SIEMENS

SIMATIC

C7-613 Control System

Manual

The following supplement is part of this documentation:

No.	Designation	Drawing number	Edition
1	Product information	A5E00861679-01	07/2006

This manual is part of the documentation packages with the order numbers:
6ES7613-1CA00-8BA0 and
6ES7613-1CA00-8BB0

Edition 01/2004

A5E00138934-03

Safety Guidelines

This manual contains notices intended to ensure personal safety, as well as to protect the products and connected equipment against damage. These notices are highlighted by the symbols shown below and graded according to severity by the following texts:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury can result if proper precautions are not taken.

Caution

indicates that property damage can result if proper precautions are not taken.

Notice

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning

This device and its components 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.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

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Disclaim of Liability

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

Technical data subject to change.

Preface

Purpose of this Manual

This manual provides a complete overview of the **C7-613 Control System** and assistance with its installation and commissioning. The manual explains how to install expansion modules and introduces the corresponding components.

This manual is intended for persons having the required qualifications to commission, operate, and program the hardware product described.

Basic knowledge requirements

A general knowledge of automation systems engineering is prerequisite for understanding the topics dealt with in this manual.

Users should also be familiar with the operation of computers or auxiliary programming equipment similar to PCs, operating under the operating system platform Windows 2000 or XP. Users should also be familiar with the STEP 7 standard software. For information, refer to the *Programming with STEP 7* manual.

In particular when using a PLC in hazardous locations, pay attention to the information on the safety of electronic controls in Chapter 2 and Appendix A.

Scope of Manual

This manual is applicable to the following:

	Order Number	As of Version	
		Firmware	Hardware
C7-613	6ES7 613-1CA01-0AE3	CPU V2.0.7 HMI V2.00	02
HMI-FBs On the CD "Configuration Tools for SIMATIC C7-613"	6ES7613-0CA00-7AA0	V2.0	

This manual describes the modules that are valid at the time the manual is issued. A product information containing up-to-date information on the module is included at more recent modules or modules with a newer version.

Approbation

For detailed information on approvals and standards, refer to Appendix A, Technical data.

Standards

The C7-613 meets the requirements and criteria of IEC 61131-2.

Its position in the IT environment

The C7-613 consists of the following components:

- SIMATIC S7-CPU 313C
- Integrated HMI module with keyboard and display

Manuals providing detailed information on these individual components are included in a documentation package. These manuals are essential when working with the C7-613.

The documentation package consists of five manuals, a Getting Started manual, and an instruction list.

You are reading this manual: **C7-613Control System** Manual	Description • Installation and wiring • Data blocks with configuration data • HMI functions • Operator control • Technical specifications of the C7-613
C7-613Control System Getting Started Getting Started	Getting Started introduces you to the C7-613 functions with operating steps and expansions of an existing sample project.
S7 300 CPU Data: CPU 31xC and CPU 31x Manual	Description of operator input, the functions, and the technical data of the CPU.
S7 300 CPU 31xC Technological functions Manual Examples	Description of the various technological functions: • Positioning • Counting • Closed loop control The CD contains examples of the technological functions
S7 300 Installation: CPU 31xC and CPU 31x Manual	Description of the configuration, installation, wiring, networking, and commissioning of an S7-300.
S7 300 module data Manual	Description of functions and technicalspecifications of signal modules,power supply modules, and interface modules
Instruction list CPU 31xC, CPU 31x, IM 151-7 CPU, BM 147-1 CPU, BM 147-2 CPU	List of the CPU instruction set and the corresponding execution times List of executable blocks (OBs/SFCs/SFBs) and the corresponding execution times.

Additional documentation

The following manuals are provided to support you when programming and configuring the C7-613:

Programming with STEP 7 Manual	Basics for programming in STEP 7
Instruction list (IL) for S7-300/400 PLCs or **Ladder diagram (LAD) for S7-300/400 PLCs** or **Function block diagram (FBD) for S7-300/400 PLCs** Reference manual	Manual for programming in STL, LAD, or FBD

Guide

This manual contains the following elements to help you access particular information quickly and easily:

- Complete table of contents at the front of the manual
- Detailed keyword index at the back of the manual

Recycling and disposal

The C7-613 system can be recycled due to its low-contaminant equipment. Contact a certified company for the environment-friendly recycling disposal of your electronic waste.

Further Support

If you have any technical questions, please get in touch with your Siemens representative or agent responsible.

You will find your contact person at:

`http://www.siemens.com/automation/partner`

Training Center

Siemens offers a number of training courses to familiarize you with the C7-613 and the SIMATIC S7 automation system. Please contact your regional training center or our central training center in D 90327 Nuremberg, Germany for details:

Telephone: +49 (911) 895-3200

Internet: `http://www.sitrain.com`

A&D Technical Support

Worldwide, available 24 hours a day:

Worldwide (Nuernberg) **Technical Support** 24 hours a day, 365 days a year Phone: +49 (180) 5050-222 Fax: +49 (180) 5050-223 E-Mail: adsupport@ siemens.com GMT: +1:00		
Europe / **Africa** (Nuernberg) **Authorization** Local time: Mon.-Fri. 8:00 AM to 5:00 PM Phone: +49 (180) 5050-222 Fax: +49 (180) 5050-223 E-Mail: adsupport@ siemens.com GMT: +1:00	**United States** (Johnson City) **Technical Support and Authorization** Local time: Mon.-Fri. 8:00 AM to 500 PM Phone: +1 (423) 262 2522 Fax: +1 (423) 262 2289 E-Mail: simatic.hotline@ sea.siemens.com GMT: –5:00	**Asia** / **Australia** (Beijing) **Technical Support and Authorization** Local time: Mon.-Fri. 8:00 AM to 5:00 PM Phone: +86 10 64 75 75 75 Fax: +86 10 64 74 74 74 E-Mail: adsupport.asia@ siemens.com GMT: +8:00
The languages of the SIMATIC Hotlines and the authorization hotline are generally German and English.		

Service & Support on the Internet

In addition to our documentation, we offer our Know-how online on the internet at:

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

where you will find the following:

- The newsletter, which constantly provides you with up-to-date information on your products.
- The right documents via our Search function in Service & Support.
- A forum, where users and experts from all over the world exchange their experiences.
- Your local representative for Automation & Drives.
- Information on field service, repairs, spare parts and more under “Services”.

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Product overview

1

1.1 Design and Structure

Figure 1-1 Front View of C7-613

Components

The C7-613 complete system consists of the following components:

- SIMATIC CPU: S7-313C
- Integrated HMI module (“C7-613 Panel” on Slot 4 in HW Config) with a keyboard and a four-line display with 20 characters or 10 graphical symbols per line

Interfaces

- An interface for connecting up to four S7-300 modules via the S7-300 I/O bus
- MPI interface for the communication with a PG/PC and further S7 CPUs, C7 control systems and OPs
- Integrated digital and analog I/O (C7-I/O)

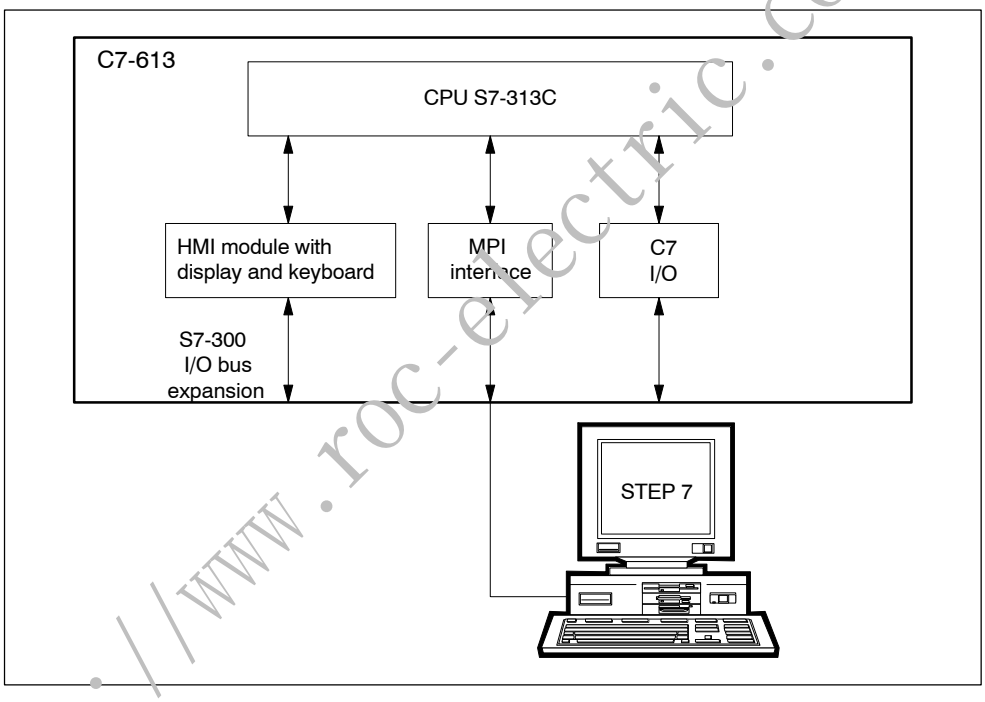


Figure 1-2 Components of the C7-613

I/O expansion on the S7-300 I/O bus

Note

This accessory allows an I/O expansion at the S7-300 I/O bus:

- 2-module I/O set: Expansion with up to two S7-300 modules
- 4-module I/O set: Expansion with up to four S7-300 modules

An IM interface cannot be plugged at the S7 300 I/O bus.

1.1.1 Controlling with the C7-613

Overview

The user program controlling the process runs on the C7-613.

The following functional units determine the mode of operation of the C7-613:

Loading memory
The loading memory is positioned on the Micro Memory Card (MMC). It includes the user program, the FBs needed for the HMI functions, and the DBs where the configuration data for the screens, messages, and info texts are stored.

Processor
The processor executes the program cyclically:

- At the beginning of the cycle, the processor reads the signal states on all inputs and generates a process image of the inputs (PII).
- The program is executed step-by-step using internal counters, bit memory, and timers.
- The processor stores the calculated signal states in the process output image (POI). At the end of the cycle, the process image is transmitted to the outputs.

Configuring and Programming

You configure and program the C7-613 by means of STEP 7 as of V 5.2 + Service Pack 1 + Hardware Update C7-613 V2.0. The programming languages available for the system are specified in the "*S7-300 Programmable Controllers, CPU Data: CPU 31xC and CPU 31x*" manual.

Prerequisite:

STEP 7 is installed on a programming device or PC under Windows 2000 or XP.

You have two possibilities of configuring and programming the C7-613:

- The programming device or PC is not connected to the C7-613:

  You store the configuration and the user program on a Micro Memory Card and plug it afterwards into the C7-613.
- The programming device or the PC is connected to the C7-613 via the MPI interface:

  You download the configuration and the user program directly into the C7-613.

1.1.2 Operator Control and Monitoring with the C7-613

Overview

Operating modes, current process values, and faults can be displayed using the C7-613. In addition, inputs can be made on the C7-613 with the keyboard. Also, simple functions for machine diagnosis can be implemented with the C7-613.

The C7-613 provides a number of standard functions. You can optimize the displays and operator inputs of the C7-613 for your respective process requirements in a configuration.

The C7-613 processes the configured HMI functions. This requires that the C7-613 is in RUN mode and that the FBs needed for the HMI functions are called cyclically in the C7-613 user program.

HMI functions

The basic functions of the C7-613 are:

- Displaying process states
- Operating the processes

The course of the operator guidance is created by using the configuration interface.

The following display and operator control functions are available for the C7-613:

- Screens
- Operational messages
- Error messages
- Info texts
- Multilingual operator prompting.

HMI functions are not possible in STOP mode. The keyboard can no longer be operated. The system message “CPU in STOP mode!” is displayed. In addition, the STOP LED indicates the STOP mode.

Screens

Logically associated process data from the open loop control can be displayed jointly in one screen and changed individually, if required.

The C7-613 is a line display device. Accordingly, a screen consisting of text elements, which can be combined from the static text and the current process values, is formed on the display.

Operational Messages

Operational messages provide information about the current machine or process states during normal production operation. Operational messages may contain process values. Process values are displayed alphanumerically, e.g. “Motor speed 4500”.

All operational messages are stored in the event buffer.

Fault messages

In contrast to operational messages, fault messages display critical machine states during the production run.

Because of their urgency, fault messages must be acknowledged before further actions are possible.

To acknowledge the fault messages:

- Via the user program
- Via the keyboard

Fault messages may contain process values. Process values are displayed alphanumerically.

All fault messages are stored in the event buffer.

Info Texts

Info texts provide supplementary information and operator notes that generally refer to the screen currently displayed.

Languages

Messages, screens, and info texts can be displayed in several languages. A maximum of five languages can be loaded to the C7-613 at the same time and made available to the operator for online selection.

Standard/special screens and system messages are permanently stored in the following languages:

- German
- English
- French
- Italian
- Spanish
- Portuguese
- Dutch
- Danish
- Norwegian
- Swedish
- Finnish
- Russian
- Polish
- Czech
- Hungarian
- Greek
- Turkish
- Japanese
- Chinese (VRC)
- Chinese (TW)
- Korean

Configuration/Process control

Before the C7-613 is operated, it must be prepared for the visual display task.

To this purpose you use the configuration interface to create a configuration for the HMI functions of the C7-613. The configuration data for screens, messages, and info texts are stored in DBs that have a defined structure. The structure is specified using the provided user-defined data types (UDT), which contain all of the variables of the DBs and their default assignment. The configured configuration is transferred, together with the user program for the C7-613, to the MMC.

As soon as the C7-613 is in RUN mode and the FBs required for the HMI functions are called cyclically, the MMC loads the DBs with the configuration data to the memory of the integrated HMI module of the C7-613. This loading operation is performed automatically after each POWER ON and each general reset. In all other cases you have to trigger the loading process via the keyboard or the user program (refer to Section 4.2).

Then, the process control phase starts. The C7-613 now responds to process signals and operator actions based on the settings.

1.1.3 Firmware updates

Firmware updates can be loaded into the operating system memory of the C7-613 in order to expand the functions and eliminate faults. To this purpose you require a Micro Memory Card with at least 2 MB flash EPROM.

1.1.4 Scope of Functions

CPU

- RAM 48 KB
  - Of which available for applications: 32 KB
  - reserved for HMI functions: 16 KB
- Loading memory and retentive memory of different sizes in the MMC
- Integrated I/O
  - 24 digital inputs
  - 16 digital outputs
  - 4 analog inputs
  - 2 analog outputs
  - 1 PT 100
- Technological functions
  - Counting, frequency measuring, or pulse width modulation
  - Closed loop control

HMI

- 128 screens with up to 8 input/output fields per screen for displaying and modifying process parameters
- 128 messages (operational and error messages) with up to 4 output fields per message for displaying process values
- 128 info texts
- Event buffer with a maximum of 256 entries
- Selection between any languages which can be created with system-resident character sets (maximum of 5 languages simultaneously)
- Password protection

1.2 Product Scope and Accessories for the C7-613

Product Components

The following components belong to the scope of delivery of C7-613, Order No. 6ES7613-1CA01-0AE3:

- 1 C7-613 control system with sealing
- 1 grounding busbar, including two mounting screws and six shielding terminals
- 10 brackets

What you need to operate the C7

- A Micro Memory Card (MMC) for storing the user program and the configuration data.

  You can only operate the C7-613 with an MMC. The recommended minimum size amounts to 128 KB. For applications with more than one language you require a larger Micro Memory Card.
- A 24 V DC power supply module
- One connector set (screw terminals or spring-type terminals) for C7 I/O with coding profiles and coding tabs
- C7-613 accessories for I/O expansion (directly on the device or up to a maximum distance of 1.5 m), in case you would like to expand the I/O
- A programming device/PC with MPI interface and MPI cable for creating the user program, or a programming device/PC capable of reading and writing to an MMC
- STEP 7 as from Version 5.2 + SPA + Hardware Update C7-613 V2.0
- The “Configuration Tools for SIMATIC C7-613” configuration CD

Accessories

- Configuration CD “Configuration Tools for SIMATIC C7-613”
  Order Number: 6ES7613-0CA00-7AA0

  The CD contains the following components:

  – Configuration interface in the languages German, English, French, Italian, Spanish

  – Manual in English, German, French, Italian, Spanish

  – Initial steps for commissioning (Getting Started) in English, German, French, Italian, Spanish

  – Templates for labeling strips

  – Backplane labeling

  – “C7-613” library with the required FBs and UDTs

  – Sample program “ZXX31_01_C7-613”

- Connector set with screw terminals,
  order no.: 6ES7635-0AA00-4AA0
- Connector set with spring-type terminals,
  order no.: 6ES7635-0AA00-4BA0
- Micro Memory Card S7-300/C7/ET 200S IM 151 CPU 3.3 V NFLASH
  64 KB, Order No: 6ES7953-8LF00-0AA0
  128 KB, Order No: 6ES7953-8LG00-0AA0
  512 KB, Order No: 6ES7953-8LJ00-0AA0
  2 MB, Order No: 6ES7953-8LL00-0AA0
  4 MB, Order No: 6ES7953-8LM00-0AA0
  8 MB, Order No: 6ES7953-8LP10-0AA0

Options

- I/O set for two modules, low profile (for I/O expansion directly on the device), Order No: 6ES7635-0AA00-6AA0

  Consisting of:

  – A cable, approximately 0.25 m (for connecting the C7-636 to the S7 module)

  – Cable, approximately 0.08 m (for connecting an S7 module to an S7 module)

  – Sheet metal mounting panel with S7 profile rails, including four combination torx screws (the mounting panel is screwed to the back of the device)

- I/O set for four modules, low profile (for I/O expansion directly on the device), Order No: 6ES7635-0AA00-6BA0

  Consisting of:

  – Cable, approximately 0.20 m

  – 190 mm S7 profile rail, including 4 countersunk screws (to be screw-mounted on the back of the device)

- 1.5 m I/O expansion cable
  (for installing an I/O expansion at a distance of up to 1.5m),
  Order No.: 6ES7635-0AA00-6CA0

  You must order an additional S7-300 PLC standard DIN rail.

Spare Parts

- Grounding busbar with shielding terminals for analog I/O,
  Order No.: 6ES7635-0AA00-6EA0
- Service package (3 sealing and 10 brackets),
  Order No.: 6ES7635-0AA00-3AA0

  The sealing must also be replaced when you replace a C7-613.

C7 accessories

- **MPI cable** (connecting C7 to PG),
  Order No.: 6ES7901-0BF00-0AA0
- **PC Adapter** (connecting C7 to PC),
  Order No.: 6ES7972-0CA23-0XA0

Documentation

- Paper documentation *Control system C7-613* , consisting of
  - *C7-613 Control System Manual*
  - Getting Started

Language	Order no.
English	6ES7613-1CA00-8AB0
German	6ES7613-1CA00-8BB0
French	6ES7613-1CA00-8CB0
Spanish	6ES7613-1CA00-8DB0
Italian	6ES7613-1CA00-8EB0

- Documentation *package C7-613 Control System*, consisting of
  - *C7-613 Control System Manual*
  - Getting Started
  - S7-300 documentation package

Language	Order no.
English	6ES7613-1CA00-8AA0
German	6ES7613-1CA00-8BA0
French	6ES7613-1CA00-8CA0
Spanish	6ES7613-1CA00-8DA0
Italian	6ES7613-1CA00-8EA0

Installing and Wiring the C7-613

2

2.1 Labeling Strips

Labeling strips

The function keys can be labeled individually with labeling strips that are inserted from the side into the keyboard.

System-specific labels

A template for the labeling strips (SLIDE613.DOC) is stored in Word format in the “Manuals” directory on the CD “Configuration Tools for SIMATIC C7-613”. You can design and print plant-specific labeling strips.

To make your own labeling strips, use transparent film (0.1 to 0.15 mm thick) so that the LEDs of the function keys remain visible. Label the film using either a printer or a wipe-resistant foil pen.

Caution

To avoid soiling of the keyboard on the inside, protect the labeling with clear adhesive strips or an adhesive transparent film. Otherwise, operating pressure causes the labeling color to rub off on the inside of the key. A key that was smudged from the inside cannot be cleaned and can only be replaced in the factory.

The labeling strips have to be cut exactly along the indicated cutting edge. If a labeling strip is cut too large, it cannot be inserted.

To insert the labeling strip:

Step	Action
1	Place the device with the front plate facing downward.
2	Remove labeling strips that may have been previously inserted.
3	With the labeling pointing downward, insert the new labeled strip into the slits of the front panel (use tweezers, if necessary). The individual positions are marked in Figure 2-1 with arrows.

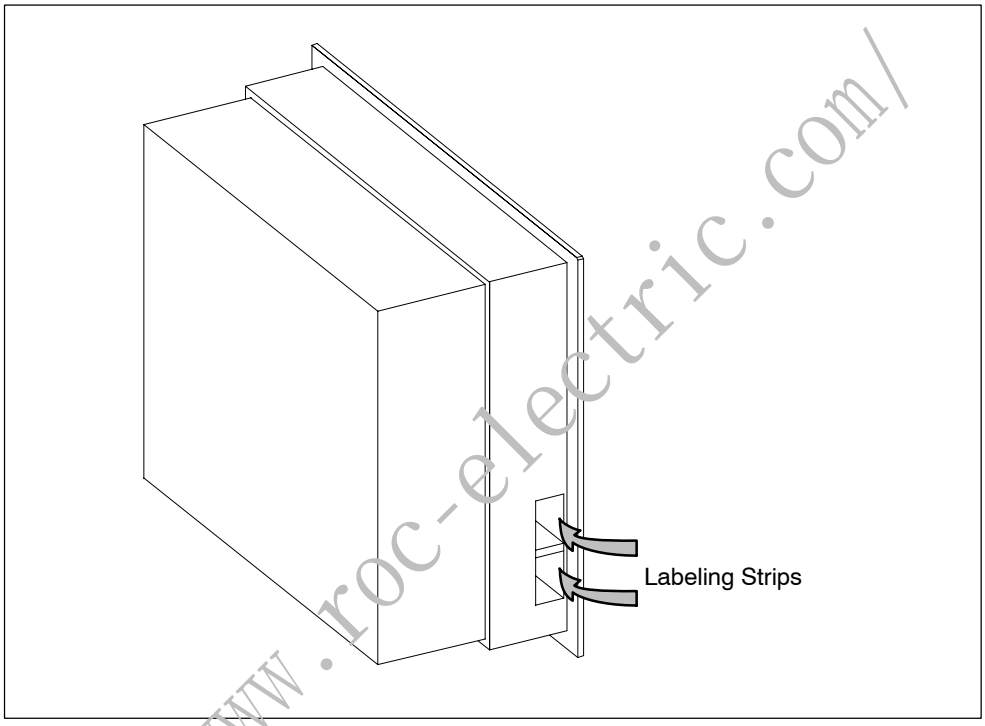


Figure 2-1 Inserting Labeling Strips

2.2 Mechanical installation

Mounting

The C7-613 is intended for stationary and enclosed installation; for example, in a control cabinet door.

Note

You can only achieve the degree of protection IP65 if you follow steps 1 through 4 during installation.

Caution

Before mounting and unmounting the device, remove the MMC, and during mounting and unmounting of the device, be careful not to damage the memory slot and the connectors for the MPI bus and the backplane bus.

To install the C7-613:

Step	Action
1	Cut out a cutout with the dimensions (198 + 1.0) mm x (148 +1.0) mm in the control cabinet door. Refer to Figure 2-3.
2	Place the C7-613 in the prepared cutout in the control cabinet door. Please make sure the seal rests evenly on all parts of the steel plate.
3	Guide the mounting hooks of seven of the provided mounting supports ① into the provided recesses in the C7-613 housing . See Figure 2-2. Mounting supports can not be affixed on the narrow side near the X11 connector (on the right side in Figure 2-2).
4	Using a screwdriver, tighten the C7-613 evenly and crosswise from behind in the control cabinet door until the front panel of the C7-613 rests on the control cabinet door ②. Position the device so that there is even spacing on all sides between the housing and the cut-out section.

Caution

Condensation may develop on the device when you take it from a cold environment to the operating area.

Before starting up the device, bring it up to room temperature. If there is condensation, device must not be switched on until it is completely dry.

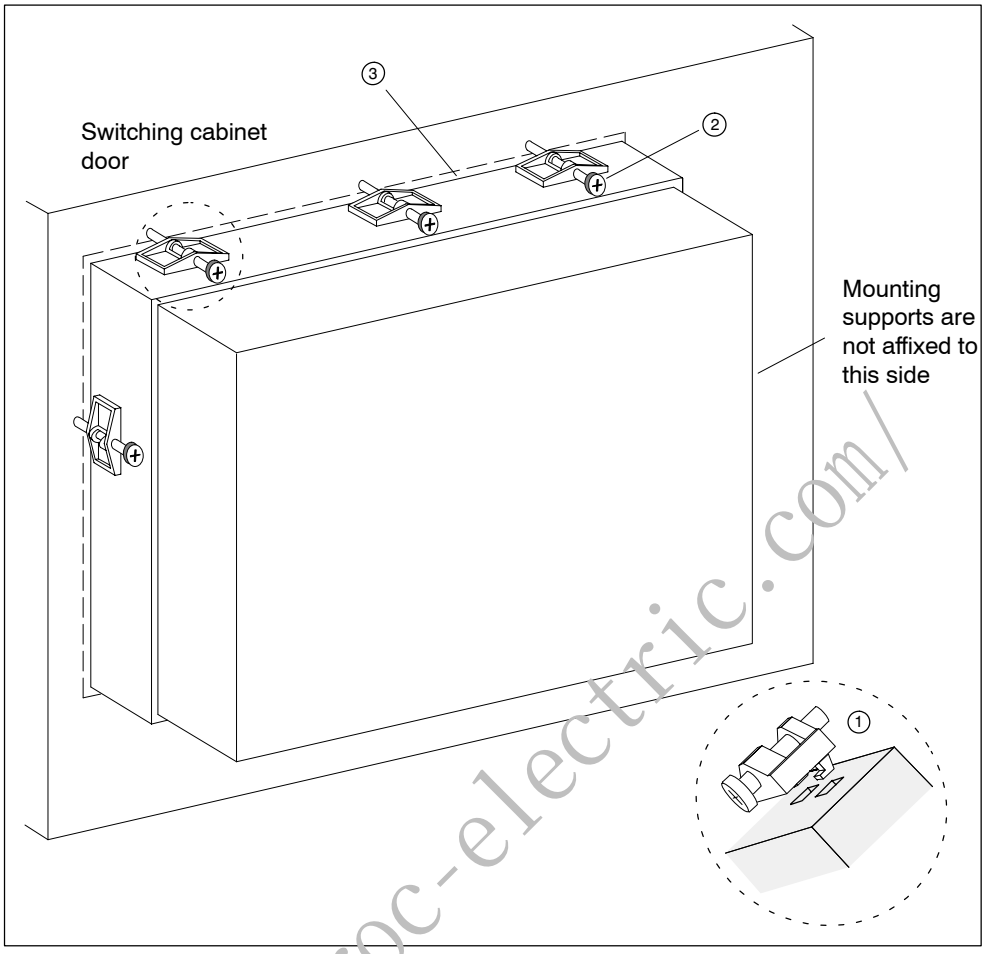


Figure 2-2 Mechanically Mounting the C7-613

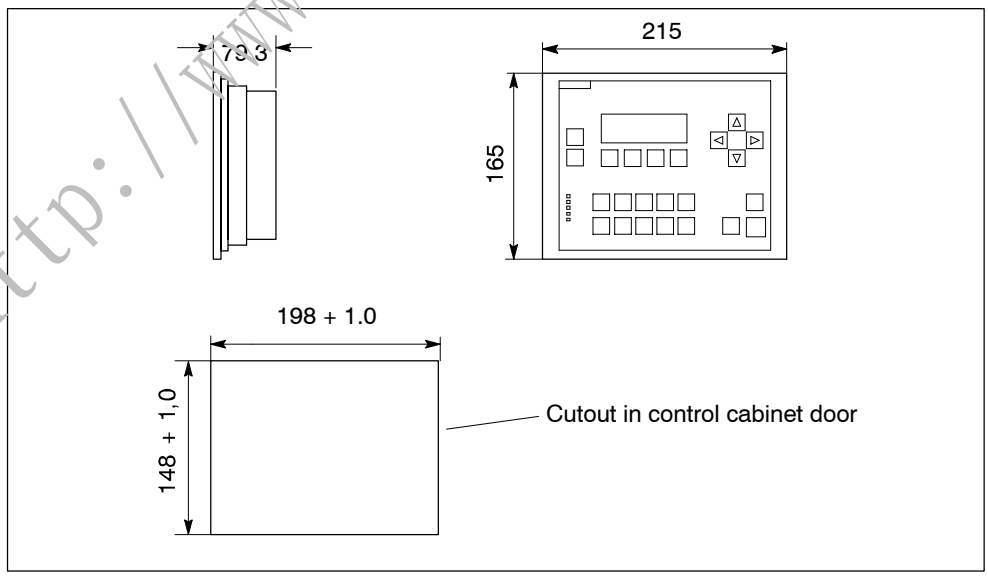


Figure 2-3 Dimension Diagrams for the C7-613 (Dimensions in mm)

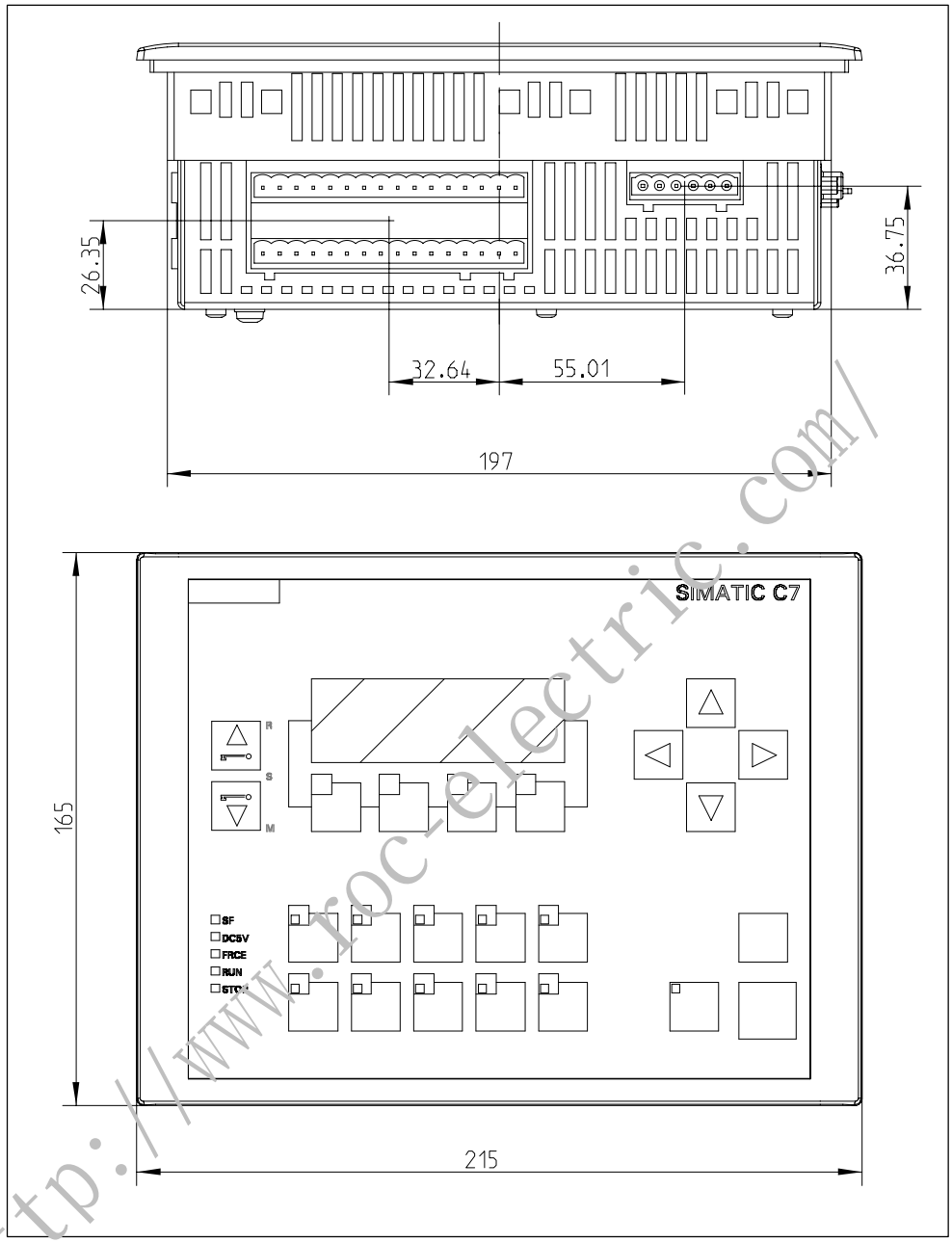


Figure 2-4 Dimension Diagrams for the C7-613 (Dimensions in mm)

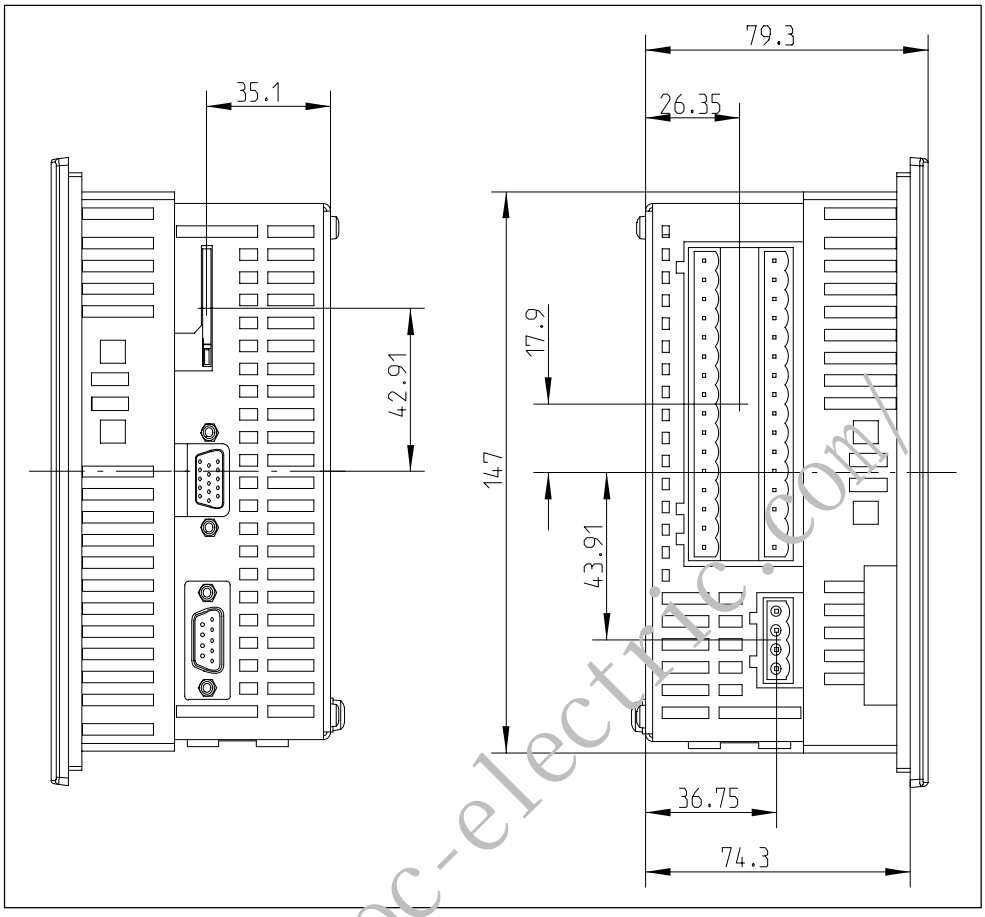


Figure 2-5 Dimension Diagrams for the C7-613 (Dimensions in mm)

2.3 Locating the C7-613 in a Mechanical Environment

Locating the C7-613

When installing a C7-613, pay attention to the following:

- The sheet of a switching panel door can be 2 to 4 mm thick. Make sure the sealing is seal-tight all round.
- Make sure the sealing is firmly seated along the front panel.
- At the sides of the C7-613, keep a clearance of at least 50 mm and 70 mm for cable outlets and the air ventilation (refer to Fig. 2-6).
- Protect the C7-613 against direct exposure to sunlight. Operation outside of closed rooms is not permitted.

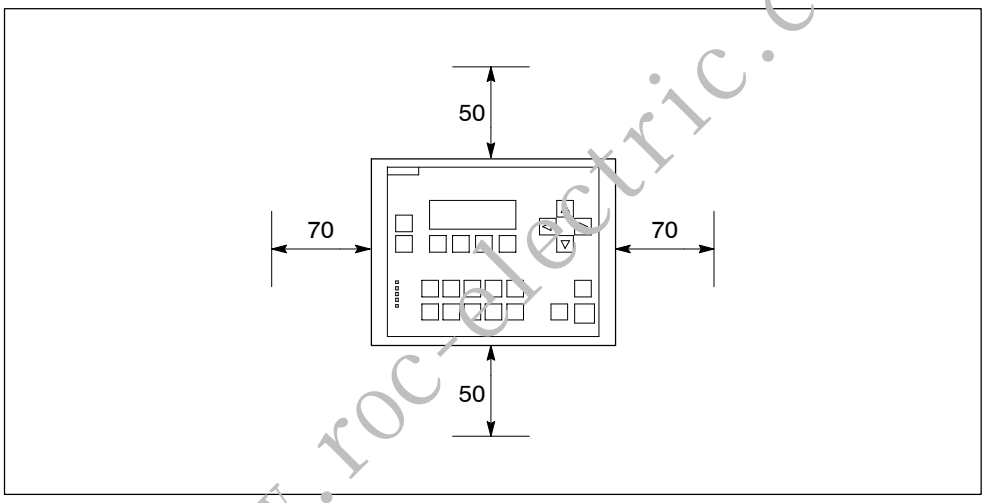


Figure 2-6 Clearances for Installing the C7-613

2.4 Setting Up the Electrical Configuration and Connector Pin Assignment

Pin Assignment of the C7-613 connectors

Tables 2-1 to 2-7 list the assignments of the C7-613 connections.

Caution

For functional reasons, the connector pin assignment is not compatible to the predecessor products C7-621, C7-623, C7-626, C7-633 and C7-634.

Note

It is not possible to include the C7-613 in an ungrounded configuration

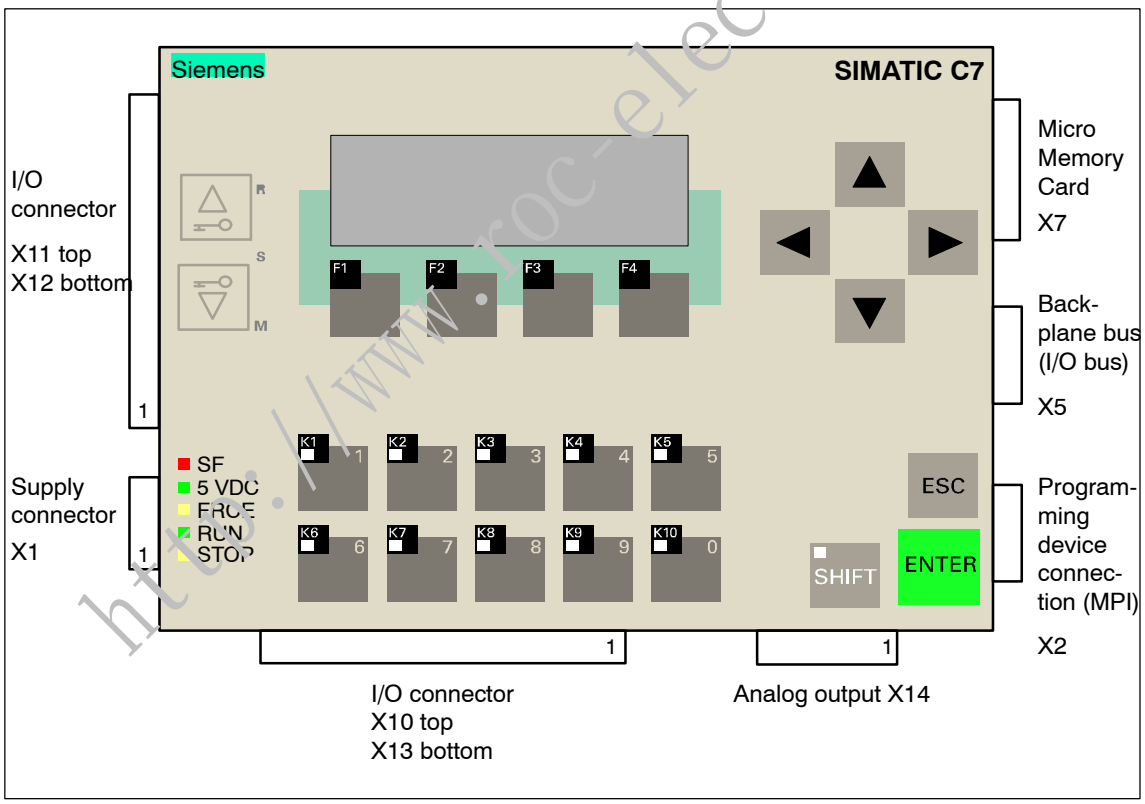


Figure 2-7 C7-613 with plugs and sockets, front view

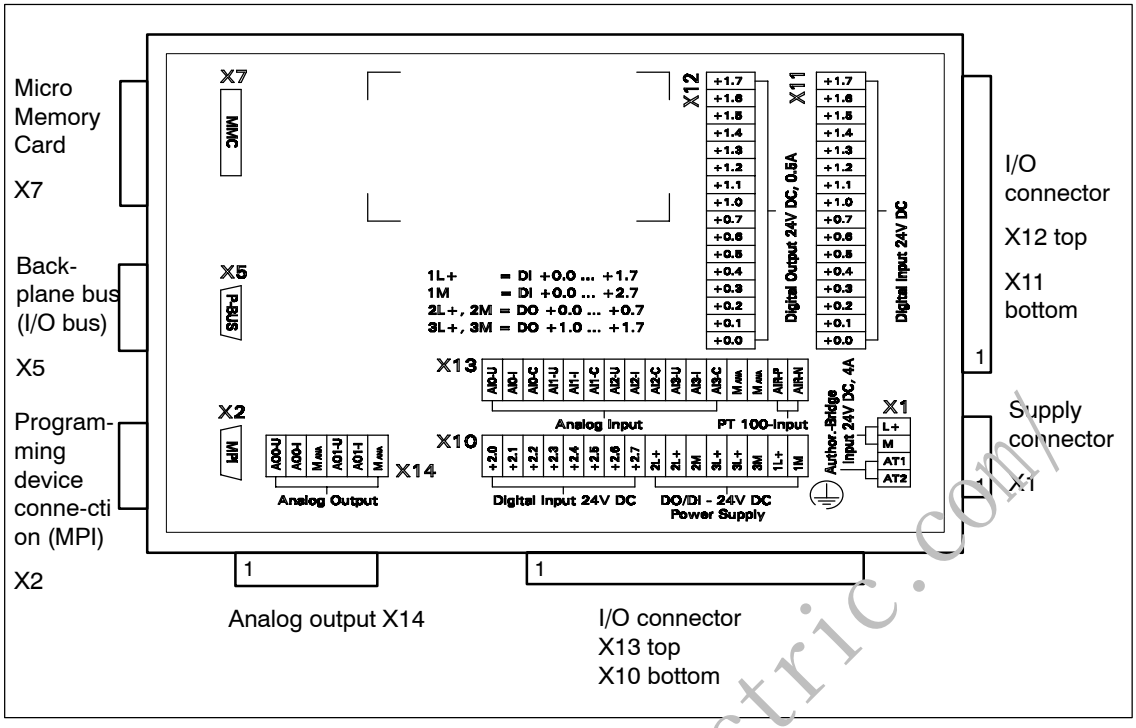


Figure 2-8 C7-613 with plugs and sockets, rear view

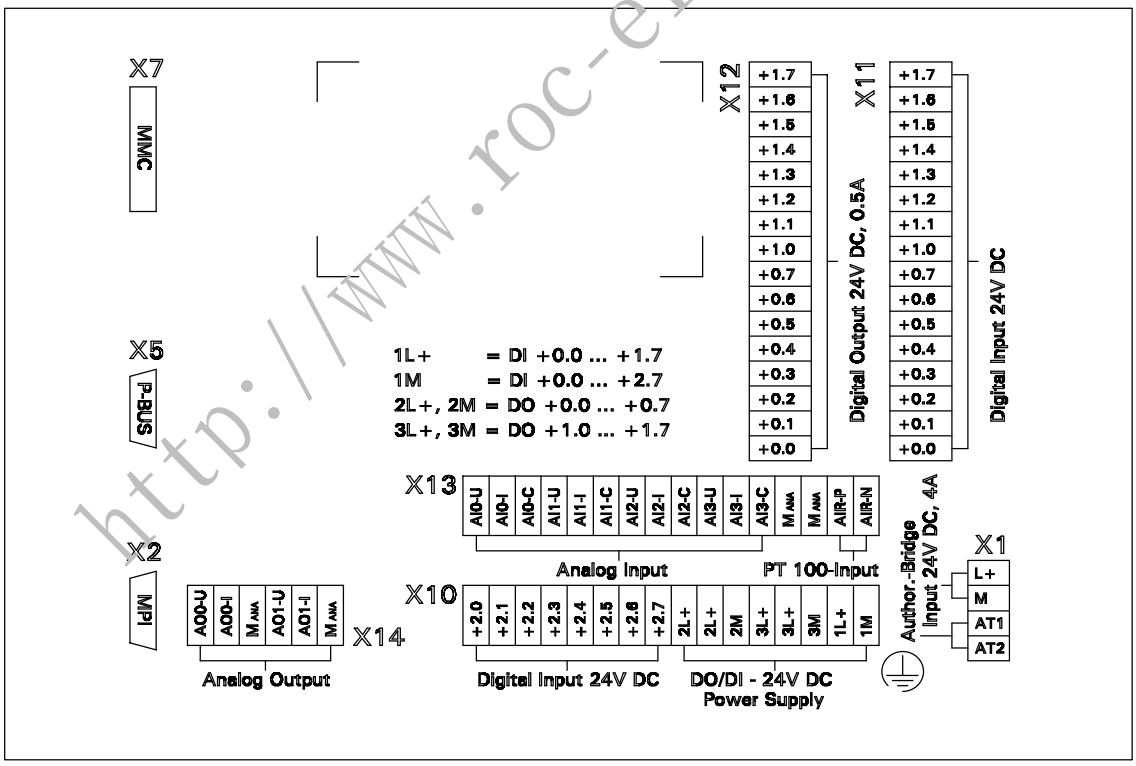


Figure 2-9 C7-613 backplane labeling

View from left

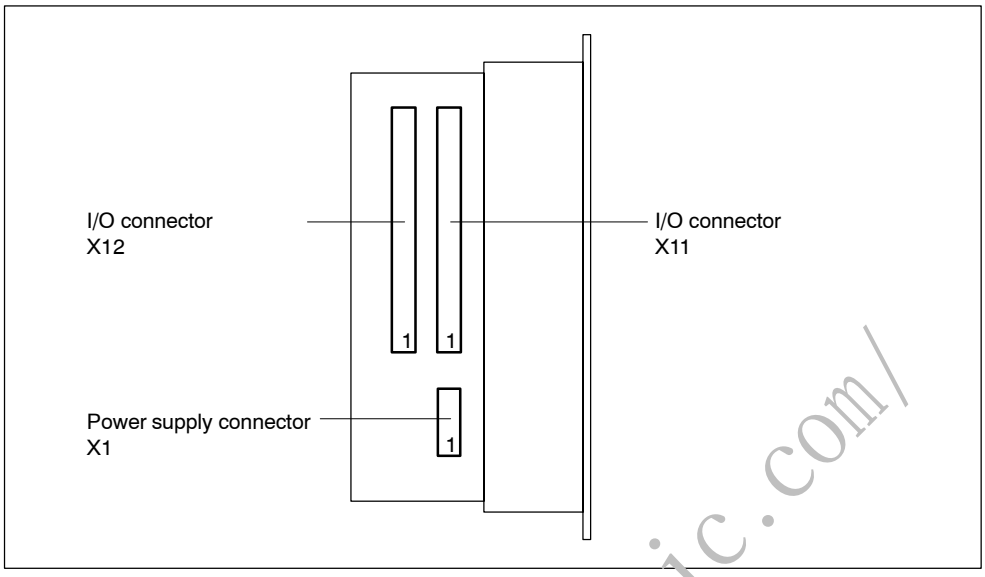


Figure 2-10 C7-613 with plugs and sockets, view from left

Supply Connector X1

Table 2-1 Supply Connector X1

Pin no.	Signal	Description
1	AT2	Authorization input (for example, for external switch)
2	AT1	Authorization input (for example, for external switch)
3	M	Ground potential 24 V DC
4	L+	Supply voltage 24 V DC

I/O connector X11

For the technological functions, the meaning of the inputs is described in the columns “Counting”, “Frequency Measuring” and “Pulse Width Modulation”.

Table 2-2 Connector Pin Assignments for I/O Connector X11

Pin no.	Pin designation	Signal / address	Description	Counting	Frequency Measuring	Pulse Width Modulation
1	X11+0.0	DI+0.0	Digital input 0	Channel 0: Trace A/Pulse		–
2	X11+0.1	DI+0.1	Digital input 1	Channel 0: Trace B/Direction		–
3	X11+0.2	DI+0.2	Digital input 2	Channel 0: Hardware Gate		
4	X11+0.3	DI+0.3	Digital input 3	Channel 1: Trace A/Pulse		–
5	X11+0.4	DI+0.4	Digital input 4	Channel 1: Trace B/Direction		–
6	X11+0.5	DI+0.5	Digital input 5	Channel 1: Hardware Gate		
7	X11+0.6	DI+0.6	Digital input 6	Channel 2: Trace A/Pulse		–
8	X11+0.7	DI+0.7	Digital input 7	Channel 2: Trace B/Direction		–
9	X11+1.0	DI+1.0	Digital input 8	Channel 2: Hardware Gate		
10	X11+1.1	DI+1.1	Digital input 9	–		
11	X11+1.2	DI+1.2	Digital input 10	–		
12	X11+1.3	DI+1.3	Digital input 11	–		
13	X11+1.4	DI+1.4	Digital input 12	Channel 0: Latch	–	
14	X11+1.5	DI+1.5	Digital input 13	Channel 1: Latch	–	
15	X11+1.6	DI+1.6	Digital input 14	Channel 2: Latch	–	
16	X11+1.7	DI+1.7	Digital input 15	–		

I/O connector X12

For the technological functions, the meaning of the outputs is described in the columns “Counting”, “Frequency Measuring”, and “Pulse Width Modulation”.

Table 2-3 Connector Pin Assignments for I/O Connector X12

Pin no.	Pin designation	Signal / address	Description	Counting	Frequency Measuring	Pulse Width Modulation
1	X12+0.0	DO+0.0	Digital output 0	Channel 0: Output		
2	X12+0.1	DO+0.1	Digital output 1	Channel 1: Output		
3	X12+0.2	DO+0.2	Digital output 2	Channel 2: Output		
4	X12+0.3	DO+0.3	Digital output 3	–		
5	X12+0.4	DO+0.4	Digital output 4	–		
6	X12+0.5	DO+0.5	Digital output 5	–		
7	X12+0.6	DO+0.6	Digital output 6	–		
8	X12+0.7	DO+0.7	Digital output 7	–		
9	X12+1.0	DO+1.0	Digital output 8	–		
10	X12+1.1	DO+1.1	Digital output 9	–		
11	X12+1.2	DO+1.2	Digital output 10	–		
12	X12+1.3	DO+1.3	Digital output 11	–		
13	X12+1.4	DO+1.4	Digital output 12	–		
14	X12+1.5	DO+1.5	Digital output 13	–		
15	X12+1.6	DO+1.6	Digital output 14	–		
16	X12+1.7	DO+1.7	Digital output 15	–		

Bottom view

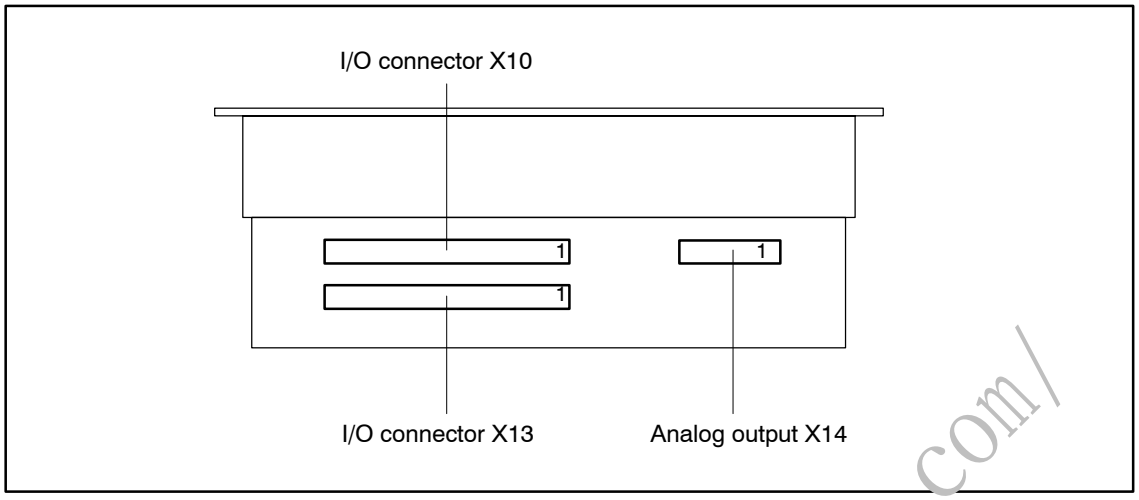


Figure 2-11 C7-613 with plugs and sockets, bottom view

I/O connector X10

Table 2-4 Connector Pin Assignment I/O Connector X10

Pin no.	Pin designation	Signal / address	Description
1	X10+2.0	DI+2.0	Digital input 16
2	X10+2.1	DI+2.1	Digital input 17
3	X10+2.2	DI+2.2	Digital input 18
4	X10+2.3	DI+2.3	Digital input 19
5	X10+2.4	DI+2.4	Digital input 20
6	X10+2.5	DI+2.5	Digital input 21
7	X10+2.6	DI+2.6	Digital input 22
8	X10+2.7	DI+2.7	Digital input 23
9	2L+	2L+	24 V supply voltage for DO 0.0 to 0.7
10	2L+	2L+	24 V supply voltage for DO 0.0 to 0.7
11	X10 2M	2M	Ground potential for DO 0.0 to 0.7
12	3L+	3L+	24 V supply voltage for DO 1.0 to 1.7
13	3L+	3L+	24 V supply voltage for DO 1.0 to 1.7
14	X10 3M	3M	Ground potential for DO 1.0 to 1.7
15	X10 1L+	1L+	24 V supply voltage for DI 0.0 to 1.7
16	X10 1M	1M	Ground potential for DI 0.0 to 2.7

I/O connector X13

Table 2-5 Connector Pin Assignment I/O Connector X13

Pin no.	Signal	Description
1	AI0-U	Analog voltage input channel 0
2	AI0-I	Analog current input channel 0
3	AI0-C	Analog reference potential channel 0
4	AI1-U	Analog voltage input channel 1
5	AI1-I	Analog current input channel 1
6	AI1-C	Analog reference potential channel 1
7	AI2-U	Analog voltage input channel 2
8	AI2-I	Analog current input channel 2
9	AI2-C	Analog reference potential channel 2
10	AI3-U	Analog voltage input channel 3
11	AI3-I	Analog current input channel 3
12	AI3-C	Analog reference potential channel 3
13	MANA	Analog ground
14	MANA	Analog ground
15	AIR-P	PT100_OUT
16	AIR-N	PT100_IN

Analog output X14

Table 2-6 Connector Pin Assignment Analog Output X14

Pin no.	Signal	Description
1	AO0_U	Analog voltage output channel 0
2	AO0_I	Analog current output channel 0
3	MANA	Analog ground
4	AO1_U	Analog voltage output channel 1
5	AO1_I	Analog current output channel 1
6	MANA	Analog ground

Side view

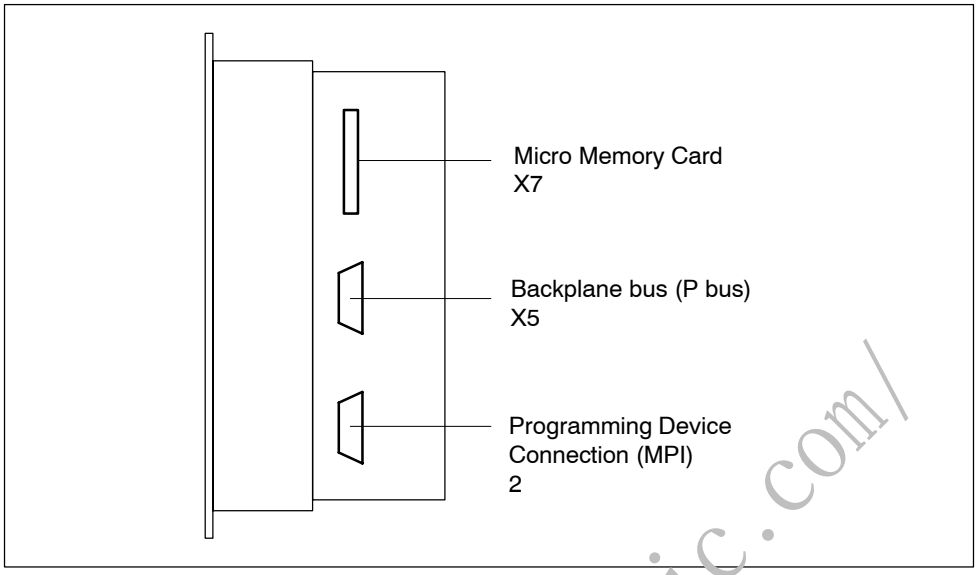


Figure 2-12 C7-613 with plugs and sockets, view from right

Programming Device Connection (MPI) X2

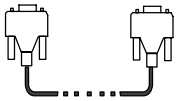
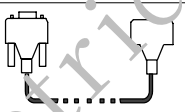
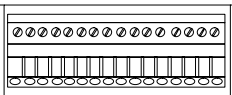
Table 2-7 Programming Device Connection (MPI) X2

Pin no.	Signal	Description
1	NC	Not connected
2	M24V	Ground potential 24 V DC
3	B	RS 485 cable B
4	RTS	RTS
5	M5V	Ground potential 5 V DC
6	P5V	Supply voltage 5 V DC
7	P24V MPI	MPI supply voltage 24 V DC
8	A	RS485 cable A
9	NC	Not connected

C7-613Device Connections

You can use the following connecting cables to connect the C7-613 to other components:

Table 2-8 Connecting Cables for Connections to the C7-613

Connecting Cable	Length	Special Features	Illustration	Connection
MPI Interface				
Programming device (PG) cable	5 m	–		For example: C7-613 – programming device C7-613 – S7-300 C7-613 – S7-400
S7-300 I/O bus				
Cable for I/O expansion	0.25 m 1.5 m	–		C7-613 – S7-300 rack
C7-613 I/O connections				
Connectors for C7-613 I/O Conductor cross-section		16-pin 6-pin 4-pin 0.2 to 2.5 mm^2		C7 – External sensors/actuators

2.5 Guidelines for Fail-safe Installation

Overview

Automation systems require appropriate shielding measures in order to prevent interference. This can only be ensured by enclosed metal installation (cabinet mounting, for example).

In a system that is not properly bonded to ground or shielded, noise on the internal controller bus may develop as a result of low frequency (LF) or high frequency (HF) signals.

Noise may be emitted from switching relays or contactors (high-speed current or voltage transitions, RF interference), or may develop as a result of equipotential differences between two plant elements (NF interference).

Note

You can find additional information about construction guidelines in the *S7-300 Automation System* installation manual.

Usage / routing of interference-proof cables

- Only shielded cables are permitted for all analog signals.
- Always use the standard cables supplied by Siemens.
- Connect both ends of the shielding of the following cables:
  - Control signal cables
  - Bus cables
  - Cables for connecting I/O devices
- Screw-tighten or interlock all connectors.
- Do not route signal cables in parallel to power circuit cables.

  Route the signal cables through a separate cable duct, which is installed at a distance of at least 50 cm away from power cables.

Control cabinet installation

Devices which may introduce external interference to the control cabinet should be mounted in the bottom area of the cabinet. Always mount the grounding busbar at a position close to the cable inlet, so that you can connect noise-carrying cables directly to earth potential. All shielded cables are to be laid here with the shield. Terminate only the outer shielding of cables equipped with double shielding.

Route longer signal cables along the cabinet walls. It is important to use an EMC-compliant cubicle construction to reduce disturbance variables. All ground connections of the cabinet must be interconnected by means of cables with a large conductor cross-section, and with appropriate contact to a large area of the steel chassis.

Analog devices installed in the control cabinet should be electrically isolated, and bonded at least once to chassis ground by means of a copper braid.

Always use metal materials of the same grading. Never use aluminum, because of the risk of oxidation.

Connect all the doors and sheet-metal parts (side walls, rear walls and cover) of the cabinet at least three times to the cabinet frame. Ensure that connections are short, large-area and free of paints.

Note

In plants generating a high electrostatic discharge level (e.g. in textile processing systems, or particular construction machinery), always connect machine parts which are subject to interference to a separate functional ground, i.e. bond the central grounding busbar of the cabinet to a separate equipotential earth (surface grounding to the building construction, steel reinforcement).

Functional ground

Connect the functional ground ⏚ (see Fig. 2-13) to chassis ground of the control cabinet, using a cable lug on a cable with a minimum conductor cross-section of 4 mm^2.

2.6 Connecting Shielded Cables

Overview

This section describes how to connect the shield of shielded signal lines to the ground. The cable shielding is connected to the grounding busbar, from there directly to the chassis ground of your C7-613 and to equipotential earth.

Procedure

Proceed as follows to install the grounding busbar supplied with the C7-613 and the shield terminals:

Step	Action
1	Mount the grounding busbar at the position shown in Fig 2-13, using the included screws ①.
2	Install the shielding terminals on the grounding busbar as shown in Fig. 2-13.
3	Push the stripped ends of the cable shielding into the shielding terminals.

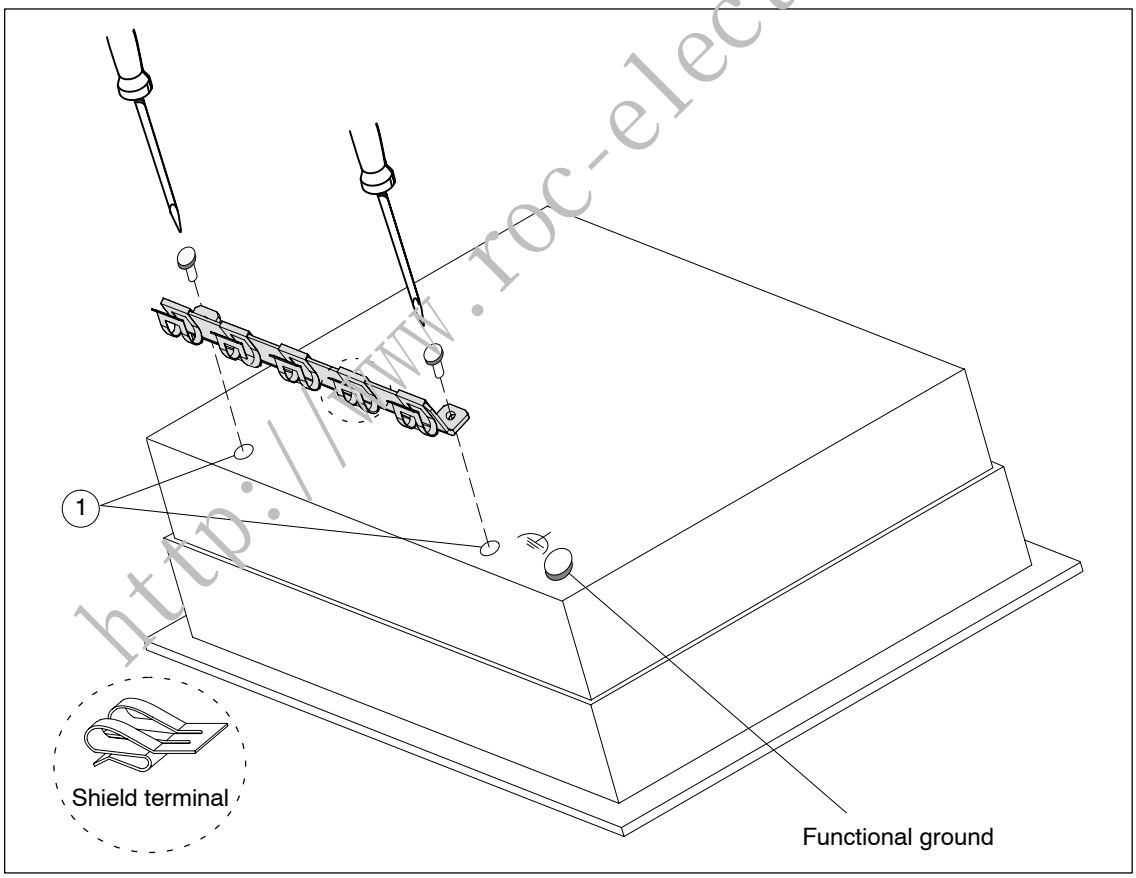


Figure 2-13 C7-613 with Grounding Bar, Shield Terminals, and Connection for Functional Ground

2.7 Preventing Connector Interchanges through Coding

Overview

You can order a connector set with coding profiles and coding tabs as an accessory for the C7-613 (see accessories in Section 1.2).

Caution

Your C7-613 control system may be damaged if you unintentionally interchange the connectors.

You should therefore prevent such interchanges by coding your connectors.

Coding connectors

Use the coding profiles ① and the coding tabs ② to prevent the connectors from being interchanged, without loss of a connecting pin (cf. Fig. 2-14).

To do this, proceede as follows:

1. Insert the coding profile ① on the connector part ❶ into the slots provided.
2. Insert the coding carrier ② on the main housing ❷ into the corresponding recesses.

A coding profile and a coding tab facing one another prevent the connector part from being inserted.

The connector element can be easily plugged in when the coding profiles and tab do not oppose each other.

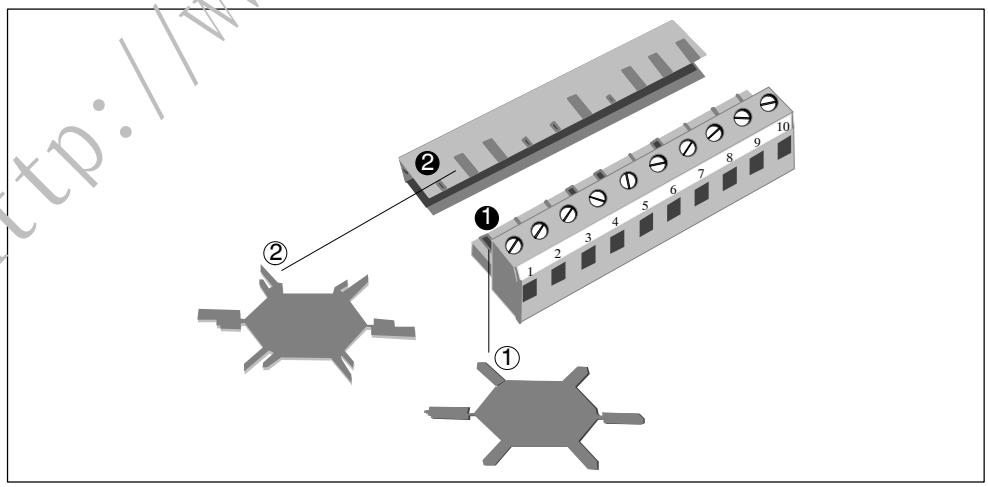


Figure 2-14 Connectors with Coding Profiles and Tabs

Special Features of the C7-613

3

Differences to CPU 313C

- Operating mode selection
- Limited connection of additional S7-300 modules
- Status display of the digital onboard I/O
- Protective circuiting against overvoltage (± 24 V) at the analog current inputs
- All inputs of the integrated I/O are connected to a common reference ground

3.1 Operating Mode Selection

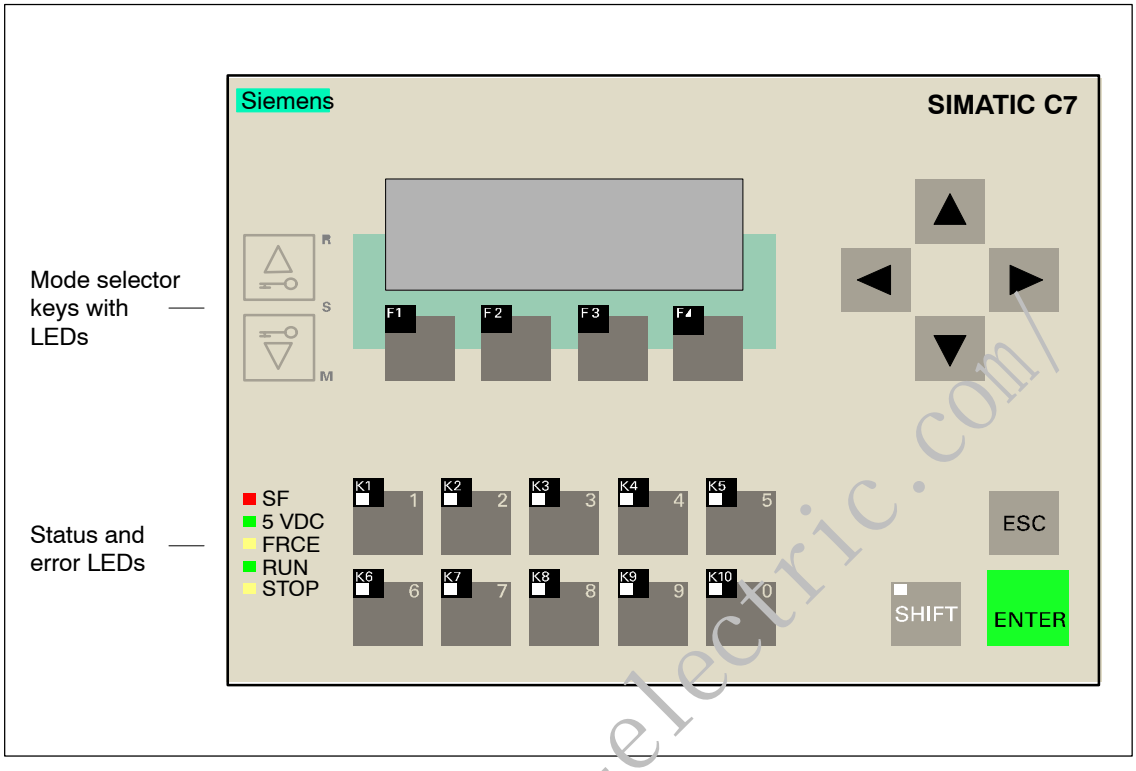


Figure 3-1 C7-613 Operating Mode Keys

Changing the C7-613 Operating Mode

The C7-613 modes RUN, STOP and MRES are selected by means of the mode selector keys:

The C7-613 carries out a mode change whenever the key is pressed. The RUN key (upper key) must be pressed for at least 500 ms for the transition to take place and to light up the relevant LED. The key LEDs do not reflect the C7-613 operating mode, but rather indicate the setting of the operating mode keys.

The key function can be activated and deactivated by means of the external authorization inputs AT1 and AT2 to prevent the C7-CPU operating modes from being changed in an uncontrolled manner (for example, by unauthorized operating staff).

When mode selection is enabled,

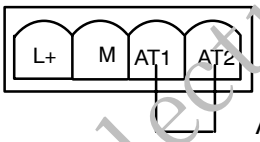
- you need to jumper the authorization inputs AT1 / AT2,
- The key LEDs alongside the operating mode keys indicate the mode selector setting,
- The current CPU operating status is indicated by the status LEDs

When mode selection is disabled:

- You must leave the authorization inputs AT1 and AT2 open
- The key LEDs alongside the operating mode keys are switched off
- The current CPU operating status is indicated by the status LEDs

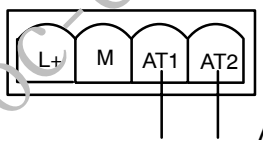
The authorization inputs are located on the supply connector X1 (see also Table 2-7).

Authorization activated:



AT1 - AT2 bridged

Authorization deactivated:



AT1 - AT2 open

Table 3-1 Operating Mode Keys

Operating Mode	Key	Description / procedure
RUN (R)		The C7-613 executes the user program. Programs and data: • Read out from the C7-613 with the programming device/PC (C7 → programming device/PC) • Transmitted to the C7-613 and changed there (programming device/PC → C7)
STOP (S)		The C7-613 does not execute user programs. Programs: • Read out from the C7-613 with the programming device/PC (C7 → programming device/PC) • Transmitted to the C7-613 and changed there (programming device/PC → C7).
MRES (M)		**CPU memory reset** Performing a general reset of the C7-CPU 613 (clearing the memory and reloading the user program from Flash memory) requires a special operating mode key procedure: 1. Select STOP mode by pressing the DOWN key. – The “S” key LED lights up – The CPU status LED “STOP” is lit. 2. Select MRES mode by pressing the UP key and the DOWN key at the same time. The “M” key LED lights up. 3. Hold the keys down until the “STOP” status LED lights up a second time and until remains lit (this happens after 3 seconds). 4. Now release the keys. 5. Within three seconds, press both keys once again simultaneously. 6. Release the keys when the “STOP” status LED flashes rapidly (at 2 Hz). When the CPU has finished the clear/reset operation, the “STOP” status LED stops flashing and remains lit. The CPU is now reset and in STOP mode.

You need to perform the steps described in the table above only if you want to reset the memory of your C7-613, and without the C7-613 having requested a memory reset (indicated by slow flashing of the “STOP” status LED). If the general reset request comes from the C7-613, the process can be started by briefly pressing both keys.

In specific situations you may need to reformat your MMC if the C7-613 requests a second memory reset. For information, refer to the *S7 300 Automation System CPU Data: CPU 31xC and CPU 31x* manual, chapter “Installation and communication functions”, SIMATIC Micro Memory Card (MMC), “Formatting the MMC after memory reset.”

When the group error LED SF of the C7-613 is lit, you need to analyse the data in the diagnostic buffer of the C7-613 on your PG/PC. More information about the entries in the diagnostic buffer is provided in the STEP 7 Online Help.

3.2 Status and Error Displays of the C7-613

Meaning of the status and error displays

The status and error displays are explained in the sequence in which they are arranged on the C7-613.

Display	Description	Description
SF (red)	C7-613 group error	**Is lit** when there are • hardware errors • firmware errors • Programming errors • Parameter assignment errors • Computing errors • Time-out • I/O errors during internal I/O functions For exact error determination, a programming device/PC has to be used and the diagnostic buffer has to be read out.
5 V DC (green)	5 V DC supply for the C7-613	**Is lit** if the internal 5 V DC supply is okay.
FRCE (yellow)	Reserved	**Is lit** when a force request is active on the CPU.
RUN (green)	RUN mode of the C7-613	**Illuminates** when the C7-613 is executing the user program. **Flashes** (2 Hz) during the C7-613 startup (in addition, the STOP display illuminates; after the STOP display goes out, the outputs are enabled).
STOP (yellow)	STOP mode of the C7-613	**Illuminates** when the C7-613 is not executing user programs. **Flashes** slowly when the C7-613 requests a CPU memory reset. **Flashes** rapidly when the C7-613 is performing a CPU memory reset.

3.3 Arrangement of Additional S7-300 Modules

Additional S7-300 Modules

You can connect up to four S7-300 expansion modules to your C7-613 via the S7-300 I/O bus. These modules can be connected either directly on the device or at a distance of up to 1.5 m. An IM interface cannot be plugged.

For information on the installation of S7-300 modules, refer to the *S7-300 Automation System Installation: CPU 31xC and CPU 31x* manual.

Connecting Additional S7-300 Modules Directly on the Device

2-module I/O set

Requirements: The C7-613 specific accessories “2-module I/O set” is available.

Use the following procedure to connect the additional S7-300 modules:

Step	Action
1	Screw the mounting plate to the backplane of the C7-613 housing.
2	Install the C7-613 in the cabinet door. Follow the instructions in chapter 2.2
3	Connect the C7-613 to the module inserted on the left in the figure using the connecting cable (0.25 m).
4	Connect the two modules using the connecting cable (0.08m).
5	Mount the modules on the S7 profile rail.

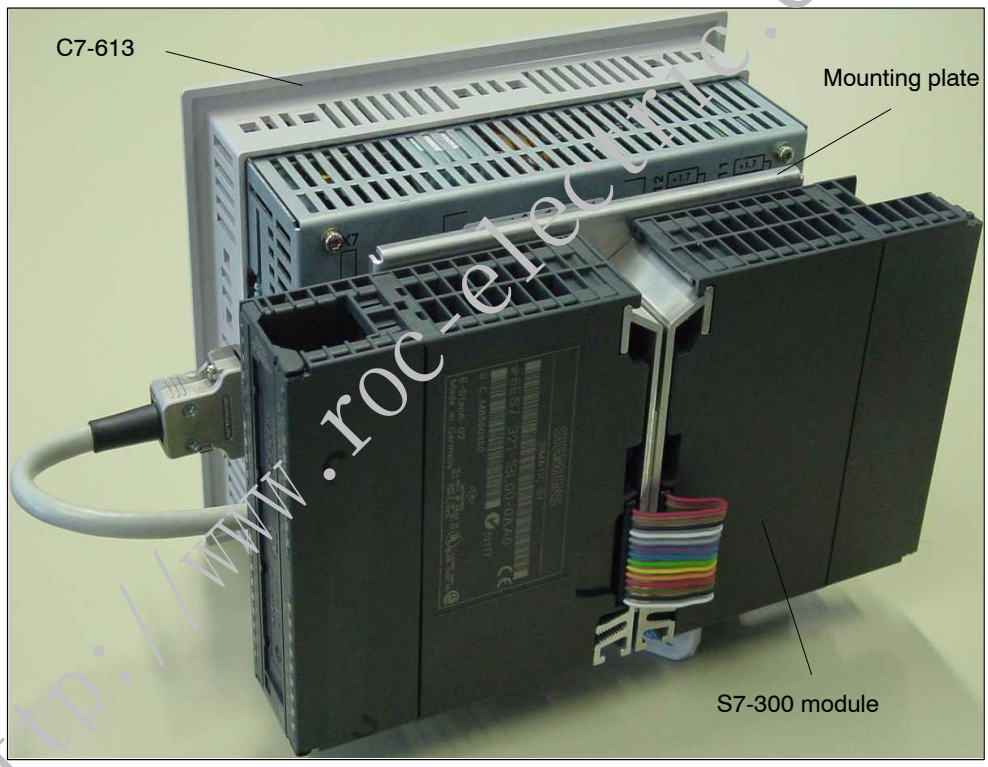


Figure 3-2 Connecting S7-300 expansion modules directly to the device using the 2-module I/O set

4-module I/O set

Requirements: The C7-613-specific accessories “4-module I/O set” is available.

Use the following procedure to connect the additional S7-300 modules:

Step	Action
1	Screw the S7 DIN rail (190 mm) to the backplane of the C7-613.
2	Install the C7-613 in the cabinet door. Follow the instructions in chapter 2.2
3	Connect the C7-613 to the outermost module on the left-hand side using the connecting cable.
4	Mount the modules on the S7 DIN rail (190 mm).

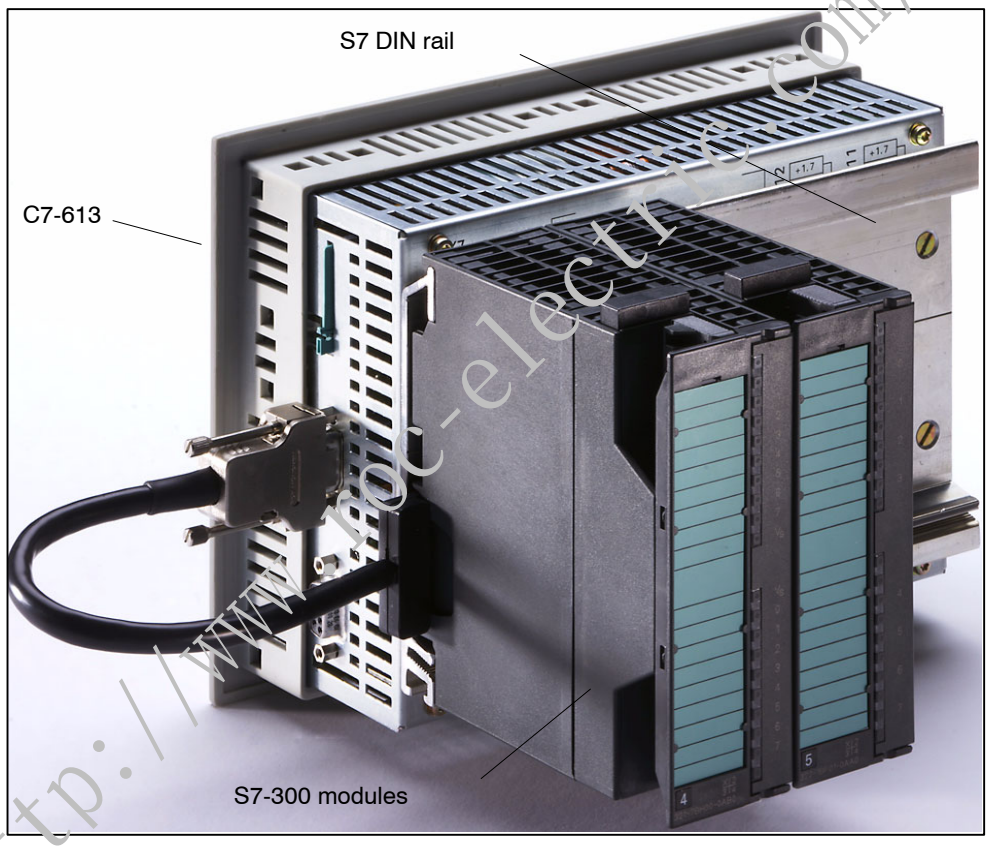


Figure 3-3 Connecting S7-300 expansion modules directly to the device using the 4-module I/O set

Connecting Additional S7-300 Modules at a Maximum Distance of 1.5 m

Requirements: The C7-613 specific accessory “1.5 m cable” and a standard profile rail.

Use the following procedure to connect the additional modules:

Step	Action
1	Connect the C7-613 to the outermost module on the left-hand side using the connecting cable.
2	Mount the modules on an S7 standard DIN rail of the S7-300 programmable controller.
3	Connect the shield support of the I/O bus cable to the S7 DIN rail using the cable clamp.

Figure 3-4 Connecting Additional S7-300 Modules at a Distance of Up to 1.5 m

3.4 Status Display of the Digital Onboard I/O

I/O status display

There are no LEDs for displaying the status of the C7-613 I/O. To display the status, you can use the configuration interface to generate process screens (see Figure 3-5 and Figure 3-6) or you can use Screens 2 and 3 provided in the sample program “ZXX31_01_C7-613”.

The values shown must be read from the **process image** of the digital C7-613 I/O and displayed in BIN format.

Note

If the C7-613 is in STOP mode, screens cannot be output.

The following data are displayed:

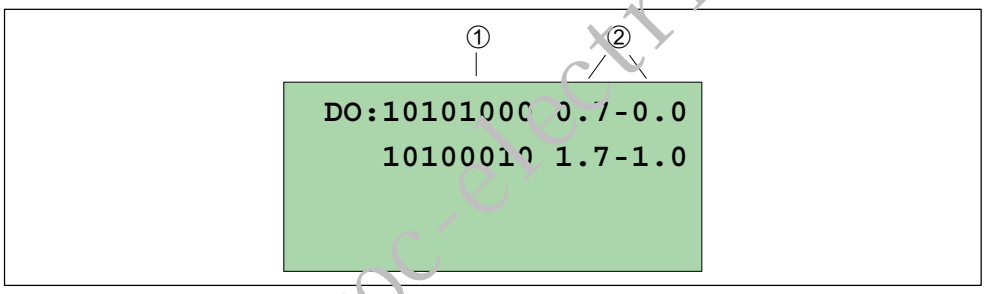


Figure 3-5 DO Status Display

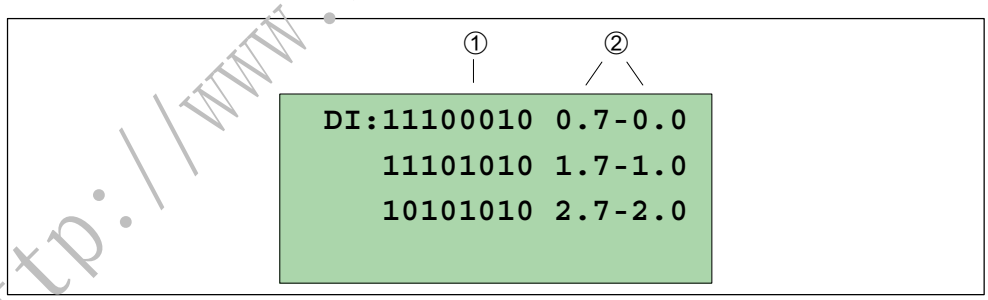


Figure 3-6 DI Status Display

Table 3-2 Description of the DI/DO Status Display in Figure 3-5 and Figure 3-6

Item	Description
①	Signal status of the DI/DO • 1 = DI/DO set • 0 = DI/DO reset
②	DI/DO pin designation

Integration into the User Program

4

4.1 Installing the CD

The configuration interface and the blocks needed for integrating the HMI functions into your user program are on the CD “Configuration Tools for SIMATIC C7-613”. During the installation process, the “C7 613 library” is set up where the blocks are stored. To install the CD, proceed as follows:

Step	Action	Result
1	Before starting the setup, close all applications (for example, STEP 7, MS Word, etc.).	
2	Place the CD in the CD drive of your programming device/PC.	
3	Start the “Setup” program in the Setup folder.	
4	Follow the step-by-step instructions displayed by the installation program.	The following components are installed on your computer: • Configuration interface • “C7-613” library with the required FBs and UDTs • Sample program “ZXX31_01_C7-613” • Manual • Getting Started

4.2 Program Structure

Overview

To integrate the HMI functionality into your user program, FBs and UDTs are available for creating DBs with configuration data. They are located on the CD “Configuration Tools for SIMATIC C7-613” in the “C7 613” library. The FBs must be called cyclically or time-controlled in your program (recommendation: 20 to 50 ms). The number of FBs for the HMI functions can be adjusted to meet your requirements.

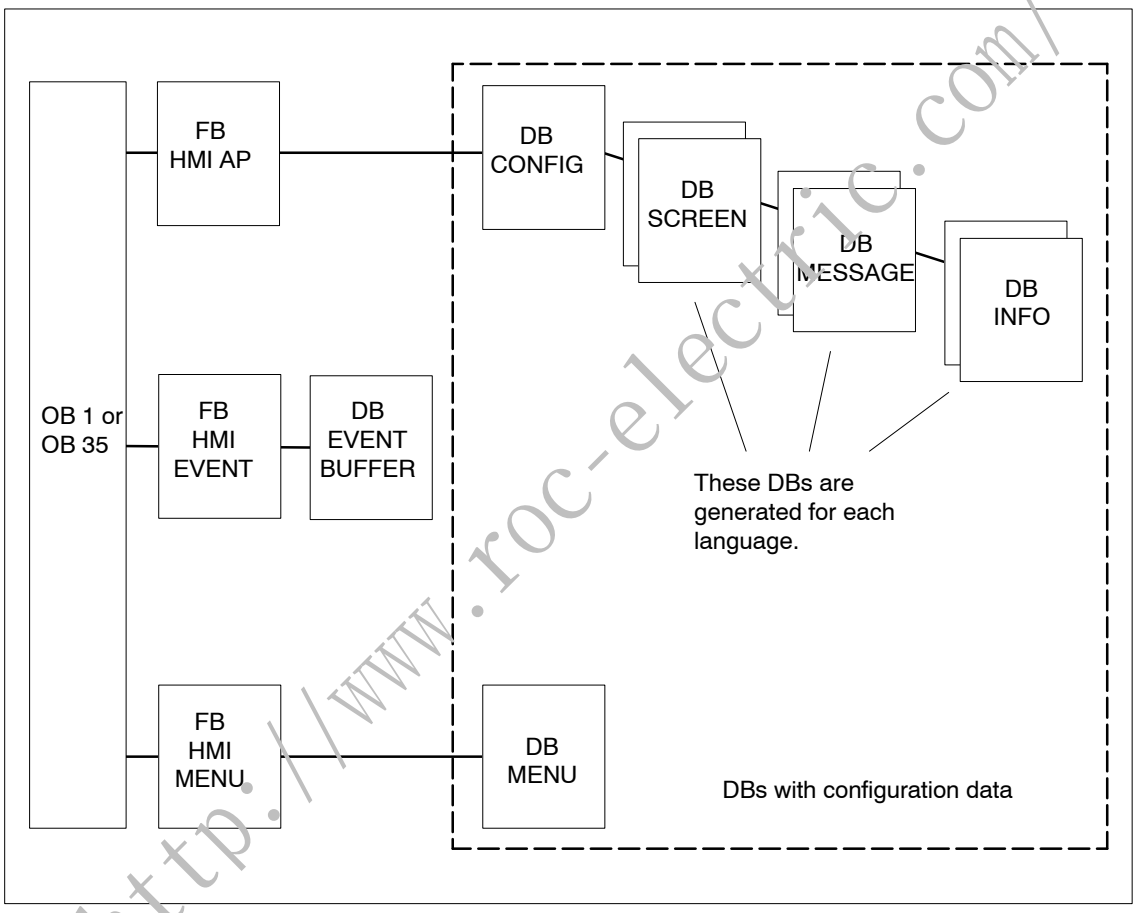


Figure 4-1 Overview of Program Structure

FBs for the HMI Functions

- FB “HMI API”

  The FB “HMI API” contains the following functions for executing the HMI functions:

  – Loading the screens, messages, and info texts to the memory of the integrated HMI module of the C7-613

  – Screen display

  – Message display

  – Info text display

  – Executing control requests

  – Transmitting keyboard and LED states

  – Managing passwords

  The contents of the screens, messages and info texts are created by using the configuration interface. The parameters are stored in the “CONFIG”, “SCREEN”, “MESSAGE” and “INFO” DBs (not relevant for sequence)

- FB “HMI EVENT”

  If you want to generate messages for your application, you will also need the “HMI EVENT” FB. It handles incoming messages and their acknowledgement. For each message, the following information is provided:

  – Message text

  – Date and time

  – “Coming, going, acknowledged” status

  As an option, you can set up the “EVENT_BUFFER” DB to save the event buffer to the MMC.

- FB “HMI MENU”

  You will need the “HMI MENU” FB only if you do not program the screen hierarchy yourself. To this purpose you specify the screen hierarchy in the “MENU” DB by means of the configuration interface. The screens can be changed by using the softkeys and the cursor keys. When a key is pressed, the “HMI MENU” FB evaluates the information in the “MENU” DB and displays the corresponding screens.

Calling the FBs

The FBs are called with an associated instance DB.

Example: Call “HMI API”, DB 11

Note

If you have programmed one of the three HMI FBs in your program, do not call the same FB again in a program section with a different priority class, since the FB must not interrupt itself.

Example: It is not permissible to call an FB in OB 1 and then call the same FB in the alarm OB.

Note

During operation, do not reload the instance DBs of the HMI FBs, since this causes inconsistent data and undefined user program performance.

Note

The HMI module integrated in the C7-613 is addressed with input/output addresses that are included in STEP 7/HW Config for the C7-613 panel (integrated HMI module). These addresses must not be written to, since this can cause undefined module performance.

Memory Requirement

User Memory:

If you use the FBs for the HMI functions, 16 KB of the 48 KB working memory are required for these functions. The rest can be used for your user program.

Loading Memory (MMC):

The DBs with configuration data for screens, messages, and info texts are stored only in the loading memory on the MMC and require the following memory:

- For process screens per language:
  - For a maximum of 64 screens: 1 DB with 16240 bytes
  - For more than 64 screens: 2 DBs with 16240 bytes each

- For messages per language:
  - For a maximum of 64 messages: 1 DB with 9584 bytes
  - For more than 64 messages: 2 DBs with 9584 bytes each
- For info texts per language:
  - 1 DB with 14448 bytes
- 1392 bytes for the “MENU”DB
- 6264 bytes for the “EVENT_BUFFER” DB

Power-Up Time

After startup of the C7-613, the content of the configuration DBs is loaded from the MMC to the memory of the integrated HMI module. The time needed for this depends on the size of the configuration and the call interval of the “HMI API” FB. At a call interval of 100 ms and a configuration with the maximum setup (128 screens, 128 messages and 128 texts) a power-up time of approx. 230 seconds results (at a call interval of 20 ms the time is reduced to approx. 110 seconds). This loading process is performed automatically after every POWER ON and general reset, and when the language is changed.

Take the following information on reducing the power-up time into consideration:

- Call the “HMI API” FB more often during the configuration time. The optimal call interval depends on the structure of your program and should lie at about 20 ms.
- As the number of configured screens, messages and info texts increases, the configuration time increases overproportionally.
- Limit the number of objects (screens, messages, info texts) to the minimum number possible.

  Once objects have been created with the configuration interface and stored in the DBs, they can no longer be removed and require space in the DBs.
- Similar screens can be created with the same screen by using variable components. (Four ASCII characters can be represented by using a double-word variable. Fixed numbers such as for example telephone numbers can be displayed as variables.)

Reloading Data Blocks with Configuration Data

Note

If you reload the data blocks with configuration data, you must always then perform the system function using the keyboard “reload application”. This causes the DBs with configuration data to be loaded from the MMC to the memory of the integrated HMI module of the C7-613. Only then will the new configuration data become effective.

4.3 Creating Configuration Data

4.3.1 Basis

Overview

The basic configuration, the configuration of the process screens, messages and info texts as well as the screen hierarchy are created by using the configuration interface. The configuration interface stores the configuration data in several DBs whose numbers are consecutive. This consecutive sequence of DBs may not be changed.

A configuration consists of the following DBs:

- Screen hierarchy DB “MENU” for the interconnection of process screens and info texts
- Configuration DB “CONFIG” for the basic configuration
- Max. of 2 process screen DBs “SCREEN” with the configuration data for screens
- Max. of 2 message DBs “MESSAGE” with the configuration data for messages
- Info text DB “INFO” with the configuration data for info texts

Screens, messages and info texts can be created simultaneously in a maximum of five languages. The corresponding DBs SCREEN, MESSAGE and INFO are created for each language.

The specification of a block ID is used in the DBs to specify the type of data block. The corresponding block IDs are called MENU, CFG, SCREEN, MESSAG and INFO.

The structure of the DBs is specified by the UDTs provided.

The screen hierarchy is also specified by using the configuration interface. It is stored in the “MENU” DB which is not language-specific.

The DBs are not included in the program. This saves user memory. The DBs are stored only in the loading memory on the MMC. To this purpose the DBs are identified as “unlinked”.

DB Structure

The configuration interface creates the following DB structure:

Table 4-1 DB Structure general

DB Number	Block name	Block ID	Description
n–1	MENU	MENU	Contains the screen hierarchy
n	CONFIG	CFG	Configuration DB with the following retentive data: Last set language, character set, date format, system language, system message $002, contrast, passwords, password level
Language 1:			Configuration data for ...
n+1	SCREEN	SCREEN	Process screens 0 to 63
n+2	SCREEN	SCREEN	Process screens 64 to 127
n+3	MESSAGE	MESSAG	Messages 0 to 63
n+4	MESSAGE	MESSAG	Messages 64 to 127
n+5	INFO	INFO	Info texts 0 to 127
Language 2:			Configuration data for ...
n+6	SCREEN	SCREEN	Process screens 0 to 63
n+7	SCREEN	SCREEN	Process screens 64 to 127
n+8	MESSAGE	MESSAG	Messages 0 to 63
n+9	MESSAGE	MESSAG	Messages 64 to 127
n+10	INFO	INFO	Info texts 0 to 127
Language 3:			Configuration data for ...
n+11	SCREEN	SCREEN	Process screens 0 to 63
n+12	SCREEN	SCREEN	Process screens 64 to 127
n+13	MESSAGE	MESSAG	Messages 0 to 63
n+14	MESSAGE	MESSAG	Messages 64 to 127
n+15	INFO	INFO	Info texts 0 to 127
Language 4:			Configuration data for ...
n+16	SCREEN	SCREEN	Process screens 0 to 63
n+17	SCREEN	SCREEN	Process screens 64 to 127
n+18	MESSAGE	MESSAG	Messages 0 to 63
n+19	MESSAGE	MESSAG	Messages 64 to 127
n+20	INFO	INFO	Info texts 0 to 127
Language 5:			Configuration data for ...
n+21	SCREEN	SCREEN	Process screens 0 to 63
n+22	SCREEN	SCREEN	Process screens 64 to 127
n+23	MESSAGE	MESSAG	Messages 0 to 63
n+24	MESSAGE	MESSAG	Messages 64 to 127
n+25	INFO	INFO	Info texts 0 to 127

All 5 DBs are not always used for a language:

- If you do not need more than 64 screens, only a single SCREEN DB is created.
- If you do not need more than 64 messages, only a single MESSAGE DB is created.

The configuration interface also assigns the DB numbers consecutively in these cases (refer to Table 4-2).

This consecutive sequence of DBs may not be changed.

Table 4-2 DB Structure at a max. of 64 screens and max. of 64 messages

DB Number	Block name	Block ID	Description
n–1	MENU	MENU	Contains the screen hierarchy
n	CONFIG	CFG	Configuration DB with the following retentive data: Last set language, character set, date format, system language, system message $002, contrast, passwords, password level
Language 1:			Configuration data for ...
n+1	SCREEN	SCREEN	Process screens 0 to 63
n+2	MESSAGE	MESSAG	Messages 0 to 63
n+3	INFO	INFO	Info texts 0 to 127
Language 2:			Configuration data for ...
n+4	SCREEN	SCREEN	Process screens 0 to 63
n+5	MESSAGE	MESSAG	Messages 0 to 63
n+6	INFO	INFO	Info texts 0 to 127
Language 3:			Configuration data for ...
n+7	SCREEN	SCREEN	Process screens 0 to 63
n+8	MESSAGE	MESSAG	Messages 0 to 63
n+9	INFO	INFO	Info texts 0 to 127
Language 4:			Configuration data for ...
n+10	SCREEN	SCREEN	Process screens 0 to 63
n+11	MESSAGE	MESSAG	Messages 0 to 63
n+12	INFO	INFO	Info texts 0 to 127
Language 5:			Configuration data for ...
n+13	SCREEN	SCREEN	Process screens 0 to 63
n+14	MESSAGE	MESSAG	Messages 0 to 63
n+15	INFO	INFO	Info texts 0 to 127

Languages

Use the **language ID** to specify for which language the blocks are intended. The language ID consists of a maximum of three characters (three-letter code/3LC).

Standard/special screens and system messages

The standard/special screens and the system messages are stored in the firmware of the C7-613 for the languages listed below. So that the C7-613 can automatically assign the standard/special screens and the system messages to your language, you must use the language IDs and character sets listed below.For all other language IDs, the standard/special screens and the system messages are output in English:

The configuration interface can be used to also carry out the language selection for the standard/special screens and system messages manually.

Language	Language ID (3-letter code/3LC)	Character set	Codepage
German	ENG	Latin 1	1252
English	GER	Latin 1	1252
French	FRA	Latin 1	1252
Italian	ITA	Latin 1	1252
Spanish	ESP	Latin 1	1252
Portuguese	POR	Latin 1	1252
Dutch	NLA	Latin 1	1252
Danish	DAN	Latin 1	1252
Norwegian	NOR	Latin 1	1252
Swedish	SWE	Latin 1	1252
Finnish	FIN	Latin 1	1252
Russian	RUS	Cyrillic	1251
Polish	POL	Central Europe	1250
Czech	CZE	Central Europe	1250
Hungarian	HUN	Central Europe	1250
Greek	GRE	Greek	1253
Turkish	TUR	Turkish	1254
Japanese	JPN	Japanese	Unicode-coded
Chinese (VRC)	CHI	Chinese	Unicode-coded
Chinese (TW)	TWI	Chinese	Unicode-coded
Korean	KOR	Korean	Unicode-coded

4.3.2 Creating Foreign-language Texts

Scenarios

The following scenarios are conceivable:

- You configure a project in a different language to your installation.
  Example: You have a German configuration interface and want to create a French project.
- You want to sell a project in several countries, each with their own national language.
  Example: You deliver a machine to Germany, England and France. All the texts are to be displayed in the respective national language at the operator panel.
- You supply a project to a multilingual country.
  Example: You sell a machine to Switzerland. The operator has to be able to select the languages German, French and Italian.

You should always initially create and test the project in one language only. This language then serves as the reference language for the translation.

Setting the language

Coding of the character set is dependent on the selected language keyboard. When editing foreign-language texts you therefore have to set the country-specific keyboard layout at your programming device/PC in Windows 2000 or Windows XP. Prerequisite is that you have added the desired language at the regional and language options of the Control Panel.

As an aid during editing you can have the screen keyboard displayed by using Start > Programs > Accessories > Input Aid.

Be sure to use the codepages listed in the table on Page 4-9 when editing in foreign languages.

If you use the configuration interface to add a language and select a specific character set for this language, you have to set a language at your programming device/PC which is assigned to the selected character set in the Table on Page 4-9.

ASCII code input by using the ALT key is only possible for the ASCII characters from 32 to 127 under Windows.

Screen hierarchy

Since the screen hierarchy (refer to Section 4.3.10) is the same for all the languages, you have to translate all the screens, messages and info texts 1:1. This means that each object in the source language may have exactly only one object in the target language.

4.3.3 Creating Asian Texts

Precondition

If you create a project with Asian text, you must have an Asian Windows system or Windows 2000 multilingual as the operating system. Only under these Windows systems can you access the required character sets.

The “Input Method Editor“ (IME) is available to help you enter Asian characters. This allows you, for example, to define texts in phonetic script.

Supported languages

The languages Chinese (PRC), Chinese (TW), Korean and Japanese are supported.

Special characters

Special characters are ASCII characters greater than ASCII 127, e.g. ã, ±, ä, è, ó.

If you use a non-Chinese character set in a text under an Asian Windows system, you should not use special characters because these may not be displayed correctly in some cases.

Messages

All the system messages are also available in the Asian languages.

Message numbers, message statuses (coming, going, acknowledged) and date/time also remain unchanged in alphanumeric characters in Asian projects and cannot be displayed in Asian characters.

Switching between Asian languages under Windows 2000

If the language support under Windows 2000 is installed, you can switch between the Asian languages offered in order to display a project.

You can only enter texts in the displayed language if you also change the operating system to the desired language.

Field length

Field lengths depend on the character width used. In the case of Asian character sets the double width of the characters can reduce the number of configurable characters in the fields.

4.3.4 Integrating the HMI FBs and DBs into a User Program

To create the program, do the following:

Step	Action
1	In SIMATIC Manager, open the “C7 613” library and copy the following objects to the block container of your project. • The required functions (FBs) • The user-defined data types (UDTs) If the block numbers have already been assigned, assign new numbers. The block names are copied unchanged to the symbol table of your S7 program.
2	Insert the data block “CONFIG” of the type UDT 15 with the “unlinked” property in the block container of your project.
3	Insert the data block “EVENT_BUFFER” of the type UDT 16 with the “unlinked” property in the block container of your project.
4	Select the “CONFIG” data block and open it by double-clicking on it. The configuration interface is opened in which you can set up the basic configuration and create screens, messages, info texts and the screen hierarchy.
5	Call the FBs either in OB 1 or the time-controlled OB 35.
6	Assign parameters to the FBs. The parameters are described in Sections 4.5 to 4.7.

4.3.5 Basic Parameter Assignment

The basic parameter assignment (configuration) is created by using the configuration interface.

The configuration interface is used to specify the basic parameter assignment valid for all the languages. The basic parameter assignment is stored in the “CONFIG” configuration DB. In addition, data that must be retained following a POWER OFF (most recent language setting, passwords, etc.) are stored in this DB.

Basic parameters:

- Selection of a maximum of 5 languages from the language stock
- Optionally for each language the specification of
  - Character set
  - Date format
  - Language of the standard/special screens and system messages
- Optionally edited text for system message $002
- Contrast setting of the display
- The value is entered via the function keys or cursor keys
- Password
- Password level

4.3.6 Creating Process Screens

Process screens are created by using the configuration interface.

Each screen consists of 4 lines with 20 characters each (10 graphical symbols for Chinese, Japanese and Korean).

A maximum of eight variables per screen can be specified for inputting and outputting data.

A screen is configured when at least one character has been edited in the static text.

The description of the screens is stored in the “SCREEN” DB through the configuration interface.

You can specify the following parameters for each screen:

- Screen number
- Screen name (optional)
- Initial screen Yes/No
- Contents of screen lines 1 to 4 for the static text
- Description of the 8 variables
  - Position in the screen
  - Display format and length
  - Memory area and address in the CPU C7-613
  - Field type (output field, output/input field, input field)
  - Limit check yes/no and if appropriate specification of the limits
- Transition using the softkeys F1 to F4 or one of the cursor keys to another screen or an info text

  This specifies the screen hierarchy (refer to Section 4.3.10 on Page 4-17).

4.3.7 Creating Messages

Messages are created by using the configuration interface.

Each message consists of 4 lines with 20 characters each (10 graphical symbols for Chinese, Japanese and Korean).

A maximum of four variables per message can be specified for outputting of data.

A message is configured if at least one character is edited in the static text. If non-configured messages are activated, the substitute message “Undefined message” is output.

You can specify an info text for each message. You can select it by using the “Cursor left“ or “Cursor right” keys.

The description of the messages is stored in the “MESSAGE” DB through the configuration interface.

You can specify the following parameters for each message:

- Event number
- Message name
- Type of message
  - Fault message (not possible for Message 0)
  - Operational message
- Contents of message lines 1 to 4 for the static text
- Description of the four output variables (no variables can be specified for Message 0, the idle message)
  - Position in the screen
  - Display format and length
  - Memory area and address in the CPU C7-613
- Assignment of an info text (you can assign one of the info texts No. 1 to No. 127 to each of the messages No. 1 to No. 127

4.3.8 Variable in Process Screens and Messages

Observe the following notes if you use variables in process screens or messages:

Note

If you define a variable that does not exist, the C7-613 switches to STOP mode when this variable is accessed. To prevent this, you can include the corresponding error OB (OB 121, OB 122, OB 85) in your user program.

Note

The fields variables must not overlap.

If the static text and the variables have the same position, the variable overwrites the static text.

Note

If the field length you selected for your output field is too small for the value to be represented, you will get the following representations:

- For binary, ASCII and Unicode formats, only the bits or characters which fit into the variables field are displayed and they are right justified.
- For decimal and hexadecimal formats, the character # is output instead of the value of the variables.

4.3.9 Creating Info Texts

Info texts are created by using the configuration interface.

Each info text consists of 4 lines with 20 characters each (10 graphical symbols for Chinese, Japanese and Korean).

An info text can be assigned to one or more screens.

An info text is configured when at least one character has been edited in the static text.

You can specify the following parameters for each info text:

- Info text number (0 to 127)
- Name of info text
- Contents of the info text lines 1 to 4
- Assignment of the cursor keys to a previous/following info text

The description of the info texts is stored in the “INFO” DB through the configuration interface.

4.3.10 Creating a Screen hierarchy

The screen hierarchy is created by your using the configuration interface to specify for each screen was which created beforehand by you which subsequent screens or info texts are to be called up by using the F1 to F4 softkeys or the cursor keys and how individual info texts are interlinked via the cursor keys.

You can configure the following alternatives:

Starting screen	Transition to ...	By using ...
Any process screen	Any process screen or special screen	F1, F2, F3, F4, or one of the 4 cursor keys
Any process screen	Any info text	F1, F2, F3, F4, or one of the 4 cursor keys
Any info text	Any info text	▽ △

It is not possible to configure a return from info texts to process screens:

Starting screen	Return transition to ...	By using ...
Any info text	The process screen from which the info text was called	ESC

The description of the screen hierarchy is stored by the configuration interface in the “MENU” DB and is identical for all the selected languages (maximum of 5).

Figure 4-2 uses an example to show the transition possibilities within a screen hierarchy.

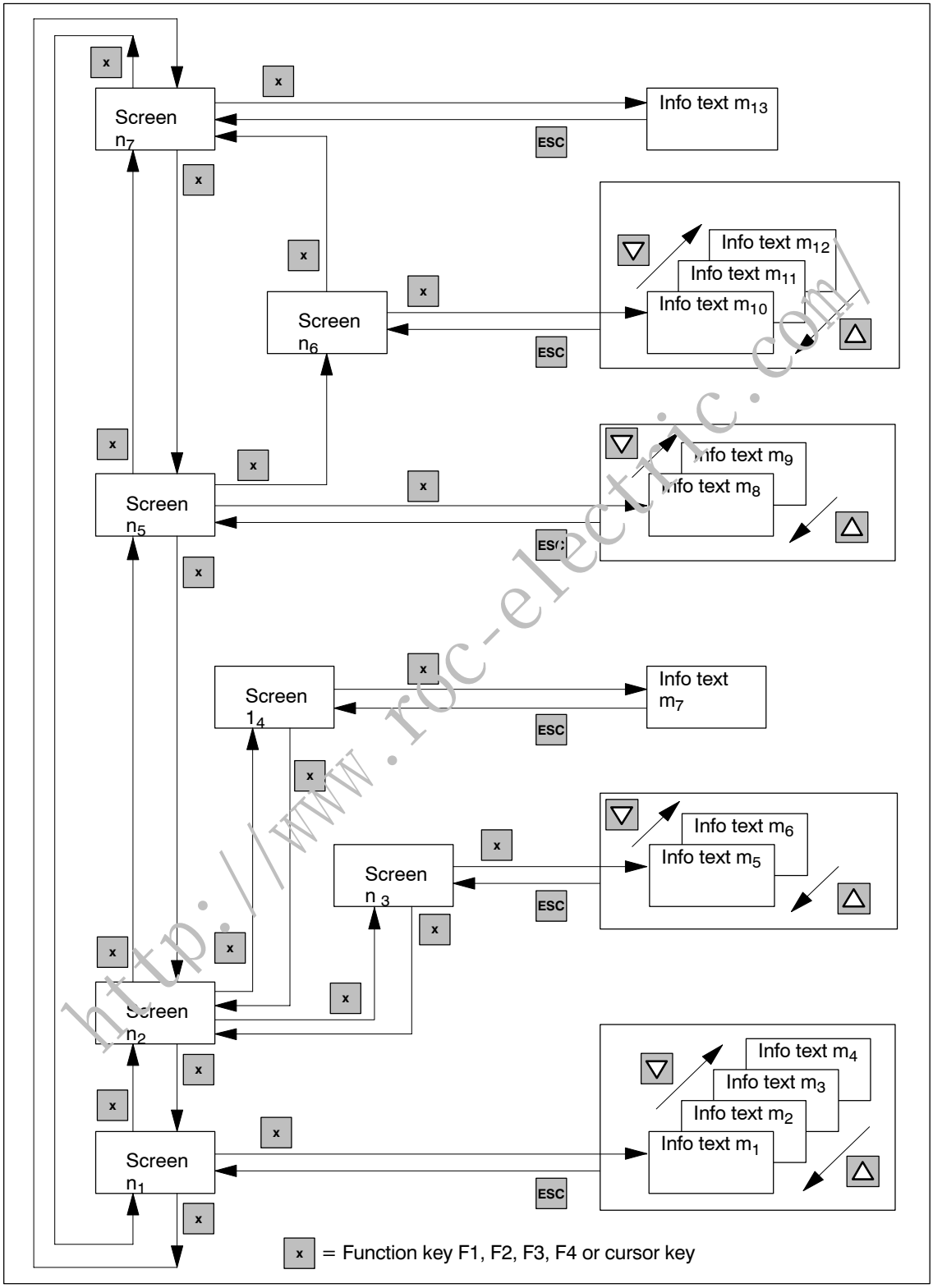


Figure 4-2 Example of a Screen Hierarchy

4.4 Converting Your Version 1 Project into a Version 2 Project

Requirements

- The DBs of the Version 1 projects have to belong to the C7_613 family and have a version <2.0.
  (See Object properties of the DBs, General Tab – Part 2)
- You have already created a Version 2 project (see Section 4.3.4).

Conversion

You convert a Version 1 project by using the configuration interface.

Step	Action
1	Open the configuration interface by clicking on the CONFIG DB of a Version 2 project.
2	Select the menu command **File > Open Version Project** in the configuration interface.
3	Navigate to the Version 1 project to be converted and open its block container.
4	Open the configuration interface of the Version 1 project by clicking on the its CONFIG DB.
5	Select the menu command **Edit > Convert to Version 2** in the configuration interface.
6	Save the converted project by using **File > Save** in the configuration interface.

Note

If you use a symbol table, a conflict may result when data blocks are being saved (error message (“Invalid symbol entry”).

In order to resolve the conflict, you have to assign the UDTs which are used by a Version 2 project to the configuration DBs in the “Data type” column of the symbol table:

DB SCREEN:	UDT11
DB MESSAGE:	UDT12
DB INFO:	UDT13
DB MENU:	UDT14
DB CONFIG:	UDT15

4.5 FB “HMI API” for the Basic HMI Functions

Function

The “HMI API” FB contains the essential functions for running the HMI functions.

The FB “HMI API” has to be called cyclically or time-controlled in your program.

Generation

In SIMATIC Manager, open the “C7 613” library and copy the “HMI API” FB to the block container of your project.

Structure and Description

The parameters of the “HMI API” FB are classified as follows:

- Parameters for specifying DB numbers: CFG_DB, EVENT_DB
- Status parameters that provide information about the status of the FB: RETVAL, ADDINFO
- HMI parameters that are updated cyclically: LEDS, OBJ_TYPE, OBJ_NO, KEYS
- Job compartment: JOB_ID, JOB_PAR1 to 3

Table 4-3 Parameters of the “HMI API” FB

Parameter	Declaration	Data Type	Memory Area	Description
CFG_DB	INPUT	BLOCK_DB	DB	Number of the configuration DB (CONFIG). This is the first DB with configuration data (CONFIG, SCREEN, MESSAGE, INFO)
EVENT_DB	INPUT	BLOCK_DB	DB	You can store the event buffer on the MMC in this DB. The DB must have been created beforehand with a size of 6144 bytes. (refer to Section 4.6.2). 0=no DB provided
LEDS	INPUT	DWORD	M, D, L, E, Const.	LED activation (see Section 4.5.1)
OBJ_TYPE	OUTPUT	BYTE	M, D, L, A	Type of object currently shown on the display 1 = Process screen 2 = Message 3 = Info text 5 = Standard/special screen
OBJ_NO	OUTPUT	BYTE	M, D, L, A	Object number currently shown on the display

Table 4-3 Parameters of the “HMI API” FB, continued

Parameter	Declaration	Data Type	Memory Area	Description
RETVAL	OUTPUT	INT	M, D, L, A	Return value; provides information about possible errors and the status of the HMI functions. The return values are described in Appendix B.1
ADDINFO	OUTPUT	INT	M, D, L, A	Supplementary information for the return value (RETVAL). The supplementary information is described in Appendix B.1
KEYS	INOUT	DWORD	M, D, L	Keyboard image (refer to Section 4.5.2)
JOB_ID	INOUT	INT	M, D, L	Job compartment, job number (Parameter can only be specified indirectly, refer to Section 4.5.3) 0 = Last job executed
JOB_PAR1	INOUT	INT	M, D, L	Job compartment Parameter 1 (parameter can only be specified indirectly; see Section 4.5.3)
JOB_PAR2	INOUT	INT	M, D, L	Job compartment Parameter 2 (parameter can only be specified indirectly; see Section 4.5.3)
JOB_PAR3	INOUT	INT	M, D, L	Job compartment Parameter 3 (parameter can only be specified indirectly; see Section 4.5.3)

4.5.1 LED Activation (LEDS)

Use

The LEDs in the C7-613 function keys can be activated from the user program. This makes it possible, for example, to signal to the operator with an illuminated LED which key he is supposed to press, depending on the situation.

Transfer

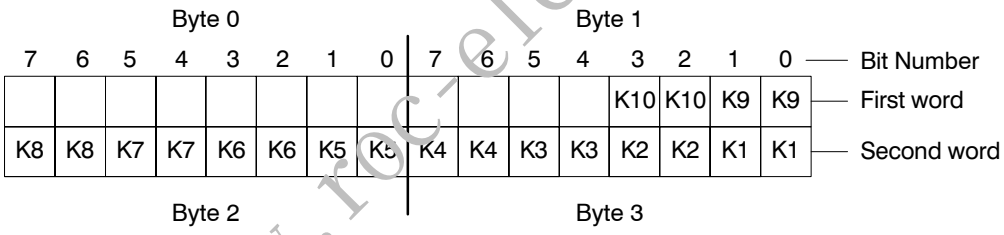
The LED image is updated each time the “HMI API” FB is called. If the C7-613 is in STOP mode, the LEDs are switched off.

Structure

The LED image is a data area with a fixed length of **two** data words.

Two bits are assigned permanently to each LED in the LED image .

LED Image:



The bit number (n) designates the first of two successive bits which together control the following four different LED states :

Bit n + 1	Bit n	LED Function
0	0	OFF
0	1	Flashing at approx. 2 Hz
1	0	Flashing at approx. 0.5 Hz
1	1	Steady light

4.5.2 Keyboard Image (KEYS)

Use

Key activation can be transmitted to the user program and evaluated there. Thus, an action such as switching on a motor can be initiated.

Transfer

Transmission of the keyboard image is filtered depending on the state of the C7-613. Keyboard operations that trigger internal responses (for example, completing an input with ENTER or changing between standard/special screens) are not relayed.

Table 4-4 Relaying Key Operations

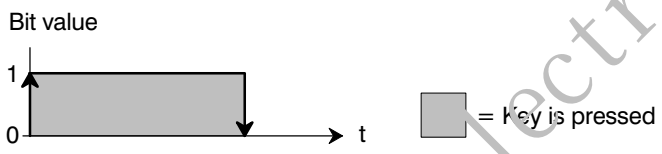
Key	State C7-613	Relay
ESC		No
ENTER		No
SHIFT	Screen level	No
	Screen level in input mode	Yes
	Standard/special screen	No
	Standard/special screen in input mode	Yes
	Message level	No
	Output of a fault message	No
Cursor	Screen level when screen is changed	Yes
	Screen level when changing from input field to input field	No
	Screen level in input mode	No
	Standard/special screen	No
	Message level	No
	Output of a fault message	No
Softkeys (F-keys)	Screen level	Yes
	Screen level in input mode	No
	Standard/special screen	No
	Message level	No
	Output of a fault message	No

Table 4-4 Relaying Key Operations, continued

Key	State C7-613	Relay
Function keys (K-keys)	Screen level	Yes
	Screen level in input mode with cursor	Yes
	Screen level in input mode with K-keys	No
	Standard/special screen	Yes
	Standard/special screen in input mode with cursor	Yes
	Standard/special screen in input mode with K-keys	No
	Message level	Yes
	Output of a fault message	Yes

Value Assignment

As long as the corresponding key is pressed, the assigned bit in the keyboard image has the value 1; otherwise the value 0.



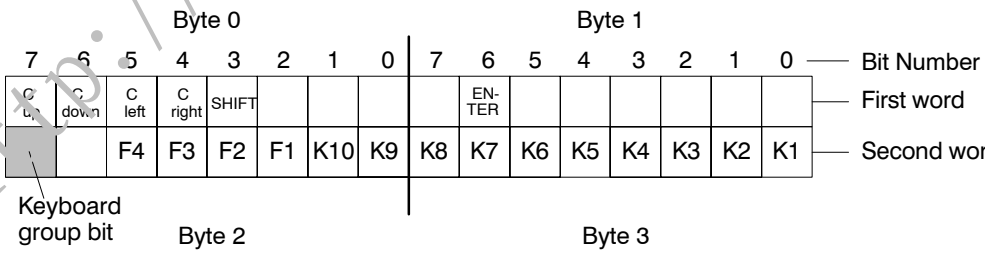
The bit for the SHIFT key is set as long as the SHIFT LED is switched on.

Structure

The keyboard image is a data area with a fixed length of **two** data words.

Exactly one bit is permanently assigned to each key in the keyboard image.

Keyboard image:



Note

The user program must not overwrite bits that are not used.

Keyboard Group Bit

The keyboard group bit is used as a check bit. Each time the keyboard image changes, it is set to “1”. After the data area has been evaluated, the user program should reset it.

By reading keyboard the group bit, it can be determined in the user program whether the image of the system keyboard has changed.

Example for the evaluation:

Table 4-5 Example for Evaluating the Keyboard Group Bit

User Program
Call the HMI APIFB
Evaluate the keyboard group bit: If the keyboard group bit = TRUE, proceed as follows: 1. Evaluate the keyboard image. 2. Carry out the desired reactions for the key operation. 3. Reset the keyboard group bit.

Note

Pressing several keys at the same time is not permissible and may cause incorrect entries under certain circumstances. The first key pressed is either responded to, or there is no response at all.

4.5.3 Job Compartment (JOB_ID, JOB_PAR1, JOB_PAR2, JOB_PAR3)

Job Compartment

You can initiate control jobs for HMI functions from the user program using the job compartment.

The job compartment consists of four words.

The job number (JOB_ID) is located in the first word of the job compartment. The job number can be entered only indirectly. Constants cannot be specified directly.

In the further words you enter a maximum of 3 parameters of the job.

Job number (JOB_ID)
Parameter 1 (JOB_PAR1)
Parameter 2 (JOB_PAR2)
Parameter 3 (JOB_PAR3)

Starting a Job

If the first word of the job compartment is not equal to zero, the control job is performed. This word is reset to zero after the end of the job.

Control Jobs

Table 4-6 lists all of the possible control jobs for the C7-613 (No. = job number of the control job), including their parameters:

Table 4-6 Control Jobs (JOB_ID) including Parameters

No.	Function
13	**Switching the language** Parameter 1 1: 1st language 2: 2nd language 3: 3rd language 4: 4th language 5: 5th language The currently set language can be reset with Parameter 1 = “0”. The language is supplied at Parameter 1. Parameter 2, 3 -
22	**Setting the display contrast** Parameter 1 0 to 15 Parameter 2, 3 –
24	**Password logout** Parameter 1, 2, 3 -
49	**Clearing the event buffer** Parameter 1, 2, 3 -

Table 4-6 Control Jobs (JOB_ID) including Parameters, continued

No.	Function
51	**Screen selection** **Note:** It is not possible to select a process screen/special screen if an object with a higher display priority (see Section 5.8) is displayed at the moment. The request is terminated with the error information “880B. To select the screen, the request has to be repeated when the higher priority object is no longer displayed. The type of object currently shown on the display is provided by means of the “OBJ_TYPE” parameter in the “HMI API” FB (see Section 4.5). Jobs with a screen number in the range 128 to 255 are rejected with the error information “880A” in as far as it is not the screen number of a special screen. • **Process Screens** Parameter 1 Screen number 0 to 127 (7F) Parameter 2, 3 - • **Special Screens** (see Section 5.4): The following special screens that are integrated in the firmware can be selected using their permanent screen number: Parameter 1 Messages 205 (CD) View 206 (CE) Save buffer 208 (D0) Delete buffer 209 (D1) Total/active number 253 (FD) Select message level 254 (FE) Select idle message and delete screen memory (refer to Section 5.2) System settings 218 (DA) Load application 221 (DD) Language selection 222 (DE) Contrast Password 227 (E3) Login 228 (E4) Password input (editing) 225 (E1) Logout Parameter 2, 3 -
90	**Saving the event buffer to the event buffer DB and the MMC** Parameter 1, 2, 3 - Fault messages are not displayed while the event buffer is being saved.

4.6 FB “HMI EVENT” for the message output

Function

The “HMI EVENT” FB manages the incoming operational messages and fault messages and checks the acknowledgement of fault messages.

If a fault message exists, it is output at the display as it was created by you by using the configuration interface. Operational messages are not output directly, but are just displayed in the message level.

Operational and fault messages are entered in the event buffer.

The FB “HMI API” has to be called cyclically or time-controlled in your program.

Generation

In SIMATIC Manager, open the “C7 613” library and copy the “HMI EVENT” FB to the block container of your project.

Structure and Description

Table 4-7 Parameters of the “HMI EVENT” FB

Parameter	Declaration	Data Type	Memory area	Description
API_DB	INPUT	BLOCK_DB	DB	Number of the instance DB of the “HMI API” FB. Needed for synchronization of “HMI EVENT” FB and “HMI API” FB.
EVENTS	INPUT	ANY	M, D, L, E	Pointer to the message area. The bit address of the message area must be “0”. You must specify the same length for the message area and the acknowledgement area. Additional information is provided in Section 4.6.1
ACKS	INPUT	ANY	M, D, L, E	Pointer to the acknowledgement area. The bit address of the acknowledgement area has to be “0”. You must specify the same length for the acknowledgement area and the message area. Additional information is provided in Section 4.6.1
RETVAL	OUTPUT	INT	M, D, L, A	Return value; provides information about possible errors. The return values are described in Appendix B.1

4.6.1 Operational Messages and Fault Messages

Triggering Messages

Messages are triggered by setting a bit in the message area. The position of the message area is specified with the “EVENTS” parameter.

Message Area

A message area can be specified for messages 1 to 127.

As soon as the bit is set in the message area and the “EVENT” FB has been run, the fault/operational message is entered as “arrived” in the event buffer. In addition, flashing fault messages appear on the display.

After resetting the same bit, the message is recorded as “gone”.

There is no message area and no message bit for Message 0 (idle message).

Assignment of Message Bit and Message Number

A bit in the message area belongs to each message. The bits are assigned automatically to message numbers in ascending order.

A message bit cannot be assigned to an idle message (message number 0).

Example:

You have assigned parameters to the following message area:

`DB 60 Address 0 Length 127 bits` (P#DB60.DBX 0.0 BOOL 127)

Figure 4-3 shows the assignment of all 127 message numbers to the individual bit numbers in the message area.

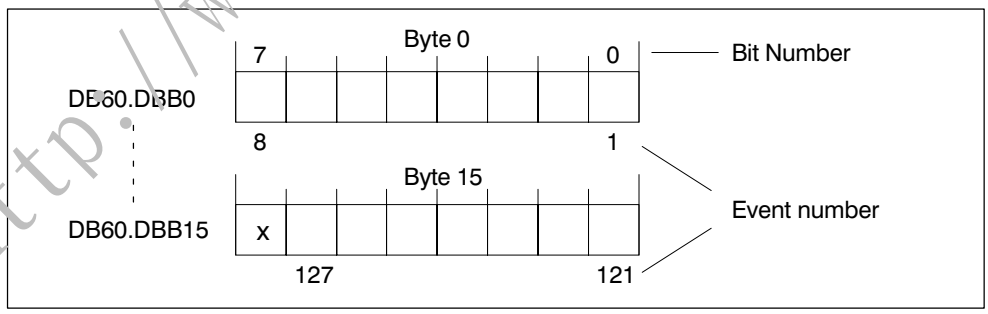


Figure 4-3 Assignment of Message Bit and Message Number

Acknowledgement

Fault messages are used to display extraordinary operating states. You therefore have to acknowledge the fault messages by setting a bit in the acknowledgement area. The position of the acknowledgement area is specified with the “ACKS” parameter. You can alternatively acknowledge:

- By pressing the ENTER key

  The “HMI EVENT“ FB recognizes that the “ENTER” key was pressed and sets the corresponding bit in the acknowledgement area. The fault message is then considered acknowledged and is no longer displayed. Reading out the acknowledgement area shows that the message was acknowledged.

- By setting a bit in the acknowledgement area

  The message is acknowledged in the user program by setting the bit in the acknowledgement area. The “HMI EVENT“ FB evaluates the acknowledgement area. The fault message is then considered acknowledged and is no longer displayed.

Acknowledgement Area

You must provide an acknowledgement bit for each message bit. The acknowledgement area must have the same length as the message area.

Assignment of the Acknowledgement Bit to the Message Number

Each fault message has a message number. The same bit x of the message area and the same bit x of the acknowledgement area are assigned to this message number, respectively.

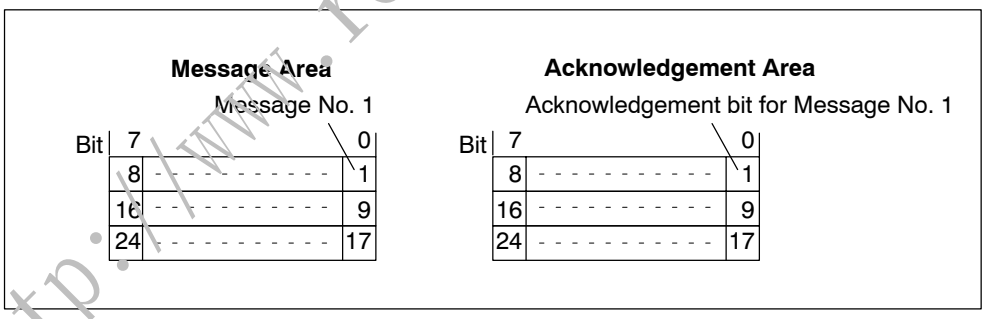


Figure 4-4 Assignment of Acknowledgement Bit and Message Number

The table below describes the sequence for fault message acknowledgement.

Table 4-8 Sequence for Fault Message Acknowledgement

Step	Action	Response	Description
1	The user program sets the fault message bit when an event arrives.	The FB resets the associated acknowledgement bit. (If you have specified an input area for the acknowledgement bits, they cannot be reset.)	A fault message has arrived but has not been acknowledged.
2	Acknowledge by pressing the ENTER key	The FB sets the acknowledgement bit	Fault message is acknowledged
	Acknowledge by setting the acknowledgement bit in the user program	The FB evaluates the acknowledgement bit	
3	Reset the fault message bit		Fault message is gone (regardless of acknowledgement status)

4.6.2 Structure of the Event Buffer DB (EVENT_BUFFER)

Function

In order to save and perform further work on the event buffer, it can be stored in a DB (EVENT_BUFFER) on the MMC. For archiving purposes, for example, you can retentively store the status of the control process at any time. This is achieved by selecting the corresponding special screen on the C7-613 or via the job compartment at the FB “HMI API”.

The “EVENT_BUFFER” DB is created by means of the UDT 16 with the “unlinked” property.

Structure and Description

Table 4-9 Structure of the Event Buffer DB

Address	Name	Type	Description
0	EVENT[1].NUMBER	BYTE	Message number The first message is the most recent message
1	EVENT[1].STATE	CHAR	Status of message “K”=coming “G”=going “Q”=acknowledged
2	EVENT[1].PVARS[1]	DWORD	Value of Process Variable 1 at the time of the status change
6	EVENT[1].PVARS[2]	DWORD	Value of Process Variable 2 at the time of the status change
10	EVENT[1].PVARS[3]	DWORD	Value of Process Variable 3 at the time of the status change
14	EVENT[1].PVARS[4]	DWORD	Value of Process Variable 4 at the time of the status change
18	EVENT[1].TIMESTAMP.YEAR	BYTE	Time stamp, year (BCD encoded)
19	EVENT[1].TIMESTAMP.MONTH	BYTE	Time stamp Month (BCD encoded)
20	EVENT[1].TIMESTAMP.DAY	BYTE	Time stamp Day (BCD encoded)
21	EVENT[1].TIMESTAMP.HOUR	BYTE	Time stamp Hour (BCD encoded)
22	EVENT[1].TIMESTAMP.MINUTE	BYTE	Time stamp Minute (BCD encoded)
23	EVENT[1].TIMESTAMP.SECOND	BYTE	Time stamp Second (BCD encoded)
24 to 47	EVENT[2]...	BYTE	Second message
48 to 71	EVENT[3]...	BYTE	Second message
	to		
6120 to 6143	EVENT[256]...	BYTE	256th message

4.7 FB “HMI MENU” for the Screen Hierarchy

Function

The “HMI MENU” FB provides support for the screen hierarchy.To accomplish this, the FB fetches information from the “MENU_DB” DB (see Section 4.3.10) regarding which key is to display which screen or which info text, and calls the corresponding objects. The softkeys and the cursor keys are used to change the screens.

Inserting an FB in the project

In SIMATIC Manager, open the “C7 613” library and copy the “HMI MENU” FB to the block container of your project.

Structure and Description

Table 4-10 Parameters of the “HMI MENU” FB

Parameter	Declaration	Data Type	Memory Area	Description
API_DB	INPUT	BLOCK_DB	DB	Number of the instance DB of the “HMI API” FB. Needed for synchronization of “HMI MENU” FB and “HMI API” FB.
MENU_DB	INPUT	BLOCK_DB	DB	Number of the DB for the screen hierarchy (refer to Section 4.3.10)
RETVAL	OUTPUT	INT	M, D, L, A	Return value; provides information about possible errors. The return values are described in Appendix B.1

Note

The screen hierarchy is identical in all 5 selected languages.

Operating the C7-613

5

5.1 Keyboard

Keyboard Design

The layout of the keys on the C7-613 is ergonomically tailored with respect to distribution and color composition for operator prompts in the various operating modes of the device

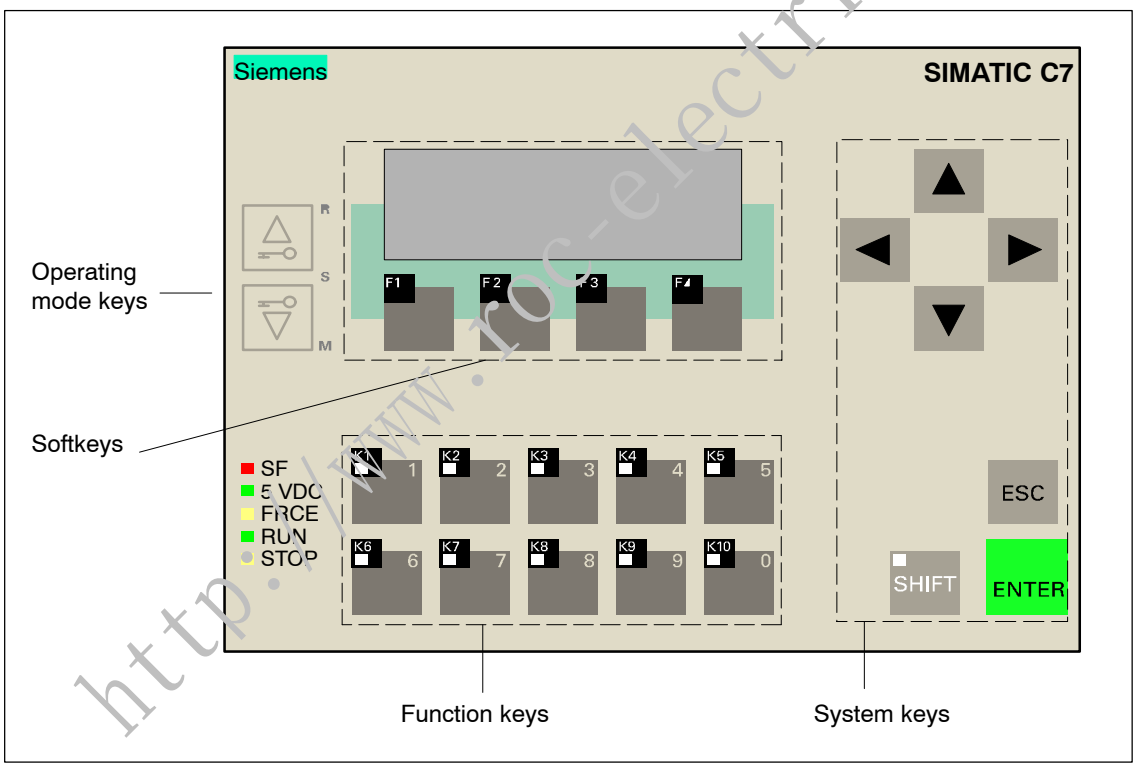


Figure 5-1 C7-613 Keyboard

Key Labeling and Key Function

The C7-613 is operated using the keyboard. The keyboard has four different functional blocks (refer to Figure 5-1):

- System keys
- Function keys (K-keys)
- Softkeys (F-keys)
- Operating mode keys

System keys

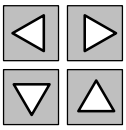
The keypad with the system keys is highlighted in Figure 5-1. The functionality of the individual keys is explained in Table 5-1.

with the corresponding K-keys used.

Table 5-1 Function of the System Keys

Key	Function	Description
SHIFT	SHIFT key	The SHIFT key is used to enable the second function of the function keys with double assignment When the SHIFT key is pressed, the SHIFT LED illuminates, indicating that the secondary function is activated. The function keys are then used to enter numerical values. The function keys (K-keys) can be assigned two functions only if the entry using function keys setting has been selected in the configuration interface. The function keys (K-keys) do not have two functions assigned if the entry using cursor keys setting has been selected in the configuration interface.
ENTER	Enter key (ENTER)	By pressing ENTER you can • Confirm and end an input, • Acknowledge fault messages, • Pass from the message level to the screen level, • Abort the display of an info text and return to the previous screen.
ESC	Escape key (ESCAPE)	By pressing ESC you can • Undo field entries as long as you have not confirmed them by pressing the ENTER key, • Branch from a screen to the screen previously selected in the screen memory, • Change from the initial screen to the message level (the ESC key is not active in the message level), • Abort the display of an info text and return to the previous screen.

Table 5-1 Function of the System Keys, continued

Key	Function	Description
	Cursor Keys	By pressing the cursor keys you can • Move within a screen either character-by-character or field-by-field to the left, the right, down, or up, depending on the operation required • Carry out the screen change and make the transition within the info texts, • Page through the messages within the event buffer or the message level. • Select the sign, • Enter hexadecimal values, • Correct and complete entries.

Note

Pressing several keys at the same time is not permissible and may cause incorrect entries under certain circumstances. The C7-613 either responds to the first key pressed or does not respond at all.

Function keys

The function keys K1 to K10 are used to call user-programmable functions. Each key has its own LED (see Figure 5-1) that you can activate from the user program.

If you have selected the “entry using function keys” setting, the K-keys can be used for entering numerical values by pressing the Shift key (Shift Lock, LED of Shift key is switched on).

Softkeys

The softkeys F1 to F4 located below the display (see Figure 5-1) can also be used to call user-programmable functions.

By using the “HMI MENU” FB, you can - depending on the display - assign alternating functions to the softkeys.

Operating Mode Keys

These keys are used to switch the C7-613 to the following different operating modes: RUN, STOP and MRES (general reset). Additional information about the operating modes is provided in Section 3.1

5.2 Operator Control Levels

Overview

At the C7-613 you can change between two separate operating levels:

- **Message Level**

  The message level displays pending messages.

- **Screen Level**

  In the screen level, functions are selected, controlled, and executed.

Message Level

The message level is the highest level on the C7-613. In the message level, pending operational messages and fault messages are displayed along with system messages. After the configuration has been loaded, the **idle message** is displayed.

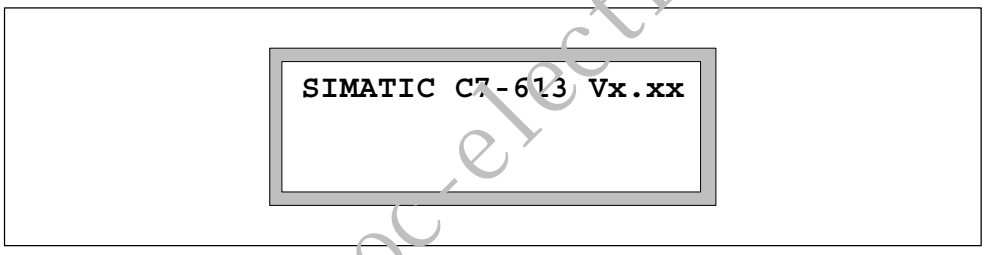


Figure 5-2 C7-613 Idle Message

If you have configured the **Message 0** , Message 0 is displayed instead of the idle message. Message 0 is assigned if you entered a static text.

Variables cannot be specified for Message 0.

Screen Level

The first screen of the screen level is the **basic screen**. Using the soft keys, you can branch from the basic screen to the **standard**/**special screens** (see Section 5.4).

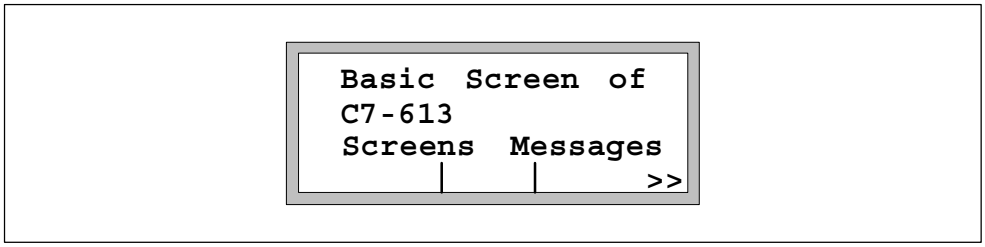


Figure 5-3 C7-613 Basic Screen

If you have configured an **initial screen**, the initial screen is displayed instead of

the basic screen. From here, you branch to other screens, depending on the configuration.

In screens you can

- View current process values,
- Enter values,
- Trigger functions via softkeys.

The linking of individual screens is referred to as the screen hierarchy (see Section 4.7). If you go deep into the screen hierarchy, you can use the ESC key to return one level at a time until you reach the initial screen (for the ESC function, see Section 5.1). The numbers of the screens which you have selected are stored in a screen memory. The screen memory can be deleted by means of the Job Request 51, screen number 254 decimal (FE hex) (refer to Section 4.5.3).

If you have assigned an initial screen, you cannot branch to the standard/special screens using the basic screen. In order to access special screens, you have specify the selection of the desired special screens on the softkeys or cursor by means of the configuration interface in your process screens. Accessing the standard screens is not possible.

Changing the operating level

To change the operating levels:

- From the screen level to the message level using a function key (K-key).

  To accomplish this, in your user program, place control job 51 for changing to the “Select message level” special screen (screen number 253 decimal, FD hex) on one of the function keys.

  Pressing the ESC key several times will also take you from the screen level to the message level (see description of the ESC key in Section 5.1),

- From the message level to the screen level by pressing the ENTER .

Forced Change to the Message Level

The screen level is exited automatically as soon as a system message or fault message is pending for display. The C7-613 then switches to the message level to display such a message. This level cannot be exited as long as a system message or an unacknowledged fault message is displayed. An unacknowledged fault message is indicated at the C7-613 by flashing of the fault message.

A fault message is acknowledged by pressing the ENTER key or by setting the corresponding bit in the acknowledgement area (see Section 4.6).

A system message is removed automatically after 2 s. In the case of operations that take long, such as saving the event buffer, the message is removed after the function is completed.

Once the fault message is acknowledged or the system message is removed, the C7-613 returns to the point from which it branched to the message level.

In the case of operational messages, the screen level is not exited. To display an operational message, you must change explicitly to the message level.

5.3 Entering Values

Overview

Numerical values are entered in the C7-613 in entry fields of screens and special screens (for example, when entering a password).

Values can be entered alternatively

- With function keys,
- With cursor keys.

The selection is specified by using the configuration interface. The input method cannot be changed during operation.

Caution

The following applies for the C7-613 with an HMI Version < 2.0.0:

If you are working with password protection, the C7-613 switches to password level 0 at logout. Logout occurs automatically if you have not performed an operation for 2 minutes or when the special screen "Logout" is selected.

However, only the selection of new screens is password-protected in this case.

The screen that is currently open as well as screens that you can access with ESC are not password protected. This also means that all of the entries in these screens are not password protected. Likewise, automatic logouts do not terminate the input mode in the case of variables.

In order to protect the C7-613 against unauthorized access, you should therefore page back with ESC so far until no screen is displayed which needs to be protected.

Field with Decimal Places

The decimal position cannot be changed during entry. The position is specified when the variable fields are configured.

Entering and Displaying of Binary Numbers

Note

If the length of the entry field is less than the number of bits specified in the data type, the bits that are not represented are filled with 0 when the entry is made.

Example:

You have specified 5 as the length of the field (Decimals_Length).
You have selected “Byte” as the data type (Access Code).

	Display	Value in the Byte
Prior to entry	11111	11111111
After entering the value 11110	11110	00011110

Limits

You can specify limits for numerical input fields in the configuration interface. A limit check is performed in these fields. C7-613 checks the limits when the ENTER key is pressed after a value is entered or modified. The values entered are accepted only if they are within the limits. If a value is entered that lies outside these limits, a corresponding system message is output.

5.3.1 Entry using Function Keys (K-keys)

Caution

If you have selected the “entry using function keys” setting, and in addition, you want to activate functions using the keys, hazardous system states may arise due to the double assignment of the function keys.

Make absolutely sure in this case that, prior to entering each value with the SHIFT key, the function keys have been switched to the entry mode. Illumination of the SHIFT LED indicates entry mode.

Also note that once the entry is acknowledged/cancelled with ENTER/ESC, the entry mode is automatically terminated (SHIFT LED turns off).

In fields where a value may be entered by the operator, the numerical value is entered on a character-by-character basis using the function keys (SHIFT Lock).

The entry begins right-justified in the fields. Entered characters are shifted to the left.

When entering decimal numbers, the “Cursor up/down” keys can be used to set the **sign**.

If the field already contains a value, it is completely removed from the field when the first character is entered.

When entering values, do the following:

Step	Action	Result
1	Using the cursor keys, select the desired entry field within the screen.	The cursor is located on the input field.
2	Press the SHIFT key in order to enter the input mode. 	The LED of the SHIFT key is illuminated (SHIFT Lock). The cursor is on the lowest order position
3	Enter the appropriate value using the function keys (K-keys). Set the sign with the “Cursor up” or “Cursor down” keys.	Your entry is displayed in the entry field.
4	You can make **corrections** with the “Cursor left” key. This returns you to the previously entered digit, and the lowest order position (cursor position) of the entered value is deleted. Now a new digit can be entered.	
5	As soon as you begin with the input, you cannot exit the respective field until you confirm or cancel the entry. Confirm your entry with  Cancel faulty input with 	The value is entered. The entry is terminated, and the SHIFT LED is turned off. The original value is entered again automatically. The entry is terminated, and the SHIFT LED is turned off.
6	If you wish to continue, place the cursor (using the cursor keys) on another entry field, and perform the next entry as described above in Steps 2 to 5.	

Entry of Hexadecimal Numbers

Also enter hexadecimal values using the function keys (K-keys). To enter the values A to F, respectively, enter one digit of the number using the function keys. Then, you can use the “Cursor up” and “Cursor down” keys to select the values A to F.

5.3.2 Entry Using Cursor Keys

In fields where a value may be entered by the operator, the numerical value is entered on a character-by-character basis using the cursor keys (SHIFT Lock).

When entering values, do the following:

Step	Action	Result
1	Using the cursor keys, select the desired entry field within the screen.	The cursor is located on the input field.
2	Press the SHIFT key in order to enter the input mode. 	The LED of the SHIFT key is illuminated (SHIFT Lock). The cursor is on the lowest order position
3	Enter the appropriate value using the function keys. If a value is already displayed, change this value on a character-by-character basis with the “Cursor up” and “Cursor down” keys. If no value is displayed yet, enter the value character-by-character. First, enter the lowest order position using “Cursor up/down”, and then expand the value to include additional positions. Move the cursor character-by-character by using the Cursor left” and “Cursor right” keys. If the cursor is positioned on the lowest order position, it jumps to the left to the highest position or the sign of the number when the “Cursor right” key is pressed. Likewise, you can use the “Cursor up” and “Cursor down” keys to change the sign. New positions are added by placing the cursor on the sign or the highest order position and activating the “Cursor left” key again.	Your entry is displayed in the entry field.
4	You can make **corrections** by moving the cursor to the appropriate position using the “Cursor right” and “Cursor left” keys. To change the value, use the “Cursor up” and “Cursor down” keys.	

Step	Action	Result
5	As soon as you begin with the input, you cannot exit the respective field until you confirm or cancel the entry.	
	Confirm your entry with ENTER	The value is entered. The entry is terminated, and the SHIFT LED is turned off.
	Cancel faulty input with ESC	The original value is entered again automatically. The entry is terminated, and the SHIFT LED is turned off.
6	If you wish to continue, place the cursor (using the cursor keys) on another entry field, and perform the next entry as described above in Steps 2 to 5.	

Entry of Hexadecimal Numbers

Hexadecimal numbers are entered like decimal numbers.

5.4 Operator Input Using Standard/Special Screens

Overview

You can use the keyboard both to select various settings and execute functions. A variety of standard/special screens are available for the C7-613 for this purpose. For example, the event buffer can be called, or a password can be entered.

There are two types of screens:

- Standard screens:
  - Standard screens are used to select special screens
  - Instead of the standard screen you can create an own screen
- Special screens:
  - Special screens are used to perform a function (for example, selecting a language).
  - Special screens cannot be changed.
  - In contrast to standard screens, special screens can be selected from the user program with Control Job 51.

Branching to Standard Screens/Special Screens

How you access the standard screens/special screens depends on whether you specified an initial screen:

- If you did not configure an initial screen, you can access the standard screens/special screens using the basic screen.
- If you have assigned an initial screen, you cannot branch to the standard/special screens using the basic screen. In order to access special screens, you have specify the selection of the desired special screens on the softkeys or cursor by means of the configuration interface in your process screens. Accessing the standard screens is not possible.

Screen Hierarchy of the Standard/Special Screens

Figure 5-4 shows an overview of the existing screen hierarchy for standard/special screens. Detailed information regarding functions and operator input for the standard/special screens is provided in the corresponding sections of this manual .

The numbers refer to the screen numbers, which are provided in the “OBJ_NO” parameter in the “HMI_API” FB.

With Job Request 51, the special screens can be selected from your user program using the numbers designated with an *.

You can use the configuration interface to configure the switch from a process screen to a special screen.

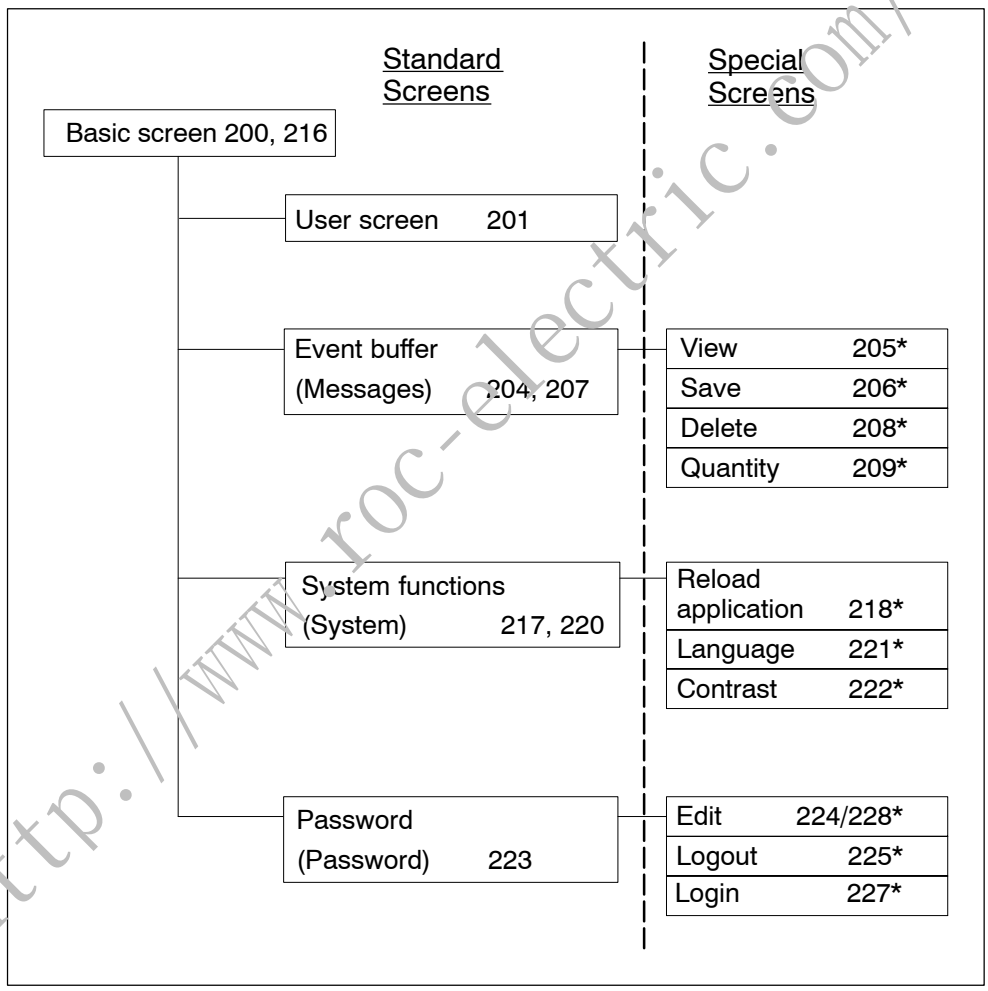


Figure 5-4 Hierarchy of Standard/Special Screens

Example

Based on the provided sample program “ZXX31_01_C7-613,” a procedure is described below for branching between individual screens in the screen hierarchy starting from the basic screen .

Step	Action	Result
1	Switch the C7-613 to RUN mode.	The idle message “Simatic C7-613 Vx.xx” is displayed.
2	Press the “ENTER” key.	The basic screen is displayed (see Figure 5-5).
3	Using the softkeys below the << and >> label, you can branch to other screens.	Additional screens are displayed.
4	In the basic screen, press the key for selecting the standard screen “Messages” (F3).	The standard screen “Event buffer” is displayed (see Figure 5-6).
5	Press the “View” key (F2).	The first entry in the event buffer is displayed.

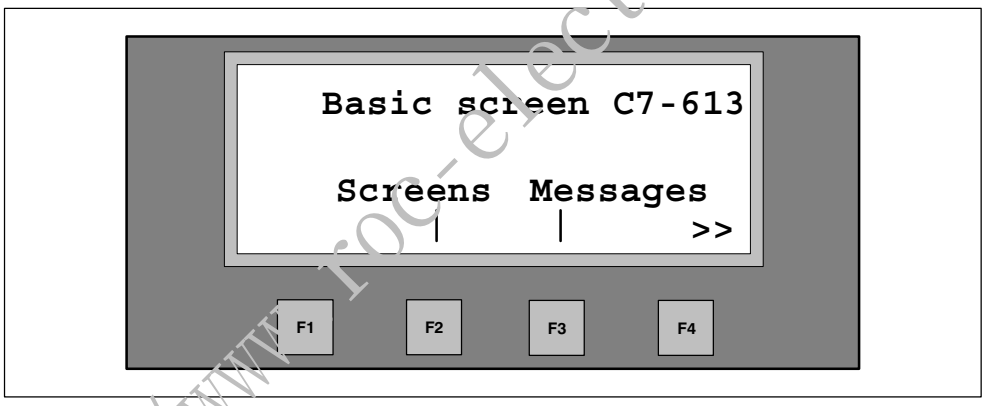


Figure 5-5 Branching in the C7-613 Basic Screen

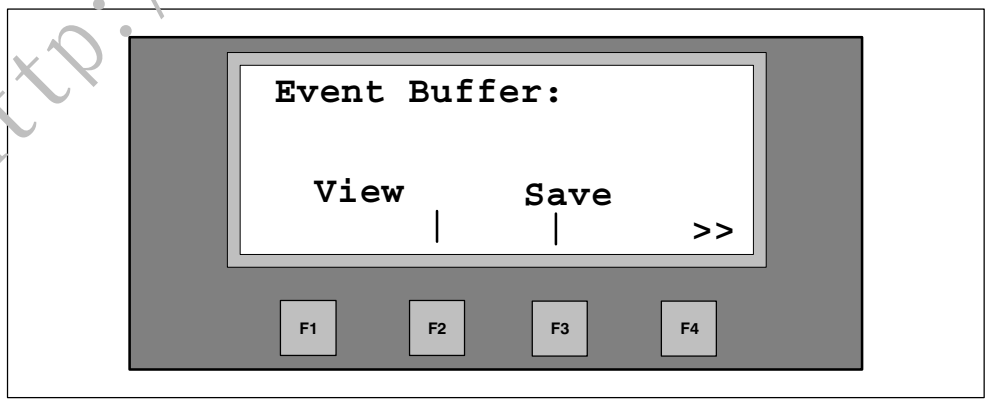


Figure 5-6 Branching in the “Event Buffer” Standard Screen

5.5 Screens

Overview

Process events (for example, processing machine or mixing station events) are displayed in screens and controlled as well (by operator inputs) on the C7-613. These screens are created application-specifically.

Logically associated process values are recorded in screens, thus providing an overview of a process or a plant. In addition to this alphanumeric “image” of the process events, screens offer the option of entering new process values, thus enabling the process to be controlled. A maximum of 128 screens containing 8 variables each can be specified in the C7-613.

Example: The process values in a screen can be arranged by the user according to thematic groups.

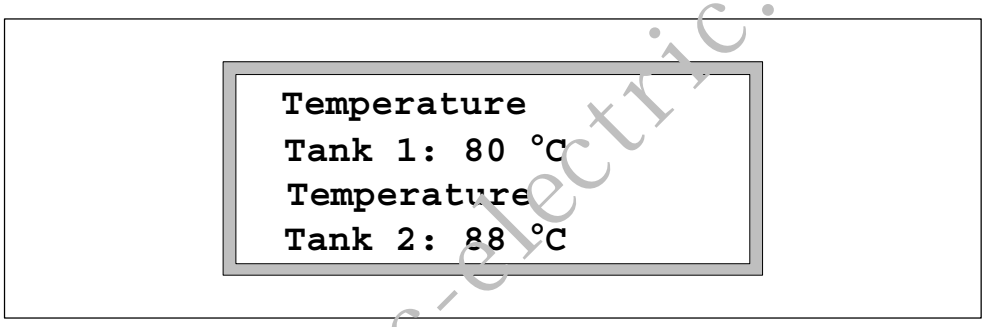


Figure 5-7 Example of Thematically Grouped Process Values (C7-613)

Selecting a Screen

Once the screens have been created (see Section 4.3.6), you can view them on the C7-613. To do this, you must select the screens.

Screens are selected with

- Softkeys (F-keys) and the cursor keys
- From the user program using Job Request 51.

Table 5-2 Options for Selecting a Screen

Selection	Description
Selection with softkeys and cursor keys	You can use the softkeys and the cursor keys to branch from one screen to another screen. The branching is specified by using the configuration interface in the DB for the screen hierarchy (MENU_DB, refer to Section 4.3.10).
Selection using a Job Request	To implement an operator prompt, you can call up a screen from the user program with Job Request 51 (see Section 4.5.3)

Components of a Screen

A screen consists of the following components:

- Static text

  The static texts contain explanations for the operator. They can also include information about the assignment of softkeys.

- Input and output fields for the following:
  - Output of process values (actual values)
  - Input of setpoint values, which are transmitted immediately after the input,
  - Combined input/output of setpoint and actual values.

Screens are created by using the configuration interface (refer to Section 4.3.6).

Input and Output Fields

Input and output fields have the following characteristics (see also Section 5.3):

- Input fields specify setpoints in numerical form.
- The flashing cursor is visible in the selected input field.
- Output fields and combined input and output fields display actual values.
- The number format, number of places before and after the decimal point, and limits are configured.

Selecting the Input and Output Fields

When a screen is displayed, the cursor is shown on the first input field. The cursor is not visible if a screen does not have an input field or a combined input/output field.

The cursor keys are used for jumping from one input field to the next . Output fields are skipped.

A screen change is carried out - if programmed -

- By pressing the “Cursor right” key or the “Cursor down” key on the last input field,
- By pressing the “Cursor left” key or the “Cursor up” key on the first input field

5.6 Messages

Overview

Messages are used to indicate events and states in the control process on the C7-613 display. The messages have to be created beforehand, however (see Section 4.3.7). A message consists of at least a static text. Fault messages and operational messages can also contain up to four output variables.

The following different types of messages exist:

- Operational messages
- Error messages
- System messages

Operational/Fault Messages

Operational and fault messages are triggered in the user program by the control process (see Section 4.6.1). They are specified by the user and contain process-related information.

System Message

The C7-613 triggers system indications. They are stored in the firmware and provide information on C7-613 operating modes as well as maloperations or malfunctions.

5.6.1 Operational Messages and Fault Messages

Overview

During the configuration you specify whether a process state is to be displayed with an operational message or a fault messages. For a message to be output, your user program must call the “HMI_API” FB and the “HMI_EVENT” FB cyclically or time-controlled.

- Operational messages
  - Operational messages are messages which provide information on regular operations or states, such as “Temperature reached” or “Motor running”.
  - Operational messages are not displayed in the screen level (no conditional change to the message level)
  - Are displayed in the message level as long as they are pending.
  - Are entered in the event buffer

- Fault messages
  - Are messages on faulty operations or state faults, e.g. “Motor temperature too high” or “Valve does not open”,
  - Fault messages are displayed immediately and appear as flashing messageson the display
  - Fault messages must always be acknowledged
  - Are displayed in the message level as long as they are pending.
  - Are entered in the event buffer

Messages that are pending or that arrive during STOP mode, POWER OFF, parameter assignment, a language change, are signaled again as arrived and unacknowledged once the mode is terminated or the function is completed.

Double entries which are caused by a STOP/RUN operating mode transition are identified by the entry of the operating mode transition in the diagnostic buffer of the CPU.

In addition to status messages, operator instructions can also be specified as fault messages. For example, if a machine operator wants to start the filling process but forgot to open the water supply at the mixer, he can be prompted with a fault message to remedy the error.

Messages can contain a static text and a maximum of four variable output fields. In the variable fields, the values that are current at the time the message appears are shown in a numerical display.

All operational and fault messages are stored in the C7-613 in an event buffer. Each status change in a message leads to a new entry in the event buffer. All messages currently in the buffer can be viewed on the display.

Message Bit Procedure for Operational/Fault Message

While the process is in operation, if the precondition is met for outputting an operational/fault message (for example, a setpoint has been reached), the user program must set a bit in the message area (“EVENTS” parameter of “HMI_EVENT” FB) for operational/fault messages. After calling “HMI API” FB and the “HMI_EVENT” FB, the data area is evaluated. As a result, a message is recognized as “arrived” and entered in the event buffer. Fault messages are displayed immediately and appear as flashing messages on the display The user program must reset the bit in the message area when the precondition for outputting the message is no longer met. The message is then considered to be “gone”.

Information regarding the data areas is provided in Section 4.6.1.

Event Buffer

Fault and operational messages are entered in the event buffer of the C7-613. The event buffer is a ring buffer and can contain up to 256 messages.

The event buffer is retained after a language change, a Reload application operation, CPU restart, POWER OFF, and general reset.

The messages are entered in the buffer in their chronological order so that the most recent message stands at the beginning.

The messages contain the following information:

- Type of message (fault message or operational message)
- Arriving (K) and Going (G) of the event
- Acknowledgement (Q) for fault messages
- Event number
- Name of message
- Time of the event
- Value of the four variables at the time of the event

Filing of messages in the event buffer in chronological order cannot be guaranteed for messages that are pending or that arrived during STOP mode, power off, parameter assignment, language changes, or while the event buffer is being saved. Active fault messages are displayed after the mode is terminated or the function is completed.

Caution

Messages that are pending just prior to POWER OFF may possibly not be stored in the event buffer.

Reading Out the Number of Entries in the Event Buffer

You can obtain the number of entries in the event buffer with the “HMI API” FB. When a fault message is displayed (parameter OBJ_TYPE=2), the level is output using the “ADDINFO” parameter.

Saving the Event Buffer to the DB

In order to save and perform further work on the event buffer, it can be stored (256 entries maximum) in a DB (EVENT_BUFFER) on the MMC. You can save with the keyboard using a special screen or in the user program by means of a job request. This requires the C7-613 to be in RUN mode and the “HMI API” FB and “HMI_EVENT” FB to be called cyclically.

The following information is entered in the EVENT_BUFFER in chronological order:

- Event number
- Status arriving (K), going (G), and acknowledged (Q)
- Value of the four variables at the time of the event
- Time of the event

The most recent event is positioned at the beginning of the EVENT_BUFFER.

The EVENT_BUFFER is not cleared when a new save operation is performed. Starting from data word 0, entries of previous saves are overwritten when a new save operation is performed. The end of the new save operation can be recognized when at least four event buffer entries are assigned a 0. An event buffer entry always consists of 12 values.

5.6.2 Acknowledging Fault Messages

Fault messages have to be acknowledged (refer to Section 4.6.1) either by using the user program or by pressing ENTER.

On the C7-613, unacknowledged fault messages appear as flashing messages on the display.

- If several fault messages are pending for display, the next fault message appears as a flashing message on the display once the previous one has been acknowledged. These also have to be acknowledged.
- If no more fault messages are pending for display, the C7-613 switches back to the operator control level from which it branched to the message level in order to display the fault message.

5.6.3 System Messages

Overview

System messages display internal operating states of the C7-613. They indicate maloperations or malfunctions, for example.

Display of System Messages

This type of message has the highest display priority (see Section 5.8). If a corresponding fault occurs in the C7-613, the object that is currently displayed is removed, and a system message is output instead. If fault messages occur while a system message is being output, they are displayed immediately after the system message is output.

Errors generate a system message in the case of input errors, for example.

The display of a system message is removed automatically after 2 s. In the case of operations that take long, such as saving the event buffer, the message is removed after the function is completed.

A list of possible system messages and a description is provided in Appendix B.2

System message $ 002

The text for the system message $ 002 “Configuration running” can be edited freely in any language selected by you by using the configuration interface. This means that you can have your individual text shown on the display while the C7-613 is being booted.

5.6.4 Displaying Messages in the Message Level

Overview

Pending (not yet gone) operational and fault messages are always output in the message level on the C7-613.

Selecting the Message Level

You access the message level from the screen level using a function key (K-key). To accomplish this, in your user program, place Job Request 51 for changing to the “Select message level” special screen (screen number 253 decimal, FD hex) on one of the function keys.

Likewise, pressing the ESC key several times takes you from the screen level to the message level (see description of the ESC key in Section 5.1).

Displaying the First/Last Message

If there are several messages, the most recent message is displayed first.

Paging through the Message Level

Use the cursor keys for paging through the messages in the message level:

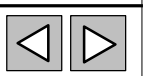
Table 5-3 Keys for Paging through the Messages

Message	Key
Previous message	
Next message	

Selection of Additional Information and Info Texts

For each message you can have additional information (state, date, time) and - if configured - an info text assigned to the message displayed. In order to select additional information and info text use the cursor keys (for details please refer to Section 5.6.6.).

Table 5-4 Selection of Additional Information/Info Texts

Message	Key
Selection of Additional Information/Info Texts	
Quitting the info text, displaying message again	

5.6.5 Viewing the event buffer

Overview

Messages occurring are written to the event buffer. You can call up the event buffer to view the message history via special screens.

Each status change (arrived/going/acknowledged) in a message leads to a new entry in the event buffer.

View event buffer

Select the special screen **Messages > View**.

The messages are stored in the buffer in chronological order (starting with the most recent message), as shown below.

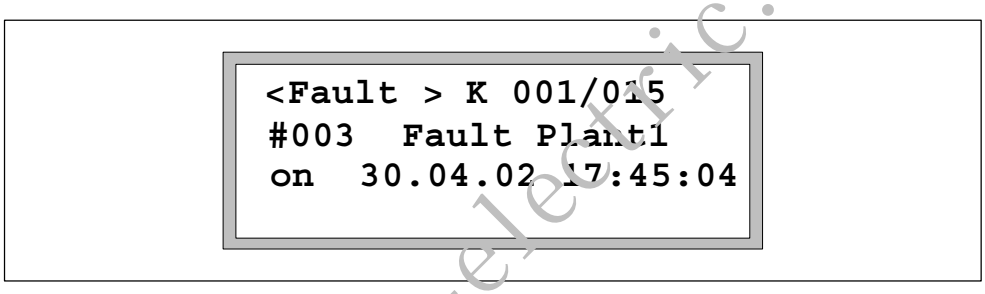


Figure 5-8 Sample Display of C7-613 Event Buffer

Table 5-5 Description of Example in Figure 5-8

Message Part	Description	Range	
<Fault>	A fault message is displayed.	<Fault> =	A fault message is displayed.
		<Operation> =	An operational message is displayed.
K	A message has arrived.	K =	A message has arrived.
		Q =	A message was acknowledged (for fault messages only)

Table 5-5 Description of Example in Figure 5-8, continued

Message Part	Description	Range
		G = A message has gone.
001/015	The displayed message is in Position 1 (most recent message). There are 15 messages in the event buffer	001 to 256
#003	Message number	001 to 127 (message number)
Fault Plant 1	Name of message	Any name can be assigned to the message
on Date Time	Time stamp of the message: Date and time for each change in the status of the message (arrived/acknowledged/gone). The format for the time stamp can be set with the following alternatives by using the configuration interface: • Default • YY-MM-DD (conforming to ISO 8601) • DD.MM.YY (German) • MM/DD/YY (American) • DD/MM/YY (English) • DD-MM-YY (Dutch) • YY/MM/DD (Taiwanese)	Default means that the display format for the time stamp is derived automatically from the language selected in the configuration interface.

Paging in the event buffer

In order to page in the event buffer use the cursor keys:

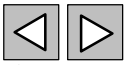
Table 5-6 Keys for Paging in the Event Buffer

Message	Key
Previous message	△
Next message	▽

Selection of Additional Information/Info Texts

For each message you can have additional information (message text, variables) and - if configured - an info text assigned to the message displayed. In order to select additional information and info text use the cursor keys (for details please refer to Section 5.6.6.).

Table 5-7 Selection of Additional Information/Info Texts

Message	Key
Selection of Additional Information/Info Texts	
Quitting the info text, displaying message again	

5.6.6 Selection of Additional Information and Info Texts

Selection of Additional Information

Figure 5-9 shows how you can use the cursor keys to have additional information for every message displayed:

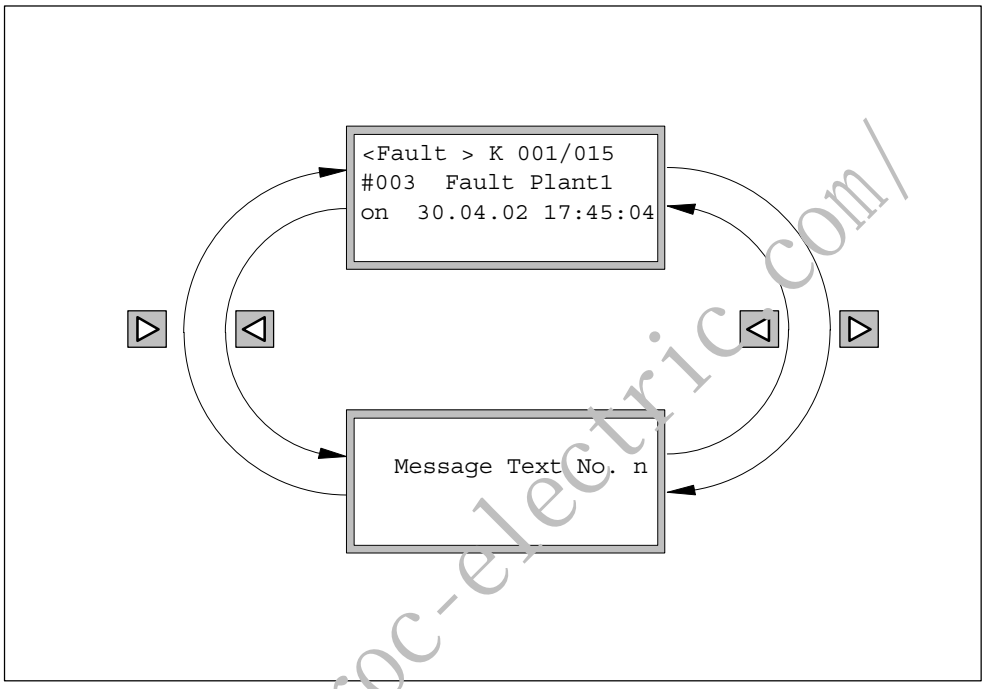


Figure 5-9 Selecting Additional Information

Selection of Info Texts

Figure 5-10 shows how you can use the cursor keys to have one or more info texts which you have assigned to a message displayed.

The info texts and their assignment to a specific message are specified by using the configuration interface.

You can carry out the following at a message:

- Assign a single info text (in the figure m_1),
- Assign several texts (in the figure m_1 to m_n) by using the configuration interface to specify the transitions between the info texts.

The cursor keys are used to page between the info texts assigned to a message.

The ESC key is used to quit the display of the info texts and return to the message.

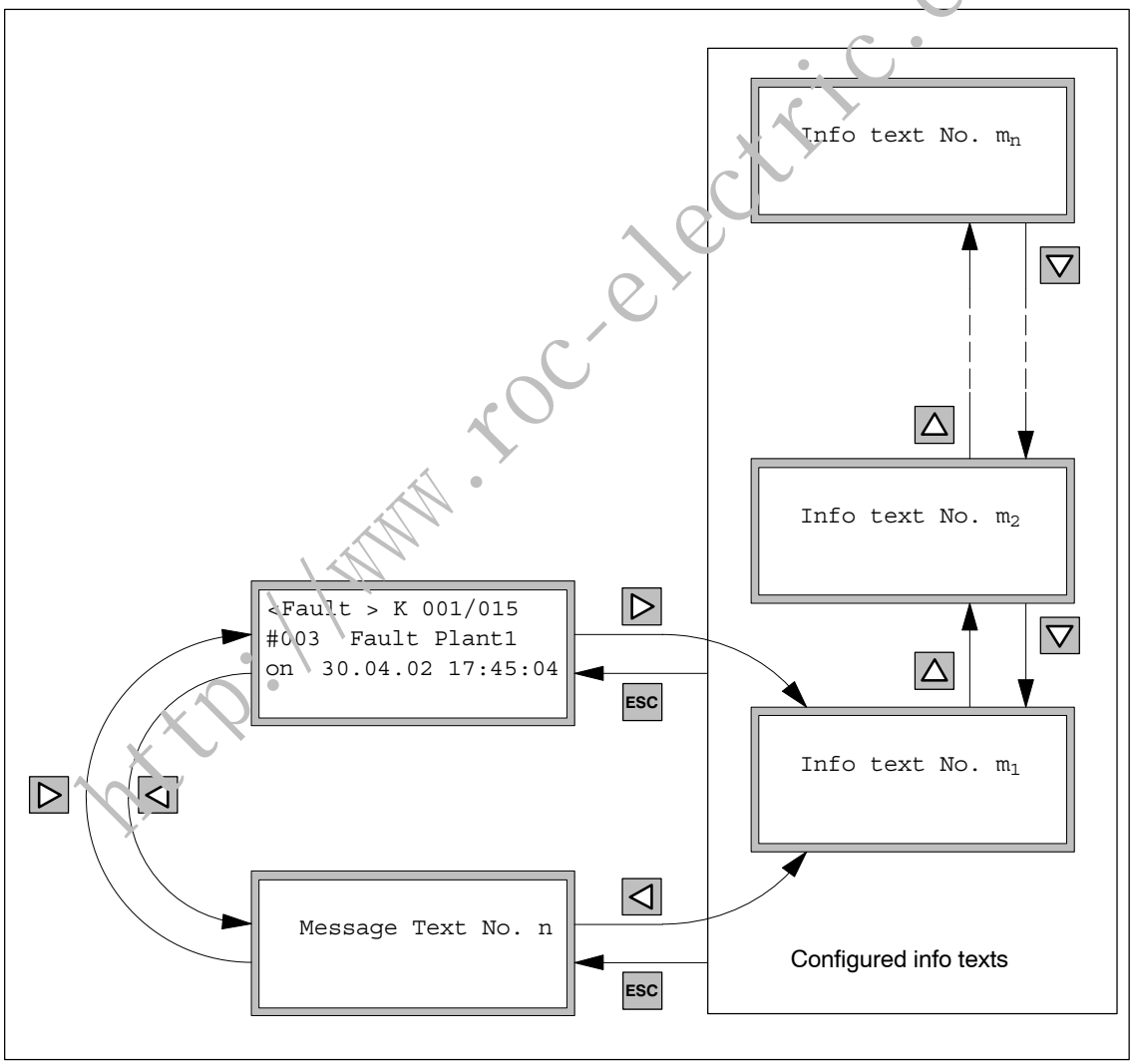


Figure 5-10 Selecting Info Texts

5.6.7 Number of Messages in the Event Buffer (Quantity)

Overview

You determine the number of messages in the event buffer as follows:

- By selecting the special screen “Messages > Quantity”
- By means of the user program by calling the “HMI API” FB

This ensures that you can carry out a backup in case of an imminent overflow of the event buffer.

Selecting the Special Screen “Messages > Quantity”

Select the special screen **Messages > Quantity**. This provides you with an overview of the following:

- The number of messages that are still pending
- The total number of messages in the buffer.

Calling the “HMI API”FB

If a message is indicated on the display (OBJ_TYPE parameter on the “HMI API” FB has the value “2”), the “ADDINFO” parameter on “HMI API” FB indicates the current number of messages in the event buffer. This ensures that you can carry out a backup in case of an imminent overflow of the event buffer.

Since the operational messages are not output directly to the display, the filling level of the event buffer cannot be shown either. Proceed as follows in order to see the filling level of the message buffer nevertheless:

1. Trigger a fault message specially created to this purpose at specific intervals.
2. Call up the “HMI API” FB.
3. Wait until the fault message is displayed (“HMI API” FB, parameter OBJ_TYPE = 2).
4. Read out the filling level from the “ADDINFO” of the called “HMI API” FB.
5. Acknowledge the fault message.

5.6.8 Clearing Entries in the Event Buffer (Clear)

Overview

Operational and fault messages are automatically stored in the event buffer. The event buffer is laid out as a ring buffer and can contain up to 256 entries.

There are two methods of clearing entries for operational or fault messages in the message buffer:

- Automatically when the buffer overflows
- By means of a special screen.

Automatic Clearing of Entries When the Event Buffer Overflows

If the event buffer can no longer accept new messages, the oldest entries are automatically cleared.

Clearing the Entire Event Buffer with Special Screen 208

This special screen can be used to clear the entire event buffer:

To clear the buffer, do the following:

1. Select the special screen **Messages > Clear**.
2. Clear buffer: press ENTER.

   Do not clear buffer: press ESC.

5.6.9 Saving the Event Buffer to the Loading Memory (Save)

Overview

In order to save and perform further work on the event buffer, it can be stored in a DB (EVENT_BUFFER) in the loading memory on the MMC.

Arriving fault messages are displayed after the save is completed.

Precondition

You have specified the “EVENT_BUFFER” DB at the “EVENT_DB” parameter of the “HMI API” FB and have created it beforehand by using the UDT 16.

Storage in DB

To store the message buffer, do the following:

1. Select the special screen **Messages > Save**.
2. Start the backup process by pressing: F3

   The messages are entered in the EVENT_BUFFER in chronological order. The most recent event is positioned at the beginning of the EVENT_BUFFER.

   Not backing up messages: ESC .

The EVENT_BUFFER is not cleared when a new save operation is performed. Starting from data word 0, entries of previous saves are overwritten when a new save operation is performed. The end of the new save operation can be recognized when at least four event buffer entries are assigned a 0. An event buffer entry always consists of 12 values.

5.7 Info Texts

Overview

You can create customized info texts. An info text can be assigned to one or more screens.

Additional information can be provided for each screen in info texts.

Info texts consist of static text only. In the C7-613, a maximum of 128 info texts can be specified.

Example: Figure 5-11 shows an info text for the process screen, Figure 5-7 on Page 5-15.

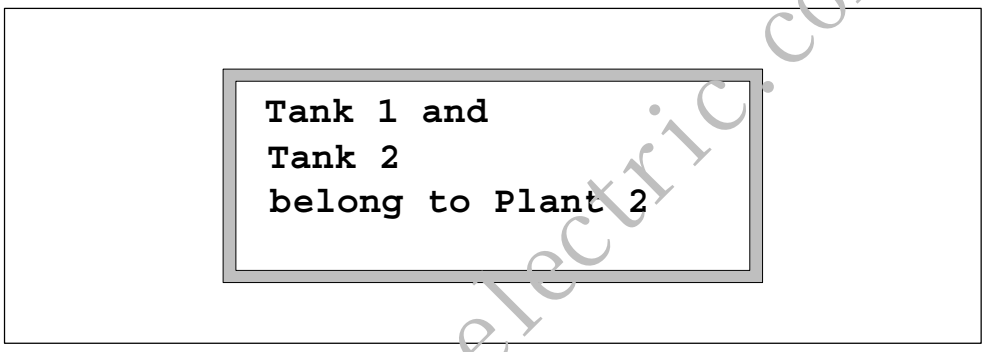


Figure 5-11 Example of an Info Text

Selecting an Info Text

Info texts are selected from a screen by means of the softkeys (F-keys) and cursor keys.

You can use the “Up” and “Down” cursor keys to page from one info text to other info texts.

Prerequisite: You have used the configuration interface to

- Created the info text beforehand (refer to Section 4.3.9),
- Specified the assignment between the corresponding keys and the info texts while specifying the screen hierarchy (refer to Section 4.3.10)
- Specified the transition to other texts for the info texts.

5.8 Display Priority of the Objects

Objects that can be presented on the C7-613 can interrupt each other. Only objects with a higher display priority can interrupt objects with a lower display priority. Objects are listed below according to their display priority:

- System messages (highest display priority)
- Error messages
- Info texts
- Process screens, standard/special screens

Operational messages cannot interrupt objects. They are presented only in the message level.

It is not possible to select a process screen/special screen at the time an object with a higher display priority is being displayed (“HMI API” FB, RETVAL = 880B). Repeat the request when the higher priority object is no longer displayed. Use the “OBJ_TYPE” parameter on the “HMI API” FB to obtain the type of the object that is currently being displayed (refer to Section 4.5).

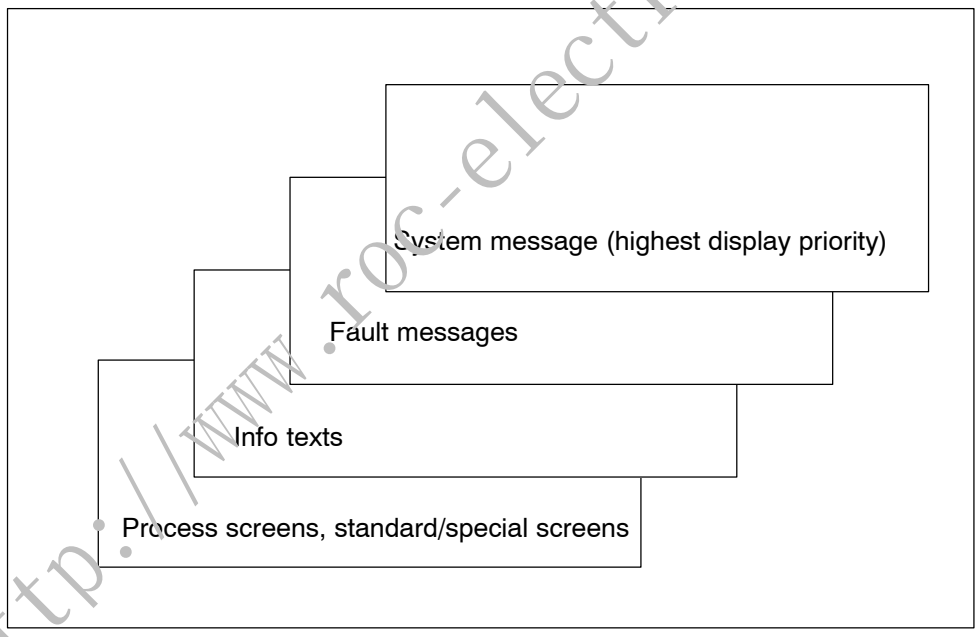


Figure 5-12 Display Priority of Objects

5.9 System Functions (System)

After you have loaded a configuration, you can use special screens to change the following C7-613 system settings specified by the configuration (see Section 4.3.5):

- Language
- Contrast

During the startup phase, the modified configuration becomes effective with “Reload application”.

5.9.1 Reloading the Application

Changes made to parameter assignments are entered in the memory of the integrated HMI module of the C7-613 only during power up in case of a power on or a general reset, or in the event of a language change. You can use the “Reload application” function when the CPU is in RUN mode to reassign parameters to the integrated HMI module.

To download the application:

Step	Action
1	Select the special screen **System -> System functions: Reload application**.
2	Activate the function by pressing the “F2” key and then the “F3” key.

Note

If you modify the sequence or the number of languages by changing the block numbers or by intervening with the configuration interface, the language that you selected in the “Language” selection” dialog box in the configuration interface may not be loaded.

In this case load the application again or switch the C7-613 off and on again and then set the desired language at the C7-613 after you have downloaded the user program to the MMC of the C7-613.

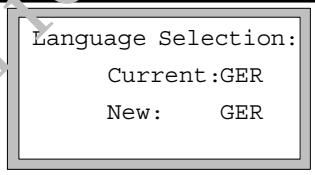
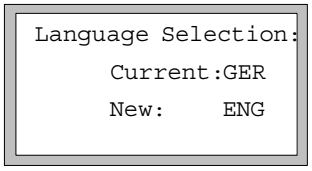
5.9.2 Language Switch (Language)

Setting the Language

Messages, screens, and info texts can be displayed in several languages. Screens, messages and info texts can be downloaded in a maximum of 5 languages simultaneously and offered for online selection by the operator. The standard/special screens and the system messages are stored in the firmware of the C7-613 for the languages listed in Section 4.3. You must use the specified language IDs (GER, ENG, etc.) so that the C7-613 can assign the standard/special screens and the system messages to your language.

The configuration interface can be used to also carry out the language selection for the standard/special screens and system messages by hand.

A language is selected as follows:

Step	Action	Result
1	Select the special screen **Language**.	
2	Select the desired language with the "Cursor up/down" keys. The selection list includes only those languages that are loaded on your C7-613.	
3	Press ENTER Press ESC to cancel the entry. The language is not changed.	The configuration for the selected language is loaded.

Note

If you modify the sequence or the number of languages by changing the block numbers or by intervening with the configuration interface, the language that you selected in the "Language selection" dialog box in the configuration interface may not be loaded.

In this case repeat the language switch at the C7-613 as described in the table above.

5.9.3 Contrast Setting (Contrast)

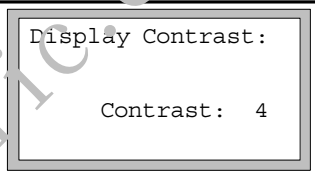
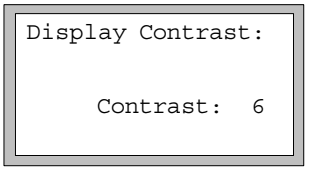
Overview

The contrast of the LCD display on the C7-613 can be changed with the special screen “Contrast”.

The modified value is entered in the configuration DB (CONFIG). The value 6 is preset.

Contrast setting

To set the contrast:

Step	Action	Result
1	Select the special screen **Contrast**.	
2	Select the desired contrast value by using these keys: 0 = Lowest contrast 15 = Greatest contrast	
3	Press ENTER Press ESC to cancel the entry.	The desired contrast is entered.
4	Exit the special screen with ESC	You will be changed to previously set screen level.

5.9.4 Setting the Date and Time

Date and Time Settings

The current date and time of the C7-613 cannot be set directly on the C7-613 by using the keyboard. You must create a separate user program for this and call the system functions SFC0 and SFC1. The provided program “ZXX31_01_C7-613“ contains an example for setting the date and time.

5.10 Password Editing (Password)

Overview

To prevent unauthorized operation of the C7-613, you have the option to set up access protection for each process screen using passwords and password levels.

Password protection for the function keys (K-keys) is not possible.

The passwords can be specified during configuration, or they can be entered with the keyboard in the special screen “Edit” while the program is running.

If you have assigned a password level for a screen, you are prompted to enter the password (LOGIN) when you call the screen.

Password Protection for Process Screens

You can specify a password level for each screen in the configuration. This screen can only be called with a password level equal to or greater than the password level setting for the screen.

If you have not carried out an operation for longer than two minutes in a password-protected screen, the C7-613 switches automatically to the password level 0. It is then no longer possible to enter variables or use the softkeys (F-keys) and the cursor keys in the opened screen. Operation is not possible until the valid password has been entered.

When paging back (pressing the ESC key) you can display any protected screen which was selected beforehand without a valid password. However, the entry of variables and the operation of the softkeys (F-keys) and the cursor keys in the protected screens is not possible.

Caution

At logout, the C7-613 switches to password level 0. The logout operation occurs automatically if no operator input was performed for two minutes or when the special screen “Logout” is selected.

The following applies for the C7-613 with an HMI Version < 2.0.0:

However, only the selection of new screens is password-protected in this case.

The screen that is currently open as well as screens that you can access with ESC are not password protected. This also means that all of the entries in these screens are not password protected. Likewise, automatic logouts do not terminate the input mode in the case of variables.

In order to protect the C7-613 against unauthorized access, you should therefore page back with ESC so far until no screen is displayed which needs to be protected.

Note

Password protection is not possible for the initial screen. This also applies to the process display “0” if you did not specify an initial screen.

Password Protection for Standard/Special Screens

There is no password protection for standard/special screens. You can protect the functions of the special screens bydoing the following:

- Prevent the output of the basic screen by branching to the standard/special screens: To do so, use the configuration interface to specify an initial screen.
- Create your own process displays with the desired password level. Place the selection of the special screens with the corresponding functions to the softkeys.

5.10.1 Password Levels and Access Rights

You can assign a password level between 0 and 4 for each screen.

Table 5-8 Password Level

Password level	Description
0	The lowest password level is assigned to screens that have little or no effect on the process sequence when displayed. As a rule, these are screens in which entries cannot be made, such as for process monitoring. To call screens of password level 0, a password is not required. If you call a screen that is assigned a higher level than 0, you are prompted on the display to enter a suitable password.
1-3	As the importance of the screens increases, they are assigned levels 1 to 3.
4 (Superuser)	Authorization to call screens assigned this password level is reserved for the plant supervisor (superuser).

5.10.2 Specifying Passwords

Overview

Passwords are specified during configuration or by using the special screen “Edit” during operation. The superuser password can only be defined in the configuration.

Assigning passwords

A maximum of 10 passwords (0 to 9) can be assigned. Password 0 is reserved for the superuser password (set permanently to Level 4. Passwords 1 to 9 can be distributed among password levels 1 to 3 at your discretion.

You can enter a number from 100 to 99 999 999. The password has to have at least three digits to ensure the protective function.

5.10.3 Entering the Password (Edit)

Overview

Passwords can be entered in the configuration (refer to Section 4.3.5) or via the special screen **Password > Edit**.

Depending on your configuration you enter the values by using either the function keys or the cursor keys (refer to Section 5.3).

Displaying the Password List

Select the special screen **Password > Edit.**

Your password, as well as all passwords that have a password level lower than yours are displayed.

The password list contains 9 passwords. Password 0 for the superuser cannot be displayed and cannot be edited.

Using the “Cursor up/down” keys, you can change from one password to the next.

You can use the F4 key to log on for a higher password level.

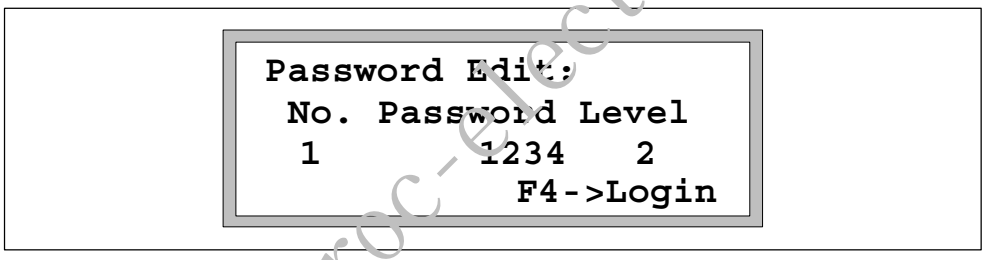


Figure 5-13 Example of a Password Entry

If you select the special screen “Password Edit” using your own process screens or Control Job 51, you cannot select the special screen “Login” using the “F4” key. In this case, you must call the “Password Login” screen using a process screen or Control Job 51

Assigning the password and password list

You can assign passwords only to those password levels that are equal to or less than your password level.

A password and a password level are assigned as follows:

Step	Action	Result
1	In the password list, select the corresponding password number.	The cursor is located in the password entry field on the first character from the right.
2	Press the SHIFT key. SHIFT	The SHIFT LED is lit. You are in entry mode.
3	Depending on the entry method you selected (see Section 5.3), the password is entered with the function keys (K-keys) or the cursor keys. Enter a password that does not yet exist. A leading zero in the password is ignored.	
4	Accept the password with the Enter key. ENTER	The SHIFT LED is turned off, and the input is completed.
5	With the “Cursor right” key, move the cursor to the password level field.	
6	Press the SHIFT key.	The SHIFT LED is lit. You are in entry mode.
7	Enter a password level 1 to 3 for the password, and confirm it. You can only enter a password level that is equal to or less than the password level you used when you logged on.	
8	Accept the password level with the Enter key.	The SHIFT LED is turned off, and the input is completed.
9	Exit the special screen with ESC	

Changing the Password and Password Level

To change a password, call up the password entry as you did when assigning the password, and overwrite the old password with the new one.

If you change your own password, you can then no longer view or change this password. You first have to log on again with your new password.

If you only want to change the password level but not the password, use the “Cursor right” key to position the cursor in the field for the password level and enter the new level there.

Deleting the Password

To delete a password, call up the password entry as you did when assigning and changing the password, and enter a zero as the new password.

5.10.4 Logging In

Login for the C7-613

If you call up a screen for which the current password level is too low, you have to log in at the C7-613. In this case, the prompt to enter a password is displayed automatically.

The entry field for the password and the current password level setting are displayed.

After you have entered the password, press ENTER .

The called screen is displayed.

5.10.5 Logging Out

Logout for the C7-613

When you log out, the C7-613 switches to the password level 0.

The logout is carried out

- Automatically if an operation is not performed for 2 minutes.
- By selecting the special screen “Logout”.
- With the Job Request 24 (Password Logout).

Please note that a password protection is not possible for the function keys (K-keys).

The following applies for the C7-613 with an HMI Version < 2.0.0:

- Only the selection of new screens is password-protected after a logout .
- The screen that is currently open as well as screens that you can access with ESC are not password protected. This also means that all of the entries in these screens are not password protected. Likewise, automatic logouts do not terminate the input mode in the case of variables.

In order to protect the C7-613 against unauthorized access, you should therefore page back with ESC so far until no screen is displayed which needs to be protected.

Logout via the special screen

Select the special screen “Password Logout”.

The C7-613 then switches from the present password level to the lowest password level 0.

Logout via the job compartment

Start the job with the Job Request 24 (Password Logout).

C7-613 then switches from the current password level to the lowest password level 0. The screen memory is deleted and the idle message is output.

Maintenance

6

The C7-613 is designed for low maintenance operation. Maintenance is required only in the following areas:

- Cleaning of the display at regular intervals
- Replacement of a faulty device

6.1 Cleaning the Display

Preparation

Clean the display of your device at regular intervals using a damp cloth. Perform the cleaning while the device is switched off. This ensures that you do not unintentionally delete functions.

Cleaning agent

Use only water and cleaning solution or a foaming screen cleaner to dampen the cloth. Spray the cleaning solution onto the cloth, rather than directly onto the monitor.

Note

If you use a harsh solvent or scouring solution, the keyboard may rub off or the display may be damaged.

6.2 Replacing the C7-613

Introduction

A C7-613 is not designed for on-site repair. Therefore, a defective C7-613 must be replaced.

Caution

The plugged Micro Memory Card (MMC) protrudes from the C7-613 and could be damaged when you remove and install the device.

Therefore withdraw the Micro Memory Card (MMC) before removing and installing the device and ensure that you do not damage the memory shaft and the connector for the MPI bus and the backplane bus.

Requirements

A new sealing is available. Always replace the sealing alongside with a replacement of your C7-613. The sealing is included in the service package (cf. chapter 1.2).

Uninstallation

Step	Action
1	You do not need to take special measures to back up the user program of the C7–613. It is saved as a non-volatile program on the MMC.
2	If you want to save the event buffer, you must first store it in a DB (EVENT_BUFFER) on the MMC (see Section 5.6.1).
3	Switch on the power supply.
4	Loosen the cables from the shielding terminals and remove all connectors.
5	Remove the MMC.
6	Loosen the supports with a screw driver and remove the device from the control panel.
7	Remove the labeling strips from the device.

Installation

Step	Action
1	With the labeling facing downward, insert the labeling strips into the slits of the front panel (see Section 2.1).
2	Complete the mechanical installation as described in Section 2.2. Be sure to observe the relevant notes.
3	Insert the MMC.
4	Insert the cables and press the bare cables into the shielding terminals, as described in Section 2.6.
5	Switch on the power supply.
6	Perform a general reset of the C7-613.
7	Switch the C7-613 to the RUN mode.

Technical data

A

A.1 Technical Specifications for Control System

Table A-1 Technical Specifications for C7-613

General data	
Order no.	6ES7613-1CA01-0AE3
Dimensions: Cut-out dimensions: Mounting depth for 2-module I/O set: Mounting depth of the 4-module I/O set:	215 x 165 x 79.3 mm (H x W x D) (198 + 1) mm x (148 +1) mm 144 mm (measured from outer edge of sheet metal cut-out) 195 mm (measured from outer edge of sheet metal cut-out)
Weight	915 g
C7-613 display	STN-LC-Display / 4 lines with 20 characters each / LED background illumination
Keyboard	Membrane keyboard 23 keys
MPI Interface	Standard MPI interface

Power supply	
Supply voltage (V_n) • Polarized input voltage • Voltage interruption (can be short-circuited)	24 V DC; (20.4 V DC to 28.8 V DC, safety extra-low voltage SELV) The C7-613 has no integrated protection against high-energy interfering pulses in the µs-range (surge pulse). For information on relevant safety regulations, refer to the *S7-300 PLC installation: CPU 31xC and 31x* manual. Yes ≥ 20 ms
Current consumption	Typically 270 mA in no-load operation, max. 900 mA
Inrush current	9 A for 20 ms
Power dissipation	approx.11.3 W
Ungrounded configuration	Not possible

Safety	
Standard references	DIN EN 61131-2 corresponds to IEC 61131-2
Protection against ingress of solid foreign bodies and water • Front panel • Housing	 IP65, to IEC 60529, NEMA 4X IP20, to IEC 60529

Electromagnetic compatibility (EMC)	
Emitted interference Limit class	 A in accordance with EN55011
Cable-fed disturbances on DC supply cables	±2 kV (to IEC 61000-4-4; burst) Surge measurements with additional protective elements: ±1 kV (in accordance with IEC 61000-4-5; µs-pulse/cable to cable) ±2 kV (in accordance with IEC 61000-4-5; µs-pulse/cable to ground)
Noise immunity on signal cables	±2 kV (to IEC 61000-4-4; burst)
Interference immunity from static discharges	±6 kV, contact discharge (in accordance with IEC 61000-4-2; ESD) ±8 kV, air discharge (in accordance with IEC 61000-4-2; ESD)
Radio frequency-proof	10 V/m, with 80% amplitude modulation at 1 kHz, 10 kHz to 80 MHz (in accordance with IEC 61000-4-6) 10 V/m, with 80% amplitude modulation at 1 kHz, 80 kHz to 1 GHz (in accordance with IEC 61000-4-3) 10 V/m, pulse-modulated 50 % ED at 900 MHz and 1.89 GHz (in accordance with IEC61000-4-3)

Climatic conditions	
Temperature • Operation	Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2: 0 °C to +40 °C for horizontal mounting 0 °C to +45 °C for 45 ° mounting 0 °C to +50 °C for vertical mounting **Note:** • When the device is in a horizontal mounting position, display readability is limited. • At temperatures < 10 °C, rapidly changing displays do not appear correctly.
• Storage/transport	-20 °C to +70 °C
Relative humidity • Operation • Storage/transport	Tested in accordance with IEC 60068-2-3 5% to 95% at 25 °C (no condensation) 5% to 95% at 25 °C (no condensation)
Air pressure • Operation • Storage/transport	 1080 to 795 hPa (corresponds with -1000 m to +2000 m) 1080 to 660 hPa (corresponds with -1000 m to +3500 m)

Mechanical environmental conditions	
Vibration	Tested in accordance with IEC 60068-2-6
• Operation	10 Hz to 58 Hz, amplitude 0.075 58 Hz to 150 Hz, acceleration 9.8 m/s^2
• Storage/transport in packaging	5 Hz to 9 Hz, amplitude 3.5 mm 9 Hz to 500 Hz, acceleration 9.8 m/s^2
Shock test	Tested in accordance with IEC 60068-2-29
• Operation	Half-sine: 150 m/s^2 (15 g), 11 ms, 18 shocks
• Storage/transport in packaging	250 m/s^2 (25 g), 6 ms, 1000 shocks
Fireproofing:	
• Terminal strips	FV2 (tested in accordance with IEC 60707)
• Master strips in housing	FV0

A.2 HMI functionality

Table A-2 HMI Functions for C7-613

Function	Value
Display	
• Technology	STN LC
• Number of lines	4
• Number of characters per line [1)]	20
• Number of graphical symbols per line [1)]	10
• Contrast setting	Yes
Screens	
• Maximum number	128
• Maximum number of characters per screen	80 characters
• Variables per screen	8
Info texts	
• Maximum number	128
• Maximum number of characters per info text	80
Messages	
• Maximum number	128
• Maximum number of characters per message	80
• Output variables per screen	4
• Maximum number of entries in the event buffer	256
• View event buffer	Yes
• View number of messages in the event buffer	Yes
• Store event buffer in data block on MMC	Yes
• Clear event buffer	Yes
Event acquisition	
In the event buffer including name, date, time-of-day, and status	Yes
Setpoint input	
• Numeric	Yes
Actual value display	
• Numeric	Yes
Combined actual value display/setpoint input	
Limit check during input	Yes
Password protection	
• Password levels	5
• Number of passwords	9 + super-user password
Function keys with integrated LEDs	
• Number	10
Online languages (selectable)	5

1) The specifications are alternative. Characters and graphical symbols can be combined within a line. A graphical symbol requires the place of 2 characters.

A.3 Technical Specifications for CPU

Memory	
User memory	
• Integrated	48 KB – Of which 32 KB for user program – Of which 16 KB required for the FBs for the HMI functions
• Expandable	No
Loading memory	Pluggable via MMC (max. 8 MB)
Backup	Ensured with MMC (maintenance-free)

Execution times	
Bit operation	0.1 µs
Word instructions	0.2 ms
Fixed-point addition	2 ms
Floating-point addition	6 ms

Timers / counters and their retentivity	
S7 counters	256
• Retentivity	Adjustable
• Default	From C 0 to C 7
• Counting range	0 to 999
IEC Counters	Yes
• Type	SFB
• Number	Unlimited (only limitation is amount of user memory)
S7 timers	256
• Retentivity	Adjustable
• Default	No retentivity
• Timing range	10 ms to 9990 s
IEC timers	Yes
• Type	SFB
• Number	Unlimited (only limitation is amount of user memory)

Data areas and their retentivity	
Total retentive data area (including memory bits; timers; counters)	All
Bit memory	256 bytes
• Retentivity	Adjustable
• Default retentivity	MB 0 to MB 15
Clock memory	8 (1 memory byte)
Data blocks	Max. 511 (from DB 1 to DB 511)
• Size	Max. 16 KB
Local data per priority class	Max. 510 bytes

Blocks	
Total	1024 (DBs, FCs, FBs) The maximum number of loadable blocks can be reduced by the MMC used by you.
OBs	See instruction list
• Size	Max. 16 KB
Nesting depth	
• Per priority class	8
• Additional nesting depth within one error OB	4
FBs	Max. 512 (from FB 0 to FB 511)
• Size	Max. 16 KB
FCs	Max. 512 (from FC 0 to FC 511)
• Size	Max. 16 KB

Address Areas (I/O)	
I/O address area overall	Max. 1024 bytes/1024 bytes (can be freely addressed)
I/O process image	128 bytes/128 bytes
Digital channels	Max. 1,016
• Of total, number of local channels	Max. 992
• Integrated channels	24 DI / 16 DO
Analog channels	Max. 253
• Of total, number of local channels	Maximum 248
• Integrated channels	4 + 1 AI/2 AO

Configuration	
Rack	Max. 1
Modules in the rack	Max. 4
Number of DP masters	
• Integrated	None
• by means of CP	Max. 2
Function modules and communication processors that can be operated	
• FM	Max. 4
• CP (PtP)	Max. 4
• CP (LAN)	Max. 4

Time-of-day	
Real-time clock	Yes (HW clock)
• Buffered	Yes
• Backup period	6 weeks, typically (at an ambient temperature of 40°C)
• Accuracy	Deviation per day < 10 s
Operating hours counter	1
• Number	0
• Range	0 to 2^{31} hours (when using SFC 101)
• Selectivity	1 hour
• Retentive	Yes; requires restarting at every restart
Clock synchronization	Yes
• In AS	Master
• On MPI	Master/Slave

S7 Message functions	
Number of stations that can log in for message functions (for example, OS)	Max. 8 (depending on the configured connection for PG/OP and S7 basic communication)
Process diagnostic messages	Yes
• Simultaneously active interrupt S blocks	Max. 20

Testing and commissioning functions	
Status/control variable	Yes
• Variables	Inputs, outputs, flags, DBs, timers, counters
• Number of variables	Max. 30
– Of those as status variable	Max. 30
– Of those as control variables	Max. 14
Force	Yes
• Variables	Inputs, outputs
• Number of variables	Max. 10
Monitor block	Yes
Single sequence	Yes
Breakpoint	2
Diagnostic buffer	Yes
• Number of entries (not configurable)	Maximum 100

Communication functions	
Programming device (PG)/OP communication	Yes
Shared data communication	Yes
• Number of shared data circuits	Max. 4
• Number of shared data packets	Max. 4
– Transmitter	Max. 4
– Receiver	Max. 4
• Size of global data packets	Max. 22 bytes
– Of those are consistent	22 bytes
S7 standard communication	Yes
• Useful data per job	Maximum 76 bytes
– Of those are consistent	76 bytes with X_SEND or X_RCV 64 bytes with X_PUT or X_GET as server
S7 communication	
• As server	Yes
• As client	Yes (by means of CP and loadable FB)
• Useful data per job	Max. 180 bytes (with PUT/GET)
– Of those are consistent	64 bytes
S5-compatible communication	yes (by means of CP and loadable FC)

Communication functions	
Number of connections	Max. 8
• Can be used for PG communication	Max. 7
– Reserved (default)	1
– Adjustable	From 1 to 7
• Can be used for OP communication	Max. 7
– Reserved (default)	1
– Adjustable	From 1 to 7
• Can be used for S7 basic communication	Max. 4
– Reserved (default)	4
– Adjustable	From 0 to 4
Routing	No

MPI	
Type of interface	Integrated RS 485 interface
Physical characteristics	RS 485
Galvanic isolation	No
Interface current supply (15 VDC to 30 VDC)	Max. 200 mA
Number of connections	8
Services	
• Programming device (PG)/OP communication	Yes
• Routing	No
• Global data communication	Yes
• S7 standard communication	Yes
• S7 communication	
– As server	Yes
– As client	Yes (by means of CP and loadable FB)
• Transmission rates	Max. 187.5 Kbits per second

Programming	
Programming language	LAD/FBD/STL
Stored instructions	See the instruction list
Nesting levels	8
System functions (SFCs)	See the instruction list
System function blocks (SFBs)	See the instruction list
User program security	Yes

Integrated I/O	
Default addresses	
• Digital inputs	124.0 to 126.7
• Digital outputs	124.0 to 125.7
• Analog inputs	752 to 761
• Analog outputs	752 to 755

Integrated functions (cf. the *S7-300 PLCs, CPU31xC Technological Functions* manual)	
Counters, frequency counters, pulse outputs (pulse width modulation)	3 channels in total, Frequency counter up to 30 kHz Pulse outputs up to 2.5 kHz
Controlled positioning	No
Integrated “Control” SFB	PID controller

A.4 Technical Specifications for Integrated I/O

Digital inputs

Number	
Number of inputs	24
• inputs usable for technological functions	12

Cable length	
• Unshielded	
– For standard DI	Maximum 600 m
– Technological functions	non-shielded cables not allowed
• Shielded	
– For standard DI	Maximum 1,000 m (109 yd.)
– Technological functions	Max. 50 m

Voltage, currents, potentials	
Rated load voltage L+	24 VDC
• Polarity reversal protection	Yes
Number of inputs that can be triggered simultaneously	
• Vertical mounting position	
– Up to 40°C	18
– Up to 50°C	12
• 45 °mounting position	
– Up to 45°C	12
• Horizontal mounting position	
– Up to 40°C	12
Galvanic isolation	
• Between channels and P-bus	Yes
• Between channels	No
Permissible potential difference	
• Between different circuits	75 VDC/60 VAC
Insulation tested at	500 V DC
Power consumption from load voltage L+ (no-load)	Max. 70 mA

Status, interrupts, diagnostics	
Interrupts	• Yes, if the corresponding channel is configured as an interrupt input • For application of technological functions, refer to "*S7-300 Programmable Controllers CPU31xC Technological Functions*" manual.
Diagnostic functions	• No diagnostics when operated as standard I/O • When using the technological functions, cf. *S7-300 Programmable Controller, CPU31xC Technological Functions" manual*

Data for selecting an encoder for standard DIs	
Input voltage	
• Rated value	24 VDC
• For signal "1"	15 V to 30 V
• For signal "0"	-3 V to 5 V
Input current	
• For signal "1"	7 mA, typically
Delay of the standard inputs	
• Configurable	Yes (0.1/0.5/3/15 ms)
• Rated value	3 ms
Input delay when using technological functions	16 µs
Input characteristic	In accordance with IEC 1131, Type 1
Connection of 2-wire BEROs	Possible
• Permissible quiescent current	Max. 1.5 mA

Digital outputs

Note

Technological functions utilize fast digital outputs. These outputs must only be connected to resistive loads.

Number	
Number of outputs	16
• Of those are high-speed outputs	4

Cable length	
• Unshielded	Maximum 600 m
• Shielded	Maximum 1,000 m (109 yd.)

Voltage, currents, potentials	
Rated load voltage L+	24 VDC
• Polarity reversal protection	Yes
Accumulated output current (per group)	
• Vertical mounting position	
– Up to 40°C	Max. 3.0 A
– Up to 50°C	Max. 2.0 A
• 45 ° mounting position	
– Up to 45°C	Max. 2.0 A
• Horizontal mounting position	
– Up to 40°C	Max. 2.0 A
Galvanic isolation	
• Between channels and P-bus	Yes
• Between channels	Yes
– In groups of	8
Permissible potential difference	
• Between different circuits	75 VDC/60 VAC
Insulation tested at	500 V DC
Current consumption from load voltage L+	Max. 20 mA per group

Status, interrupts, diagnostics	
Interrupts	• No interrupts when operated as standard I/O • When using the technological functions, cf. *S7-300 Programmable Controller, CPU31xC Technological Functions" manual*
Diagnostic functions	• No diagnostics when operated as standard I/O • When using the technological functions, cf. *S7-300 Programmable Controller, CPU31xC Technological Functions" manual*

Data for selecting an actuator for standard DOs	
Output voltage	
• For signal "1"	Min. L+ (–0.8 V)
Output current	
• For signal "1"	
– Rated value	0.5 A
– Permissible range	5 mA to 0.6 A
• For "0" signal (residual current)	Max. 0.5 mA
Load impedance range	48 Ω to 4 kΩ
Lamp load	Max. 5 W
Parallel connection of 2 outputs	
• for redundant load control	Possible
• For performance increase	Not possible
Digital input control	Possible
Switching frequency	
• For resistive load	Maximum 100 Hz
• with inductive load to IEC 947-5, DC13	Max. 0.5 Hz
• with lamp load	Maximum 100 Hz
• Fast outputs with resistive load	Maximum 2.5 kHz
Inductive breaking voltage limited internally to	(L+) – 48 V, typically
Short-circuit protected output	Yes, electronic
• Response threshold	1 A, typically

Analog inputs

Number	
Number of inputs	
• Current / voltage input	4 channels
• Resistance input	1 channel

Cable length	
• Shielded	Maximum 100 m (109 yd.)

Voltage, currents, potentials	
Resistance input	
• No-load voltage	2.5 V, typically
• Measurement current	1.8 mA to 3.3 mA, typically
Galvanic isolation	
• Between channels and P-bus	Yes
• Between channels	No
Permissible potential difference	
• Between inputs and M_{ANA} (V_{CM})	8.0 V DC
• between M_{ANA} and $M_{internal}$ (V_{ISO})	75 VDC/60 VAC
Insulation tested at	500 V DC

Analog value generation	
Measuring principle	Actual value encoding (successive approximation)
Integration / conversion time / resolution (per channel)	
• Configurable	Yes
• Integration time in ms	2.5 / 16.6 / 20
• Permissible input frequency	Maximum 400 Hz
• Resolution (incl. overshoot range)	11 bits + sign bit
• Suppression of interference frequency f1	400 / 60 / 50 Hz
Time constant of the input filter	0.38 ms
Basic execution time	1 ms

Interference suppression, error limits	
Interference suppression at f = n × (f1 ±1 %) (f1 = interference frequency), n = 1, 2	
• Common mode interference (VCM < 1.0 V)	> 40 dB
• Push-pull interference (peak value of the interference < rated value of the input range)	> 30 dB
Crosstalk between the inputs	>50 dB (at V_{CM} =0 V)
Operational error limit (across the temperature range, relative to input range)	
• Voltage/current	< 1 %
• Resistance	< 5 %
Basic error limits (operational error limit at 25 °C, relative to input range)	
• Voltage/current	< 0.7%
• Resistance	< 3 %
Temperature error (relative to input range)	±0.006 %/K
Linearity error (relative to input range)	±0.06 %
Accuracy of reproducibility (in transient state at 25 °C, relative to input range)	±0.06 %

Status, interrupts, diagnostics	
Interrupts	No interrupts
Diagnostic functions	No diagnostics

Encoder selection data	
Input ranges (rated values)/input resistance	
• Voltage	±10 V/100 kΩ 0 V to 10 V/100 kΩ
• Current	±20 mA / 50 Ω 0 mA to 20 mA/50 Ω 4 mA to 20 mA/50 Ω
• Resistance	0 Ω to 600 Ω/10 MΩ
• Resistive thermometer	Pt 100/10 MΩ
Permissible input voltage (destruction limit)	
• For voltage input	Maximum 30 V continuous;
• For current input	Maximum 2.5 V continuous;
Permissible input current (destruction limit)	
• For voltage input	Max. 0.5 mA continuous
• For current input	Max. 50 mA continuous
Connection of signal encoders	
• for voltage measurement	Possible
• For current measurement	
– As 2-wire measuring transducer	Possible, with external power supply
– As 4-wire measuring transducer	Possible
• For measuring resistance	
– With 2-wire connection	Possible, without cable resistance compensation
– With 3-wire connection	Not possible
– With 4-wire connection	Not possible
Linearization of characteristic curve	By software
• For resistive thermometer	Pt 100
Temperature compensation	No
Technical unit for temperature measurement	Degrees Centigrade/Fahrenheit/Kelvin

Analog outputs

Number	
Number of outputs	2

Cable length	
Shielded cable length	Maximum 200 m (109 yd.)

Voltage, currents, potentials	
Rated load voltage L+	24 VDC
• Polarity reversal protection	Yes
Galvanic isolation	
• Between channels and P-bus	Yes
• Between channels	No
Permissible potential difference	
• Between outputs and M_{ANA} (V_{CM})	8.0 V DC
• between M_{ANA} and $M_{internal}$ (V_{ISO})	75 VDC/60 VAC
Insulation tested at	500 V DC

Analog value generation	
Resolution (incl. overshoot range)	11 bits + sign bit
Conversion time (per channel)	1 ms
Settling time	
• For resistive load	0.6 ms
• For capacitive load	1.0 ms
• For inductive load	0.5 ms

Interference suppression, error limits	
Crosstalk between the outputs	> 60 dB
Operational error limit (across the temperature range, relative to output range) • Voltage/current	 ±1 %
Basic error limits (operational error limit at 25 °C, relative to output range) • Voltage/current	 ±0.7 %
Temperature error (relative to output range)	±0.01 %/K
Linearity error (relative to output range)	±0.15 %
Accuracy of reproducibility (in transient state at 25 °C, relative to output range)	±0.06 %
Output ripple; bandwidth 0 to 50 kHz (relative to output range)	±0.1 %

Status, interrupts, diagnostics	
Interrupts	• No interrupts when operated as standard I/O • When using the technological functions, see "*S7-300 Programmable Controller, CPU31xC Technological Functions*" manual
Diagnostic functions	• No diagnostics when operated as standard I/O • When using the technological functions, see "*S7-300 Programmable Controller, CPU31xC Technological Functions*" manual

Data for selecting an actuator	
Output range (rated values)	
• Voltage	±10 V 0 V to 10 V
• Current	±20 mA 0 mA to 20 mA 4 mA to 20 mA
Load resistance (in the rated range of the output)	
• Voltage outputs	
– ohmic load	Minimum 1 kΩ
– Capacitive load	Maximum 0.1 µF
• Current outputs	
– ohmic load	Maximum 300 Ω
– inductive load	max. 0.1 mH
Voltage output	
• Short-circuit protection	Yes
• Short-circuit current	55 mA, typically
Current output	
• No-load voltage	Typically 17 V
Destruction limit for externally applied voltages / currents	
• Output voltage to M_{ANA}	Maximum 16 V continuous;
• Current	Max. 50 mA continuous
Connection of actuators	
• For voltage output	
– 2-wire connection	Possible, without cable resistance compensation
– 4-wire connection (measuring line)	Not possible
• For current output	
– 2-wire connection	Possible

A.5 Notes on the power supply

24 VDC Supply

For the C7-613, the entire 24 VDC power supply (operating voltage, load voltage, relay supply, etc.) must be generated as safety extra-low voltage (SELV).

Warning

Personal injury and property damage can occur.

If you do not configure the 24 VDC power supply of the C7-613 correctly, the components of your automation system may be damaged and personal injury may occur.

For the 24 VDC power supply of the C7-613, use only safety extra-low voltage (SELV).

A.6 Approvals

Approvals for USA and Canada

Note

Which one of the approvals (UL/CSA or cULus) listed below is relevant for your product is indicated on the rating plate.

UL approval

Underwriters Laboratories Inc. to

- UL 508 (Industrial Control Equipment)

CSA approval

Canadian Standards Association to

- C22.2 No. 142 (Process Control Equipment)

or

Underwriters Laboratories Inc. to

- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Process Control Equipment)

or

Underwriters Laboratories Inc. to

- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Process Control Equipment)
- UL 1604 (Hazardous Location)
- CSA-213 (Hazardous Location)

APPROVED for use in
Class I, Division 2, Group A, B, C, D Tx;
Class I, Zone 2, Group IIC Tx

FM Approval

FM-Standards No. 3611, 3600, 3810 APPROVED for use in Class I, Division 2, Group A, B, C, D indoor hazardous locations.

Class I, Division 2, Group IIC

Warning

Personal injury and property damage can occur.

In a potentially explosive environment, there is a risk of personal injury and damage to material if you disconnect a connector while the system is in operation.

In a potentially explosive environment, always switch off power to the C7-613 before you disconnect any connectors.

Warning

WARNING – DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS LOCATION IS KNOWN TO BE NON–HAZARDOUS

Marine approval

Approvals by the following classification authorities are pending:

- ABS (American Bureau of Shipping)
- BV (Bureau Veritas)
- DNV (Det Norske Veritas)
- GL (Germanischer Lloyd)
- LRS (Lloyds Register of Shipping)
- Class NK (Nippon Kaiji Kyokai)

A.7 Notes on CE Mark

EC Guideline 89/336/EEC EMC Guidelines

CE This product meets the requirements of the EC guideline 89/336/EEC "Electromagnetic Compatibility".

The EC declarations of conformity and their associated documentation are available for the competent authorities in accordance with the above-mentioned EC Guideline, Article 10 (1) at the following address:

Siemens Aktiengesellschaft
Automation technology
A&D AS RD 4
PO box 1963
D-92209 Amberg

Range of Application

The following range of application applies for the C7-613 control system, in accordance with this CE marking:

Range of Application	Requirements	
	Noise emission	Noise immunity
Industrial applications	EN 50081-2: 1993	EN 61000-6-2: 1999

Note the installation guidelines

The installation guidelines and safety notes provided in the documentation are to be adhered to during commissioning and operation.

A.8 Notes for Machine Manufacturers

Introduction

The SIMATIC automation system is not a machine in the sense of the EC guideline “Machinery”. Consequently, no declaration of conformity exists with regard to the EC guideline 89/392/EEC “Machinery”.

EC Guideline 89/392/EEC ”Machinery”

EC guideline 89/392/EEC “Machinery” regulates the requirements of machinery. In this guideline, machinery is considered to include all associated parts or mechanisms (cf. EN 292-1, Section 3.1).

SIMATIC is a part of the electrical equipment of a machine and must therefore be included by the machine manufacturer in the declaration of conformity.

Electrical equipment of machinery in accordance with EN 60204

The standard EN 60204-1 (Safety of Machinery, General Requirements of the Electrical Equipment of Machinery) is applicable for the electrical equipment of machinery.

The following table is provided to help you with the declaration of conformity; it indicates which criteria are applicable to SIMATIC in accordance with EN 60204-1 (June 1993 edition).

EN 60204-1	Subject / criterion	Comments
Section 4	General Requirements	The requirements are satisfied if the devices are mounted/installed in accordance with the installation guidelines. You must also take into account the explanations provided on previous pages.
Section 11.2	Digital I/O interfaces	The requirements are satisfied.
Section 12.3	Programmable Equipment	The requirements are satisfied if devicesfor protection against changes to memory by unauthorized persons are installed in lockable cabinets.
Section 20.4	Dielectric Tests	The requirements are satisfied.

Error Information for HMI FBs and System Messages

B

B.1 Error Information for HMI FBs

Introduction

This chapter describes error information for HMI FBs, including when error information occurs and how the cause of the error can be removed.

The FBs use the error code (return value “RETVAL” parameter) to supply information about the errors and the status of HMI functions or the integrated HMI module.

On the “HMI API” FB, you receive more detailed information on the error code involved by means of the “ADDINFO” parameter.

In addition to the error codes listed here, those of SFC 58, SFC 59, SFC 83, and SFC 84 are also relevant. These SFCs are called internally by the HMI FBs. The SFC error codes are output without modification using the “RETVAL” parameter. Additional information on the error codes for these SFCs can be obtained in the STEP 7 Online Help.

Error information of the “HMI API” FB

Error Code (W#16#...)	Cause	Remedy
7000	Integrated HMI module of C7-613 is being initialized.	This is a status message that provides information about the function that is currently being performed. The integrated HMI module of the C7-613 is undergoing a cold restart. No additional action is required. The integrated HMI module of the C7-613 can also be initialized during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during initialization. Outputting of pending messages is delayed.
7001	Parameter assignment for the integrated HMI module of the C7-613 is in progress.	The DBs with the configuration data are being loaded from the MMC to the internal memory of the integrated HMI module. This always occurs following a power ON or general reset, or when the “Reload application” or “Swap languages” system function is applied. Wait until the parameter assignment is completed. The integrated HMI module of the C7-613 can also be configured during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during parameter assignment. Incoming messages are delayed.
7130	The job compartment is occupied at the moment.	The job that was initiated using the “JOB_ID” parameter is not yet finished. This job can be an internal job or one that you initiated. Wait until the “JOB_ID” has the value “0”, and repeat the job request before executing a new job.
8001	An error occurred while reading a data record (SFC 59).	The SFC 59 RETVAL is displayed using the “ADDINFO” parameter. Additional information on the SFC RETVAL can be obtained in the STEP 7 Online Help.
8002	An error occurred while writing a data record (SFC 58).	The SFC 58 RETVAL is displayed using the “ADDINFO” parameter. Additional information on the SFC RETVAL can be obtained in the STEP 7 Online Help.
8100	Job number in the job compartment is invalid or not permissible.	Correct the job number in the “JOB_ID” parameter. Valid values can be found in the description of the controller tasks (refer to Section 4.5.3).
8101	Parameter 1 (“JOB_PAR1”) of the job compartment has an invalid value for this job.	Valid values for this job can be found in the description of the controller tasks (refer to Section 4.5.3).

Error Code (W#16#...)	Cause	Remedy
8102	Parameter 2 (“JOB_PAR2”) of the job compartment has an invalid value for this job.	Valid values for this job can be found in the description of the controller tasks (refer to Section 4.5.3).
8103	Parameter 3 (“JOB_PAR3”) of the job compartment has an invalid value for this job.	Valid values for this job can be found in the description of the controller tasks (refer to Section 4.5.3).
8211	The number of one of the data blocks for the configuration data is incorrectly specified in the “ADDINFO” parameter, or the DB is not available.	Check to determine whether the specified DB number is a valid DB number for this CPU. Check to determine whether the specified data block is loaded. Correct the DB number or create the configuration again (refer to Section 4.3).
8212	The DB specified in the “ADDINFO” parameter is too short.	Check to determine whether the specified DB (DB number in hexadecimal form) is the correct DB or check the structure of the specified DB. Information on the DB structure is contained in Appendix C.1 to C.5.
8213	The DB specified in the “ADDINFO” parameter does not have the “unlinked” attribute.	Check to determine at the specified DB (DB number in hexadecimal form) whether the “unlinked” attribute is set. To select the “unlinked” attribute, refer to the STEP 7 Online Help.
8214	The DB specified in the “ADDINFO” parameter is write-protected.	Remove the write protection from the specified DB (DB number in hexadecimal form). For information on removing the write protection, refer to the STEP 7 Online Help.
8215	The ID of DB specified in the “ADDINFO” parameter is invalid.	Check the block ID of the specified DB (DB number in hexadecimal form). Information on the block ID is contained in Appendix C.1 to C.5.
8221	The number of the event DB specified in the “EVENT_DB” parameter is incorrect, or the DB is not available. This check is performed only after a backup job is initiated.	Check to determine whether the specified DB number is a valid DB number for this CPU. Check to determine whether the specified block is loaded. Correct the DB number, or create the corresponding EVENT_DB (refer to Section 4.6.2).
8222	The DB for backing up the event buffer on the MMC that is specified in the “EVENT_DB” parameter is too short. This check is performed only after a backup job is initiated.	Check to determine whether the specified DB is the correct DB or check the length (6144 bytes) and the structure of the specified DB. Information on the DB structure is contained in Section 4.6.2 .

Error Code (W#16#...)	Cause	Remedy
8223	The DB for backing up the event buffer on the MMC that is specified in the “EVENT_DB” parameter does not have the “unlinked” attribute. This check is performed only after a backup job is initiated.	Check to determine whether the “unlinked” attribute has been selected for the specified DB. To select the “unlinked” attribute, refer to the STEP 7 Online Help.
8224	The DB for backing up the event buffer on the MMC that is specified in the “EVENT_DB” parameter is write-protected. This check is performed only after a backup job is initiated.	Remove the write protection from the specified DB. For information on removing the write protection, please refer to the STEP 7 Online Help.
8400	The language selection “SetLang” specified in the configuration DB (“CONFIG”) has the value “0”.	Use the configuration interface to set the language with which the C7-613 boots up after restarting.
840 x	The language selection “SetLang = x” specified in the configuration DB (“CONFIG”) is not available.	Use the configuration interface to set the language with which the C7-613 boots up after restarting.
8406	The language selection “SetLang” specified in the configuration DB (“CONFIG”) has a value > 5.	Use the configuration interface to set the language with which the C7-613 boots up after restarting.
84xy	Parameter assignment is faulty in DB y of language x.	The values x and y mean: • x = Language index (1 to 5) • y = DB of the language (0 up to a maximum of 5). – 0 = Configuration DB (“CONFIG”) – 1 = First DB for process screens (”SCREEN”) The byte address within the DB at which the error occurred is specified in the parameter “ADDINFO” (hexadecimal form). Information on the DB structure is contained in Appendix C.1 to C.5. The parameter assignment is described in Section 4.3.

Error Code (W#16#...)	Cause	Remedy
880A	A selected process screen/special screen or an info text is not available.	Check whether a configuration is available for the selected object. A process screen or info text is configured if at least one character is edited in the static text.
	A screen was selected in the screen number range 128 to 255, but the screen is not a special screen.	Only the numbers 1 to 127 are valid for the selection of process screens. In the range of 128 to 255 only the screen numbers of special screens (see Section 4.5.3) can be selected.
880B	The selected process screen/special screen cannot be shown at the present time with control job 51 (display image selection).	A process screen/special screen cannot be selected, if an object with a higher display priority (refer to Section 5.8) is currently being displayed. Repeat the control job when the higher priority object is no longer displayed. Use the “OBJ_TYPE” parameter on the “HMI API” FB to obtain the type of the object that is currently being displayed (refer to Section 4.5).

Error information of the “HMI EVENT” FB

Error ID(W#16#...)	Cause	Remedy
7000	Integrated HMI module of C7-613 is being initialized. Incoming messages are delayed.	This is a status message that provides information about the function that is currently being performed. The integrated HMI module of the C7-613 is undergoing a cold restart. No additional action is required. The integrated HMI module of the C7-613 can also be initialized during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during initialization.
7001	Parameter assignment for the integrated HMI module of the C7-613 is underway. Incoming messages are delayed.	The DBs with the configuration data are being loaded from the MMC to the internal memory of the integrated HMI module. This always occurs following a power ON or general reset, or when the “Reload application” or “Swap languages” system function is applied. Wait until the parameter assignment is completed. The integrated HMI module of the C7-613 can also be configured during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during parameter assignment.
7002	Function for displaying a message is being executed. Job order has been placed.	This is a status message that provides information about the function that is currently being performed. No additional action is required.
7003	A fault message was acknowledged using the “Enter” key. The acknowledgement bit is set in the acknowledgement area.	This is a status message that provides information about the function that is currently being performed. No additional action is required.
7130	The job compartment is occupied at the moment. Pending messages will be delayed until the job compartment becomes free again.	This status is temporary. The job request is repeated.
8211	The number specified in the “API_DB” parameter is incorrect, or the DB is not available.	Check to determine whether the specified DB number is a valid DB number for this CPU (1 to 511). Check to determine whether it is the instance DB of the “HMI-API” FB. Check to determine whether the DB exists at all.

Error ID(W#16#...)	Cause	Remedy
8212	The DB specified in the “API_DB” parameter is too short.	Check to determine whether the specified DB is the instance DB of the “HMI-API” FB. If necessary, recreate the instance DB.
8213	The DB specified in the “API_DB” parameter is not available in the user memory.	Check to determine whether the specified DB is loaded. If necessary, remove the “unlinked” attribute. To remove “unlinked” as an attribute, refer to the STEP 7 Online Help.
8214	The DB specified in the “API_DB” parameter is write-protected.	Remove the write protection from the specified DB. For information on removing the write protection, please refer to the STEP 7 Online Help.
8215	The DB specified in the “API_DB” parameter is invalid.	Check to determine whether the specified DB is the instance DB of the “HMI-API” FB. If necessary, recreate the instance DB.
8220	The bit address of the message area pointer is not “0”.	Set the address of the area pointer to a byte limit, for example, P#M 20.4 BOOL ... to P#M 20.0 BOOL ...
8221	The access type of the message area pointer cannot be interpreted.	Use an area pointer of the following types: BOOL; BYTE; WORD; INT; DWORD; DINT For example: P#M20.0 BOOL 128, P#M20.0 BYTE 16, P#M20.0 WORD 8, P#M20.0 INT 8, P#M20.0 DWORD 4, P#M20.0 DINT 4 Pay attention to the maximum length information.
8230	The bit address of the acknowledgement area pointer is not “0”.	Set the address of the area pointer to a byte limit. For example: P#M 20.4 BOOL 16 to P#M 20.0 BOOL 16.

Error ID(W#16#...)	Cause	Remedy
8231	The access type of the acknowledgement area pointer cannot be interpreted.	Use an area pointer of the following types: BOOL; BYTE; WORD; INT; DWORD; DINT For example: P#M20.0 BOOL 128, P#M20.0 BYTE 16, P#M20.0 WORD 8, P#M20.0 INT 8, P#M20.0 DWORD 4, P#M20.0 DINT 4 Pay attention to the maximum length information.
8234	The message area and acknowledgement area lengths are not identical.	Adjust the address information according to the length information in the message area. For example, from EVENTS := P#M 20.0 BOOL 12 ACKS := P#M 24.0 BOOL 15 to EVENTS := P#M 20.0 BOOL 12 ACKS := P#M 24.0 BOOL 12

Error information of the “HMI MENU” FB

Error ID(W#16#...)	Cause	Remedy
7000	The integrated HMI module of C7-613 is being initialized.	This is a status message that provides information about the function that is currently being performed. The integrated HMI module of the C7-613 is undergoing a cold restart. No additional action is required. The integrated HMI module of the C7-613 can also be initialized during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during initialization. Outputting of pending messages is delayed.
7001	Parameter assignment for the integrated HMI module of the C7-613 is underway.	The DBs with the configuration data are being loaded from the MMC to the internal memory of the integrated HMI module. This always occurs following a power ON or general reset, or when the “Reload application” or “Swap languages” system function is applied. Wait until the parameter assignment is completed. The integrated HMI module of the C7-613 can also be configured during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during parameter assignment. Incoming messages are delayed.
710x	An object of type “x“ is displayed that is not being processed by the “HMI_MENU” FB.	This is an internal message and is not relevant to the user. Parameters cannot be assigned for a screen hierarchy for objects of type “x”: X = 2 (message) X = 3 (info text) X = 5 (standard screen/special screen)
7130	The job compartment of the “HMI_API” FB is still occupied by another job request.	This status is temporary. Perform the function again.
8211	The number specified in the “API_DB” parameter is incorrect, or the DB is not available.	Check to determine whether the specified DB number is a valid DB number for this CPU (1 to 511). Check to determine whether it is the instance DB of the “HMI-API” FB. Check to determine whether the DB exists at all.

Error ID(W#16#...)	Cause	Remedy
8212	The DB specified in the “API_DB” parameter is too short.	Check to determine whether the specified DB is the instance DB of the “HMI-API” FB. If necessary, recreate the instance DB.
8213	The DB specified in the “API_DB” parameter is not available in the user memory.	Check to determine whether the specified DB is loaded. If necessary, remove the “unlinked” attribute. To remove “unlinked” as an attribute, refer to the STEP 7 Online Help.
8214	The DB specified in the “API_DB” parameter is write-protected.	Remove the write protection from the specified DB. For information on removing the write protection, please refer to the STEP 7 Online Help.
8215	The DB specified in the “API_DB” parameter is invalid.	Check to determine whether the specified DB is the instance DB of the “HMI-API” FB. If necessary, recreate the instance DB.
8221	The number specified in the “MENU_DB” parameter is incorrect, or the DB is not available.	Check to determine whether the specified DB number is a valid DB number for this CPU (1 to 511). Check to determine whether the specified block is loaded. Correct the DB number or create the screen hierarchy by using the configuration interface (see Section 4.3.10).
8222	The DB specified in the “MENU_DB” parameter is too short.	Check to determine whether the specified DB is the correct DB or check the structure of the specified DB. Further information on the DB structure is contained in Appendix C.5.
8223	The DB specified in the “MENU_DB” parameter does not have the “unlinked” attribute.	Check to determine whether the “unlinked” attribute has been selected for the specified DB. To select the “unlinked” attribute, refer to the STEP 7 Online Help.
8225	The DB specified in the “MENU_DB” parameter is invalid.	Check to determine whether the specified DB is the menu DB (refer to Section 4.3.10) Check to determine whether “MENU” is entered as the block ID.
84xx	A menu configuration is not available for the configured screen with the number “xx”.	This is a configuration error. This error is caused by selecting a screen for which there is no entry in the menu DB (“MENU_DB”). Use the configuration interface to insert an entry for the selected screen (refer to Section 4.3.10).

B.2 System Messages

Introduction

This chapter presents system messages, including when system messages occur and how the cause of the error can be removed.

Note

So long as there are no data blocks with configuration data in the C7-613 or the integrated HMI module, system languages are displayed in English.

System Messages

System Message	Cause	Remedy
$ 000 V.... (Version) SIMATIC C7-613 Startup	The integrated HMI module of C7-613 is being initialized.	This is a status message that provides information about the function that is currently being performed. The integrated HMI module of the C7-613 is undergoing a cold restart. No additional action is required.
$ 001 Parameters have not been assigned to the C7-613.	There are no data blocks with configuration data.	Load the data blocks with the configuration data to the MMC, and reinitiate parameter assignment for the integrated HMI module. Since a valid parameter assignment does not yet exist, a STOP to RUN transition is sufficient.
	A parameter assignment error was detected during the transfer.	Evaluate the “RETVAL” error information and the “ADDINFO” status information of the “HMI API” FB. Eliminate the parameter assignment error, and reinitiate a parameter assignment for the integrated HMI module. Since a valid parameter assignment does not yet exist, a STOP to RUN transition is sufficient.
$ 002 Parameter assignment is underway (Note: You can edit the text for this system message freely in every language selected by you by using the configuration interface.)	The parameter assignment operation is not yet completed.	The DBs with the configuration data are being loaded from the MMC to the internal memory of the integrated HMI module. This always occurs following a power ON or general reset, or when the “Reload application” or “Swap languages” system function is applied. Wait until the parameter assignment is completed. Parameter assignment can last several minutes depending on the size of the project (refer to Section 4.2). The integrated HMI module of the C7-613 can also be configured during operation, if an internal error occurs in the integrated HMI module or during basic HMI functions. HMI functions are not possible during parameter assignment. Incoming messages are delayed.

System Message	Cause	Remedy
$ 003 The event buffer is empty.	There are no messages in the event buffer.	–
$ 004 Parameter assignment error	There is an error in a data block with configuration data.	Eliminate the parameter assignment error. You can obtain more detailed information in the “RETVAL” error information and the “ADDINFO” status information of the “HMI API” FB. Reinitiate a parameter assignment for the integrated HMI module. Since a valid parameter assignment does not yet exist, a STOP to RUN transition is sufficient.
$ 006 Parameters have not been assigned to the object.	The selected object is not available, or there is no configuration for the requested object.	Configure the object (screen or info text).
$ 008 CPU is in STOP mode	Serves as a note, since HMI functions are not possible when the CPU is in STOP mode.	Switch the CPU to RUN mode to perform the HMI functions.
$ 009 No active faults.	The message is displayed after selection of the message level, if there are no current operation/fault messages.	–
$ 010 Backup of the event buffer is under way.	The event buffer is being transferred to the EVENT_BUFFER on the MMC. The message is displayed until the backup operation is completed.	Wait until the transfer operation is completed.
$ 011 Screen #0 is missing.	A process screen with the number 0 has not been created.	Check your configuration. Create the process screen by using the configuration interface. Use a general reset operation or select the special screen “Reload application” to reinitiate a parameter assignment for the integrated HMI module.
$ 012 Unknown password	The entered password is unknown.	Check your password. You may have entered an incorrect figure. Reenter the password level.
$ 013 Inadmissible password	The entered password is already in use. The password does not contain at least three characters.	Use another password. Use a password that has at least 3 characters.
$ 014 Illegal password level	The specified password level does not match the password or is too high.	Check your present password level. You may have entered an incorrect figure. Reenter the password level. Permissible password level lies in the range of 0 to 3.
$ 015 Entry > upper limit value	The input value is greater than the upper limit value. The original value is retained.	Repeat the entry with a lower value.

System Message	Cause	Remedy
$ 016 Entry < lower limit value	The input value is less than the lower limit value. The original value is retained.	Repeat the entry with a higher value.
$ 017 Value not permissible for data type	The entered value does not match the data format.	Reenter the value using a value that is permissible for the data format. Check the configuration data of the variables.
$ 018 CPU is in RUN mode!	The CPU is in RUN mode. However, HMI functions are not possible, since the “HMI API” FB is not being called.	Check your program. Ensure that the “FB HMI” is called.
$ 019 Screen cannot be shown	The selected screen is a standard screen. Standard screens cannot be selected by means of the job interface or the “HMI MENU” FB. A special screen with the selected name is not available.	Check the number of the selected screen. The permissible numbers for special screens are found in Section 4.5.3

B.3 Conversion Tables for Decimal/Hexadecimal

Table B-1 Conversion table for screen numbers/info text numbers
(upper number decimal value, lower number hexadecimal value)

01 **01**	02 **02**	03 **03**	04 **04**	05 **05**	06 **06**	07 **07**	08 **08**	09 **09**	10 **0A**
11 **0B**	12 **0C**	13 **0D**	14 **0E**	15 **0F**	16 **10**	17 **11**	18 **12**	19 **13**	20 **14**
21 15	22 **16**	23 **17**	24 **18**	25 **19**	26 **1A**	27 **1B**	28 **1C**	29 **1D**	30 **1E**
31 **1F**	32 **20**	33 **21**	34 **22**	35 **23**	36 **24**	37 **25**	38 **26**	39 **27**	40 **28**
41 **29**	42 **2A**	43 **2B**	44 **2C**	45 **2D**	46 **2E**	47 **2F**	48 **30**	49 **31**	50 **32**
51 **33**	52 **34**	53 **35**	54 **36**	55 **37**	56 **38**	57 **39**	58 **3A**	59 **3B**	60 **3C**
61 **3D**	62 **3E**	63 **3F**	64 **40**	65 **41**	66 **42**	67 **43**	68 **44**	69 **45**	70 **46**
71 **47**	72 **48**	73 **49**	74 **4A**	75 **4B**	76 **4C**	77 **4D**	78 **4E**	79 **4F**	80 **50**
81 **51**	82 **52**	83 **53**	84 **54**	85 **55**	86 **56**	87 **57**	88 **58**	89 **59**	90 **5A**
91 **5B**	92 **5C**	93 **5D**	94 **5E**	95 **5F**	96 **60**	97 **61**	98 **62**	99 **63**	100 **64**
101 **65**	102 **66**	103 **67**	104 **68**	105 **69**	106 **6A**	107 **6B**	108 **6C**	109 **6D**	110 **6E**
111 **6F**	112 **70**	113 **71**	114 **72**	115 **73**	116 **74**	117 **75**	118 **76**	119 **77**	120 **78**
121 **79**	122 **7A**	123 **7B**	124 **7C**	125 **7D**	126 **7E**	127 **7F**	128 **80**		

Table B-2 Screen Position (Top: Decimal Value; Bottom: Hexadecimal Value)

01 **01**	02 **02**	03 **03**	04 **04**	05 **05**	06 **06**	07 **07**	08 **08**	09 **09**	10 **0A**	11 **0B**	12 **0C**	13 **0D**	14 **0E**	15 **0F**	16 **10**	17 **11**	18 **12**	19 **13**	20 **14**
21 **15**	22 **16**	23 **17**	24 **18**	25 **19**	26 **1A**	27 **1B**	28 **1C**	29 **1D**	30 **1E**	31 **1F**	32 **20**	33 **21**	34 **22**	35 **23**	36 **24**	37 **25**	38 **26**	39 **27**	40 **28**
41 **29**	42 **2A**	43 **2B**	44 **2C**	45 **2D**	46 **2E**	47 **2F**	48 **30**	49 **31**	50 **32**	51 **33**	52 **34**	53 **35**	54 **36**	55 **37**	56 **38**	57 **39**	58 **3A**	59 **3B**	60 **3C**
61 **3D**	62 **3E**	63 **3F**	64 **40**	65 **41**	66 **42**	67 **43**	68 **44**	69 **45**	70 **46**	71 **47**	72 **48**	73 **49**	74 **4A**	75 **4B**	76 **4C**	77 **4D**	78 **4E**	79 **4F**	80 **50**
Key F 1					Key F2						Key F3						Key F4		

01 **01**	02 **02**	03 **03**	04 **04**	05 **05**	06 **06**	07 **07**	08 **08**	09 **09**	10 **0A**	11 **0B**	12 **0C**	13 **0D**	14 **0E**	15 **0F**	16 **10**	17 **11**	18 **12**	19 **13**	20 **14**
21 **15**	22 **16**	23 **17**	24 **18**	25 **19**	26 **1A**	27 **1B**	28 **1C**	29 **1D**	30 **1E**	31 **1F**	32 **20**	33 **21**	34 **22**	35 **23**	36 **24**	37 **25**	38 **26**	39 **27**	40 **28**
41 **29**	42 **2A**	43 **2B**	44 **2C**	45 **2D**	46 **2E**	47 **2F**	48 **30**	49 **31**	50 **32**	51 **33**	52 **34**	53 **35**	54 **36**	55 **37**	56 **38**	57 **39**	58 **3A**	59 **3B**	60 **3C**
61 **3D**	62 **3E**	63 **3F**	64 **40**	65 **41**	66 **42**	67 **43**	68 **44**	69 **45**	70 **46**	71 **47**	72 **48**	73 **49**	74 **4A**	75 **4B**	76 **4C**	77 **4D**	78 **4E**	79 **4F**	80 **50**
Key F 1					Key F2						Key F3						Key F4		

Configuration DBs

C

C.1 Configuration DB “CONFIG”

Structure and Description

Table C-1 Structure of the Configuration DB

Address	Name	Type	Description
0	DB_HEADER.HEAD.ID	STRING[6]	The block ID “CFG” identifies the DB as configuration DB
8	DB_HEADER.HEAD.LANGUAGE	STRING[3]	Language ID in 3-letter code
14	DB_HEADER.HEAD.AMOUNTOBJ	INT	Number of objects
16 to 31	Reserved	BYTE	Reserved, do not overwrite
32	CFG_DATA.INPUTMODE	BYTE	Input of values (variables): 0 = Input with function keys (C keys) 1 = Input with cursor keys)
33	CFG_DATA.SETLANG	BYTE	Number of the selected language (1-5). The C7-613 powers up after a cold restart with this language. If you change the language setting during operation, the new language setting is stored here.
34	CFG_DATA.CONTRAST	BYTE	Contrast (default = 6) 0 to 15
36 to 47	CFG_DATA.Reserved	BYTE	Reserved, must be 0
48	CFG_DATA.SUPERUSER.PASS	DINT	Superuser password 100 to 99 999 999, 0 = No password
52	CFG_DATA.SUPERUSER.Reserved	WORD	Reserved, do not change
54	CFG_DATA.PASSWORDS[1].PASS	DINT	Password 1 100 to 99 999 999, 0 = No password
58	CFG_DATA.PASSWORDS[1].Reserved	BYTE	Reserved, must be 0
59	CFG_DATA.PASSWORDS[1].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0

Table C-1 Structure of the Configuration DB, continued

Address	Name	Type	Description
60	CFG_DATA.PASSWORDS[2].PASS	DINT	Passwort 2 100 to 99 999 999, 0 = No password
64	CFG_DATA.PASSWORDS[2]. Reserved	BYTE	Reserved, must be 0
65	CFG_DATA.PASSWORDS[2].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
66	CFG_DATA.PASSWORDS[3].PASS	DINT	Passwort 3 100 to 99 999 999, 0 = No password
70	CFG_DATA.PASSWORDS[3]. Reserved	BYTE	Reserved, must be 0
71	CFG_DATA.PASSWORDS[3].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
72	CFG_DATA.PASSWORDS[4].PASS	DINT	Passwort 4 100 to 99 999 999, 0 = No password
76	CFG_DATA.PASSWORDS[4]. Reserved	BYTE	Reserved, must be 0
77	CFG_DATA.PASSWORDS[4].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
78	CFG_DATA.PASSWORDS[5].PASS	DINT	Passwort 5 100 to 99 999 999, 0 = No password
82	CFG_DATA.PASSWORDS[5]. Reserved	BYTE	Reserved, must be 0
83	CFG_DATA.PASSWORDS[5].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
84	CFG_DATA.PASSWORDS[6].PASS	DINT	Passwort 6 100 to 99 999 999, 0 = No password
88	CFG_DATA.PASSWORDS[6]. Reserved	BYTE	Reserved, must be 0
89	CFG_DATA.PASSWORDS[6].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
90	CFG_DATA.PASSWORDS[7].PASS	DINT	Passwort 7 100 to 99 999 999, 0 = No password
94	CFG_DATA.PASSWORDS[7]. Reserved	BYTE	Reserved, must be 0
95	CFG_DATA.PASSWORDS[7].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
96	CFG_DATA.PASSWORDS[8].PASS	DINT	Passwort 8 100 to 99 999 999, 0 = No password
100	CFG_DATA.PASSWORDS[8]. Reserved	BYTE	Reserved, must be 0

Table C-1 Structure of the Configuration DB, continued

Address	Name	Type	Description
101	CFG_DATA.PASSWORDS[8].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0
102	CFG_DATA.PASSWORDS[9].PASS	DINT	Password **9** 100 to 99 999 999, 0 = No password
106	CFG_DATA.PASSWORDS[9]. Reserved	BYTE	Reserved, must be 0
107	CFG_DATA.PASSWORDS[9].LEVEL	BYTE	Password level 1 to 3 No password is needed for password level 0

Optional parts of the configuration DB

The date format, the character set, the language for the standard/special screens and system messages and the text for the freely editable system message $002 are stored here for each configured language (parameter "3LC").

Table C-2 Structure of configuration DB, optional part

Address	Name	Type	Description
108	LANG[1].PRES.SYSTEM_LANG	WORD	Number of the system language
110	LANG[1].PRES.DATA_TIME_ FORMAT	WORD	Format of date and time 0 = The format is determined by the language set at the parameter "3LC". 1 = YY-MM-DD (in accordance with ISO 8601) 2 = DD.MM.YY (German) 3 = MM/DD/YY (American) 4 = DD/MM/YY (English) 5 = DD-MM-YY (Dutch) 6 = YY/MM/DD (Taiwanese)
112	LANG[1].PRES.FONT	WORD	Selected character set 0 = The character set is determined by the language set at the parameter "3LC". 0 = Latin1 (English, German, French, ...) 2 = Greek 3 = Cyrillic 4 = Turkish 5 = Chinese 6 = Korean 7 = Japanese
114	LANG[1].PRES.Res	STRING[12]	Reserved, must be 0
128	LANG[1].SUBST_MSG_STATIC[1]	STRING[20]	Static text of the 1st line from the system message $002
150	LANG[1].SUBST_MSG_STATIC[2]	STRING[20]	Static text of the 2nd line from the system message $002

Table C-2 Structure of configuration DB, optional part, continued

Address	Name	Type	Description
172	LANG[1].SUBST_MSG_STATIC[3]	STRING[20]	Static text of the 3rd line from the system message $002
194	LANG[1].SUBST_MSG_STATIC[4]	STRING[20]	Static text of the 4th line from the system message $002
216 to 323	LANG[2]....		Optional part for the 2nd configured language
324 to 431	LANG[3]....		Optional part for the 3rd configured language
432 to 539	LANG[4]....		Optional part for the 4th configured language
540 to 647	LANG[5]....		Optional part for the 5th configured language

C.2 Process screen DB “SCREEN”

Structure and Description

Table C-3 Structure of DB for Process Screens

Address	Name	Type	Description
0	DB_HEADER.HEAD.ID	STRING[6]	The block ID “SCREEN” identifies the DB as a DB for storing screens.
8	DB_HEADER.HEAD.LANGUAGE	STRING[3]	Language ID in 3-letter code
14	DB_HEADER.HEAD.AMOUNTOBJ	INT	Number of objects
16 to 31	DB_HEADER.HEAD.Reserved[..]	BYTE	Reserved
32	SCREEN[0].PIC_INFO.INFO	BYTE	Reserved, do not overwrite!
33	SCREEN[0].PIC_INFO.STARTUP	BYTE	Initial screen 1 = The screen is the initial screen and is displayed as the first screen after POWER ON. If several screens have this ID, the first screen with this ID is shown as the initial screen.
34	SCREEN[0].PIC_INFO.Reserved	BYTE	Reserved
35	SCREEN[0].PIC_INFO.PASSLEVEL	BYTE	Password level 0 to 4 This screen can be called only with a password level ≥ the password level set here. Password protection is not possible for the initial screen.
36	SCREEN[0].PIC_INFO.PICNAME	STRING[14]	Freely selectable screen name. This line does not appear on the screen.
52	SCREEN[0].PIC_STATIC[1]	STRING[20]	Static text of the first line of Screen 0.
74	SCREEN[0].PIC_STATIC[2]	STRING[20]	Static text of the second line of Screen 0.
96	SCREEN[0].PIC_STATIC[3]	STRING[20]	Static text of the third line of Screen 0.
118	SCREEN[0].PIC_STATIC[4]	STRING[20]	Static text of the fourth line of Screen 0.
140	SCREEN[0].PIC_VAR[1].POSITION	BYTE	Position of the first (most significant) position of the variable within the screen. Line break is not possible. 0=Variable is not shown 1 to 50 (hex) = Starting field number (tables are provided in Appendix B.3 for decimal/hexadecimal conversion of positions of variables).

Table C-3 Structure of DB for Process Screens, continued

Address	Name	Type	Description
141	SCREEN[0].PIC_VAR[1]. DECIMALS_LENGTH	BYTE	Length of field and number of decimal places. For numbers with decimal places, the length of the field must be at least two times greater than the number of decimal places. Bit 0 to 3 = Length of Field 1 to F (hexadecimal) Bit 4 to 7 = Number of decimal places 0 to D (hexadecimal) Example: 15 hex means: Length of field = 5 number of decimal places = 1
142.0 142.1	SCREEN[0].PIC_VAR[1]. FIELDTYPE	BOOL	Field type (combination of Bit 0 and Bit 1) (right bit=Bit 0) 00=Output field 01=Output/input field 10=Input field
142.2 142.3	SCREEN[0].PIC_VAR[1].ATTRIBUTE	BOOL	Type of display/mode of representation (combination of Bit 2 and Bit 3) (right bit=Bit 2) 00=Normal 01=Flashing
142.4 142.5 142.6	SCREEN[0].PIC_VAR[1]. TARGETFORMAT	BOOL	Representational format, combination of Bit 4, 5 and 6 (right bit=Bit 4) 000=Decimal 001=Hexadecimal 010=Binary 011=ASCII (only for output) 100 = Unicode
142.7	SCREEN[0].PIC_VAR[1].LIMON	BOOL	Limit check during input 1=Limit check switched on
143	SCREEN[0].PIC_VAR[1]. AREACODE	CHAR	Memory area “P”=I/O “E”=Input “A”=Output “D”=Data block “M”=Bit memory area
144	SCREEN[0].PIC_VAR[1].BLOCKNO	INT	Block number, only relevant for area ID “D”.
146	SCREEN[0].PIC_VAR[1].BYTENO	INT	Offset address Password level 0 to 16383

Table C-3 Structure of DB for Process Screens, continued

Address	Name	Type	Description
148	SCREEN[0].PIC_VAR[1].ACCESS	CHAR	Data type “X”=BOOL “C”=CHAR “B”=BYTE “I”=INT “L”=DINT “W”=WORD “D”=DWORD
149	SCREEN[0].PIC_VAR[1].BITNO	BYTE	Bit number 0 to 7; must be 0 for all data types except “X”.
150	SCREEN[0].PIC_VAR[1].UPPERLIM	DINT	Upper limit If limit monitoring is switched on, the variable is monitored at the input for values > the upper limit. If the limit is exceeded, a corresponding system message is output.
154	SCREEN[0].PIC_VAR[1].LOWERLIM	DINT	Lower Limit If limit monitoring is switched on, the variable is monitored at the input for values < the lower limit. If the lower limit is exceeded, a corresponding system message is output.
158 to 175	SCREEN[0].PIC_VAR[2].		Description for Variable 2
176 to 193	SCREEN[0].PIC_VAR[3].		Description for Variable 3
194 to 211	SCREEN[0].PIC_VAR[4].		Description for Variable 4
212 to 229	SCREEN[0].PIC_VAR[5].		Description for Variable 5
230 to 247	SCREEN[0].PIC_VAR[6].		Description for Variable 6
248 to 265	SCREEN[0].PIC_VAR[7].		Description for Variable 7
266 to 283	SCREEN[0].PIC_VAR[8].		Description for Variable 8
284 to 535	SCREEN[1]...		Screen description for Screen 1
to			
15908 to 16159	SCREEN[63]...		Screen description for Screen 63

Example for a created process screen

Table C-4 Example for a created process screen

Address	Name	Type	Actual Value	Description
0	DB_HEADER.HEAD.ID	STRING[6]	“SCREEN“	Block ID
8	DB_HEADER.HEAD.LANGUAGE	STRING[3]	“GER“	Language ID
14	DB_HEADER.HEAD.AMOUNTOBJ	BYTE	1	Number of objects
16 to 31	DB_HEADER.HEAD.Reserved[..]	INT	0	Reserved
32	SCREEN[0].PIC_.INFO.INFO	BYTE	0	Reserved
33	SCREEN[0].PIC_INFO.STARTUP	BYTE	0	Not an initial screen
34	SCREEN[0].PIC_INFO.Reserved	BYTE	0	Reserved
35	SCREEN[0].PIC_INFO.PASSLEVEL	BYTE	1	Password level 1
36	SCREEN[0].PIC_INFO.PICNAME	STRING[14]	“Screen 0“	Name of screen
52	SCREEN[0].PIC_STATIC[1]	STRING[20]	“Tank 1“ (1)	First line of Screen0
74	SCREEN[0].PIC_STATIC[2]	STRING[20]	“Temperature“ (2)	Second line of Screen 0
96	SCREEN[0].PIC_STATIC[3]	STRING[20]	DEGREE” (3)	Third line of Screen 0
118	SCREEN[0].PIC_STATIC[4]	STRING[20]	“ “	Fourth line of Screen 0
140	SCREEN[0].PIC_VAR[1].POSITION	BYTE	2A (hex) (4)	Position of variable within the screen (second position in third line)
141	SCREEN[0].PIC_VAR[1]. DECIMALS_LENGTH	BYTE	15 (hex) (5) (6)	Length of field= 5; number of decimal places=1
142.0 142.1	SCREEN[0].PIC_VAR[1]. FIELDTYPE	BOOL	10 (7)	Field type: Input field
142.2 142.3	SCREEN[0].PIC_VAR[1]. ATTRIBUTE	BOOL	00 (8)	Type of representation: Standard
142.4 142.5 142.6	SCREEN[0].PIC_VAR[1]. TARGETFORMAT	BOOL	000 (9)	Representational format: Decimal
142.7	SCREEN[0].PIC_VAR[1].LIMON	BOOL	0 (10)	0=Limit check switched off
143	SCREEN[0].PIC_VAR[1]. AREACODE	CHAR	D (11)	Memory area “D”=Data block
144	SCREEN[0].PIC_VAR[1].BLOCKNO	INT	20 (12)	Block number 20
146	SCREEN[0].PIC_VAR[1].BYTENO	INT	30 (13)	Offset address Byte 30

Table C-4 Example for a created process screen, continued

Address	Name	Type	Actual Value	Description
148	SCREEN[0].PIC_VAR[1].ACCESS	CHAR	"I" (14)	Data Type "I"=Integer
149	SCREEN[0].PIC_VAR[1].BITNO	BYTE	0	Bit Number 0
150	SCREEN[0].PIC_VAR[1].UPPERLIM	DINT	0	Upper limit: no limit monitoring
154	SCREEN[0].PIC_VAR[1].LOWERLIM	DINT	0	Lower limit: no limit monitoring
.....				

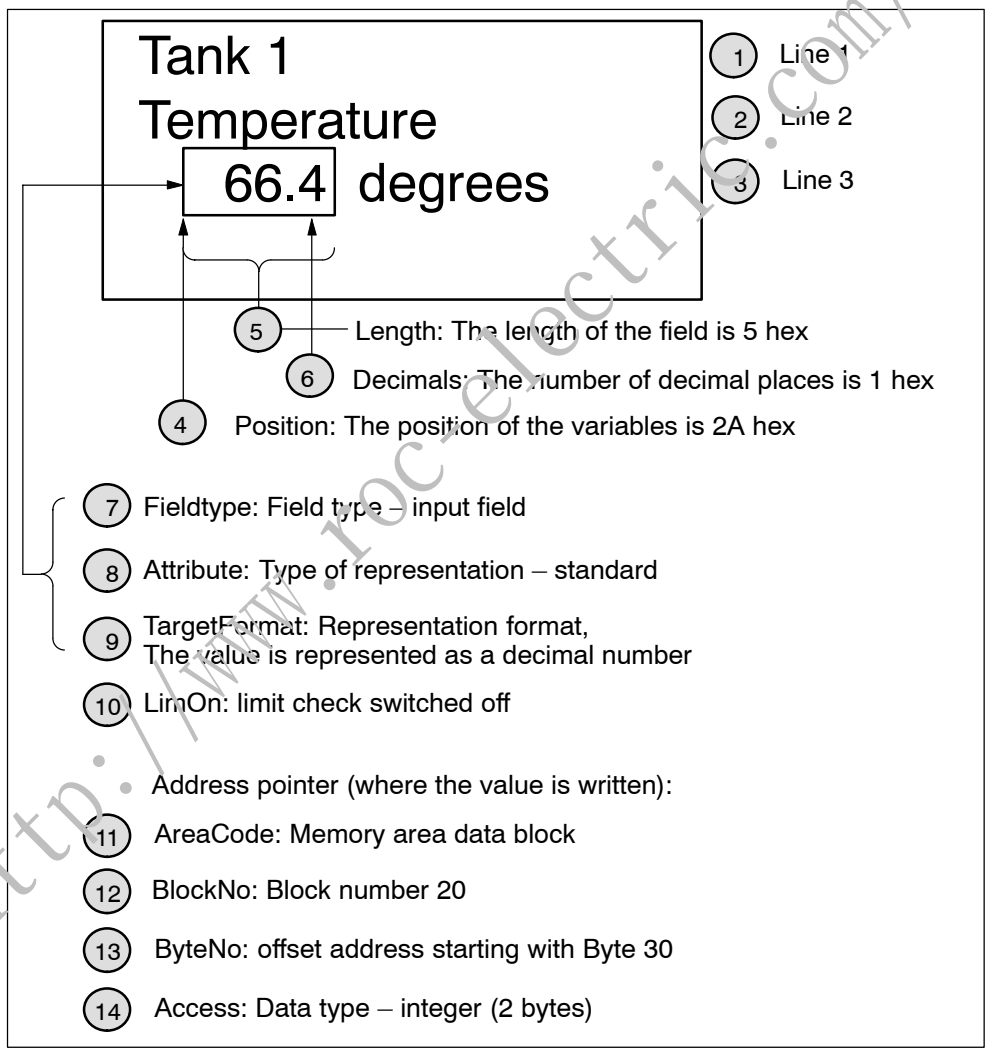


Figure C-1 Description of an Edited Screen

C.3 Message DB “MESSAGE”

Structure and Description

Table C-5 Structure of DB for Messages

Address	Name	Type	Description
0	DB_HEADER.HEAD.ID	STRING[6]	The block ID “MESSAG” identifies the DB as a DB for storing messages.
8	DB_HEADER.HEAD.LANGUAGE	STRING[3]	Language ID in 3-letter code
14	DB_HEADER.HEAD.AMOUNTOBJ	INT	Number of objects
16 to 31	DB_HEADER.HEAD.Reserved[..]	BYTE	Reserved
32	MESSAGE[0].MSG_INFO.INFO	BYTE	Reserved, do not overwrite!
33	MESSAGE[0].MSG_INFO. ACKNOWLEDGE	BYTE	Acknowledgement: 0 = Acknowledgement required (fault message) FF hex = No acknowledgement (operational message)
34	MESSAGE[0].MSG_INFO.Reserved	BYTE	Reserved, do not overwrite!
35	MESSAGE[0].MSG_INFO.RefInfo	BYTE	Reference to assigned text 0 = No info text 1 to 7F hex = Info text number
36	MESSAGE[0].MSG_INFO. MSGNAME	STRING[14]	Freely selectable message name. This line does not appear in the message. However, the name is output in the event buffer.
52	MESSAGE[0].MSG_STATIC[1]	STRING[20]	Static text of the first line of Message 0
74	MESSAGE[0].MSG_STATIC[2]	STRING[20]	Static text of the second line of Message 0
96	MESSAGE[0].MSG_STATIC[3]	STRING[20]	Static text of the third line of Message 0
118	MESSAGE[0].MSG_STATIC[4]	STRING[20]	Static text of the fourth line of Message 0
140	MESSAGE[0].MSG_VAR[1]. POSITION	BYTE	Location of the first (most significant) position of the variable within the message. Line break is not possible. 0=Variable is not shown 1 to 50 (hex) = Starting field number (tables are provided in Appendix B.3 for decimal/hexadecimal conversion of positions of variables).

Table C-5 Structure of DB for Messages, continued

Address	Name	Type	Description
141	MESSAGE[0].MSG_VAR[1]. DECIMALS_LENGTH	BYTE	Length of field and number of decimal places. For numbers with decimal places, the length of the field must be at least two times greater than the number of decimal places. Bit 0 to 3 = Length of Field 1 to F (hex) Bit 4 to 7 = Number of decimal places 0 to D (hex) Example: 15 hex means: Length of field = 5 number of decimal places = 1
142.0 142.1	MESSAGE[0].MSG_VAR[1]. Reserved	BOOL	Reserved
142.2 142.3	MESSAGE[0].MSG_VAR[1]. ATTRIBUTE	BOOL	Type of display/mode of representation (combination of Bit 2 and Bit 3) (right bit=Bit 2) 00=Normal 01=Flashing
142.4 142.5 142.6	MESSAGE[0].MSG_VAR[1]. TARGETFORMAT	BOOL	Representational format, combination of Bit 4, 5 and 6 (right bit=Bit 4) 000=Decimal 001=Hexadecimal 010=Binary 011=ASCII 100 = Unicode
143	MESSAGE[0].MSG_VAR[1]. AREACODE	BYTE	Memory area “P”=I/O “E”=Input “A”=Output “D”=Data block “M”=Bit memory area
144	MESSAGE[0].MSG_VAR[1]. BLOCKNO	INT	Block number; relevant only if you set the area ID to “D”.
146	MESSAGE[0].MSG_VAR[1]. BYTENO	INT	Offset address Password level 0 to 16383
148	MESSAGE[0].MSG_VAR[1]. ACCESS	CHAR	Data Type “X”=BOOL “C”=CHAR “B”=BYTE “I”=INT “L”=DINT “W”=WORD “D”=DWORD
149	MESSAGE[0].MSG_VAR[1].BITNO	BYTE	Bit number 0 to 7; must be 0 for all data types except “X”.

Table C-5 Structure of DB for Messages, continued

Address	Name	Type	Description
150 to 159	MESSAGE[0].MSG_VAR[2].		Description for Variable 2
160 to 169	MESSAGE[0].MSG_VAR[3].		Description for Variable 3
170 to 179	MESSAGE[0].MSG_VAR[4].		Description for Variable 4
180 to 327	MESSAGE[1]...		Description for Message 1
	to		
9356 to 9503	MESSAGE[63]...		Description for Message 63

C.4 Info text-DB “INFO”

Structure and Description

Table C-6 Structure of DB for Info Texts

Address	Name	Type	Description
0	DB_HEADER.HEAD.ID	STRING[6]	The block ID “INFO” identifies the DB as a DB for storing info texts.
8	DB_HEADER.HEAD.LANGUAGE	STRING[3]	Language ID in 3-letter code
14	DB_HEADER.HEAD.AMOUNTOBJ	INT	Number of objects
16 to 31	DB_HEADER.HEAD.Reserved[..]	BYTE	Reserved
32	INFO[0].INF_INFO.Reserved	DWORD	Reserved, do not overwrite!
36	INFO[0].INF_INFO.INFO_NAME	STRING[14]	Freely selectable info text name, This line does not appear in the info text.
52	INFO[0].INF_STATIC[1]	STRING[20]	Static text of the first line of Info Text 0.
74	INFO[0].INF_STATIC[2]	STRING[20]	Static text of the second line of Info Text 0.
96	INFO[0].INF_STATIC[3]	STRING[20]	Static text of the third line of Info Text 0.
118	INFO[0].INF_STATIC[4]	STRING[20]	Static text of the fourth line of Info Text 0.
140	INFO[0].INF_REFERENCES. FORWARD	INT	Reference following info text Info text number or 255 if there is no reference. When the info text is output, the referenced info text can be selected by using the keys “Cursor down” or “Cursor right”.
142	INFO[0].INF_REFERENCES. BACKWARD	INT	Reference previous info text Info text number or 255 if there is no reference. When the info text is output, the referenced info text can be selected by using the keys “Cursor up” or “Cursor left”.
144 to 255	INFO[1]...		Description for Info Text 1

to

14256 to 14367	INFO[127]...		Description for Info Text 127

C.5 Screen hierarchy DB “MENU”

Structure and Description

Table C-7 Structure of DB for the Screen Hierarchy

Address	Name	Type	Description
0	DB_HEADER.HEAD.ID	STRING[6]	The block ID “MENU” identifies the DB as a DB for storing the screen hierarchy.
8	DB_HEADER.HEAD.LANGUAGE	STRING[3]	Language ID in 3-letter code
14	DB_HEADER.HEAD.AMOUNTOBJ	INT	Reserved, no entry required.
16 to 31	DB_HEADER.HEAD.Reserved[..]	BYTE	Reserved
32	MENU[0].MNU_INFO.Reserved	BYTE	Reserved, must be 0!
33.0	MENU[0].MNU_INFO. SCR_F1_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “F1” is pressed. 0 = Screen 1 = Info text
33.1	MENU[0].MNU_INFO. SCR_F2_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “F2” is pressed. 0 = Screen 1 = Info text
33.2	MENU[0].MNU_INFO. SCR_F3_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “F3” is pressed. 0 = Screen 1 = Info text
33.3	MENU[0].MNU_INFO. SCR_F4_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “F4” is pressed. 0 = Screen 1 = Info text
33.4	MENU[0].MNU_INFO. SCR_RIGHT_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “Cursor right” is pressed. 0 = Screen 1 = Info text
33.5	MENU[0].MNU_INFO. SCR_LEFT_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “Cursor left” is pressed. 0 = Screen 1 = Info text
33.6	MENU[0].MNU_INFO. SCR_DOWN_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “Cursor down” is pressed. 0 = Screen 1 = Info text
33.7	MENU[0].MNU_INFO. SCR_UP_INFO	BOOL	Selection whether a screen or an info text is to be displayed when “Cursor high” is pressed. 0 = Screen 1 = Info text

Table C-7 Structure of DB for the Screen Hierarchy, continued

Address	Name	Type	Description
34	MENU[0].SCR_F1	BYTE	No. of the screen/info text called up when “F1” is pressed. 0 to 127 process screens Special screens (for permissible numbers, refer to Section 4.5.3) 0 to 127 info texts 255 = No screen change
35	MENU[0].SCR_F2	BYTE	No. of the screen/info text called up when “F2” is pressed.
36	MENU[0].SCR_F3	BYTE	No. of the screen/info text called up when “F3” is pressed.
37	MENU[0].SCR_F4	BYTE	No. of the screen/info text called up when “F4” is pressed.
38	MENU[0].SCR_RIGHT	BYTE	No. of the screen/info text called up when “Cursor right” is pressed.
39	MENU[0].SCR_LEFT	BYTE	No. of the screen/info text called up when “Cursor left” is pressed.
40	MENU[0].SCR_DOWN	BYTE	No. of the screen/info text called up when “Cursor down” is pressed.
41	MENU[0].SCR_UP	BYTE	No. of the screen/info text called up when “Cursor up” is pressed.
42 to 51			Description for Menu 1

to

1302 to 1311			Description for Menu 127

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SIEMENS

Product Information

07.2006

Device Manual C7-613 Control System

Device Manual C7-635 Control System

Device Manual C7-636 Control System

This product information contains important information about the documentation mentioned above. It is to be regarded as a separate component. Its specifications and information have a higher binding nature than those of other manuals, instruction lists and Getting Starteds.

New C7 devices with larger working memory

The working memory of the following C7 devices was extended. The CPUs can now execute larger user programs.

Due to these improvements, the order number of the CPUs were changed.

The new C7 devices are:

- contained in STEP7 V5.4 Service Pack 1
- configurable with the older STEP7 versions:
  The C7 devices with the new order number can be downloaded from the Internet as a hardware update (0109).
  Requirement is STEP7 V5.2, Service Pack1.
- configurable with the corresponding previous C7 devices
- compatible with the previous C7 devices

Non-retentive data blocks

In opposition to the data in the S7-300, CPU 31xC and CPU 31x manual, Technical data", chapter 4.1.2, the C7 devices with frimware V2.0.12 are no longer supported by retentive data blocks. Non-retentive data blocks and code blocks can be loaded to the maximum limit of the working memory. Retentive data blocks can be loaded to the maximum retentive limit of the working memory (see the following table).

Product description	Previous order nr.	Firmware <	Previous Working memory	Previous Working memory retentive **	New order nr.	Firmware ≧	Working memory new	Working memory retentive ** new	Hard-ware update
C7-613	6ES7613-1CA01-0AE3	V2.0.12	48 KB	48 KB	6ES7613-1CA02-0AE3	V2.0.12	80 KB	64 KB	0109
C7-635 Touch	6ES7635-2EB01-0AE3	V2.0.12	64 KB	64 KB	6ES7635-2EB02-0AE3	V2.0.12	96 KB	64 KB	0109
C7-635 Key	6ES7635-2EC01-0AE3	V2.0.12	64 KB	64 KB	6ES7635-2EC02-0AE3	V2.0.12	96 KB	64 KB	0109
C7-636 Touch*	6ES7636-2EB00-0AE3	V2.0.12	128 KB	128 KB	6ES7636-2EB00-0AE3	V2.0.12	128 KB	128 KB	-
C7-636 Key*	6ES7636-2EC00-0AE3	V2.0.12	128 KB	128 KB	6ES7636-2EC00-0AE3	V2.0.12	128 KB	128 KB	-

* not affected by the extension of the memory

** Maximum size for retentive working memory for retentive data blocks