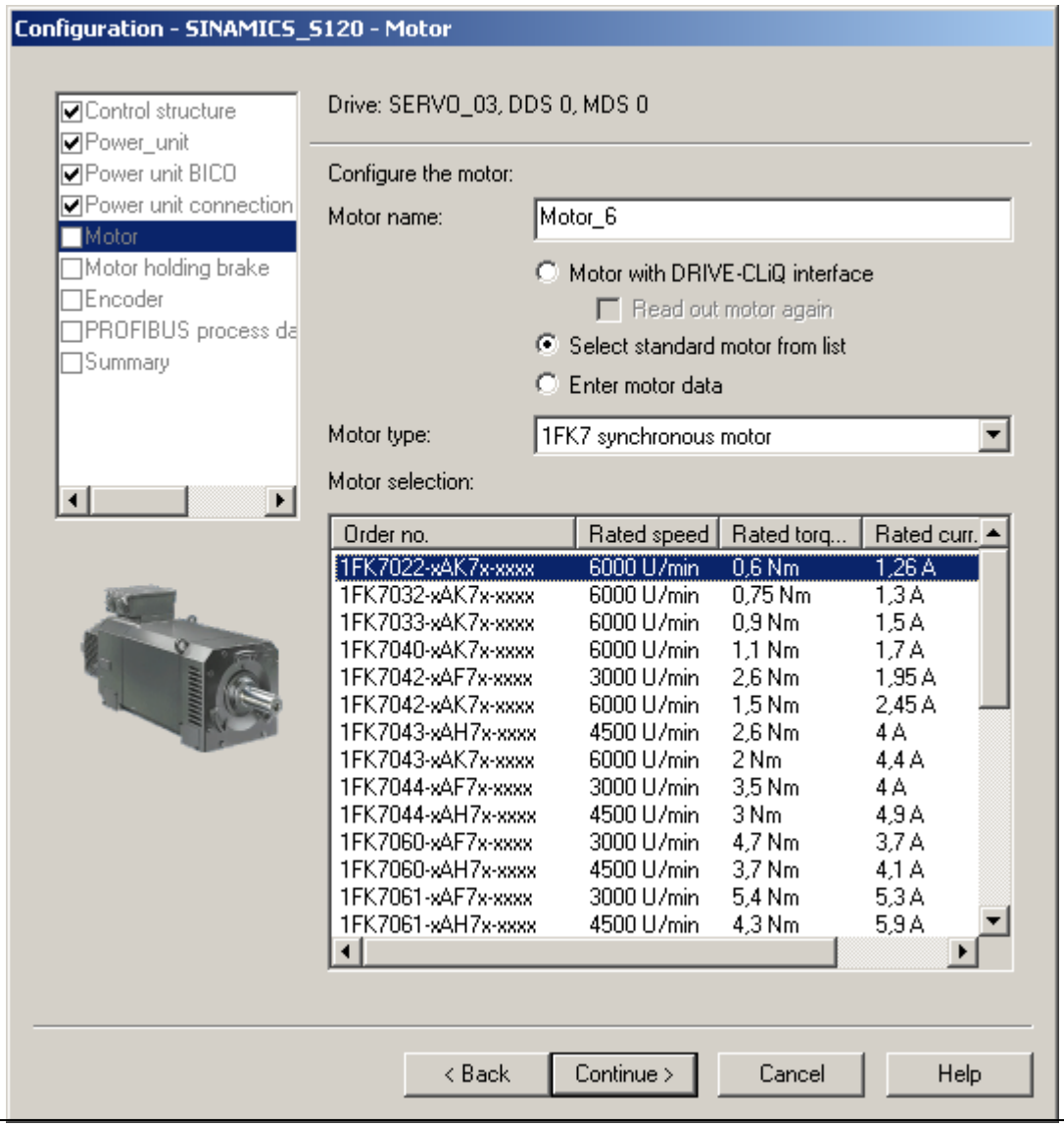
Sequence	Activity	Result
12	Accept the default settings and click "Continue >". 	

Sequence	Activity	Result
13	The power section has DRIVE-CLIQ technology and has already been correctly configured. Check the order number and click "Continue >".	

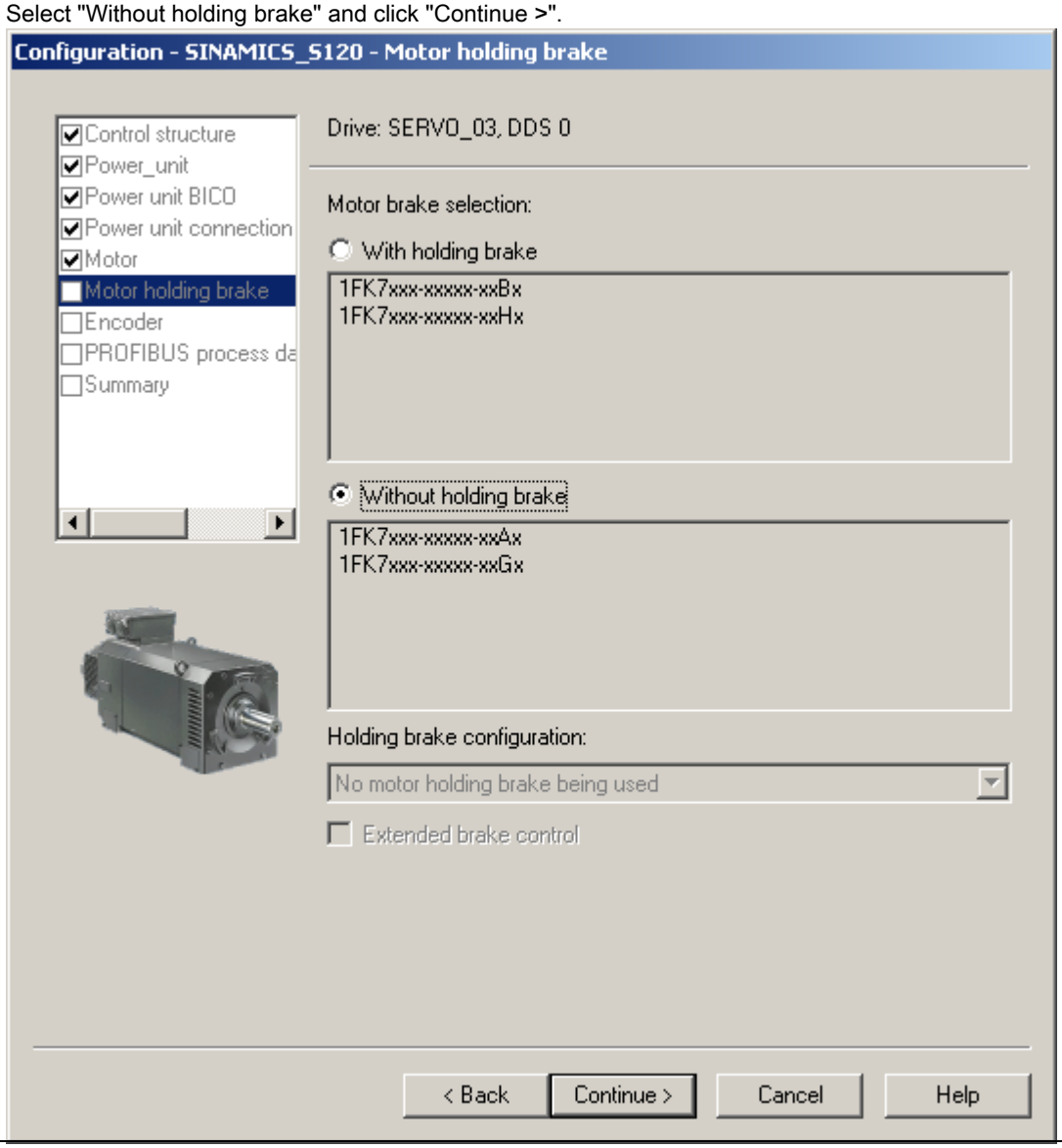


Sequence	Activity	Result
14	The SINAMICS® training case on which this document is based does not have an active infeed module. Confirm the warning with "OK". 	
15	Click the blue button and in the **TB30_04** context menu, select digital input 0, which corresponds to parameter r4022, bit 0. Then click "Continue >". 	

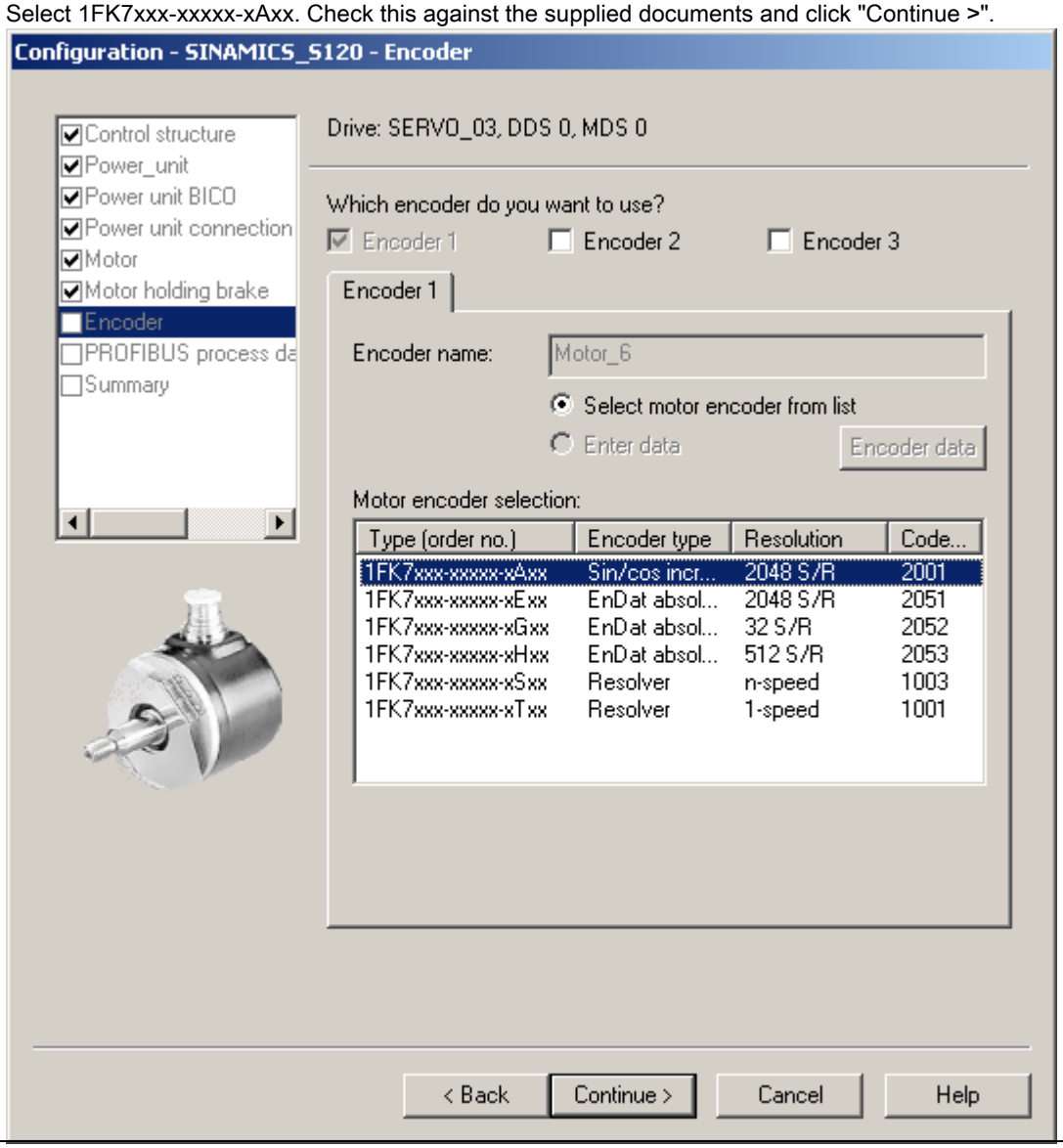
Sequence	Activity	Result
16	The motor without complete DRIVE-CLIQ technology is connected to terminal X2 of the power section. Click "Continue >". 	

Sequence	Activity	Result
17	Select the correct motor from the list. To activate the selection option, you must select the "Select standard motor from list" box. The motor used in the SINAMICS® training case is the 1FK7022-xAK7x-xxxx. Check this against the supplied documents or the motor type plate (lower motor - blue gear wheel). Select the appropriate motor and click "Continue >".  	

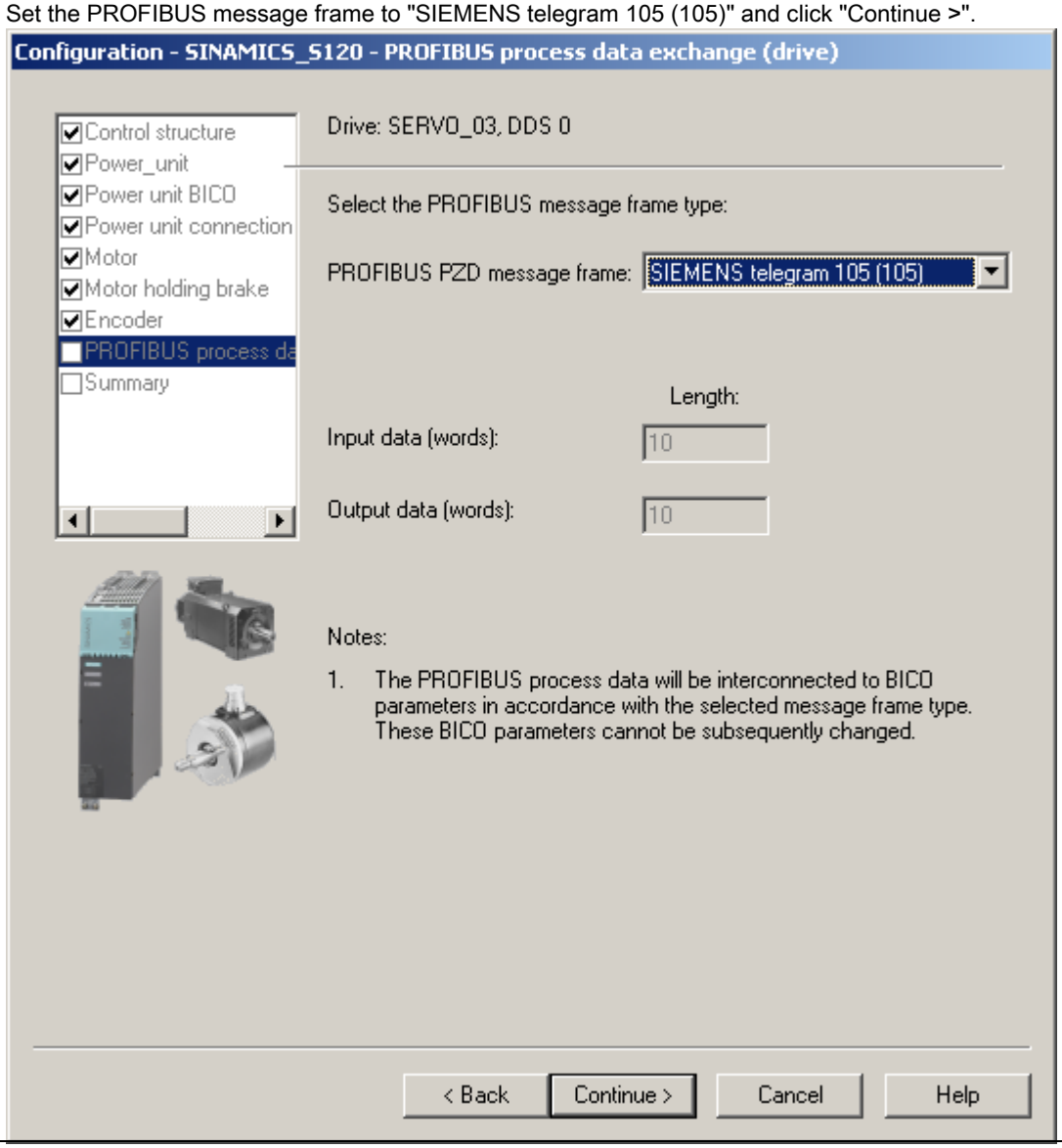
Sequence	Activity	Result
18	Select "Without holding brake" and click "Continue >".	



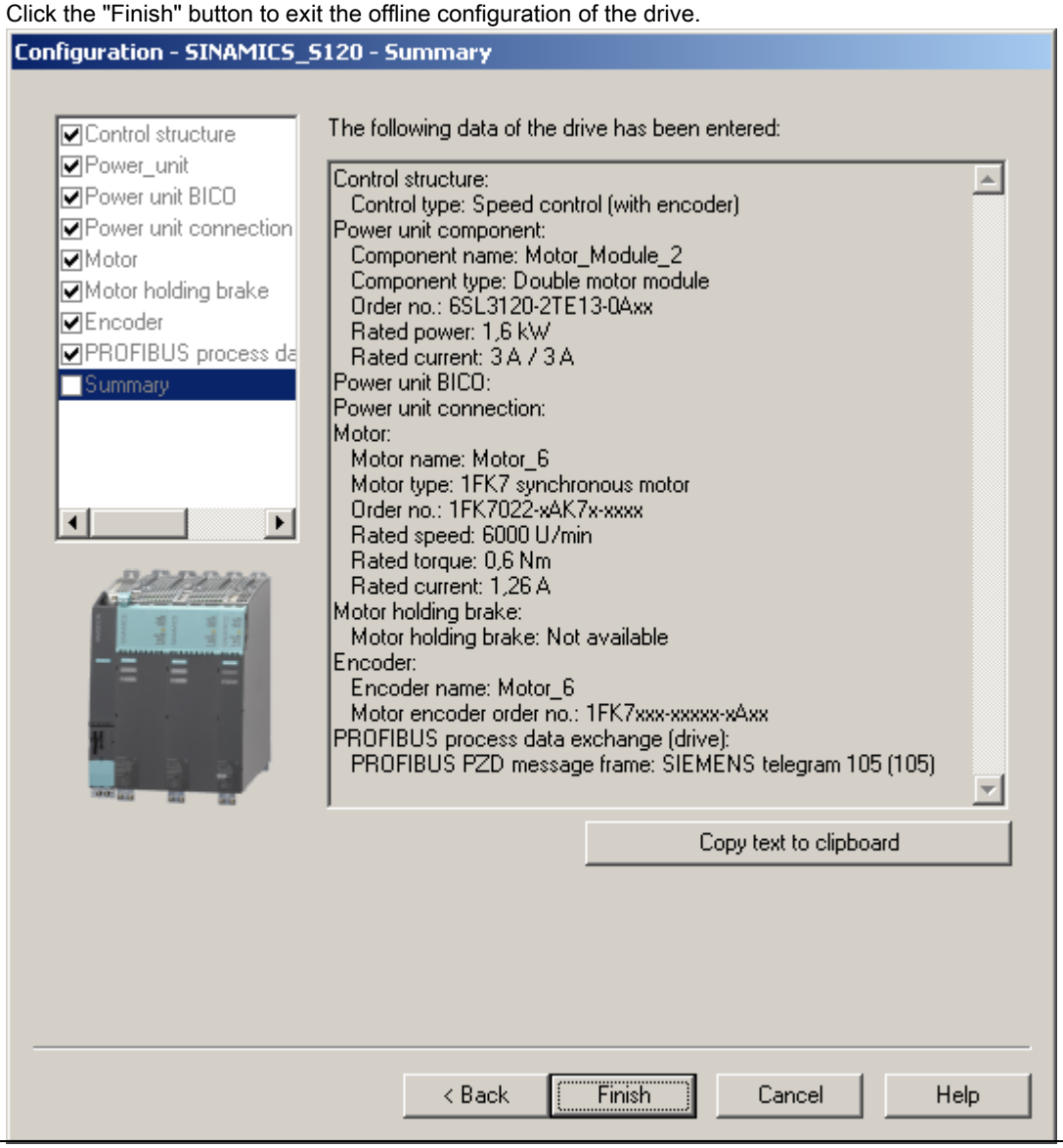
Sequence	Activity	Result
19	Select 1FK7xxx-xxxxx-xAxx. Check this against the supplied documents and click "Continue >".	



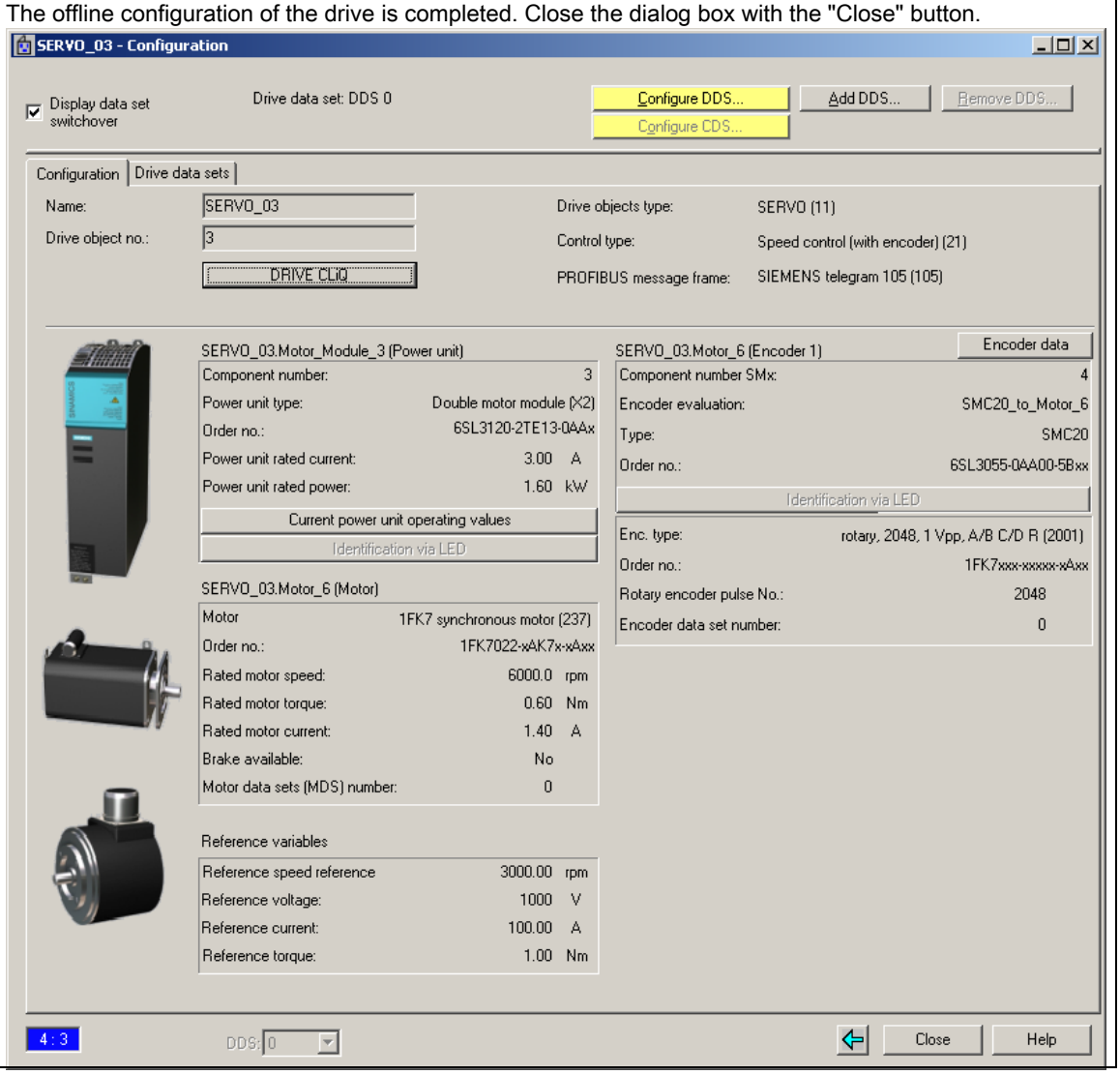
Sequence	Activity	Result
20	Set the PROFIBUS message frame to "SIEMENS telegram 105 (105)" and click "Continue >".	

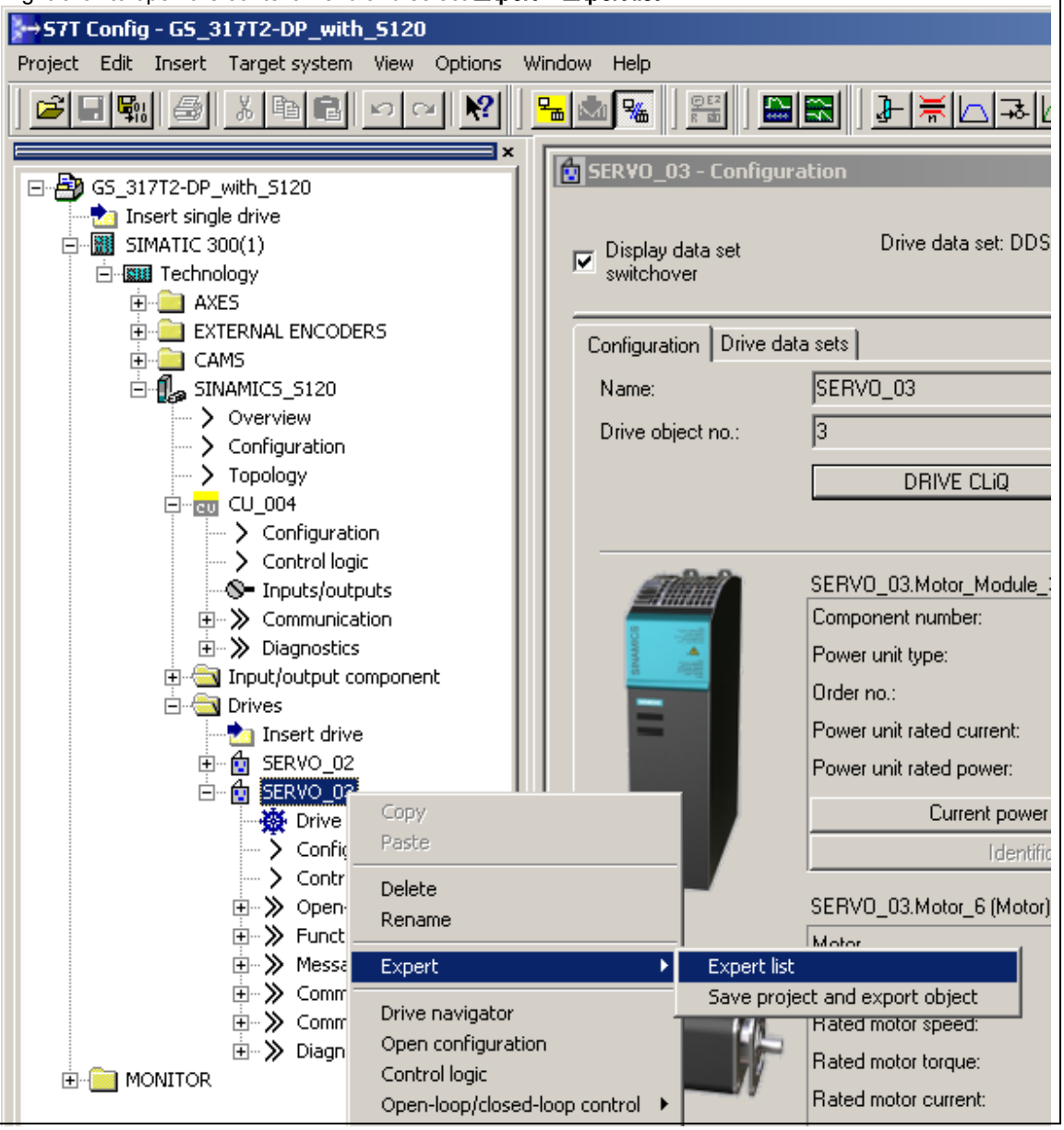


Sequence	Activity	Result
21	Click the "Finish" button to exit the offline configuration of the drive.	

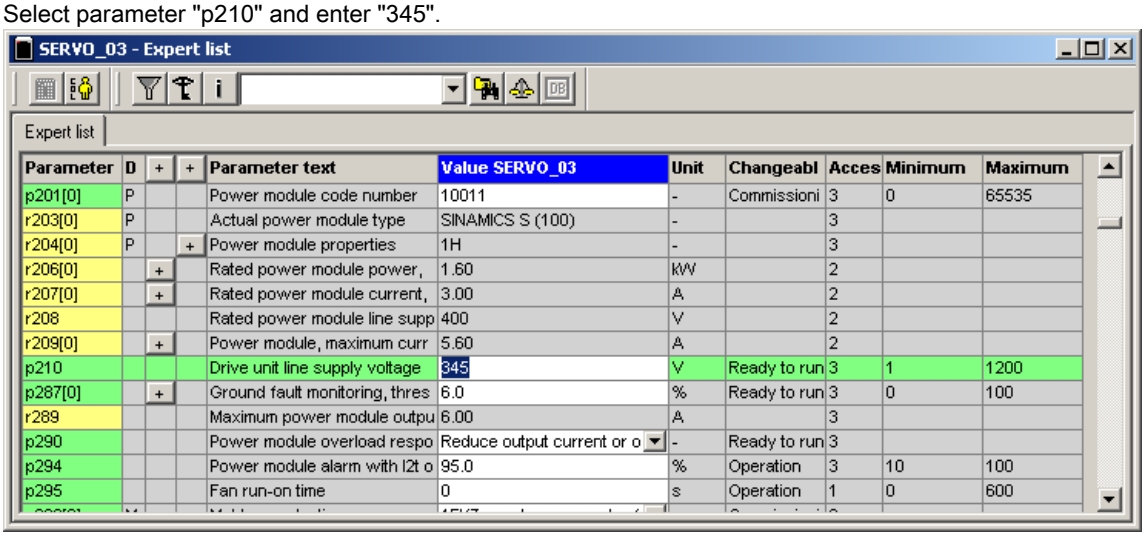


Sequence	Activity	Result
22	The offline configuration of the drive is completed. Close the dialog box with the "Close" button.	



Sequence	Activity	Result
23	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > SINAMICS_S120 > Drives > Servo_03**. Right-click to open the context menu and select **Expert > Expert list**.  	

Sequence	Activity	Result
24	Select parameter "p210" and enter "345".	

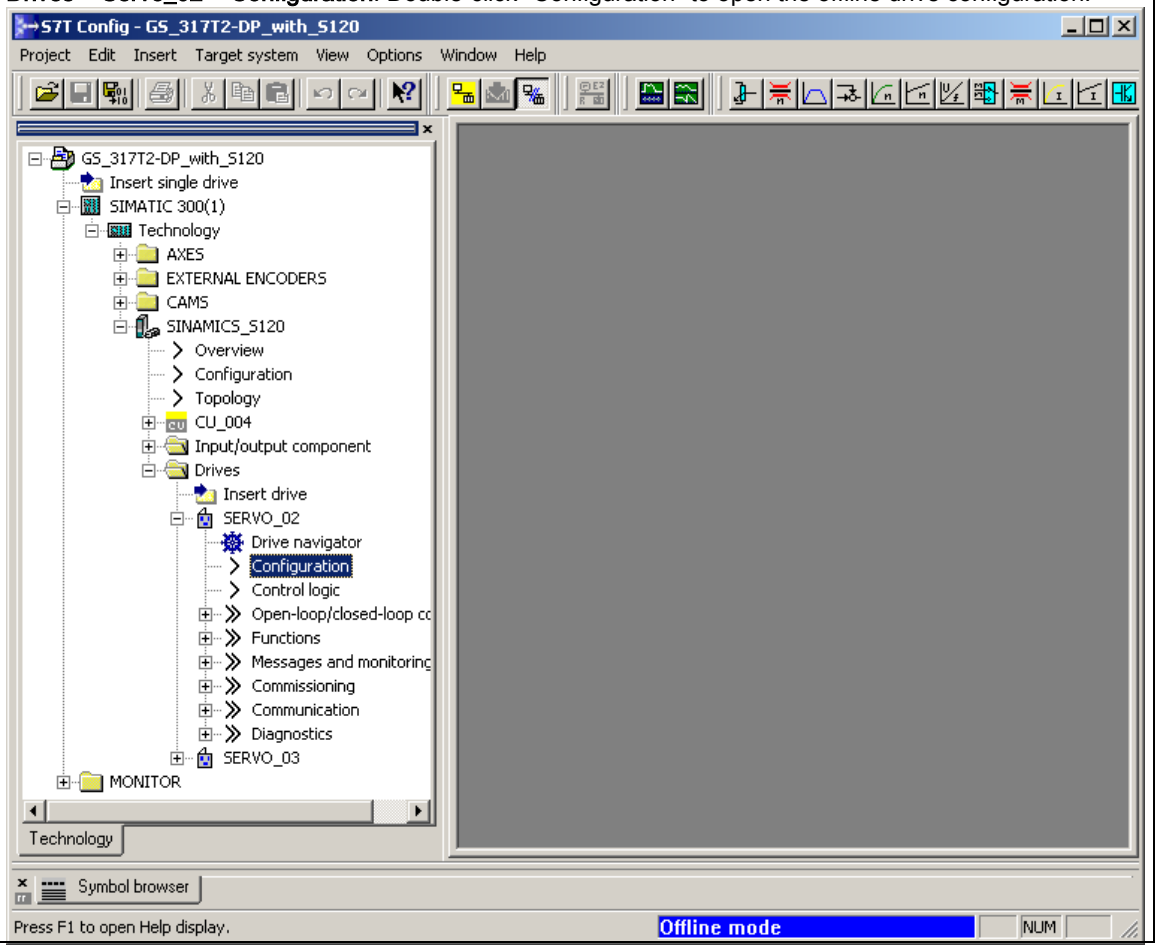


Parameter	D	+	+	Parameter text	Value SERVO_03	Unit	Changeabl	Acces	Minimum	Maximum
p201[0]	P			Power module code number	10011	-	Commissioni	3	0	65535
r203[0]	P			Actual power module type	SINAMICS S (100)	-		3		
r204[0]	P		+	Power module properties	1H	-		3		
r206[0]		+		Rated power module power,	1.60	kW		2		
r207[0]		+		Rated power module current,	3.00	A		2		
r208				Rated power module line supp	400	V		2		
r209[0]		+		Power module, maximum curr	5.60	A		2		
p210				Drive unit line supply voltage	345	V	Ready to run	3	1	1200
p287[0]		+		Ground fault monitoring, thres	6.0	%	Ready to run	3	0	100
r289				Maximum power module outpu	6.00	A		3		
p290				Power module overload respo	Reduce output current or o	-	Ready to run	3		
p294				Power module alarm with I2t o	95.0	%	Operation	3	10	100
p295				Fan run-on time	0	s	Operation	1	0	600

The smart line module and the motor module of the SINAMICS S120 training case have been especially equipped for operation on a 230 V system. For this reason, "Parameter p210" of the connected drives must be set to the following value, which differs from the factory settings:

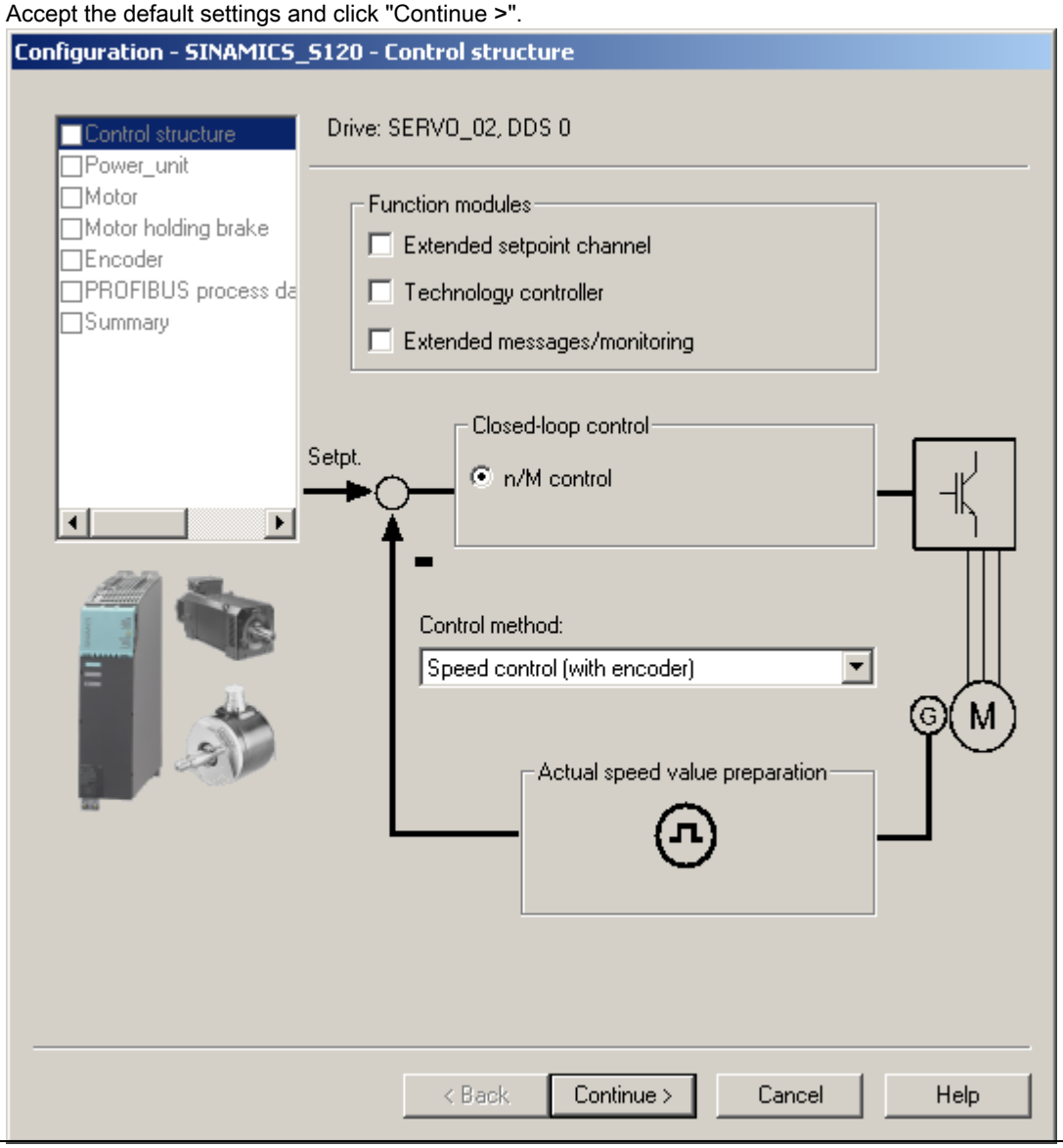
p210 = 345 V device connection voltage SERVO/VECTOR

The setting of "parameter p210 = 345 V" **cannot** be calculated by the SINAMICS operating system and is pre-assigned for the error-free operation of the SINAMICS S120 training case on the 230 V system.

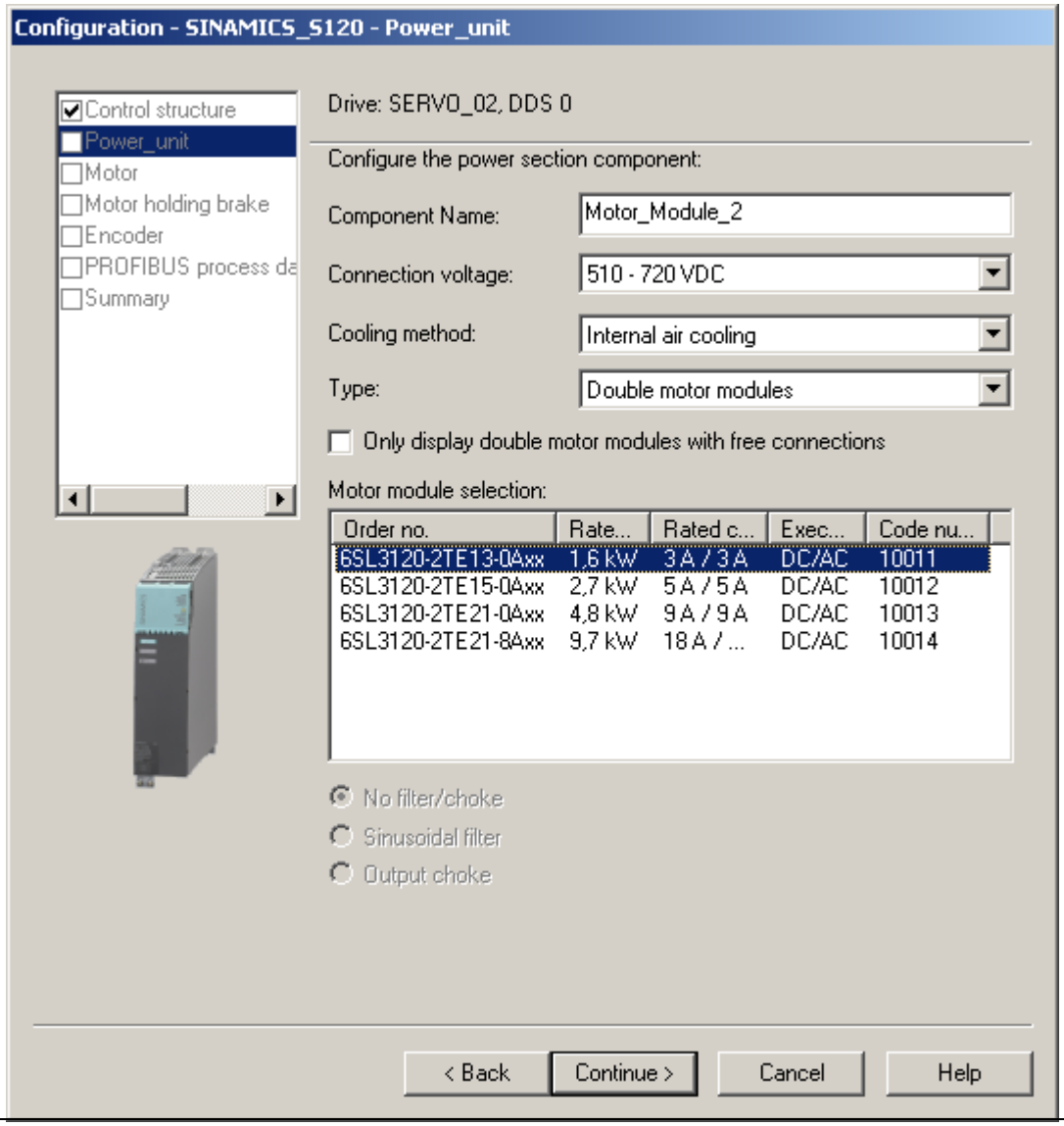
Sequence	Activity	Result
25	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > SINAMICS_S120 > Drives > Servo_02 > Configuration**. Double-click "Configuration" to open the offline drive configuration. 	

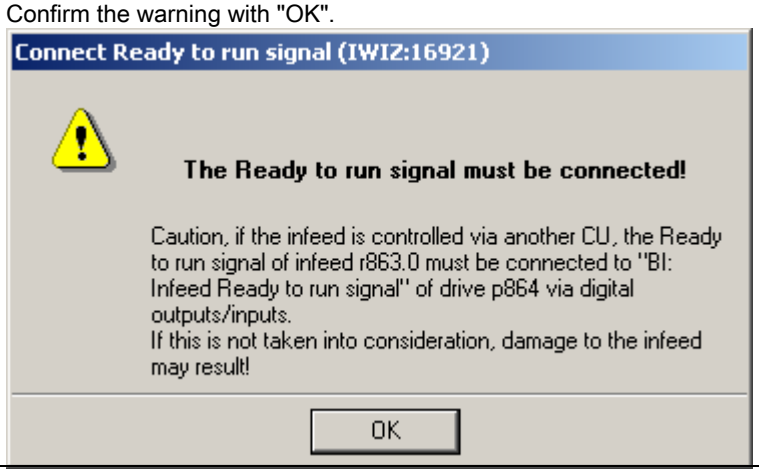
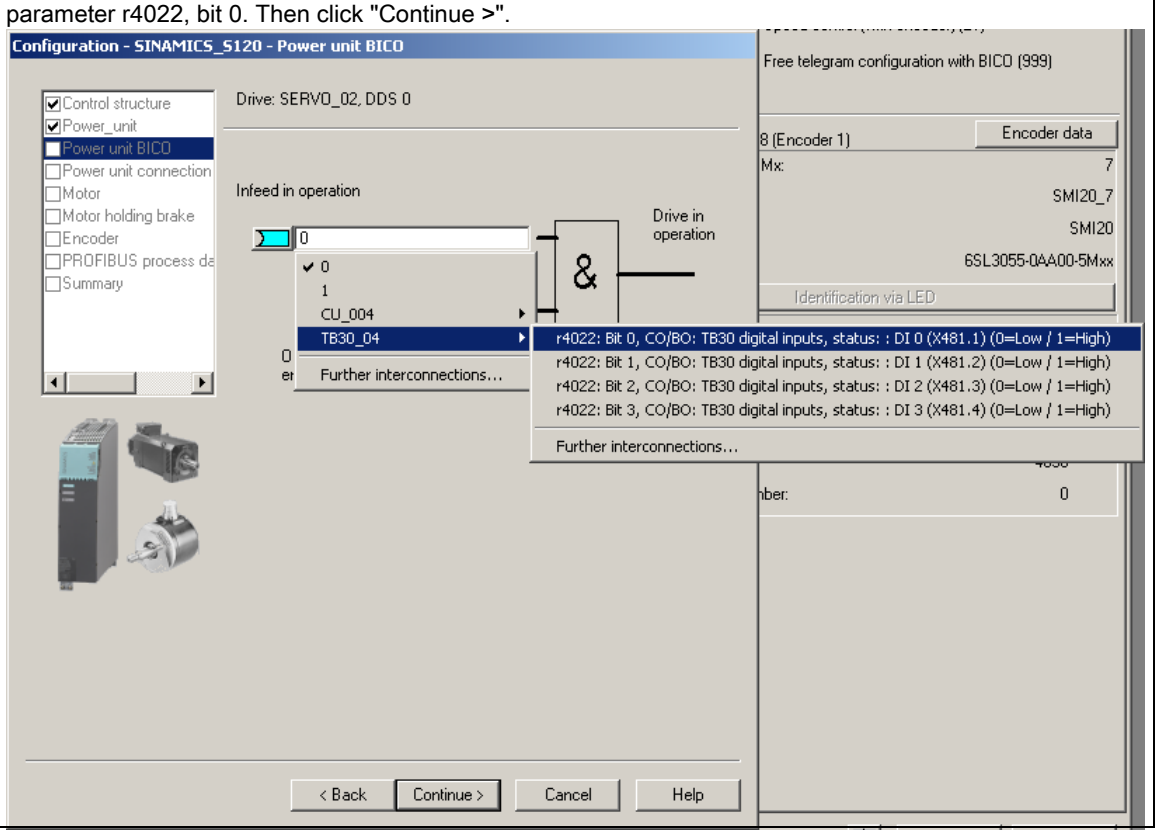
Sequence	Activity	Result
26	Start the configuration by clicking the "Configure DDS…" button.	

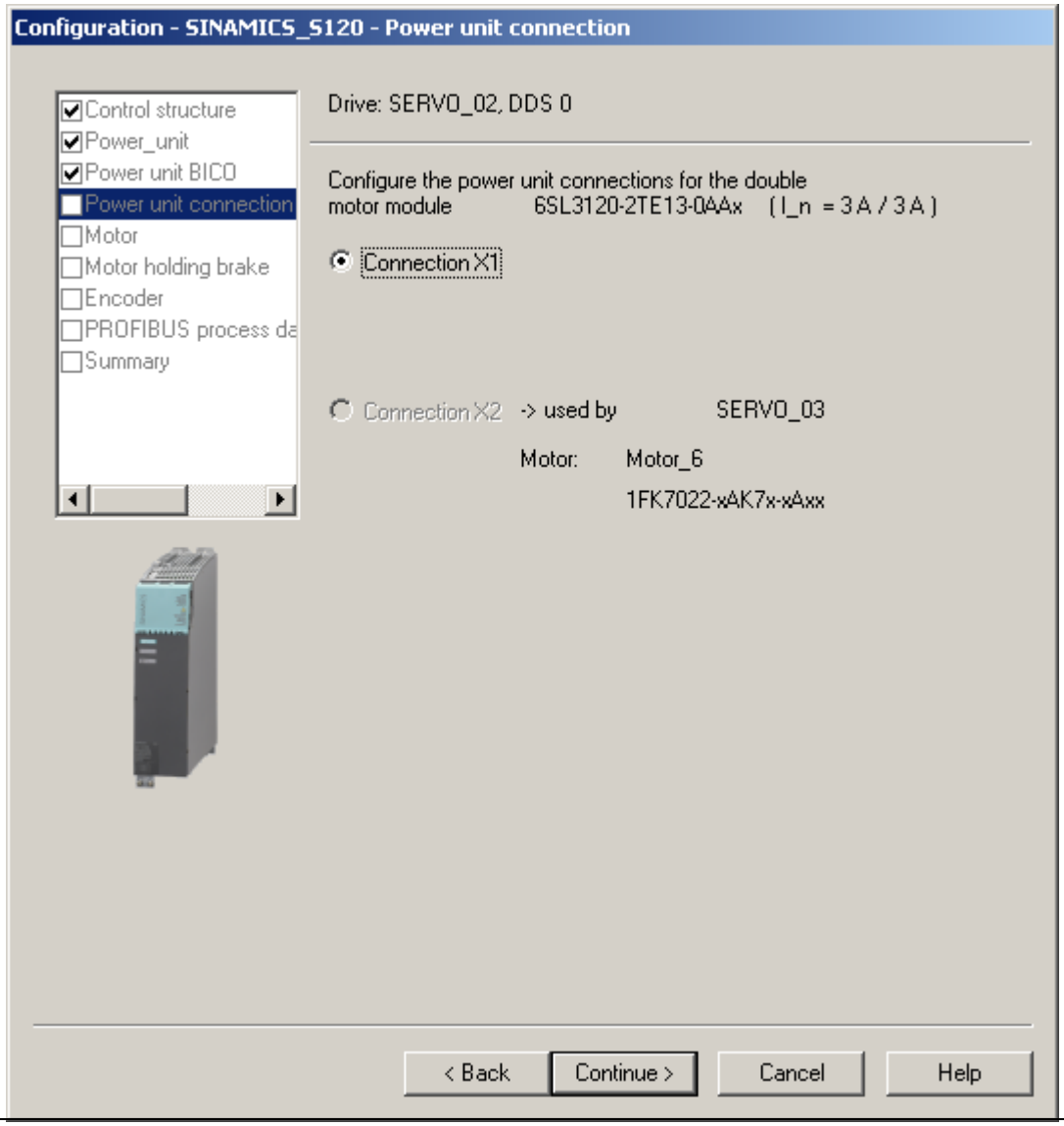
Sequence	Activity	Result
27	Accept the default settings and click "Continue >".	

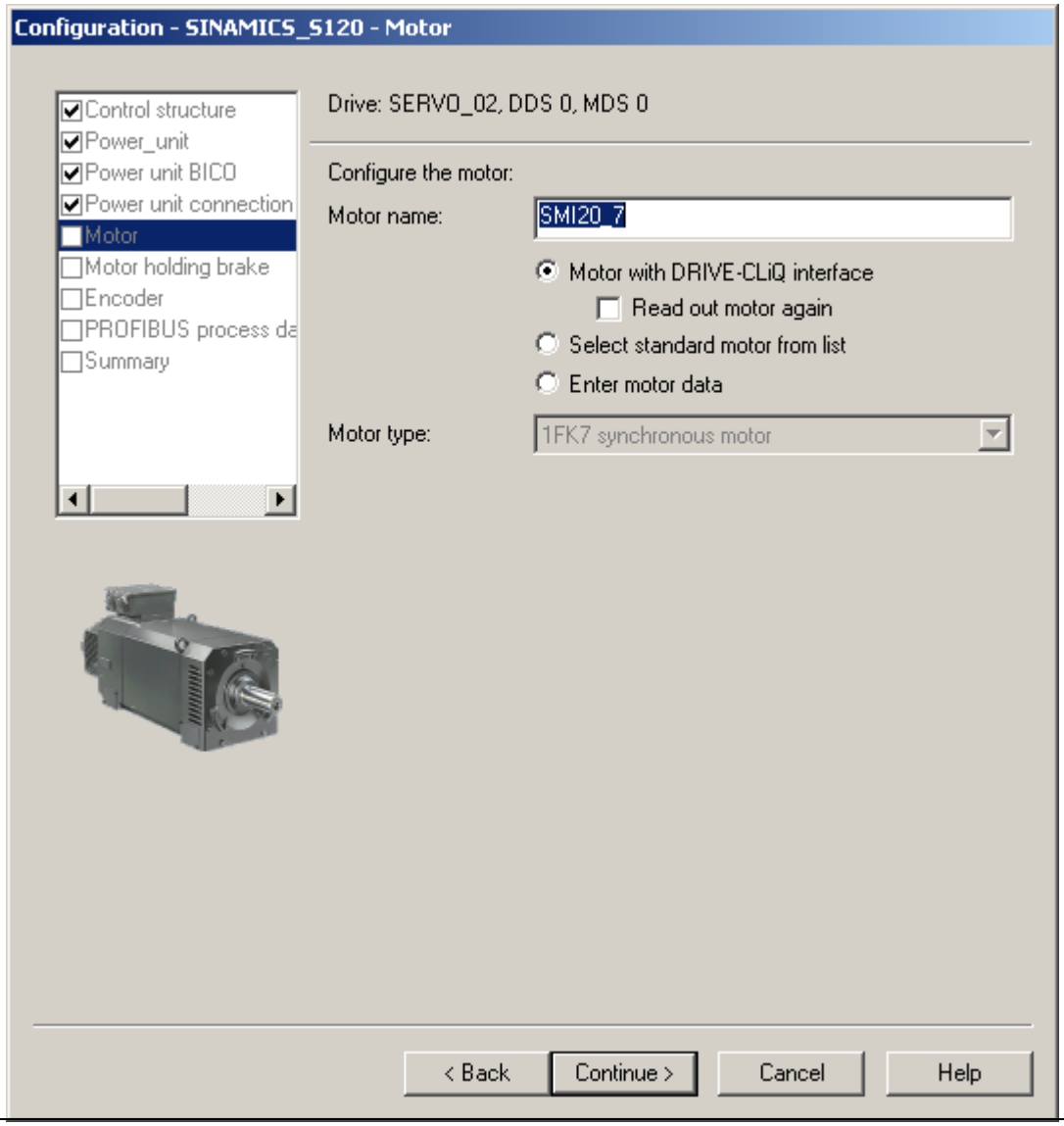


Sequence	Activity	Result
28	The power section has DRIVE-CLIQ technology and has already been correctly configured. Check the order number and click "Continue >".	

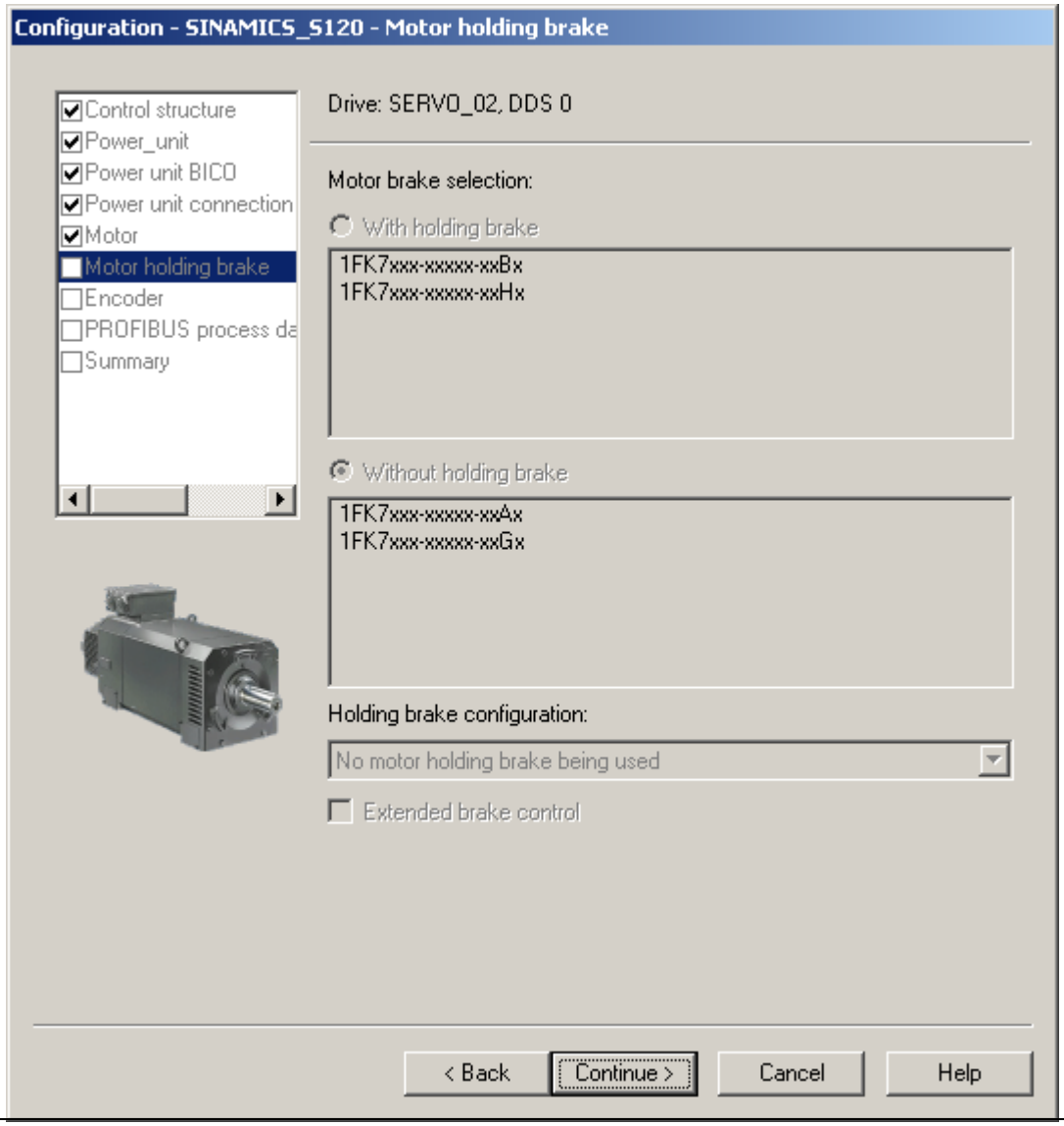


Sequence	Activity	Result
29	The SINAMICS® training case on which this document is based does not have an active infeed module. Confirm the warning with "OK". 	
30	Click the blue button and in the **TB30_04** context menu, select digital input 0, which corresponds to parameter r4022, bit 0. Then click "Continue >". 	

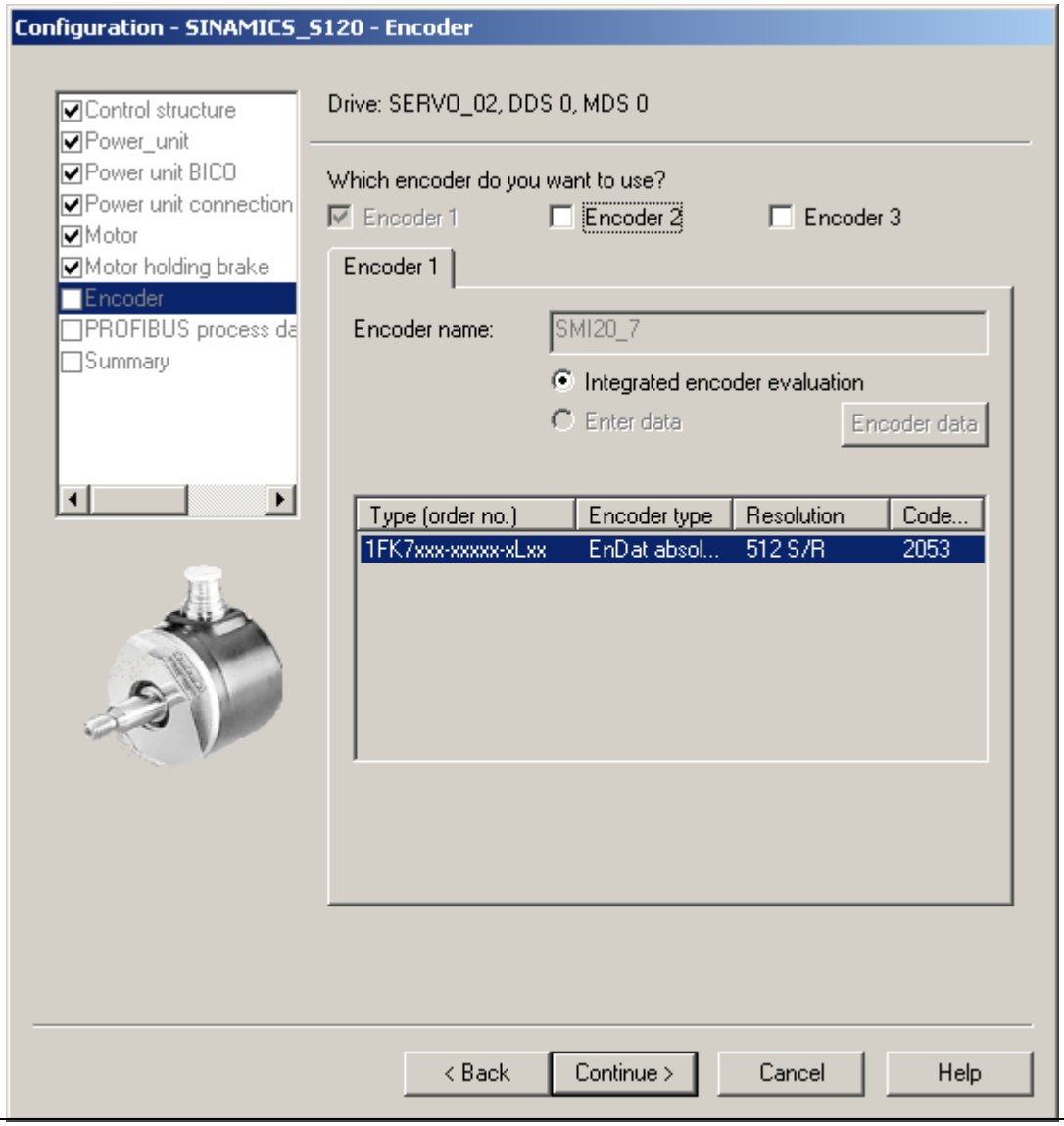
Sequence	Activity	Result
31	The motor with complete DRIVE-CLIQ technology is connected to terminal X1 of the power section. Click "Continue >". 	

Sequence	Activity	Result
32	The motor with complete DRIVE-CLIQ technology has already been correctly configured. Click "Continue >". 	

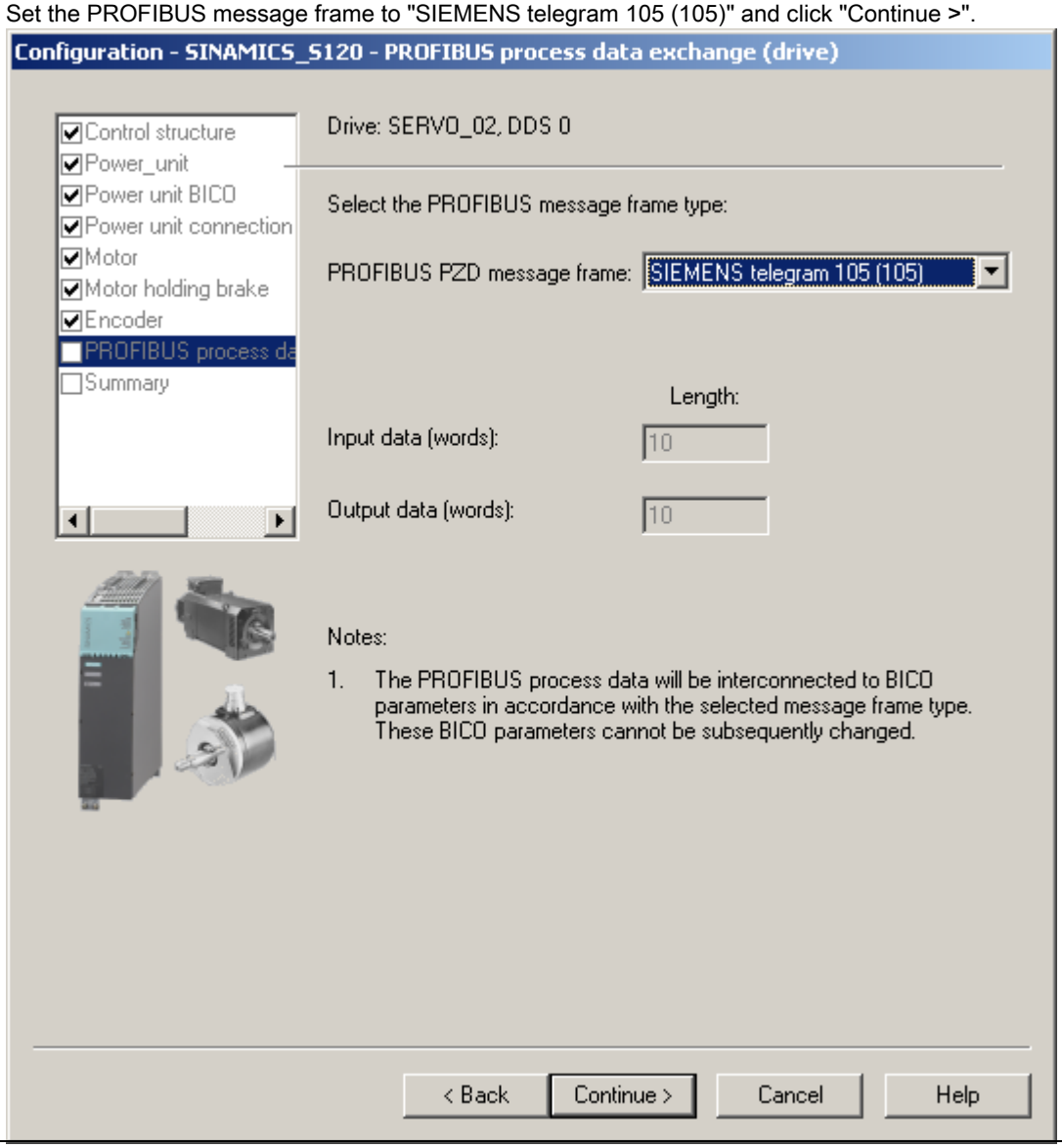
Sequence	Activity	Result
33	Click "Continue >".	



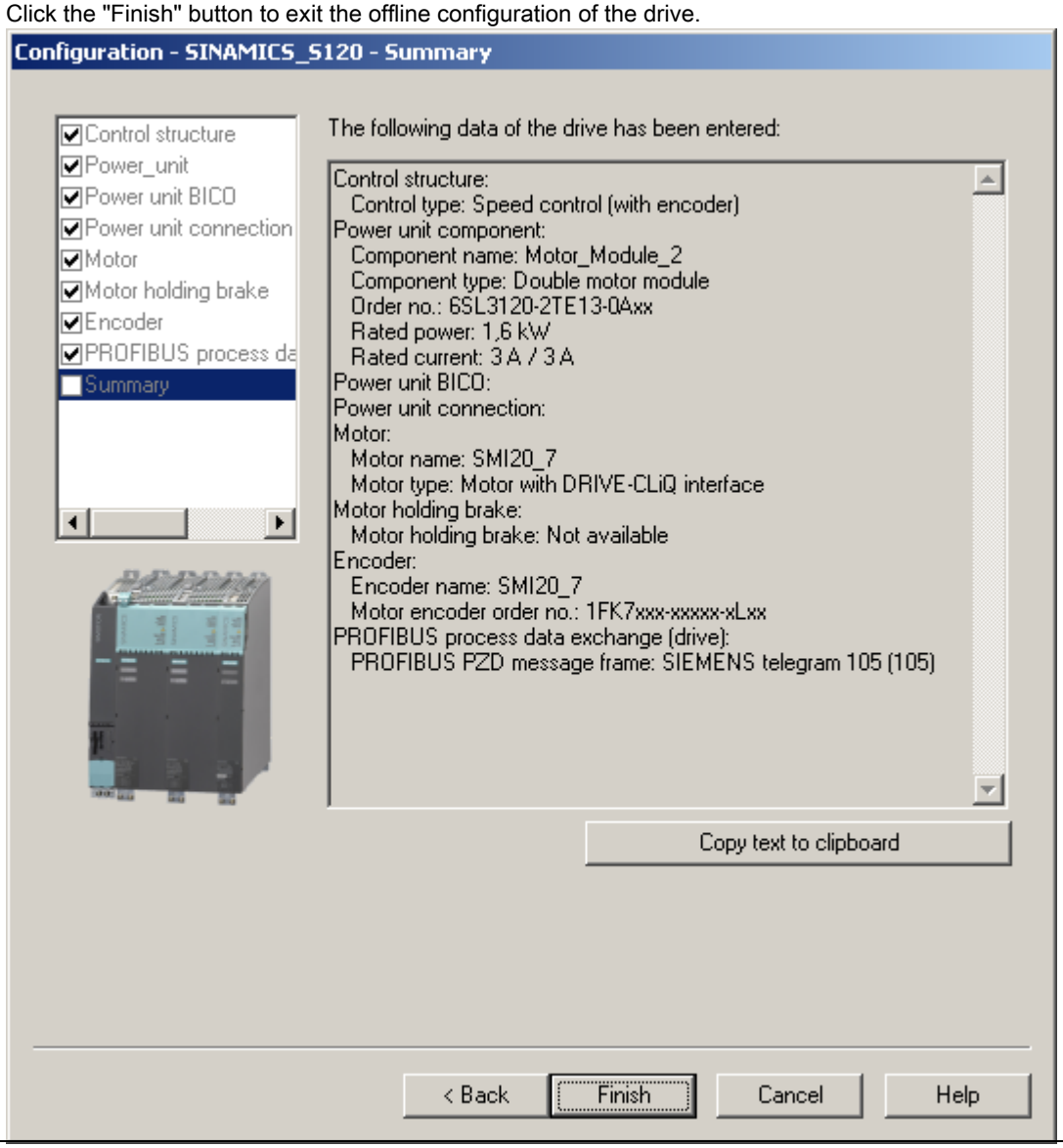
Sequence	Activity	Result
34	The correct encoder has already been correctly configured by means of DRIVE-CLIQ technology. Click "Continue >".	



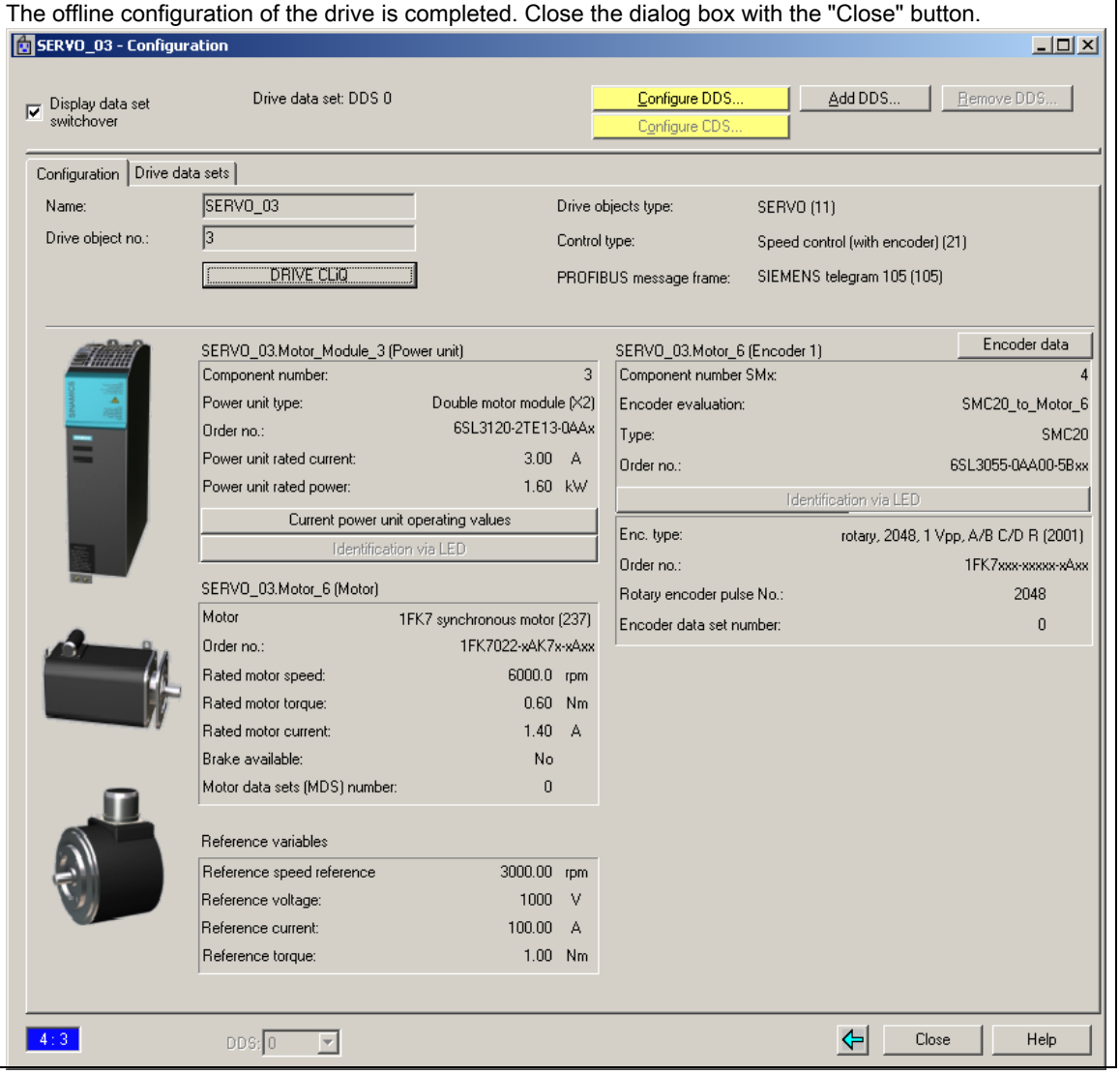
Sequence	Activity	Result
35	Set the PROFIBUS message frame to "SIEMENS telegram 105 (105)" and click "Continue >".	

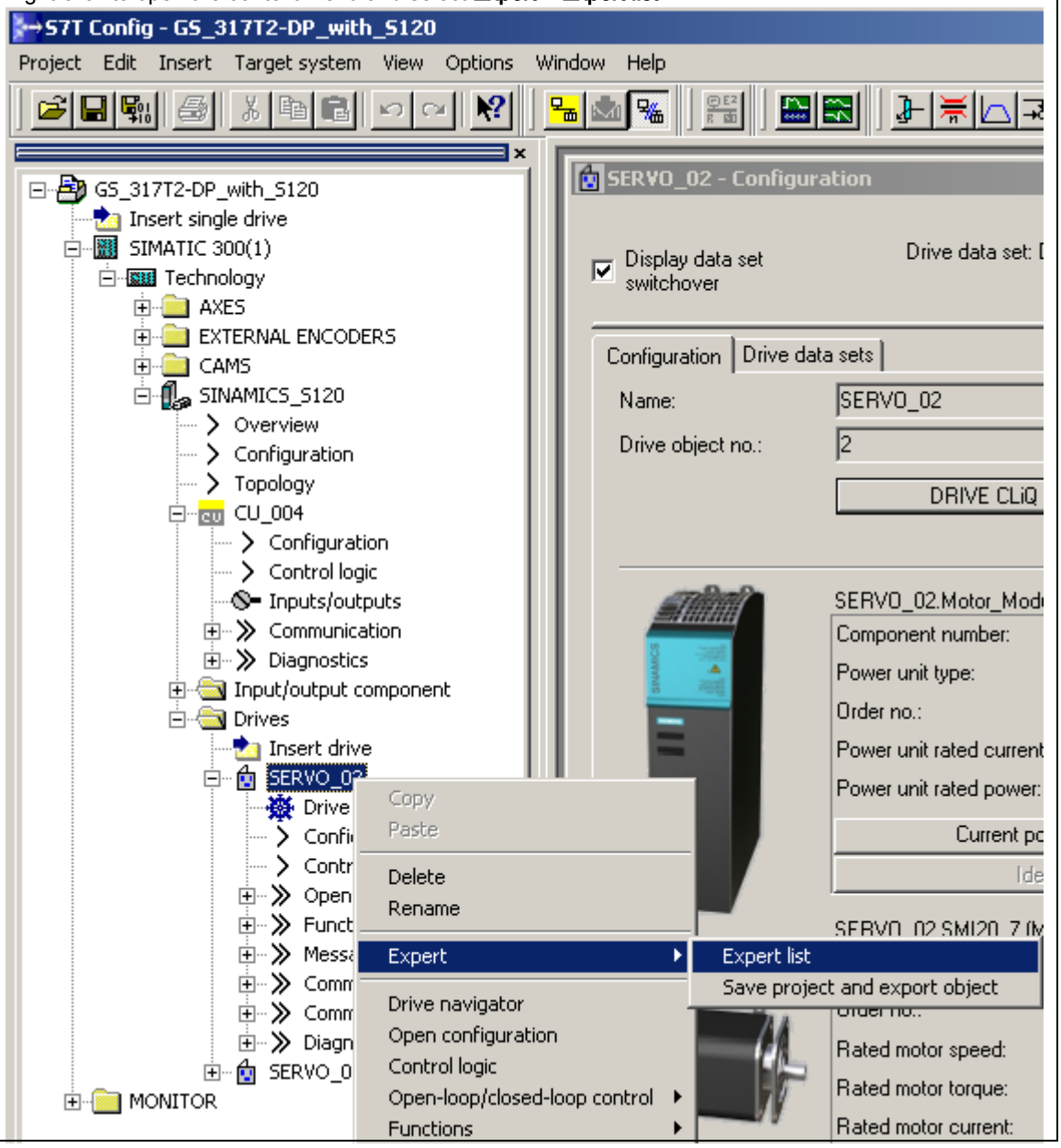


Sequence	Activity	Result
36	Click the "Finish" button to exit the offline configuration of the drive.	

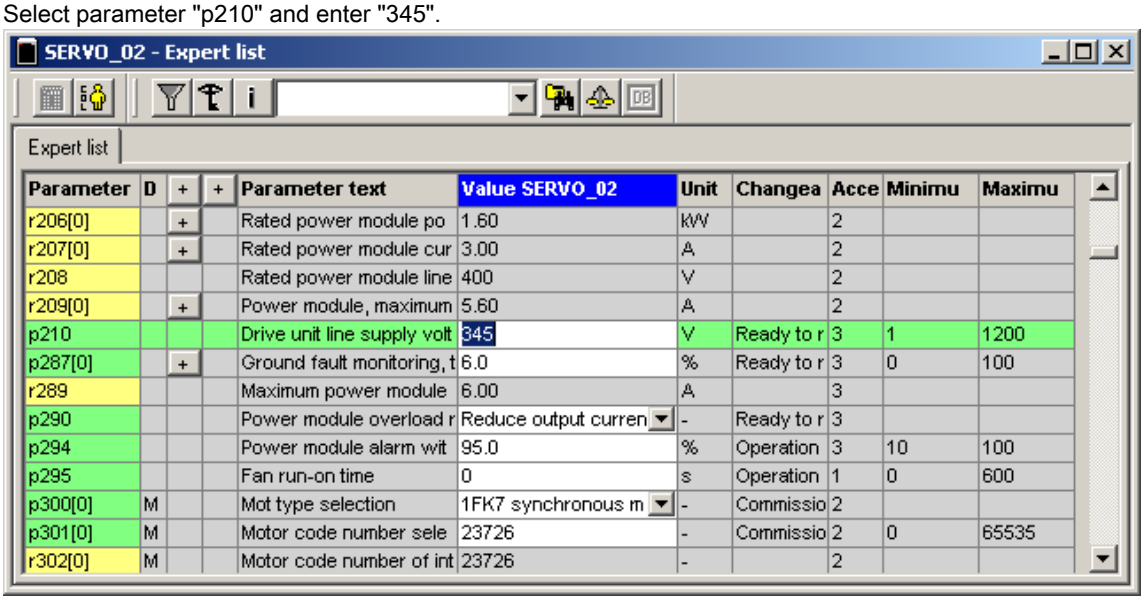


Sequence	Activity	Result
37	The offline configuration of the drive is completed. Close the dialog box with the "Close" button.	



Sequence	Activity	Result
38	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > SINAMICS_S120 > Drives > Servo_02**. Right-click to open the context menu and select **Expert > Expert list**.  	

Sequence	Activity	Result
39	Select parameter "p210" and enter "345".	



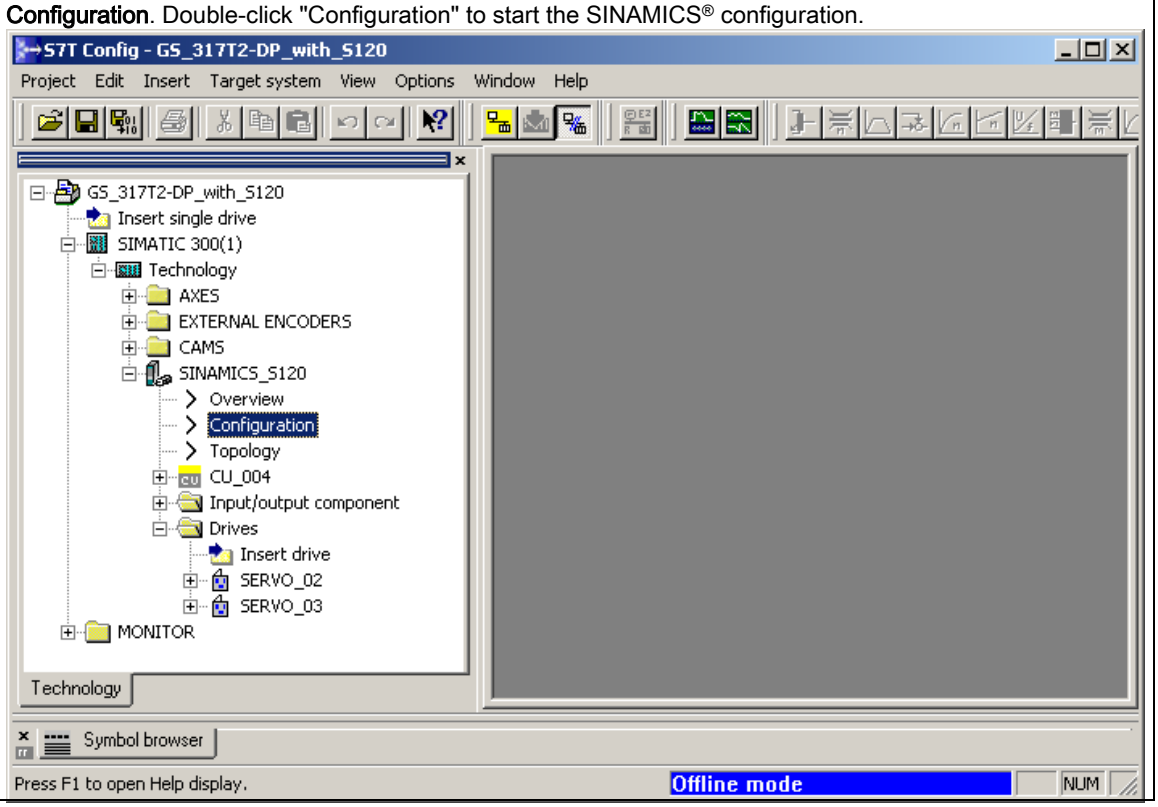
Parameter	D	+	+	Parameter text	Value SERVO_02	Unit	Changea	Acce	Minimu	Maximu
r206[0]		+		Rated power module po	1.60	kW		2		
r207[0]		+		Rated power module cur	3.00	A		2		
r208				Rated power module line	400	V		2		
r209[0]		+		Power module, maximum	5.60	A		2		
p210				Drive unit line supply volt	345	V	Ready to r	3	1	1200
p287[0]		+		Ground fault monitoring, t	6.0	%	Ready to r	3	0	100
r289				Maximum power module	6.00	A		3		
p290				Power module overload r	Reduce output curren	-	Ready to r	3		
p294				Power module alarm wit	95.0	%	Operation	3	10	100
p295				Fan run-on time	0	s	Operation	1	0	600
p300[0]	M			Mot type selection	1FK7 synchronous m	-	Commissio	2		
p301[0]	M			Motor code number sele	23726	-	Commissio	2	0	65535
r302[0]	M			Motor code number of int	23726	-		2		

The smart line module and the motor module of the SINAMICS S120 training case have been especially equipped for operation on a 230 V system. For this reason, "Parameter p210" of the connected drives must be set to the following value, which differs from the factory settings:

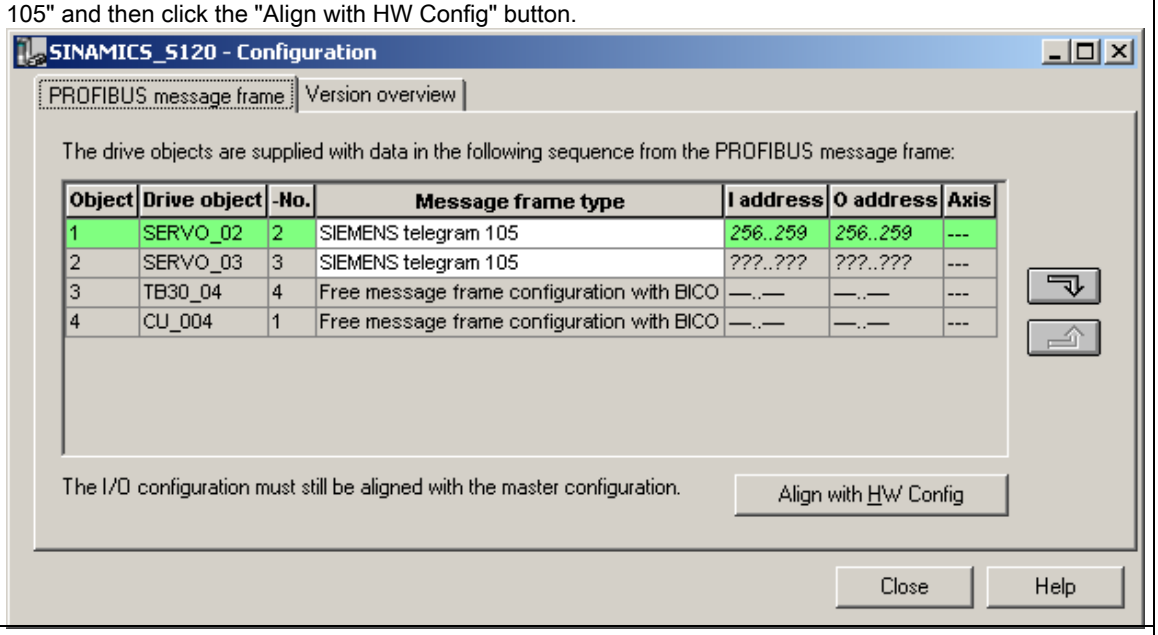
p210 = 345 V device connection voltage SERVO/VECTOR

The setting of "parameter p210 = 345 V" cannot be calculated by the SINAMICS operating system and is pre-assigned for the error-free operation of the SINAMICS S120 training case on the 230 V system.

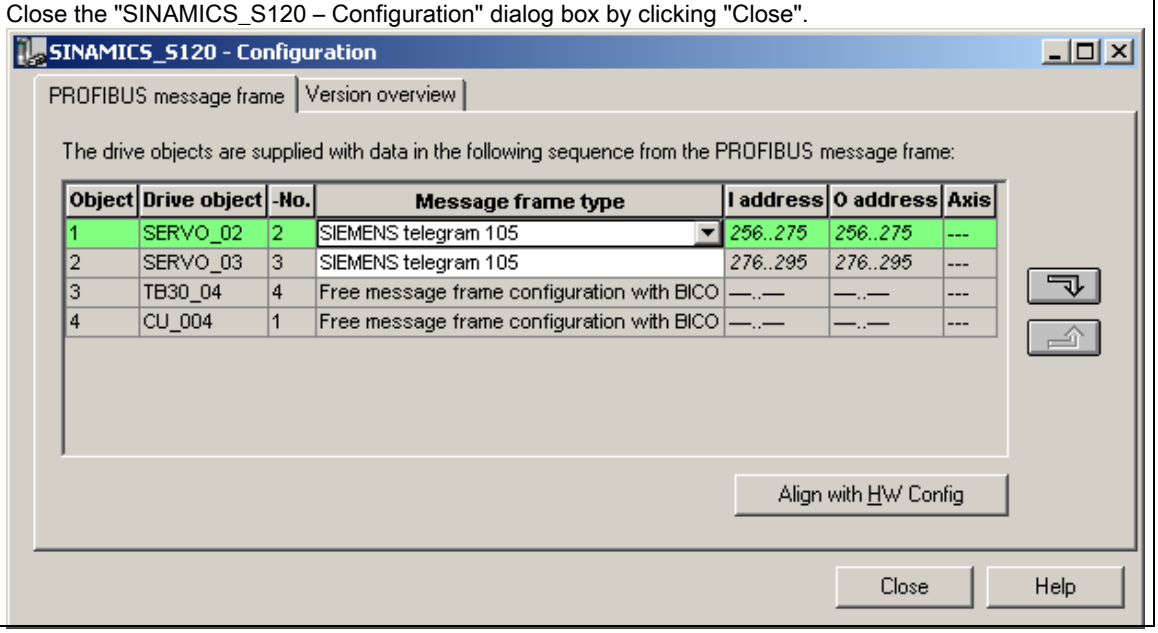
40	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > SINAMICS_S120 > Configuration**. Double-click "Configuration" to start the SINAMICS® configuration.	

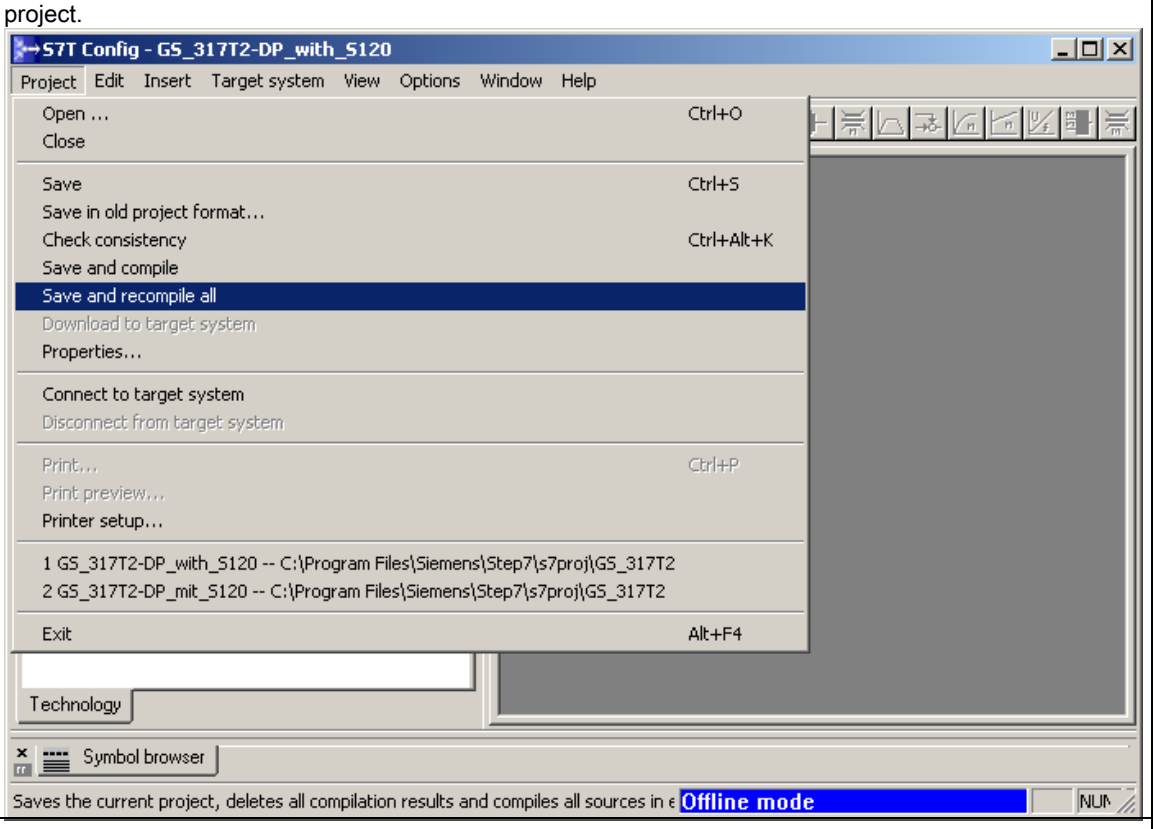
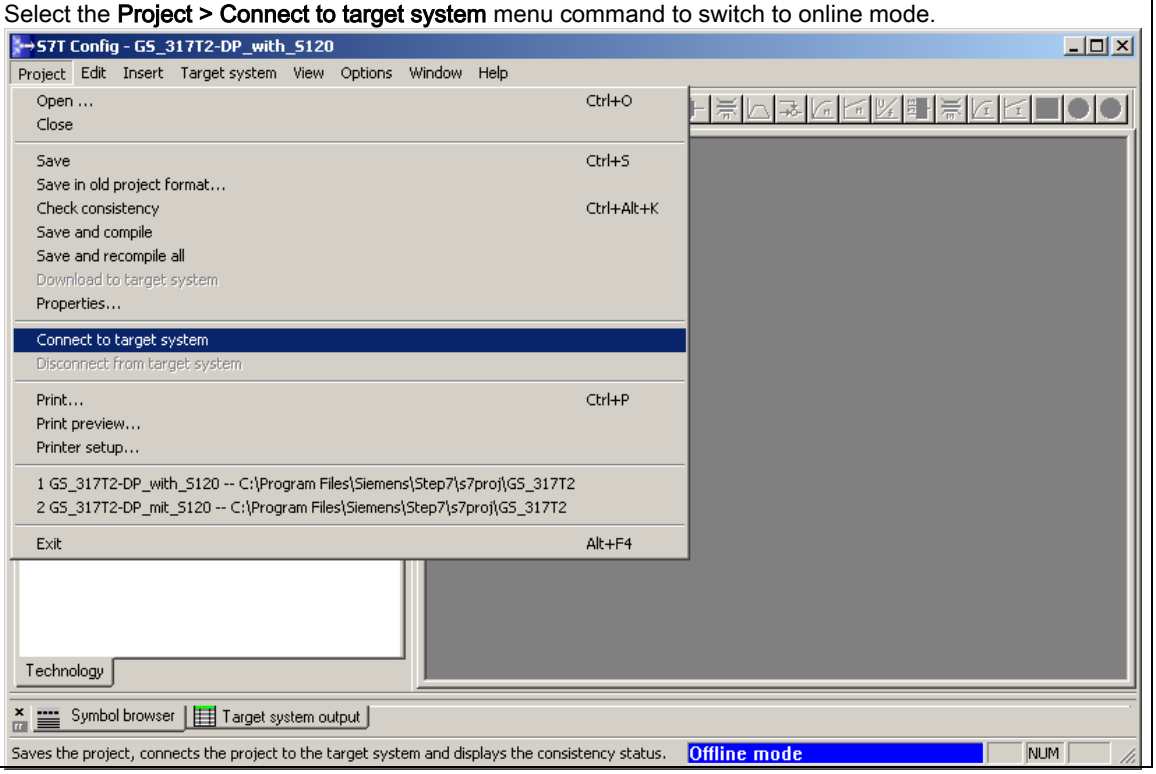


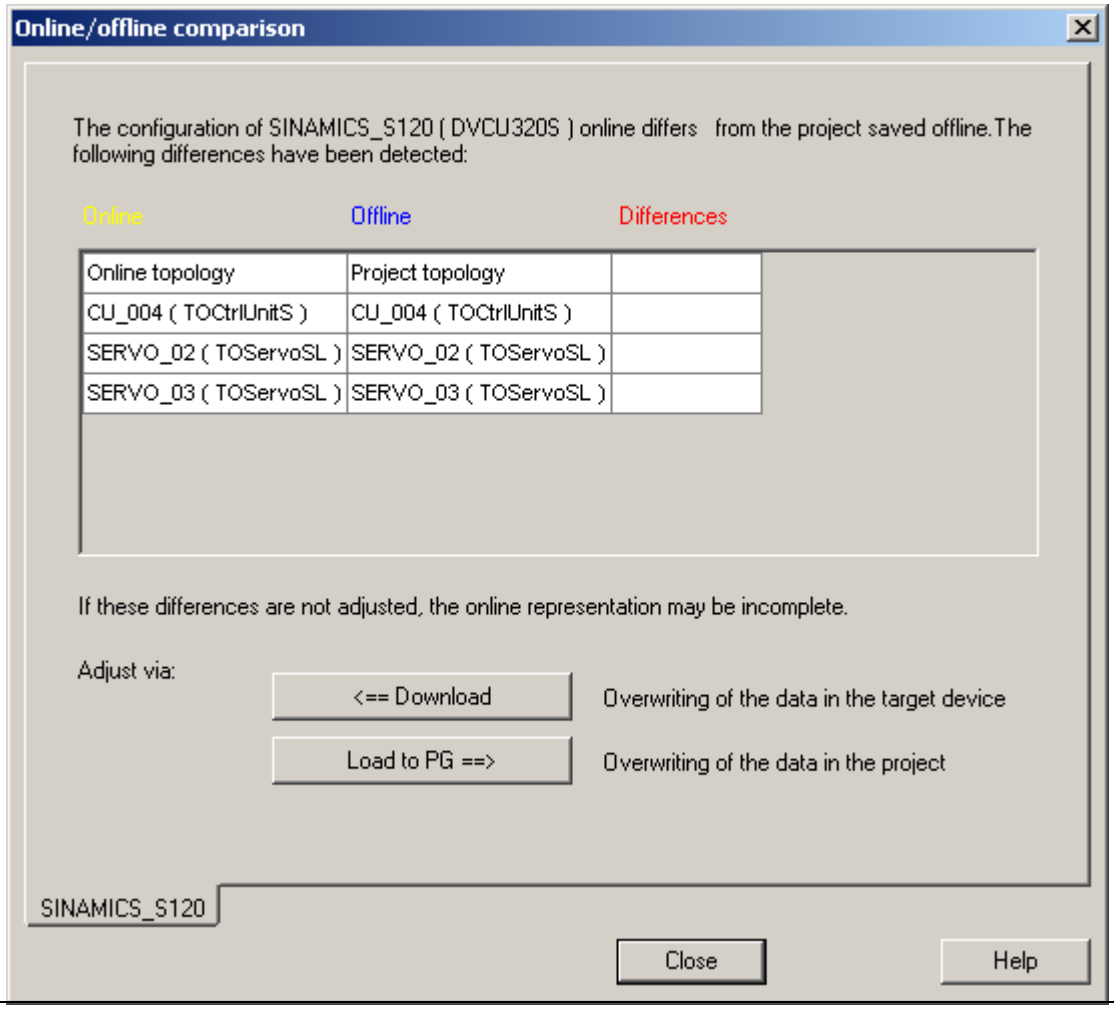
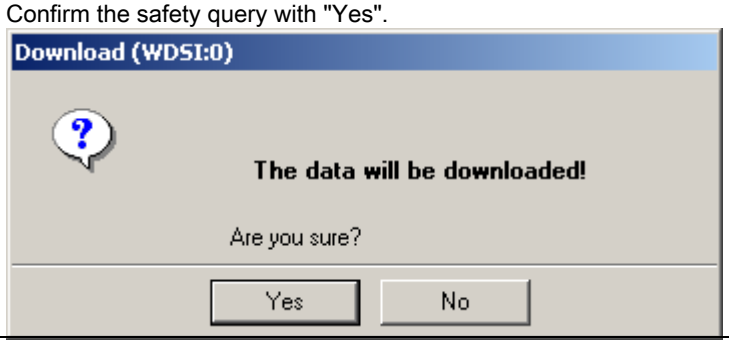
Sequence	Activity	Result
41	In the "SINAMICS_S120 – Configuration" dialog box, set both message frame types to "SIEMENS telegram 105" and then click the "Align with HW Config" button.	

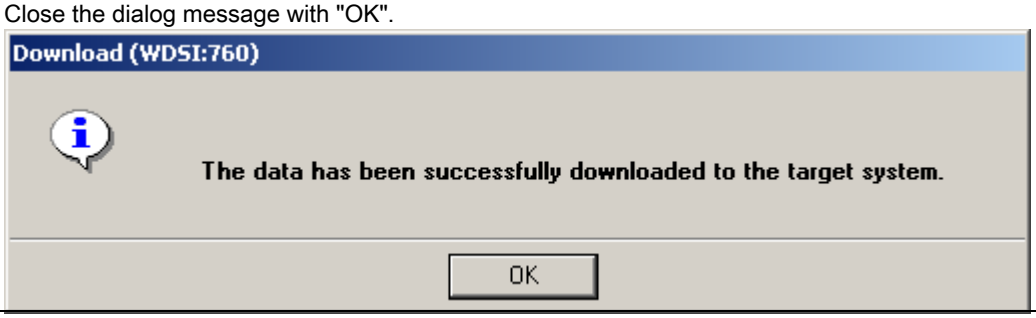
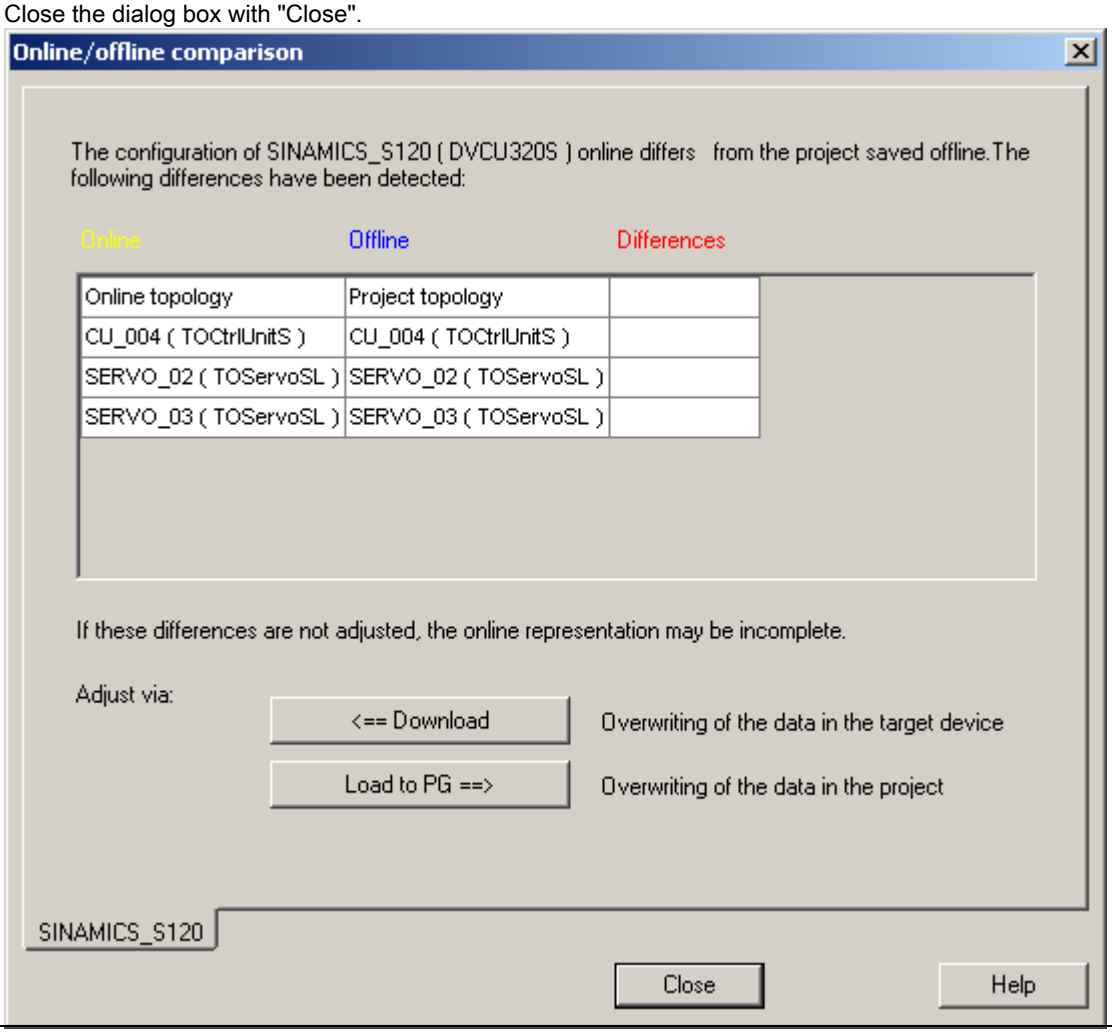


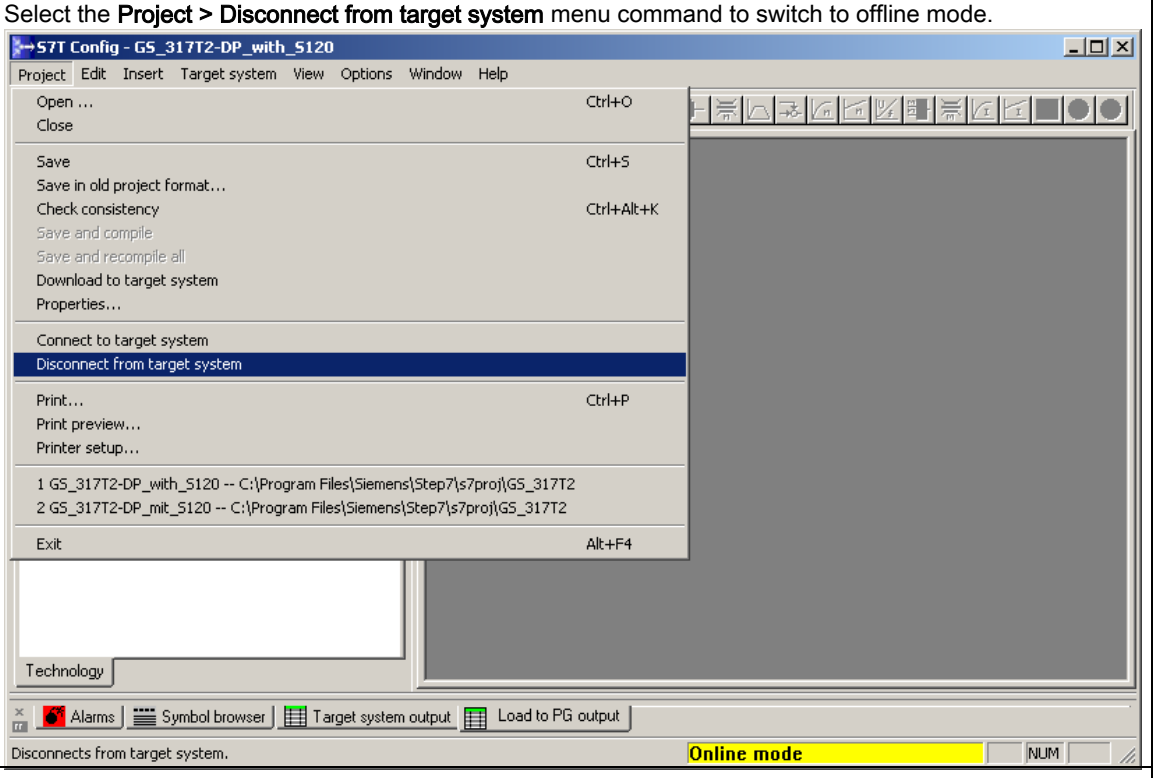
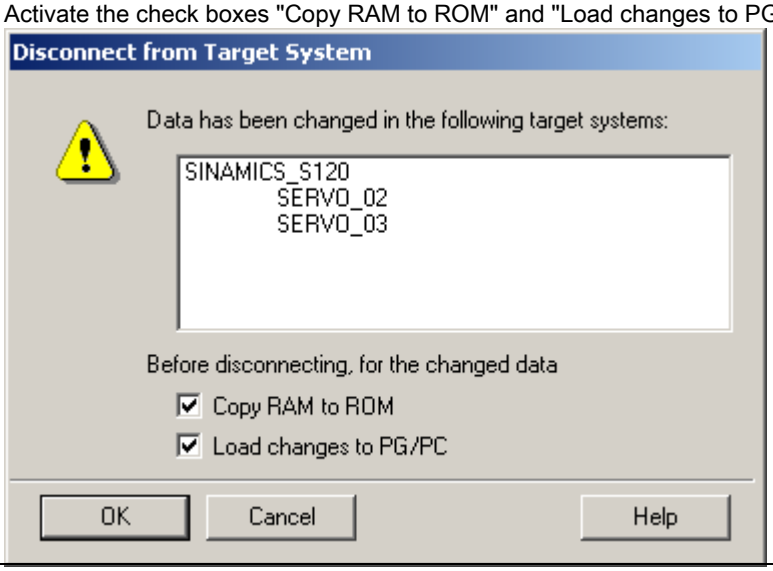
42	Close the "SINAMICS_S120 – Configuration" dialog box by clicking "Close".	



Sequence	Activity	Result
43	Select the **Project > Save and recompile all** menu command to save and compile the entire technology project.  	
44	Select the **Project > Connect to target system** menu command to switch to online mode.  	

Sequence	Activity	Result
45	The desired configuration is on the PG/PC. Click the "<== Download" button to transfer the configuration to the drive.  	
46	Confirm the safety query with "Yes".  	

Sequence	Activity	Result
47	Close the dialog message with "OK". 	
48	Close the dialog box with "Close". 	

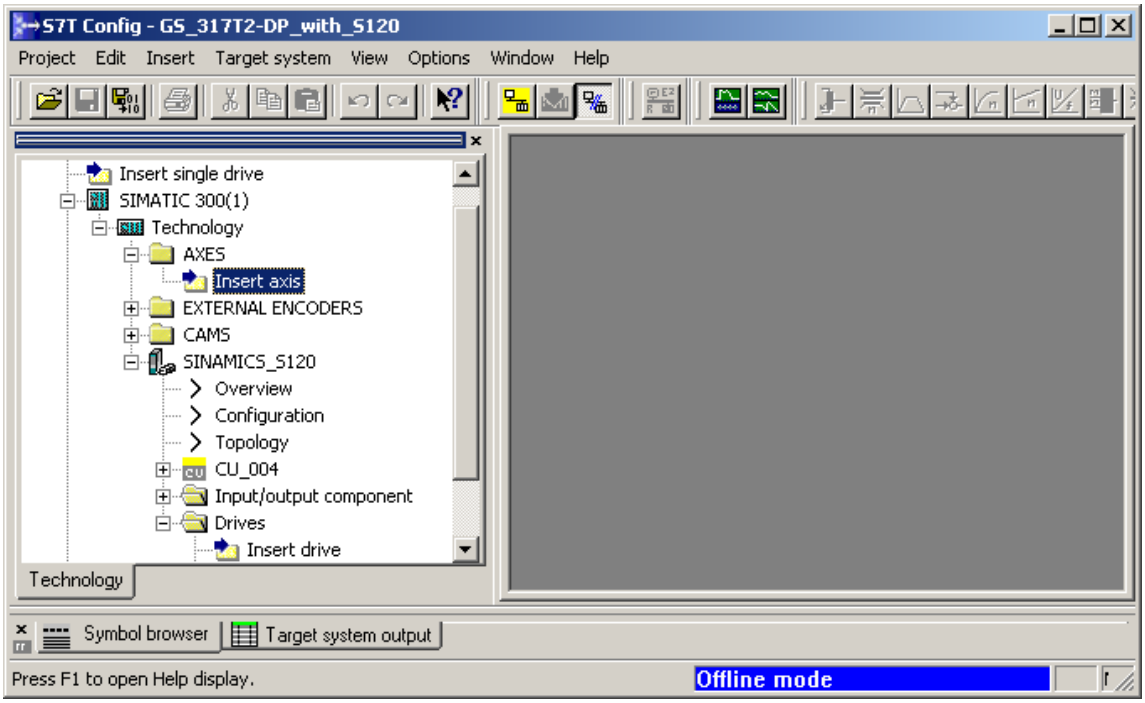
Sequence	Activity	Result
49	Select the **Project > Disconnect from target system** menu command to switch to offline mode.  	
50	Activate the check boxes "Copy RAM to ROM" and "Load changes to PG/PC". Then confirm with "OK".  	

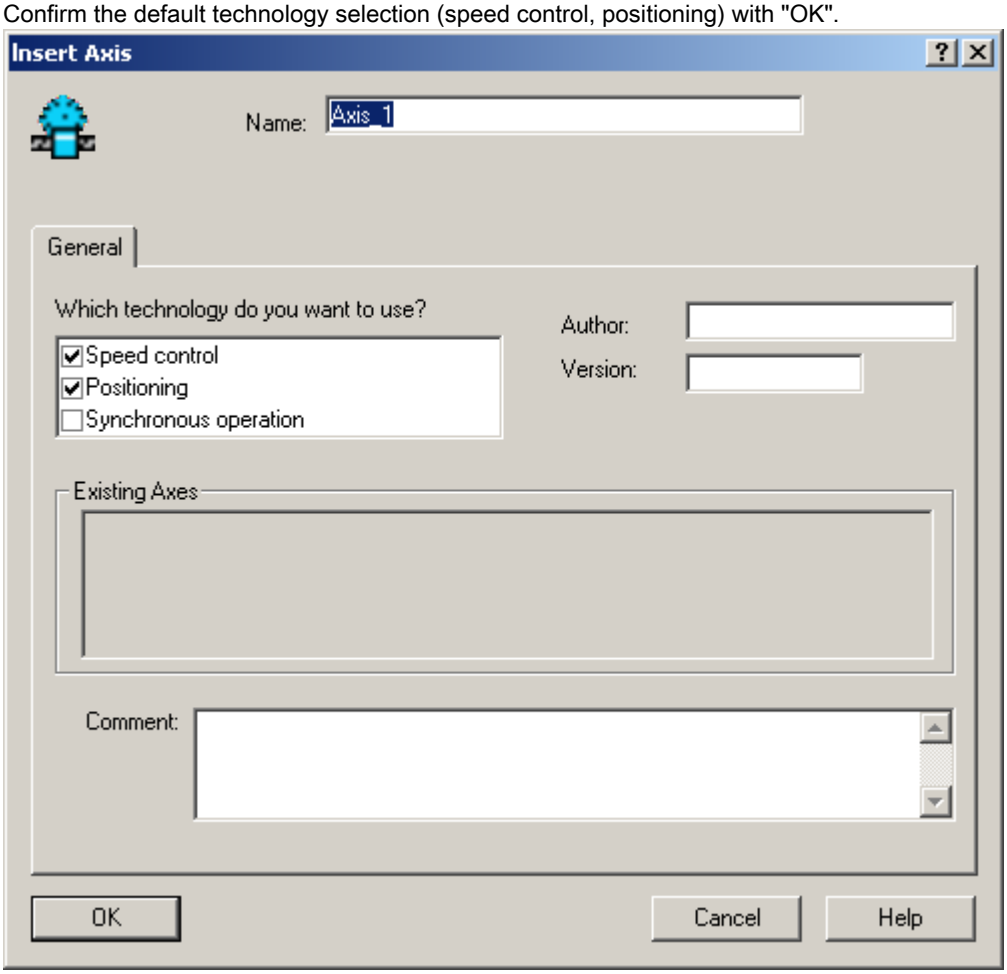
3.10 10. Step: Configuring the axes with S7T Config

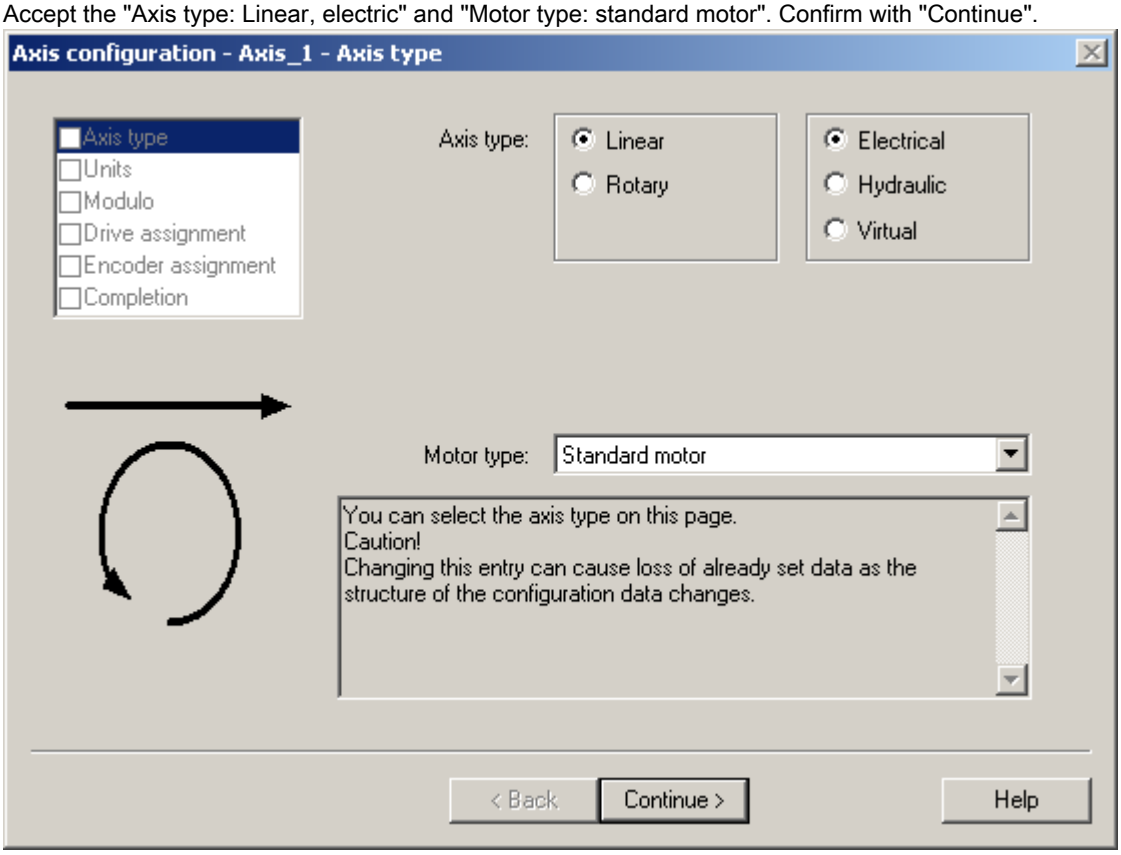
Important information

In this step, you create your technology objects (e.g. axes) with S7T Config. Use "Technology Objects Management“ to generate a technology DB for each TO. Do not copy the technology DBs in order to ensure a defined assignment between the technology DB and its TO.

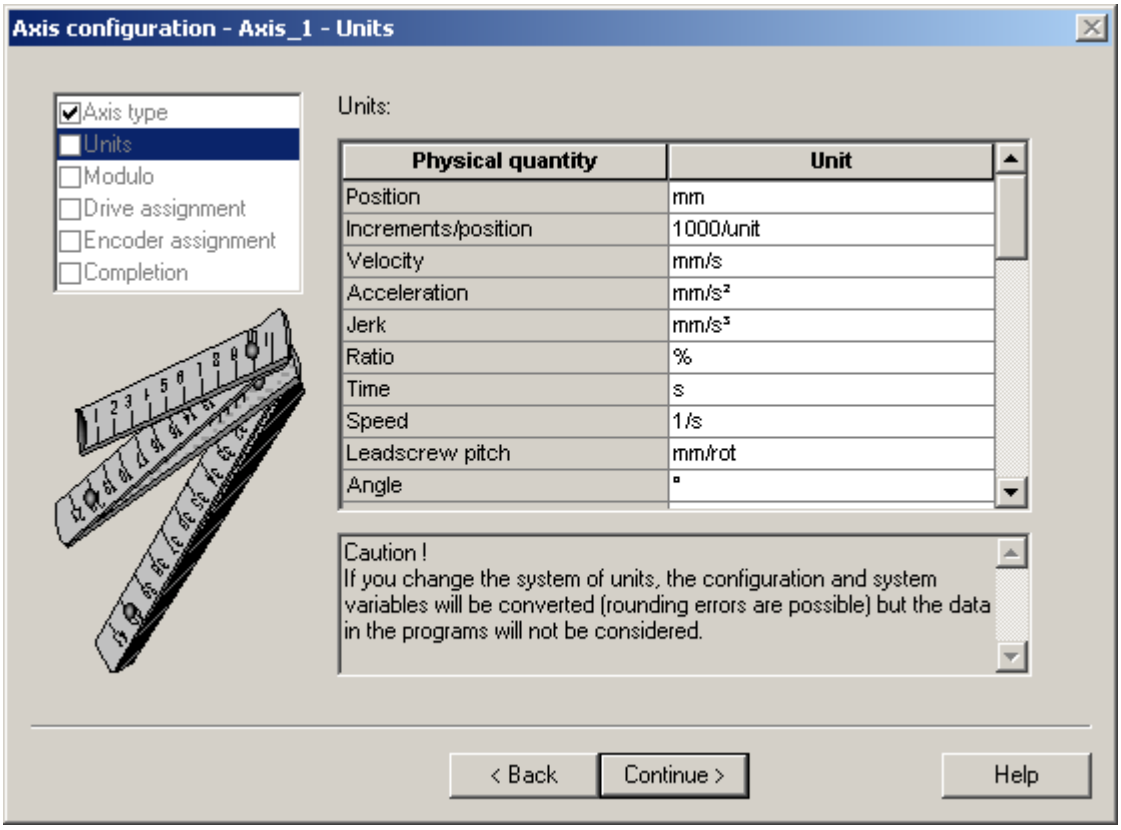
Procedure

Sequence	Activity	Result
1	In the project navigator, open the tree structure **SIMATIC 300(1) > Technology > AXES**. Double-click "Insert axis" to start the axis wizard:  **Result:** The “Insert Axis" dialog box opens.	

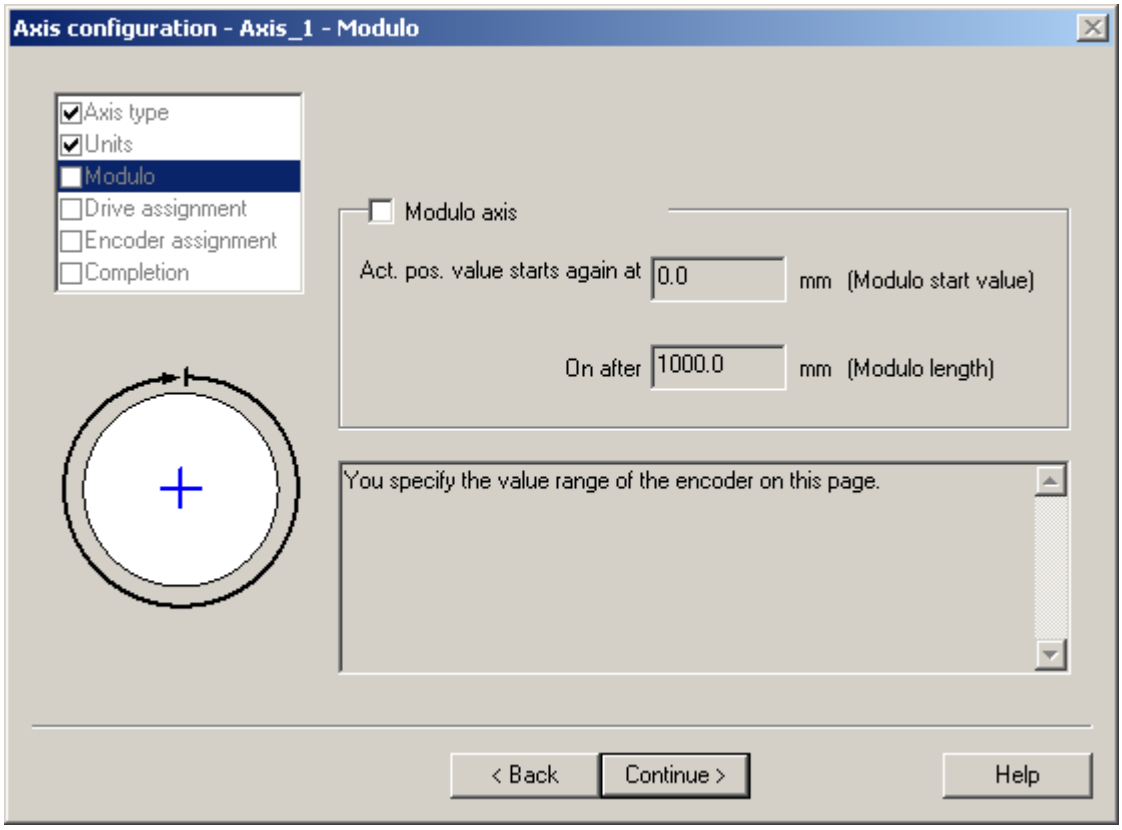
Sequence	Activity	Result
2	Confirm the default technology selection (speed control, positioning) with "OK".  **Result:** The "Axis Configuration - Axis_1 – Axis Type" dialog box opens.	

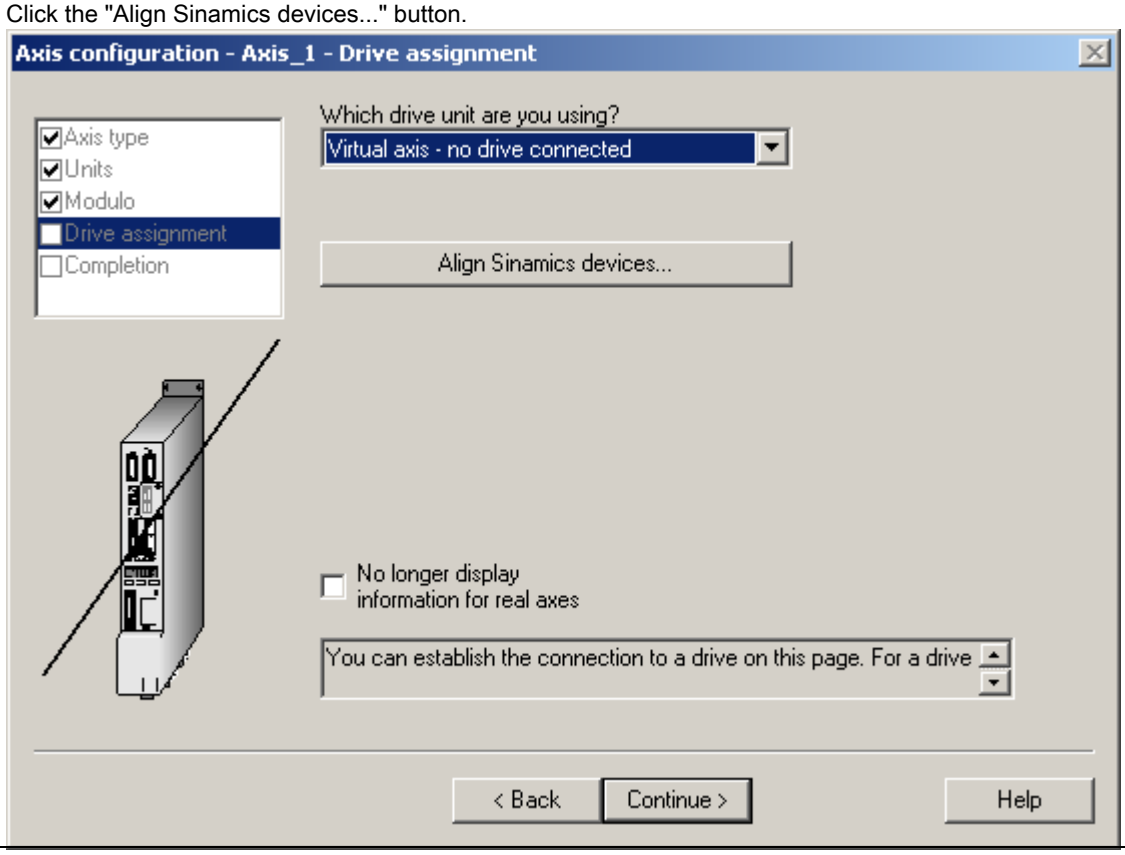
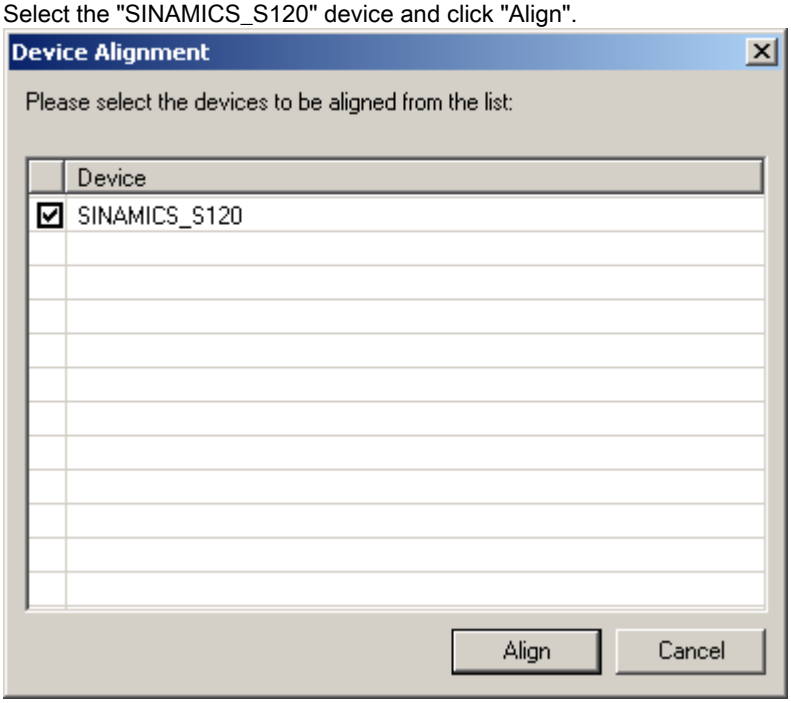
Sequence	Activity	Result
3	Accept the "Axis type: Linear, electric" and "Motor type: standard motor". Confirm with "Continue".  **Result:** The "Axis configuration - Axis_1 - Units" dialog box opens.	

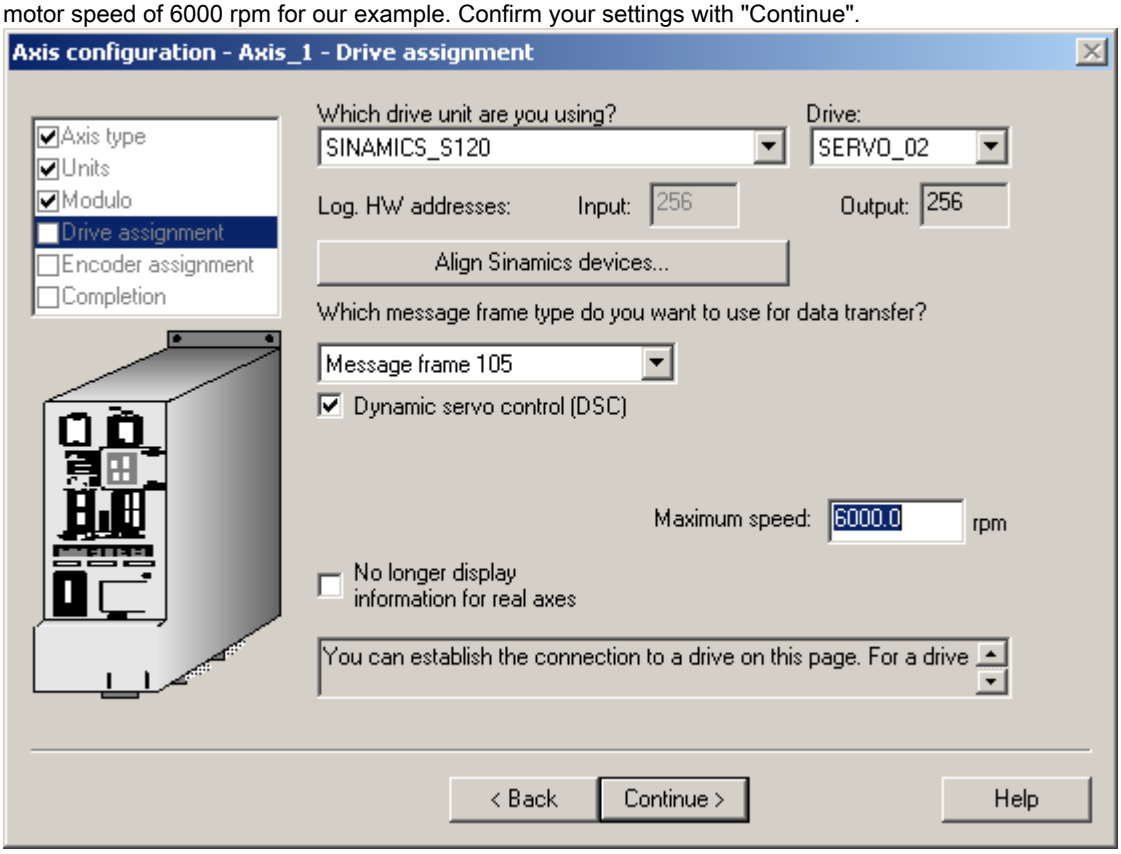
Sequence	Activity	Result
4	Confirm with "Continue".	

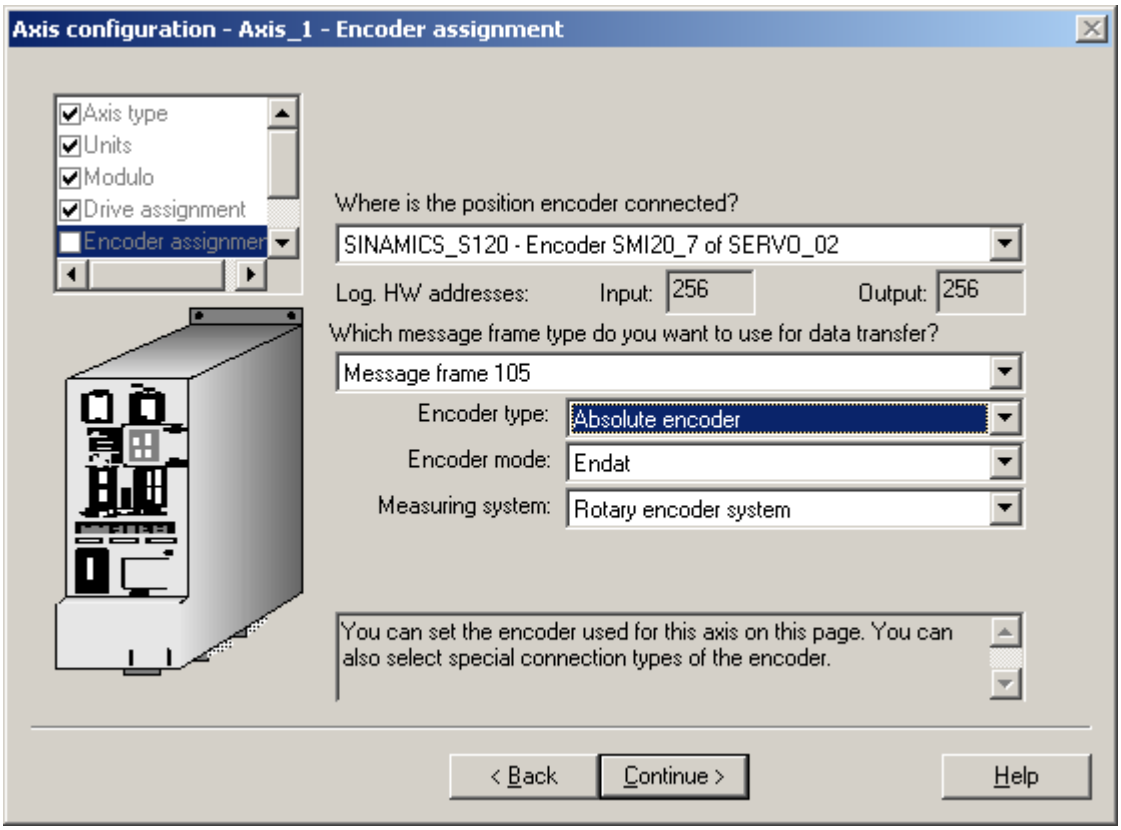


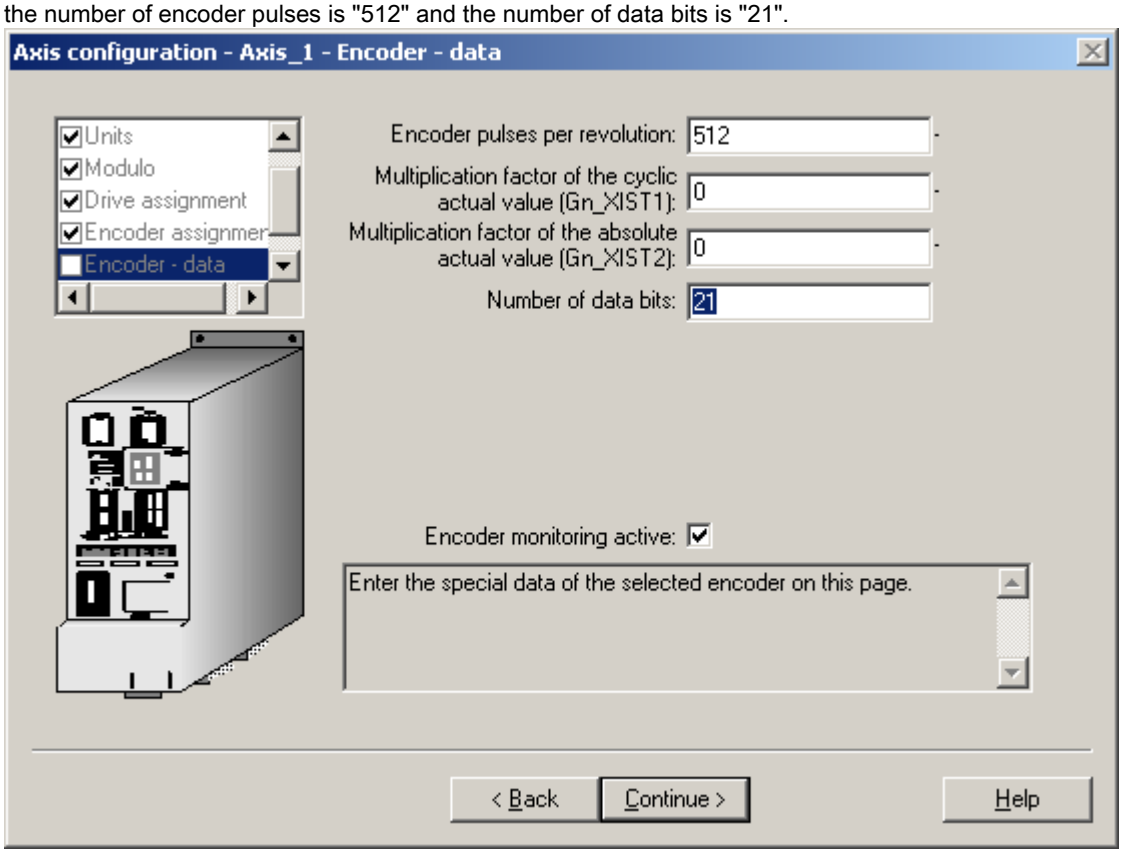
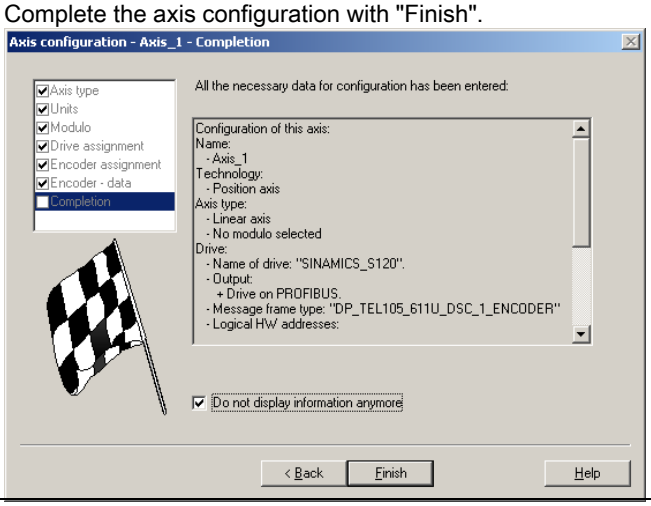
Result: The "Axis configuration Axis_1 - Modulo" dialog box opens.

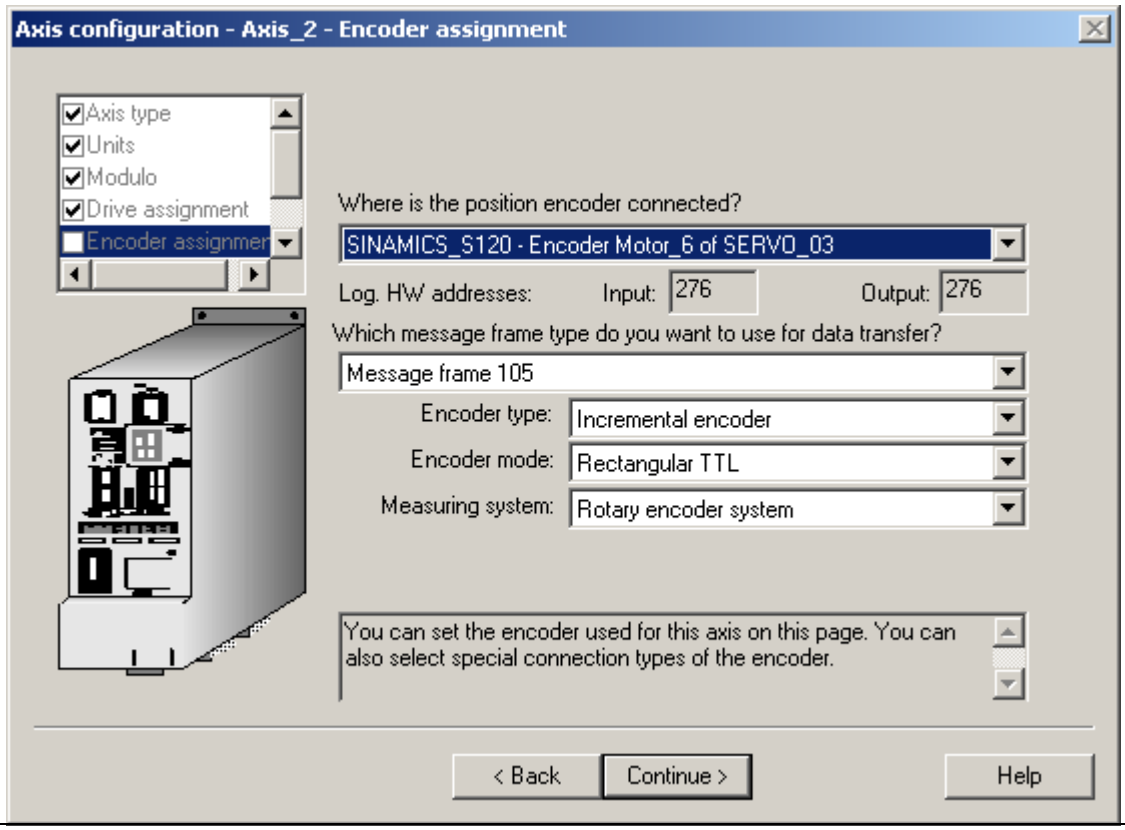
Sequence	Activity	Result
5	Confirm with "Continue".  **Result:** The "Axis Configuration - Axis_1 Drive Assignment" dialog box opens.	

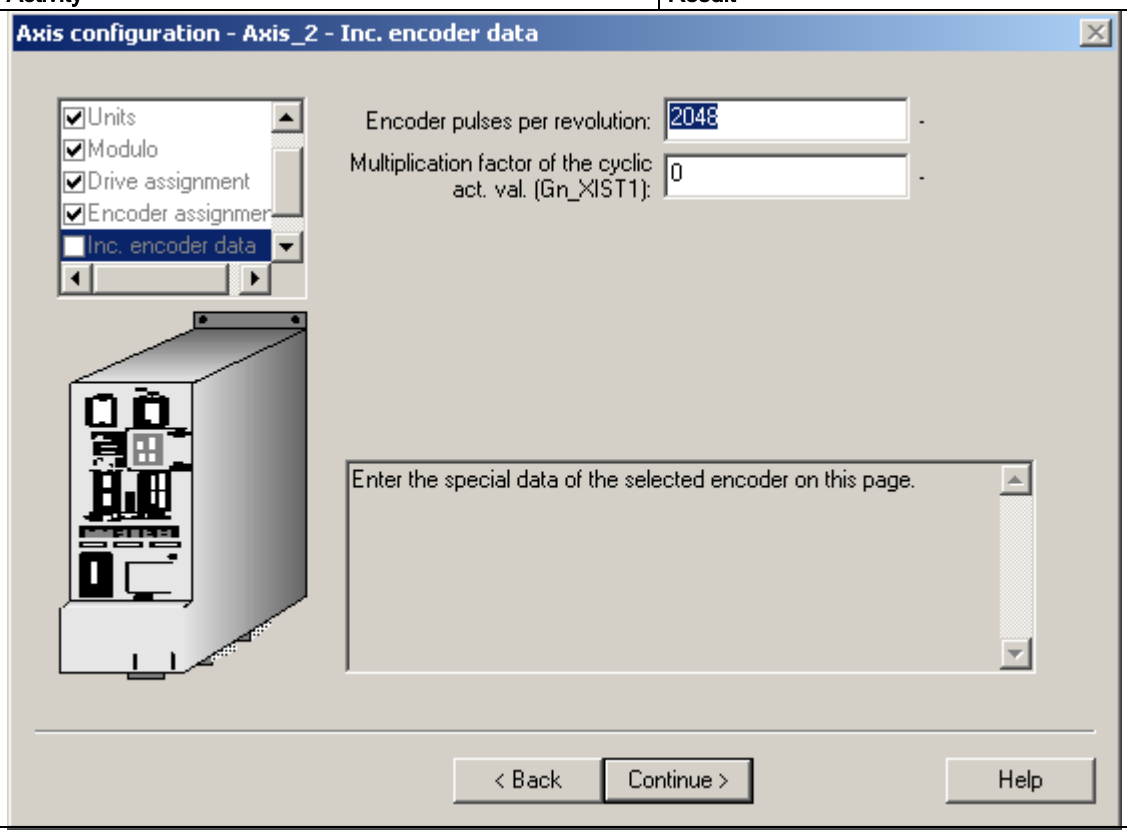
Sequence	Activity	Result
6	Click the "Align Sinamics devices..." button.  	
7	Select the "SINAMICS_S120" device and click "Align".  **Result:** The "Axis Configuration - Axis_1 Drive Assignment" dialog box opens again.	
8	Select your "actual drive unit (SINAMICS_S120)".	

Sequence	Activity	Result
9	The configured message frame is taken over from the drive configuration and must be confirmed in this dialog box. Enter the maximum motor speed as "Rated speed“ (see motor type plate). Set a maximum motor speed of 6000 rpm for our example. Confirm your settings with "Continue".  **Result:** A message box appears.	
9	Close the message box with "OK".	The "S7T Config Help" online help opens.
10	Close the online help.	The "Axis configuration - Axis_1 – Encoder assignment" dialog box opens.

Sequence	Activity	Result
11	Select the encoder type and mode, and the measuring system. Settings for the first axis in our example: • "Encoder type" is an "Absolute encoder" • "Encoder mode" is "Endat" • "Measuring system" is "Rotary encoder system" Confirm with "Continue".  **Result:** The "Axis Configuration - Axis_1 - Encoder - Data" dialog box opens.	

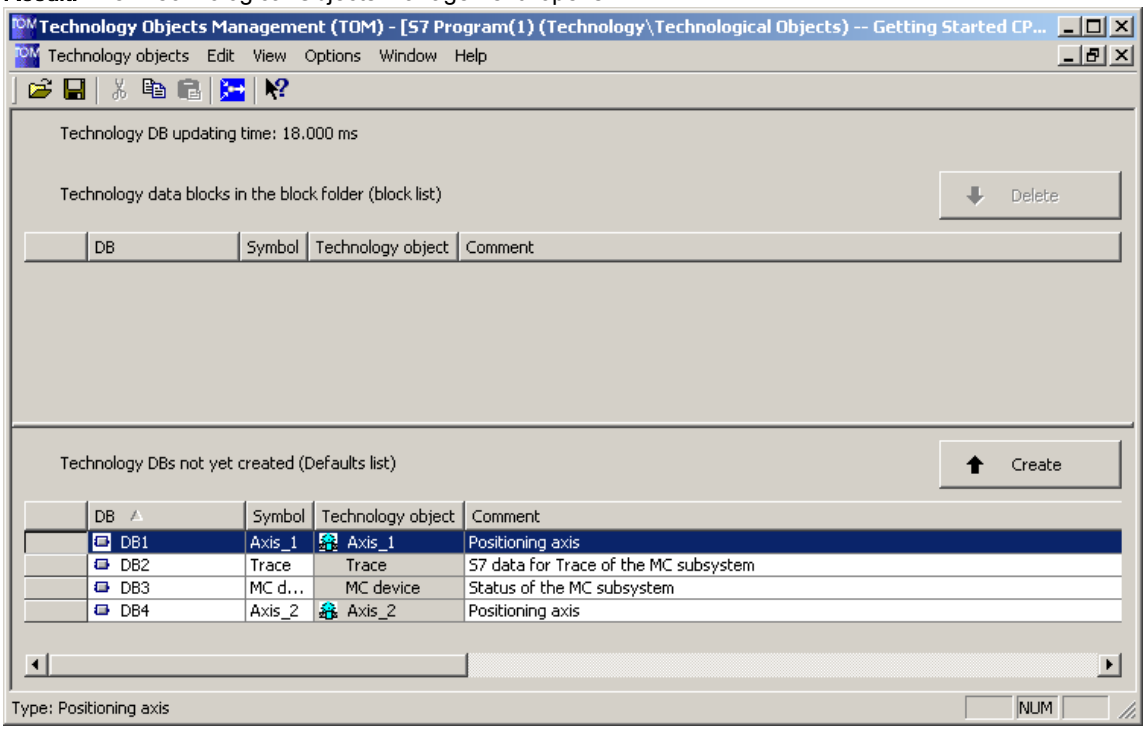
Sequence	Activity	Result
12	Enter the resolution specified on your motor rating plate as well as the number of data bits. In our example, the number of encoder pulses is "512" and the number of data bits is "21".  Accept the settings with "Continue". If you use another encoder type, you can find appropriate examples for the encoder configuration in the online help of S7T Config. **Result:** The "Axis Configuration - Axis_1 - Completion" dialog box opens, showing the data you configured.	
13	Complete the axis configuration with "Finish".  	A message box appears.
14	Close the message box with "OK".	The "S7T Config Help" online help opens.
15	Close the online help.	The axis configuration with S7T Config is completed.

Sequence	Activity	Result
16	Select **Project > Save and recompile all** to save the configuration in S7T Config.	The system now compiles the axis configuration data.
	Note: Repeat sequence 1 to 16 in step number 10 if you are using a double axis module. The SINAMICS® demonstration case has a motor module with absolute encoder and a motor module with incremental encoder. Make sure that you make the correct settings during the configuration of the second axis.	
	The second drive has an incremental encoder with 2048 encoder lines.  	

Sequence	Activity	Result
		

3.11 11. Step: Creating the technology DBs

Procedure

Sequence	Activity	Result
1	Change to "Technological Objects Management". Confirm the first message box with "OK", and the second with "Yes". If you are not running the "Technological Objects Management“ application yet, you can open it by double-clicking "Technological Objects“ in the "Technology“ folder in SIMATIC Manager (see also step: "Configuring the axes with S7T Config"). **Result:** The "Technological Objects Management" opens.  Edit the DB numbers as shown in the figure in order to adapt these for use in our example.	
2	Create the technology DBs listed below by clicking "Create": • Axis_1 • Axis_2 (if this exists) • Trace • MCDevice	The system generates the technology data blocks DB1, DB2, DB3 or DB4.
3	Close the "Technological Objects Management" via the **Technological objects > Exit** menu command.	

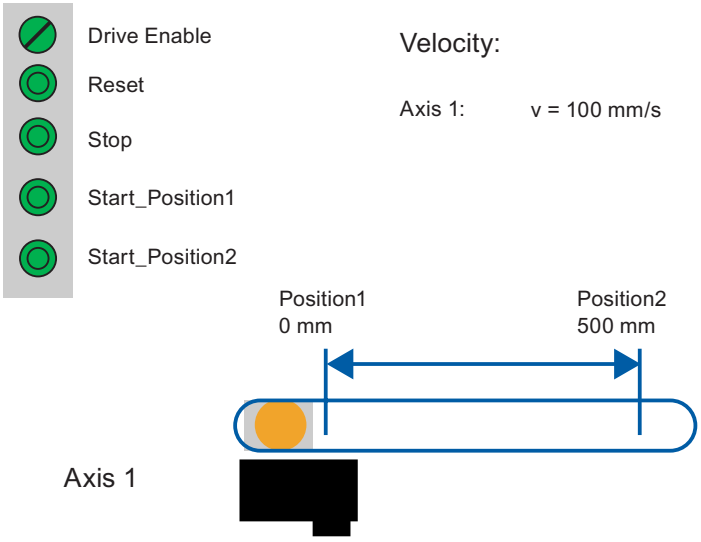
3.12 12. Step: Controlling the axis with the STEP 7 user program

Procedure

Sequence	Activity	Result
1	In SIMATIC Manager, open the sample project "\Examples\PROJECT-CPU317T". Copy the blocks listed below to your project: • OB1 • FB 100 (SimplePositioning) • FB401 (MC_Power) • FB402 (MC_Power) • FB405 (MC_Halt) • FB410 (MC_MoveAbsolute) • DB 100 (IDB_SimplePositioning) • AxisData (variable table for axis control) Confirm the message "The object 'OB1' already exists. Do you want to overwrite it?" with "Yes". Also copy the inputs, outputs and flags from the example symbol table to the project, so that the symbols are displayed completely in the variable table. Important: The sample program does not contain DB1 to DB4! Create these technology DBs in STEP 7 (see the step "Creating the technology DBs"), in order to maintain consistency between the user program and the technology objects.	The sample program is copied to the project.
2	You can edit the sample program in the LAD/STL/FBD Editor. To do so, click FB 100, then right-click to select "Open object".	The LAD/STL/FBD editor opens.
3	Select these settings: • View > LAD, • View > Overviews, and • View > Details.	You have now opened an extended and clear view for editing the STEP 7 user program.
4	In SIMATIC Manager, load the entire user program to the CPU with **PLC > Download user program to memory card**.	
5	Confirm the message box with "Yes".	The STEP 7 user program is now stored in the CPU. This download of your SDBs may take longer (up to a few minutes), because of their larger data volume.

3.13 13. Step: Trial run

Procedure

Sequence	Activity	Result
1	In the "Blocks" folder of your project, double-click the "AxisData" variable table.	The variable table is opened for monitoring.
2	Select **PLC > Connect to > Configured CPU** to go online.	The CPU "STOP" status is indicated on the bottom right.
3	Select **Variable > Monitor** to set monitoring mode.	The "Status value" column shows the actual values of the addresses. Use the variable table to monitor the control and status bits of the application, and the status of the axis.
	Caution You start the drive in the next two steps. To stop the drive again: Set input I0.2 (Stop) to "1" Switch the CPU to STOP.	
4	Switch the CPU to RUN.	The CPU "RUN" status is indicated on the bottom right.
5	Perform the following trials: Monitor the relevant output values. • Enable the axis by setting I0.0 = "1" (DriveEnable) • Move the axis into position 2 (500 mm) by setting I0.4 (StartPosition2) • Move the axis into position 1 (0 mm) by setting I0.3 (StartPosition1) • Stop the moving axis with a signal at I0.2 (Stop) • Acknowledge all queued errors of the axis with I0.1 (Reset) Terminal strip:  	

Further information

4

4.1 Further information

Diagnostics / correction of errors

Incorrect operator input, faulty wiring or inconsistent configuration data may lead to errors.

For information on how to analyze such errors and messages, refer to the *S7-Technology* manual.

Service and support on the Internet

In addition to our documentation, we offer a comprehensive online knowledge base on the Internet at:

http://www.siemens.com/automation/service&support

There you will find:

- The newsletter that provides you with latest information relating to your product
- Your appropriate documentation, using our Service & Support search engine
- A bulletin board in which users and specialists worldwide exchange their know-how
- Your local Siemens partner for Automation & Drives in our Partner database
- Information about local service, repairs, and spare parts. You will find much more under "Services".

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