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Application description • 09/2014

SINAMICS G/S: HMI direct access

SINAMICS G120 SINAMICS S120

http://support.automation.siemens.com/WW/view/en/97550333

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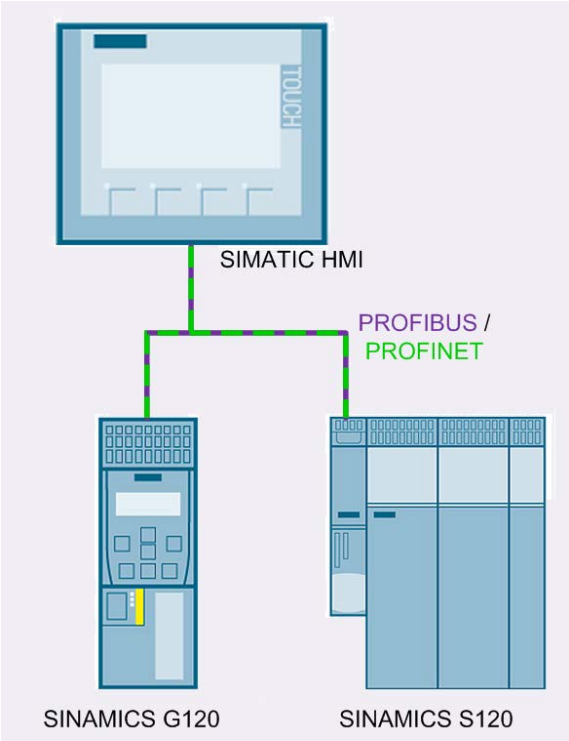
1 Task

1.1 Using the application

Fig. 1-1



This application example shows how communication can be established between a SIMATIC HMI and a SINAMICS G120 or a SINAMICS S120 without using a SIMATIC S7 PLC.

You can operate a SIMATIC HMI together with a SINAMICS drive unit independently of a SIMATIC PLC.

Note HMI direct access is also possible if a SIMATIC controller is connected to the bus.

1.2 Core content of the application

This application deals with the following key points:

- Configuring the communication in the TIA Portal V13
- Description of the communication

1.3 Demarcation

Note HMI direct access from a SIMATIC HMI to a drive is not possible via a network transition. (No HMI direct access via routing)

This application only contains a description of the communication configuration.

Configuring a SINAMICS drive is not discussed here. It is assumed that readers have a basic knowledge about parameterizing SINAMICS drives.

It is not explained how to configure the SIMATIC HMI. It is assumed that readers have basic knowledge about WinCC V12 or higher.

2 Preconditions

2.1 HMI direct access via PROFINET

Precondition, SIMATIC HMI:

- HMI with PROFINET interface

Precondition, SINAMICS drive:

- SINAMICS G120 FW >= V4.7
- SINAMICS S120

2.2 HMI direct access via PROFIBUS

Precondition, SIMATIC HMI:

- HMI with PROFIBUS interface FW >= 13.0.0

Precondition, SINAMICS drive:

- SINAMICS G120 FW >= V4.7
- SINAMICS S120

3 Technical background

3.1 Acyclic communication

Acyclic (non-cyclic) communication is used to access drive parameters directly via the SIMATIC-HMI.

DANGER	**It is not permissible that the drive is only controlled via acyclic communication.** **Switch-on and switch-off commands must be implemented via terminal or cyclic communication!**

3.2 Drive object number G120 / S120

The drive object number (DO number) is required to address parameter access operations.

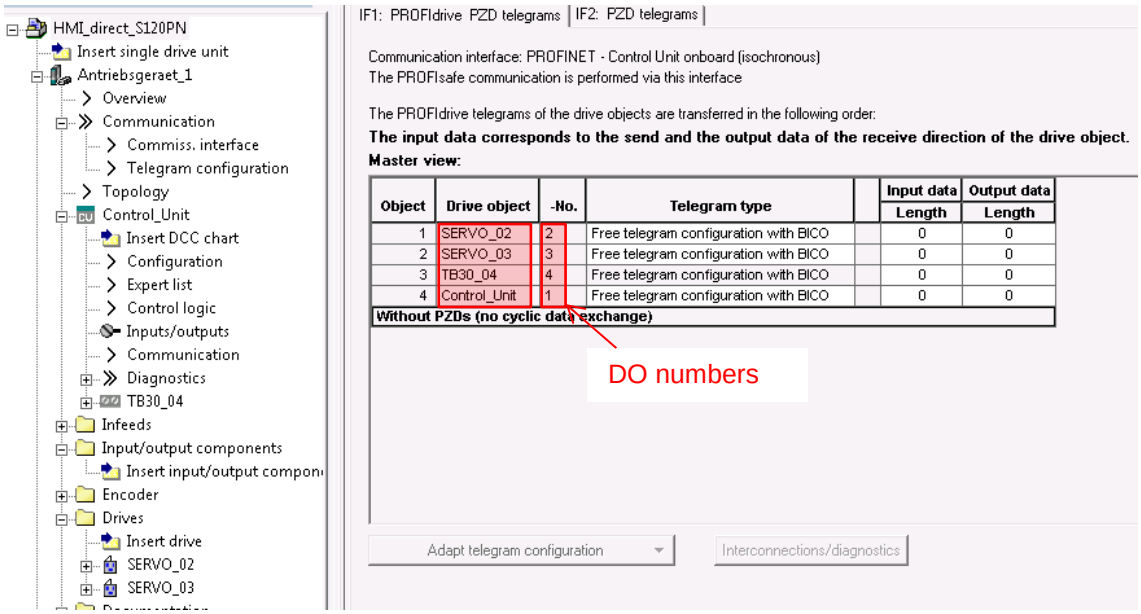
SINAMICS G120

For SINAMICS G120, the DO number is always 1.

SINAMICS S120

For SINAMICS S120, the Control Unit has the number 1; the DO numbers of additional drive objects can be found in the STARTER project for the drive device under telegram configuration.

Fig. 3-1 DO number of the SINAMICS S120

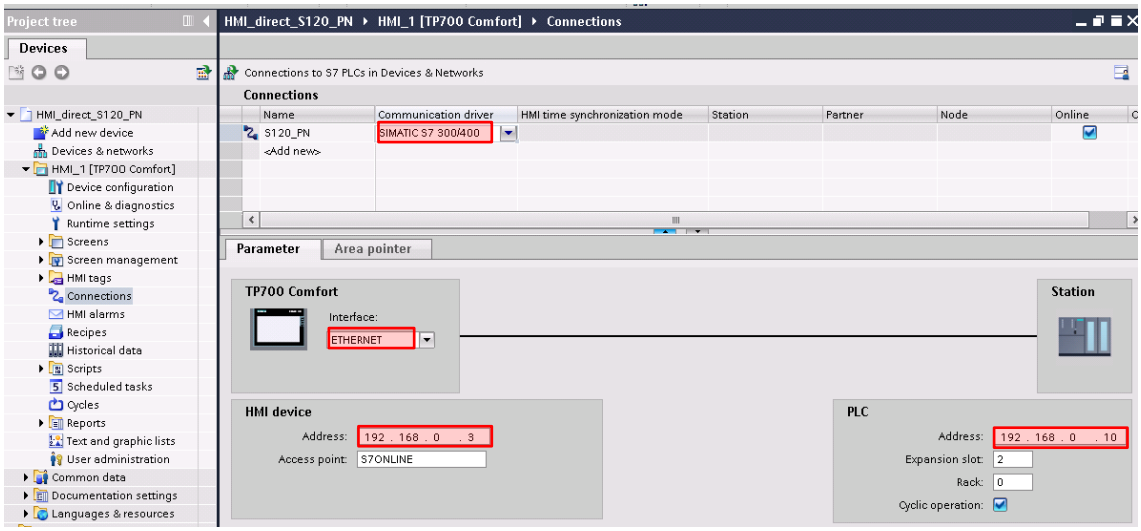


3.3 Creating the HMI connection

- Create a new HMI, or open the configuration of an existing HMI.
- In the project navigation, open the "Connections" window
- Add a new connection using "Add new".
- Select "SIMATIC S7 300/400" as communication driver

Communication via PROFINET

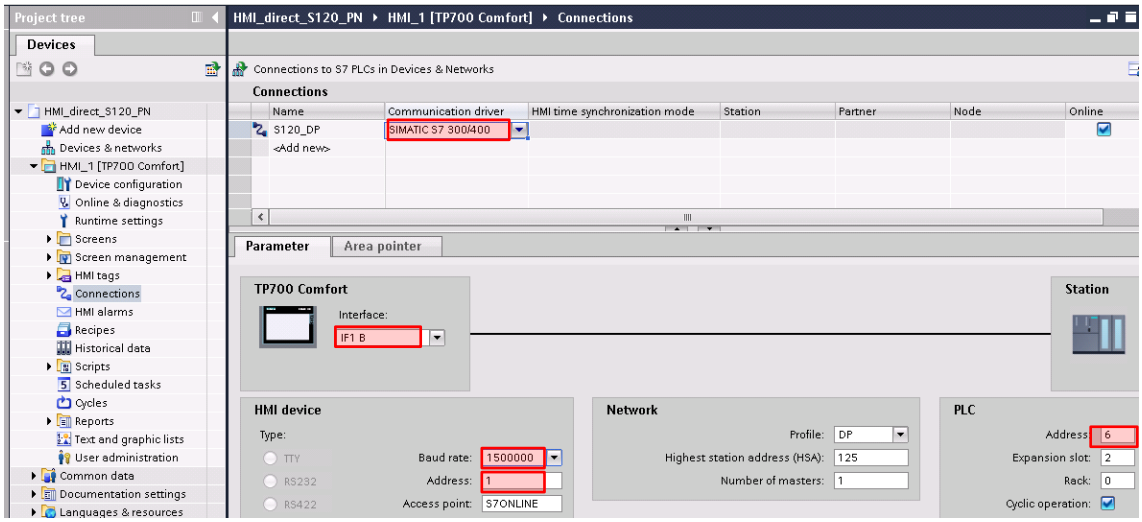
Fig. 3-2



- Select the Ethernet interface of your HMI
- For the HMI device, enter the IP address of your HMI
- For the control, enter the IP address of your SINAMICS drive
- Expansion slots and racks are not relevant to this case

Communication via PROFIBUS

Fig. 3-3



- Select the PROFIBUS interface of your HMI.
- For the HMI device, set the PROFIBUS address of your HMI as well as the baud rate of the Profibus line.
- For the control, enter the PROFIBUS address of your SINAMICS drive

  Expansion slots and racks can be left at their standard values.

3.4 Establishing the DB access

Parameters are accessed in the SINAMICS drive via HMI variables using S7 communication.

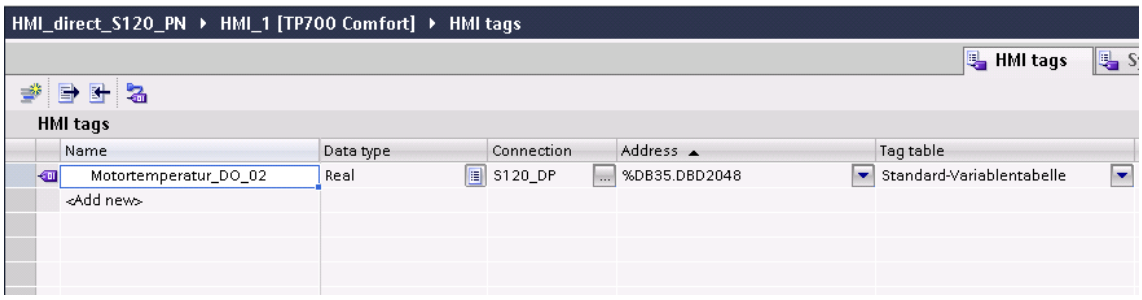
All parameters can be accessed.

Whether a parameter can be written to via HMI direct access depends on whether it is a display parameter (rxxxx) or an adjustable parameter (pxxxx) – and in which operating state the SINAMICS drive is in. For more detailed information, please consult the parameter description. See **Fehler! Verweisquelle konnte nicht gefunden werden.**

3.4.1 Creating HMI variables

- Create a variable for parameter access. Use the connection from chapter 3.3

Fig. 3-4



- Use the data types that match the particular parameter. See Table 3-1
- The address comprises parameter number, index and DO number:

  DB<parameter number>.DB<a>data block offset a=B│W│D

1. The data block number corresponds to the parameter number.
2. The data block offset is formed from the DO number and the parameter index:

   Data block offset (binary): $x_{15}x\ x\ x\ x_{10}$ $x_9x\ x\ x\ x\ x\ x\ x\ x_0$

   Drive object number, bits 10-15 Parameter index bit 0-9

Note Data block offset = 1024*drive object No. + parameter index

For variables, data type byte, the data block offset is specified as DBB, for integer, as DBW and for variables, type double integer or real, as DBD.

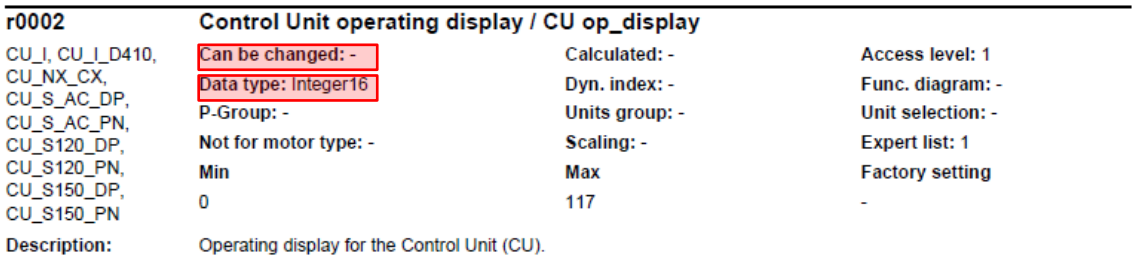
Note It is important that the data type of the variable matches the parameter data type.

Table 3-1

Data type parameter	Data type HMI variable	Offset
Integer8	Byte	B
Integer16	Int / Word	W
Unsigned8	Byte	B
Unsigned16	Int / Word	W
Unsigned32	DInt / DWord	D
FloatingPoint32	Real	D

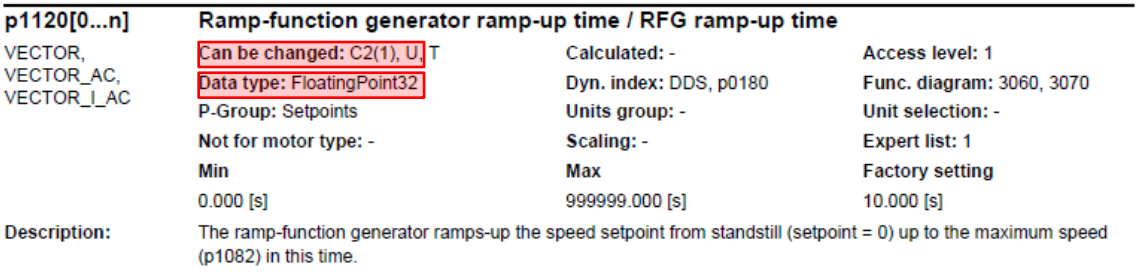
You can find the data types of the drive parameters in the parameter description in the List Manual for the drive. Here, a description is also provided regarding in which operating states, adjustable parameters can be changed.

Fig. 3-5



Data type: Integer16

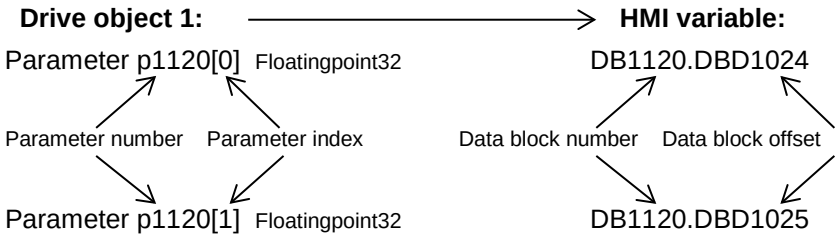
Fig. 3-6

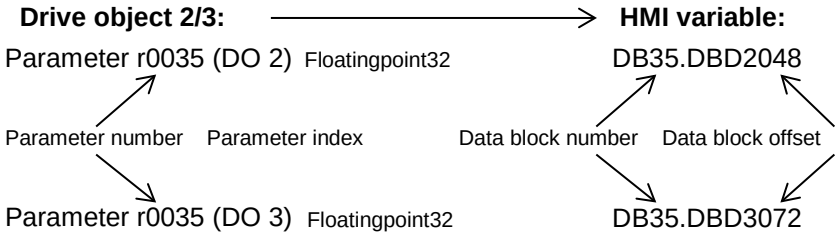


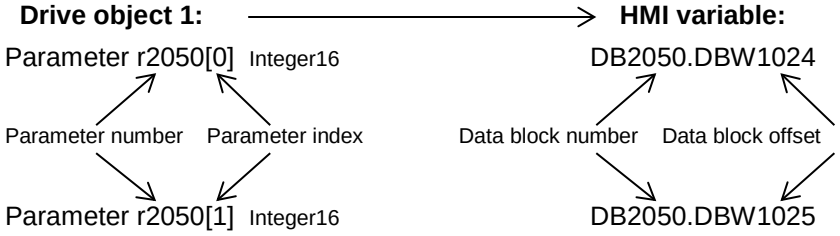
Data type: FloatingPoint32

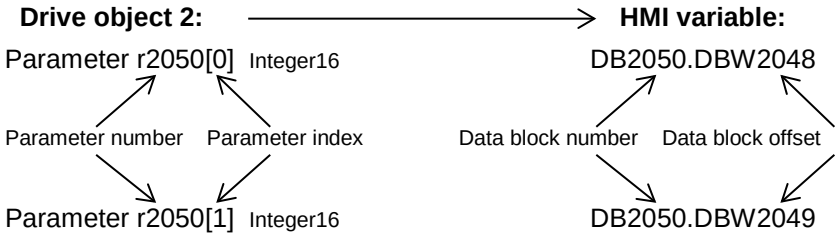
Can be changed: C2(1) = commissioning, U = operation, T = ready

3.4.2 Examples for various parameters









4 Examples

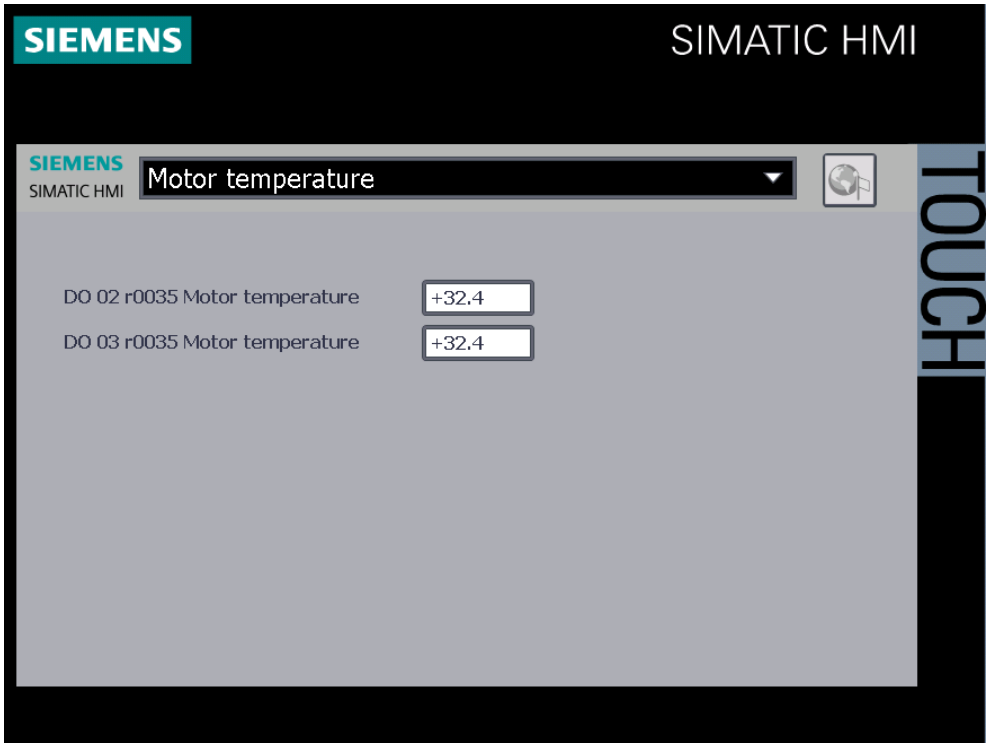
The access to several parameters is shown in the project examples.

The following applications are shown:

4.1 Output of display parameters

Display of the motor temperature

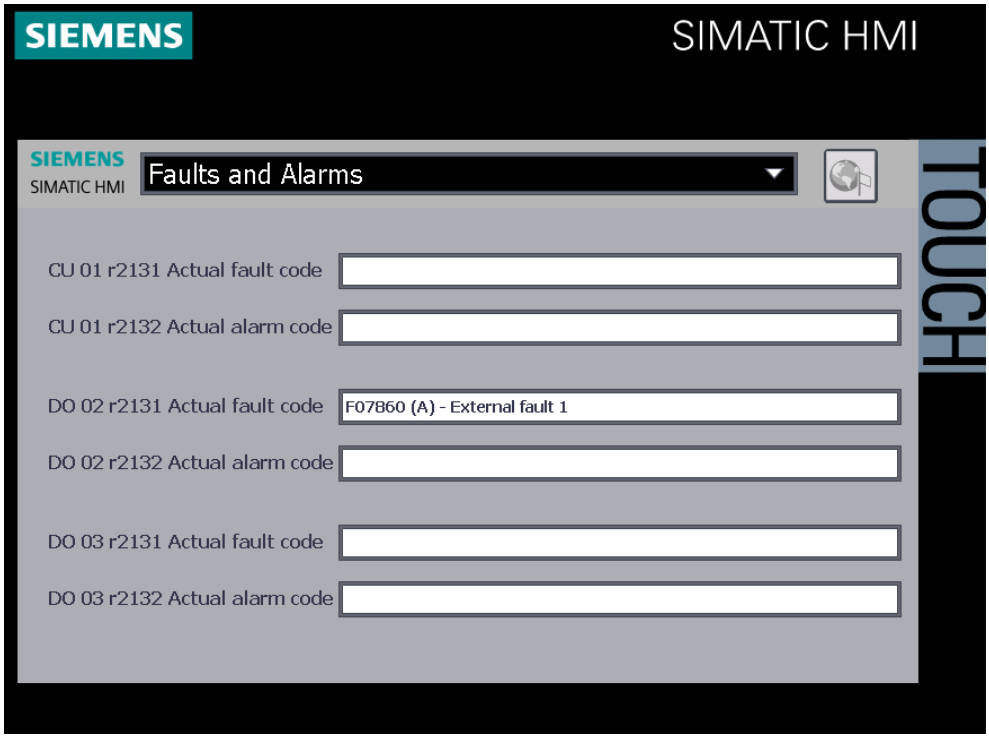
Fig. 4-1 Motor temperature



Parameter r0035 is shown in the "Motor temperature" screen.

Display of faults and alarms in plain text

Fig. 4-2 Faults and alarms



An active fault and alarm are displayed in plain text in the "Faults and alarms" screen.

You can find fault texts in the XML format at the following link:

http://support.automation.siemens.com/WW/view/en/10804921/133100

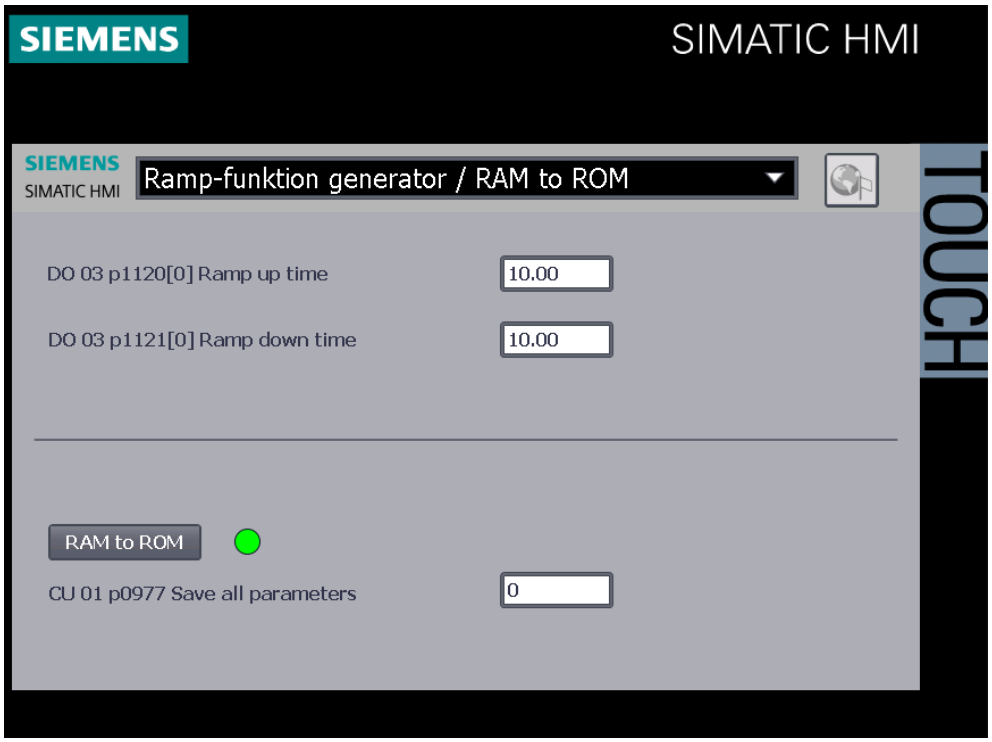
You can convert the XML files to the required Excel format using the SINAMICS XML parser. You can find the SINAMICS XML parser at the following link:

http://support.automation.siemens.com/WW/view/en/77467239

4.2 Reading and writing adjustable parameters

Reading and writing parameters, e.g. ramp-up time, RAM to ROM

Fig. 4-3 Ramp-function generator / RAM to ROM



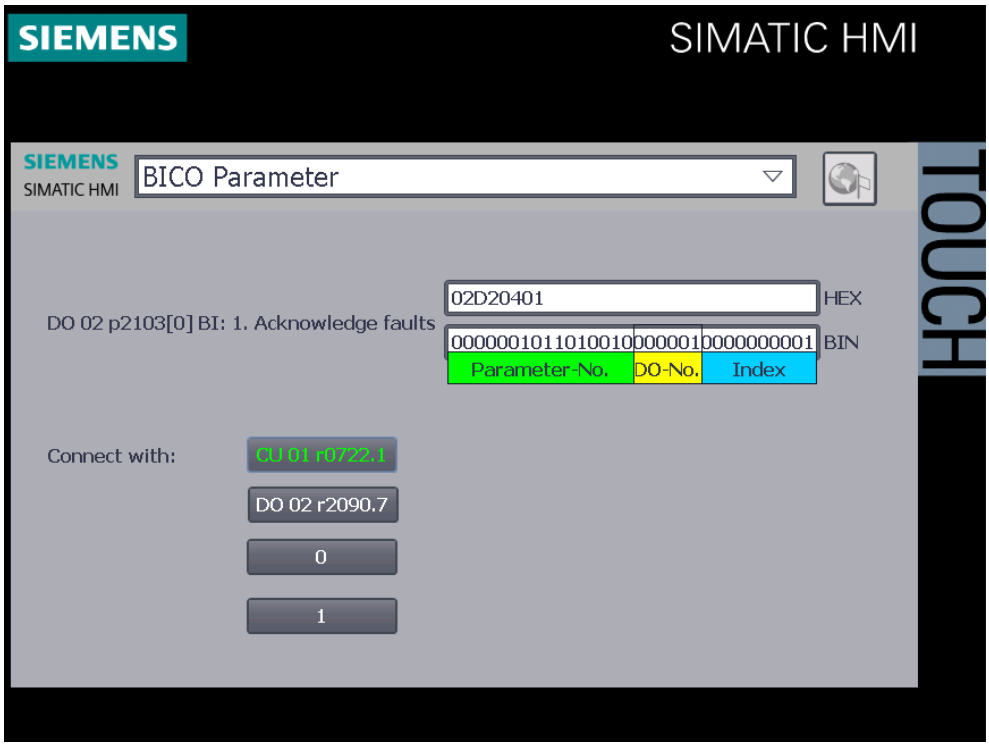
In the "Ramp-function generator / RAM to ROM" screen, the ramp-up and ramp-down times of the ramp-function generator is displayed in an input/output field – and can also be changed.

The parameters can be backed up to ROM using parameter p0977 (SINAMICS G120 p0971). To do this, a value of 1 is written to parameter p0977 (p0971). After the operation has been completed. The parameter of the drive is set to 0. Parameter p0977 (p0971) is also visualized in color in an input/output field.

4.3 Reading and writing BICO parameters

Reading and writing BICO parameters

Fig. 4-4



In the screen "BICO parameter“, parameter p2103 "BI: Acknowledge faults“ can be interconnected to other parameters, 0 or 1, for example.

The value of parameter p2103[is] shown in the hexadecimal and binary formats.

Note

In the SINAMICS drive, parameters can be logically combined using BICO parameters.

The parameter contains the following information:

Parameter index:	Bits 0 - 9
DO number:	Bits 10 - 15
Parameter number:	Bits 16 - 31

Note

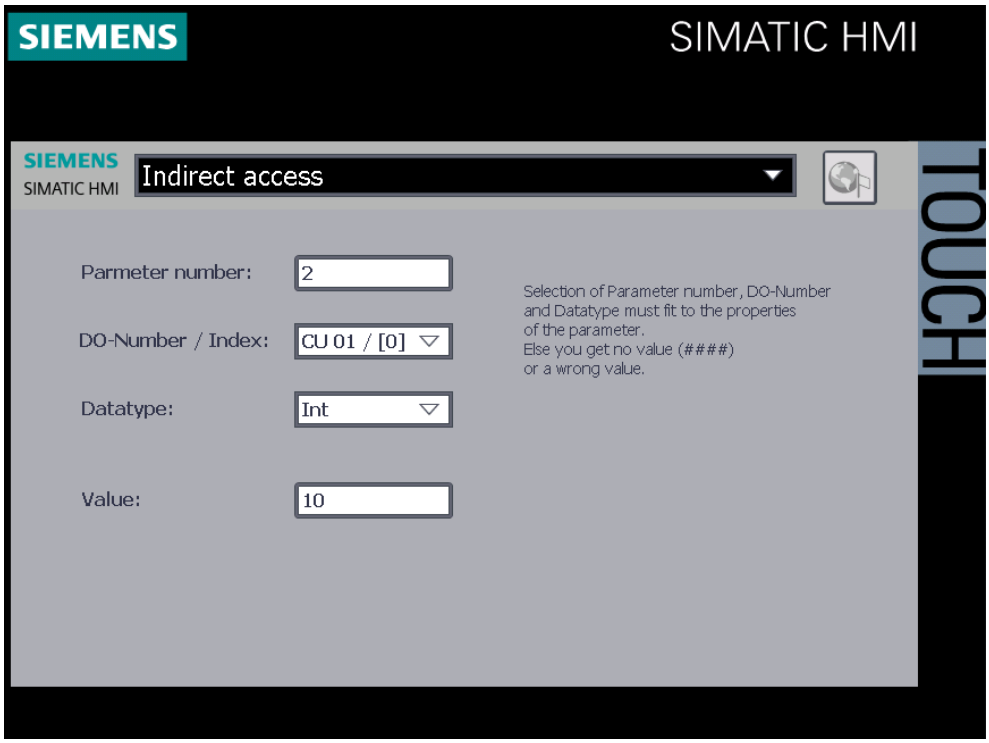
Interconnection within the drive object:

For interconnections within the DO (always for SINAMICS G120), bits 10 – 15 can be set to "true" (decimal 63).

4.4 Indirect parameter access

Indirect access via variable

Fig. 4-5



Parameters can be displayed and values changed in the "Indirect access" screen. Without creating the parameters directly as HMI variable. HMI variables were created for the parameter number, DO number and index as well as for the data type.

The data type must be selected so that it matches the required parameter, so that the value can always be correctly displayed.

Note If the correct parameter data type is not set, then either no value (####) or an incorrect value is displayed.

5 Downloading projects

The following TIA Portal projects can be downloaded:

- SINAMICS G120 via PROFINET connected to HMI TP 700
- SINAMICS G120 via PROFIBUS connected to HMI TP 700
- SINAMICS S120 via PROFINET connected to HMI TP 700
- SINAMICS S120 via PROFIBUS connected to HMI TP 700

In the projects, the HMI configuration has the functions described in Chapter 4. There is no drive configuration included in the projects.

6 References

Table 6-1

	Topic	Title
\1\	Siemens Industry Online Support	http://support.automation.siemens.com
\2\	Download page of the article	http://support.automation.siemens.com/WW/view/en/97550333
\3\	Fault texts in the XML format	http://support.automation.siemens.com/WW/view/en/10804921/133100
\4\	XML parser	http://support.automation.siemens.com/WW/view/en/77467239

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8 History

Table 8-1

Version	Date	Revision
V1.0	09/2014	First Edition