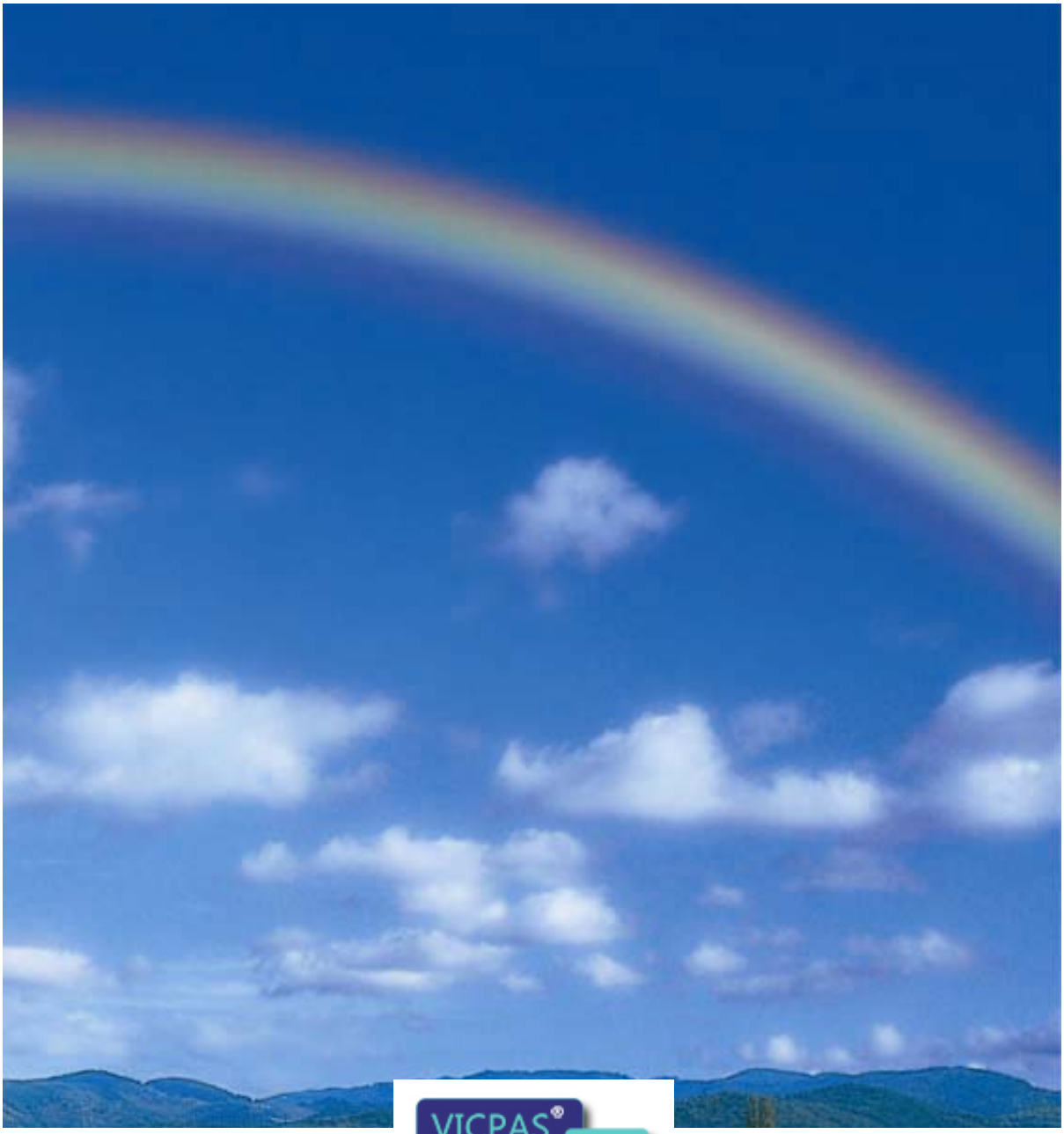
SIEMENS

SIMATIC
C7-613 Control System

Getting Started Edition 01/2004

First Steps in Commissioning



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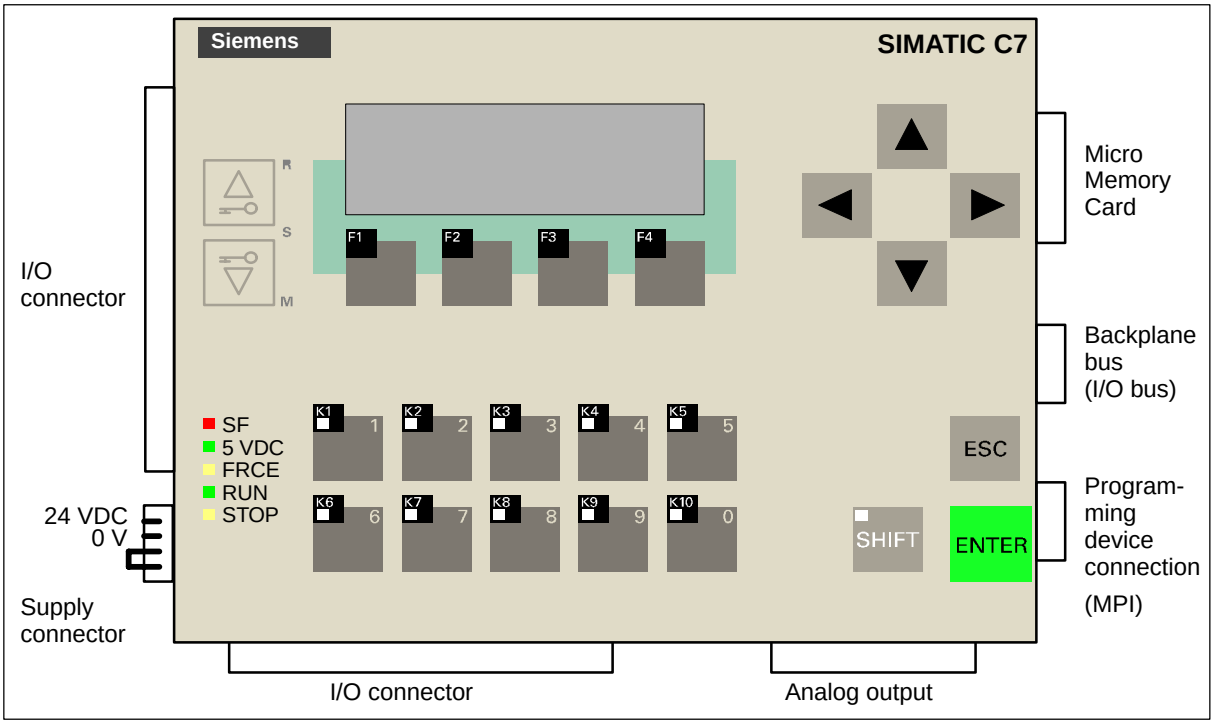
Introduction

This instruction manual introduces you to the functions of the C7-613 using operator steps and add-ons to the existing sample project “ZXX31_01_C7-613.” References to the “C7-613 Control System” manual are provided to give you an initial overview of the information you can find there.

You will need 1 to 2 hours to perform the sample project, depending on you level of experience.



C7-613 with Connectors and Sockets

Task Definition

Start up the C7-613, perform simple input operations, and expand the existing configuration by creating new HMI objects. You use the S7 program “C7-613 Basic” as the basis. For comparison, the S7 program “C7-613 Extended V2” has been included with all the expansions.

Requirements

The following requirements must be met to perform this task:

- You have a C7-613 with an inserted Micro Memory Card (recommended size of 128 Kbytes) and a 24 V DC power supply module.
- You have jumpered the authorization bridge Pin 1 (AT2) with Pin 2 (AT1) on the supply connector (see Figure “C7-613 with Connector and Sockets”).
- You have connected the C7-613 to the 24 V DC power supply using the supply connector (see Figure “C7-613 with Connector and Sockets”).
- STEP 7 ≥ V5.2 is installed correctly on your programming device/PC.
- You have the CD “Configuration Tools for SIMATIC C7-613”. The CD includes the “C7 613” library with the required FBs, UDTs, and the sample program “ZXX31_01_C7-613”.
- The programming device/PC is connected to the C7-613 using the MPI connector.

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Notes on the installation guidelines for fail-safe installation are provided in Section 2.5 of the manual.

Warning

Operating the C7-613 as part of a plant or system requires that certain rules and standards be followed, depending on the application.
Observe the applicable safety and accident prevention standards, such as IEC 204 (Emergency OFF devices).
Failure to observe these standards may cause serious bodily injury, and may damage machines and facilities.

Warning

You may come into contact with live electrical wires if the power supply module is switched on or the supply lead of the power supply module is connected to the network.
Wire the C7-613 only when it is disconnected!

Step 1: Installing the sample project and the library

Sequence	Action	Result
1	Close all applications (for example, STEP 7, MS Word, etc.). Insert the “Configuration Tools for SIMATIC C7-613” CD into the drive. Start the installation program on the CD by double-clicking the SETUP.EXE file in the SETUP folder.	This starts the installation program.
2	Follow the instructions of the installation program.	If the installation was successful, the “C7 613” library and the sample program “ZXX31_01_C7-613” are stored on your programming device/PC. The library contains all of the FBs required for the HMI functions, as well as the UDTs and DBs for storing the HMI configuration data. The sample program “ZXX31_01_C7-613” is stored in the ...\Siemens\Step7\Examples directory.

Step 2: Setting up your own project

Sequence	Action	Result
1	In the ...\Siemens\STEP7\Examples directory, open the “ZXX31_01_C7-613” project with **File > Open... > Sample projects**.	A split window appears containing the title of the project.
2	Create a copy of the project with **File > Save As**	The “Project Save As” window is displayed.
3	Enter your choice of name for the new project in the “Name” field, and then click “OK”.	Your project is created and opened.
4	In your project, double-click the “SIMATIC C7-613 V2”.	The station is opened.

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Sequence	Action	Result
5	Open the “C7-613 Basic” S7 program of the C7 CPU 613 and click the “Block” container. If needed, change to the detail view with **View > Details**.	The blocks listed below are displayed.

Block	Name (in the toolbar)	Description
System data		System data blocks for the C7-613
OB1	CYCL_EXEC	Cyclic program processing
FBs from the “C7-613” library (called up in OB1):		
FB1	HMI API	FB for the basic HMI functions
FB2	HMI EVENT	FB for the message output
FB3	HMI MENU	FB for the screen hierarchy/display sequence
FB11	TIME	FB for setting the time
DB1	API_IDB	Instance DB of FB1 HMI API
DB2	EVENT_IDB	Instance DB of FB2 HMI EVENT
DB3	MENU_IDB	Instance DB of FB3 HMI MENU
DB10	WORK_DB	DB for work data
DB11	TIME_DB	Instance DB of FB11 TIME
Basic parameter assignment for the HMI functions:		
DB99	MENU_DB_APP	DB for the screen hierarchy/sequence (language-independent)
DB100	CONFIG	Configuration DB (language-independent)
DBs containing the HMI configuration data in English :		
DB101	SCREEN_1_LANG_1	DB for screens in English
DB102	MESSAGE_1_LANG_1	DB for messages in English
DB103	INFO_LANG_1	DB for info texts in English
DBs containing the HMI configuration data in German :		
DB104	SCREEN_1_LANG_2	DB for screens in German
DB105	MESSAGE_1_LANG_2	DB for messages in German
DB106	INFO_LANG_2	DB for info texts in German
DBs containing the HMI configuration data in French, Spanish, and Italian: DB107 to 115		
DB127	EVENT_BUFFER	DB for backing up the event buffer
UDT 1...6 , 11...16		UDTs for the formation of the DBs for the HMI configuration data
DIAGNOSIS	DIAGNOSIS	Variable table for diagnostics
MESSAGES	MESSAGES	Variable table for message output
SFC0,1,...		C7 CPU 613 system functions

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Sequence	Action	Result
6	Switch the C7-613 to the STOP state. To do so, press the operating mode key:	The following message is output on the LCD display: "$ 008 CPU is in STOP!"
7	In the STOP state of the CPU download all the blocks of the "C7-613 Basic" S7 program with **PLC > Download User Program to Memory Card** into the C7-613 connected to your programming device/PC.	The programming device/PC loads the program and the HMI configuration to the MMC of the C7-613.
8	After the loading operation is completed, switch the C7-613 to RUN mode. To do so, press the operating mode key:	The HMI configuring data are loaded from the MMC to the memory of the integrated HMI module. The following message is output on the LCD display: "$ 002 transfer Downloading user data" After the downloading process has been completed, the idle message "SIMATIC C7-613 V..." is displayed.

Step 3: Performing operator inputs

You will next perform the following actions:

- Select a language
- Select a screen
- Enter a value
- Display info texts
- Output and acknowledge fault messages

Selecting a Language:

The sample project is prepared in several languages in which the HMI objects (screens, messages, info texts) can be displayed. By switching the language, you change the language that is currently displayed.

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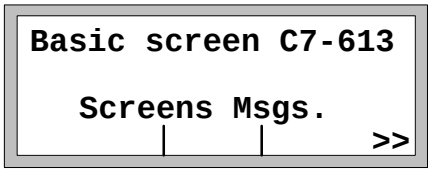
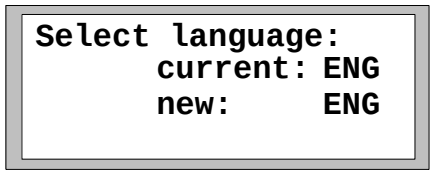
Sequence	Action	Result
1	The idle message “SIMATIC C7-613 V...” appears on the LCD display. Press the “ENTER” key.	You are now in the basic C7-613 screen 
2	Press the following keys in consecutive order: F4 (>>), F2 (System), F4 (>>), and F2 (language).	The “Language selection” screen is displayed 
3	Select your choice of language using the “Cursor up” and “Cursor down” keys, and then press the “ENTER” key.	The following display appears in the new language: “$ 002 transfer the configuration is running!” After the parameter assignment operation is completed, the idle message “SIMATIC C7-613 V...” is displayed. All HMI objects are now shown in the selected language.

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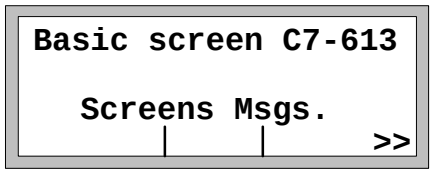
Selecting a Screen:

The created screens are selected starting from the idle message.

Sequence	Action	Result
1	The idle message “SIMATIC C7-613 V...” appears on the LCD display. Press the “ENTER” key.	You are now in the basic C7-613 screen 
2	Press the F2 key (Screens) and then F3 (Start).	The first screen is displayed. It outputs the date and time. The screen information is stored in the “SCREEN_1_LANG_1“ DB as Screen 0, starting with Byte 32.
3	You can select additional screens with the F1 (<<) and F4 (>>) keys.	The selected screen is displayed. The configured screen hierarchy/sequence is stored in the “MENU_DB_APP” DB for all languages.
4	Pressing the “ESC” key takes you back to the previous screen.	

Enter a value

You can enter values in the input fields of the screens.

Sequence	Action	Result
1	Select the “Fixed-Point Representation” screen by pressing the F4 (>>) key several times.	The “Fix. point rep.” screen is displayed. The cursor is located on the input field.
2	Press the SHIFT key.	You are in input mode. The Shift LED is switched on.
3	Enter a number using the K-keys. The number is entered right-justified.	The entered numerals are shifted to the left.
4	You assign the sign using the “Cursor up” and “Cursor down” keys.	
5	The input of the complete number is confirmed with ... ENTER Incorrect input is cancelled with ... ESC	The value is transmitted to the variable. The Shift LED is switched off. The value currently calculated by the CPU is entered in the field. The Shift LED is switched off.

Additional entries can be made in the “Value Input” screen. Select the input field by using the cursor keys.

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Display info texts

Info texts can be called up in every screen.

Sequence	Action	Result
1	Call up an info text in a displayed screen. To do this, press the F2 (Info) key.	The info text assigned to the screen is displayed. The assignment of the F2 key is also stored in the “MENU_DB_APP” DB. The info texts are stored in the “INFO_LANG_1” DB.
2	You can page through the info texts using these cursor keys. Press the “Cursor down” key: Press the “Cursor up” key:	Which info texts are displayed is stored in the “INFO_LANG_1” DB: The info text displayed under “REFERENCES.FORWARD” is displayed. The info text displayed under “REFERENCES.BACKWARD” is displayed.
3	Pressing the “ESC” key takes you back to the previous screen.	

Output and acknowledge fault messages

If a fault occurs, a fault message is read out.

Sequence	Action	Result
1	Press the key “K1” and keep it pressed. In this example, faults are simulated by pressing a K-key to simply trigger a message. The user program has been written in such a way that detection of a “K1” key activation triggers the message by setting Bit 32.0 in DB 10 in the message area. The position of the message area is specified using the “EVENTS” parameter in the “HMI EVENT” FB.	A fault is generated and the following message is output flashing: “Message 1 Fault message Acknowledgement required Acknowledge with ENTER” Message 1 is stored in the “MESSAGE_1_LANG_1” DB starting with Byte 180.
2	Release the “K1” key.	The fault is eliminated when the key is released. Bit 32.0 is reset. However, since the message has not been acknowledged, it continues to flash on the display.
3	Acknowledge the message by pressing the “ENTER” key. The “HMI EVENT” FB sets Bit 48.0 in the acknowledgement area in DB 10. The “ACKS” parameter in the “HMI EVENT” FB specifies the position of the acknowledgement area.	The message is no longer displayed.

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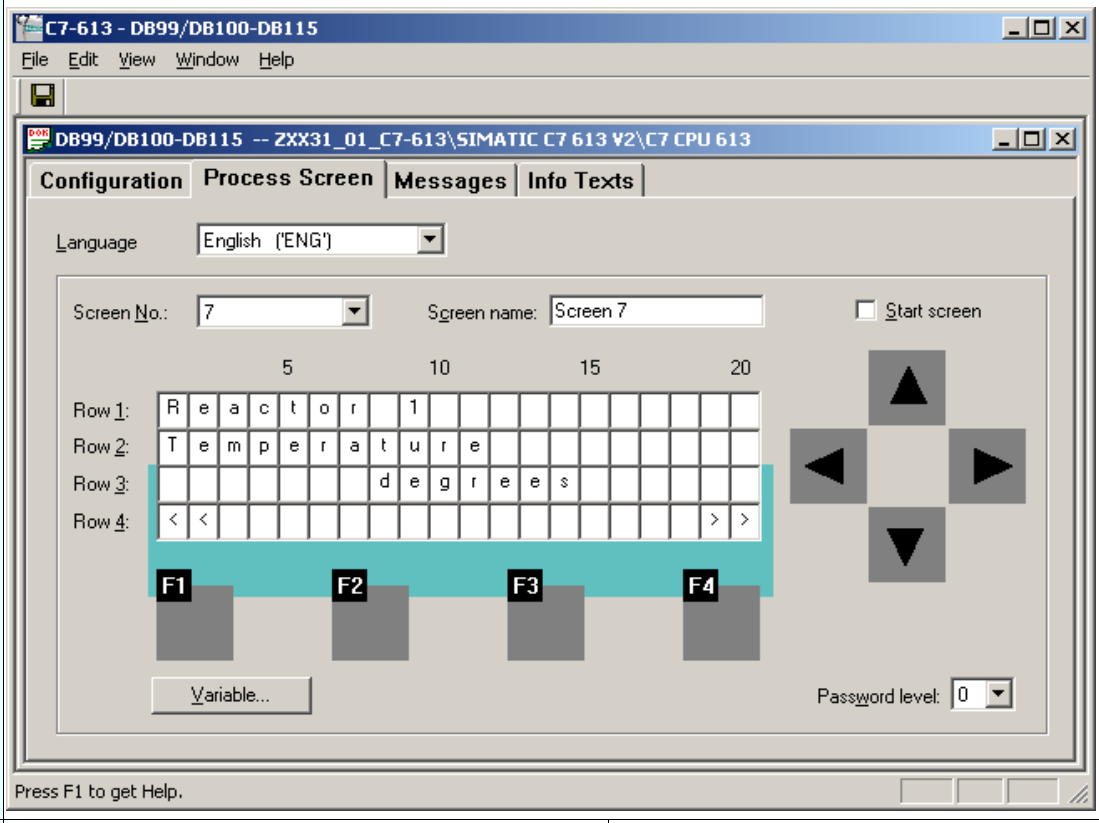
Step 4: Expanding the Configuration

In this step you carry out the following actions by using the configuration interface:

- Create a new screen
- Include a new screen in the menu DB
- Reload the application
- Add a new message
- Create a new info text

Create a new screen

To add an additional screen to the “SCREEN_1_LANG_1” DB, edit the static text of the screen and specify a variable.

Se-quence	Action	Result
1	Double-click on the “CONFIG” DB.	The configuration interface is opened.
2	In the “Process screens” tab, select “English (’ENG’)” in the “Language” drop-down selection box.	The language “English (’ENG’)” is set.
3	In the “Process screens” tab, select “New screen” in the “Screen No.” drop-down selection box .	The screen number 7 is entered in the “Screen No.” drop-down selection box.
4	Carry out the entries shown in the screen. In order to position the input cursor, click on the field to be described. You can also use the cursor keys of the keyboard in order to move the input cursor within the 80 fields. You can write continuously within a line. Existing characters are overwritten. The Delete key is used to delete the character at the position of the input cursor. The Backspace key is used to delete the character to the left of the input cursor in the same line. 	
5	Click on the “Variable...” command button in the “Process screens” tab.	The “Variable in process screen” dialog box is opened.

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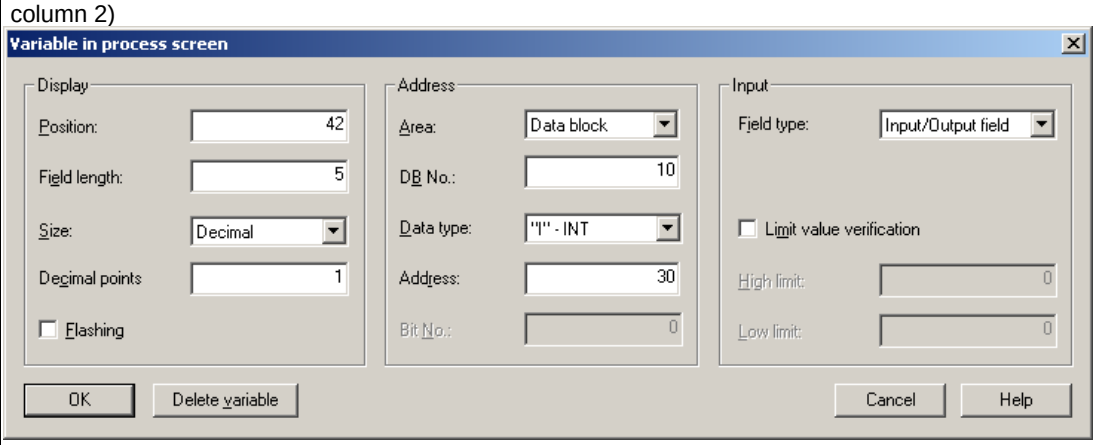
Sequence	Action	Result
6	Carry out the entries shown in the screen in the “Variable” dialog box. This defines a decimal variable having a length of 5 with one decimal position and with non-flashing display at Position 42 (line 3, column 2) 	
7	Click on “OK” in the “Variable” dialog box.	The “Variable” dialog box is closed.
8	Save the process screen by using **File > Save**.	The process screen is stored in the “SCREEN_1_LANG_1” DB.
9	Select the “SCREEN_1_LANG_1” DB in the SIMATIC Manager and download it into the C7-613 by using **PLC > Download**.	The programming device/PC loads the block to the MMC of the C7-613.
10	For the new screen to be displayed, you must perform the following two steps: 1. Include the new screen in the screen hierarchy 2. Reload the application	

Include the new screen in the screen hierarchy

In this example, the screen hierarchy is structured in such a way that you can switch to the previous screen using the softkey F1, and to the subsequent screen using the softkey F4. In Screen 6 F4 is used to progress to Screen 0 (initial screen). In Screen 0 F1 is used to progress to Screen 6.

In order to include the new process screen 7 in the existing screen hierarchy between Screen 6 and Screen 0, change the transitions of the process screens 0, 6 and 7 to each other in the “Process screens” tab.

Sequence	Action	Result
1	In the “Process screens” tab, select the Screen No. 0 in the “Screen No.” drop-down selection box.	The contents of Screen 0 are displayed.
2	Click on the “F1” command button.	The “Screen hierarchy” dialog box is opened.
3	Activate the “Screen No.” radio button in the “Screen hierarchy” dialog box and select Screen No. 7 in the drop-down selection box.	The transition from Screen 0 to Screen 7 with the softkey F1 is prepared.
4	Confirm the entry with OK.	The “Screen hierarchy” dialog box is closed.
5	Select Screen No. 6 in the drop-down box of the “Process screen” tab.	The contents of Screen 6 are displayed.
6	Click on the “F4” command button.	The “Screen hierarchy” dialog box is opened.

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Sequence	Action	Result
7	Activate the “Screen No.” radio button in the “Screen hierarchy” dialog box and select Screen No. 7 in the drop-down selection box.	The transition from Screen 6 to Screen 7 with the softkey F4 is prepared.
8	Confirm the entry with OK.	The “Screen hierarchy” dialog box is closed.
9	Select Screen No. 7 in the drop-down selection box of the “Process screen” tab.	The contents of Screen 7 are displayed.
10	Click on the “F1” command button.	The “Screen hierarchy” dialog box is opened.
11	Activate the “Screen No.” radio button in the “Screen hierarchy” dialog box and select Screen No. 6 in the drop-down selection box.	The transition from Screen 7 to Screen 6 with the softkey F1 is prepared.
12	Confirm the entry with OK.	The “Screen hierarchy” dialog box is closed.
13	Select Screen No. 7 in the drop-down selection box of the “Process screen” tab.	The contents of Screen 7 are displayed.
14	Click on the “F4” command button.	The “Screen hierarchy” dialog box is opened.
15	Activate the “Screen No.” radio button in the “Screen hierarchy” dialog box and select Screen No. 0 in the drop-down selection box.	The transition from Screen 7 to Screen 0 with the softkey F4 is prepared.
16	Confirm the entry with OK.	The “Screen hierarchy” dialog box is closed.
17	Save the modifications by using **File > Save**.	The modified screen hierarchy is stored in the “MENU_DB_APP” DB in your project.
18	Select the “MENU_DB_APP” DB in the SIMATIC Manager and download it into the C7-613 by using **PLC > Download**.	The programming device/PC loads the block to the MMC of the C7-613.
19	For the screen to be displayed, you must now perform the “Reload application” step.	

Reload the application

The MMC will load changes you made to the HMI configuration to the memory of the integrated HMI module only during power-up following a power ON, general reset, or when the language is changed. For this reason, you must download DBs that you changed from the MMC to the memory of the integrated HMI module using the “Reload application” function.

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Sequence	Action	Result
1	Press the “ESC” key on the C7-613 repeatedly until the idle message “SIMATIC C7-613 V...” is displayed. Then, press the “ENTER” key.	You are now in the basic C7-613 screen.
2	Press the F4 key (>>) and then the F2 key (System).	The “System functions” screen is displayed
3	Press the F2 key (Reload application). In the subsequent screen, confirm by pressing F3.	If you have not created an own system message, the following is displayed in the system language: “$ 002 transfer Downloading User-Data After the parameter assignment operation is completed, the idle message “SIMATIC C7-613 V...” is displayed.

Screen 7 is now included in the screen hierarchy between Screen 6 and Screen 0. Check the modified transition at the C7-613:

Sequence	Action	Result
1	Press the key F4 in Screen 6.	You move to Screen 7.
2	Press the key F4 in Screen 7.	You move to Screen 0 (initial screen).
3	Press the key F1 in Screen 0.	You move to Screen 7.
4	Press the key F1 in Screen 7.	You move to Screen 6.

Add a new message

You add a message to the “MESSAGE_1_LANG_1” DB and trigger it by using the variable table “MESSAGES”.

Sequence	Action	Result
1	In the “Info texts” tab, select “English (’ENG’)” in the “Language” drop-down selection box.	The language “English (’ENG’)” is set.
2	In the “Info texts” tab, select “New Info texts” in the “Info text No.” drop-down selection box.	The number 11 is entered in the drop-down selection box.

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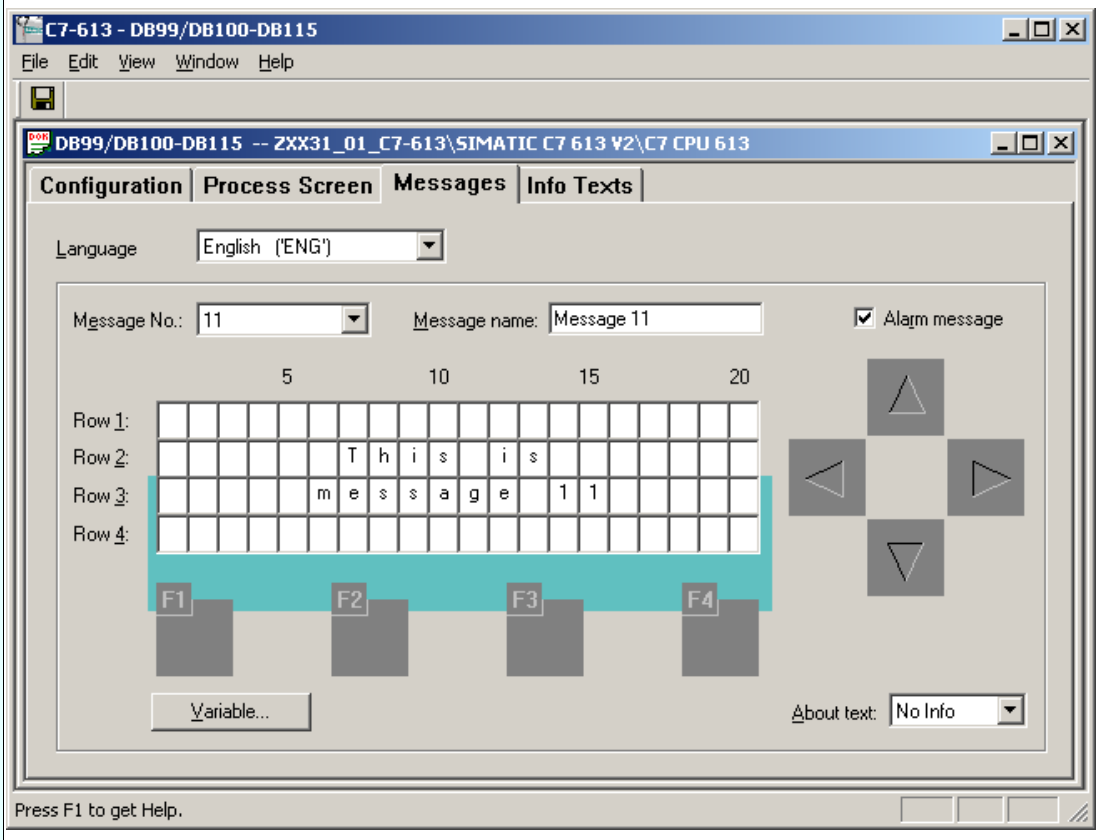
Se-quence	Action	Result
3	Carry out the entries shown in the screen. 	
4	Save the message by using **File > Save**.	The message is stored in the “MESSAGE_1_LANG_1” DB.
5	Select the “MESSAGE_1_LANG_1” DB in the SIMATIC Manager and download it into the C7-613 by using **PLC > Download**.	The programming device/PC loads the data to the MMC of the C7-613.
6	For the message to be displayed, you must perform the “Reload application” step (see Page 11).	The MMC transfers the DB to the memory of the integrated HMI module.
7	In your project, select the variable table “MESSAGES“ and open it with a double-click.	The variable table is opened.
8	Switch to “Online” with **PLC > Connect to > Configured CPU**	The connection to the C7-613 is set up.
9	Switch to “Monitor” with **Variable > Monitor**	The current status value is displayed.
10	To trigger Message 11: Enter a “1” as the control value for the message area of Message 11 (DB10.DBX33.2), and set the value to “1” with **Variable > Modify**. The message area is specified in the “HMI EVENT” FB using the “EVENTS” parameter	Message 11 appears on the C7-613 display as a flashing message.

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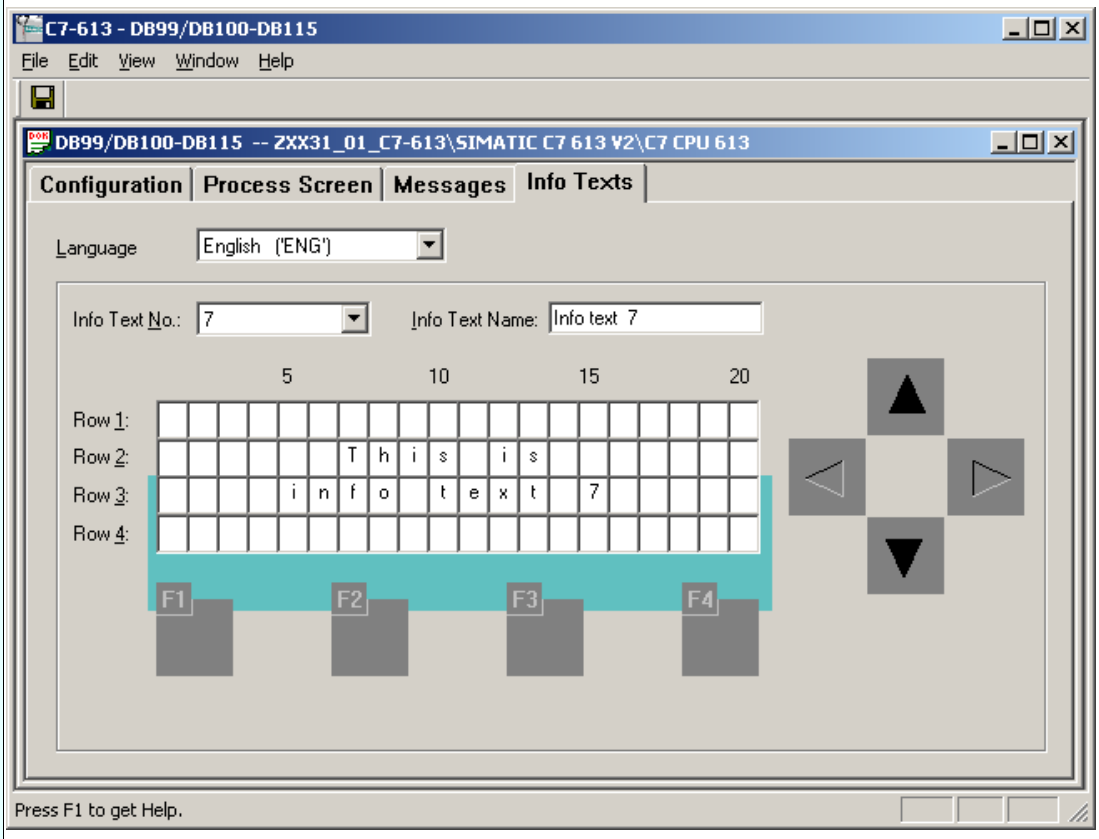
Sequence	Action	Result
10	Then reset DB10.DBX33.2 to “0”, and accept the value with **Variable > Modify**.	The fault is now eliminated, but Message 11 is still displayed flashing.
11	To acknowledge Message 11: Enter a “1” as the control value for the acknowledgement area of Message 11 (DB10.DBX49.2), and set the value to “1” with **Variable > Modify**. The acknowledgement area is specified in the “HMI EVENT” FB using the “ACKS” parameter	Message 11 is no longer displayed.

Create a New Info Text

You specify a separate info text for Screen 7.

Sequence	Action	Result
1	In the “Messages” tab, select “English (’ENG’)” in the “Language” drop-down selection box.	The language “English (’ENG’)” is set.
2	In the “Info texts” tab, select “New info text” in the “Info text No.” drop-down selection box.	The number 7 is entered in the drop-down selection box.
3	Carry out the entries shown in the screen. 	
4	Save the Info text 7 with **File > Save**.	Info text 7 is stored in the “INFO_LANG_1” DB.
5	Select the “INFO_LANG_1” DB in the SIMATIC Manager and download it into the C7-613 by using **PLC > Download**.	The programming device/PC loads the data to the MMC of the C7-613.

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Sequence	Action	Result
6	To assign the Info text 7 to the function key F2 of Screen 7: In the “Process screens” tab, select the Screen No. 7 in the “Screen No.” drop-down selection box.	Process screen 7 is displayed.
7	Click on the “F2” command button.	The “Screen hierarchy” dialog box is opened.
8	Activate the “Info text No.” radio button in the “Screen hierarchy” dialog box and select Info text No. 7 in the drop-down selection box.	The transition from Screen 7 to Info text 7 with the softkey F2 is prepared.
9	Confirm the entry with OK.	The “Screen hierarchy” dialog box is closed.
10	Save the modifications by using **File > Save**.	The modified screen hierarchy is stored in the “MENU_DB_APP” DB in your project.
11	Download the “MENU_DB_APP” DB into the C7-613 by using **PLC > Download**.	The programming device/PC loads the block to the MMC of the C7-613.
12	For the info text to be displayed, you must perform the “Reload application” step (see Page 11).	The MMC transfers the DB to the memory of the integrated HMI module. When displaying Screen 7, the new Info text 7 is output by pressing the “F2” function key.

Diagnostics/Fault Removal

By means of the error code (parameter return value “RETVAL”), the FBs provide information about error occurrences and the status of the HMI functions and the integrated HMI module.

You can obtain further information about the existing error code in the “HMI API” FB using the “ADDINFO” parameter. These values are displayed in the variable table “DIAGNOSIS”.

Sequence	Action	Result
1	In your project, select the variable table “DIAGNOSIS“ and open it with a double-click.	The variable table is opened. The “HMI API” FB displays the “RETVAL” and “ADDINFO” parameters. The “HMI EVENT” and “HMI MENU” FBs display the “RETVAL” parameter.
2	Switch to “Online” with **PLC > Connect to > Configured CPU**	The connection to the C7-613 is set up.
3	Switch to “Monitor” with **Variable > Monitor**	The current status value is displayed.

The various error information is explained in the Appendix B.1 of the manual.

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