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Configuration of a Measuring Probe on a SINAMICS S120 CU3x0 / CU3x0-2 for Use in a Technology CPU 31xT

S7 Technology

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1 Introduction

Global Measuring with Digital Inputs of the CU310, CU310-2, CU320 and CU320-2

With a global measuring probe you can capture the position of any axis or encoder¹ at the time of measuring.

The CU310, CU310-2, CU320 and CU320-2 of a SINAMICS S120 have digital inputs/outputs which you can use as global measuring probe inputs.

On the other hand, a local measuring probe can only capture the position of the axis or encoder to whose drive/system it is connected.

Configuration procedure

The configuration is done following the steps below.

- Configuration of the SINAMICS S120 to which measuring probes are connected:
 - Adding a message for the Control Unit to the message traffic
 - Configuration of the inputs as measuring probe
- Calculating the e-address of the measuring probe
- Configuration of the Technology
 - Insertion and configuration of the measuring probe
 - Updating the Technology configuration
- Configuration of the FB433 "MC_MeasuringInput"

2 Requirements

The following description assumes that the SINAMICS S120, to which the measuring probe signal is connected, and the axis or encoder to be measured are already created in the project.

The SINAMICS S120, to which the measuring probe is connected, and the axis or encoder to be measured must be synchronously connected to the DP drive of the Technology CPU.

You can also measuring the position of a virtual axis.

¹ See Requirements

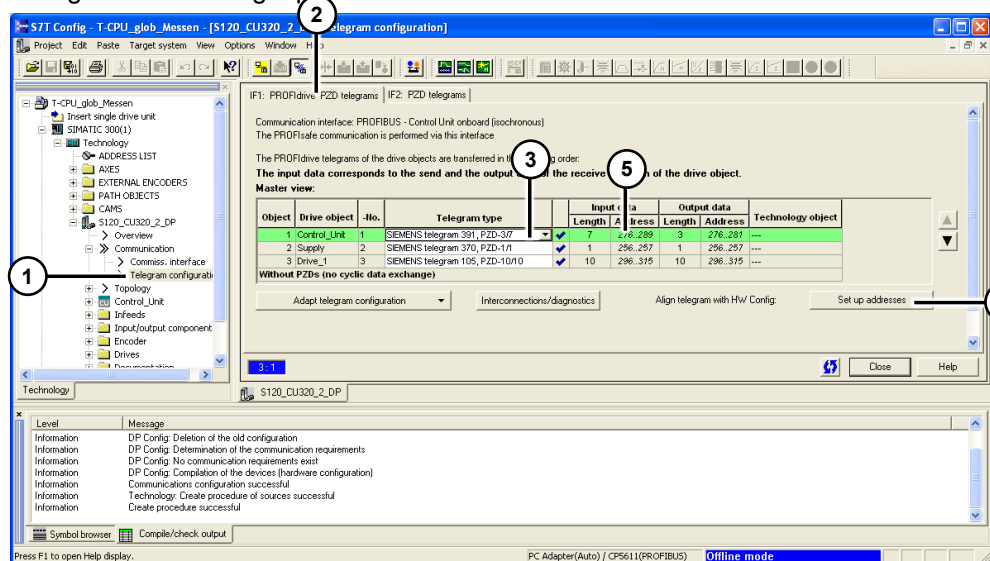
3 Configuration of the Digital Inputs/Outputs of a CU310, CU310-2, CU320 or CU320-2 as Measuring Probes

3.1 Telegram Configuration

The signal status of the measuring probes is not transferred via the axis message but by the standard telegrams 391/392 and 393/396 (only CU310-2 and CU320-2). By setting the telegram 39x the SINAMICS IOs are interconnected automatically via BICO interconnections to the 39x telegram and are therefore available.

Procedure

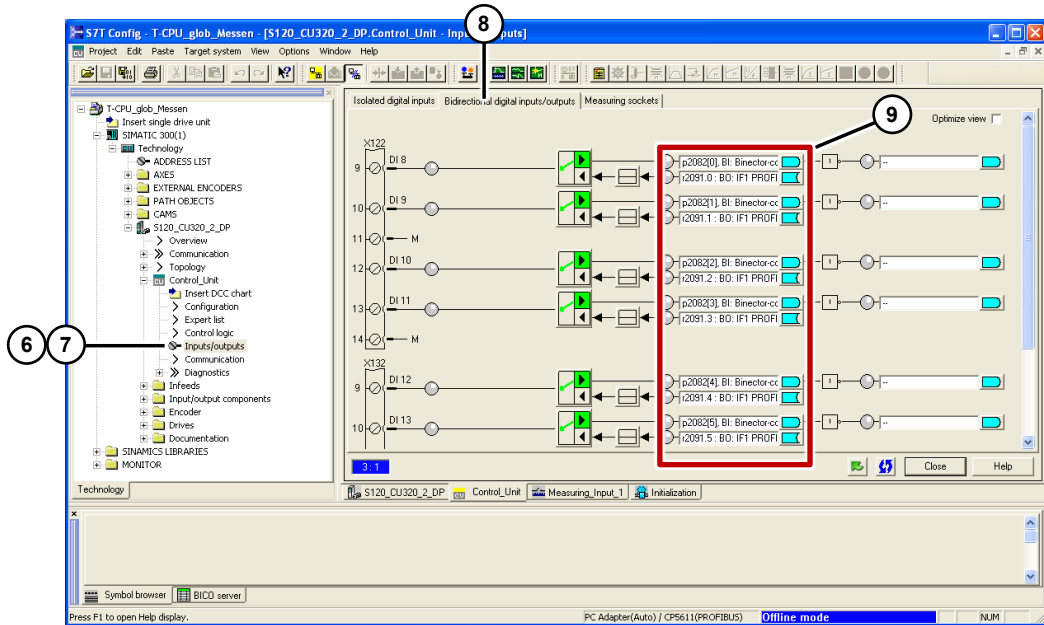
1. In the project navigator, under the SINAMICS device you select **Communication > Telegram Configuration**.
2. Double-click **Telegram configuration** and in the window that opens you switch to the **PROFdrive PZD telegrams** tab. There you get a display of the components with address areas (input/output data).
3. For the telegram type you select **SIEMENS Telegram 391** (max. 2 measuring probes), 392 (max. 6 measuring probes) or 393/396 (max. 8 measuring probes, only CU310-2/ CU320-2). The telegram depends on the number of configured measuring inputs.



4. You must do an alignment of addresses between HW Config and T-Config. If this has not yet been done or you have changed an IO address, click **Set up addresses**. If there are question marks instead of IO addresses in the fields, you must likewise do an alignment.
5. Note the start address of the telegram for the Control Unit.
6. In the project navigator, under the SINAMICS device you select **Control Unit > Inputs/Outputs**.
7. Under the Control Unit you double-click **Inputs/outputs**. The window opens in the working area.

3 Configuration of the Digital Inputs/Outputs of a CU310, CU310-2, CU320 or CU320-2 as Measuring Probes

8. Now you select the **Bidirectional digital inputs/outputs** tab.
9. Check that p2082[x] and r2091.x are entered here.
If not, repeat step [3](#).

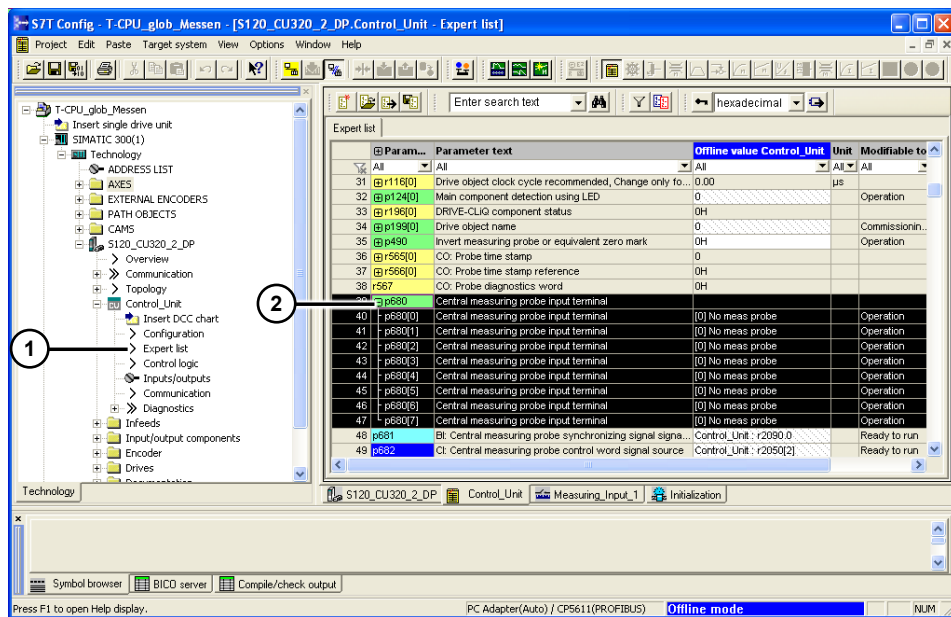


3.2 Configuration of the DIOs as Measuring Probes

In the SINAMICS S120 you must specify which DIOs are to be used as measuring probe inputs.

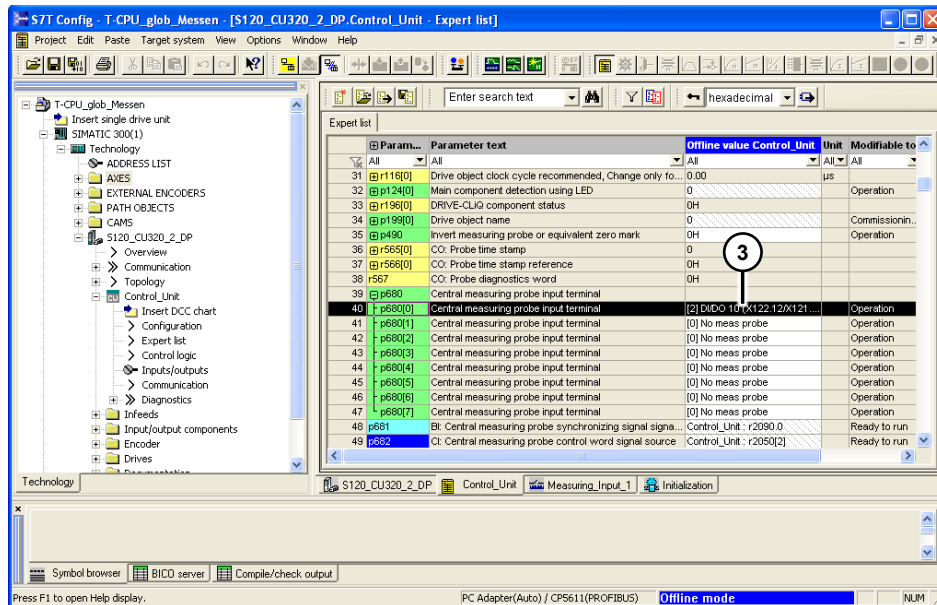
Procedure

1. In the project navigator, under the SINAMICS device you select **Control Unit > Expert list**.
2. Double-click **Expert list**, navigate to P680 and open it.



3 Configuration of the Digital Inputs/Outputs of a CU310, CU310-2, CU320 or CU320-2 as Measuring Probes

3. Enter the inputs/outputs that you want to use as measuring probe input in an index of p680 (DI/DO 10 in Parameter Index 0, for example).



Note

- With telegram 391 you may only use indices 0 and 1.
- With telegram 392 you may only use indices 0 to 5.
- With telegrams 393 and 396 you can use all 8 indices.

4 Specification of the Hardware Address of the Measuring Probe

You can calculate the address of a measuring probe from the previous parameters.

Procedure

1. You calculate the byte address by adding the noted basic input address (first value of the input data) of the Control Unit to the offset. The offset always has the value **3**
($276 + 3 = 279$, for example).
2. You take the bit address from the last column of the following table
(Bit 2 for DI/DO10, for example).

Table 4-1

Input CU320	Input CU310	Bit addr
X122.8 (DI/DO 9)	X121.8 (DI/DO 9)	Bit 1
X122.10(DI/DO 10)	X121.10 (DI/DO 10)	Bit 2
X122.11(DI/DO 11)	X121.11 (DI/DO 11)	Bit 3
X132.8 (DI/DO 13)	-	Bit 5
X132.10 (DI/DO 14)	-	Bit 6
X132.11(DI/DO 15)	-	Bit 7

Table 4-2

Input CU320-2	Input CU310-2	Bit addr
X122.9 (DI/DO 8)	X121.7 (DI/DO 8)	Bit 0
X122.10(DI/DO 9)	X121.8 (DI/DO 9)	Bit 1
X122.11(DI/DO 10)	X121.10(DI/DO10)	Bit 2
X122.12(DI/DO 11)	X121.11 (DI/DO 11)	Bit 3
X132.9 (DI/DO 12)	X131.1 (DI/DO 12)	Bit 4
X132.10 (DI/DO 13)	X131.2 (DI/DO 13)	Bit 5
X132.12 (DI/DO 14)	X131.4 (DI/DO 14)	Bit 6
X132.13 (DI/DO 15)	X131.5 (DI/DO 15)	Bit 7

3. The hardware address of the measuring probe is the result of the byte and bit addresses (279.2, for example).

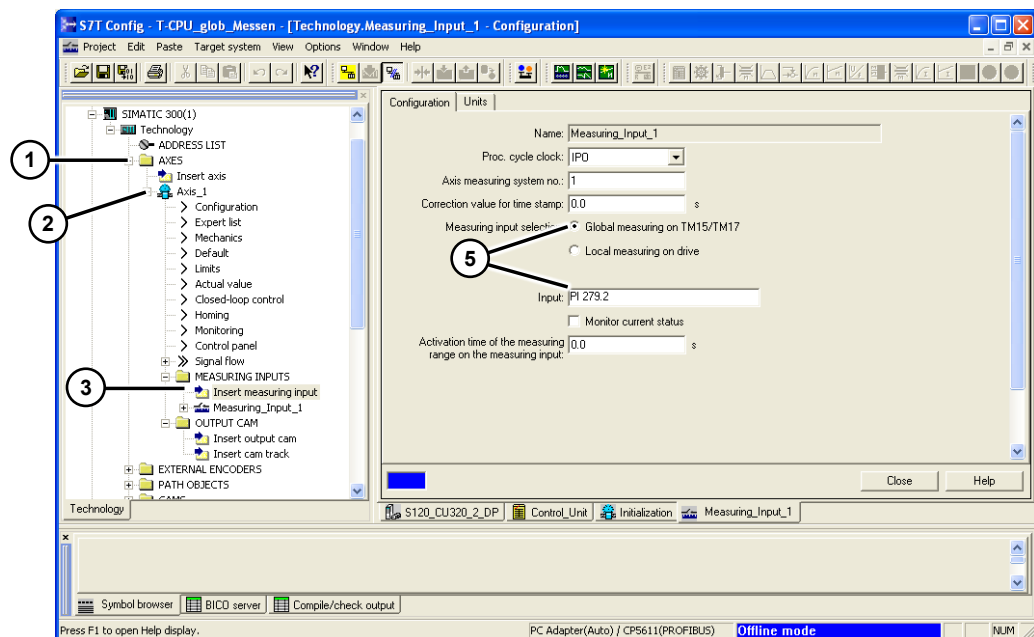
5 Parameters for Technology

5.1 Adding and Parameterizing Measuring Probes

The measuring probe must be inserted under the axis whose position is to be measured. This results in the assignment between measuring probe and axis.

Procedure

1. In the project navigator, under the SIMATIC 300 device you select **Technology > Axes**.
2. Expand the branch of the axis on which the measuring probe is to act (whose position is to be captured at the time of measurement).
3. Select **Measuring Inputs** and double-click **Insert measuring input**.
4. In the window that opens: Confirm or you change the name of the measuring input and click OK.
5. In the configuration mask that opens automatically you select **Global measuring on TM15/TM17** and for **Input** you enter the calculated hardware address of the measuring input (**PI** is preset automatically).



5.2 Updating the Technology Configuration

The FastIO configuration is not set automatically with **Save and Compile** and therefore has to be created manually.

Procedure

1. In the project navigator, under the SIMATIC 300 device you select **Technology**.
2. Right-click **Technology** and select **FastIO > Create new configuration**.
3. Now save and compile the project.



WARNING

If the FastIO configuration is not created anew each time the measuring input settings are changed, undefined behavior might occur which could lead to damage to property or persons.

Therefore you should create the FastIO configuration manually each time there is a change in the DI/DO settings of the SINAMICS or the measuring input configuration of the Technology.

6 S7 Program

In your program you should use the block **FB433 "MC_MeasuringInput"** to use the measuring input.

You define the Technology object number to be used for this as usual in the Technology Object Manager.