SIEMENS

S7-200

SIMATIC
Text Display (TD) User Manual

System Manual

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Safety Guidelines

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

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

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

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

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

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

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

Prescribed Usage

Note the following:

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

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Preface

Scope of this Manual

This manual describes the installation, configuration and operation of the TD 100C version 1.0, the TD 200 version 3.0, the TD 200C version 1.0, and the TD400C version 2.0. This manual also describes the Text Display wizard of STEP 7-Micro/WIN (used to configure the S7-200 CPU for the TD devices) and the Keypad Designer application (used to configure the keypad of the TD 100C, the TD 200C and the TD400C).

To utilize these TD devices, you must use the following:

- STEP 7-Micro/WIN version 4.0 SP2 or greater for TD 100C version 1.0
- STEP 7-Micro/WIN version 4.0 or greater for TD 200C version 1.0 and TD 200 version 3.0
- STEP 7-Micro/WIN version 4.0 SP6 or greater for the TD400C version 2.0

Purpose of the manual

The SIMATIC Text Display (TD) User Manual is a combination user and reference manual that describes the operation of the TD devices with an S7-200 CPU.

Required Basic Knowledge

This manual is designed for engineers, programmers, and maintenance personnel who have a general knowledge of programmable logic controllers and operator interfaces.

Recycling and Disposal

Please contact a company certified in the disposal of electronic scrap for environmentally safe recycling and disposal of your device.

Place of this Document in the Information Environment

Table 1 Place of the Text Display User Manual in the Information Environment

Product Family	Documentation	Order Number
S7-200	SIMATIC Text Display (TD) User Manual (resides on the STEP 7-Micro/WIN documentation CD)	Not applicable
	Simplified Chinese Character Set (resides on the STEP 7-Micro/WIN documentation CD)	Not applicable
S7-200	S7-200 Programmable Controller System Manual	6ES7 298-8FA24-8BH0

Finding Your Way

If you are a first-time (novice) user of TD devices, you should read the entire SIMATIC Text Display (TD) User Manual. If you are an experienced user, refer to the table of contents or index to find specific information.

The SIMATIC Text Display User Manual is organized according to the following topics:

- Chapter 1 (Product Overview) provides an overview of the TD devices
- Chapter 2 (Installing Your TD Device) provides installation instructions and guidelines.
- Chapter 3 (Using the Keypad Designer to Create a Custom Faceplate for Your TD Device) provides information about the Keypad Designer and the steps required for configuring the keypad and faceplate for the TD devices that can be customized..
- Chapter 4 (Using the Text Display Wizard to Configure the S7-200 CPU for Your TD Device) provides information about using the Text Display wizard of STEP 7-Micro/WIN to configure the S7-200 CPU for the TD device.
- Chapter 5 (Operating Your TD Device) provides information about the basic operation of the TD devices and also describes the features and capabilities.
- Appendix A (Technical Specifications and Reference Information) provides the technical information for the TD devices and also provides references for the character sets supported.
- Appendix B (Connecting Multiple Devices on a Network) provides information about using a TD device in a network with other TD devices and S7-200 CPUs.
- Appendix C (Troubleshooting) provides information to help you diagnose problems with the TD device.

The Simplified Chinese Character Set shows the characters supported by the TD devices. This file is an electronic file and resides on the STEP 7-Micro/WIN documentation CD.

Approvals

Agency Approvals

The SIMATIC Text Display (TD) devices meet the standards and regulations of the following agencies.

- Underwriters Laboratories, Inc. (UL): UL 60950 for the TD 200C and TD 200; and UL 508, UL 1604 for the TD 100C and TD400C
- Canadian Standards Association: CSA C22.2 No. 60950 standard for the TD 200C and TD 200; and CS22.2 No. 142 standard and CSA-213 for the TD 100C and TD400C

Refer to Appendix A for additional compliance information.

Certification

The SIMATIC Text Display devices have the following certifications:

- Underwriters Laboratories (UL) Standards
  - TD 200C and TD 200: UL 60950 and CSA C22.2 No. 60950
  - TD 100C and TD400C: UL 508 and CS22.2 No. 142; UL 1604 and CSA-213
- Factory Mutual Research: Standard Class Number 3611, Class I, Division 2, Group A, B, C, D, and Class I, Zone 2, Group IIC.
  Temperature class T5 is adhered to when the ambient temperature during operation does not exceed 60 degrees C.

CE Labeling

The SIMATIC TD devices fulfil the requirements and protection guidelines of the following EU directives:

- EC Directive 94/9/EC "ATEX directive" (TD 200 and TD 200C only)
- EC Directive 89/336/EEC "EMC directive" (TD 100C, TD 200, TD 200C and TD400C)

C-Tick

The SIMATIC devices are compliant with requirements of the following standards.

- AS/NZS CISPR22 (TD 100C, TD 200, TD 200C)
- AS/NZS CISPR11 (TD400C)

Note

The only valid approvals for the TD400C device are those shown on the label on the rear panel of the device.

Services and Support

Additional Support

Local Siemens Sales Office or Distributor: For assistance in answering any technical questions, for training on the S7-200 products, or for ordering S7-200 products, contact your Siemens distributor or sales office. Because your sales representatives are technically trained and have the most specific knowledge about your operations, process and industry, as well as about the individual Siemens products that you are using, they can provide the fastest and most efficient answers to any problems that you might encounter.

Service and 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:

- Access the S7-200 Internet site to find additional S7-200 product information: www.siemens.com/S7-200
  This site includes frequently asked questions (FAQs), Programming Tips (application examples and sample programs), information about newly released products, and product updates or downloads
- Read the newsletter, which constantly provides you with up-to-date information on your products
- Use the Search feature of the Service & Support area to find specific documentation
- Share information and exchange experiences with a forum of other users and experts from all over the world
- Find your local Siemens representative for Automation & Drives
- Use the "Services" link to find information on field service, repairs, spare parts and more

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For assistance in answering any technical questions, for training on a specific product, or for ordering any SIMATIC products, contact your Siemens distributor or sales office. Because the sales representatives are technically trained and have specific knowledge about your operations, process and industry, as well as about the individual Siemens products that you are using, they can provide the fastest and most efficient answers to any problems that you might encounter.

Technical services

The highly trained staff of the SIMATIC Customer Support center is also available to help you resolve any problems that you might encounter. Their services are available world-wide 24 hours a day, 7 days a week.

Figure 1-1 World-Wide SIMATIC Customer Support

Table 2 Contact Information for SIMATIC Customer Support

United States: Johnson City, TN	World-wide: Nuremberg	Asia and Australia: Beijing
Technical Support and Authorization Local time: Monday to Friday 8:00 AM to 5:00 PM Telephone: +1 (423) 262-2522 or +1 (800) 333-7421 (USA only) Fax: +1 (423) 262-2289 Mail to: techsupport.sea@siemens.com GMT: -5:00	**Technical Support** 24 hours a day, 365 days a year Telephone: +49 (180) 5050-222 Fax: +49 (180) 5050-223 Mail to: ad.support@siemens.com GMT: +1:00 **Authorization** Local time: Monday to Friday 8:00 AM to 5:00 PM Telephone: +49 (180) 5050-222 Fax: +49 (180) 5050-223 Mail to: ad.support@siemens.com GMT: +1:00	**Technical Support and Authorization** Local time: Monday to Friday 8:00 AM to 5:00 PM Telephone: +86 10 64 75 75 75 Fax: +86 10 64 74 74 74 Mail to: ad.support.asia@siemens.com GMT: +8:00
The languages for the SIMATIC hotlines and the Authorization hotline are generally German and English.		

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Product Overview 1

1.1 Overview

Product Overview

The S7-200 TD devices provide a low-cost human-machine interface (HMI), allowing an operator or user to interact with your application.

The TD devices allow you to configure a set of hierarchical user menus to provide additional structure for the interaction with your application. You can also configure the TD device to display alarms or messages that are enabled by specific bits in the S7-200 CPU.

Tip
The TD devices provide additional functionality, such as the hierarchical user-defined menus. The TD 200C and the TD 200 are fully compatible with projects that were created with earlier versions of the TD 200 (prior to TD 200 V3.0, which supported only the bit-enabled messages from the S7-200 CPU).

You can use the TD 200C or the TD 200 device with an existing TD configuration without having to modify the control program in the S7-200 CPU.

The TD 100C and the TD400C devices are not compatible with the TD 200 devices.

1.2 Introducing the S7-200 Text Display (TD) Device

Introducing the S7-200 Text Display (TD) Devices

Your S7-200 TD device is a 2- or 4-line text display device that can be connected to the S7-200 CPU. The TD device allows you to view, monitor, and change the process variables pertaining to your application.

The S7-200 product family provides four TD devices:

- **TD 100C:** The TD 100C has a 4-line text display with 2 font choices. Your display can have 16 characters per line for a total of 64 characters, or you can use a bold font with 12 characters per line for a total of 48 characters. The faceplate of the TD 100C offers complete flexibility of the keypad layout and faceplate design.
  You can create a custom keypad with up to 14 buttons (keys) of variable size, with varying shapes, colors, or fonts that can be layered onto any background image.

- TD 200C: The TD 200C has a 2-line text display with 20 characters per line for a total of 40 characters. The faceplate of the TD 200C offers complete flexibility of the keypad layout and faceplate design.
  You can create a custom keypad with up to 20 buttons (keys) of variable size, with varying shapes, colors, or fonts that can be layered onto any background image.
- TD 200: The faceplate of the TD 200 provides four keys with predefined, set-bit functions and allows up to eight set-bit functions by using the SHIFT key.
- TD400C: The TD400C can have a 2- or 4-line text display depending on your font and character choice.The TD400C buttons (keys) are tactile and have fixed positions.
  - Your display can have a 4-line display with 12 small Chinese characters per line for a total of 48 characters, or 24 small ASCII characters per line for a total of 96 characters.
  - Your display can have a 2-line display with 8 large Chinese characters per line for a total of 16 characters, or 16 large ASCII characters per line for a total of 32 characters.
  - You can create a custom keypad with up to 15 buttons (keys) of varying colors, functions, or fonts that can be layered onto any background image.

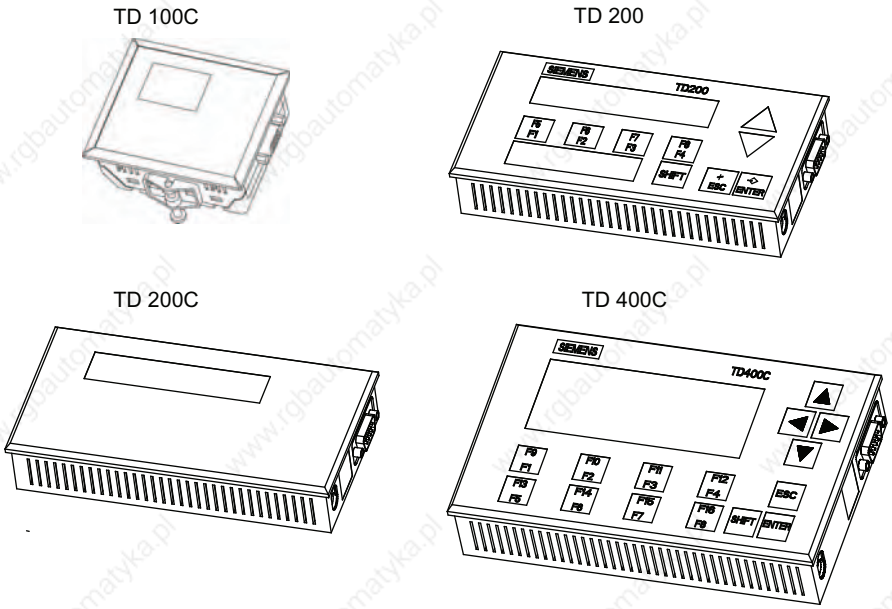

Figure 1-1 Text Display (TD) Devices

The TD devices receive power from the S7-200 CPU through the TD/CPU cable. The TD 200, TD 200C and TD400C devices can also receive power from a separate power supply.

The TD devices contain the following elements:

- Text display area: The TD 200C, TD 200 and TD400C have a backlit liquid crystal display (LCD).
  - The TD 200C and TD 200 displays have a resolution of 33 x 181 pixels
  - The TD400C display has a resolution of 192 x 64 pixels.
  - The TD 100C has a liquid crystal display (LCD) with a resolution of 132 x 65 pixels. There is no backlight on the TD 100C.
- Communication port: 9-pin D-connector
- Power connector
  - The TD 200C, TD 200, and TD400C have a connector for using an optional external power supply (power for the TD device is typically supplied by the S7-200 CPU through the TD/CPU cable).
  - The TD 100C does not have the option of using an external power supply.

STEP 7-Micro/WIN provides tools to help you configure the TD devices. Using the following tools, you can easily program your S7-200 to display text messages and other data:

- Text Display wizard helps you configure messages for the TD devices.
- Keypad Designer helps you to configure the custom keypad for the TD 100C, the TD 200C, and the TD400C. The Keypad Designer includes samples and templates in the following directories:
  - Sample bitmaps for buttons and backgrounds:
    C:/Program Files/Siemens/TD Keypad Designer/Images
  - Sample projects:
    C:/Program Files/Siemens/TD Keypad Designer/Samples
  - Sample template (for printing multiple copies of the faceplate):
    C:/Program Files/Siemens/TD Keypad Designer/Templates

Each TD device functions as a network master when it is connected over a network that contains one or more S7-200 CPUs. The TD device is also designed to operate with other masters in a network. Multiple TD devices can be used with one or more S7-200 CPUs connected to the same network. More than one TD device can connect to the same S7-200 CPU.

1.3 Features of the Text Display (TD) Devices

Features of the Text Display (TD) Devices

You can use your TD device to perform the following tasks:

- Viewing a hierarchy of user menus and screens that allow an operator to interact with the application or process

  You create these user menus and screens with the Text Display wizard of STEP 7-Micro/WIN
- Displaying alarms (bit-enabled messages) that are generated by the S7-200 CPU
  You define these alarms with the Text Display wizard of STEP 7-Micro/WIN
- Modifying designated program variables

  The TD device allows you to define a variable as either a text string or a numeric string:
  - Text string: All characters in a variable are editable
  - Numeric string: Only the numeric characters are editable (the cursor skips over all non-numeric characters)

  The TD device allows you to define a variable as a word, double word, or real
- Forcing or unforcing I/O points: You can force individual I/O points in the S7-200 CPU to be on or off (TD 200C, TD 200, and TD400C only)
- Setting the time and date (if the S7-200 CPU supports a real-time clock)
- Viewing the CPU status (including version information)

The TD 200C and TD400C provide additional functionality for interacting with the S7-200 CPU:

- You can change the operating mode (RUN or STOP) of the S7-200 CPU
- You can load the user program in the S7-200 CPU to a memory cartridge
- You can access and edit the data stored in the memory of the S7-200 CPU

International Languages and Characters Support

The TD 200C and TD 200 devices provide a default TD character set which supports bar graph characters. The TD devices (as noted) support the following Windows character sets for displaying messages:

- Arabic
- Baltic
- Chinese (Simplified Chinese)1
- Cyrillic
- Greek
- Hebrew
- Latin 1 (with Boldface)
- Latin 2 (with Boldface)
- Turkish (Latin 5)

The TD devices provide system menus and prompts in six languages: English, German, French, Spanish, Italian, and Simplified Chinese.

In the TD 100C, all fonts except Simplified Chinese are available in two sizes: 12 and 16 characters per row. All the 12 character fonts are bold.

The TD400C supports the character sets in two sizes.

Table 1-1 Fonts Supported by the TD Devices

TD 100C	TD 200	TD 200C	TD400C V 2.0
Latin 1	Latin 1	Latin 1	Latin 1
-	Latin 1 Bold	Latin 1 Bold	Latin 1 Bold
Latin 2	Latin 2	Latin 2	Latin 2
-	Latin 2 Bold	Latin 2	Latin 2 Bold
Cyrillic	Cyrillic	Cyrillic	Cyrillic
Greek	Greek	Greek	Greek
Turkish	Turkish	Turkish	Turkish
Baltic Rim	Baltic Rim	Baltic Rim	Baltic Rim
-	Arabic	Arabic	Arabic
-	Hebrew	Hebrew	Hebrew
-	Original TD 200	Original TD 200	-
-	Bar Graph	Bar Graph	-
Simplified Chinese[1]	Simplified Chinese	Simplified Chinese	Simplified Chinese
1 The TD 100C includes approximately 1900 out of the possible 6763 Chinese characters.			

1.4 Comparing the TD Devices

Comparing the Text Display Devices

Table 1-2 Comparing the TD Devices

Feature	TD 100C V 1.0	TD 200 V3.0	TD 200C V 1.0	TD400C V 2.0
Text display area	4 lines, up to 64 characters (up to 16 characters per line)	2 lines, up to 40 characters (up to 20 characters per line)	2 lines, up to 40 characters (up to 20 characters per line)	2 lines with large font, up to 16 Chinese or 32 ASCII characters per line (up to 8 Chinese or 16 ASCII characters per line) 4 lines with small font, up to 24 ASCII characters (up to 12 Chinese characters per line) Display backlight can be configured to extend the life of the TD400C device
Keypad options	User-designed custom keypad Standard keypad	Standard keypad	User-designed custom keypad Standard keypad	User designed custom keypad Standard keypad
Configurable buttons	Custom keypad: Up to 14 (user-configurable) Standard keypad: 2	Standard keypad: 4 (Up to 8 when using SHIFT)	Custom keypad: Up to 20 (user-configurable) Standard keypad: 4 (up to 8 when using SHIFT)	Custom keypad: Up to 15 (user configurable) Standard keypad: 8 (up to 16 when using SHIFT)
System buttons (pre-configured)	ENTER, ESC (Escape), UP, DOWN, LEFT and RIGHT arrows, F1, F2	ENTER, ESC (Escape), SHIFT, UP and DOWN arrows	ENTER, ESC (Escape), SHIFT, UP, DOWN, LEFT, and RIGHT arrows	ENTER, ESC (Escape), SHIFT, UP, DOWN, LEFT, and RIGHT arrows
User-defined menus and user screens	Maximum of 32 screens Up to 4 user menus, with up to 8 screens per user menu	Maximum of 64 screens Up to 8 user menus, with up to 8 screens per user menu	Maximum of 64 screens Up to 8 user menus with up to 8 screens per user menu	Maximum of 64 screens Up to 8 user menus with up to 8 screens per user menu
Alarms (from the S7-200 CPU)	Up to 40 alarm messages	Up to 80 alarm messages	Up to 80 alarm messages	Up to 80 alarm messages
Alarm indicator (icon)	Yes	Yes	Yes	Yes
Variable embedded in an alarm or screen	1 per line (1 for one-line alarms; 2 for two-line alarms, 4 for a screen)	Up to 6 variables per alarm or screen	Up to 6 variables per alarm or screen	Up to 6 variables per alarm or screen
Icons (graphics) embedded in a message	No	No	Yes	Yes

Feature	TD 100C V 1.0	TD 200 V3.0	TD 200C V 1.0	TD400C V 2.0
System menu options	Release the password Set the time and date CPU status Clean keypad	Force I/O Release the password Set the time and date CPU status Switch languages (if configured) Clean keypad	Force I/O Release the password Set the time and date CPU status Switch languages (if configured) Change the CPU operating mode Clean keypad Edit the CPU memory Program a memory cartridge	Force I/O Release the password Set the time and date CPU status Switch language (if configured) Change the CPU operating mode Clean keypad Edit the CPU memory Program a memory cartridge
Password protection	Yes	Yes	Yes	Yes
Multiple language sets	No	Yes	Yes	Yes
Character sets supported (for displaying different languages)	7 character sets: Latin 1, Latin 2, Chinese (Simplified)[1], Cyrillic, Baltic, Greek, Turkish	10 character sets: Latin 1/Bold, Latin 2/Bold, Chinese (Simplified), Cyrillic, Arabic, Baltic, Greek, Hebrew, Turkish, and Standard TD (includes Bar Graph)	10 character sets: Latin 1/Bold, Latin 2/Bold, Chinese (Simplified), Cyrillic, Arabic, Baltic, Greek, Hebrew, Turkish, and Standard TD (includes Bar Graph)	9 characters sets: Latin 1/Bold, Latin 2/Bold, Chinese (Simplified), Cyrillic, Arabic, Baltic, Greek, Hebrew, Turkish
Languages for system menus and error messages	6 languages: English, French, German, Italian, Spanish, and Chinese	6 languages: English, French, German, Italian, Spanish, and Chinese	6 languages: English, French, German, Italian, Spanish, and Chinese	6 languages: English, French, German, Italian, Spanish, and Chinese
Feedback (when pressing a button)	Visual indicator in the text display area	Tactile dome over the buttons on the keypad and visual indicator	Visual indicator in the text display area	Tactile dome over the buttons on the keypad, visual indicator, and audio feedback

[1] The TD 100C includes approximately 1900 out of the possible 6763 Chinese characters..

1.5 Using the TD Device to Access Screens and Alarms

Using the TD Device to Access Screens and Alarms

When you configure the TD device with the Text Display wizard of STEP 7-Micro/WIN, you create the screens and alarms for the TD device. You use the buttons on the keypad of the TD device to navigate through the screens and menus. The TD 200 device uses the standard TD keypad. The standard faceplates for the TD devices are shown in Figure 1-2.

The TD 100C and TD 200C allow you to create your own custom-designed buttons with specialized functions.

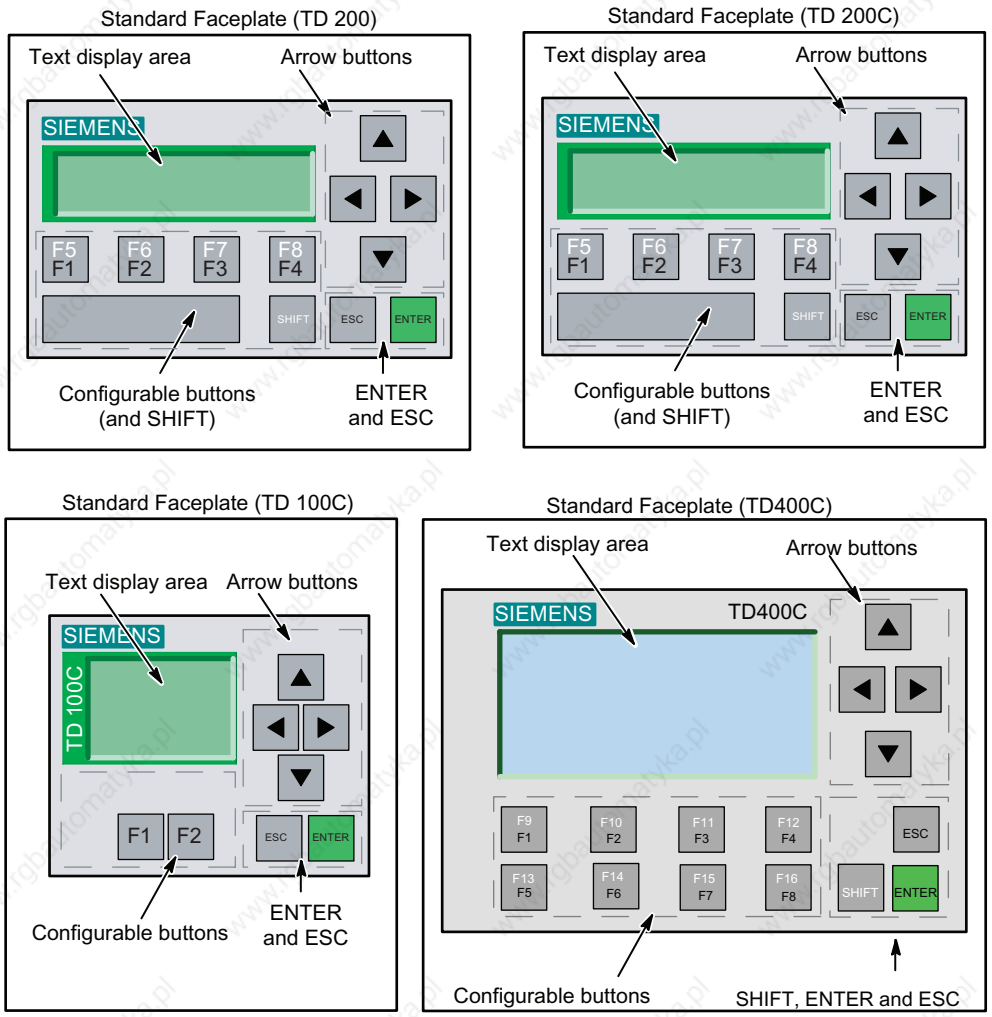

Figure 1-2 Standard Keypad Configuration for the TD Devices

Dividing Information into Screens and Bit-Enabled Alarms

As shown in Figure 1-3, you can configure the TD device to display screens (which are initiated by operator action) and bit-enabled alarms (which are initiated by the S7-200 CPU).

- Screens: You can create screens that allow the operator (using the TD device) to initiate the interaction with the S7-200 CPU. With the TD device, you can configure a user menu (up to 8 entries or groups for the TD 200C, TD 200, and TD400C, and up to 4 entries or groups for the TD 100C) that provides a hierarchy for the screens. You can create up to 8 screens for each menu item or group.
- Alarms: You can create alarm messages that allow the user program in the S7-200 CPU to initiate interaction with the operator by displaying a message on the TD device.

During the configuration of the TD device, you also designate which type of message (screens or alarms) will be the default display mode for the TD device. After power-up, the TD device goes to the default display mode. Also, the TD device returns to the default display mode after a period of inactivity (if no buttons have been pressed for one minute).

Storing the Screens and Alarms in the Parameter Block

The S7-200 CPU stores the text, embedded variables, and format information for the alarms and screens in a parameter block located in V memory. You use the Text Display wizard to configure the starting address for the parameter block in V memory, and the Text Display wizard allocates the memory required to store the information for the TD device.

If you configure more than one parameter block for the S7-200 CPU (with each parameter block having a different range of addresses in V memory), you can connect several TD devices to that one S7-200 CPU. You configure the V memory address for the specific parameter block for each of the TD devices. The Diagnostic Menu of the TD device provides a TD Setup command for specifying the starting address of the parameter block.

Tip
The parameter block for the TD 100C and the TD400C is not compatible with other TD devices. The TD 100C parameter block is only compatible with a TD 100C parameter block, and the TD400C parameter block is only compatible with a TD400C parameter block.

Displaying the Screens and Alarms on the TD Device

When the operator uses the buttons on the TD device to select a screen, the TD device reads the screen information from the parameter block (stored in V memory of the S7-200 CPU) and displays the appropriate screen.

When you configure an alarm, you also configure an alarm bit for enabling a specific alarm. The logic of your user program sets this alarm bit to display the alarm on the TD device. When you create the text for the alarm, you also designate the alarm bit. If you configured an alarm to require acknowledgement by an operator, that alarm also has an acknowledge bit. The TD device continuously polls the alarm bits to determine which alarms have been enabled.

To display an alarm on the TD device, your user program in the S7-200 CPU must first set the alarm bit for the specific alarm. When your user program sets one of the alarm bits, the TD device then reads the alarm bits in the parameter block in the S7-200 CPU and displays the corresponding alarm message.

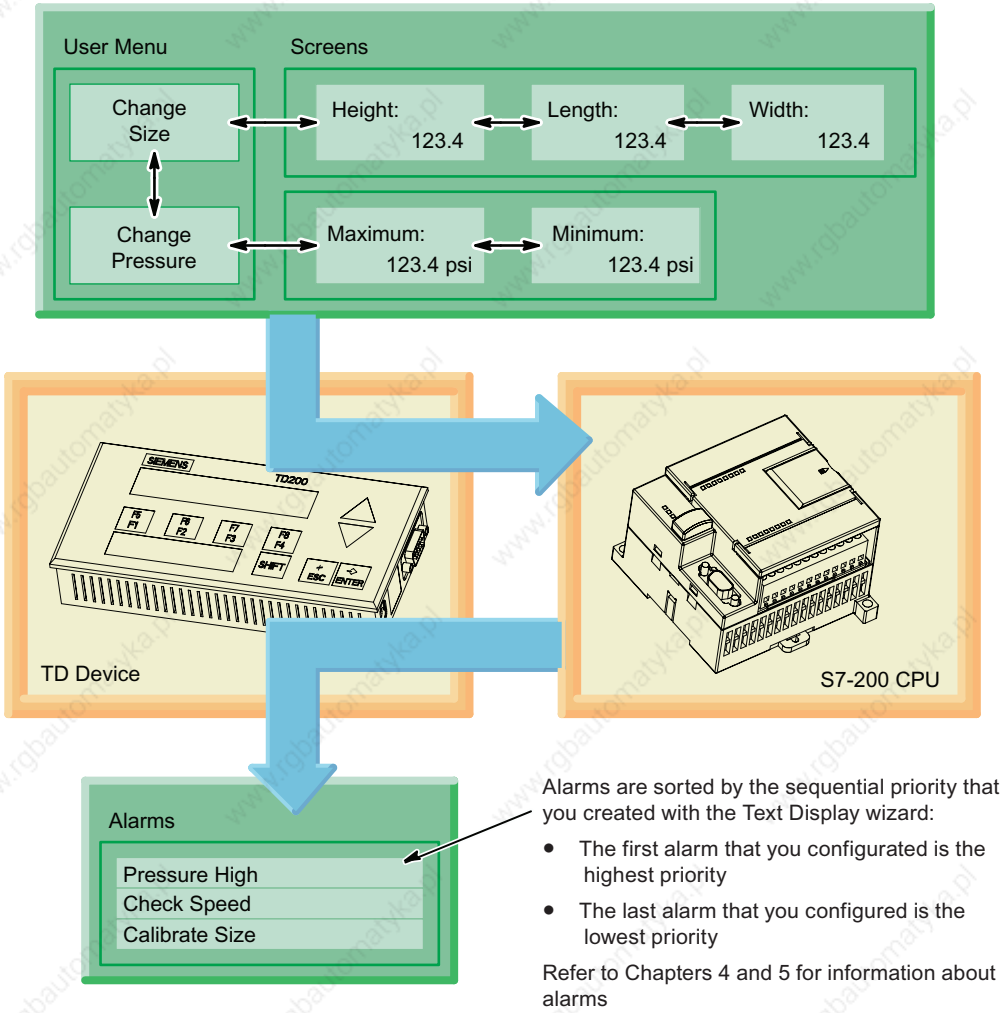

Figure 1-3 Screens and Alarms

1.6 Installation and Configuration Tasks

Installation and Configuration Tasks

As shown in Figure 1-4, you use the Text Display wizard of STEP 7-Micro/WIN to configure the TD device. You can create a custom faceplate for the TD 100C, TD 200C, and TD400C. The Keypad Designer creates a keypad configuration file for the Text Display wizard.

An overview of the tasks for installing your TD device is shown in the figures below. Refer to Chapter 2.

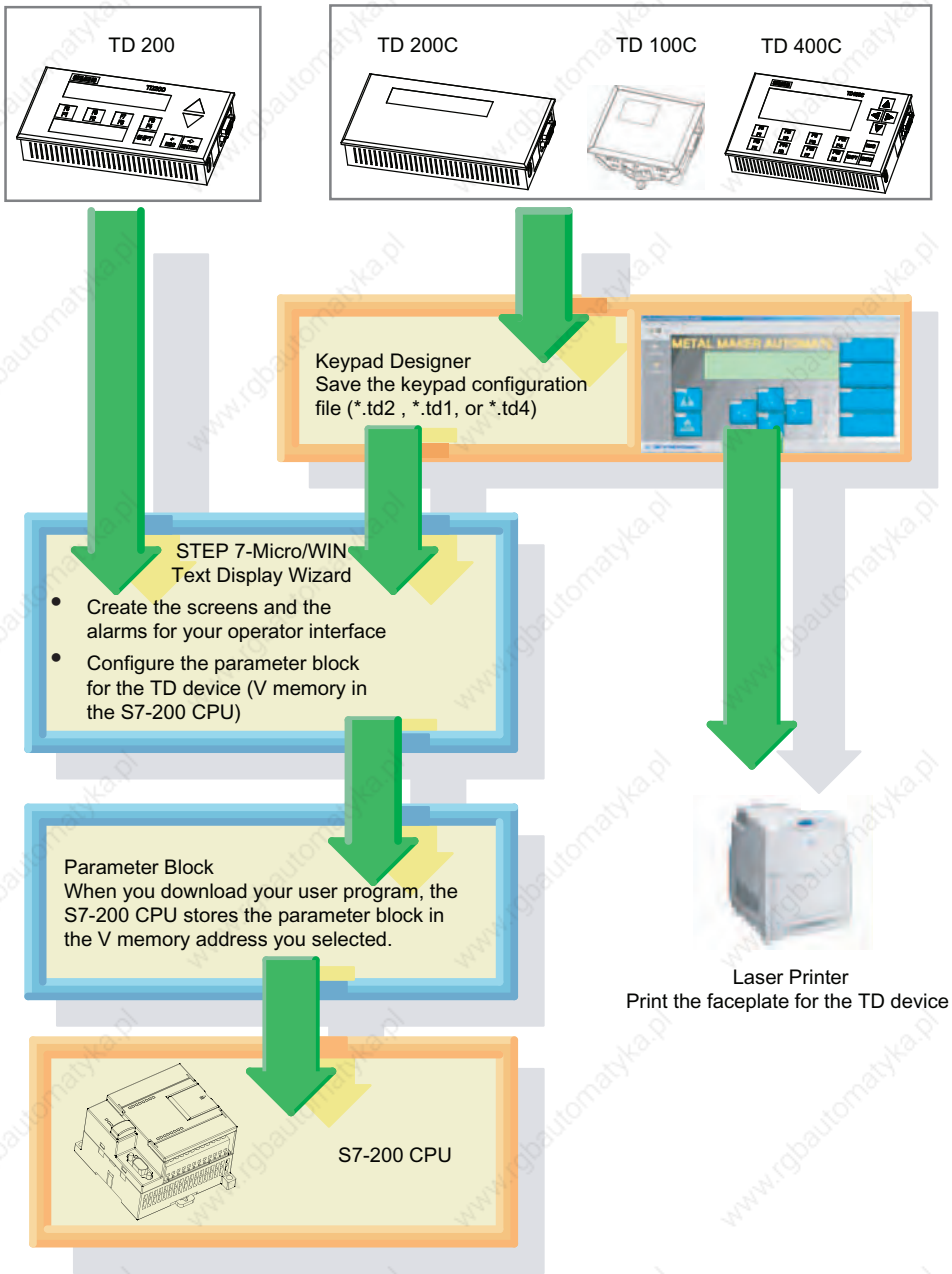

Figure 1-4 Configuration Tasks for the TD Devices

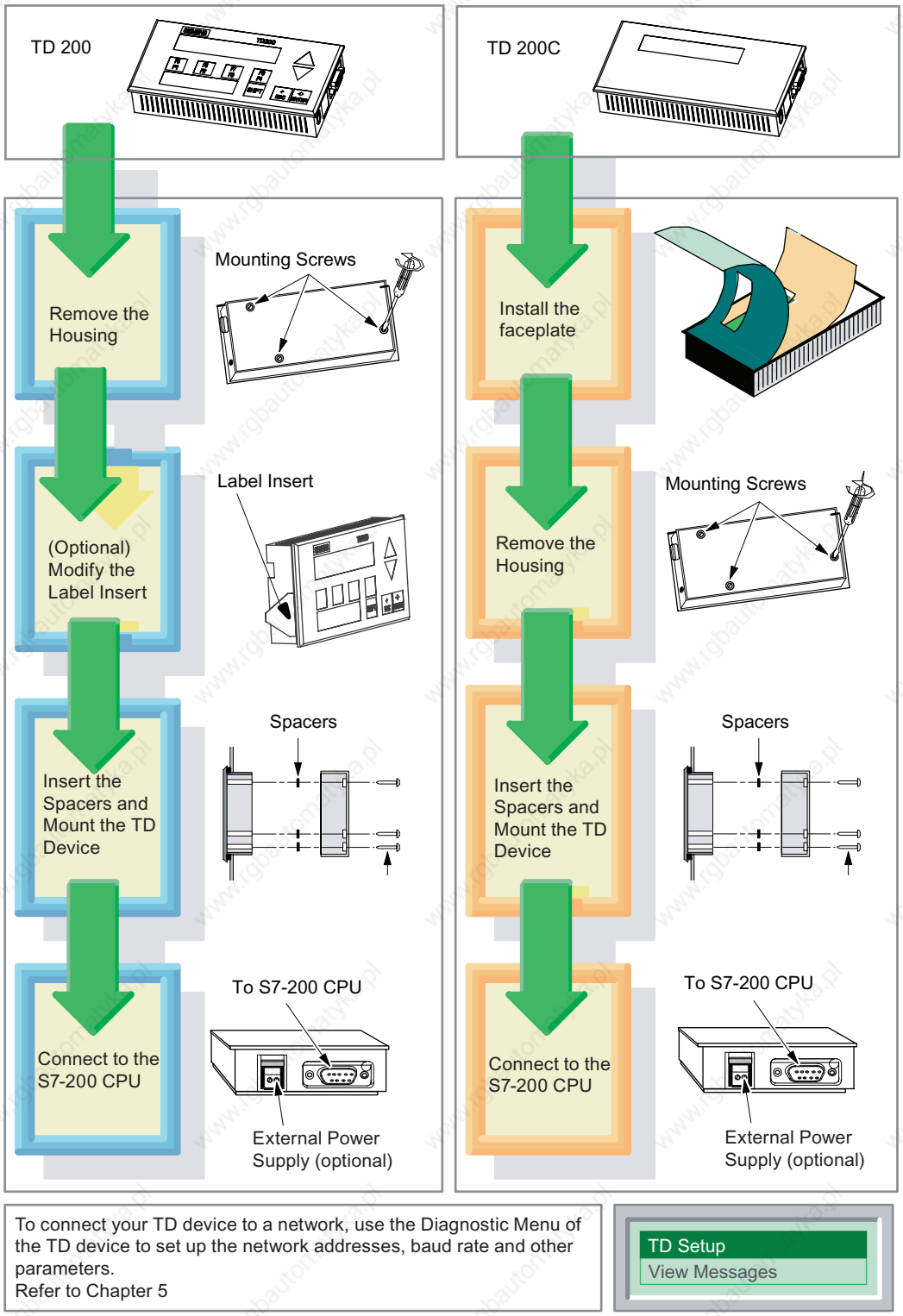

Figure 1-5 Installing Your TD 200 and TD 200C Device

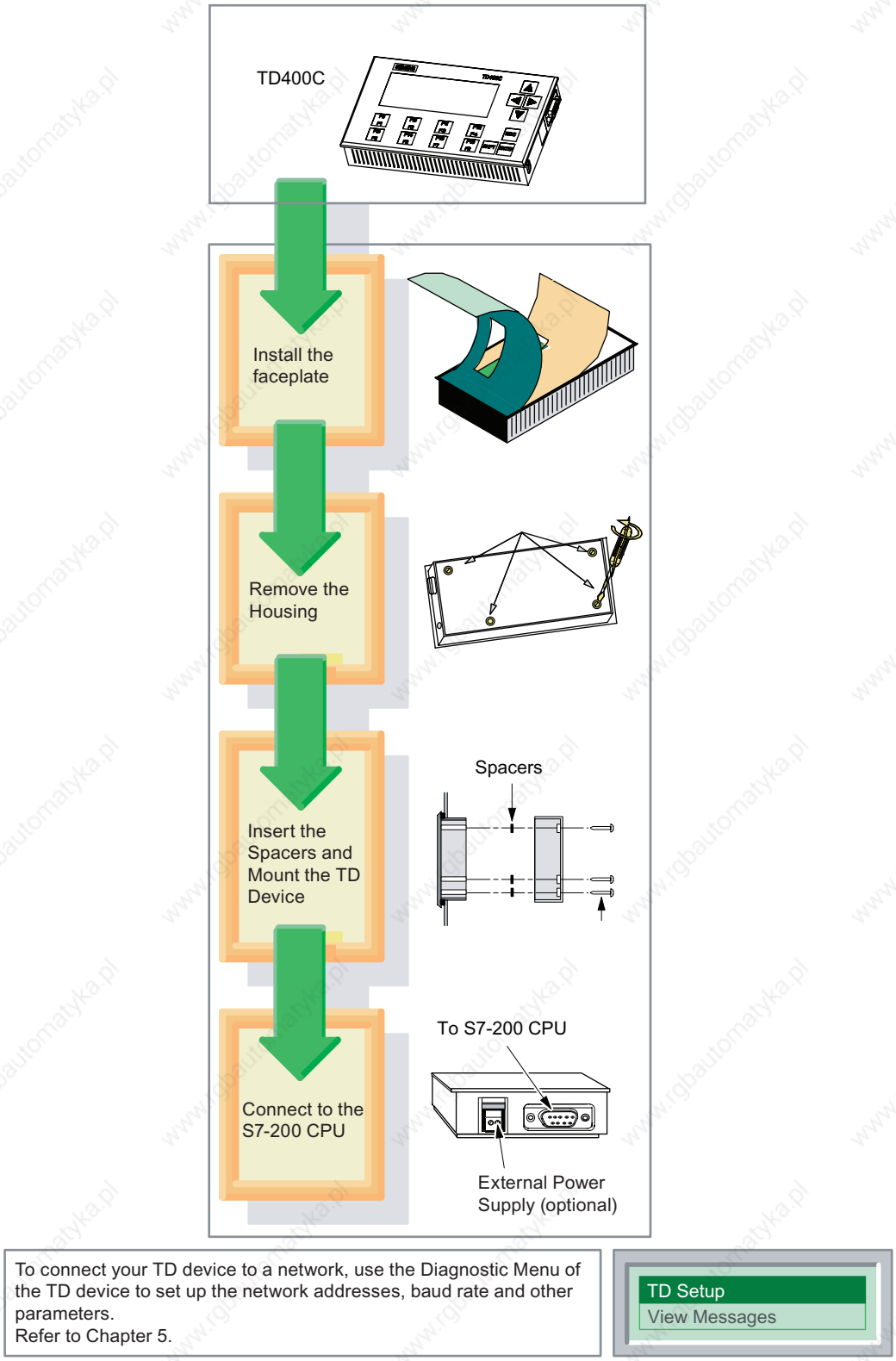

Figure 1-6 Installing Your TD400C Device

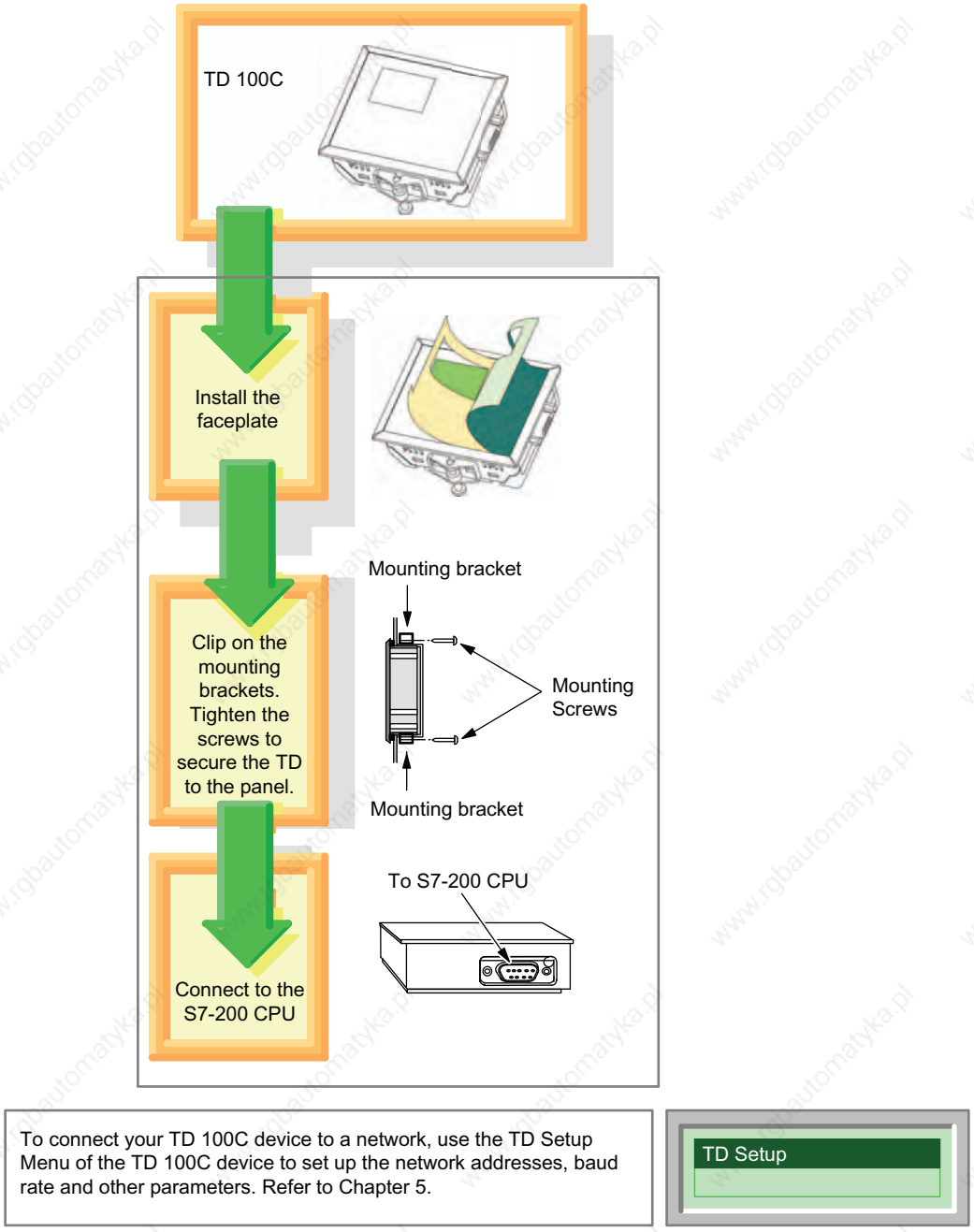

Figure 1-7 Installing Your TD 100C Device

1.7 Creating a Custom Faceplate for the TD Device

Creating a Custom Faceplate for the TD Device

With the TD device, you can design a custom faceplate that can be layered onto any background image. The TD 100C and the TD 200C lets you incorporate buttons (keys) of varying size, with varying shapes, colors or fonts. The TD400C lets you incorporate buttons (keys) of varying colors and fonts. The positions and size of the TD400C buttons (keys) are fixed.

As shown in Figure 1-7, you use several applications to create a custom faceplate:

- Keypad Designer: Creates the layout and the configuration for the keypad
- Third-party graphics application: Designs the graphical appearance of the faceplate
- STEP 7-Micro/WIN (Text Display wizard): Configures the parameter block for the TD 100C, TD 200C, and the TD400C
- Word-processing application (optional): Prints multiple copies of the faceplate Siemens provides document files (in 6 languages) for Microsoft Word that help you to align the panel images for the perforations on the A4 blank faceplate material. To open these documents, browse to the Templates subdirectory under the Keypad Designer application (C:/Program Files/Siemens/TD Keypad Designer/Templates) and select the template for your TD device and language.

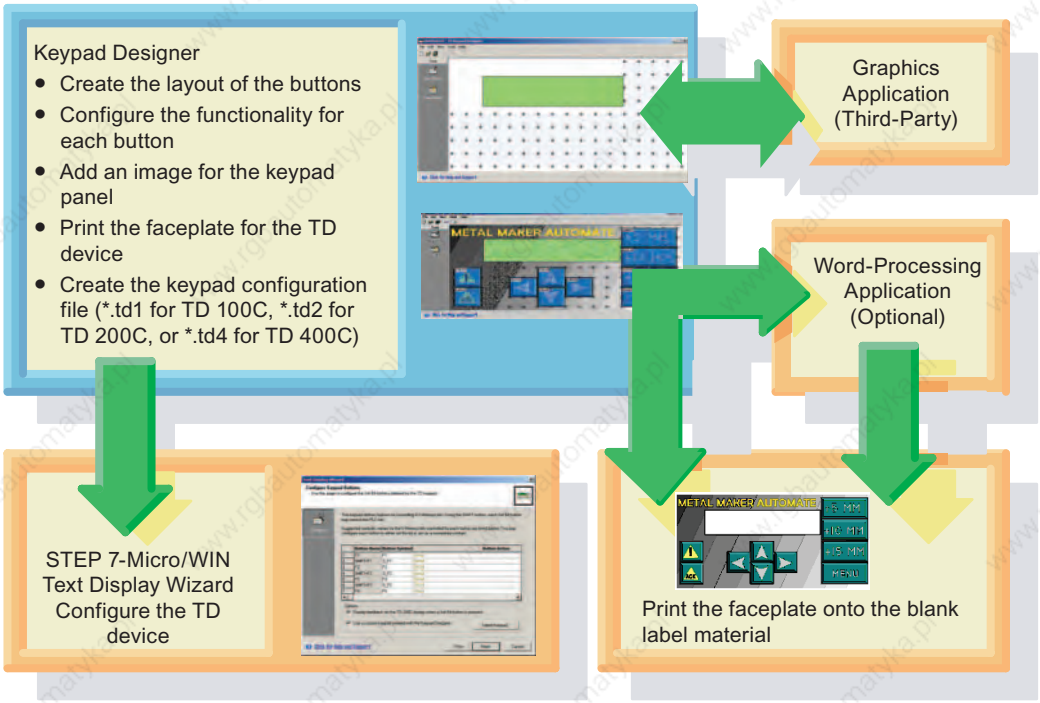

Figure 1-8 Using the Keypad Designer and Other Applications to Create a Custom Faceplate

1.8 Printing the Custom Faceplate for the TD device

Printing the Custom Faceplate for the TD Device

The TD 100C and the TD 200C ship with one blank faceplate (envelope-size) for printing the faceplate. The faceplate is constructed from durable, polyester material which has been designed especially for use on HMI faceplates.

The TD400C does not include a blank faceplate. You can either order blank faceplates, or use the Keypad Designer to print a TD400C custom faceplate on A4 paper and take it to a local supplier to make a custom TD400C faceplate.

- You can print a single faceplate directly from the Keypad Designer on the envelope-sized blank faceplate.
- To print multiple faceplates, you can use the Microsoft Word template (provided in the Templates subdirectory) that ensures your faceplate design is properly sized. You can print multiple faceplates onto the perforated A4-size blank faceplate sheets.

Refer to Chapter 3 for specific information about printing the custom faceplate for your TD device.

Tip:
The faceplate material is specially treated on one side to accommodate printing with a laser printer. The treated surface is up (or toward you) when you are holding the material with the cut corner in the top right of the sheet.

Ensure that the material is correctly inserted into the laser printer so that the faceplate prints the reversed image onto the treated surface of the material. You must print a reversed-image version of the faceplate onto the faceplate material.

Before printing your custom faceplate onto the blank faceplate sheet, first test your design by printing the faceplate onto regular paper. You can then temporarily use the paper faceplate to test the functionality of the design with your TD device.

Printer Requirements

To print your custom-designed image onto the blank faceplate material, you must use a laser printer that supports the following features:

- Paper size: The laser printer must be able to print on both the A4 (210 mm X 297 mm) and envelope formats.
- Color: The laser printer must support color printing.
- Transparencies: The laser printer must support the printing of transparencies (or other non-paper stock)

Ordering Additional Faceplate Material

You can order additional blank faceplates for the TD 100C, TD 200C, and TD400C device in perforated A4-size sheets (10 sheets/package). The faceplate material is especially designed for printing on a laser printer. The blank faceplate sheets also allow you to utilize the services of professional printing vendors that specialize in laser printing in order to create large quantities of high-quality faceplates.

Contact your local Siemens representative or distributor to purchase additional quantities of the faceplate material. The order numbers are shown below:

- TD 200C: the order number for additional blank faceplates is 6ES7 272-1AF00-7AA0
- TD 100C: the order number for additional blank faceplates is 6ES7 272-1BF00-7AA0
- TD400C: the order number for additional blank faceplates is 6AV6671-0AP00-0AX0

Installing your Text Display (TD) Device

2

2.1 Overview

Installing your TD Device

You can install your TD device for easy access, whether on a panel or on a door of an enclosure.

Installed properly, the TD devices meet the following standards (as noted) for protection.

- IP 65 (mounted on front of the panel)
- IP 20 (mounted on casing)
- UL 50 Type 4X

Refer to Appendix A for technical specification and for information about agency approvals and other certifications.

Tip
You can use the TD 200, version 3.0 and the TD 200C, version 1.0 with an existing TD 200 configuration without having to modify the control program in the S7-200 CPU. The TD 100C and the TD400C are not compatible with the TD 200 devices, nor with each other.

2.2 Components Shipped with the TD Devices

Components Shipped with the TD Devices

The TD devices ship with the following components:

- Gasket: Protective cushion with gasket for installing the TD device in inclement environments
- TD/CPU cable: 9-pin, straight-through cable that provides both communication and power to the TD device. The TD 200, TD 200C, and TD400C ship with a TD/CPU cable. The TD 100C does not include a TD/CPU cable; it must be ordered separately. The order number for the TD/CPU cable is 6ES7-901-3EB10-0XA0.
- Spacers: Self-adhesive spacers for mounting the TD device in a panel (TD 200, TD 200C, and TD400C only)
- Mounting brackets: Brackets for mounting the TD device in a panel (TD 100C only)
- Power connector: The TD 200, TD 200C, and the TD400C ship with a connector to power the TD device from an external supply.

The TD 200 ships with a pull-out user label that allows you to label the function keys for your application.

The TD 100C and TD 200C ship with a blank faceplate that you can customize. The TD 100C, TD 200C and TD400C ship with a pre-printed faceplate for the standard TD keypad. The faceplate is constructed from durable, polyester material which has been designed specifically for use for HMI faceplates.

Tip
To print your custom-designed image onto the blank faceplate material, you must use a laser printer that supports the printing of transparencies on both A4 and envelope formats and also supports color printing.

General TD Installation Information

Tip
To ensure compliance with IP 65 or UL 50 Type 4X:

- The minimum panel thickness must be at least 1.5 mm.
- For the TD 200, TD 200C, and TD400C, the mounting screws must be tightened to a torque of 0.7 N-m.
- For the TD 100C, the mounting screws must be tightened to a torque of 0.2 Nm (about 0.5 mm the height of the seal).
- The gasket must be replaced whenever the TD device is removed and reinstalled.

To procure new gaskets, contact your Siemens distributor or sales representative.

The TD 100C, TD 200, TD 200C, and TD400C devices are suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC; or non-hazardous locations.

⚠ WARNING
WARNING - EXPLOSION HAZARD! DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS LOCATION IS KNOWN TO BE NON-HAZARDOUS

⚠ WARNING
WARNING - EXPLOSION HAZARD!
Substitution of components may impair suitability for Class I, Division 2 or Zone 2.

2.3 Mounting the TD 200, TD 200C, and TD400C in a Panel or on a Surface

Mounting the TD 200, TD 200C, and TD400C in a Panel or on a Surface

Tip
If you are using a customized label insert for your TD device, you must first install the new label insert before you mount the TD device.

Preparing the Mounting Surface for a TD 200, TD 200C, or TD400C

To prepare the surface where the TD device is to be mounted or installed, use the dimensions for your TD device as shown below:

- For a TD 200 and TD 200C, cut a 138 mm x 68 mm hole in the mounting surface (DIN 43700).
- For a TD400C, cut a 163.5 mm x 93.5 mm hole in the mounting surface
- Refer to Table A-1 for the outside dimensions of your TD device.

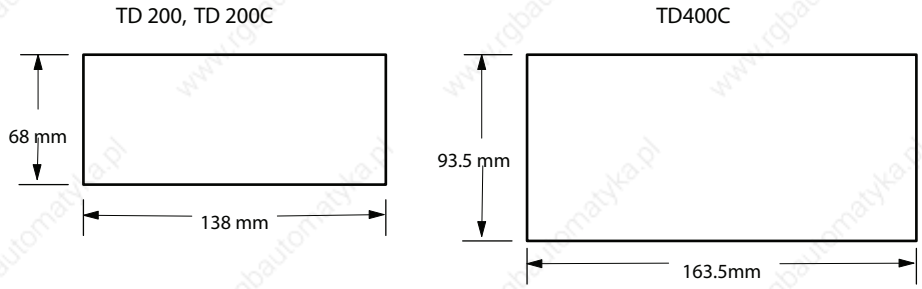

Figure 2-1 Dimensions for cutting a Hole in the Mounting Surface of the TD 200, TD 200C,and TD400C

Preparing the TD 200, TD 200C, and TD400C for Mounting

Refer to the figure below and use the following procedure to separate the front cover from the housing of your TD device:

1. For the TD 200 and TD 200C, use a flat-head screwdriver or a T8 Torx screwdriver to remove the three screws from the rear of the device. For the TD400C, use a cross screwdriver for M3 to remove the four screws from the rear of the device.
2. Remove the front cover of the TD device from the housing.

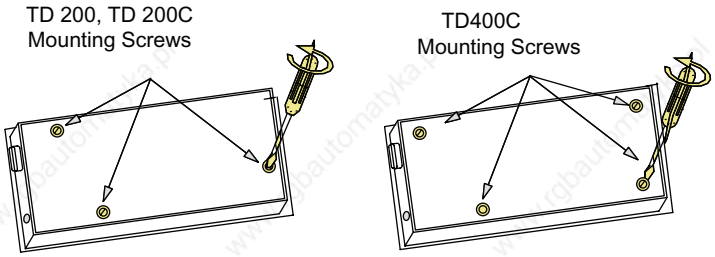

Figure 2-2 Removing the Mounting Screws of the TD device

Positioning the Spacers for the TD 200, TD 200C, and TD400C

The self-adhesive spacers included with the TD 200, TD 200C, and TD400C maintain the pressure on the TD device circuit board when the TD device is assembled. The number of spacers required is dependant upon the thickness of the mounting surface.

Refer to Figure 2-3 and use the following procedure to position the spacers:

1. Determine the number of spacers required, based on the thickness of the panel:
   - For up to 1.5 mm, use one spacer.
   - For 1.5 mm to 4.0 mm, use two spacers.
2. Place the spacers over the screw holes on the inside of the backplate.

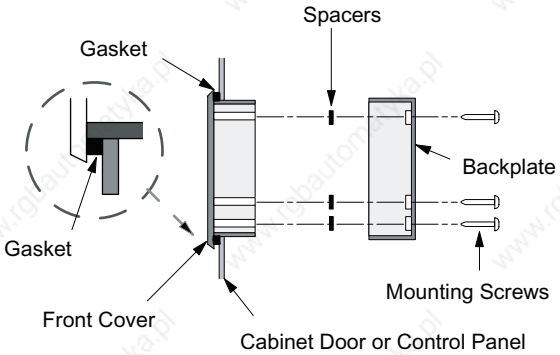

Figure 2-3 Positioning Spacers on the TD Device

Mounting the TD 200, TD 200C, and the TD400C

Refer to Figure 2-3 and use the following procedure to complete the mounting of your TD device:

1. Remove the gasket from the protective cushion.
2. Place the supplied gasket on the frontplate of the TD device.
3. Install the spacers (if required).
4. Fit the frontplate into the cutout you made in the mounting surface.
5. Secure the backplate onto the frontplate of the TD device using the screws you removed from the backplate. Carefully tighten the screws until snug.

2.4 Mounting the TD 100C in a Panel or on a Surface

Mounting the TD 100C in a Panel or on a Surface

Preparing the Mounting Surface for a TD 100C

To prepare the surface where the TD 100C is to be mounted or installed:

- Cut a 69 mm x 82 mm hole in the mounting surface (DIN 43700)
- Refer to Table A-1 for the outside dimensions of the TD 100C device.

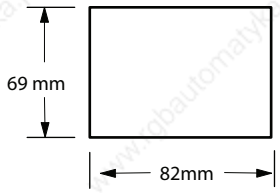

Figure 2-4 Dimensions for Cutting a Hole in the Mounting Surface of the TD 100C

Mounting the TD 100C

Use the following procedure to complete the mounting of your TD 100. See figure below.

1. Remove the gasket from the protective cushion.
2. Place the supplied gasket on the frontplate of the TD device.
3. Fit the TD 100C into the cutout you made in the mounting surface.
4. Attach the special mounting brackets (included) to the TD 100C.
5. Tighten the mounting screws on the mounting brackets to secure the TD 100C to the panel.

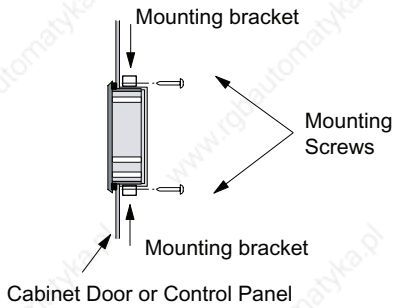

Figure 2-5 Mounting the TD 100C

2.5 Customizing the Labels for the Keys of the TD 200

Customizing the Labels for the Keys of the TD Device

The TD 200 allows you to define the functions for four of the nine keys (or buttons) on the standard faceplate. You can remove the label insert of the TD 200 and designate the functions assigned to those user-defined keys. You can also replace the standard TD 200 insert with your own custom insert for the user-defined keys.

You must remove (at least partially) the TD housing in order to access the label insert from underneath the front cover of the TD device.

Modifying the Label Insert of the TD 200

1. Remove the three screws on the back of the TD device and remove the front cover from the housing.
2. Remove the label insert by pulling the label insert tab out of the label slot with a pair of pointed tweezers.
3. Turn the label insert over and create your own label design. (The reverse side of the label insert is blank.)
4. Insert the label by placing the corner of the label into the label slot.

5. Reinstall the front cover into the back housing.
6. Replace and tighten the three screws on the back of the TD device to ensure that the cover and housing are secure.

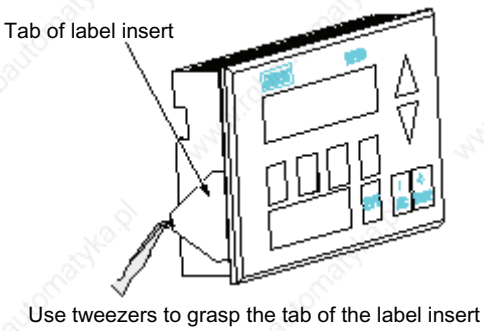

Figure 2-6 Removing the Label Insert

Creating a Custom Label Insert for the TD 200

The dimensions for creating your own custom label insert are shown in the figure below. These dimensions are valid for TD 200, hardware revision 3 and later.

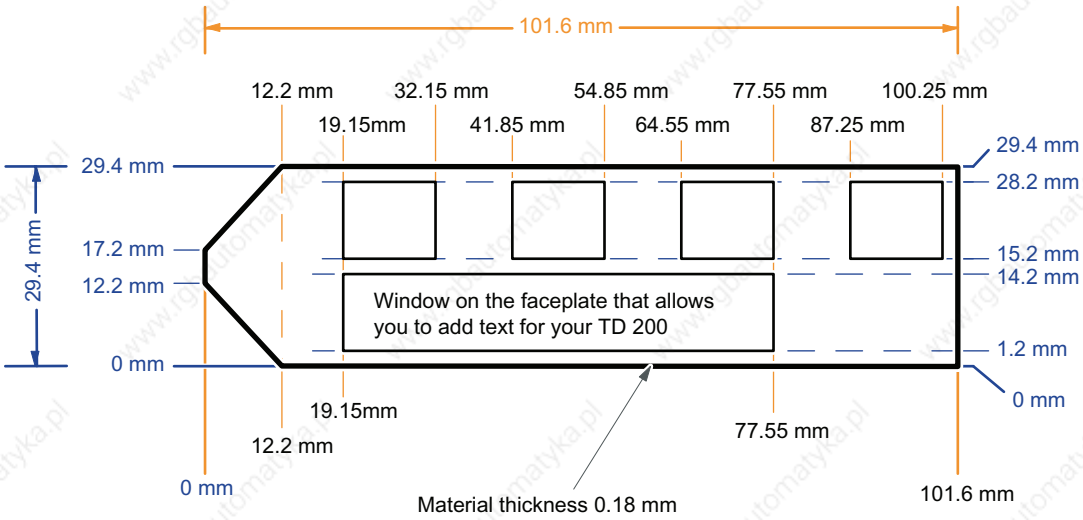

Figure 2-7 Dimensions for a Custom Label Insert

2.6 Installing a Faceplate for the TD 100C, TD 200C and TD400C

Installing a Faceplate for the TD 100C, TD 200C, and TD400C

The TD 100C and TD 200C ship with a blank faceplate (envelope size) for creating a custom-designed faceplate. The TD400C does not ship with a blank faceplate; you can order a package with blank faceplates (see appendix A for order information).

The TD devices do not ship with the faceplate attached. The front of the TD is an adhesive surface (shipped with a protective paper) that allows you to attach your custom faceplate.

Refer to Chapter 3 for information about designing and printing a custom faceplate.

The figure below shows the dimensions for the faceplate of the TD devices. Blank faceplate material for the TD 100C, TD 200C and TD400C is available in the sizes shown below.

- Envelope size for printing a single faceplate (TD 100C, TD 200C only)
- A4 size (210 mm x 297 mm) for printing multiple copies of the faceplate (TD 100C, TD 200C, and TD400C)

You must cut the faceplate from the envelope-sized material, but the A4 material is perforated to allow you to remove the faceplates without cutting.

Use the following procedure to install your custom faceplate on the TD device. The example shown here is for the TD 200C. Installing a faceplate on a TD 100C and TD400C is similar; the differences are noted below. To prepare for installation, remove the protective film covering the display window of the TD device and the back of the preprinted (standard) faceplate. The protective film is blue for the TD 100C and the TD 200C, and is transparent for the TD400C.

1. The dimensions for the custom faceplate are shown for the TD device.
2. If your TD device has a strip of protective paper, remove the strip to expose the strip of the adhesive. For the TD 200C and the TD400C, it is on the left side of the device. For the TD 100C, it is on the right side of the device.
3. Carefully align your custom faceplate on the entire TD device, and then seal the faceplate to the exposed adhesive by pressing down on the left (TD 200C and TD400C) or on the right (TD 100C) side of the faceplate.
4. Carefully lift back the unadhered faceplate and remove the rest of the protective paper from the TD device.
5. Carefully position the faceplate onto the TD device. Firmly press the faceplate onto the adhesive, taking care to remove any air bubbles that may have been trapped underneath.

CAUTION
Do not use excessive force when you install the faceplate onto the TD400C device. If you use excessive force in pressing the faceplate onto the TD400C device, it may cause damage to the springs under the faceplate. Ensure that excessive force is not used when you install the faceplate onto the device.

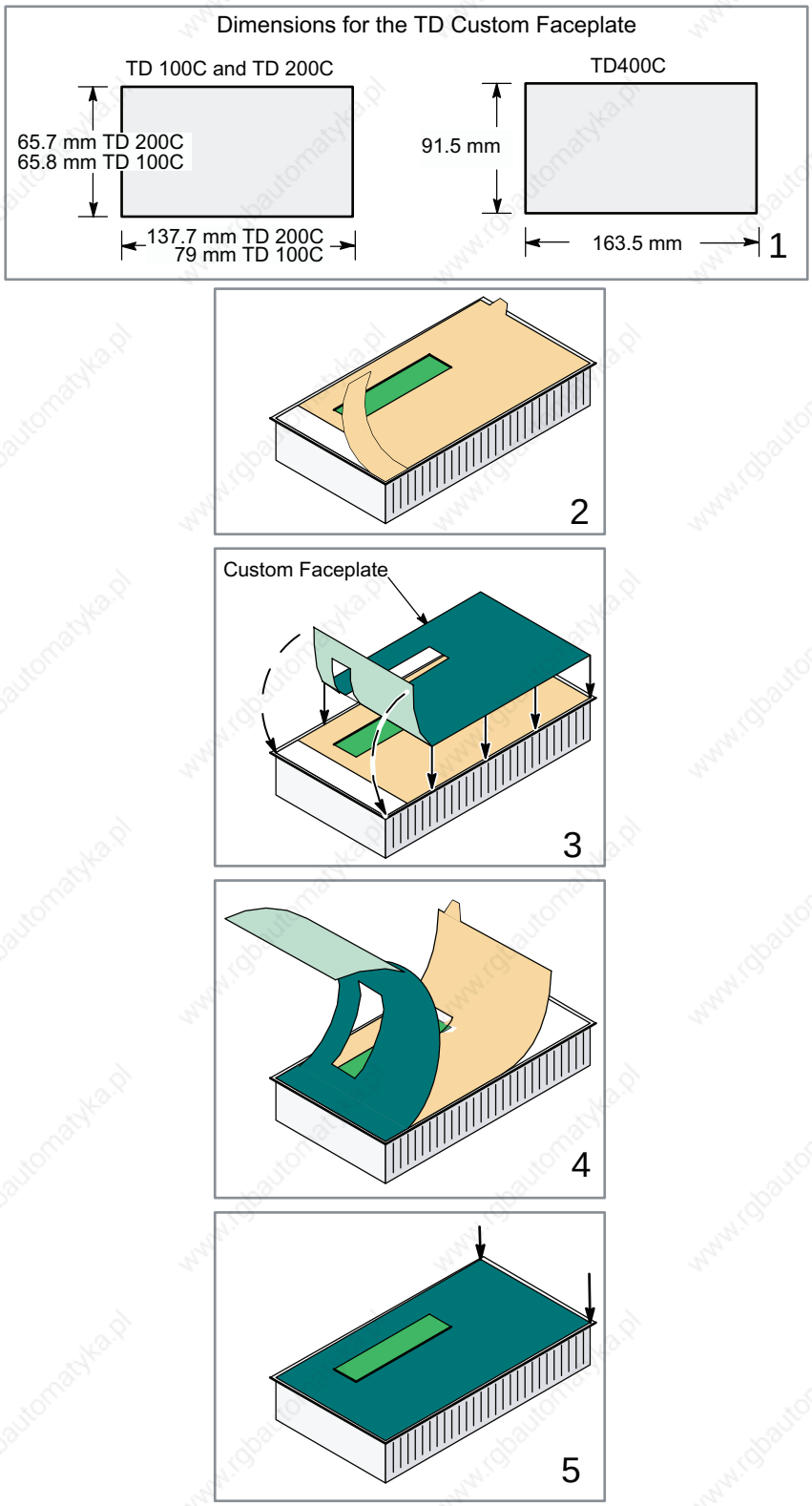

Figure 2-8 Installing a Custom Faceplate on a TD Device

The standard TD faceplates are shown in Figure 1-2. The TD 200C comes configured as a standard TD 200 (with LEFT and RIGHT arrows). The TD 100C comes configured with six standard keys (UP, DOWN, LEFT and RIGHT arrows, ESC, and ENTER). The TD400C comes configured with seven standard keys (UP, DOWN, LEFT, RIGHT, ESCAPE, ENTER, and SHIFT).

After creating and installing the custom faceplate on your TD device you must also download the TD configuration that you created with both the Keypad Designer and the Text Display wizard.

- Chapter 3 describes the Keypad Designer
- Chapter 4 describes the Text Display wizard

2.7 Connecting the TD/CPU Cable

Connecting the TD/CPU Cable

CAUTION
Operating the TD device with an ungrounded voltage source can damage the TD device. The TD device may only be connected to grounded voltage sources. Non-grounded operation can cause the TD device to become damaged. Always ensure that the voltage source for the TD device is properly grounded.

The TD devices can use the TD/CPU cable for communicating with the S7-200 CPU.

- You can connect the TD device directly to the S7-200 CPU, creating a one-to-one network configuration. In this configuration, one TD device connects to one S7-200 CPU through the TD/CPU cable.
- You can connect multiple TD devices to multiple S7-200 CPUs over a network. The TD device defaults to address 1 and attempts to communicate to a CPU at address 2.

For more information about connecting to multiple CPUs, see Appendix B. For information about changing the default addresses in the TD device, see Chapter 5.

If you require a longer cable (>2.5 m) to connect the TD device to the S7-200 CPU, use PROFIBUS components for the network connection. Refer to the SINEC IK10 Catalog.

2.8 Supplying Power for the TD Device

Supplying Power for the TD Device

The S7-200 CPU uses the TD/CPU cable to provide power to the TD device. Use this type of power supply when the distance between the TD device and the S7-200 CPU is less than 2.5 m (the length of the TD/CPU cable). The TD 200, TD 200C and the TD400C have the option of using an external power supply.

Tip
The TD 100C device must use the TD/CPU cable to provide power from the S7-200 CPU to the TD device. The TD 100C does not have the option of using an external power supply.

Tip
If the distance between the TD 200, TD 200C or TD400C and the S7-200 CPU is greater than 2.5 m, use an external 24 VDC power supply.

If you require a longer cable (greater than 2.5 m) to connect the TD device to the S7-200 CPU, use PROFIBUS components for the network connection. Refer to the SINEC IK10 Catalog.

Refer to Appendix B for information about using the TD device on a network.

As shown in the figure below, the TD device provides up to two options for providing power:

- The TD/CPU cable allows the S7-200 CPU to provide power to the TD device over the communications port. This is the only option available for the TD 100C.

  For information about the TD/CPU cable and the communications port, refer to Appendix B.

- You can connect the TD 200, TD 200C or the TD400C to an external power supply.

  The TD 200, TD 200C or TD400C requires 120 mA at 24 VDC to operate. An optional power connector is provided with the TD 200, TD 200C and the TD400C.

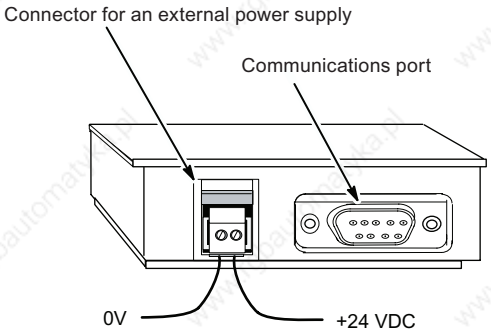

Figure 2-9 Connecting Power to the TD Device (TD 200, TD 200C, and TD400C)

2.9 Establishing a Connection for Your TD Device

Establishing a Connection for Your TD Device

As described in Chapter 4, you use the Text Display wizard of STEP 7-Micro/WIN to configure the screens, alarms, languages, and custom keypad layout for the TD 100C, TD 200C and the TD400C. The S7-200 CPU stores this information in a parameter block (V memory).

The TD devices ship with a default configuration and are set to communicate at a rate of 9600 baud. The TD devices must communicate with the S7-200 CPU to be able to read the parameter block.

You must configure your TD device to communicate at the same baud rate as your S7-200 CPU.

TD 100C, TD 200C, and TD400C

Until the TD device successfully connects to the S7-200 CPU and reads the parameter block, the TD device remains configured for the standard TD keypad shown in the figure below.

To change the baud rate of your TD device, you use the ESC and ENTER buttons to navigate to the Diagnostic/TD Setup Menu and change the TD Setup parameters. (See Chapter 5.) Because the TD devices ship with no faceplate attached, it may be difficult to consistently press ESC or ENTER.

The TD 100C, TD 200C, and TD400C devices ship with a faceplate for the standard TD keypad. In addition, the Keypad Designer provides a sample faceplate for the standard TD keypad in the following directory.

C:/Program Files/Siemens/ TD Keypad Designer/Templates

For temporary use, you can print this faceplate onto paper and lay the paper on top of the TD device (without removing the covering from the adhesive).

Refer to Chapter 3 for information about opening the Keypad Designer and printing a faceplate.

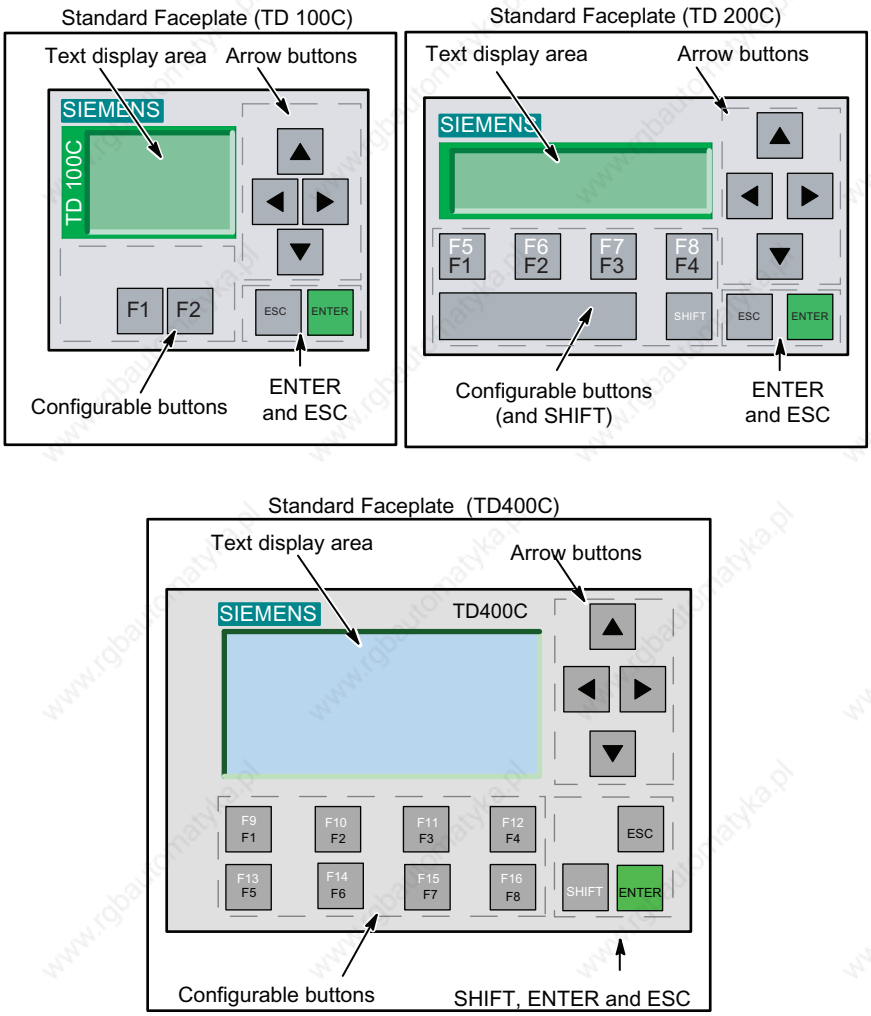

Figure 2-10 Standard TD Keypad for the TD 100C, TD 200C and TD400C

Tip
On an initial setup for the TD 100C, TD 200C, or TD400C, use the default keypad template shipped with the device to configure baud rates and addresses. Once the TD device has communicated to the CPU, the TD device will use the custom keypad configuration.

Tip
If you are using a custom keypad that does not support the ENTER and ESC buttons, you must use the standard keypad to set up the TD device.

To restore the standard TD keypad:

1. Power down the TD device
2. Press and hold the lower right corner (where ENTER key is located on the standard keypad)
3. Power up the TD device

The default keypad is restored until the TD device is power cycled again.

Using the Keypad Designer to Create a Custom Faceplate for your Text Display (TD) Device

3

3.1 Overview

Overview of Chapter 3

With the TD 100C, TD 200C, and the TD400C, you can design a custom keypad that incorporates buttons (keys) of varying size, with varying shapes, colors, or fonts that can be layered onto any background image. You can configure up to 14 buttons on the TD 100C, up to 20 buttons on the TD 200C, and up to 15 buttons on the TD400C.

The Keypad Designer application allows you to create a custom-designed layout for the keypad of the TD 100C, TD 200C, and TD400C, and also includes samples and templates in the following directories:

- Sample bitmaps for buttons and backgrounds:
  - C:/Program Files/Siemens/TD Keypad Designer/Images
- Sample projects:
  - C:/Program Files/Siemens/TD Keypad Designer/Samples
- Templates (for printing multiple copies of the faceplate):
  - C:/Program Files/Siemens/TD Keypad Designer/Templates

This chapter guides you through the tasks required for creating the layout for the keypad, creating the configuration file for the keypad, and printing the faceplate for the TD 100C, TD 200C, and the TD400C.

You use the configuration file when you are configuring the TD 100C, the TD 200C and the TD400C with the Text Display wizard of STEP 7-Micro/WIN. Refer to Chapter 4 for information about the Text Display wizard.

TIP

For more information about creating a custom faceplate, refer to FAQ 23707064 on the Siemens Internet site at www.siemens.com/S7-200.

3.2 Using the Keypad Designer with Other Applications

Using the Keypad Designer with Other Applications

Use the Keypad Designer to create the custom-designed layout for the keypad.

The TD 100C and the TD 200C lets you incorporate buttons (keys) of varying size, with varying shapes, colors or fonts. The TD400C lets you incorporate buttons (keys) of varying colors and fonts. The positions and size of the TD400C buttons (keys) are fixed.

You can configure up to 20 buttons on the TD 200C; up to 14 buttons on the TD 100C; and up to 15 buttons on the TD400C. As shown in the figure below, you use several applications to create a custom keypad:

- Keypad Designer: Creates the layout and the configuration for the keypad
- Third-party graphics application: Designs the graphical appearance of the faceplate
- STEP 7-Micro/WIN (Text Display wizard): Configures the parameter block for the TD device
- Word-processing application (optional): Prints multiple copies of the faceplate

Siemens provides document files (in up to 6 languages depending upon your TD device) for Microsoft Word that helps you to align the panel images for the perforations on the A4 blank faceplate material. To open these documents, browse to the Templates subdirectory under the Keypad Designer application (C:/Program Files/Siemens/TD Keypad Designer/Templates) and select the template for your TD device and language.

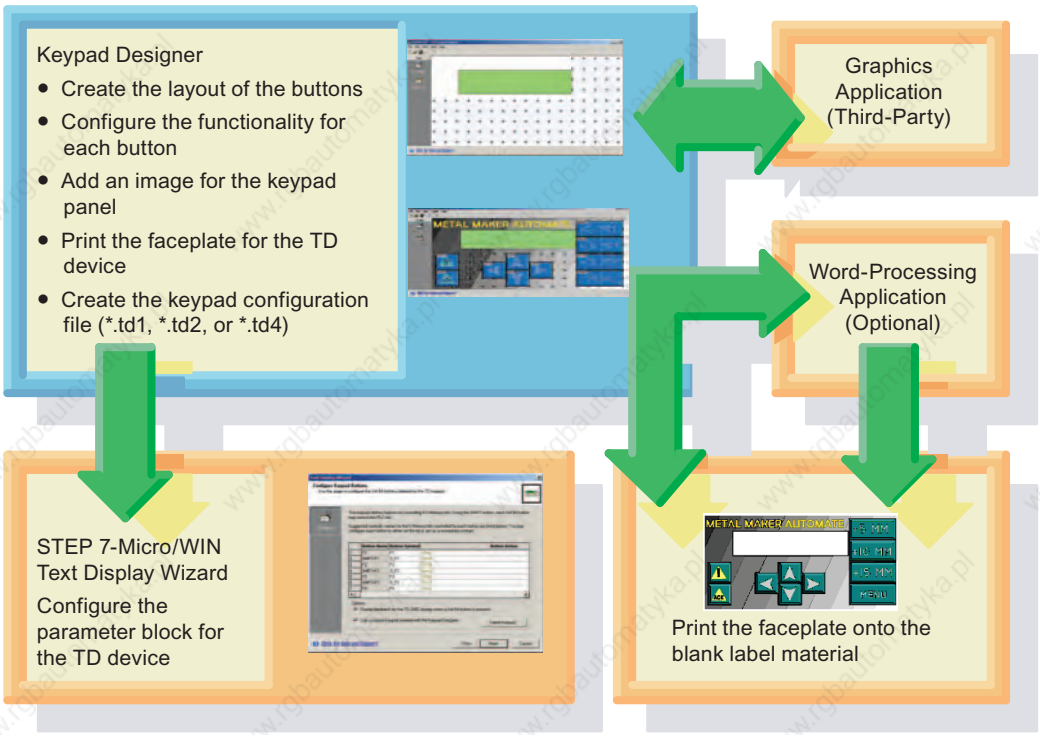

Figure 3-1 Using the Keypad Designer to Create the Custom Faceplate for Your TD Device

As shown in the figure below, you perform the following tasks when designing a custom keypad:

- You use the Keypad Designer to define the layout and the functions for the buttons.
- You export the button template to a third-party graphics application. You then create the panel image by designing the graphical representations for the buttons and the background for the faceplate.
- After you import the panel image into the Keypad Designer, you print the faceplate for the TD device.
- You use the Keypad Designer to create the configuration file (*.td2 for the TD 200C, *.td1 for the TD 100C, or *.td4 for the TD400C).

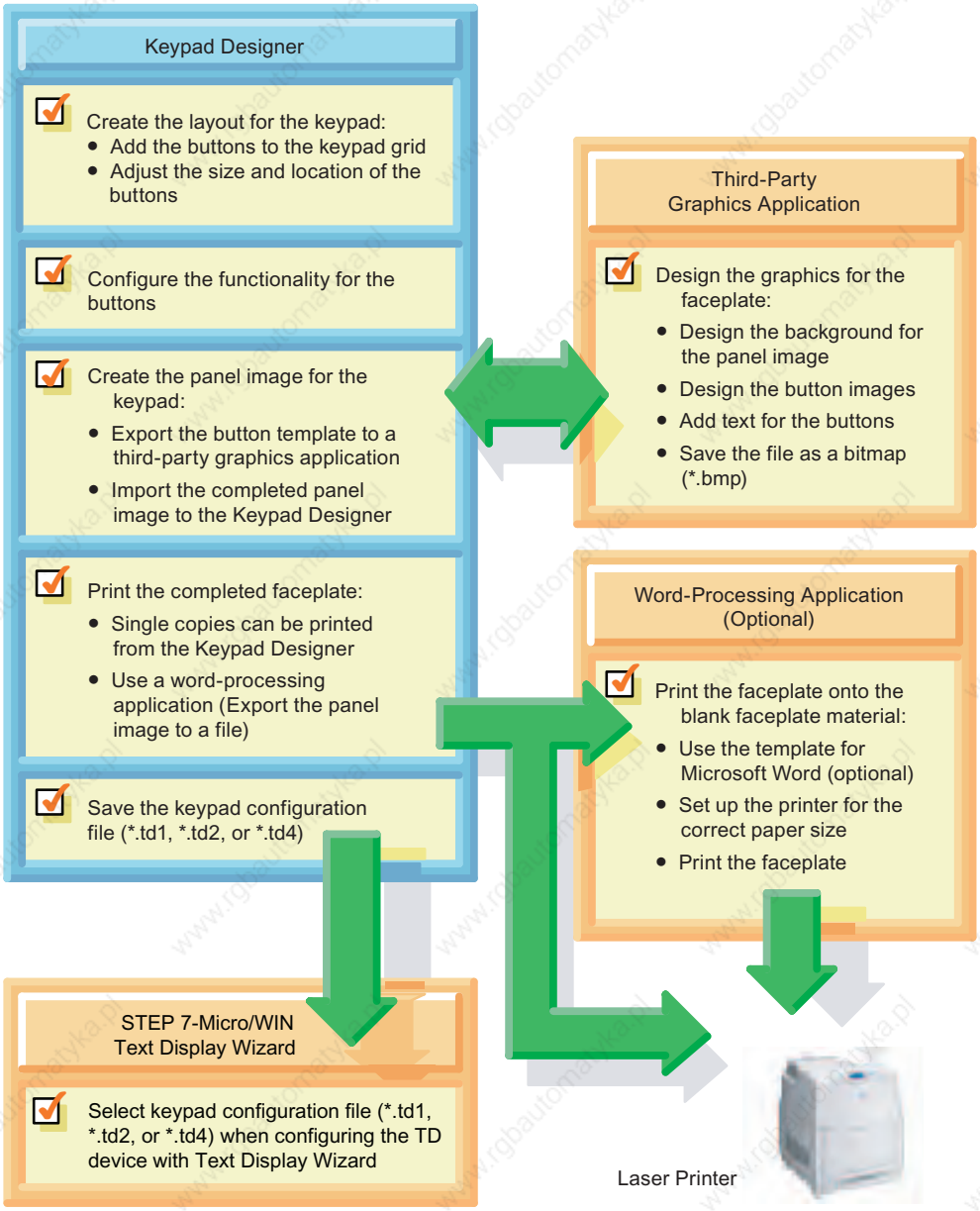

Figure 3-2 Tasks for Creating a Custom Faceplate

3.3 Starting the Keypad Designer

Starting the Keypad Designer

You use the Keypad Designer application to create a custom-designed layout for the keypad of the TD 100C, the TD 200C, or the TD400C.

When you install STEP 7-Micro/WIN, you also install the Keypad Designer application. The Keypad Designer does not require STEP 7-Micro/WIN.

You can start the Keypad Designer either from within STEP 7-Micro/WIN or as a stand-alone application:

- To start as a stand-alone application: Select the Start > SIMATIC > TD Keypad Designer menu command
- To start from STEP 7-Micro/WIN: Click the Keypad Designer icon in the Tools window

The Keypad Designer application opens with a blank keypad template. The TD 200C and the TD400C templates are shown in the figures below.. Select **File > New** to create a new keypad layout for either the TD 100C, the TD 200C, or the TD400C. In the Keypad Designer Type dialog, select the keypad type.

To open an existing project, select the **File > Open** menu command and browse to the project.

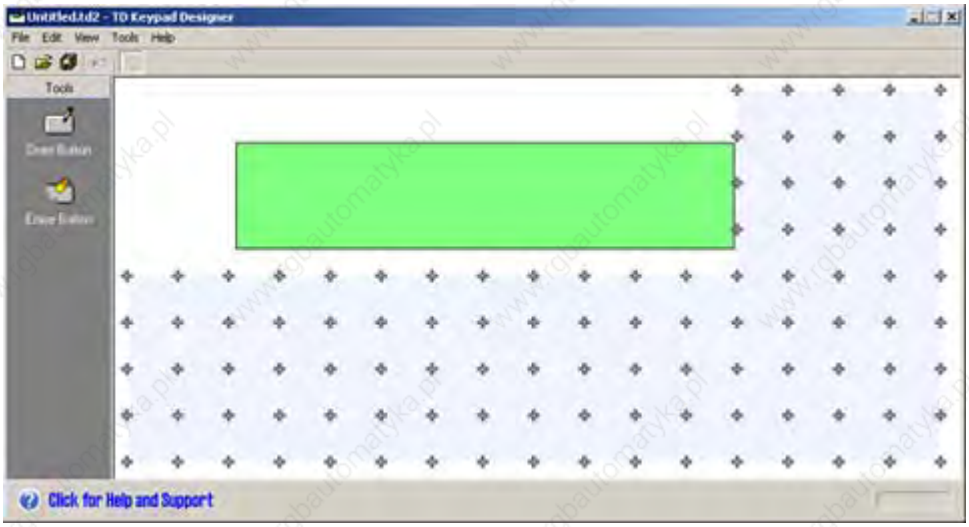

Figure 3-3 TD 200C Keypad Template

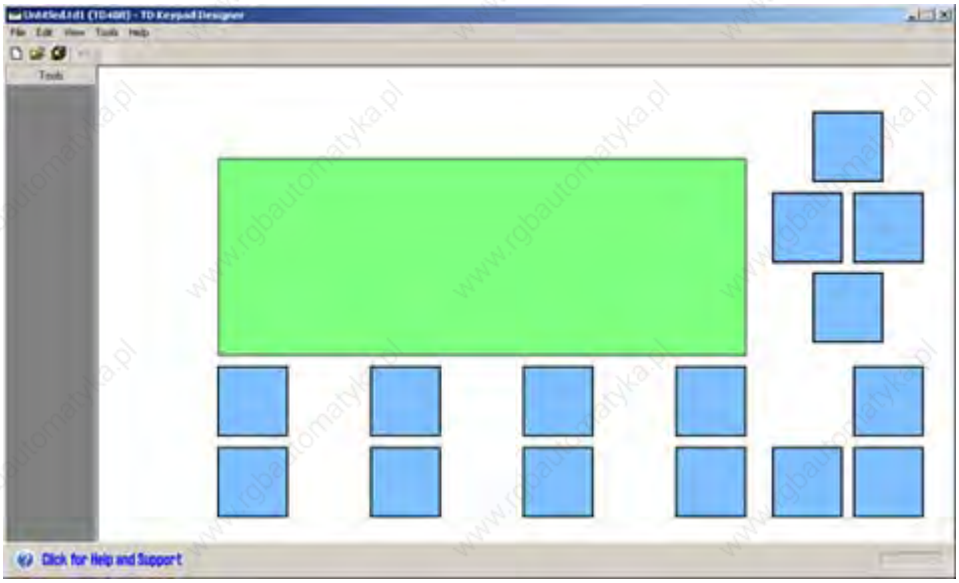

Figure 3-4 TD400C Keypad Template

If you open a file with different target (for example, you are working on a TD 200C file, and you open a TD 100C file), the panel workspace resizes for the new target. Since the application is sized based on the panel workspace, you may have to resize and re-position your application framework.

Table 3-1 describes the files that are used by the Keypad Designer.

You can change the language of the Keypad Designer by selecting the Tools > Options menu command. You select the language from the Options dialog shown below.

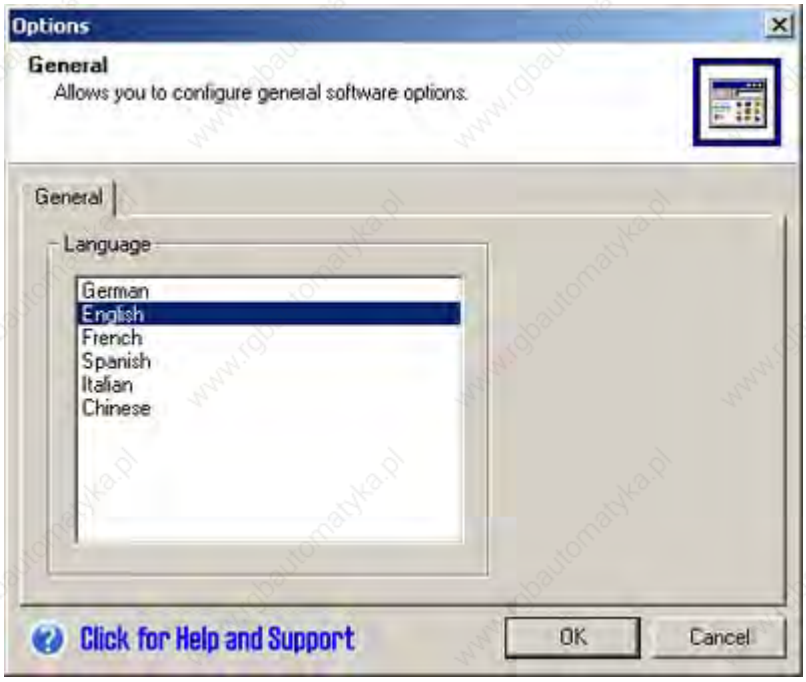

Figure 3-5 Options Dialog

Table 3-1 Files Used by the Keypad Designer

File Type	Extension	Description
TD file Open, Save, Save As	*.td2 (TD 200C) *.td1 (TD 100C) *.td4 (TD400C)	Create the Keypad project file that stores the configuration data for the custom-designed keypad (used by the Text Display wizard)
Button Template Export	*.bmp	Export the layout of the buttons on the keypad to a graphics application by selecting a file
Panel Image Import	*.bmp	Import the finished bitmap of the faceplate from the graphics application by selecting a file
Panel Image Export (Optional)	*.bmp	Export the finished faceplate to a word-processing application for printing multiple copies of the faceplate

3.4 Adding Buttons to the Keypad

Adding Buttons to the Keypad

The TD 100C and the TD 200C allow you relative freedom when designing your keypad. With the TD400C, the position and size of the buttons are fixed. You cannot add, remove, or change the TD400C buttons.

On the TD keypad you can configure up to 20 buttons for the TD 200C, up to 14 buttons for the TD 100C, and up to 15 buttons for the TD400C.

- You can vary the size and the location of the buttons (TD 100C and TD 200C only)
- You can define the functionality for each button.

The Keypad Designer provides a grid that aligns the location of the buttons with the physical keypad of the TD device.

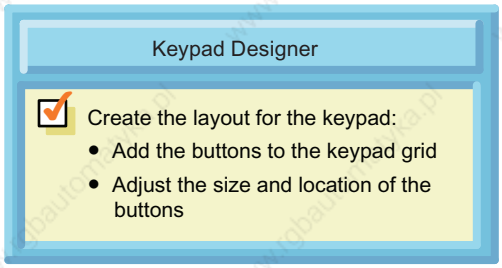

Figure 3-6 Adding the Button to the TD 100C and TD 200C Keypad

Tip
Typically, your keypad design should always include buttons with the following functions: Enter, Escape, Up Arrow, and Down Arrow. These functions allow you to access the pre-configured menus and functions of the TD device.

Inserting a Button

With the TD 100C and the TD 200C, you can add a button to the keypad grid. The TD400C does not have this option.

1. Click the Draw Button icon.
2. Move the cursor over the grid.
3. Move the cursor (and button) into position on the keypad grid.
4. Hold down the left mouse button and drag the cursor to adjust the size and shape of the button.
5. Release the mouse button to insert the button onto the keypad

After you have inserted the button onto the keypad grid, you can relocate the button by dragging it to a new location on the grid. However, you cannot resize the button.

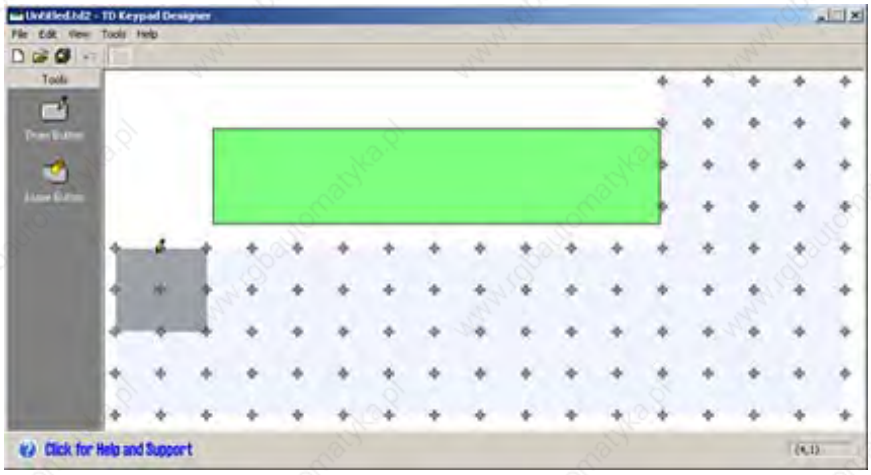

Figure 3-7 Adding a Button (TD 100C and TD 200C)

Modifying the Shape of a Button

With the TD 100C and the TD 200C you can modify the shape of a button. The Keypad Designer provides two methods for modifying the shape of a button. The TD400C does not have this option.

- Changing the size or shape of a button by adding a second button on top of the first button
- Erasing a portion of the button

Extending the Shape of a Button

You cannot resize a button that has been inserted onto the keypad grid. However, with the TD 100C and the TD 200C, you can insert a second button on top of the first button to create a new size for the button. The TD400C does not have this option.

As shown in the figure below, adding a second button also allows you to create buttons of non-rectangular shape (combining the shapes of both buttons).

When you insert the second button, ensure that the cursor is within the boundaries of the first button.

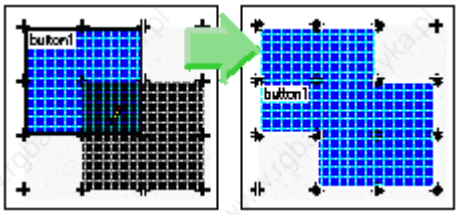

Figure 3-8 Extending the Shape of a Button (TD 100C and TD 200C)

Erasing an Area of the Button

With the TD 100C and the TD 200C, you can change the shape of the button by clicking the Erase Button icon. The TD400C does not have this option.

As shown in the figure below, the Keypad Designer alerts you if the shape of the button is invalid.

To delete the entire button, select the button and press the Delete key.

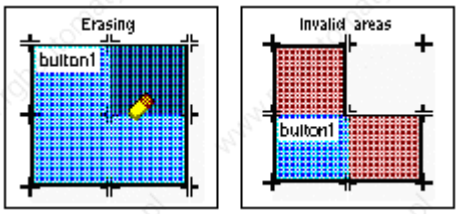

Figure 3-9 Erasing an Area of a button (TD 100C and TD 200C)

Tip

A valid button must consist of at least 4 adjacent cells, with each cell having at least 2 neighbor cells. A neighbor cell must be left, right, or up or down from the cell. Diagonal neighbor cells are not counted.

3.5 Defining the Properties of the Button

Defining the Properties of the Button

After you create the button, you define the function that will be performed when an operator presses the button.

You use the Properties dialog to configure the functionality for the button:

- Select the button to be configured.
- Select the Edit > Properties menu command to display the Properties dialog.

  You can also right-click the button and select Properties from the context menu. You can double-click the button to bring up the Set Button Properties.
- Select the function for the button and provide a valid function name. Click OK. See Figure 3-10 for an example of the TD 200C button functions.

The TD400C has up to 15 buttons that can be defined. You do not have to define (or use) all the buttons. Some buttons can be blank or unused.

Table 3-2 describes the functions that you can configure for the button. The default function is to set a bit in the S7-200 CPU (Set PLC Bit).

Some functions can also be used in combination with other buttons, such as SHIFT or the arrow buttons. The Properties dialog provides suggestions for appropriate buttons for combining the functions.

After you configure the functions for each button on the keypad, select the File > Save or the File > Save As menu command to create the configuration file (*.td2 for the TD 200C, *.td1 for the TD 100C, or *.td4 for the TD400C).

Tip
A button that has been configured will display the button name on the button in the panel layout.

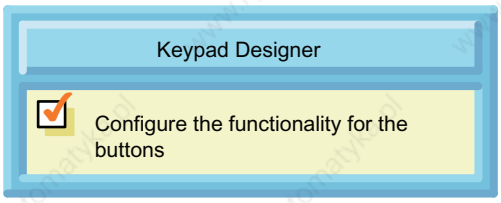

Figure 3-10 Defining the Properties for the Button

Figure 3-11 Button Properties Dialog

Table 3-2 Button Properties for the TD 100C, TD 200C, and TD400C

Category	Function	Description
Navigation or Selection	Enter	Selects a menu item or confirms a value
	Escape	Exits from a menu or cancels a selection
	Up Arrow	Scrolls (upwards) through menu items or increments a value that can be edited
	Down Arrow	Scrolls (downwards) through menu items or decrements a value that can be edited
	Left Arrow	Moves the cursor to the left
	Right Arrow	Moves the cursor to the right
Entering data	Set Bit	Sets a memory bit in the S7-200 CPU. You use the Text Display wizard to assign the specific bit address For the TD 200C and TD400C, you can use this button to set two different bits by defining the Shift button
	Shift	Allows you to use one Set PLC Bit button to control two different bits in the S7-200 CPU (TD 200C, TD400C)
	Clear Value	Sets the value being entered to zero (0)
	Edit V-Memory	Edits a V memory location in the S7-200 CPU. You must specify the address for the V memory at run time (TD 200C, TD400C)

Category	Function	Description
User Screens and Alarms (User menu or Alarms menu) See Chapters 4 and 5	Menu Mode	Displays the standard TD menus (See Chapter 5)
	Display Alarm	Displays the current alarm message(s)
	Display User Menus	Displays the user menu
	Menu 1 Screen 0	Displays the first user screen in the first user menu
	Menu 2 Screen 0	Displays the first user screen in the second user menu
	Menu 3 Screen 0	Displays the first user screen in the third user menu
	Menu 4 Screen 0	Displays the first user screen in the fourth user menu
	Menu 5 Screen 0	Displays the first user screen in the fifth user menu (TD 200C, TD400C)
	Menu 6 Screen 0	Displays the first user screen in the sixth user menu (TD 200C, TD400C)
	Menu 7 Screen 0	Displays the first user screen in the seventh user menu (TD 200C, TD400C))
	Menu 8 Screen 0	Displays the first user screen in the eighth user menu (TD 200C, TD400C)
Setting up the TD 200C (Operator menu) See Chapter 5	CPU Status	Displays the View CPU Status screen Reads and displays the status of the S7-200
	Select Language Set	Displays the Set Language screen, allowing you to switch between the languages that you configured for the TD 200C, TD400C)
	Set PLC Time and Date	Displays the Set Time and Date screen, allowing you to enter the time and date
Diagnostics (Diagnostic Menu) See Chapter 5	Change PLC Mode	Displays the Change CPU Mode screen, allowing you to change the operating mode of the S7-200 (TD 200C, TD400C)
	Edit Memory	Displays the Edit CPU Memory screen (TD 200C, TD400C)
	Force I/O	Displays the Force I/O screen (TD 200C, TD400C)
	Program Memory Cartridge	Displays the Make MC screen, allowing you to copy the user program to the memory cartridge (TD 200C, TD400C)
	TD Setup	Displays the TD Setup screen
	View Messages	Displays the View Messages screen (TD 200C, TD400C)
Password See Chapter 5	Release Password	Allows you to immediately restore the password-protection for the TD device
No Function	No Function	Allows you to identify a button as "not used"

3.6 Exporting the Keypad Layout to a Graphics Application

Exporting the Keypad Layout to a Graphics Application

After you have configured the buttons on the keypad, you can create the graphical representation for the faceplate. You can use any third-party graphics application to add colors, lines and other artwork to the panel design.

The Keypad Designer exports the layout of the buttons as a bitmap file (*.bmp) that you edit with the graphics application.

As shown in the figure below, the button template provides a bitmap image of the layout of the keypad that you can use with your graphical application to position, size and align the graphical elements of your faceplate design. These elements can include logotype, text, or other images.

The Keypad Designer allows you to export the layout of the buttons into your graphics application. Use the File > Export >Button Template to File menu command to create a bitmap file (*.bmp) that you insert into the graphics application.

After you customize the layout (adding background image, colors, buttons or logotype), you save the file as a bitmap (*.bmp). This bitmap becomes the panel image for the Keypad Designer.

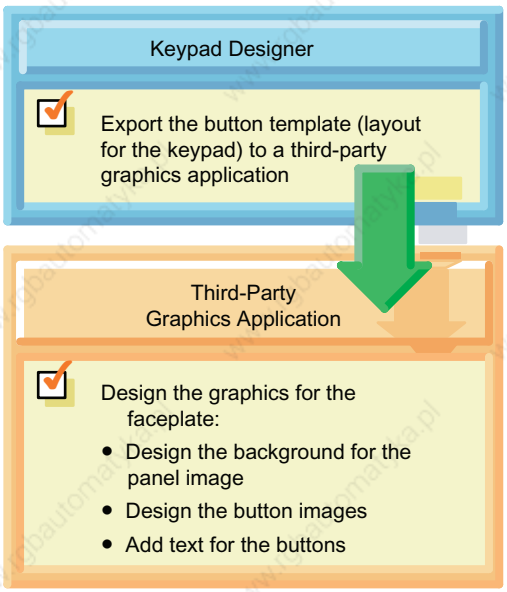

Figure 3-12 Creating the Panel Image: Export Button Layout

Tip
When you design the colors for your panel image, be aware that any white area will be printed as transparent (clear).

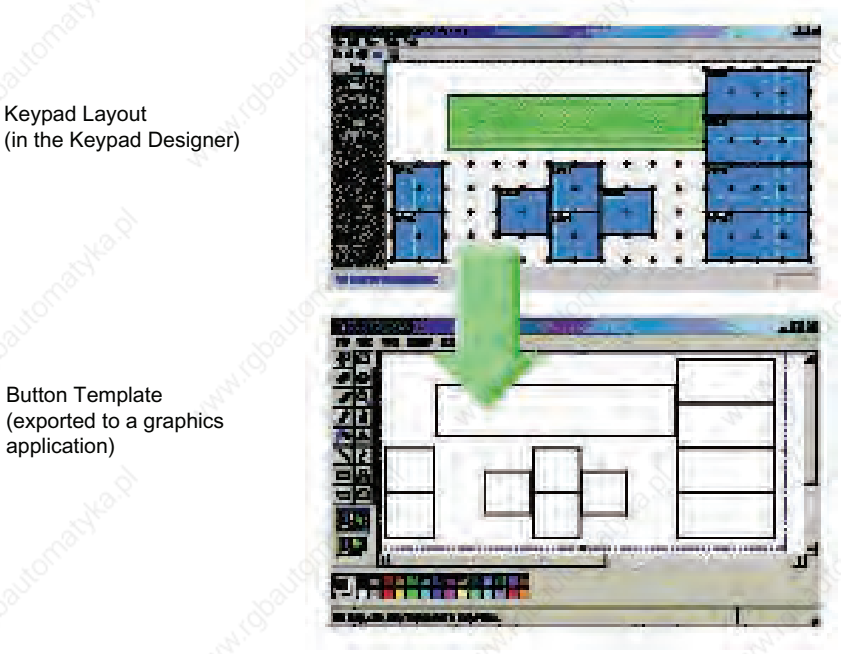

Figure 3-13 Exporting the Button Template to a Graphics Application

3.7 Adding a Panel Image to the Faceplate

Adding a Panel Image to the Faceplate

Using your own graphics application, you create the following graphical elements for the faceplate of the TD 100C, TD 200C, or the TD400C:

- Button images
- Background image or color scheme
- Text (for the buttons or the background)
- Logotypes (and other images or text)

For the TD 100C and the TD 200C, you are not required to use square buttons. However, you must ensure that your button design covers the area of the button as defined in the button template.

After you have used your graphics application to modify the panel image for the faceplate, save the design as a bitmap file (*.bmp).

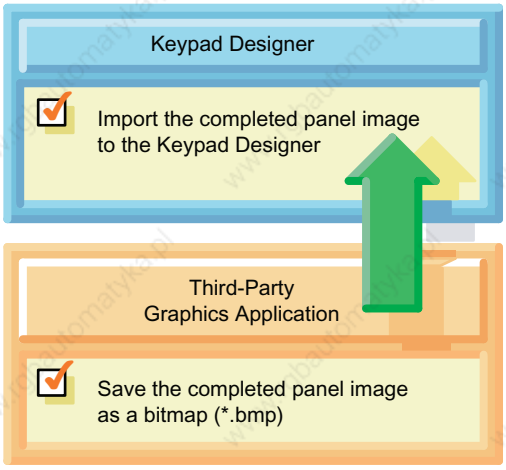

Figure 3-14 Creating the Panel Image: Import Panel Image

Importing a Panel Image

When you have completed the graphical design of panel image for the faceplate, you import the panel image back into the Keypad Designer.

After you open your keypad project (*.td1, *.td2, or *.td4), use the File > Import >Panel Image from File menu command to select the bitmap file that you created with your graphics application.

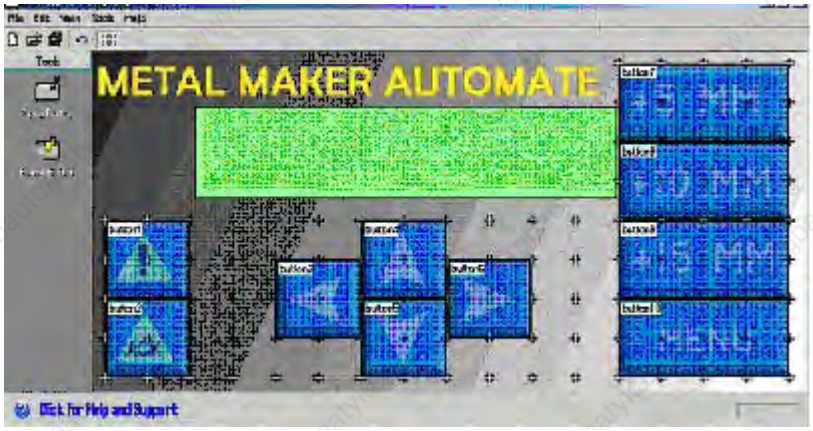

Figure 3-15 Keypad with a Panel Image

Tip

When you design your faceplate, you can create the bitmap with any resolution. However, the size of the background image for the TD device must exactly match the following dimensions:

- For the TD 200C:
  Width: 137 mm (+/- 0.15 mm) (5.42 inches)
  Height: 65.7 mm (+/- 0.15 mm) (2.58 inches)
- For the TD 100C:
  Width: 79 mm ((+/- 0.1 mm) (3.11 inches)
  Height: 65.8 mm (+/- 0.1 mm) (2.59 inches)
- For the TD400C:
  Width: 91.5 (+/- 0.1 mm) (3.6 inches)
  Height: 163.5 (+/- 0.1mm) (6.44 inches)

If your faceplate design does not match these dimensions, the Keypad Designer alerts you before importing the panel image. If you import a panel image with incorrect dimensions, the Keypad Designer resizes your panel image, which could distort the appearance of your faceplate design.

3.8 Saving the Keypad to a TD Configuration File

Saving the Keypad to a TD Configuration File

When you save the keypad, you create a TD configuration file (*.td1 for the TD 100C, *.td2 for the TD 200C, and *.td4 for the TD400C). This file contains the following information about the buttons on the keypad:

- Number of buttons
- Location and sizes of the buttons
- Names of the buttons
- Functions assigned to the buttons
- Panel image (if one was imported)

Use the **File > Save or File > Save As** menu command to save the configuration of the keypad.

The Text Display Wizard uses this information for configuring the TD 100C, TD 200C, or TD400C. See Chapter 4 for more information.

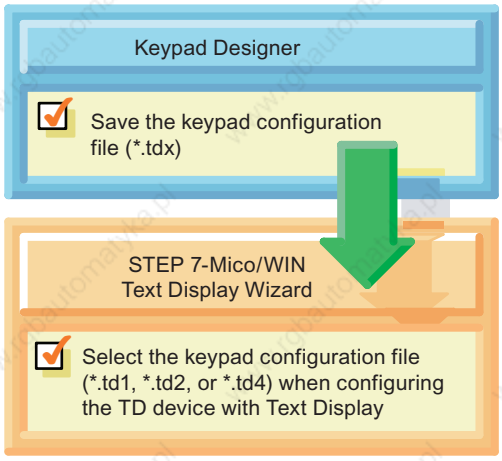

Figure 3-16 Saving the TD Configuration File

Tip
The Keypad Designer allows you to save invalid or incomplete configurations. This allows you to save interim versions of your work. However, always ensure that the final configuration of the keypad is valid and complete before using the configuration file (*.tdx) with the Text Display wizard.

3.9 Reversing the Panel Image

Reversing the Panel Image

The Reverse Panel Image option only affects the way that the panel image is saved to a file using the File > Export > Panel Image to File menu command. The exported bitmap file can then be inserted into the Microsoft Word template. For more information see the next section, Printing the Panel Image on a Faceplate. The Reverse Panel Image option does not change the layout of the keypad.

- Printing a reversed image allows you to orient the side of the faceplate with the ink from the printing process towards the TD device. The operator then touches only the plastic membrane and not the ink when pressing a button. See the figure below..
- Printing a non-reversed panel image allows the elements to be read correctly when printed. Use the non-reversed panel image when you print a paper copy of the faceplate for review. See figure below.

Use the File > Export > Reverse Panel Image menu command to select this function. A check mark notifies you that Reverse Panel Image function is selected.

Figure 3-17 Reversed Panel Image

Figure 3-18 Non-reversed Panel Image

3.10 Printing the Panel Image on a Faceplate

Printing the Panel Image on a Faceplate

To print your custom-designed panel image onto the blank faceplate material, you must use a laser printer that supports printing transparency material in both the A4 and envelope formats and also supports color printing.

- You can print a single panel image directly from the Keypad Designer on the envelope-sized blank faceplate (shipped with the TD 100C and TD 200C device). When you print a single faceplate (File > Print), the panel image is always reversed.
- To print multiple panel images, you can use the Microsoft Word template that ensures your panel image design is properly sized. You can print multiple panel images onto the perforated A4-size blank faceplate sheets. See Appendix A for order numbers.

Tip
The faceplate material is specially treated on one side to accommodate printing with a laser printer. The treated surface is up (or toward you) when you are holding the material with the cut corner in the top right of the sheet.

Ensure that the material is correctly inserted into the laser printer so that the panel image is printed onto the treated surface of the material. You must print a reversed-panel image version onto the faceplate material. To reverse the panel image, see the previous section, Reversing the Panel Image.

Before printing your panel image onto the blank faceplate sheet, first test your design by printing the panel image onto regular paper. You can then temporarily use the paper faceplate to test the functionality of the design with your TD device.

Using the blank faceplate sheets also allows you to create large quantities of high-quality faceplates by utilizing the professional printing services of shops that specialize in laser printing.

You can order additional blank faceplates in perforated A4-size sheets (10 sheets/package) for the TD 100C, TD 200C and TD400C. The faceplate material is especially designed for printing with laser printers.

The blank faceplate material for the TD 100C, TD 200C and TD400C is available in the sizes below:

- Envelope size for printing a single faceplate (TD100C, TD200C): The Keypad Designer prints registration lines for trimming the faceplate to the correct dimensions. (Use a metal straight edge and a knife or razor blade to ensure accurate and straight cuts.) The TD 100C and TD 200C devices ship with a single blank faceplate. The TD400C does not include a single faceplate.
- A4 size (210 mm x 297 mm) for printing multiple copies of the faceplate (TD100C, TD200C, and TD400C): You can use the Microsoft Word template to print the faceplate onto perforated areas of the material. You do not have to cut the faceplates from the material. Order these A4 sheets from your Siemens distributor. See Appendix A for order numbers.

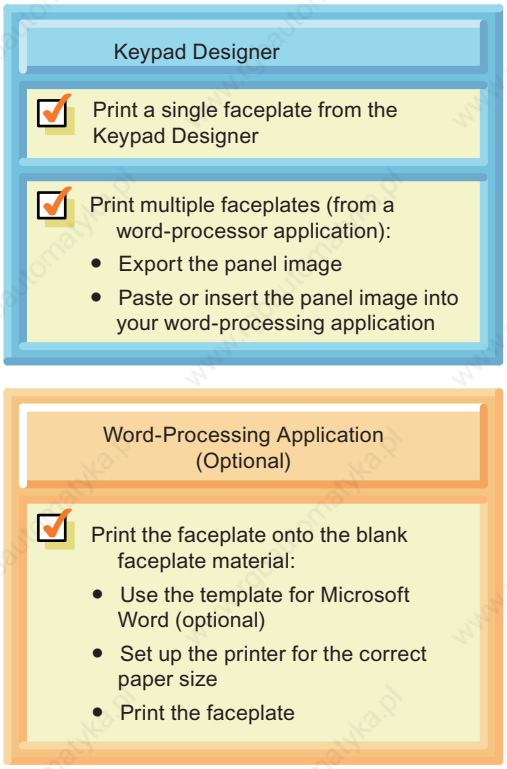

Figure 3-19 Printing the Faceplate

Tip
Before attempting to print a custom faceplate, ensure that both the printer and the word-processing application are set to the correct paper size:

- Single-copy sheet: Set both the printer and word-processing application to print on Envelope.
- Multiple-copy A4 sheet: Set both the printer and the word-processing application to print on A4-size paper.

Your computer and your laser printer may have other settings that cause the printer to scale the faceplate to an incorrect size. Always first print a test copy on paper before printing your faceplate onto the blank material.

Printing a Single Faceplate from the Keypad Designer

You can print individual faceplates directly from the Keypad Designer:

1. Ensure that the laser printer is set to print envelopes.
2. Insert the envelope-size faceplate material into the tray.
3. Select the File > Print menu command.
4. Select the laser printer and click OK.
5. Using the cut lines and a paper cutter, cut the faceplate from the material

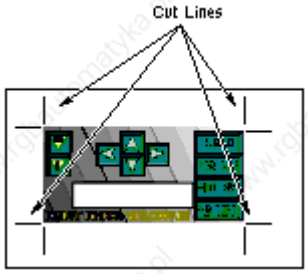

Figure 3-20 Printing a Single Faceplate

Tip
For best results use a razor-blade cutting knife with a metal straight edge to cut the faceplate from the material. You can also use a high-quality paper cutter. Be especially careful when using scissors or similar tools. Scissors are more likely to stretch or tear the material, causing irregular edges for the faceplate.

Printing the Faceplate from a Word-Processing Application

You use a word-processing application (such as Microsoft Word) to print multiple copies of the faceplate onto A4-size blank faceplate material. After you export the panel image of the faceplate into a document, you adjust the location of the panel images and print the document.

Tip
Siemens provides document files (in 6 languages) for Microsoft Word that helps you to align the panel images for the perforations on the A4 blank faceplate material. To open these documents, browse to the Templates subdirectory under the Keypad Designer application (C:/Program Files/Siemens/TD Keypad Designer/Templates) and select the template for your TD device and language.

Before printing the faceplate onto the blank faceplate material, you must ensure that the document and the printer settings are both set to print on A4 paper. Also, ensure that the laser printer itself is configured to print A4 paper.

After you print the faceplate document, you use the perforations to remove the faceplates from the sheet.

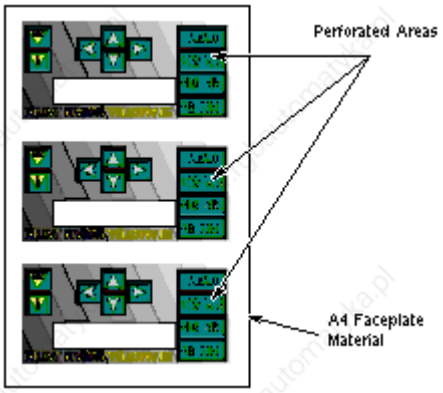

Figure 3-21 Printing Multiple Faceplates

To export the panel image to your word-processing application:

1. Open your word-processing application (Microsoft Word) and open the template file.
2. Open the Keypad Designer
3. In the Keypad Designer, select the File > Export > Panel Image to File menu command to create a bitmap file that you insert into the word-processing application.
4. Insert the panel image into the document by using the word-processing application to insert the bitmap file (*.bmp) that you created with the Keypad Designer.
5. Follow the instructions in the template file for positioning and sizing the faceplate.
6. After inserting the panel image into the document, save the document using the File > Save As menu command of the word-processing application.

With the panel images saved in your document, you can print the document to your laser printer.

Tip
Before printing the panel image onto the blank faceplate material, first test your design by printing the faceplate onto regular A4 paper.

3.11 Installing the Printed Faceplate onto the TD device

Installing the Printed Faceplate onto the TD 100C, TD 200C, and TD400C

Use the following procedure to install your custom faceplate on the TD device. The example shown here is for the TD 200C. Installing a faceplate on a TD 100C and TD400C is similar; the differences are noted below. To prepare for installation, remove the protective film covering the display window of the TD device and the back of the preprinted (standard) faceplate. The protective film is blue for the TD 100C and the TD 200C, and transparent for the TD400C.

1. If your TD device has a strip of protective paper, remove the strip to expose a strip of the adhesive. For the TD 200C and TD400C, it is on the left side; for the TD 100C, it is on the right side of the device.
2. Carefully align your custom faceplate on the entire TD device, and then seal the faceplate to the exposed adhesive by pressing down on the left (TD 200C and TD400C) or on the right (TD 100C) side of the faceplate.
3. Carefully lift back the unadhered faceplate and remove the rest of the protective paper from the TD device.
4. Carefully position the faceplate onto the TD device. Firmly press the faceplate onto the adhesive, taking care to remove any air bubbles that may have been trapped underneath.

CAUTION
Do not use excessive force or a hard (or sharp) tool when you install the faceplate onto the TD400C device. If you use excessive force a hard tool when you press the faceplate onto the TD400C device, it may cause damage to the springs under the faceplate. Ensure that excessive force or a hard (or sharp) tool is not used when you install the faceplate onto the device

Refer to Chapter 2 for additional information about installing the TD devices, including the dimensions for the faceplate.

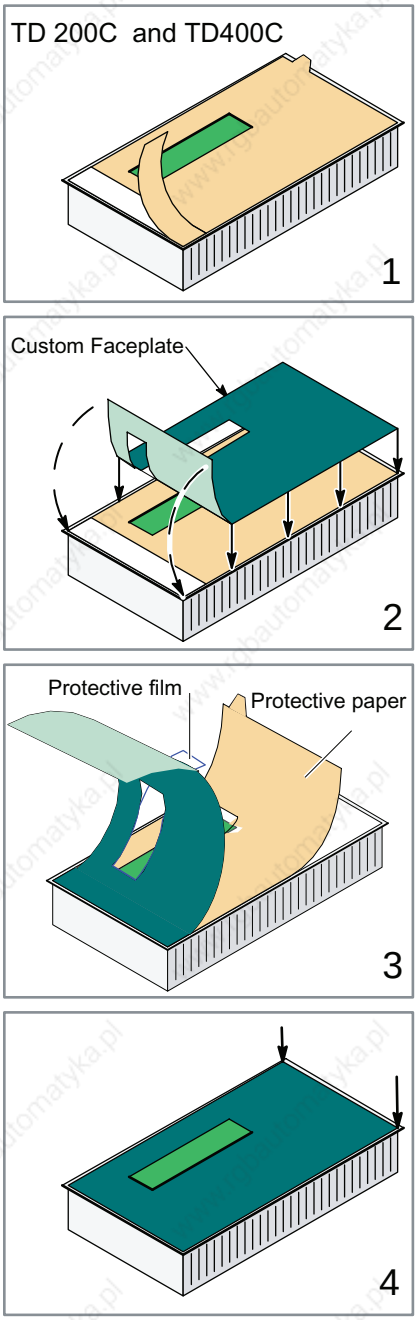

Figure 3-22 Adhering the Faceplate onto the TD Device

Using the Text Display Wizard to Configure the S7-200 CPU for Your Text Display (TD) Device

4

4.1 Overview

Overview of Chapter 4

You do not configure or program the TD device. The Text Display wizard creates a parameter block that stores the configuration, screens and alarms for the TD device. The S7-200 CPU stores the parameter block in V memory. At power-up, the TD device reads the parameter block from the S7-200 CPU.

You use the Text Display wizard of STEP 7-Micro/WIN to perform the following tasks:

- Configuring the parameters for the TD device
- Creating the screens and alarms to be displayed on the TD device
- Creating the language sets for the TD device (TD 200, TD 200C and TD400C only)
- Assigning the V memory address for the parameter block

Tip
To connect your TD device to a network, you use the Diagnostic or TD Setup Menu of the TD device to set up the network addresses, baud rate and other parameters. Refer to Chapter 5.

4.2 Overview of the Configuration Tasks

Overview of the Configuration Tasks

The S7-200 CPU stores the configuration data for the TD device, including the screens and alarms, into a parameter block (located in V memory). The Text Display wizard creates the parameter block. When you download your project (user program and data block) to the S7-200 CPU, you also download the parameter block as part of the data block.

You do not configure or program the TD device. At power-up, the TD device reads the parameter block from the S7-200 CPU.

As shown in the figure below, you use the Text Display wizard of STEP 7-Micro/WIN to create the parameter block for the TD devices. The next figure shows the sequence of the tasks required for configuring the parameters of the TD device.

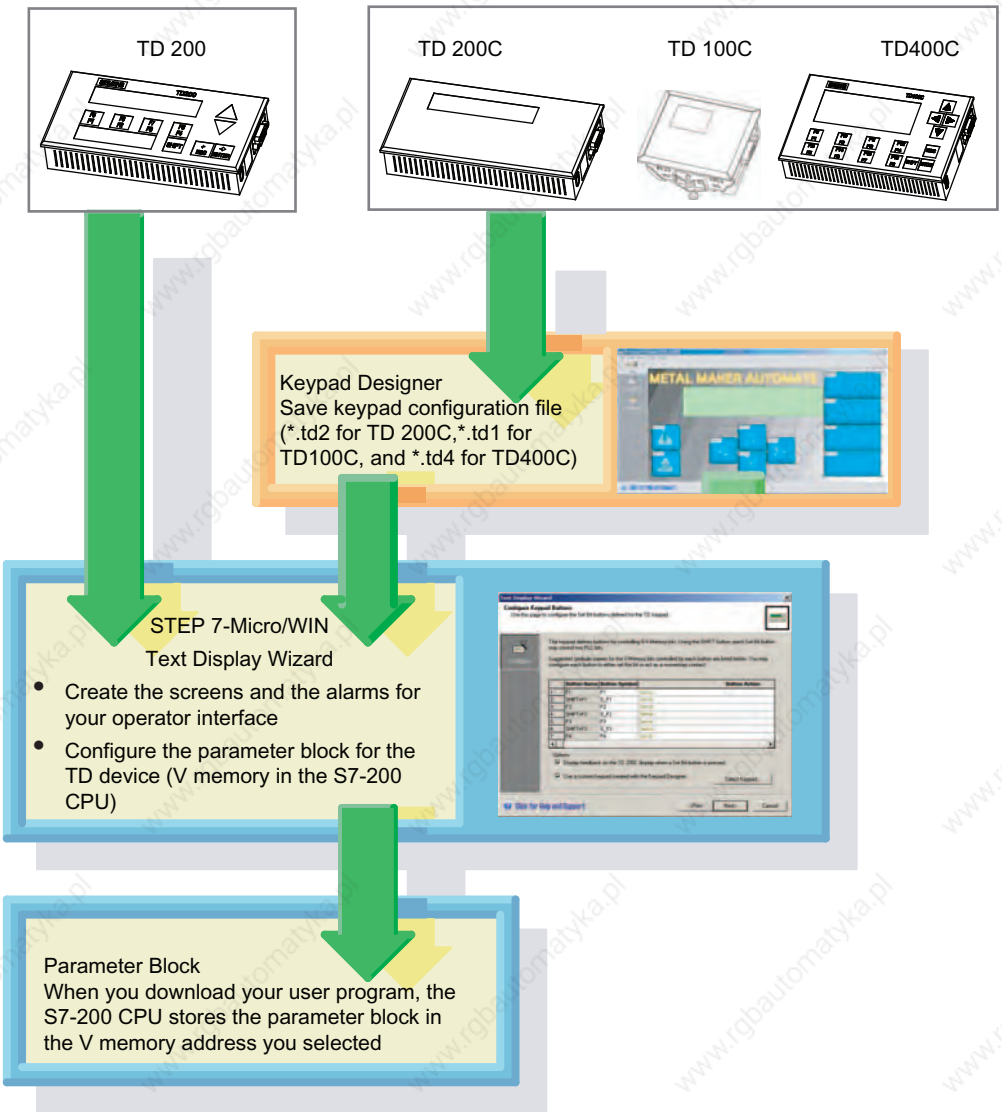

Figure 4-1 Using the Text Display Wizard to Configure the TD Device

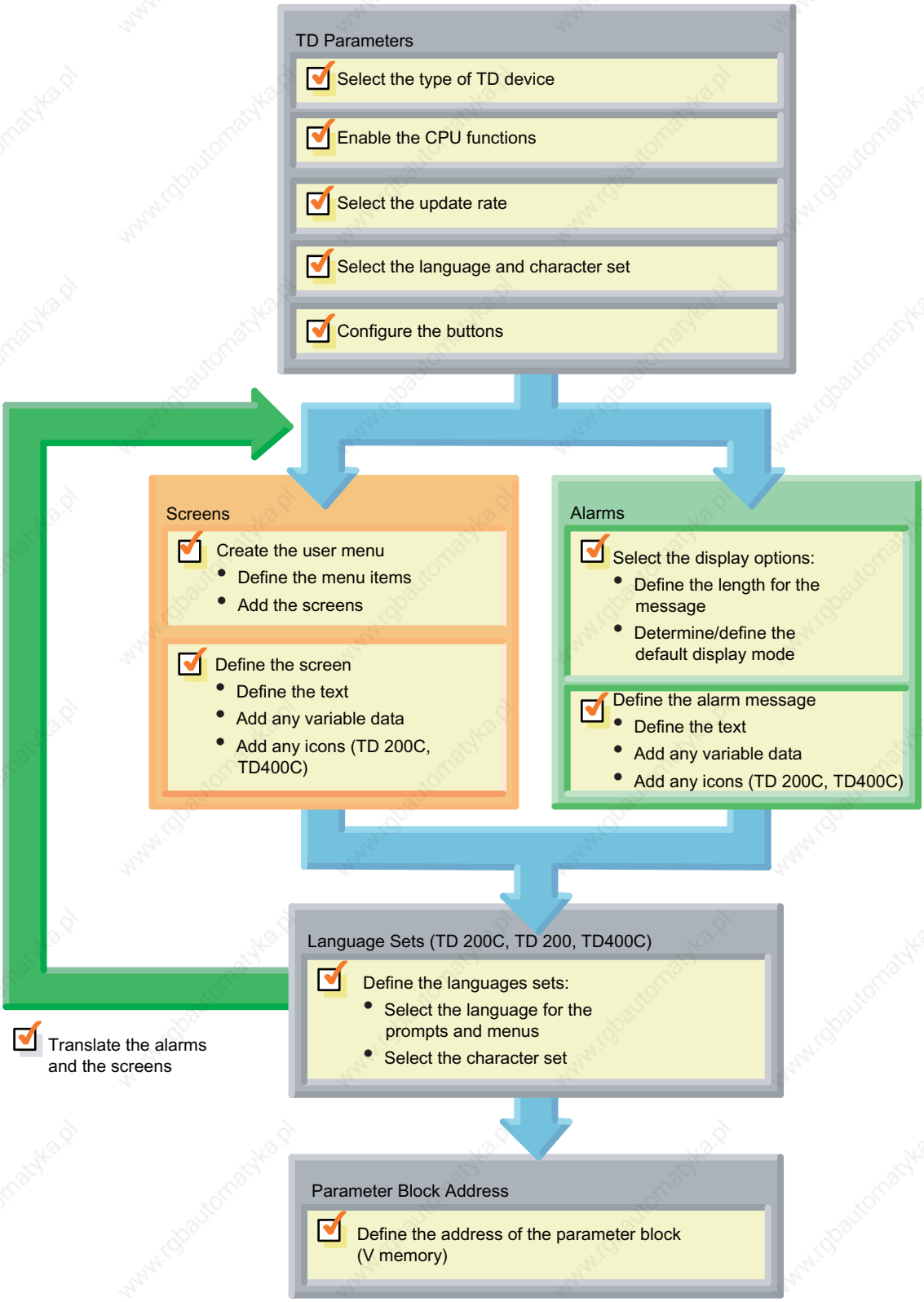

Figure 4-2 Configuration Tasks of the Text Display Wizard

4.3 Configuring the Text Display Device

Configuring the Text Display (TD) Device

STEP 7-Micro/WIN provides a wizard that makes it easy to configure the parameter block and the messages in the data memory area of the S7-200 CPU.

Text Display Wizard Tasks

As shown below, the Text Display wizard performs the same basic tasks for configuring the TD devices. However, the specific selections reflect the differences between the TD devices.

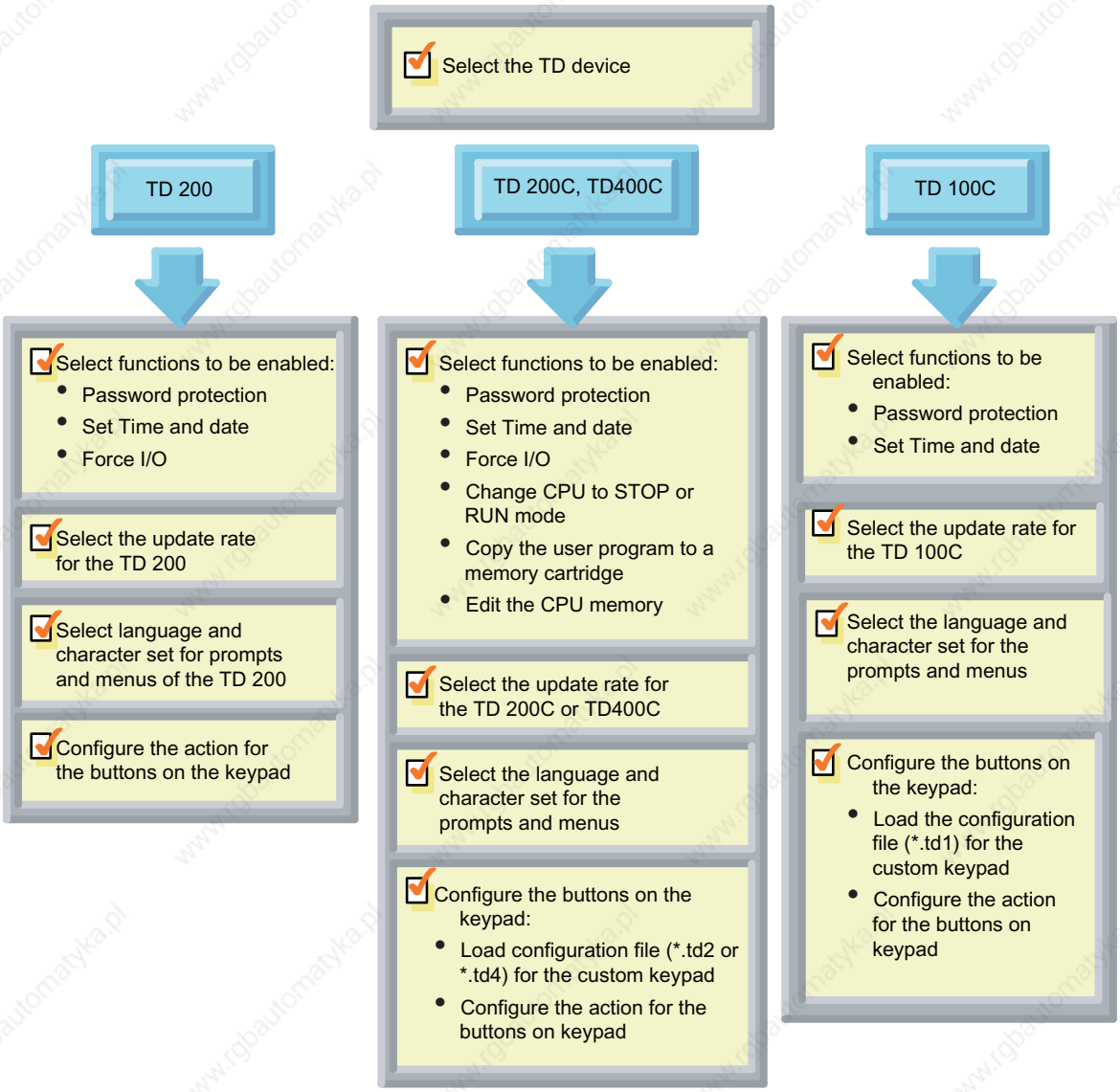

Figure 4-3 Tasks Required for Configuring the Parameters of the TD Device

Starting the Text Display Wizard for the TD Device

You use the Text Display wizard to configure the parameters for the TD device. You can also use the Text Display wizard to modify an existing TD configuration.

To open the Text Display wizard:

1. Start STEP 7-Micro/WIN.
2. Select the **Tools > Text Display Wizard** menu command.

The Text Display wizard displays the Introduction dialog, as shown in the figure below.

If the Text Display wizard finds an existing TD configuration, the Introduction dialog provides a list of existing TD configurations and allows you to select a TD configuration to modify.

Use the Next button to proceed through the dialogs of the wizard.

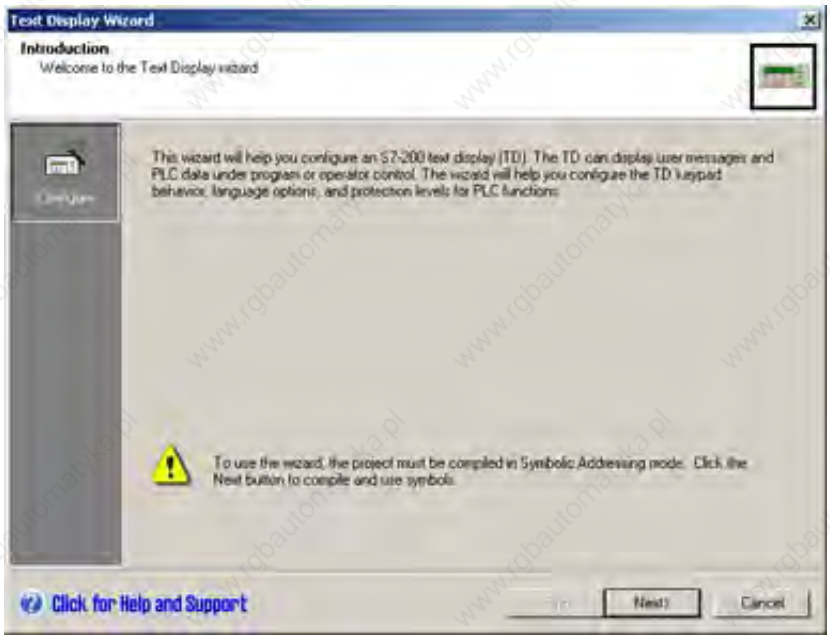

Figure 4-4 Text Display Wizard

Selecting the Type of Device to Configure

As shown below, the Text Display wizard prompts you to select the type of TD device to be configured.

The Text Display wizard uses this selection to display the dialogs for configuring the parameters for your specific TD device.

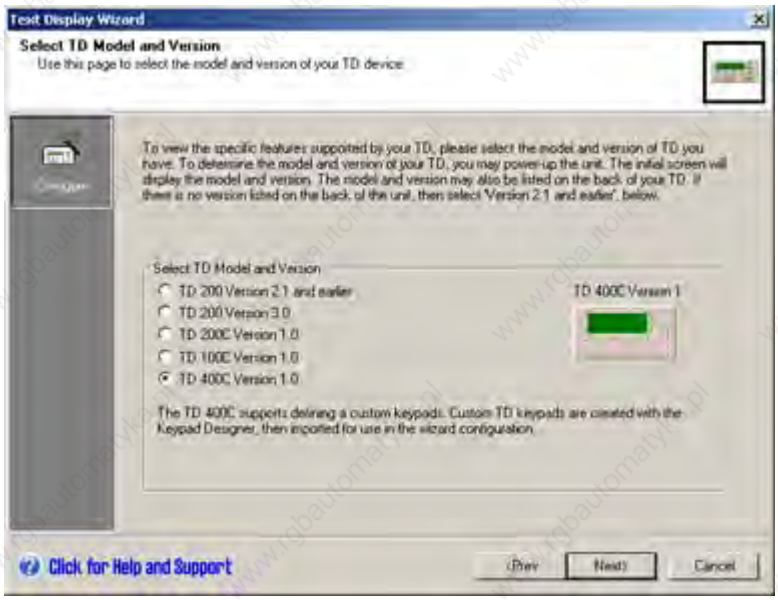

Figure 4-5 Selecting the TD Device

Selecting a Password for the TD Device

Selecting a password for the TD device helps you to protect the security of your process or application. By enabling a four-digit password (from 0000 to 9999), you can control access to the S7-200 CPU by requiring that an operator enter the password before editing variables from the TD device.

The TD password also restricts access to the following TD functions:

- Set time and date
- TD Setup
- Forcing I/O
- Changing the CPU mode
- Creating a memory cartridge
- Editing CPU memory

Tip
The TD password affects only the ability of an operator to use the TD device for certain functions.

If your S7-200 CPU is configured to require a password, the operator must enter the CPU password to force I/O and create a memory cartridge. The TD password is used in addition to the CPU password.

Enabling the TD Menu Functions

You can select the TD functions that appear on your TD device menu. The TD devices have different functions available. Refer to Chapter 5 for information about these CPU functions.

TD 200

Select the functions you want to be available on the TD 200 menus. The TD 200 supports the following functions:

- Setting the Time-of-Day clock: Allows you to set the time and date for the S7-200 CPU
- Forcing I/O: Allows you to force I/O points in the S7-200 CPU to be on or off

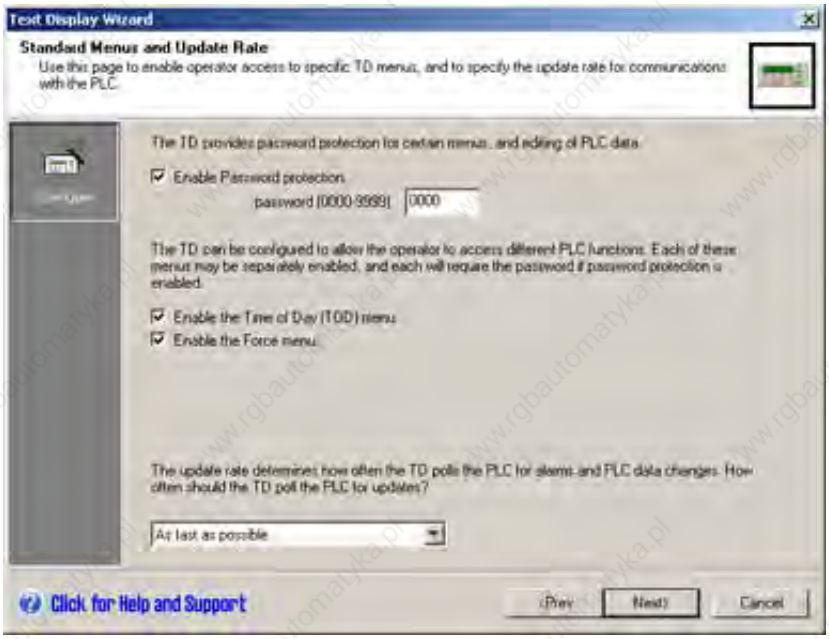

Figure 4-6 Enabling the CPU Functions for the TD 200

TD 200C and TD400C

Select the functions you want to be available on the TD 200C or TD400C menus. The TD 200C and TD400C support the following functions:

- Setting the Time-of-Day clock: Allows you to set the time and date for the S7-200 CPU
- Forcing I/O: Allows you to force I/O points in the S7-200 CPU to be on or off
- Creating a memory cartridge: Allows you to create a memory cartridge which is a complete copy of the CPU
- Changing the operating mode: Allows you to set the S7-200 CPU to STOP or RUN
- Editing the CPU memory: Allows you to view and change the values of the data stored in the S7-200 CPU

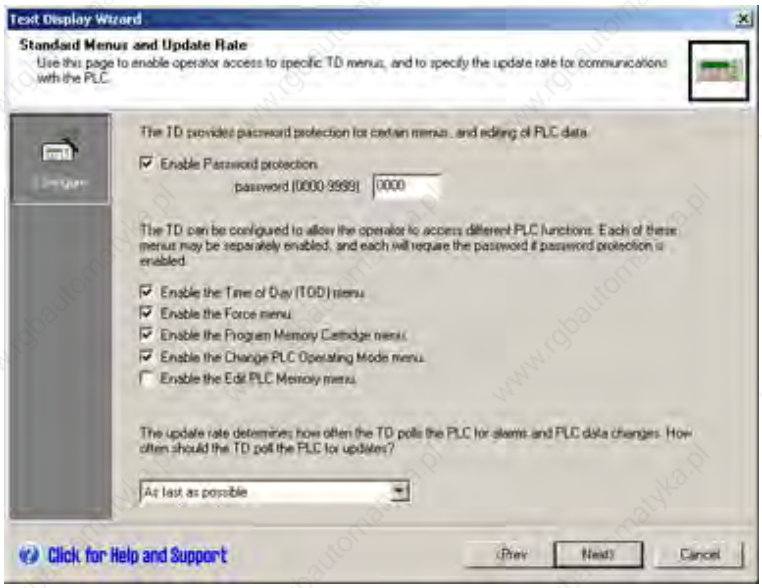

Figure 4-7 Enabling the CPU Functions for the TD400C and TD 200C

TD 100C

Select the function you want to be available on the TD 100C menus.

The TD 100C supports the Setting the Time-of-Day clock function. This function allows you to set the time and date for the S7-200 CPU function.

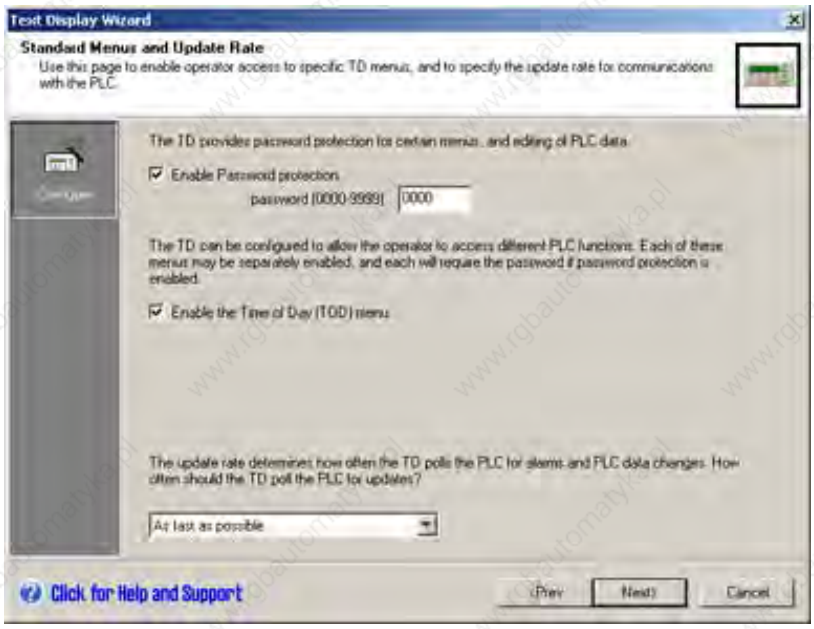

Figure 4-8 Enabling the CPU Functions for the TD 100C

Selecting the Update Rate for the TD Device

You can select how often the TD device performs a read operation to update the information from the S7-200 CPU. You can select from "As fast as possible" to "Every 15 seconds" (in one-second increments).

Selecting the Language and the Character Set

The Text Display wizard allows you to select the language for the system menus and prompts of the TD device. This selection does not affect the language setting for the screens or alarms that you enter. You select a character set that supports the language of the text that you enter for the screens and alarms. (If the character set does not match the Windows character set, the Text Display wizard may not display the characters correctly. The TD device displays these characters correctly.)

- Select the language for the system menus and prompts displayed by the TD device.

  The TD devices support English, French, German, Italian, Simplified Chinese, and Spanish.

- Select the character set for the text in your alarms and screens.

  Refer to Appendix A for descriptions of the character sets supported by your TD device. The Simplified Chinese Character Set is an electronic file that resides on the STEP 7-Micro/WIN documentation CD

These settings define a language set for the TD device. The Text Display wizard also provides a series of dialogs for copying the alarms and screens to create additional language sets (TD 200, TD 200C, and TD400C). For each language set, you select the language and the character set.

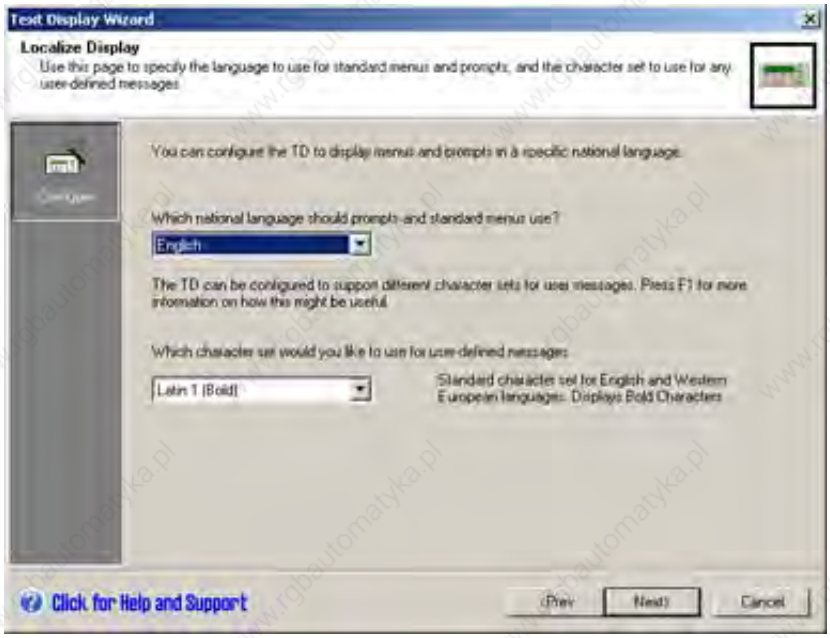

Figure 4-9 Localizing the TD Device

Tip

When you create multiple language sets (TD 200, TD 200C, and TD400C), the Text Display wizard copies the alarms and screens from the primary language set to the other language set. You then edit the screens and alarms to translate the text displayed for the new language set.

If you need to modify the screens or messages (such as to add a new variable or to add a new alarm), you must edit the primary language. The Text Display wizard copies these changes to the other language sets.

The Text Display wizard only allows you to change the text in the other language sets.

Selecting the Font Size (TD 100C, TD400C)

The TD 100C and TD400C support two font sizes for displaying user and alarm messages. Larger fonts are easier to read, but will result in fewer characters per user message. You select the font size for the TD100C as shown in the figure below. You select the font size for the TD400C when you configure the alarm or user message (refer to the section on configuring screens and alarms in this chapter).

The following font sizes are available:

- TD 100C:
  Small font (16 ASCII or 8 Chinese characters per line)

  Large font (12 ASCII characters per line)

  Font selection applies to all messages and screens
- TD400C:

  Small font (24 ASCII or 12 Chinese characters per line)
  Large font (16 ASCII or 8 Chinese characters per line)

  Each alarm or screen can have a different font

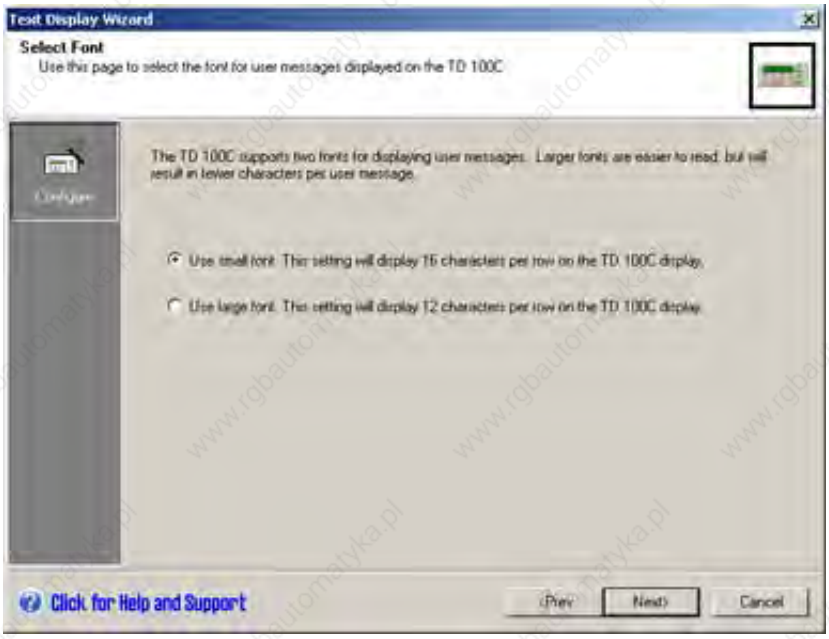

Figure 4-10 Selecting the Font Size (TD 100C)

Loading a Custom Keypad (TD 100C, TD 200C, and TD400C Only)

The TD 100C, TD 200C, and TD400C allow you to create a custom keypad. As described in Chapter 3, you can insert buttons onto the keypad. The Keypad Designer saves this configuration to a file (*.td1 for the TD 100C, *.td2 for the TD 200C, and *.td4 for the TD400C).

To load the keypad configuration file into the Text Display wizard:

- Select the option, Use a custom keypad created with the Keypad Designer. (Find this check box in the Options area of the Configure Keypad Buttons dialog. See Figure below.)
- Browse to the keypad configuration file (*.tdx) that you created with the Keypad Designer.

The Text Display wizard loads the keypad configuration file and updates the table of buttons and the button symbols.

The Text Display wizard lists only those buttons that you had defined with the Set Bit functionality when you created the buttons with the Keypad Designer.

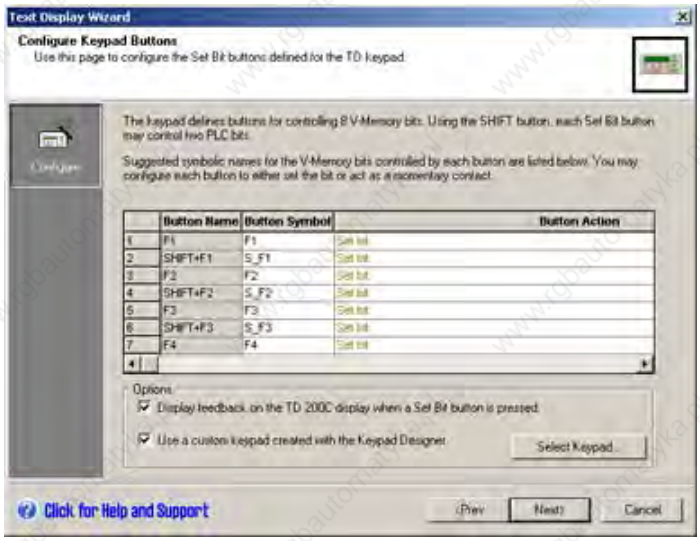

Figure 4-11 Configuring the Functions for the Buttons (TD 200C)

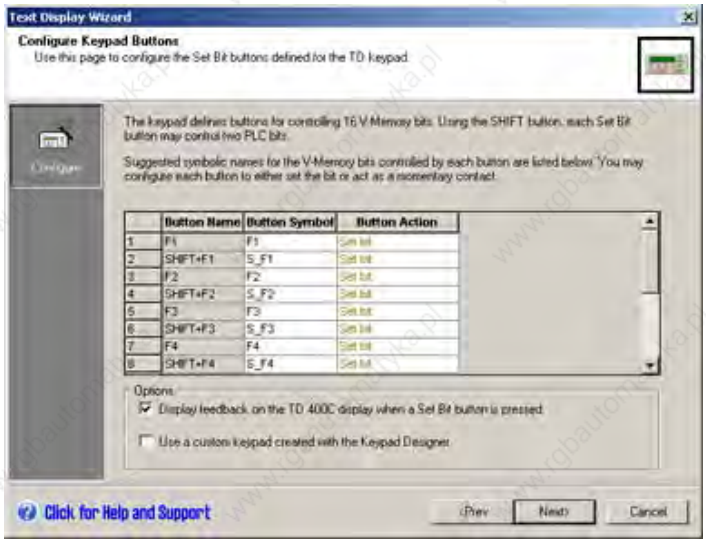

Figure 4-12 Configuring the Functions for the Buttons (TD400C)

Configuring the Buttons on the Keypad

As shown in previous figure, the Configure Keypad Buttons dialog allows you to select a symbol name and an action for each of the configurable buttons on the TD device.

- The TD 200 keypad provides 4 configurable buttons and a SHIFT button that can be configured for up to 8 bits in the S7-200 CPU
- The TD 200C can be configured for up to 20 configurable buttons
- The TD 100C can be configured for up to 14 configurable buttons
- The TD400C can be configured for up to 15 configurable buttons

Tip
The Configure Keypad Buttons dialog of the Text Display wizard displays only those buttons that set bits in the S7-200 CPU. The Text Display wizard does not list the buttons with other functionality, such as ESC or SHIFT.

The symbols that you assign to the buttons on the keypad allow the logic of your user program in the S7-200 CPU to interact with the TD device. (The Text Display wizard suggests a symbol for these buttons. You can accept the recommendation or enter a new symbol for the button.)

For each button, you configure the type of action:

- Set bit: When you press the button on the TD device, the TD device sets the bit on in the S7-200 CPU. The bit stays on until the logic of your user program in the S7-200 CPU resets the bit.
- Momentary contact: When you press the button on the TD device, the TD device sets the bit on in the S7-200 CPU. When the TD device button is released, the TD device turns the bit off in the S7-200 CPU.

Tip
The TD device only sets the bit on or off in the S7-200 CPU a single time when the TD device button is either pressed or released.

Tip
The TD device can display a special icon that provides visual feedback to the operator and shows that the set bit key was pressed in the CPU. To enable this feature, check the box at the bottom of the Configure Keypad Buttons wizard screen (see the previous figure).

4.4 Configuring the Screens for the Text Display Device

Configuring the Screens for the TD Device

The TD device supports a set of user-defined screens and a user menu. Screens allow the operator using the TD device to initiate the interaction with the S7-200 CPU. See the figure below.

- User menu: Provides a hierarchy for switching between groups of screens. For the TD 200, TD 200C, and the TD400C you configure up to 8 entries in the user menu. For the TD 100C, you configure up to 4 entries in the user menu.
- Screens: You create up to 8 screens for each entry in the user menu.

The TD device displays the screens and the items on the user menu in the order that you configure them.

If you configure both alarms and screens, you also designate the default display mode for the TD device.

The operator uses the buttons on the keypad to navigate through the user menu or the screens that you configured.

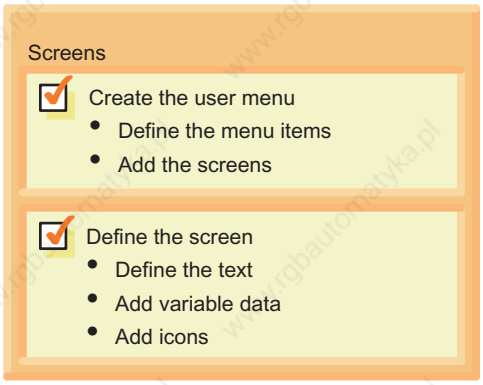

Figure 4-13 Configuring the Screens

The buttons that a TD operator could use to navigate from a user menu to the screens associated with that item in the menu are shown below.

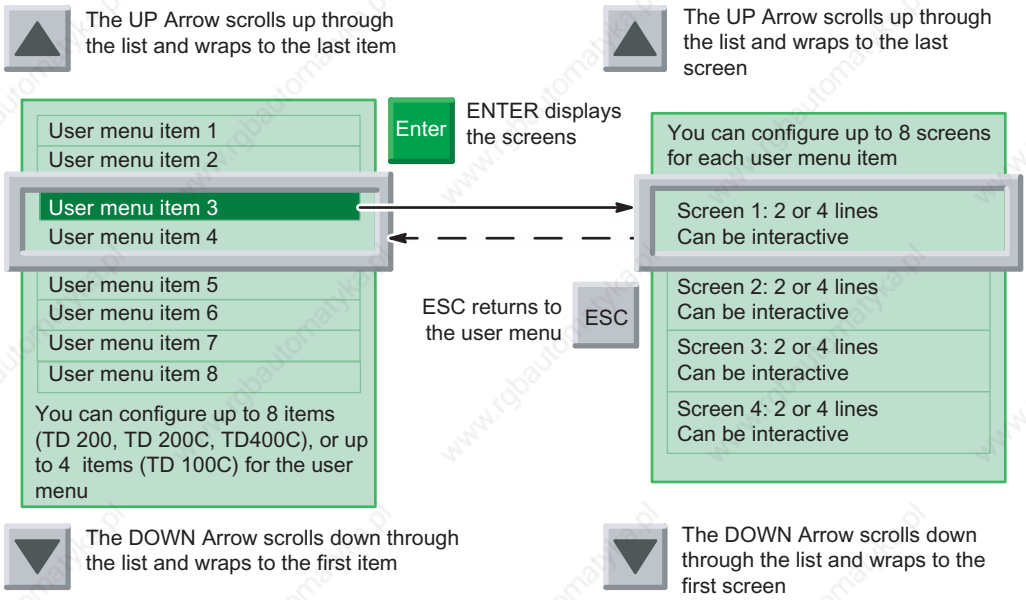

Figure 4-14 Navigating through a Hierarchy of User-Defined Screens

Tip
The screens in the TD 200 and TD 200C are always two lines. The screens in the TD 100C are always four lines. The screens in the TD400C can be 4 lines (with the small font), or 2 lines (with the large font).

After you have configured the TD device, you can configure the screens and the user menu. Click the user menu icon to start creating the user menu for the screens. See the figure below.

For the user menu, you perform the following tasks:

- Create the groups (names) to be displayed on the user menu
- Determine the sequence of the groups listed on the user menu

For the screens, you perform the following tasks:

- Add the screens to each group (on the user menu)
- Create the text message (and add variables) for each screen
- Add icons to the text message (TD 200C and TD400C only)
- Determine the sequence of the screens for each group

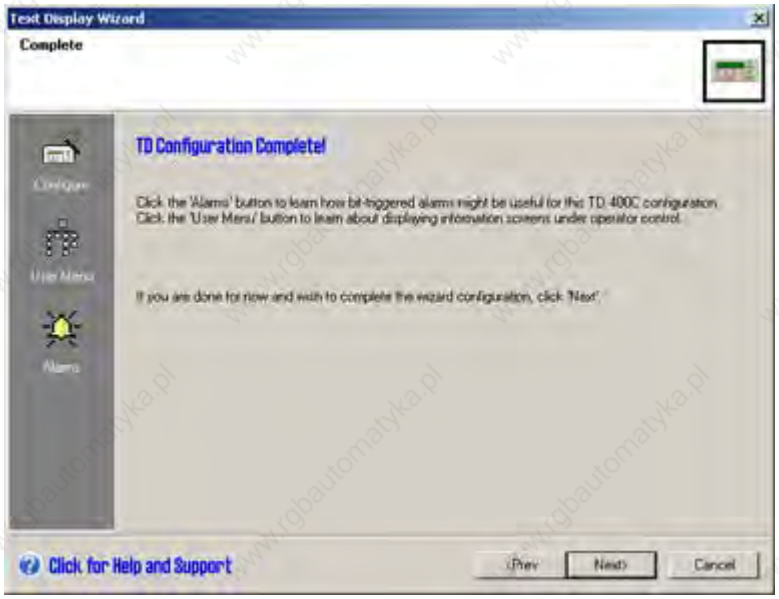

Figure 4-15 Selecting the Screen Configuration Tasks

Creating the User Menu

The process for creating the screens and user menu is not sequential: You can choose to enter the screens for each individual group before creating the next group, or you can enter all of the groups for the user menu before creating any of the screens.

To configure the user menu, you enter the names for each group of screens. See the figure below for an example of the TD400C. The Text Display wizard displays a green ENTER icon (and blue arrow) to show which group is selected.

To create the screens associated with a group on the user menu:

1. Move the cursor to the box that designates the group on the user menu.
2. Click the Add Screen button.
3. Create the text for the screen.
4. Click the Add Screen button to create the other screens in this group.

Use the Move Choice Up and Move Choice Down buttons to change the sequence of the groups listed on the user menu.

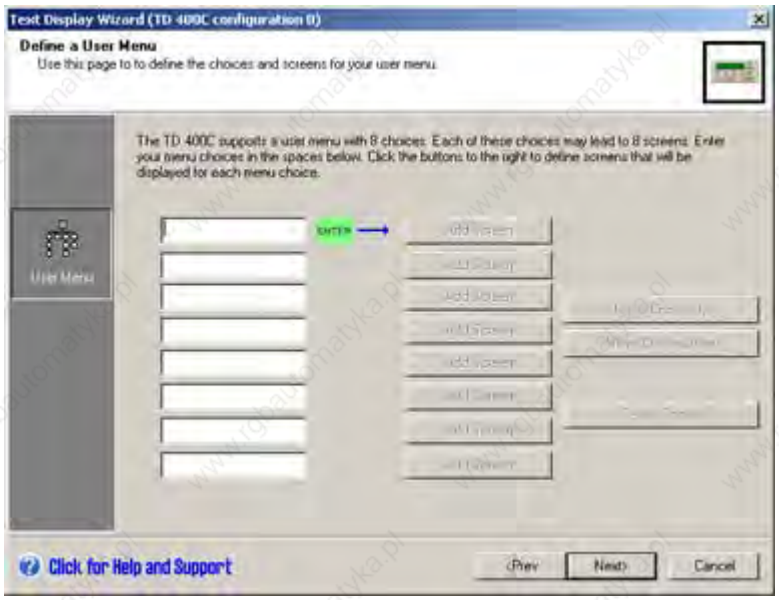

Figure 4-16 Defining the User Menu

Creating the Text for a Screen

Your screen message can contain the following elements:

- Text: Enter your text in the green area that represents the text display area of the TD device
- Icons (optional): Click the icons in the toolbar to insert the icon into the text message (TD 200C and TD400C only)
- Variable data (optional): Click the Insert PLC Data button to embed a variable into the text message
- Font selection (TD400C only): Select the Font button to select a font. You can select a different font for each row of the user message.

You can designate the screen to be the default screen. The TD will show the default screen after being powered on.

Figure 4-17 Creating the Message for a TD 200C Screen

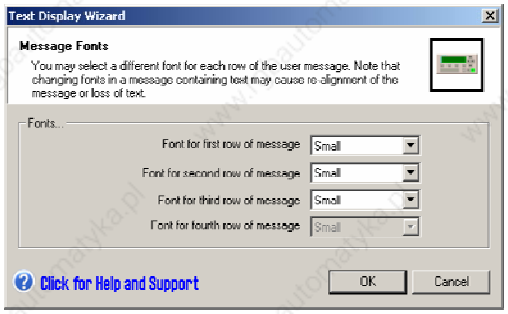

Figure 4-18 Creating the Message for a TD400C Screen

Embedding a Variable into the Text of a Screen

You can embed a variable data field into the text of the screen. To open the Insert PLC Data dialog, move the cursor to the location for the variable in your text and click the Insert PLC Data button. As shown in the figure below, you enter the following information:

Tip
For the TD 200, TD 200C, and the TD400C, you can embed up to 6 variables per screen. For the TD 100C, you can embed up to 1 variable per line (4 variables per screen).

- Data address:
  - VB: Numeric String, Text String
  - VW: Signed, Unsigned
  - VD: Real, Signed, Unsigned
- Data Format: Signed, Unsigned, Real, Numeric String, or Text String
- Digits to the right of the decimal: Up to 7

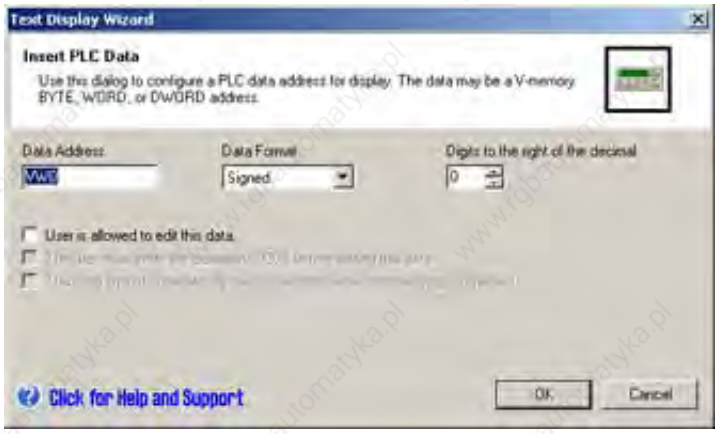

Figure 4-19 Inserting PLC Data

The TD device rounds a real number to the specified decimal place. For example, if the real number value is 123.456 and you select 2 digits to the right of the decimal, the TD 200 displays this value as: 123.46.

Tip
Refer to the SIMATIC S7-200 Programmable Controller System Manual for information about the data types or for the memory addresses supported by the S7-200 CPU.

You can also allow the operator to modify the data stored at this memory location in the S7-200 CPU.

- You can require the operator enter the TD password before editing the variable. (You must have enabled password-protection for the TD device.)
- You can configure the cursor to jump to the variable field.
- You can define a symbolic name for the variable. You use the symbolic name to access this data with your user program.

Clicking OK inserts the variable into the text of the screen. The Text Display wizard inserts a block of 4 characters to show the presence of the variable. The value to be displayed for the variable is right-justified at that location (anchored to the right-most character).

Data values are always right-justified to the right-most character of an embedded variable. As a data value grows in magnitude, it utilizes more spaces to the left of the anchor point and can overwrite the text characters. Always provide sufficient space between the end of your text and the anchor point to allow for the expected range of the data value.

Tip
The actual number of characters used to display a value varies with the size of the value. To help calculate the number of characters required for displaying the value of the variable, see the examples listed in Table 4-1.

The TD device displays all values as decimal numbers. Positive signed values are displayed without a sign, and negative signed values are displayed with a leading minus sign. Unsigned values are displayed without a sign. A leading zero is used for all fractional numbers (for example, 0.5). Real numbers are displayed with the number of decimal places you specify. The value is rounded to the specified decimal place.

Table 4-1 Calculating the Number of Characters Required to Display a Value

Size	Type	Resolution (Digits to right of decimal)	Maximum Number of Characters	Example
Byte (VB)	String	Not applicable	Line length [1]	Hello, world
	Numeric String	Not applicable	Line length [1]	800.333.7421
Word (VW)	Unsigned	0	5	12345
		1 to 4	6	1234.5, 1.2345
		5	7	0.12345
		6	8	0.012345
		7	9	0.0012345
	Signed	0	6	-12345
		1 to 4	7	-1234.5, -1.2345
		5	8	-0.12345
		6	9	-0.012345
		7	10	-0.0012345
Double-Word (VD)	Unsigned	0	10	1234567890
		1 to 7	11	123456789.1, 123.4567891
	Signed	0	11	-1234567890
		1 to 7	12	-123456789.1, -123.4567891
	Real	0	Line length[1]	-1234567
		1 to 7	Line length[1]	12345.6, 0.0123456

[1] The length of a line (number of characters in a line) varies by TD model and character size. The line length is always 20 for a TD 200 or TD 200C. The line length is either 12 or 16 characters for a TD 100C. The line length for the TD400C depends on the font you selected. If you selected a small font, you have 24 ASCII characters or 12 Chinese characters per line. If you selected a large font, you have 16 ASCII characters or 8 Chinese characters per line.

Embedded String Variables

There are special considerations when you set up a string variable for the TD devices. String variables are positioned the same as numeric variables, that is, the right-most character of the variable is positioned at the right-most position of the embedded variable in the Text Display wizard. This can cause problems when you want to place a text string adjacent to other text in the message.

When you embed a string variable in a TD alarm or screen, the Text Display wizard shows the embedded variable occupying 4 character spaces (or 2 Chinese characters) for the variable. These 4 spaces are the right-most 4 characters of the text string. If you want to have the text adjacent to other text, that is, to the left of the variable, the characters in the string need to be left-justified and padded with spaces to place the text in the proper position on the display.

For example: Assume that we want to show the pump status and that status is either "Pump OK" or "Pump High Temp". The screen display shows the word "Pump" followed by a string variable which is set to either "OK" or "High Temp". You set up the display in the Text Display wizard like this:

Pump _ _ _ _ _ _□□□□

The underlines are blank spaces, and the squares are the embedded variable (which takes up 4 character spaces). You can create 2 strings that you copy into the variable based on the current pump status. These strings are "OK" and "High Temp". These strings are displayed in the figure below.

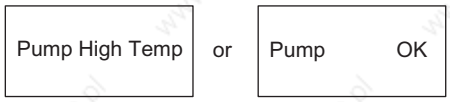

Figure 4-20 Embedded String Variable

The right-most character of the "OK" string is placed in the right-most position of the embedded variable. Since the string is only 2 characters, it displays on the right side of the display where the embedded variable is placed.

To make the "OK" string display next to "Pump", simply add blank spaces to the "OK" string to match the length of the other string. The "OK" string would become "OK ". Now the string is displayed in the figure below.

Figure 4-21 Embedded String Variable with Blank Spaces

The figure below shows how to create the two strings using the STR_CPY command. Note how the "OK" string is padded with blank spaces to left justify the characters on the TD display.

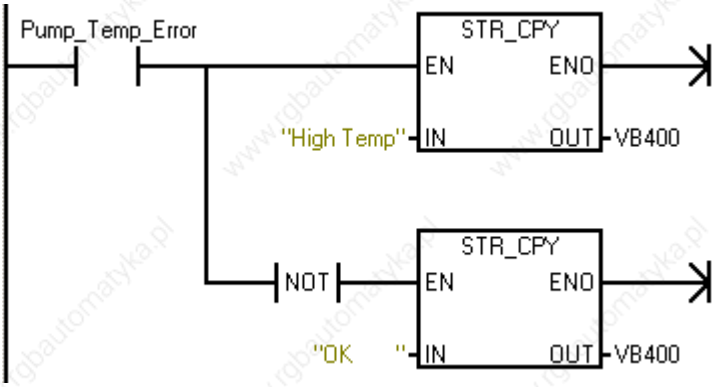

Figure 4-22 Using STR_CPY to Create Strings

4.5 Configuring the Alarms

Configuring the Alarms

Alarms allow the user program in the S7-200 CPU to initiate interaction with the operator by displaying an alarm message on the TD device. When your user program sets an alarm bit, the TD device reads the text of the alarm from the S7-200 CPU.

The figure below lists the key tasks for creating alarms. You configure the following information for each alarm:

- Number of alarms: Up to 80 alarms for the TD 200, TD 200C and TD400C, and up to 40 alarms for the TD 100C to be configured for the TD device
- Text message for the individual alarms
- Priority for the alarms is determined by the sequence in which you configure the alarms:
  - The first alarm has the highest priority
  - The last alarm has the lowest priority
- Acknowledgement (if required)

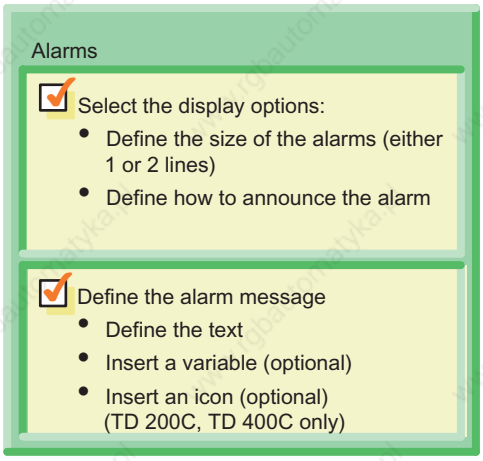

Figure 4-23 Configuring the Alarms

The TD 200, TD 200C, and TD400C devices store up to 80 alarms, and the TD 100C device stores up to 40 alarms. The TD displays the alarm messages according to priority.

The operator uses the buttons on the keypad to scroll through the list of alarms. See the figure below.

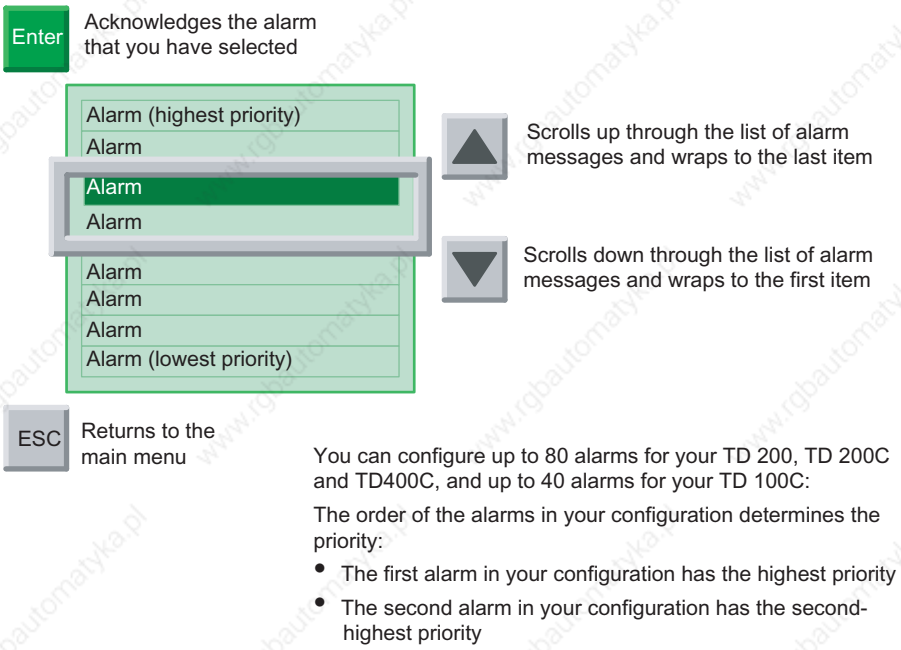

Figure 4-24 Alarm Messages

Determining the Type of Operator Interaction for an Alarm

The Text Display wizard allows you to determine the type interaction required by the operator for an alarm. If the user screens are set as the default display mode for the TD device and an alarm is enabled, an alarm indicator will begin to flash on the TD display. The indicator is large if there is an alarm enabled that requires acknowledgement. The indicator will be small if the alarms do not require acknowledgement. The user can switch to the alarm display to view the alarms.

The alarm display will show one or more alarms in priority order. An UP or DOWN arrow in the right-most character position indicates more alarms are active, but not visible on the display. The operator can press either the UP or the DOWN arrow key to scroll through the other enabled alarms.

The operator can edit or accept variable values by pressing the ENTER key. The TD device will write the updated variable value to the CPU and set the edit notification bit for that variable when the operator presses the ENTER key. The TD device then moves the cursor to the next editable variable. Pressing ENTER for the last editable variable of an alarm writes this last value to the S7-200 CPU and the TD device then resets the alarm enable bit. For more information on editing variables, see Editing a Variable that is Embedded in an Alarm or a Screen in Chapter 5.

Every alarm falls into one of four possible alarm acknowledgement and editing types. This section explains specifically how each alarm type is handled by the TD device. The four alarm types follow:

- No acknowledgement required, no edits allowed
- Acknowledgement required, no edits allowed
- No acknowledgement required, edits allowed
- Acknowledgement required, edits allowed

No Acknowledgement Required, No Edits Allowed
In this combination of no acknowledgement required and no edits allowed, the TD device simply displays the alarm. The ENTER key has no function since there are no editable variables within the alarm. The alarm may contain variables that are updated at the update rate of the TD device. This type of alarm is replaced on the display if a higher priority alarm is enabled by the S7-200 CPU. The operator can either press the UP or the DOWN arrow key to scroll to other alarms or press ESC to return to the menus.

The TD device does not clear the corresponding alarm-enable bit in the S7-200 CPU.

Acknowledgement Required, No Edits Allowed
In this combination of acknowledgement required and no edits allowed, the TD device displays the alarm and makes the entire alarm flash (blink) until the operator presses ENTER to acknowledge the alarm. Variable values are updated from the S7-200 CPU at the normal update rate while the alarm is flashing.

When the operator presses ENTER, the TD device:

- Sets the acknowledgement-notification bit for this alarm.
- Clears the alarm-enable bit for this alarm. This causes the alarm to be removed from the display on the next update cycle.

Another alarm cannot replace the one flashing until the operator acknowledges the flashing alarm. This is also true even if a higher priority alarm is enabled in the S7-200 CPU. If the TD device is configured for single line alarms and the CPU enables a higher priority alarm, the flashing alarm shifts down to the next line of the display. The operator cannot press the UP or the DOWN key to scroll through other enabled alarms until the current alarm is acknowledged.

No Acknowledgement Required, Edits Allowed
In this combination of no acknowledgement required and edits allowed, the TD device displays a alarm and then waits for the operator to edit a value in the alarm. All of the variables within the alarm are updated at the update rate. Since the alarm does not require acknowledgement, this type of alarm is removed from the TD device display if a higher priority alarm is enabled in the S7-200 CPU.

Acknowledgement Required, Edits Allowed
In this combination of acknowledgement required and edits allowed, the TD device displays the alarm, causes the entire alarm to flash (blink), and then waits until the operator acknowledges the alarm and edits or accepts the values in the alarm. This type of alarm requires that the operator edits or accepts the values displayed in the alarm. If the operator aborts the edit by pressing the ESC key before editing all the values in the alarm, the alarm flashes to indicate that edits are still required.

When the alarm is enabled in the S7-200 CPU, the TD device notes this and, if there is space available on the display, reads the alarm from the CPU. The TD device then displays the alarm and causes the entire alarm to flash to notify the operator that the alarm is present and must be acknowledged.

Setting the Default Display Mode and Alarm Parameters

The TD device supports alarms that are displayed under program control. After you have configured the TD device, you can configure the alarms. When you configure the alarms, you also select either screens (default) or alarms as the default display mode for the TD device.

Click the Alarms icon to start creating alarms. As shown in the figure below, you select the following information:

- Default display mode: Select either alarms or screens as the default display mode. This selects which type of messages the TD device displays after powering up or after a prolonged period of no key presses by the user.
- Size of the alarms: Select 1 line or 2 lines (TD 100C, TD200 and TD400C), or 4 lines (TD400C only).

For Chinese characters, select either one row or two rows of text.

Figure 4-25 Configuring the TD 200C Alarm Options

Figure 4-26 Configuring the TD400C Alarm Options

Tip

The TD 200, TD 200C, and the TD400C support up to 80 alarms, and the TD 100C supports up to 40 alarms. The priority for the alarms is determined sequentially, from the first alarm (highest priority) to the last (lowest priority).

Entering the Text for an Alarm

Clicking Next displays the Alarms dialog shown in the figure below. You can select a symbolic name for the alarm. The user program uses the symbolic name to enable (and display) the alarm. Click the New Alarm button to create the alarm message. Your alarm message can contain the following elements:

- Text: Enter your text in the green area that represents the text display area of the TD device
- Icons (optional, TD 200C and TD400C): Click the icons in the toolbar to insert the icon into the text message
- Variable data (optional): Click the Insert PLC Data button to embed a variable into the text message
- Fonts: For the TD400C you select the font to use for the alarm message

To ensure that important alarms are acknowledged by an operator, you can configure the alarm to require acknowledgement.

You select the symbolic name for the acknowledgement bit for the alarm. The user program uses this symbolic name to report that the alarm has been acknowledged.

To acknowledge an alarm with the TD device, the operator selects the alarm and presses ENTER.

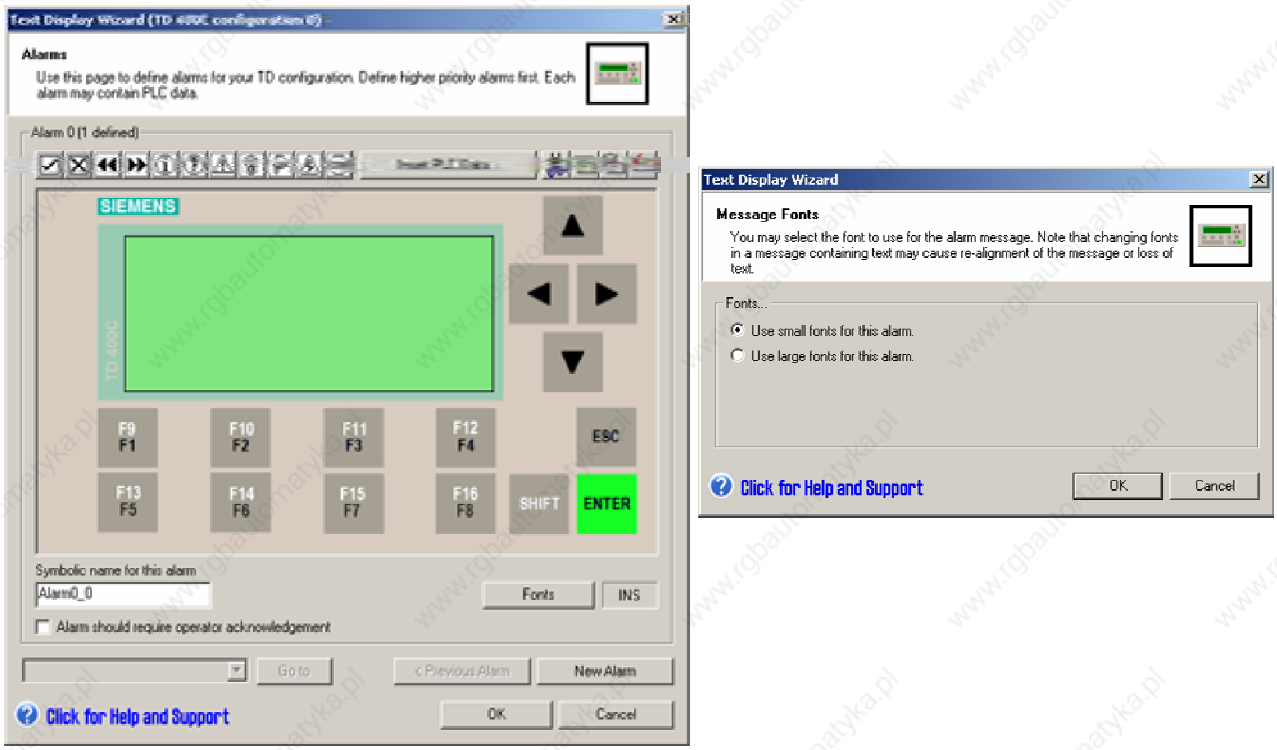

Figure 4-27 Creating the Text for an Alarm

Embedding a Variable into the Text of an Alarm

You can embed a variable data field into the text of the alarm. To embed a variable, move the cursor to the location for the variable in your text and click the Insert PLC Data button. As shown in the figure below you enter the following information:

Tip
For the TD 200, TD 200C, and the TD400C, you can embed up to 6 variables per alarm. For the TD 100C, you can embed up to 1 variable per line (1 for one-line alarms, and 2 for two-line alarms).

- Data address:
  - VB: Numeric String, Text String
  - VW: Signed, Unsigned
  - VD: Real, Signed, Unsigned
- Data Format: Signed, Unsigned, Real, Numeric String, or Text String
- Digits to the right of the decimal: Up to 7
  - The TD device rounds a real number to the specified decimal place. For example, if the real number value is 123.456 and you select 2 digits to the right of the decimal, the TD 200 displays this value as: 123.46.

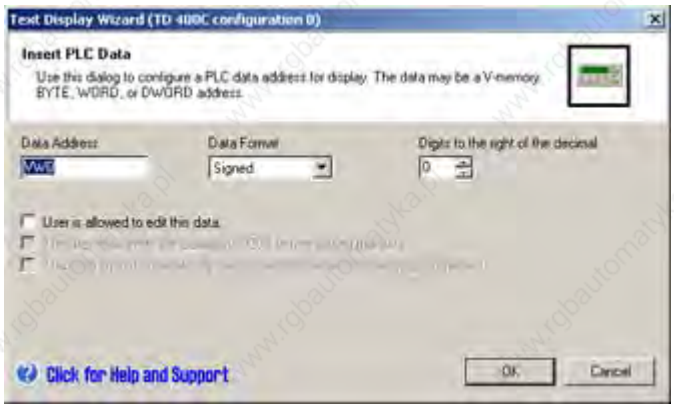

Figure 4-28 Inserting a Variable into the Text of an Alarm

Tip

Refer to the SIMATIC S7-200 Programmable Controller System Manual for information about data types or for the memory addresses supported by the S7-200 CPU.

You can also allow the operator to modify the data stored at this memory location in the S7-200 CPU.

- You can require the operator enter the TD password before editing the variable. (You must have enabled password-protection for the TD device.)
- You can configure the cursor to jump to the variable field.
- You can define a symbolic name for the variable. You use the symbolic name to access this data with your user program.

Clicking OK inserts the variable into the text of the alarm. The Text Display wizard inserts a block of 4 characters to show the presence of the variable. The value to be displayed for the variable is right-justified at that location (anchored to the right-most character).

Data values are always right-justified to the right-most character of an embedded variable. As a data value grows in magnitude, it utilizes more spaces to the left of the anchor point and can overwrite the text characters. Always provide sufficient space between the end of your text and the anchor point to allow for the expected range of the data value.

Tip
The actual number of characters used to display a value varies with the size of the value. To help calculate the number of characters required for displaying the value of the variable, see the examples listed in Table 4-2.

The TD device displays all values as decimal numbers. Positive signed values are displayed without a sign, and negative signed values are displayed with a leading minus sign. Unsigned values are displayed without a sign. A leading zero is used for all fractional numbers (for example, 0.5). Real numbers are displayed with the number of decimal places you specify. The value is rounded to the specified decimal place.

For more information about embedding string variables in an alarm, see page 53.

Table 4-2 Calculating the Number of Characters Required to Display a Value

Size	Type	Resolution (Digits to right of decimal)	Maximum Number of Characters	Example
Byte (VB)	String	Not applicable	Line length [1]	Hello, world
	Numeric String	Not applicable	Line length [1]	800.333.7421
Word (VW)	Unsigned	0 1 to 4 5 6 7	5 6 7 8 9	12345 1234.5, 1.2345 0.12345 0.012345 0.0012345
	Signed	0 1 to 4 5 6 7	6 7 8 9 10	-12345 -1234.5, -1.2345 -0.12345 -0.012345 -0.0012345
Double-Word (VD)	Unsigned	0 1 to 7	10 11	1234567890 123456789.1, 123.4567891
	Signed	0 1 to 7	11 12	-1234567890 -123456789.1, -123.4567891
	Real	0 1 to 7	Line length[1] Line length[1]	-1234567 12345.6, 0.0123456

[1] The length of a line (number of characters in a line) varies by TD model and character size. The line length is always 20 for a TD 200 or TD 200C. The line length is either 12 or 16 characters for a TD 100C. The line length for the TD400C depends on the font you selected. If you selected a small font, you have 24 ASCII characters or 12 Chinese characters per line. If you selected a large font, you have 16 ASCII characters or 8 Chinese characters per line.

4.6 Configuring the Language Sets (TD 200, TD 200C, and TD400C)

Configuring the Language Sets for the TD Device (TD 200, TD 200C, TD400C)

The Text Display wizard allows you to configure multiple language sets for your TD device, including not only the system prompts or messages, but also for the user alarms, user menus, and screens. The Text Display wizard copies the user alarms and user screens that you have configured into the language set. You must manually enter the translated text for each alarm, menu, or screen.

For each language set, you select the following information:

- Language for the system prompts
- Character set
- Identifier

You also select which of the language sets is the primary language for the TD device.

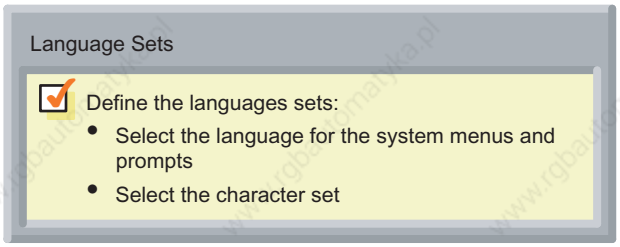

Figure 4-29 Configuring the Languages for the TD Device

Tip
When you create multiple language sets, the Text Display wizard copies the user alarms, menus, and screens from the primary language set to the other language set. You then edit the alarms, menus, and screens to translate the text displayed for the new language set.

If you need to modify the screens or messages (such as to add a new variable or to add a new alarm), you must edit the primary language. The Text Display wizard copies these changes to the other language sets.

The Text Display wizard only allows you to change the text in the other language sets.

After you have configured the alarms and screens for one language set, you can add a new language set:

1. Click the icon to start configuring the language sets for the TD device.
2. Add a new language by selecting New Language Set.
3. Select an existing language set to be the source for the new language set.
4. (Optional) Select the option for primary language to configure the new language as the default language set for the TD device.
5. Click the Next button to display the Localize Display dialog.

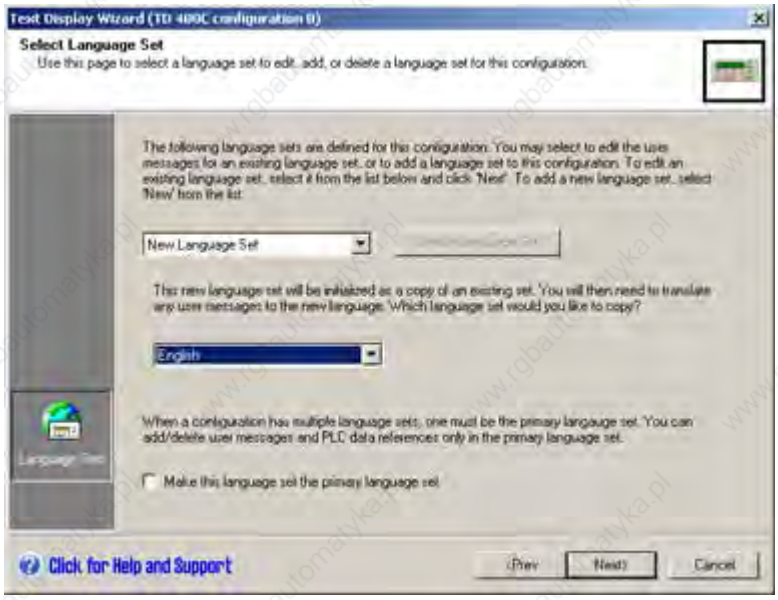

Figure 4-30 Adding a Language

The Localize dialog configures the menus and character set for the TD device

1. Select the language for the system menus and prompts of the TD device.
2. Select the character set for the text.
3. Enter the name to be displayed on the TD device for this language set.

After you click the Next button, the Text Display wizard copies all of the user alarms, menus, and screens from the selected language set to the new language set.

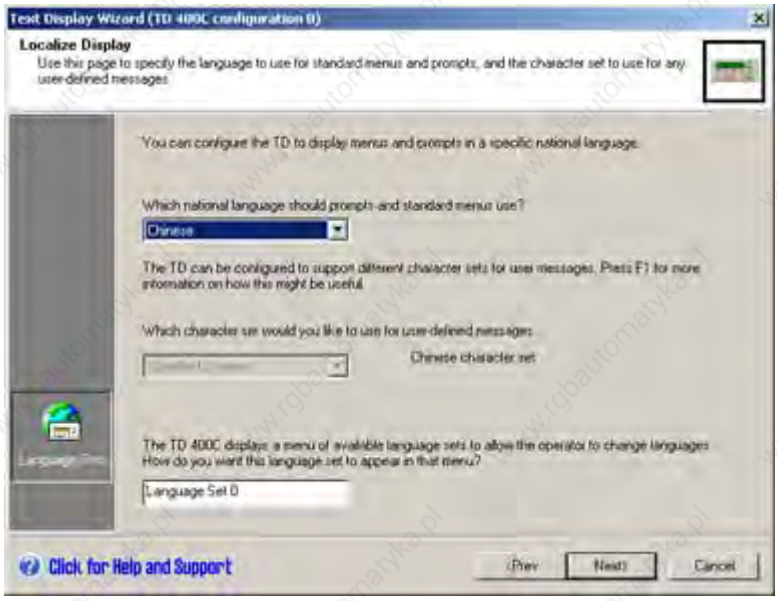

Figure 4-31 Localizing the Display

Notes for Using the Simplified Chinese Character Set

Tip

The Simplified Chinese character set requires a Chinese version of Windows or a Chinese emulator to properly display Chinese characters in the Text Display wizard. You must start the Chinese emulator before you start the STEP 7-Micro/WIN software.

On the TD 200C, and the TD 200, you can display up to 20 single-byte characters per line of your message. Because Simplified Chinese uses double-byte characters, you can display up to 10 double-byte characters per line for a message in Chinese.

On the TD 100C, you can display up to 16 single-byte characters per line of your message. Because Simplified Chinese uses double-byte characters, you can display up to 8 double-byte characters per line for a message in Chinese.

On the TD400C using a small font, you can display up to 24 single-byte characters per line of your message. Because Simplified Chinese uses double-byte characters, you can display up to 12 double-byte characters per line for a message in Chinese. If you selected a large font, you can display up to 16 single-byte characters or 12 Chinese characters per line.

The standard ASCII characters, such as numbers, punctuation, and upper and lowercase alphabet characters, are available when using the Simplified Chinese character set. Depending on your keyboard and/ or emulator, some of these standard characters may be formatted as single-byte characters instead of the double-byte characters like the Simplified Chinese characters. Standard ASCII characters and Chinese characters can be mixed on the TD display.

The Text Display wizard displays 8, 10 or 12 double-byte character places for the text of a screen or alarm. You can fit any of the following combinations into a character position:

- 1 double-byte character
- 2 single-byte characters (standard ASCII)
- 1 single-byte character and 1 single-byte blank

You cannot fit one single-byte character plus one double-byte character in a character position.

The TD 100C does not support the entire Simplified Chinese character set, but does support the most commonly used characters. Characters that are not supported by the TD 100C are displayed as a square.

See the Simplified Chinese Characters Set on the STEP 7-Micro/WIN documentation CD for a list of characters supported by the TD 100C.

4.7 Assigning the V Memory Address for the Parameter Block

Assigning the V Memory Address for the Parameter Block

The Text Display wizard creates the parameter block that you download to the S7-200 CPU with your user program. The parameter block includes the configuration data for the TD device and any screens and alarms that you created.

The Text Display wizard calculates the amount of memory required for the parameter block and suggests a starting address in V memory.

The default location for the parameter block is VB0.

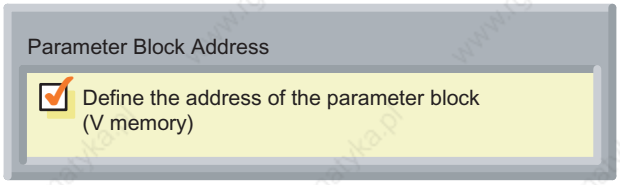

Figure 4-32 Assigning the Address of the Parameter Block

4.8 Finishing the Configuration for the TD Device

Finishing the Configuration for the TD Device

After you complete the configuration for your TD device, the Text Display wizard displays a summary dialog. (See the figure below.)

If you enter a name for the TD configuration, STEP 7-Micro/WIN creates an entry in the project tree for the TD configuration.

STEP 7-Micro/WIN also creates the following subroutines:

- TD_CTRL_x (where x is the TD configuration number)
  - This subroutine ensures that all updates for the TD device (such as alarms or changing the language setting) occur immediately.
  - Your user program should use SM0.0 to call this subroutine every scan
- TD_ALM_x (where x is the TD configuration number)
  - Your user program uses this subroutine to call the alarm by the symbolic name (configured by the Text Display wizard). This subroutine requires the S7-200 Symbol Table.

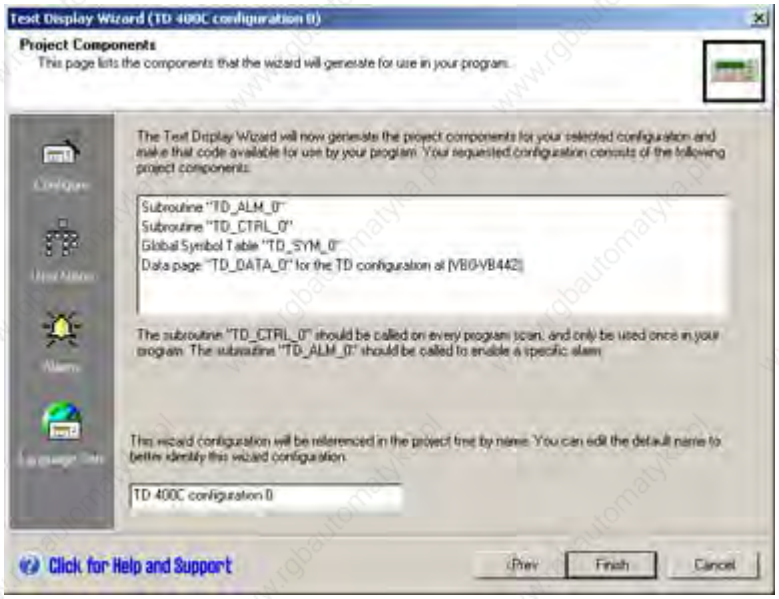

Figure 4-33 Summary Dialog

Operating Your Text Display (TD) Device 5

5.1 Overview

Operating Your TD Device

Included in this chapter is information about routine operator tasks, such as entering and releasing the password, editing variables embedded in a message or screen, and checking the status information of the S7-200 CPU. This chapter also describes the less-routine diagnostic functions provided by the TD device for troubleshooting problems in the S7-200 CPU, such as forcing I/O or changing the operating mode

5.2 Using the Text Display Device to Access Screens and Alarms

Using the TD Device to Access Screens and Alarms

The TD devices allow you to structure information as either screens or bit-enabled alarm messages. You use the buttons of the keypad of the TD device to navigate through the screens and menus:

- TD 200: Uses the standard TD keypad.
- TD 100C, TD 200C, and TD400C: Allow you to change the configuration and use your own custom-designed keypad. (If there is no custom configuration, the TD 100C,TD 200C and TD400C defaults to the standard TD keypad configuration.)

Tip
For more information about configuring the functionality of the buttons on the keypad:

- Chapter 4 provides information about configuring the buttons for the TD devices. The TD configuration is downloaded to the S7-200 CPU with your user program.
- Chapter 3 provides information about creating a custom keypad layout for the TD device, and assigning specific functionality for each button. (You then integrate the custom keypad with the screens and alarm messages as described in Chapter 4.)

As shown in Figure 5-1 and Figure 5-2, the standard TD keypad provides the following buttons:

- ENTER and Escape (ESC) buttons:
  - ENTER selects a menu item or confirms a value.
  - ESC exits from a menu or cancels a selection.
- Configurable buttons:
  - Function keys perform the task that you configured with the Text Display wizard. The TD 200, TD 200C, and TD400C uses F1 to F4, and the TD 100C uses F1 and F2.
  - SHIFT on the TD 200, TD 200C and TD400C allows the function keys (F5 to F8) to perform the task that you configured with the Text Display wizard.

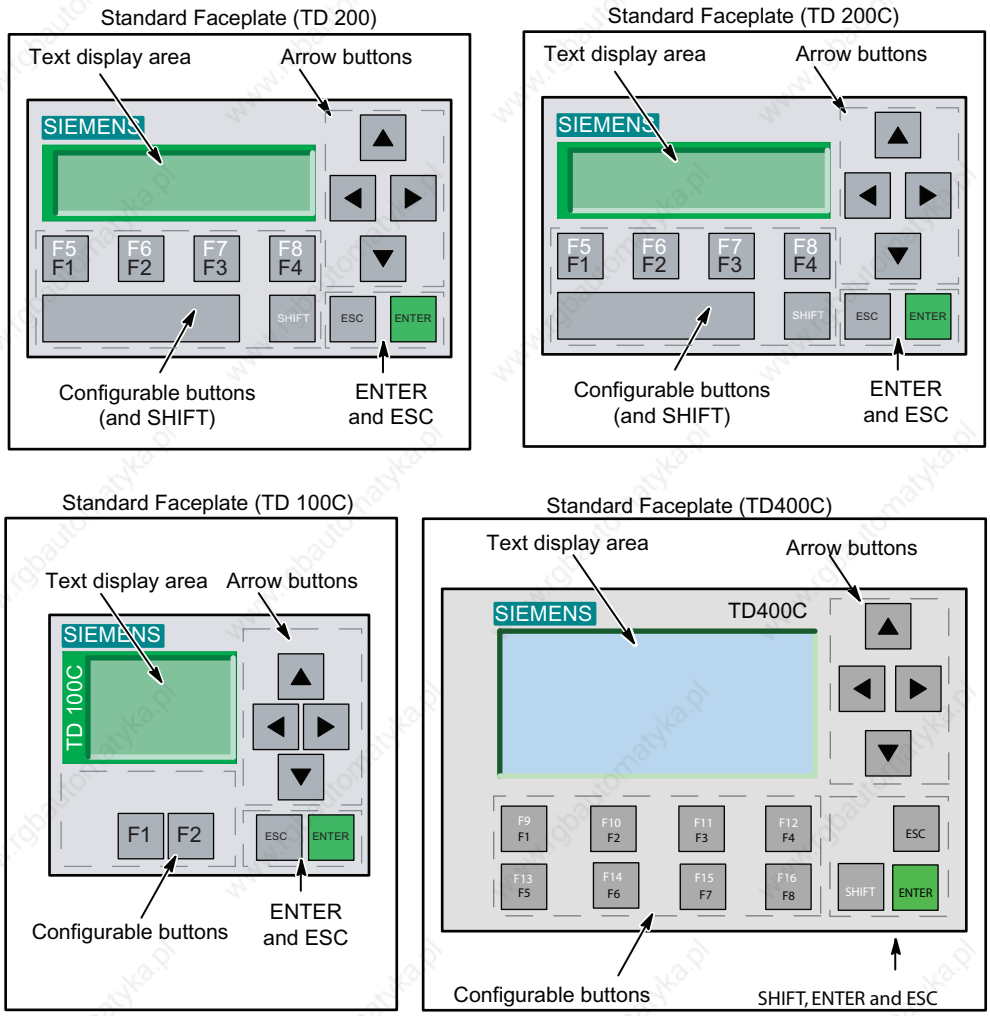

Figure 5-1 Standard TD Keyboards

- Arrow buttons:
  - UP arrow scrolls (upwards) through menu items or increments a value that can be edited.
  - DOWN arrow scrolls (downwards) through menu items or decrements a value that can be edited.
  - LEFT and RIGHT arrows move the cursor left or right within the message (TD 100C, TD 200C, and TD400C only). For a TD 200, use SHIFT+DOWN to move right and SHIFT+UP to move left. You can also use ENTER to move to the next variable message.

To select a menu item, use the UP and DOWN arrows to scroll through the list of available items. The TD device highlights the menu item.

- Pressing ENTER selects the highlighted item.
- Pressing ESC returns to the previous menu or screen.

Display Backlight on the TD400C

The TD400C allows you to set the amount of time that the display backlight is on. This allows you to extend the life of theTD400C by turning off the backlight when the display is not needed.

You can configure the TD400C display backlight on time:

- From 1 to 59 minutes in 1 minute increments
- Always on
- 1, 2, 4, or 8 hours
- Default on time (10 minutes)

The backlight will turn on when:

- The TD400C is powered on
- The S7-200 CPU forces a reset of the TD400C with the TD_Reset bit in the TD parameter block.
- You press a key. The time is extended each time a key is pressed.
- A new alarm is read from the S7-200 CPU

When the display backlight is turned on, the backlight is on for the time that you configured in the TD Setup menu.

If the backlight is currently off and you press a key, the first keypress will turn on the backlight, but will not execute the key function. You must press the key a second time to execute the key function. There will be no audio or visual feedback for the first keypress that turns on the backlight. This lets you know that the key did not execute the key function and you must press the key again.

If your TD400C has an alarm that requires acknowledgement (an alarm that flashes or blinks), and that alarm is enabled, the display backlight will be on until you acknowledge the alarm.

Displaying Information on the TD Device

The TD device provides both screens (user-defined menus with associated screens of information) and bit-enabled alarm messages:

- Menu: A menu is a list of items that select a grouping of related screens. The TD 200, TD 200C and the TD400C have 8 menus available; the TD 100C has 4 menus available
- Screen or alarm:
  - A screen or alarm for the TD 200 and TD 200C displays up to two lines of text that provide information for the operator. Each line can be up to 20 characters of text and data. A screen contains up to 40 characters of text and data. An alarm can be either 1 or 2 lines.
  - A screen or alarm for the TD400C displays up to four lines of text that provide information for the operator. Each line can be up to 24 characters of text and data. A screen contains up to 96 characters of text and data. An alarm can be either 1, 2, or 4 lines.
  - A screen or alarm for the TD 100C displays up to four lines of text that provide information for the operator. (Each line can contain either 12 or 16 characters of text and data. A screen contains 48 or 64 characters of text and data. An alarm can be either 1 or 2 lines.)

    The textual message of the screen or alarm can convey information for the operator and can also allow the operator to interact with the S7-200 CPU by changing the embedded value of a variable (such as a set point or limit).

You can configure the TD device to display screens (which are initiated by operator action) and bit-enabled alarms (which are generated by the S7-200 CPU). You can also configure the TD 200 and TD 200C, and TD400C device to display an icon to alert the operator of some event or action required. (Refer to Chapter 4 for information about configuring the TD device.)

Tip
Pressing ESC returns you to the previous menu. If there is no activity for 20 seconds (no button pressed), the TD device returns to the default display mode.

The operator uses the buttons on the keypad to navigate through the menu or a list of text. Figure 5-2 shows the buttons that an operator could use to navigate from a user menu to the screens associated with that item in the menu. Figure 5-3 shows how to navigate through the alarms. The TD 200, TD 200C, and the TD400C have eight menus available, and the TD 100C has four menus available.

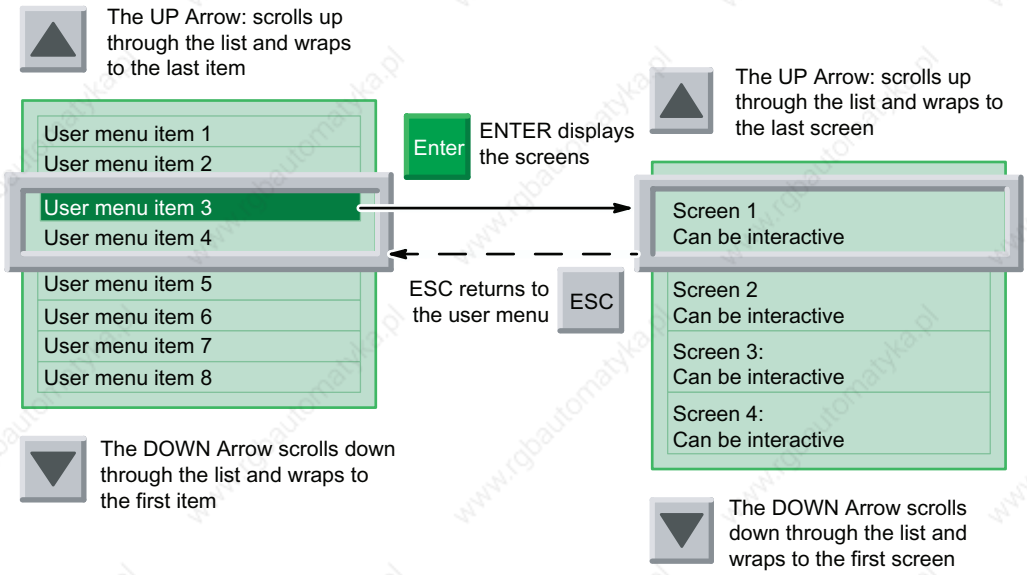

Figure 5-2 Using the Keypad to Navigate between User Menus and Screens

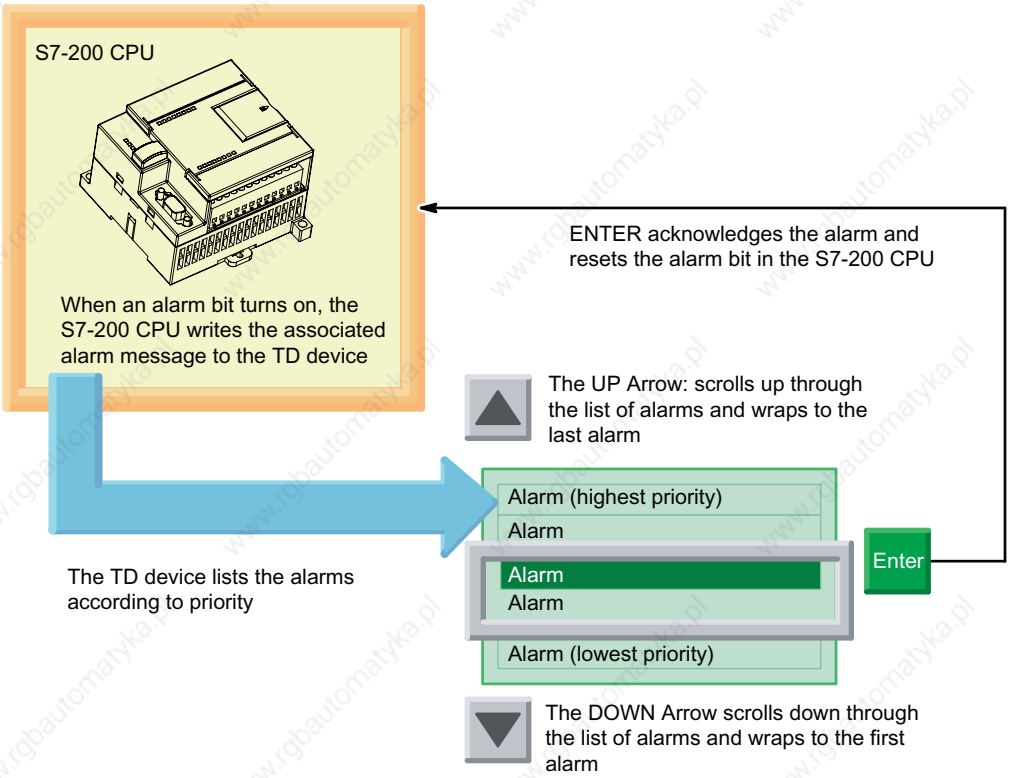

Figure 5-3 Displaying and Acknowledging Alarms

Using the TD Device to Edit Variables in the S7-200 CPU

A screen or alarm message can contain an embedded variable field that allows an operator to respond by changing the value of the variable. The operator uses the keypad to edit variables:

- Selecting the Screen: The operator uses the UP or DOWN arrows to display the screen that contains the variable to be edited. (From a menu, the operator presses ENTER to access the group of screens.)
- Navigating to the variable: The operator presses ENTER to navigate to the first editable variable.
- Changing the value of the variable: Pressing the UP arrow increments (increases) the value, and pressing the DOWN arrow decrements (decreases) the value. (Pressing and holding the UP or DOWN arrow accelerates the operation.) Pressing both SHIFT+ENTER resets the variable to 0. Pressing ESC aborts the edit.
- Press LEFT or RIGHT to move the cursor position within the variable. The TD 200 uses SHIFT+UP to move left and SHIFT+DOWN to move right.
- Updating the data in the S7-200 CPU: Pressing ENTER writes the updated value for the variable to the S7-200 CPU and moves the cursor to the next editable variable on the screen.

For more information about editing variables, see the section Editing a Variable that is Embedded in an Alarm or a Screen in this chapter.

5.3 Accessing the Menus and Screens

Accessing the Menus and Screens

When you configured the TD device (as described in Chapter 4), you created the screens and alarms for the TD device. If you configured both alarms and screens, you also designated which type of message (screens or the alarms) would be the default display mode for the TD device. After power-up or after a period of inactivity, the TD device returns to the default display mode.

In addition to the screens and alarms that you configured, the TD device provides standard functions that the operator can access from system-level and pre-defined menus. From the default display mode, the operator uses ESC to access the menu hierarchy. The operator then presses ENTER to select the menu item for accessing the other menus or functions. Figure 5-5 and Figure 5-6 show the hierarchy of menus for these functions for the TD devices. (The menus show all of the functions that are available on the TD device. For some of the functions to be listed on the menu, you must have enabled the function during configuration. See Chapter 4.)

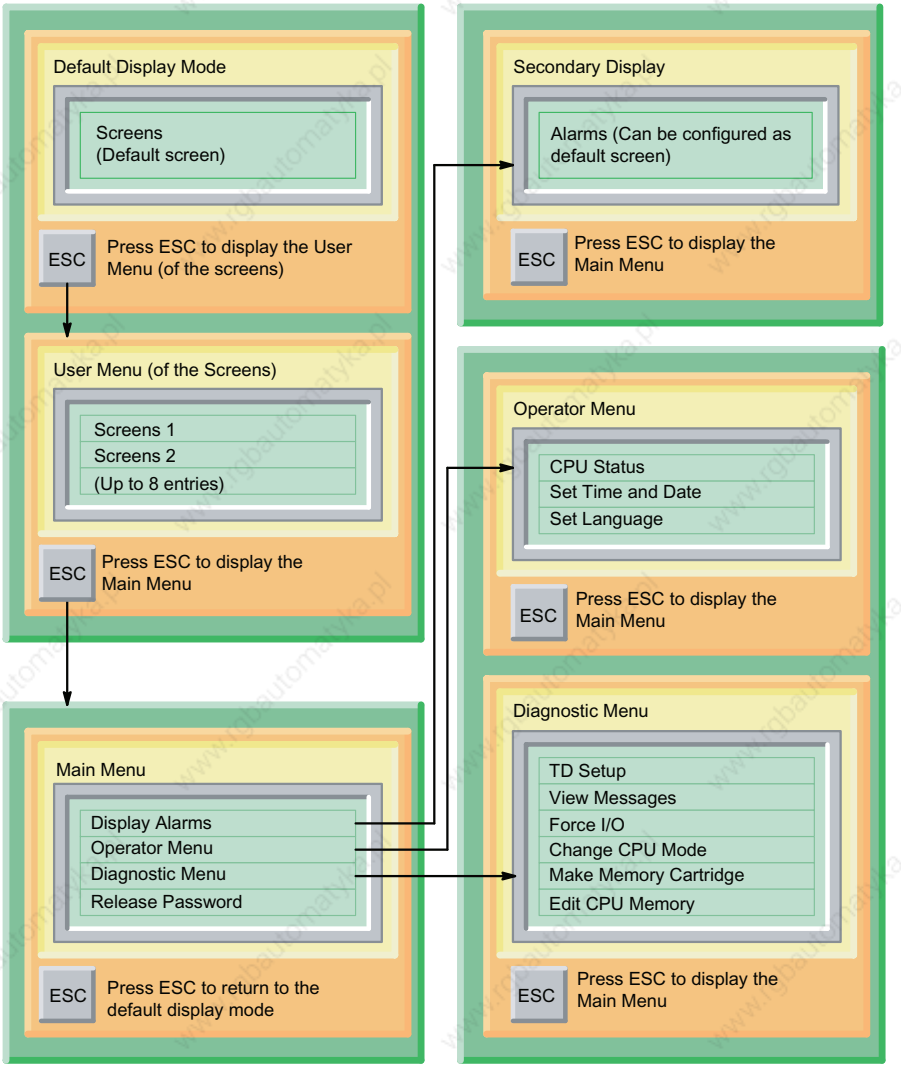

Figure 5-4 Menu Hierarchy for the TD 200, TD 200C, and TD400C

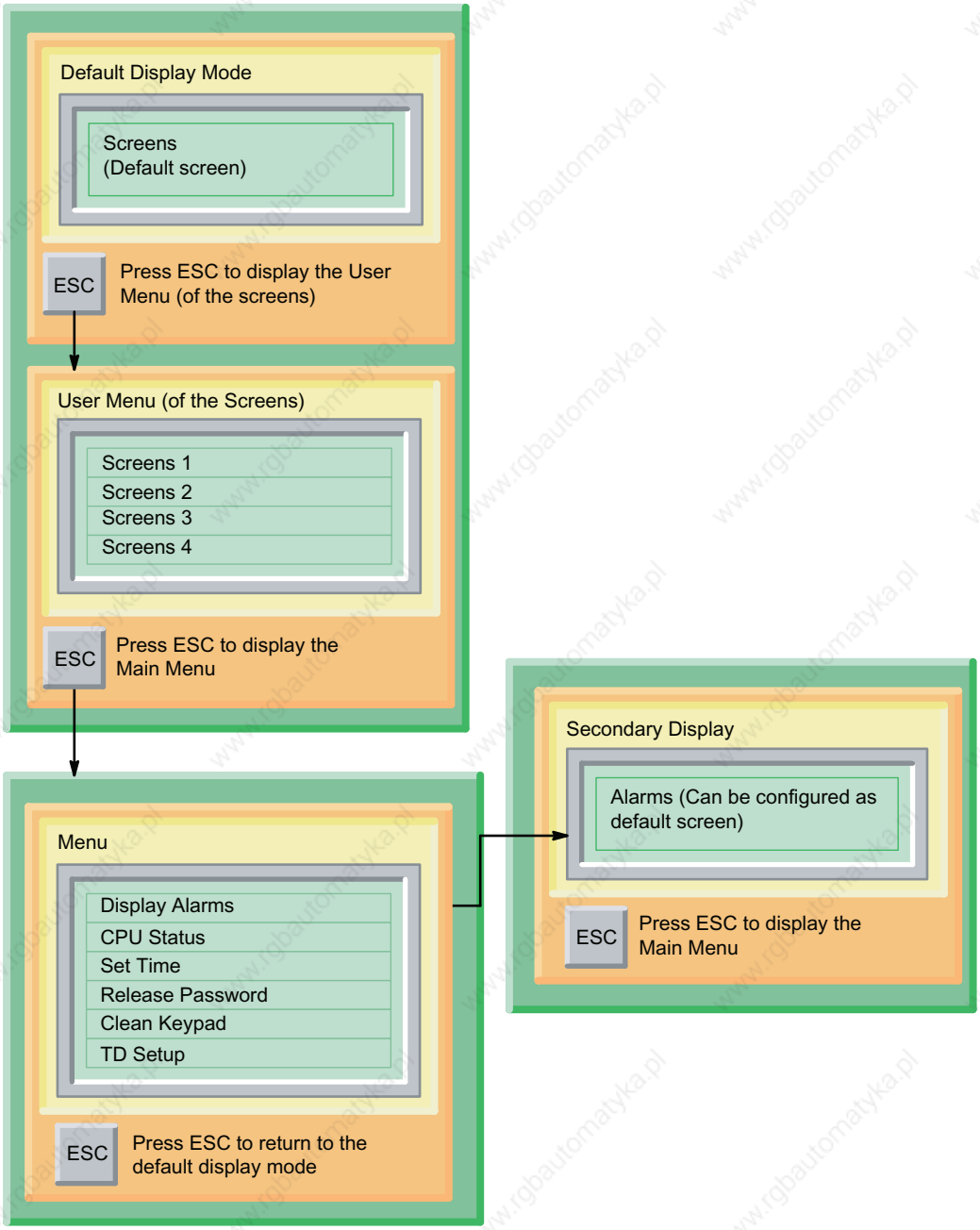

Figure 5-5 Menu Hierarchy for the TD 100C

5.4 Entering and Releasing a Password

Entering and Releasing a Password

You use the Text Display wizard of STEP 7-Micro/WIN to configure the password for the TD device. Refer to Chapter 4 for information about configuring the TD device. To ensure that an unauthorized user does not have access to the TD device during an interval for the automatic time-out, you can use the Release Password feature.

Certain operations (such as forcing I/O or making a memory cartridge) may also require that the operator enter the 8-character CPU password for the S7-200 CPU. (You must have enabled the S7-200 CPU for password-protection in order for the TD device to prompt the operator for the CPU password.)

Entering the Password

If configured for a password, the TD device prompts the operator to enter the 4-digit password before allowing the operator to access screens or menus. If the password uses fewer than 4 digits, the operator must press ENTER for the unused (remaining) characters.

Use the UP or DOWN arrow to select each digit of the password, pressing ENTER to move to the next digit. You can also use the RIGHT and LEFT arrows to move within the password.

The TD device provides a time-out feature which automatically restores password protection after a period of inactivity. If no buttons have been pressed after 2 minutes, the TD device then requires a password again before allowing an operator to access menus or to edit variables.

Releasing the Password

In order to provide additional security for your application, the TD device provides a Release Password command that immediately restores the password-protection. The TD device then requires that the operator enter the password before allowing access. The Release Password command prohibits another person from using the TD device without first entering a password (for example, before a password entered by an operator times out).

You access the Release Password command from the main menu, as shown in figure below.

The Release Password is not applicable for the CPU password: The TD device releases the CPU password as soon as the operator exits the function that required the password.

For example: If the operator entered the CPU password in order to force an I/O point in the S7-200 CPU, the TD device releases the CPU password as soon as the operator exits the Force menu.

The Release Password command is available only if you defined a 4-digit password when you configured the TD device.

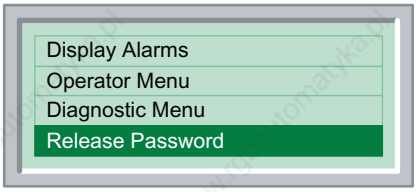

Figure 5-6 Release Password Command

5.5 Viewing the Screens and the Alarms

Viewing the Screens and the Alarms

As described in Chapter 4, you can configure screens and alarms for the TD device. If you configure both alarms and screens, you also designate which set of messages (screens or alarms) are the default display mode for the TD device. The default configuration selects the screens to be the default display.

After power-up or after a period of inactivity (one minute), the TD device returns to the default display mode. As shown in the figures below, the operator can switch between the default display mode and the secondary display mode.

Tip
For the TD 100C, TD 200C, and the TD400C: If you do not configure buttons for ESC or ENTER, you cannot access the main menu.

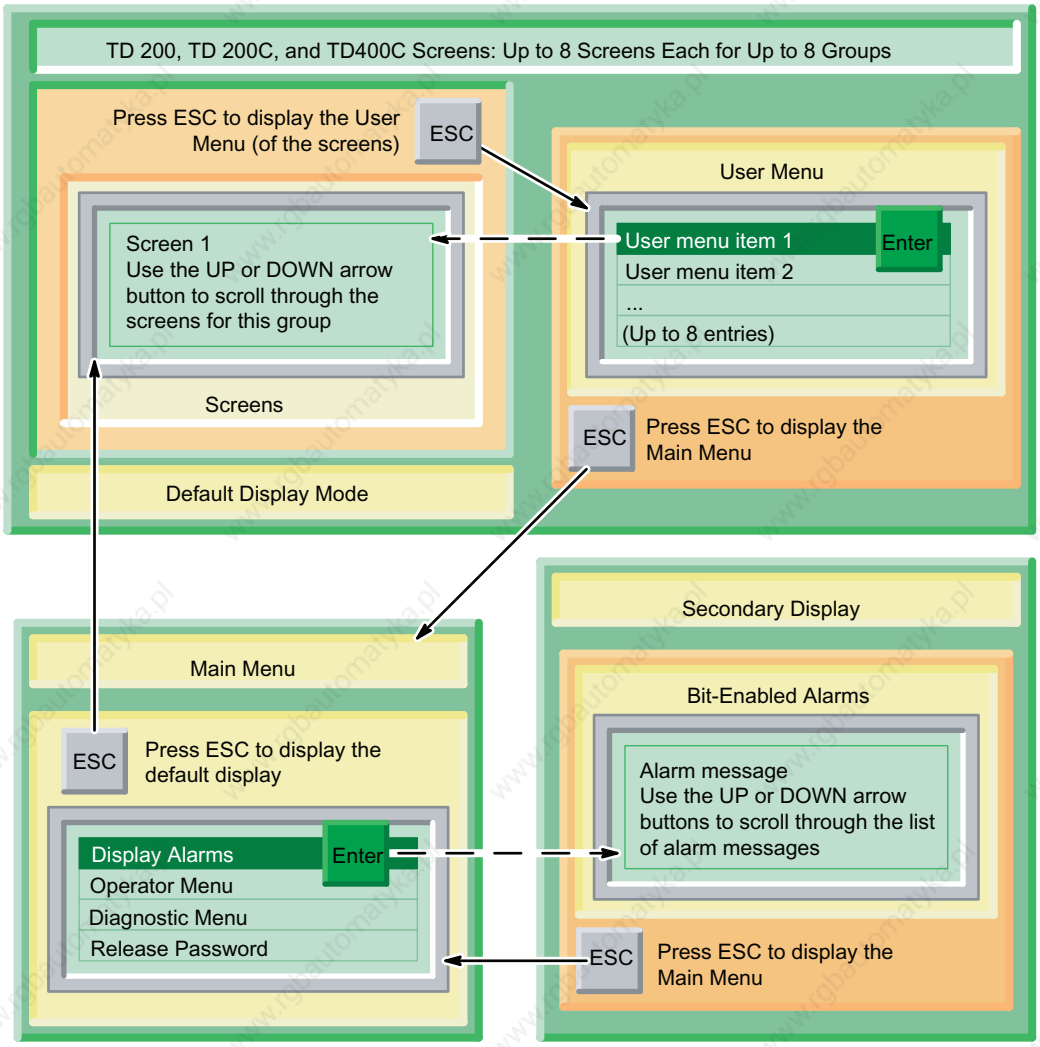

Figure 5-7 TD 200, TD 200C, and TD400C - Navigating between the Default and Secondary Displays

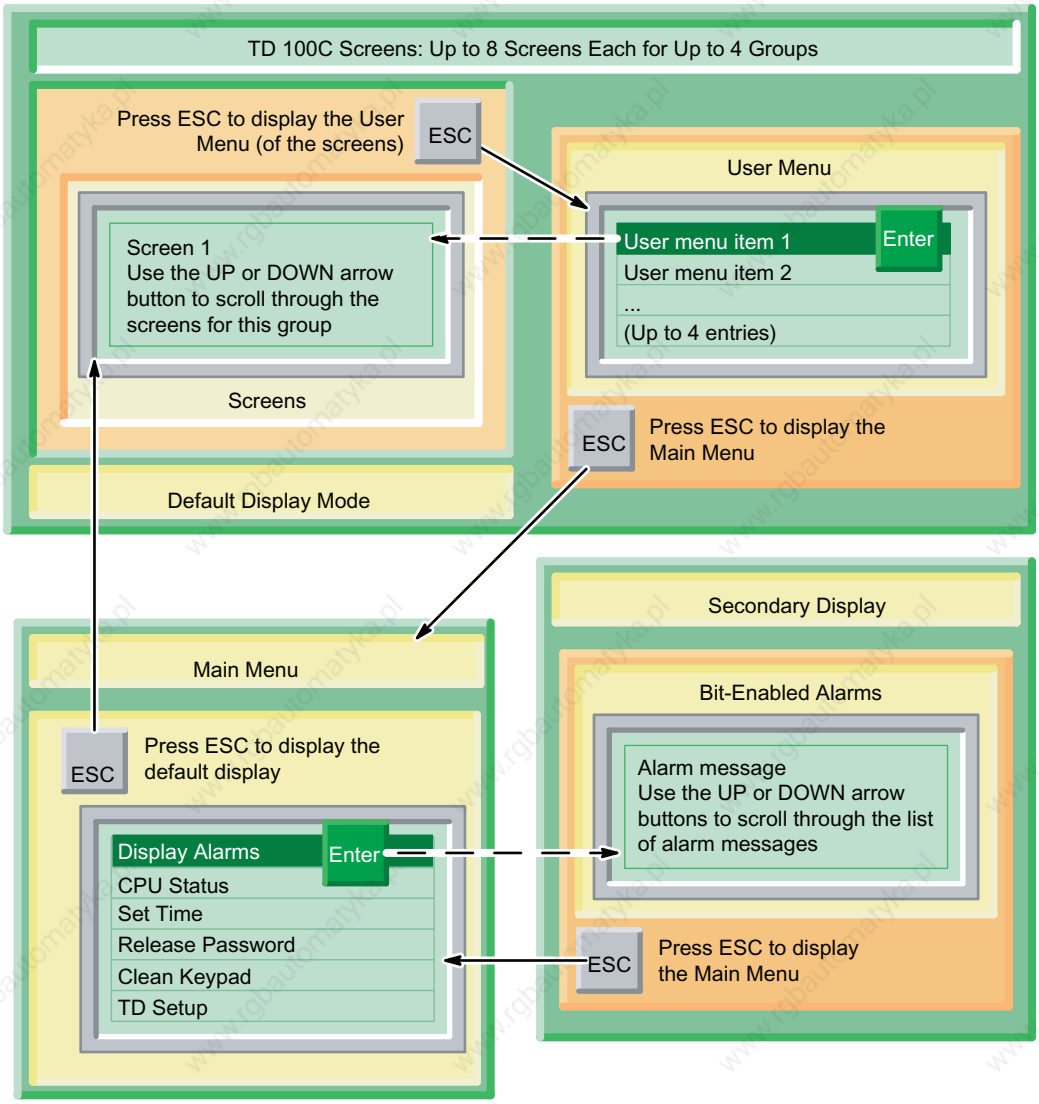

Figure 5-8 TD 100C - Navigating between the Default and Secondary Displays

Displaying the Alarms

If you created both screens and alarms when you configured the TD device, the main menu of the TD device includes a command that allows you to access the secondary (non-default) display. The TD device always returns to the default display mode after a period of inactivity.

As shown in the TD 200C example in the figure below, the main menu provides a Display Alarms command for the default TD configuration. If you configured alarms as the default display, the main menu lists a User Menu entry.

After displaying the alarms, you use the UP and DOWN arrows to scroll through the sequential list of alarms.

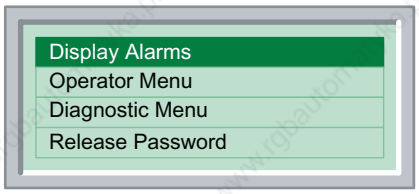

Figure 5-9 Displaying the Alarms

Tip
The TD 100C, TD 200C, and the TD400C allow you to configure a button specifically for displaying alarms when you are creating your custom keypad.

The TD device displays the highest priority alarm. The TD device displays an up or down arrow with the alarm to alert the operator that other alarms have been enabled. (The up arrow shows that higher-priority alarms have been enabled, and the down arrow shows that lower-priority alarms have been enabled.)

After reading a new alarm from the S7-200 CPU, the TD device sorts the alarms again to display the highest priority alarms at the top of the list. The TD device determines the priority based on the sequence of the alarms in the parameter block:

- The first alarm that you created has the highest priority.
- The second alarm that you created has the second-highest priority.
- The last alarm that you created has the lowest priority.

Tip
You can scroll up and down through the list of enabled alarms. However, the TD device returns to the highest-priority alarm after a period of inactivity: If you have not pressed a button for 10 seconds while the TD device has displayed the current alarm, then the TD device automatically returns to the highest-priority alarm.

Acknowledging an Alarm

If an alarm requires acknowledgement, the TD device does not remove that alarm until you acknowledge the alarm:

1. Use the UP or DOWN arrow to select the alarm.
2. Press ENTER to acknowledge the alarm.

Types of Alarms

The Text Display wizard allows you to determine the type interaction required by the operator for an alarm. If the user screens are set as the default display mode for the TD device and an alarm is enabled, an alarm indicator will begin to flash on the TD display. The indicator is large if there is an alarm enabled that requires acknowledgement. The indicator will be small if the alarms do not require acknowledgement. The user can switch to the alarm display to view the alarms.

The alarm display will show one or more alarms in priority order. An UP or DOWN arrow in the right-most character position indicates more alarms are active, but not visible on the display. The operator can press either the UP or the DOWN arrow key to scroll through the other enabled alarms.

The operator can edit or accept variable values by pressing the ENTER key. The TD device will write the updated variable value to the CPU and set the edit notification bit for that variable when the operator presses the ENTER key. The TD device then moves the cursor to the next editable variable. Pressing ENTER for the last editable variable of an alarm writes this last value to the S7-200 CPU and the TD device then resets the alarm enable bit. For more information on editing variables, see Editing a Variable that is Embedded in an Alarm or a Screen in Chapter 5.

Every alarm falls into one of four possible alarm acknowledgement and editing types. This section explains specifically how each alarm type is handled by the TD device. The four alarm types follow:

- No acknowledgement required. No edits allowed
- Acknowledgement required. No edits allowed
- No acknowledgement required. Edits allowed
- Acknowledgement required. Edits allowed

No Acknowledgement Required, No Edits Allowed

In this combination of no acknowledgement required and no edits allowed, the TD device simply displays the alarm. The ENTER key has no function since there are no editable variables within the alarm. The alarm may contain variables that are updated at the update rate of the TD device. This type of alarm is replaced on the display if a higher priority alarm is enabled by the S7-200 CPU. The operator can either press the UP or the DOWN arrow key to scroll to other alarms or press ESC to return to the menus.

The TD device does not clear the corresponding alarm-enable bit in the S7-200 CPU.

Acknowledgement Required, No Edits Allowed

In this combination of acknowledgement required and no edits allowed, the TD device displays the alarm and makes the entire alarm flash (blink) until the operator presses ENTER to acknowledge the alarm. Variable values are updated from the S7-200 CPU at the normal update rate while the alarm is flashing.

When the operator presses ENTER, the TD device:

- Sets the acknowledgement-notification bit for this alarm.
- Clears the alarm-enable bit for this alarm. This causes the alarm to be removed from the display on the next update cycle.

Another alarm cannot replace the one flashing until the operator acknowledges the flashing alarm. This is also true even if a higher priority alarm is enabled in the S7-200 CPU. If the TD device is configured for single line alarms and the CPU enables a higher priority alarm, the flashing alarm shifts down to the next line of the display. The operator cannot press the UP or the DOWN key to scroll through other enabled alarms until the current alarm is acknowledged.

No Acknowledgement Required, Edits Allowed

In this combination of no acknowledgement required and edits allowed, the TD device displays a alarm and then waits for the operator to edit a value in the alarm. All of the variables within the alarm are updated at the update rate. Since the alarm does not require acknowledgement, this type of alarm is removed from the TD device display if a higher priority alarm is enabled in the S7-200 CPU.

Acknowledgement Required, Edits Allowed

In this combination of acknowledgement required and edits allowed, the TD device displays the alarm, causes the entire alarm to flash (blink), and then waits until the operator acknowledges the alarm and edits or accepts the values in the alarm. This type of alarm requires that the operator edits or accepts the values displayed in the alarm. If the operator aborts the edit by pressing the ESC key before editing all the values in the alarm, the alarm flashes to indicate that edits are still required.

When the alarm is enabled in the S7-200 CPU, the TD device notes this and, if there is space available on the display, reads the alarm from the CPU. The TD device then displays the alarm and causes the entire alarm to flash to notify the operator that the alarm is present and must be acknowledged.

Clearing an Alarm

- If an alarm required acknowledgement, the TD device will clear the alarm enable at the same time that the Alarm Acknowledgement bit is set in the CPU.
- If an alarm contains editable variables, the TD device will clear the alarm enable bit when all of the edits are completed and the last editable variable in the messages is written to the CPU.
- The PLC program logic may clear the alarm enable bit at any time. This will remove the alarm message from the TD display. An alarm message will not be removed from the display if the user is editing a variable in the message or if the message has not yet been acknowledged.
- If the message does not require acknowledgement and/or does not contain editable variables, then the CPU program logic MUST clear the alarm enable bit.

Editing a Variable that is Embedded in an Alarm or a Screen

If you configured a screen or an alarm to include a variable, you can enter a new value for the variable:

- Use ENTER to move the cursor to the variable. The TD device will write the updated variable value to the CPU and set the edit notification bit for that variable when the operator presses the ENTER key, completing the edit of the variable.
- Use the UP or DOWN arrows to change the value of the variable.
- Use the following buttons to move the cursor to different characters within the variable:
  - TD 100C, TD 200C, and TD400C: LEFT and RIGHT arrows
  - TD 200: SHIFT+UP arrow and SHIFT+DOWN arrow
- ESC rereads the value of the variable from the S7-200 CPU and redisplays the value.
- ENTER writes the new value to the S7-200 CPU. (If the alarm contains other variables, the cursor moves to the next variable.) The TD device will write the updated variable value to the CPU and set the edit notification bit for that variable when the operator presses the ENTER key, completing the edit of the variable.

If the variable was configured as a numeric string, the cursor skips over any non-numeric characters in the message. See Chapter 4. After you have edited all of the variables in an alarm, the TD device resets the alarm bit in the S7-200 CPU.

Notice
Due to restrictions in the format used to store real (floating-point) numbers in both the S7-200 CPU and the TD device, the accuracy of the number is limited to six significant digits. Editing a real number with more than six digits may not change the value of the variable, or may cause other digits within the number to change:

- Changing the least significant (right-most) digit of a real-number variable with more than six digits may have no effect. For example, if you try to change the "9" in "1234.56789", the value of the variable does not change.
- Changing the most significant (left-most) digit of a real-number variable with more than six digits may cause other (less significant) digits in the variable to change.

TD Bit Usage

A summary of the TD bit usage is shown in Table 5-1.

Table 5-1 Summary of TD Bit Usage

Bits Associated with Alarms and Screens	Enable Condition for the Bit	Results shown on the TD Display	Clear Condition for the Bit
ALARM ENABLE	The alarm must be enabled with the TD_ALRM instruction using the Alarm Symbolic Name as the instruction input.	When an alarm is enabled and the TD default display mode is set to the alarm mode, the alarm message is placed on the TD display. If there are multiple alarms enabled, the highest priority alarm is displayed. If an alarm requires user acknowledgment, the message will flash (blink) until it is acknowledged by the user. The alarm MUST be acknowledged before other alarms can be viewed. An alarm that requires acknowledgement will not be replaced on the display by higher priority alarms until the alarm is acknowledged. If the alarm contains editable variables the user can edit or accept the values (by pressing the ENTER key). If the edits are not completed, and the alarm message required acknowledgement, the message will again begin to flash. If the user screens are set as the default display mode for the TD device and an alarm is enabled, an alarm indicator will begin to flash on the TD display. The indicator is large if there is an alarm enabled that requires acknowledgement. The indicator will be small if the alarms do not require acknowledgement. The user can switch to the alarm display to view the alarms. The alarms will be presented to the user in priority order.	There are different ways to clear the alarm enable bit: If an alarm required acknowledgement, the TD device will clear the alarm enable at the same time that the 'Alarm Acknowledgement' bit is set in the CPU. If an alarm contains editable variables, the TD device will clear the alarm enable bit when all of the edits are completed and the last editable variable in the messages is written to the CPU. The PLC program logic may clear the alarm enable bit at any time. This will remove the alarm message from the TD display. An alarm message will not be removed from the display if the user is editing a variable in the message or if the message has not yet been acknowledged. If the message does not require acknowledgement and/or does not contain editable variables, then the CPU program logic MUST clear the alarm enable bit.

Bits Associated with Alarms and Screens	Enable Condition for the Bit	Results shown on the TD Display	Clear Condition for the Bit
ALARM ACKNOW-LEDGE	Alarm acknowledgement is available only if the wizard configuration has the option enabled for this alarm: Alarm should require operator acknowledgement	The user acknowledges an alarm message by scrolling to the message and pressing the ENTER key. The TD device will then set the acknowledge notification bit in the CPU and the alarm message will stop flashing (blinking). If there are no editable variables in the message the TD device will also clear the alarm enable bit for this message. If there are editable variables in the message, the user must either edit the variables (change them and press ENTER) or accept the current values (press ENTER). When the last variable in the message is edited or accepted, the TD device will write the variable to the CPU and clear the alarm enable bit. If the user does not complete editing the variables in the message, the TD device will begin to flash (blink) the message to notify the user that an action is still pending.	The TD device will set the alarm acknowledge bit. The user program logic must clear the alarm acknowledgement bit.
ALARM MESSAGE: EMBEDDED VARIABLE EDIT NOTIFICATION	The edit notification is available only when the alarm contains a variable and the user has enabled the Wizard option to allow editing of the variable. "Operator is allowed to edit this data". If the alarm message contains multiple editable variables, each variable has a unique edit notification bit.	The TD device will write the updated variable value to the CPU and set the edit notification bit for that variable when the operator presses the ENTER key, completing the edit of the variable.	The user program can monitor the edit notification bit to recognize when an editable value has been changed by the operator. The user program can then take some action based on the new value for the variable. The user program must clear the edit notification bit so that subsequent edits can be recognized.

Bits Associated with Alarms and Screens	Enable Condition for the Bit	Results shown on the TD Display	Clear Condition for the Bit
USER SCREEN: EMBEDDED VARIABLE EDIT NOTIFICATION	The edit notification is available only when the user screen contains a variable and the user has enabled the Wizard option to allow editing of the variable. "Operator is allowed to edit this data". If the user screen contains multiple editable variables, each variable has a unique edit notification bit.	The TD device will write the updated variable value to the CPU and set the edit notification bit for that variable when the operator presses the ENTER key, completing the edit of the variable.	The user program can monitor the edit notification bit to recognize when an editable value has been changed by the operator. The user program can then take some action based on the new value for the variable. The user program must clear the edit notification bit so that subsequent edits can be recognized.

5.6 Performing Typical or Routine Operator Tasks

Performing Typical or Routine Operator Tasks

The Operator Menu allows you to perform the following tasks:

- Determining the model and version of the S7-200 CPU (CPU Status)
- Viewing the error messages generated by the S7-200 CPU (CPU Status)
- Setting the time in the S7-200 CPU (Set Time and Date)
- Selecting a language set for the TD device (Set Language) (TD 200, TD 200C, and TD400C)

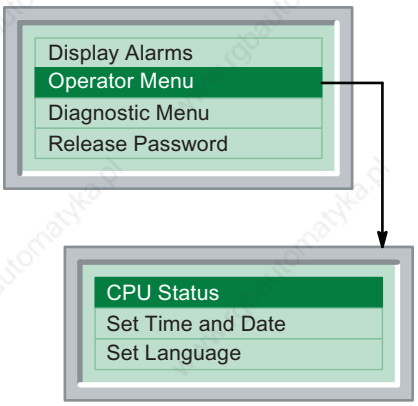

Figure 5-10 Operator Menu for TD 200, TD 200C, and TD400C

Viewing the Status of an S7-200 CPU

The CPU Status command allows you to display the following information:

- Model and version of the S7-200 CPU
- Error messages generated by the S7-200 CPU

After you select the CPU Status command, the TD device displays the CPU model and version.

Press the UP or DOWN arrows to display the error messages that were generated by the S7-200 CPU.

The TD device displays an error message only if an error exists in the S7-200 CPU. The CPU classifies errors as either fatal errors or non-fatal errors.

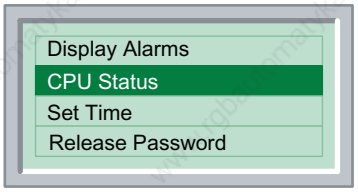

Figure 5-11 CPU Status Menu for TD 100C

Table 5-2 lists the error messages that can be displayed by the TD devices. Refer to the SIMATIC S7-200 Programmable Controller System Manual for information about specific errors.

Table 5-2 Error Messages Relating to the Status of the S7-200 CPU

Type	Message	Description
Fatal	Program Checksum Error	Hardware failure (S7-200 CPU)
	Compare Contact	User program error: Illegal Compare contact
	EEPROM/Permanent Memory Failure	Hardware failure (S7-200 CPU)
	Memory Cartridge Failure	Memory cartridge failure
	Scan Watchdog Timeout	Hardware failure (S7-200 CPU)
	Unknown Error XXXX (where XXXX = the error number)1	CPU failure (S7-200 CPU)
Non-Fatal	I/O Error Mod X (where X = the number of the I/O module)	An expansion module encountered an I/O error. If there are multiple failures, the TD device displays this message multiple times one time for each failed module.
	Runtime Error XXXX (where XXXX = the error number)[1]	The S7-200 CPU encountered an error while executing the user program, such as: • Indirect addressing • HSC setup and execution errors • Attempting to execute an illegal instruction (ENI, DISI, or HDEF) inside an interrupt routine • Subroutine nesting errors • TODW data errors • Simultaneous Transmit (XMT) and Receive (RCV) errors
[1] Refer to the SIMATIC S7-200 Programmable Logic Controller System Manual for information about specific errors.		

Setting Time and Date in the S7-200 CPU

You can use the TD device to change the time-of-day settings in the S7-200 CPU. This allows an operator to easily adjust for time changes.

The TD device does not maintain time and date settings. In order to display the time and date values, the TD device reads the current time and date from the S7-200 CPU and displays these values. The operator can then use this screen to edit these values and then write the new time and date settings back to the S7-200 CPU.

Tip
The TD device does not validate the time, date or day of the week values that you enter. You can inadvertently write an incorrect date or day of the week to the S7-200 CPU.

To allow an operator to change the time and date settings in the S7-200 CPU:

- You must have enabled (selected) the time-of-day (TOD) option when you configured the TD device with the Text Display wizard. Refer to Chapter 4.
- The S7-200 CPU must support the TOD clock

Tip
If you configured a password for the TD device, the operator must enter the password before being allowed to set the time and date.

If the TD device was not configured to allow changes to the time or if the S7-200 CPU does not support the TOD clock, the Set Time and Date command does not appear on the Operator Menu.

After you select the Set Time command, the TD device reads the current date and time from the S7-200 CPU.

The Time and Date screen displays the following information:

- Date: day-month-year (for Chinese, the date is displayed as year-month-day)
- Time
- Day of the week

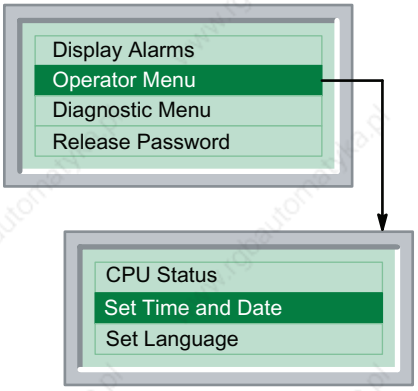

Figure 5-12 Setting the Time and Date on the TD 200, TD200C, and TD400C

Use the UP or DOWN arrow buttons to change the values in the fields.

Use the ENTER to move to the next field. (For a TD 100C, TD 200C, and TD400C, you can also use the RIGHT arrow. For a TD 200, you can use the SHIFT+DOWN arrow.)

Use the ESC to move back to the first field. (For a TD 100C, TD 200C, and TD400C, you can also use the LEFT arrow. For a TD 200, you can use the SHIFT+UP arrow.)

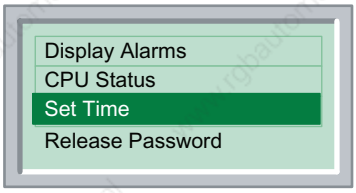

Figure 5-13 Setting the Time and Date on the TD 100C

Pressing ENTER when the cursor is located on the last field of the Time and Date screen writes the new time and date values to the S7-200 CPU and returns to the Operator Menu.

Pressing ESC when the cursor is located on the first field of the Time and Date screen returns to the Operator Menu.

Changing the Language Set (TD 200C, TD 200, and TD400C only)

You can use the TD device to change the language set in order to localize the TD device for another country. You must have created different language sets for your alarms and screens when you configured the TD device with the Text Display wizard. Each language set that you configure selects the language for the system menus and prompts of the TD device, as well as the screens and alarms. Refer to Chapter 4 for information about configuring language sets for the TD device.

Selecting the Set Language command displays a menu of the languages that you configured with the Text Display wizard as shown in the figure below. Use the UP or DOWN arrows to select the language to be displayed by the TD device.

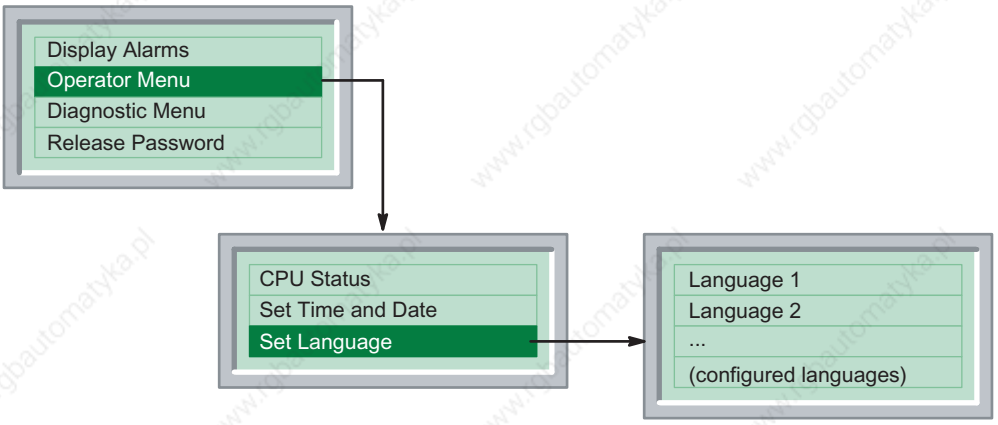

Figure 5-14 Selecting One of the Language Sets Configured for the TD Device

Cleaning the Keypad

The Clean Keypad function disables the keypad for 30 seconds to allow you to clean the keypad without affecting TD operation. The TD device displays a count down timer that shows the remaining seconds.

5.7 Performing Specialized Operator Tasks (Diagnostic/Setup Menu)

Performing Specialized Operator Tasks (Diagnostic/Setup Menu)

Some of the pre-configured tasks provided by the TD device provide assistance with setting up the TD device or troubleshooting problems with the S7-200 CPU. These functions are typically accessed infrequently. See the figures below.

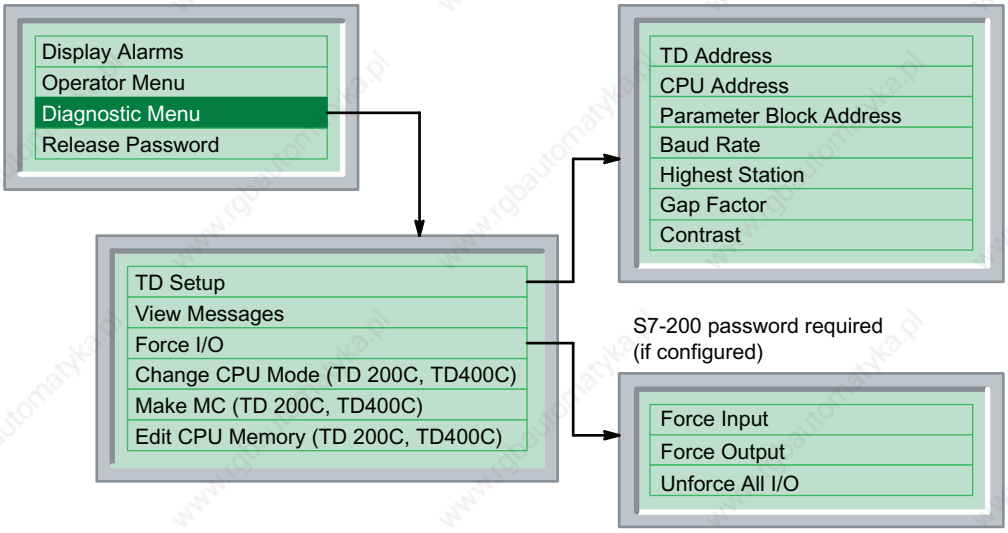

Figure 5-15 TD 200, TD 200C, and TD400C Diagnostic Menu Hierarchy

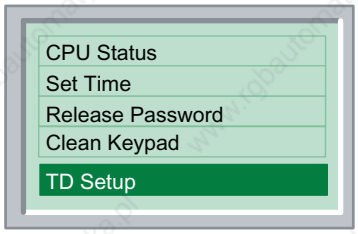

Figure 5-16 TD 100C Diagnostic Menu Hierarchy

Tip
If you are using a custom keypad that does not support the ENTER and ESC buttons, you must use the standard keypad to set up the TD device.

To restore the standard TD keypad:

1. Power down the TD device
2. Press and hold the lower right corner (where ENTER key is located on the standard keypad)
3. Power up the TD device

The default keypad is restored until the TD device is power cycled again.

Setting up the TD Device

As shown in the figure below, you use the TD Setup menu to configure various parameters for the TD device, such as network addresses, address of the parameter block (stored in V memory of the S7-200 CPU), baud rate, and other communication parameters.

- Setting the network address for the TD device: Use the UP or DOWN arrow to set the network address (default address = 1).
- Setting the CPU address: Use the UP or DOWN arrow to select the network address for the S7-200 CPU (default = 2).
- Setting the address for the parameter block: Designates a V memory location where the parameter block (or an offset to the location of the parameter block) is stored in the S7-200 CPU. Setting the address of the parameter block allows you to connect multiple TD devices to a single S7-200 CPU.

  Use the UP or DOWN arrow to select the starting V memory address of the parameter block that stores the configuration of the TD device.

  The address of the parameter block must match the address that you configured in the S7-200 CPU (address range: VB0 to VB32000, default = VB0).

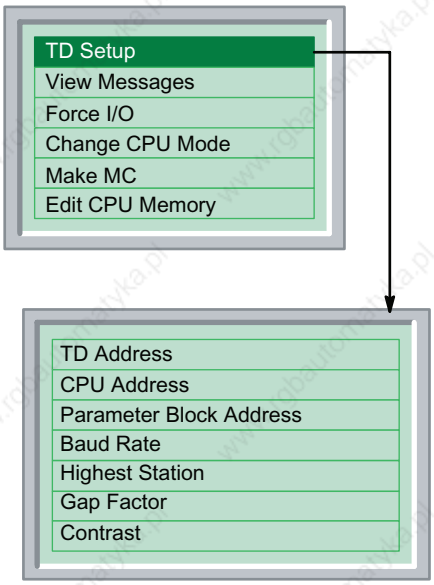

Figure 5-17 TD Setup Menu for the TD 200 and TD 200C

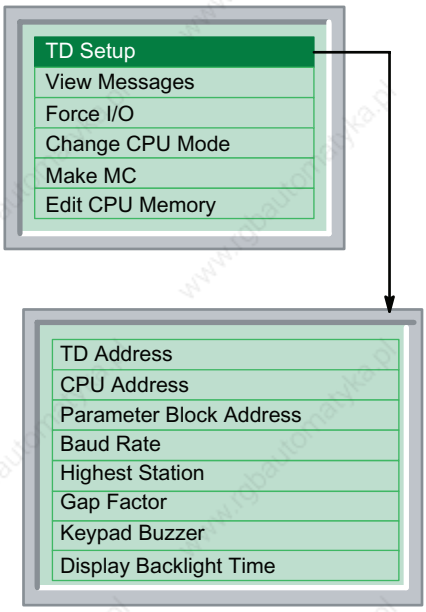

Figure 5-18 TD setup menu for the TD400C

- Setting the baud rate for the TD device: choose the baud rate for the TD device. You can choose either 9.6 kbaud (9600 baud), 19.2 kbaud, or 187.5 kbaud.

  Use the UP or DOWN arrow to select the baud rate. The baud rate must match the baud rate of the S7-200 CPU and any other device on the same network.

- Setting the Highest Station: Changes the highest station address for the TD device. This setting tells the TD device which network addresses to check when looking for other network master devices. The default highest station address is 31. This means that the TD device checks addresses 0 through 31 when looking for other network masters. This setting should only be changed when there are more than 32 master devices on the network.

  Use the UP and DOWN arrows to select the highest address on the network (default = 31).

- Setting the Gap Factor: Changes the Gap Factor for the TD device. This setting tells the TD device how often to check for other network master devices. The default setting of 10 causes the TD device to check once every 10 messages. A setting of 1 would cause the TD device to check for other masters after every message.

  Use the UP and DOWN arrows to select the gap factor between stations (default = 10).

- Setting the contrast:

  – TD 100C, TD 200, and TD 200C: You can optimize the display for different viewing angles and lighting conditions by adjusting the contrast of the screen on the TD device. The default contrast value is 40, with values ranging from 25 (lighter) to 55 (darker).

    Use the UP and DOWN arrows to select the contrast setting for the display area of the TD device (default setting = 40).

- Selecting the keypad buzzer: The TD400C has a keypad buzzer setting (On or Off) to provide audio feedback when a key is pressed. The default is set to On.

- Setting the display backlight time: The TD400C allows you to set the time that the display backlight is on allowing you to extend the life of the TD400C display.
  - The backlight on time is configurable from 1 to 60 minutes in one minute increments
  - You can configure the backlight to be on all the time
  - The default backlight on time is 10 minutes

Tip
At 9600 baud or 19.2 kbaud, the highest station address may need to be increased, even though the network does not contain more than 32 masters. Increasing the highest station address allows more time for the masters to transmit messages.

Viewing the TD Messages Stored in the S7-200 CPU (TD 200, TD 200C, and TD400C only)

You can review all of the TD messages (screens and alarms) that you configured for the TD device within the language set currently selected for the TD device.

The View Messages command allows you to verify that all of the alarms and screens were correctly stored in the S7-200 CPU.

The View Messages command does not allow you to edit any values that are displayed in the messages.

Selecting the View Messages command displays all of the messages and process values stored in the S7-200 CPU. Use the UP and DOWN arrows to scroll through messages stored in the S7-200 CPU.

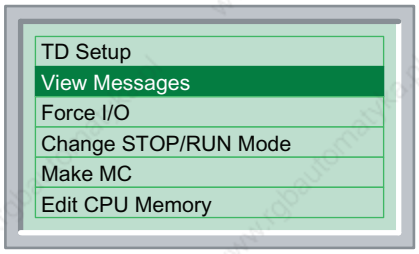

Figure 5-19 View Messages Command

Forcing the Inputs and Outputs in the S7-200 CPU (TD 200, TD 200C, and TD400C only)

The Force I/O menu allows you to force inputs, force outputs, or unforce all inputs and outputs. The Force I/O command is available only if you enabled the force-menu when you configured the TD device with the Text Display wizard.

Caution
Turning off the power to the S7-200 CPU before the force information is written to the permanent memory in the CPU can cause the S7-200 CPU to experience a failure the next time you turn the S7-200 CPU on.

To clear the error condition, use the TD device to either unforce all of the I/O points or else rewrite the force information to the S7-200 CPU. Cycling the power to the S7-200 CPU should clear the error.

If the S7-200 CPU requires a password before allowing the I/O to be forced, the TD device prompts the operator to enter the 8-character CPU password.

The Force I/O command provides the following options:

- Force Inputs: Allows you to force individual inputs on or off, or to turn off the Force function
- Force Outputs: Allows you to force individual outputs on or off, or to turn off the Force function
- Unforce All I/O: Allows you to turn off the Force function for all of the forced I/O points

Use the UP or DOWN arrow to select the specific I/O point. Pressing ENTER moves the cursor to the Force options. (For a TD 200C and TD400C, you can also use the RIGHT arrow. For a TD 200, you can use the SHIFT+DOWN arrow.)

Use the UP or DOWN arrow to select the type of force condition for the selected I/O point.

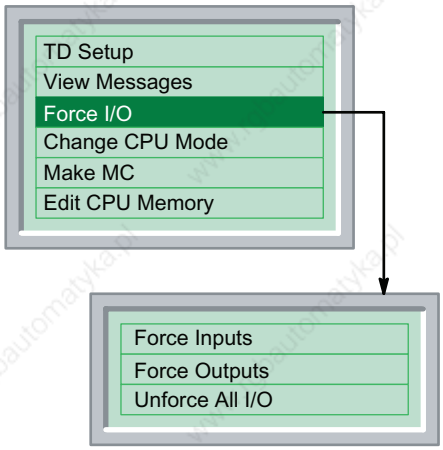

Figure 5-20 Force I/O Command

Tip
Unforcing the I/O points does not place them in the OFF state. Unforcing only removes the Force option. The points remain in their last state until you manually change them or they are changed by the user program in the S7-200 CPU.

Changing the Operating Mode of the S7-200 CPU (TD 200C and TD400C)

The Change STOP/RUN Mode command is only available for the TD 200C and TD400C and is only available if you selected this function when you configured the TD device with the Text Display wizard. See Chapter 4.

You can use the TD device to change the operating mode of the S7-200 CPU from STOP to RUN or from RUN to STOP. The operator may need to enter the TD password, if the TD device is configured for password-protection.

In order to allow the TD device to change the operating mode, the mode selector switch on the S7-200 must be set to either RUN or TERM.

The TD device cannot change the operating mode if the mode selector switch is set to STOP.

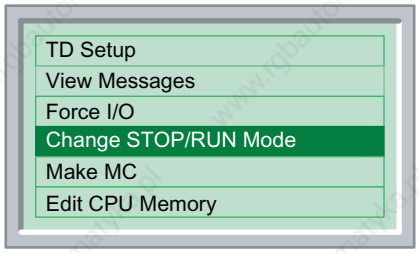

Figure 5-21 Changing the Operator Mode

Copying the User Program to a Memory Cartridge (TD 200C and TD400C)

The Make MC (memory cartridge) command is only available for the TD 200C and TD400C and only if you selected this function when you configured the TD device with the Text Display wizard. See Chapter 4.

You can use the TD 200C and TD400C to copy the user program in the S7-200 CPU to a memory cartridge (MC). The operator may need to enter both the TD password and the CPU password, if both the TD device and the S7-200 CPU are configured for password-protection.

Before attempting to write the user program to the memory cartridge, ensure that you have installed a memory cartridge in the S7-200 CPU.

After you select the Make MC command, the TD device alerts you that this operation will erase any existing data on the memory cartridge. Press the DOWN arrow to continue.

After reading the message, press ENTER to continue or press ESC to abort the operation

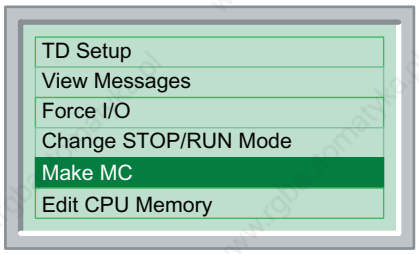

Figure 5-22 Making a Memory Cartridge

Editing the CPU Memory (TD 200C and TD400C)

The Edit CPU Memory command is only available for the TD 200C and TD400C and only if you selected this function when you configured the TD device with the Text Display wizard. See Chapter 4

You can use the TD 200C and TD400C to edit the values stored in the memory of the S7-200 CPU. The operator may need to enter the TD password, if the TD device is configured for password-protection.

After you select the Edit CPU Memory command (see the figure below), the TD device displays the Edit CPU Memory screen.

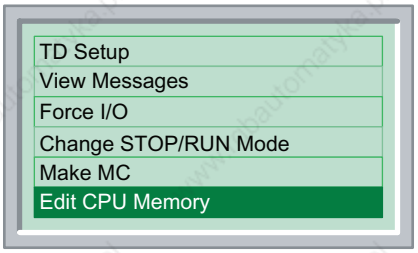

Figure 5-23 Edit CPU Memory Command

As shown in the figure below, you press ESC to edit the data in the memory address. The TD device places a cursor on the memory area.

- To edit the memory address: Use the UP or DOWN arrows to change the memory address. (Use the RIGHT or LEFT arrow keys to move between the fields of the memory address.) Press ENTER to display the value of that memory address and to move the cursor to the data type field.
- To edit the data type: Use the UP or DOWN arrows to change the data type. Press ENTER to display the value and to move the cursor to the value field.
- To edit the value stored in the memory address: Use the UP or DOWN arrows to change the value.

Press ENTER to write the new values to the memory address in the S7-200 CPU. Pressing ESC aborts the function.

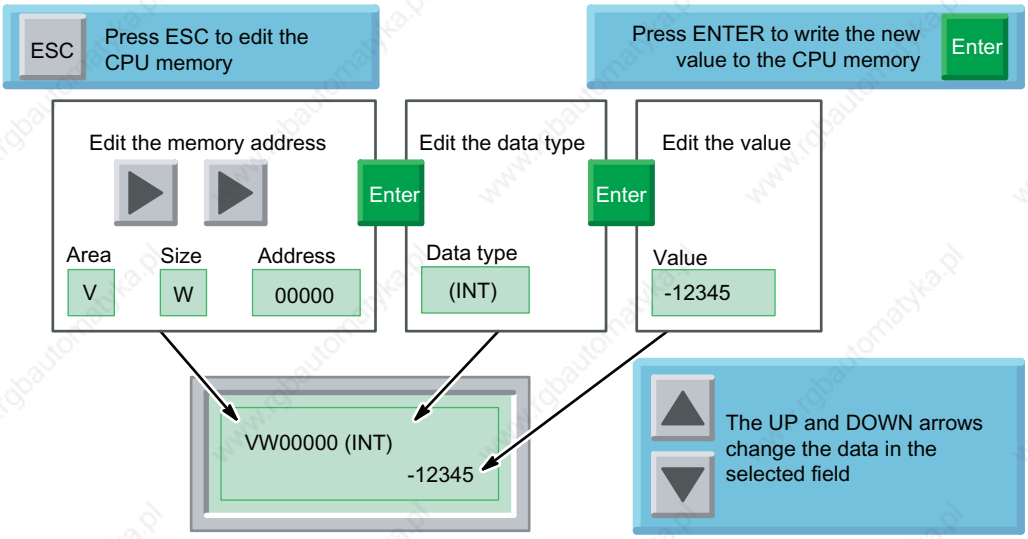

Figure 5-24 Editing the Memory in the S7-200 CPU

Table 5-3 lists the memory address and data types possible. For information about the memory areas, sizes of the data, and data types supported by your S7-200 CPU, refer to the S7-200 Programmable Controller System Manual.

Use the UP and DOWN arrows to scroll through the list of valid entries for each field.

To change the numeric value displayed in the address and value fields:

- Use the UP and DOWN arrows to adjust each digit in the value or address.
- Use the LEFT and RIGHT arrows to move between the digits of the value or address.
- Press ENTER to write the new value to the S7-200 CPU.

Tip
Binary values cannot be edited.

Table 5-3 Possible Values for the CPU Memory Address and Data Type

Field	Description
Memory area	V Variable memory area M Bit Memory area SM Special Memory area T Timers Current value only[1], INT only C Counters Current value only[1], INT only I Inputs Q Outputs
Memory size	B (byte) W (word) D (double-word)
Address	0 to 32000 (limited by the memory for your S7-200 CPU) Refer to the S7-200 Programmable Controller System Manual for the range of memory supported by the different S7-200 CPU models)
Data type	INT Integer (valid for Byte, Word or Double-word) Byte values are displayed as unsigned integers Word and Double-word values are displayed as signed integers REAL Real or floating-point (valid for Double-word only) The value displayed for a Real number is rounded to 6 or 7 significant digits. The TD device displays the Real number in fixed-point format only (no scientific notation) The TD device cannot display Real numbers larger than 18 digits and allows up to 7 decimal places. (For example: The TD device displays 0.00000005 as 0.0000001, and displays real numbers less than 0.00000005 as "0.0".) The TD device writes the number displayed to the S7-200 CPU without rounding. HEX Hexadecimal (valid for Byte, Word, and Double-word) BIN Binary (valid for Byte and Word only) Binary values are displayed in the same pattern (7..0) as discussed in the S7-200 Programmable Controller System Manual and displayed by the Status Chart of STEP 7-Micro/WIN Binary values cannot be edited
[1] The TD device displays only the current value for timers and counters. To display preset values for timers or counters, you must store these values in V memory. The TD device does not display the value of the timer or counter bit.	

Technical Specifications and Reference Information

A

A.1 General Specifications for the Text Display Devices

General Technical Specifications for the Text Display Devices

Order Number	Description	Dimensions (mm) (H x H x D)	Weight
6ES7 272- 1BA10-0YA0	TD 100C Operator Interface	89.6 x 76 x 35.7	0.11 kg
6ES7 272-0AA30-0YA0	TD 200 Operator Interface	148 x 76 x 28	0.19 kg
6ES7 272-1AA10-0YA0	TD 200C Operator Interface	148 x 76 x 28	0.20 kg
6AV66640-0AA00-0AX1	TD400C Operator Interface	174 x 102 x 31	0.31 kg
6ES7 272-1AF00-7AA0	TD 200C Blank faceplate material, A4 size (10 sheets/package)		
6ES7 272-1BF00-7AA0	TD 100C Blank faceplate material, A4 size (10 sheets/package)		
6AV6671-0AP00-0AX0	TD400C Blank faceplate material, A4 size (10 sheets/package)		
6ES7 901-3EB10-0XA0	TD/CPU cable	3 meters	0.15 kg

A.2 Technical Specifications for the TD 100C, TD 200 and TD 200C

Technical Specifications for the TD 100C, TD 200 and TD 200C

Table A-1 Technical Specifications for the TD 100C, TD 200 and TD 200C

General	TD 100C 6ES7 272-1BA10-0YA0	TD 200 6ES7 272-0AA30-0YA0	TD 200C 6ES7 272-1AA10-0YA0
Keyboard	Customizable faceplate Supports up to 14 keys	Membrane keypad with 9 keys; Tab inserts for customer-specific labeling	Customizable faceplate Supports up to 20 keys
Display	FSTN-Graphic Display with 132 x 65 (columns x rows), no backlight	STN-Graphic Display with 181 x 33 (Columns x Rows), LED backlight	
PLC interface	RS 485 (PPI); 9.6 / 19.2 / 187.5 Kbits/s		
Supply voltage (U_N)	Supplied by the S7-200 CPU, no external supply, (24 VDC (8 VDC ... 30 VDC) safety extra low voltage, NEC Class 2 or limited power source)	24 VDC, 15 VDC ... 30 VDC, safety extra low voltage, NEC Class 2 or limited power source (supplied by the S7-200 CPU, mains adapter or a 24 VDC external supply). The TD device has no integrated means of protection against strong interference pulses in the microsecond range (surge impulse). If the power being supplied has no appropriate means of protection, then a surge voltage protector should be pre-connected.	
Current consumption (I_N)	Typical 20 mA, maximum 50 mA, at U_N 24V (no fuse in TD 100C)	Typical 70 mA, (terminating resistors switched off) Maximum 120 mA at UN 24V (3.15A fuse in TD 200).	
Inrush current	Not applicable	Maximum 0.6 A / 15 ms	
Degree of protection	IP 65[1] (mounted on front of the panel) IP 20 (mounted on casing) UL 50 Type 4X[1]	IP 65[2] (mounted on front of the panel) IP 20 (mounted on casing) UL 50 Type 4X[2]	
Safety			
Safety standard	IEC61131-2, UL508, CSA C22.2 No. 142	EN 60950, IEC 60950, UL 60950, CSA C22.2 No. 60950	
Noise emission	<45dB(A) to DIN 45635 (no fan)		

[1] To ensure compliance of the TD 100C with IP 65 and UL 50 Type 4X, you must follow these guidelines. The minimum panel thickness must be at least 1.5 mm. The mounting screws on the TD 100C device must be tightened to a torque of 0.2 Nm (about 0.5 mm the height of the seal). The gasket must be replaced whenever the TD device is removed and reinstalled. To procure new gaskets, contact your Siemens distributor or sales representative.

[2] To ensure compliance of the TD 200C and TD 200 with IP 65 and UL 50 Type 4X, you must follow these guidelines. The minimum panel thickness must be at least 1.5 mm. The mounting screws on the TD 200C or TD 200 device must be tightened to a torque of 0.7 N-m. The gasket must be replaced whenever the TD device is removed and reinstalled. To procure new gaskets, contact your Siemens distributor or sales representative.

Technical Specifications for the TD 100C, TD 200 and TD 200C (continued)

General	TD 100C 6ES7 272-1BA10-0YA0	TD 200 6ES7 272-0AA30-0YA0	TD 200C 6ES7 272-1AA10-0YA0
Electromagnetic Compatibility (EMC) (tested with TD/CPU cable 6ES7 901-3EB10-0XA0)			
Emitted interference Limit class	B to EN 55022 = CISPR 22		
Noise immunity on signal lines	±2kV according to IEC 61000-4-4 1000-4-4; Burst		
Noise immunity to discharge of static electricity	±6kV Contact discharge (according to IEC 61000-4-2; ESD) ±8kV Air discharge (according to IEC 61000-4-2; ESD)		
Conducted interference on DC power supply line	Not applicable	±2kV according to IEC 61000-4-4; Burst ±1kV according to IEC 61000-4-5; ms-impulse (Surge); (line against line) ±2kV according to IEC 61000-4-5; ms-impulse (Surge); (line against earth) Power supplies with the same voltage can only be used with additional means of protection, for example, a surge voltage protector available from the Dehn company, type RZ/E 24 V-, order No. 917 204.	
Noise immunity to high frequency emission	10 V/m with 80% amplitude modulation at 1 kHz, 9 kHz to 80 MHz (according to IEC 61000-4-6) 10 V/m with 80% amplitude modulation at 1 kHz, 80 MHz to 2 GHz (according to IEC 61000-4-3)		
Climatic Conditions			
Temperature Operation Storage/Transport	Tested according to IEC 60068-2-1, IEC 60068-2-2 ±0° C to +60° C (+32° F to +140° F) (rate of temperature change max. 10° C/h) -20° C to +60°C (-4° F to +140° F) (rate of temperature change max. 20° C/h		
Relative humidity Operation Storage/Transport	Tested according to IEC 60068-2-78, IEC 600068-2-30 95% at 30°C (no condensation) 95% at 55°C (no condensation)		
Mechanical Environmental Conditions			
Vibration Operation Transport (packaged)	Tested according to IEC 60068-2-6 5 Hz to 9 Hz, amplitude, 3,5 mm 9 Hz to 150 Hz, acceleration 9.8 m/s2 5 Hz to 9 Hz, amplitude 3.5 mm 9 Hz to 500Hz, acceleration 9.8 m/s²	Tested according to IEC 60068-2-6 10 Hz to 58 Hz, amplitude 0.075 mm 58 Hz to 150 Hz, acceleration 9.8 m/s² 5 Hz to 9 Hz, amplitude 3.5 mm 9 Hz to 500 Hz, acceleration 9.8 m/s²	
Shock Operation Transport (packaged)	Tested according to IEC 60068-2-27/29 Semisinusoidal: 150 m/s² (15g), 11 ms Semisinusoidal: 250 m/s² (25g), 6 ms		
Special Features			
Quality assurance	In accordance with ISO 9001		
Servicing	Maintenance-free (no battery)		
Panel mounting	Accessories for panel mounting are enclosed		

A.3 Technical Specifications for the TD400C

Technical Specifications for the TD400C

Table A-2 Technical Specifications for the TD400C

General	TD400C 6AV6640--0AA00-0AX1
Keyboard	Customizable faceplate Supports up to 15 keys
Display	STN-Graphic Display with 192 x 64 (Columns x Rows), backlight
PLC interface	RS 485 (PPI); 9.6 / 19.2 / 187.5 Kbits/s
Supply voltage (U_N)	24 VDC, 15 VDC ... 30 VDC, safety extra low voltage, NEC Class 2 or limited power source (supplied by the S7-200 CPU, mains adapter or a 24 VDC external supply). The TD device has no integrated means of protection against strong interference pulses in the microsecond range (surge impulse). If the power being supplied has no appropriate means of protection, then a surge voltage protector should be pre-connected.
Current consumption (I_N)	Typical 41 mA
Inrush current	Maximum 570 mA
Degree of protection	IP 65[1] (mounted on front of the panel) IP 20 (mounted on casing)
Noise emission	<45dB(A) to DIN 45635 (no fan)
1 To ensure compliance of the TD400C with IP 65 and UL 50 Type 4X, you must follow these guidelines. The minimum panel thickness must be at least 1.5 mm. The mounting screws on the TD device must be tightened to a torque of 0.7 N-m. The gasket must be replaced whenever the TD device is removed and reinstalled. To procure new gaskets, contact your Siemens distributor or sales representative.	

Table A-3 Technical Specifications for the TD400C (continued)

General	TD400C 6AV6640-0AA00-0AX1
Electromagnetic Compatibility (EMC) (tested with TD/CPU cable)	
Emitted interference Limit class	A to EN 55011 = CISPR 11
Noise immunity on signal lines	±1kV, Testing according to IEC 61000-4-4; Burst
Noise immunity to discharge of static electricity	±8kV Air discharge (according to IEC 61000-4-2; ESD)
Conducted interference on DC power supply line	±2kV, Testing according to IEC 61000-4-4; Burst ±1kV according to IEC 61000-4-5; ms-impulse (Surge); (line against line) ±2kV according to IEC 61000-4-5; ms-impulse (Surge); (line against earth) Power supplies with the same voltage can only be used with additional means of protection, for example, a surge voltage protector available from the Dehn company, type RZ/E 24 V-, order No. 917 204.
Noise immunity to high frequency emission	10 V/m with 80% amplitude modulation at 1 kHz, 20 kHz to 80 MHz 10 V/m with 80% amplitude modulation at 1 kHz, 80 MHz to 1 GHz

General	TD400C 6AV6640-0AA00-0AX1
Climatic Conditions	
Temperature Operation Storage/Transport	 0 to +50 °C -20 to +60°C
Relative humidity Operation Storage/Transport	 5% to 85% (30°C), no condensation 5% to 85% (40°C), no condensation
Mechanical Environmental Conditions	
Vibration Operation Transport (packaged)	Tested according to IEC 60068-2-6 5 Hz to 9 Hz, amplitude, 3,5 mm 9 Hz to 150 Hz, acceleration 9.8 m/s2 5 Hz to 9 Hz, amplitude 3.5 mm, 9 Hz to 500 Hz, acceleration 9.8 m/s2
Shock Operation Transport (packaged)	Tested according to IEC 60068-2-27/29 Semisinusoidal: 150 m/s2 (15g), 11 ms Semisinusoidal: 250 m/s2 (25g), 6 ms
Special Features	
Quality assurance	In accordance with ISO 9001
Servicing	Maintenance-free (no battery)
Panel mounting	Accessories for panel mounting are enclosed

A.4 Certificates, Directives and Declarations for the TD Device

Certificates, Directives and Declarations for the TD Device

IEC 61131-2

The TD 100C and TD400C devices satisfy the requirements and criteria of the IEC 61131-2 standard (programmable controllers, part 2 on equipment requirements and tests).

Notes on the CE Symbol

The following applies to the SIMATIC product described in this operating instruction

EMC Directive

This product fulfils the requirements for the EC directive 89/336/EEC on "electromagnetic compatibility" and the following fields of application apply according to this CE symbol. See Table A-4.

Table A-4 EMC Directive

Field of Application	Requirement for	
	Emitted Interference	Noise Immunity
Residential, commercial areas and light industrial environments	EN 61000-6-3	EN 61000-6-1
Industry	EN 61000-6-4	EN 61000-6-2

ATEX Directive (Explosion Protection Guidelines) (TD 200 and TD 200C)

The TD 200 and TD 200C devices fulfil the requirements for the EC directive 94/9/EEC on "ATEX" (Devices and protection systems to be used as prescribed in potentially explosive areas (Guidelines for Explosion Protection)) and was tested according to EN 50021 (Electrical apparatus for potentially explosive atmospheres; Type of protection "n"

II 3G EEx nA OO T3.T6

Declaration of Conformity (TD 200C, TD 200, and TD400C)

The EC declarations of conformity and the documentation relating to this are available to the authorities concerned, according to the above EC directive, from:

Siemens AG
Bereich Automatisierungs- und Antriebstechnik
A&D AS RD ST
Postfach 1963
D-92209 Amberg

Tel.: 09621 80 3283
Fax: 09621 80 3278

Siemens SNC (Siemens Numerical Control Co., Ltd.)
211100 No. 18, Siemens Road
Jiangning Development Zone
Nanjing, P.R. China

Tel.: 86 25 52101888
Fax: 86 25 52101666

Observing the Setup Guidelines

The setup guidelines and notes on safety given in the manual must be observed on startup and during operation.

A.5 Approvals for USA, Canada and Australia

Approvals for USA, Canada and Australia

The characters stamped on a device are indicative of the requirements which that device meets:

Underwriters Laboratories: cULus Approval, Hazardous Location

cULus Listed 21BP I.T.E. for Hazardous Location
Underwriters Laboratories Inc., according to:

- TD 200 and TD 200C:
  UL 60950 (Information Technology)
  CSA C22.2 No. 60950 (Information Technology)
- TD 100C and TD400C
  UL 508 (Industrial Control Equipment)
  CSA C22.2 No. 142 (Industrial Control Equipment)
  UL 1604 (Hazardous Location)
  CSA-213 (Hazardous Location)

APPROVED for use in:

- Cl. I, Div.2, GP. A, B, C, D, T5
- Cl. I, Zone 2, GP.IIC, T5

Please see the note below:

Note

This plant has to be mounted according to the NEC (National Electric Code) stipulations.

When used in environments according to class I, division 2 (see above), the SIMATIC TD device must be mounted in a housing that corresponds to at least IP54 according to EN 60529.

FM approval to Factory Mutual Approval Standard Class Number 3611, Class I, Division 2, Group A, B, C, D, and Class I, Zone 2, Group IIC.
Temperature Class T5 is adhered to when the ambient temperature during operation does not exceed 60 degrees C

Note for Australia: The TD 100C, TD 200, and TD 200C devices fulfil the requirements for Norm AS/NZS CISPR22. The TD400C device fulfils the requirements for Norm AS/NZS CISPR 11.

FM Approval Notes

FM approval, if present, is to Factory Mutual Approval Standard Class Number 3611, Class I, Division 2, Group A, B, C, D, and Class I, Zone 2, Group IIC.

Temperature class T5 is adhered to when the ambient temperature during operation does not exceed 60 degrees C.

WARNING

Personal injury or property damage can result if you do not follow FM hazardous location guidelines.

In hazardous areas, personal injury or property damage can result if you close or disconnect an electrical circuit during operation (for example, plug-in connections, fuses, switches).

Do not close or disconnect any live circuits unless explosion hazards can be definitely excluded. Do not disconnect while the circuit is live unless the location is known to be non-hazardous.

Note

TD400C Approvals

The only valid approvals for the TD400C device are those shown on the label on the rear panel.

A.6 Standard TD Character Set (TD 200, TD 200C)

Standard TD Character Set (TD 200, TD 200C)

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	ｱ	A7	167	ﾀ	D4	212
!	21	33	N	4E	78	{	7B	123	ｲ	A8	168	ﾁ	D5	213
"	22	34	O	4F	79	|	7C	124	ｳ	A9	169	ﾂ	D6	214
#	23	35	P	50	80	}	7D	125	ｴ	AA	170	ﾃ	D7	215
$	24	36	Q	51	81	→	7E	126	ｵ	AB	171	ﾘ	D8	216
%	25	37	R	52	82	←	7F	127	ｶ	AC	172	ﾙ	D9	217
&	26	38	S	53	83		80	128	ｷ	AD	173	ﾚ	DA	218
'	27	39	T	54	84	ü	81	129	ｸ	AE	174	ﾛ	DB	219
(	28	40	U	55	85		82	130	ｹ	AF	175	ﾜ	DC	220
)	29	41	V	56	86		83	131	-	B0	176	ﾝ	DD	221
*	2A	42	W	57	87	ä	84	132	ｱ	B1	177	ﾞ	DE	222
+	2B	43	X	58	88		85	133	ｲ	B2	178	°	DF	223
,	2C	44	Y	59	89		86	134	ｳ	B3	179	α	E0	224
-	2D	45	Z	5A	90		87	135	ｴ	B4	180	ß	E1	225
.	2E	46	[	5B	91		88	136	ｵ	B5	181	ß	E2	226
/	2F	47	¥	5C	92		89	137	ｶ	B6	182	ε	E3	227
0	30	48	]	5D	93		8A	138	ｷ	B7	183	μ	E4	228
1	31	49	^	5E	94		8B	139	ｸ	B8	184	σ	E5	229
2	32	50	_	5F	95		8C	140	ｹ	B9	185	ρ	E6	230
3	33	51	`	60	96		8D	141	ｺ	BA	186	g	E7	231
4	34	52	a	61	97	ä	8E	142	ｻ	BB	187	√	E8	232
5	35	53	b	62	98		8F	143	ｼ	BC	188	⁻¹	E9	233
6	36	54	c	63	99	æ	90	144	ｽ	BD	189	j	EA	234
7	37	55	d	64	100	Æ	91	145	ｾ	BE	190	ˣ	EB	235
8	38	56	e	65	101	ss	92	146	ｿ	BF	191	¢	EC	236
9	39	57	f	66	102	å	93	147	ﾀ	C0	192	ǀ	ED	237
:	3A	58	g	67	103	ö	94	148	ﾁ	C1	193	ñ	EE	238
;	3B	59	h	68	104	Å	95	149	ﾂ	C2	194	ö	EF	239
<	3C	60	I	69	105		96	150	ﾃ	C3	195	p	F0	240
=	3D	61	j	6A	106		97	151	ﾄ	C4	196	q	F1	241
>	3E	62	k	6B	107		98	152	ﾅ	C5	197	θ	F2	242
?	3F	63	l	6C	108	ö	99	153	ﾆ	C6	198	∞	F3	243

Figure A-1 Standard TD Character Set for the TD 200 and TD 200C

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
@	40	64	m	6D	109	ü	9A	154	ｽ	C7	199	Ω	F4	244
A	41	65	n	6E	110		9B	155	ｾ	C8	200	ü	F5	245
B	42	66	o	6F	111		9C	156	ｿ	C9	201	Σ	F6	246
C	43	67	p	70	112		9D	157	ﾀ	CA	202	Π	F7	247
D	44	68	q	71	113		9E	158	ﾁ	CB	203		F8	248
E	45	69	r	72	114		9F	159	ﾂ	CC	204	Å	F9	249
F	46	70	s	73	115		A0	160	ﾃ	CD	205		FA	250
G	47	71	t	74	116	｡	A1	161	ﾄ	CE	206	æ	FB	251
H	48	72	u	75	117	｢	A2	162	ﾅ	CF	207	Æ	FC	252
I	49	73	v	76	118	｣	A3	163	ﾆ	D0	208	ss	FD	253
J	4A	74	w	77	119	､	A4	164	ﾇ	D1	209	å	FE	254
K	4B	75	x	78	120	･	A5	165	ﾈ	D2	210	▮	FF	255
L	4C	76	y	79	121	ｦ	A6	166	ﾉ	D3	211			

Figure A-2 Standard TD Character Set for the TD 200 and TD 200C (continued)

Alt Key Combinations for International and Special Characters

Certain international and special characters may not display correctly on the TD display if entered with the Text Display wizard with the standard TD character set. For international and special characters, use the ALT key and number combinations shown in Table A-5 to enter the characters in the Text Display wizard.

Table A-5 ALT Key Combinations for International Special Characters

Character	ALT + Key Combination
ü	Alt + 0129
ä	Alt + 0132
æ	Alt + 0144
Æ	Alt + 0145
å	Alt + 0147
ö	Alt + 0148
Å	Alt + 0149
°	Alt + 0223
α	Alt + 0224
ß	Alt + 0225
є	Alt + 0227
ц	Alt + 0228
σ	Alt + 0229
¢	Alt + 0236
ñ	Alt + 0238
Ω	Alt + 0244
Σ	Alt + 0246
∏	Alt + 0247
├	Alt + 0126 (left arrow ←)
┤	Alt + 0127 (right arrow →)
[	Alt + 0251 (single bar)

Character	ALT + Key Combination
[[	Alt + 0252 (double bar)
[[[	Alt + 0253 (triple bars)
[[[[	Alt + 0254 (four bars)
[[[[[	Alt + 0255 (five bars)
↑	Alt + 0249 (up arrow)

Bar Graph Character Set (TD 200, TD 200C)

The bar graph characters that are supported by the standard TD character set are shown below.

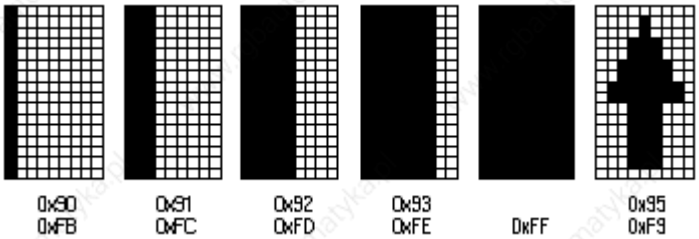

Figure A-3 Bar Graph Character Set for the TD 200 and TD 200C

A.7 Arabic Character Set (TD 200, TD 200C, and TD400C)

Arabic Character Set (TD 200, TD 200C, and TD400C)

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	ش	D4	212
!	21	33	N	4E	78	{	7B	123	¨	A8	168	ص	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	ض	D6	214
#	23	35	P	50	80	}	7D	125	ª	AA	170	×	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	ط	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	ظ	D9	217
&	26	38	S	53	83	€	80	128	-	AD	173	ع	DA	218
'	27	39	T	54	84	پ	81	129	®	AE	174	غ	DB	219
(	28	40	U	55	85	‚	82	130	¯	AF	175	ـ	DC	220
)	29	41	V	56	86	ƒ	83	131	°	B0	176	ف	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	ق	DE	222
+	2B	43	X	58	88	…	85	133	²	B2	178	ك	DF	223
,	2C	44	Y	59	89	†	86	134	³	B3	179	ة	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	ل	E1	225
.	2E	46	[	5B	91	ˆ	88	136	µ	B5	181	ة	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	م	E3	227
0	30	48	]	5D	93	ط	8A	138	·	B7	183	ن	E4	228
1	31	49	^	5E	94	‹	8B	139	¸	B8	184	ه	E5	229
2	32	50	_	5F	95	Œ	8C	140	¹	B9	185	و	E6	230
3	33	51	`	60	96	چ	8D	141	º	BA	186	ى	E7	231
4	34	52	a	61	97	ژ	8E	142	»	BB	187	ة	E8	232
5	35	53	b	62	98	ڈ	8F	143	¼	BC	188	ة	E9	233
6	36	54	c	63	99	گ	90	144	½	BD	189	ة	EA	234
7	37	55	d	64	100	‘	91	145	¾	BE	190	ة	EB	235
8	38	56	e	65	101	’	92	146	؟	BF	191	ى	EC	236
9	39	57	f	66	102	“	93	147	ء	C0	192	ي	ED	237
:	3A	58	g	67	103	”	94	148	ء	C1	193	ة	EE	238
;	3B	59	h	68	104	•	95	149	آ	C2	194	ة	EF	239
<	3C	60	I	69	105	–	96	150	أ	C3	195	ً	F0	240
=	3D	61	j	6A	106	—	97	151	ؤ	C4	196	ٌ	F1	241
>	3E	62	k	6B	107	ک	98	152	إ	C5	197	ٍ	F2	242
?	3F	63	l	6C	108	™	99	153	ئ	C6	198	ٍ	F3	243
@	40	64	m	6D	109	ڑ	9A	154	ا	C7	199	ٌ	F4	244
A	41	65	n	6E	110	›	9B	155	ب	C8	200	ُ	F5	245
B	42	66	o	6F	111	œ	9C	156	ة	C9	201	ِ	F6	246
C	43	67	p	70	112		9D	157	ت	CA	202	÷	F7	247
D	44	68	q	71	113		9E	158	ث	CB	203	ّ	F8	248
E	45	69	r	72	114	ں	9F	159	ج	CC	204	ْ	F9	249
F	46	70	s	73	115		A0	160	ح	CD	205	ْ	FA	250
G	47	71	t	74	116	،	A1	161	خ	CE	206	Û	FB	251
H	48	72	u	75	117	¢	A2	162	د	CF	207	ü	FC	252
I	49	73	v	76	118	£	A3	163	ذ	D0	208		FD	253
J	4A	74	w	77	119	¤	A4	164	ر	D1	209		FE	254
K	4B	75	x	78	120	¥	A5	165	ز	D2	210	ے	FF	255
L	4C	76	y	79	121	¦	A6	166	س	D3	211			

Figure A-4 Arabic Character Set

A.8 Baltic Character Set

Baltic Character Set

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	Ō	D4	212
!	21	33	N	4E	78	{	7B	123	Ø	A8	168	Õ	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	Ö	D6	214
#	23	35	P	50	80	}	7D	125	Ŗ	AA	170	×	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	Ų	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	Ł	D9	217
&	26	38	S	53	83	€	80	128	-	AD	173	Ś	DA	218
'	27	39	T	54	84		81	129	®	AE	174	Ū	DB	219
(	28	40	U	55	85	‚	82	130	Æ	AF	175	Ü	DC	220
)	29	41	V	56	86		83	131	°	B0	176	Ż	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	Ž	DE	222
+	2B	43	X	58	88	…	85	133	²	B2	178	ß	DF	223
,	2C	44	Y	59	89	†	86	134	³	B3	179	ą	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	ļ	E1	225
.	2E	46	[	5B	91		88	136	µ	B5	181	ā	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	ć	E3	227
0	30	48	]	5D	93		8A	138	·	B7	183	ä	E4	228
1	31	49	^	5E	94	‹	8B	139	ø	B8	184	å	E5	229
2	32	50	_	5F	95		8C	140	¹	B9	185	ę	E6	230
3	33	51	`	60	96	¨	8D	141	ŗ	BA	186	ē	E7	231
4	34	52	a	61	97	ˇ	8E	142	»	BB	187	č	E8	232
5	35	53	b	62	98	¸	8F	143	¼	BC	188	é	E9	233
6	36	54	c	63	99		90	144	½	BD	189	ź	EA	234
7	37	55	d	64	100	‘	91	145	¾	BE	190	ė	EB	235
8	38	56	e	65	101	’	92	146	æ	BF	191	ģ	EC	236
9	39	57	f	66	102	“	93	147	Ą	C0	192	ķ	ED	237
:	3A	58	g	67	103	”	94	148	Į	C1	193	ī	EE	238
;	3B	59	h	68	104	•	95	149	Ā	C2	194	ļ	EF	239
<	3C	60	I	69	105	–	96	150	Ć	C3	195	š	F0	240
=	3D	61	j	6A	106	—	97	151	Ä	C4	196	ń	F1	241
>	3E	62	k	6B	107		98	152	Å	C5	197	ņ	F2	242
?	3F	63	l	6C	108	™	99	153	Ę	C6	198	ó	F3	243
@	40	64	m	6D	109		9A	154	Ē	C7	199	ō	F4	244
A	41	65	n	6E	110	›	9B	155	Č	C8	200	õ	F5	245
B	42	66	o	6F	111	¯	9C	156	É	C9	201	ö	F6	246
C	43	67	p	70	112		9D	157	Ź	CA	202	÷	F7	247
D	44	68	q	71	113	˛	9E	158	Ė	CB	203	ų	F8	248
E	45	69	r	72	114		9F	159	Ģ	CC	204	ł	F9	249
F	46	70	s	73	115		A0	160	Ķ	CD	205	ś	FA	250
G	47	71	t	74	116		A1	161	Ī	CE	206	ū	FB	251
H	48	72	u	75	117	¢	A2	162	Ļ	CF	207	ü	FC	252
I	49	73	v	76	118	£	A3	163	Š	D0	208	ż	FD	253
J	4A	74	w	77	119	¤	A4	164	Ń	D1	209	ž	FE	254
K	4B	75	x	78	120		A5	165	Ņ	D2	210	˙	FF	255
L	4C	76	y	79	121	¦	A6	166	Ó	D3	211			

Figure A-5 Baltic Character Set

A.9 Simplified Chinese Character Set

Simplified Chinese Character Set

The TD devices support the Simplified Chinese character set (GB2312-80) for the People's Republic of China. The TD devices use Microsoft Windows encoding for this character set. The Windows encoding allows the TD devices to display the same characters as shown in the STEP 7-Micro/WIN Text Display wizard when you are using a Chinese emulator or a Chinese version of Microsoft Windows.

Chinese characters are represented in STEP 7-Micro/WIN by a pair of numbers which represent the encoding of the character in the GB2312-80 specification. The TD devices also use a pair of numbers to represent the Chinese character.

Notes for Using the Simplified Chinese Character Set

Tip
The Simplified Chinese character set requires a Chinese version of Windows or a Chinese emulator to properly display Chinese characters in the Text Display wizard. You must start the Chinese emulator before you start the STEP 7-Micro/WIN software.

On the TD 200C and the TD 200, you can display up to 20 single-byte characters per line of your message. Because Simplified Chinese uses double-byte characters, you can display up to 10 double-byte characters per line for a message in Chinese.

On the TD 100C, you can display up to 16 single-byte characters per line of your message. Because Simplified Chinese uses double-byte characters, you can display up to 8 double-byte characters per line for a message in Chinese.

On the TD400C using a small font, you can display up to 24 single-byte characters per line of your message. Because Simplified Chinese uses double-byte characters, you can display up to 12 double-byte characters per line for a message in Chinese. If you selected a large font, you can display up to 16 single-byte characters or 8 Chinese characters.

The standard ASCII characters, such as numbers, punctuation, and upper and lowercase alphabet characters, are available when using the Simplified Chinese character set (shown below). Depending on your keyboard and/ or emulator, some of these standard characters may be formatted as single-byte characters instead of the double-byte characters like the Simplified Chinese characters. Standard ASCII characters and Chinese characters can be mixed on the TD display.

The Text Display wizard displays 8 , 10, or 12 double-byte character places for the text of a screen or alarm. You can fit any of the following combinations into a character position:

- 1 double-byte character
- 2 single-byte characters (standard ASCII)
- 1 single-byte character and 1 single-byte blank

You cannot fit one single-byte character plus one double-byte character in a character position.

TD 100C does not support the entire Simplified Chinese character set, however, the most-used characters have been included in the TD 100C. See the Simplified Chinese Characters Set for a list of supported characters. Characters that are not supported by the TD 100C are displayed as a square.

Tip
The Simplified Chinese Character Set electronic file resides on the STEP 7-Micro/WIN documentation CD. This file shows the characters supported by the different TD devices.

The Standard Character Set (ASCII) for the TD400C is shown below.

Char	Hex	Dec		Char	Hex	Dec		Char	Hex	Dec		Char	Hex	Dec
	20	32		8	38	56		P	50	80		h	68	104
!	21	33		9	39	57		Q	51	81		I	69	105
"	22	34		:	3A	58		R	52	82		j	6A	106
#	23	35		;	3B	59		S	53	83		k	6B	107
$	24	36		<	3C	60		T	54	84		l	6C	108
%	25	37		=	3D	61		U	55	85		m	6D	109
&	26	38		>	3E	62		V	56	86		n	6E	110
'	27	39		?	3F	63		W	57	87		o	6F	111
(	28	40		@	40	64		X	58	88		p	70	112
)	29	41		A	41	65		Y	59	89		q	71	113
*	2A	42		B	42	66		Z	5A	90		r	72	114
+	2B	43		C	43	67		[	5B	91		s	73	115
,	2C	44		D	44	68		\	5C	92		t	74	116
-	2D	45		E	45	69		]	5D	93		u	75	117
.	2E	46		F	46	70		^	5E	94		v	76	118
/	2F	47		G	47	71		_	5F	95		w	77	119
0	30	48		H	48	72		`	60	96		x	78	120
1	31	49		I	49	73		a	61	97		y	79	121
2	32	50		J	4A	74		b	62	98		z	7A	122
3	33	51		K	4B	75		c	63	99		{	7B	123
4	34	52		L	4C	76		d	64	100		|	7C	124
5	35	53		M	4D	77		e	65	101		}	7D	125
6	36	54		N	4E	78		f	66	102		~	7E	126
7	37	55		O	4F	79		g	67	103			7F	127

Figure A-6 Standard Character Set (ASCII Code) for TD400C

A.10 Cyrillic Character Set

Cyrillic Character Set

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	Ф	D4	212
!	21	33	N	4E	78	{	7B	123	Ё	A8	168	Х	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	Ц	D6	214
#	23	35	P	50	80	}	7D	125	Є	AA	170	Ч	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	Ш	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	Щ	D9	217
&	26	38	S	53	83	Ђ	80	128	-	AD	173	Ъ	DA	218
'	27	39	T	54	84	Ѓ	81	129	®	AE	174	Ы	DB	219
(	28	40	U	55	85	‚	82	130	Ї	AF	175	Ь	DC	220
)	29	41	V	56	86	ѓ	83	131	°	B0	176	Э	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	Ю	DE	222
+	2B	43	X	58	88	…	85	133	І	B2	178	Я	DF	223
,	2C	44	Y	59	89	†	86	134	і	B3	179	а	E0	224
-	2D	45	Z	5A	90	‡	87	135	ґ	B4	180	б	E1	225
.	2E	46	[	5B	91	€	88	136	µ	B5	181	в	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	г	E3	227
0	30	48	]	5D	93	Љ	8A	138	·	B7	183	д	E4	228
1	31	49	^	5E	94	‹	8B	139	ё	B8	184	е	E5	229
2	32	50	_	5F	95	Нь	8C	140	№	B9	185	ж	E6	230
3	33	51	`	60	96	Ќ	8D	141	є	BA	186	з	E7	231
4	34	52	a	61	97	Ћ	8E	142	»	BB	187	и	E8	232
5	35	53	b	62	98	Ц	8F	143	ј	BC	188	й	E9	233
6	36	54	c	63	99	ђ	90	144	Ѕ	BD	189	к	EA	234
7	37	55	d	64	100	‘	91	145	ѕ	BE	190	л	EB	235
8	38	56	e	65	101	’	92	146	ї	BF	191	м	EC	236
9	39	57	f	66	102	“	93	147	А	C0	192	н	ED	237
:	3A	58	g	67	103	”	94	148	Б	C1	193	о	EE	238
;	3B	59	h	68	104	•	95	149	В	C2	194	п	EF	239
<	3C	60	I	69	105	–	96	150	Г	C3	195	р	F0	240
=	3D	61	j	6A	106	—	97	151	Д	C4	196	с	F1	241
>	3E	62	k	6B	107		98	152	Е	C5	197	т	F2	242
?	3F	63	l	6C	108	™	99	153	Ж	C6	198	у	F3	243
@	40	64	m	6D	109	лъ	9A	154	З	C7	199	ф	F4	244
A	41	65	n	6E	110	›	9B	155	И	C8	200	х	F5	245
B	42	66	o	6F	111	нь	9C	156	Й	C9	201	ц	F6	246
C	43	67	p	70	112	ќ	9D	157	К	CA	202	ч	F7	247
D	44	68	q	71	113	ћ	9E	158	Л	CB	203	ш	F8	248
E	45	69	r	72	114	ц	9F	159	М	CC	204	щ	F9	249
F	46	70	s	73	115		A0	160	Н	CD	205	ъ	FA	250
G	47	71	t	74	116	Ў	A1	161	О	CE	206	ы	FB	251
H	48	72	u	75	117	ў	A2	162	П	CF	207	ь	FC	252
I	49	73	v	76	118	Ј	A3	163	Р	D0	208	э	FD	253
J	4A	74	w	77	119	¤	A4	164	С	D1	209	ю	FE	254
K	4B	75	x	78	120	Ґ	A5	165	Т	D2	210	я	FF	255
L	4C	76	y	79	121	¦	A6	166	У	D3	211			

Figure A-7 Cyrillic Character Set

A.11 Greek Character Set

Greek Character Set

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	Τ	D4	212
!	21	33	N	4E	78	{	7B	123	¨	A8	168	Υ	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	Φ	D6	214
#	23	35	P	50	80	}	7D	125		AA	170	Χ	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	Ψ	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	Ω	D9	217
&	26	38	S	53	83	€	80	128	-	AD	173	Ϊ	DA	218
'	27	39	T	54	84		81	129	®	AE	174	Ϋ	DB	219
(	28	40	U	55	85	‚	82	130	―	AF	175	ά	DC	220
)	29	41	V	56	86	ƒ	83	131	°	B0	176	έ	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	ή	DE	222
+	2B	43	X	58	88	…	85	133	²	B2	178	ί	DF	223
,	2C	44	Y	59	89	†	86	134	³	B3	179	ΰ	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	α	E1	225
.	2E	46	[	5B	91		88	136	µ	B5	181	β	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	γ	E3	227
0	30	48	]	5D	93		8A	138	·	B7	183	δ	E4	228
1	31	49	^	5E	94	‹	8B	139	Έ	B8	184	ε	E5	229
2	32	50	_	5F	95		8C	140	Ή	B9	185	ζ	E6	230
3	33	51	`	60	96		8D	141	Ί	BA	186	η	E7	231
4	34	52	a	61	97		8E	142	»	BB	187	θ	E8	232
5	35	53	b	62	98		8F	143	Ό	BC	188	ι	E9	233
6	36	54	c	63	99		90	144	½	BD	189	κ	EA	234
7	37	55	d	64	100	‘	91	145	Ύ	BE	190	λ	EB	235
8	38	56	e	65	101	’	92	146	Ώ	BF	191	μ	EC	236
9	39	57	f	66	102	“	93	147	ΐ	C0	192	ν	ED	237
:	3A	58	g	67	103	”	94	148	Α	C1	193	ξ	EE	238
;	3B	59	h	68	104	•	95	149	Β	C2	194	ο	EF	239
<	3C	60	I	69	105	–	96	150	Γ	C3	195	π	F0	240
=	3D	61	j	6A	106	—	97	151	Δ	C4	196	ρ	F1	241
>	3E	62	k	6B	107		98	152	Ε	C5	197	ς	F2	242
?	3F	63	l	6C	108	™	99	153	Ζ	C6	198	σ	F3	243
@	40	64	m	6D	109		9A	154	Η	C7	199	τ	F4	244
A	41	65	n	6E	110	›	9B	155	Θ	C8	200	υ	F5	245
B	42	66	o	6F	111		9C	156	Ι	C9	201	φ	F6	246
C	43	67	p	70	112		9D	157	Κ	CA	202	χ	F7	247
D	44	68	q	71	113		9E	158	Λ	CB	203	ψ	F8	248
E	45	69	r	72	114		9F	159	Μ	CC	204	ω	F9	249
F	46	70	s	73	115		A0	160	Ν	CD	205	ϊ	FA	250
G	47	71	t	74	116	΄	A1	161	Ξ	CE	206	ϋ	FB	251
H	48	72	u	75	117	Ά	A2	162	Ο	CF	207	ό	FC	252
I	49	73	v	76	118	£	A3	163	Π	D0	208	ύ	FD	253
J	4A	74	w	77	119	¤	A4	164	Ρ	D1	209	ώ	FE	254
K	4B	75	x	78	120	¥	A5	165		D2	210		FF	255
L	4C	76	y	79	121	¦	A6	166	Σ	D3	211			

Figure A-8 Greek Character Set

A.12 Hebrew Character Set (TD 200, TD 200C, and TD400C)

Hebrew Character Set (TD 200, TD 200C, and TD400C)

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	״	D4	212
!	21	33	N	4E	78	{	7B	123	¨	A8	168	״	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	״	D6	214
#	23	35	P	50	80	}	7D	125	×	AA	170	׳	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	״	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172		D9	217
&	26	38	S	53	83	€	80	128	-	AD	173		DA	218
'	27	39	T	54	84		81	129	®	AE	174		DB	219
(	28	40	U	55	85	‚	82	130	¯	AF	175		DC	220
)	29	41	V	56	86	ƒ	83	131	°	B0	176		DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177		DE	222
+	2B	43	X	58	88	…	85	133	²	B2	178		DF	223
,	2C	44	Y	59	89	†	86	134	³	B3	179	א	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	ב	E1	225
.	2E	46	[	5B	91	ˆ	88	136	µ	B5	181	ג	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	ד	E3	227
0	30	48	]	5D	93		8A	138	·	B7	183	ה	E4	228
1	31	49	^	5E	94	‹	8B	139	¸	B8	184	ו	E5	229
2	32	50	_	5F	95		8C	140	¹	B9	185	ז	E6	230
3	33	51	`	60	96		8D	141	÷	BA	186	ח	E7	231
4	34	52	a	61	97		8E	142	»	BB	187	ט	E8	232
5	35	53	b	62	98		8F	143	¼	BC	188	י	E9	233
6	36	54	c	63	99		90	144	½	BD	189	ך	EA	234
7	37	55	d	64	100	‘	91	145	¾	BE	190	כ	EB	235
8	38	56	e	65	101	’	92	146	¿	BF	191	ל	EC	236
9	39	57	f	66	102	“	93	147	À	C0	192	ם	ED	237
:	3A	58	g	67	103	”	94	148	Á	C1	193	מ	EE	238
;	3B	59	h	68	104	•	95	149	Â	C2	194	ן	EF	239
<	3C	60	I	69	105	–	96	150	Ã	C3	195	נ	F0	240
=	3D	61	j	6A	106	—	97	151	Ä	C4	196	ס	F1	241
>	3E	62	k	6B	107	˜	98	152	Å	C5	197	ע	F2	242
?	3F	63	l	6C	108	™	99	153	Æ	C6	198	ף	F3	243
@	40	64	m	6D	109		9A	154	Ç	C7	199	פ	F4	244
A	41	65	n	6E	110	›	9B	155	È	C8	200	ץ	F5	245
B	42	66	o	6F	111		9C	156	É	C9	201	צ	F6	246
C	43	67	p	70	112		9D	157	Ê	CA	202	ק	F7	247
D	44	68	q	71	113		9E	158	Ë	CB	203	ר	F8	248
E	45	69	r	72	114		9F	159	Ì	CC	204	ש	F9	249
F	46	70	s	73	115		A0	160	Í	CD	205	ת	FA	250
G	47	71	t	74	116	¡	A1	161	Î	CE	206		FB	251
H	48	72	u	75	117	¢	A2	162	Ï	CF	207		FC	252
I	49	73	v	76	118	£	A3	163	Ð	D0	208		FD	253
J	4A	74	w	77	119	₪	A4	164	Ñ	D1	209		FE	254
K	4B	75	x	78	120	¥	A5	165	Ò	D2	210		FF	255
L	4C	76	y	79	121	¦	A6	166	Ó	D3	211			

Figure A-9 Hebrew Character Set

A.13 Latin 1 Character Set

Latin 1 Character Set

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	Ô	D4	212
!	21	33	N	4E	78	{	7B	123	¨	A8	168	Õ	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	Ö	D6	214
#	23	35	P	50	80	}	7D	125	ª	AA	170	×	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	Ø	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	Ù	D9	217
&	26	38	S	53	83	€	80	128	-	AD	173	Ú	DA	218
'	27	39	T	54	84		81	129	®	AE	174	Û	DB	219
(	28	40	U	55	85	‚	82	130	¯	AF	175	Ü	DC	220
)	29	41	V	56	86	ƒ	83	131	°	B0	176	Ý	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	Þ	DE	222
+	2B	43	X	58	88	…	85	133	²	B2	178	ß	DF	223
,	2C	44	Y	59	89	†	86	134	³	B3	179	à	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	á	E1	225
.	2E	46	[	5B	91	ˆ	88	136	µ	B5	181	â	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	ã	E3	227
0	30	48	]	5D	93	Š	8A	138	·	B7	183	ä	E4	228
1	31	49	^	5E	94	‹	8B	139	¸	B8	184	å	E5	229
2	32	50	_	5F	95	Œ	8C	140	¹	B9	185	æ	E6	230
3	33	51	`	60	96		8D	141	º	BA	186	ç	E7	231
4	34	52	a	61	97	Ž	8E	142	»	BB	187	è	E8	232
5	35	53	b	62	98		8F	143	¼	BC	188	é	E9	233
6	36	54	c	63	99		90	144	½	BD	189	ê	EA	234
7	37	55	d	64	100	‘	91	145	¾	BE	190	ë	EB	235
8	38	56	e	65	101	’	92	146	¿	BF	191	ì	EC	236
9	39	57	f	66	102	“	93	147	À	C0	192	í	ED	237
:	3A	58	g	67	103	”	94	148	Á	C1	193	î	EE	238
;	3B	59	h	68	104	•	95	149	Â	C2	194	ï	EF	239
<	3C	60	I	69	105	–	96	150	Ã	C3	195	ð	F0	240
=	3D	61	j	6A	106	—	97	151	Ä	C4	196	ñ	F1	241
>	3E	62	k	6B	107	˜	98	152	Å	C5	197	ò	F2	242
?	3F	63	l	6C	108	™	99	153	Æ	C6	198	ó	F3	243
@	40	64	m	6D	109	š	9A	154	Ç	C7	199	ô	F4	244
A	41	65	n	6E	110	›	9B	155	È	C8	200	õ	F5	245
B	42	66	o	6F	111	œ	9C	156	É	C9	201	ö	F6	246
C	43	67	p	70	112		9D	157	Ê	CA	202	÷	F7	247
D	44	68	q	71	113	ž	9E	158	Ë	CB	203	ø	F8	248
E	45	69	r	72	114	Ÿ	9F	159	Ì	CC	204	ù	F9	249
F	46	70	s	73	115		A0	160	Í	CD	205	ú	FA	250
G	47	71	t	74	116	¡	A1	161	Î	CE	206	û	FB	251
H	48	72	u	75	117	¢	A2	162	Ï	CF	207	ü	FC	252
I	49	73	v	76	118	£	A3	163	Ð	D0	208	ý	FD	253
J	4A	74	w	77	119	¤	A4	164	Ñ	D1	209	þ	FE	254
K	4B	75	x	78	120	¥	A5	165	Ò	D2	210	ÿ	FF	255
L	4C	76	y	79	121	¦	A6	166	Ó	D3	211			

Figure A-10 Latin 1 Character Set

A.14 Latin 2 Character Set

Latin 2 Character Set

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	Ô	D4	212
!	21	33	N	4E	78	{	7B	123	¨	A8	168	Ő	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	Ö	D6	214
#	23	35	P	50	80	}	7D	125	Ş	AA	170	×	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	Ř	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	Ů	D9	217
&	26	38	S	53	83	€	80	128	-	AD	173	Ú	DA	218
'	27	39	T	54	84		81	129	®	AE	174	Ű	DB	219
(	28	40	U	55	85	‚	82	130	Ż	AF	175	Ü	DC	220
)	29	41	V	56	86		83	131	°	B0	176	Ý	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	Ţ	DE	222
+	2B	43	X	58	88	…	85	133	˛	B2	178	ß	DF	223
,	2C	44	Y	59	89	†	86	134	ł	B3	179	ŕ	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	á	E1	225
.	2E	46	[	5B	91		88	136	µ	B5	181	â	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	ă	E3	227
0	30	48	]	5D	93	Š	8A	138	·	B7	183	ä	E4	228
1	31	49	^	5E	94	‹	8B	139	¸	B8	184	Ĺ	E5	229
2	32	50	_	5F	95	Ś	8C	140	ą	B9	185	ć	E6	230
3	33	51	`	60	96	Ť	8D	141	ş	BA	186	ç	E7	231
4	34	52	a	61	97	Ž	8E	142	»	BB	187	č	E8	232
5	35	53	b	62	98	Ź	8F	143	Ľ	BC	188	é	E9	233
6	36	54	c	63	99		90	144	˝	BD	189	ę	EA	234
7	37	55	d	64	100	‘	91	145	ľ	BE	190	ë	EB	235
8	38	56	e	65	101	’	92	146	ż	BF	191	ě	EC	236
9	39	57	f	66	102	“	93	147	Ŕ	C0	192	í	ED	237
:	3A	58	g	67	103	”	94	148	Á	C1	193	î	EE	238
;	3B	59	h	68	104	•	95	149	Â	C2	194	ď	EF	239
<	3C	60	I	69	105	–	96	150	Ă	C3	195	đ	F0	240
=	3D	61	j	6A	106	—	97	151	Ä	C4	196	ń	F1	241
>	3E	62	k	6B	107		98	152	Ĺ	C5	197	ň	F2	242
?	3F	63	l	6C	108	™	99	153	Ć	C6	198	ó	F3	243
@	40	64	m	6D	109	š	9A	154	Ç	C7	199	ô	F4	244
A	41	65	n	6E	110	›	9B	155	Č	C8	200	ő	F5	245
B	42	66	o	6F	111	ś	9C	156	É	C9	201	ö	F6	246
C	43	67	p	70	112	ť	9D	157	Ę	CA	202	÷	F7	247
D	44	68	q	71	113	ž	9E	158	Ě	CB	203	ř	F8	248
E	45	69	r	72	114	ź	9F	159	Ě	CC	204	ů	F9	249
F	46	70	s	73	115		A0	160	Í	CD	205	ú	FA	250
G	47	71	t	74	116	ˇ	A1	161	Î	CE	206	ű	FB	251
H	48	72	u	75	117	˘	A2	162	Ď	CF	207	ü	FC	252
I	49	73	v	76	118	Ł	A3	163	Đ	D0	208	ý	FD	253
J	4A	74	w	77	119	¤	A4	164	Ń	D1	209	ţ	FE	254
K	4B	75	x	78	120	Ą	A5	165	Ň	D2	210	˙	FF	255
L	4C	76	y	79	121	¦	A6	166	Ó	D3	211			

Figure A-11 Latin 2 Character Set

A.15 Turkish (Latin 5) Character Set

Turkish (Latin 5) Character Set

Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec
	20	32	M	4D	77	z	7A	122	§	A7	167	Ô	D4	212
!	21	33	N	4E	78	{	7B	123	¨	A8	168	Õ	D5	213
"	22	34	O	4F	79	|	7C	124	©	A9	169	Ö	D6	214
#	23	35	P	50	80	}	7D	125	ª	AA	170	×	D7	215
$	24	36	Q	51	81	~	7E	126	«	AB	171	Ø	D8	216
%	25	37	R	52	82		7F	127	¬	AC	172	Ù	D9	217
&	26	38	S	53	83	€	80	128	-	AD	173	Ú	DA	218
'	27	39	T	54	84		81	129	®	AE	174	Û	DB	219
(	28	40	U	55	85	‚	82	130	¯	AF	175	Ü	DC	220
)	29	41	V	56	86	ƒ	83	131	°	B0	176	İ	DD	221
*	2A	42	W	57	87	„	84	132	±	B1	177	Ş	DE	222
+	2B	43	X	58	88	…	85	133	²	B2	178	ß	DF	223
,	2C	44	Y	59	89	†	86	134	³	B3	179	à	E0	224
-	2D	45	Z	5A	90	‡	87	135	´	B4	180	á	E1	225
.	2E	46	[	5B	91	ˆ	88	136	µ	B5	181	â	E2	226
/	2F	47	\	5C	92	‰	89	137	¶	B6	182	ã	E3	227
0	30	48	]	5D	93	Š	8A	138	·	B7	183	ä	E4	228
1	31	49	^	5E	94	‹	8B	139	¸	B8	184	å	E5	229
2	32	50	_	5F	95	Œ	8C	140	¹	B9	185	æ	E6	230
3	33	51	`	60	96		8D	141	º	BA	186	ç	E7	231
4	34	52	a	61	97		8E	142	»	BB	187	è	E8	232
5	35	53	b	62	98		8F	143	¼	BC	188	é	E9	233
6	36	54	c	63	99		90	144	½	BD	189	ê	EA	234
7	37	55	d	64	100	‘	91	145	¾	BE	190	ë	EB	235
8	38	56	e	65	101	’	92	146	¿	BF	191	ì	EC	236
9	39	57	f	66	102	“	93	147	À	C0	192	í	ED	237
:	3A	58	g	67	103	”	94	148	Á	C1	193	î	EE	238
;	3B	59	h	68	104	•	95	149	Â	C2	194	ï	EF	239
<	3C	60	i	69	105	–	96	150	Ã	C3	195	ğ	F0	240
=	3D	61	j	6A	106	—	97	151	Ä	C4	196	ñ	F1	241
>	3E	62	k	6B	107	˜	98	152	Å	C5	197	ò	F2	242
?	3F	63	l	6C	108	™	99	153	Æ	C6	198	ó	F3	243
@	40	64	m	6D	109	š	9A	154	Ç	C7	199	ô	F4	244
A	41	65	n	6E	110	›	9B	155	È	C8	200	õ	F5	245
B	42	66	o	6F	111	œ	9C	156	É	C9	201	ö	F6	246
C	43	67	p	70	112		9D	157	Ê	CA	202	÷	F7	247
D	44	68	q	71	113		9E	158	Ë	CB	203	ø	F8	248
E	45	69	r	72	114	Ÿ	9F	159	Ì	CC	204	ù	F9	249
F	46	70	s	73	115		A0	160	Í	CD	205	ú	FA	250
G	47	71	t	74	116	¡	A1	161	Î	CE	206	û	FB	251
H	48	72	u	75	117	¢	A2	162	Ï	CF	207	ü	FC	252
I	49	73	v	76	118	£	A3	163	Ğ	D0	208	ı	FD	253
J	4A	74	w	77	119	¤	A4	164	Ñ	D1	209	ş	FE	254
K	4B	75	x	78	120	¥	A5	165	Ò	D2	210	ÿ	FF	255
L	4C	76	y	79	121	¦	A6	166	Ó	D3	211			

Figure A-12 Turkish (Latin 5) Character Set

Connecting Multiple Devices on a Network

B

B.1 Overview

Overview of Appendix B

You can connect multiple TD devices and S7-200 CPUs together on one communication network. The TD devices act as network masters and do not interfere with each other. You can designate the S7-200 CPUs to be either masters or slaves on the network.

B.2 Communicating with Multiple CPUs

Communicating with Multiple CPUs

Figure B-1 shows a typical network with two TD 200s and two S7-200 CPUs. Each TD 200 communicates to one of the CPUs. The addresses of each device are noted below the device in the figure. In this example:

- TD 200 Number 1 is configured to communicate to the S7-200 CPU at address 2 (CPU 1)
- TD 200 Number 2 is configured to communicate to the S7-200 CPU at address 3 (CPU 2)

Tip
You can connect multiple TD devices to a single S7-200 CPU. You can store separate parameter blocks for each TD device in different V memory locations in the CPU.

If you do not store separate parameter blocks for each TD device that is connected to the CPU, any of these TD devices can acknowledge the same messages and use function keys to initiate operations in the CPU.

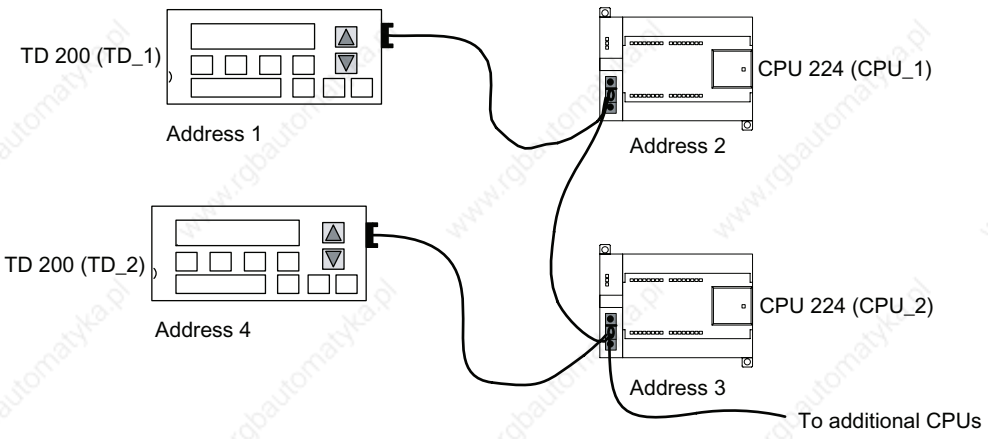

Figure B-1 Typical Multiple CPU Network

Tip
The display time slows as more TD devices are added to the network.

Network connectors are available from Siemens. Using these connectors allows you to isolate the CPUs from one another (the 24 VDC), but still allows you to power the TD device from the CPU. See the SIMATIC S7-200 Programmable Controller System Manual for more information about using network connectors.

B.3 Determining the Distances, Transmission Rate, and Cable

Determining the Distances, Transmission Rate, and Cable

As shown in Table B-1, the maximum length of a network segment is determined by two factors: isolation (using an RS-485 repeater) and baud rate.

Isolation is required when you connect devices at different ground potentials. Different ground potentials can exist when grounds are physically separated by a long distance. Even over short distances, load currents of heavy machinery can cause a difference in ground potential.

Table B-1 Maximum Length for a Network Cable

Baud Rate	Non-Isolated CPU Port[1]	CPU Port with Repeater or EM 277
9.6 kbaud to 187.5 kbaud	50 m	1,000 m
[1] The maximum distance allowed without using an isolator or repeater is 50 m. You measure this distance from the first node to the last node in the segment,		

Using Repeaters on the Network

An RS-485 repeater provides bias and termination for the network segment. You can use a repeater for the following purposes:

- To increase the length of a network: Adding a repeater to your network allows you to extend the network another 50 m. If you connect two repeaters with no other nodes in between (as shown in Figure B-2), you can extend the network to the maximum cable length for the baud rate. You can use up to 9 repeaters in series on a network, but the total length of the network must not exceed 9600 m.
- To add devices to a network: Each segment can have a maximum of 32 devices connected up to 50 m at 9600 baud. Using a repeater allows you to add another segment (32 devices) to the network.
- To electrically isolate different network segments: Isolating the network improves the quality of the transmission by separating the network segments which might be at different ground potentials.

A repeater on your network counts as one of the nodes on a segment, even though it is not assigned a network address.

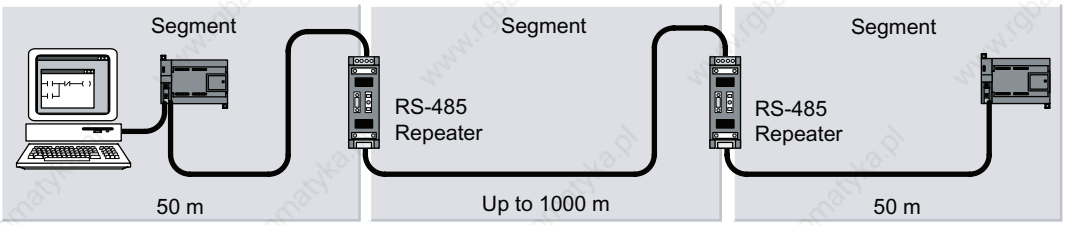

Figure B-2 Sample Network with Repeaters

B.4 Selecting the Network Cable

Selecting the Network Cable

S7-200 networks use the RS-485 standard on twisted pair cables. Table B-2 lists the specifications for the network cable. You can connect up to 32 devices on a network segment.

Table B-2 General Specifications for Network Cable

Specifications	Description
Cable type	Shielded, twisted pair
Loop resistance	≤115 Ω /km
Effective capacitance	30 pF/m
Nominal impedance	Approximately 135 Ω to 160 Ω (frequency =3 MHz to 20 MHz)
Attenuation	0.9 dB/100 m (frequency=200 kHz)
Cross-sectional core area	0.3 mm^2 to 0.5 mm^2
Cable diameter	8 mm ±0.5 mm

B.5 Biasing and Terminating the Network Cable

Biasing and Terminating the Network Cable

Siemens provides two types of network connectors that you can use to easily connect multiple devices to a network: a standard network connector and a connector that includes a programming port (which allows you to connect a programming station or an HMI device to the network without disturbing any existing network connections). The programming port connector passes all signals (including the power pins) from the S7-200 through to the programming port, which is especially useful for connecting devices that draw power from the S7-200 (such as a TD 200).

Both connectors have two sets of terminal screws to allow you to attach the incoming and outgoing network cables. Both connectors also have switches to bias and terminate the network selectively. Figure B-3 shows typical biasing and termination for the cable connectors.

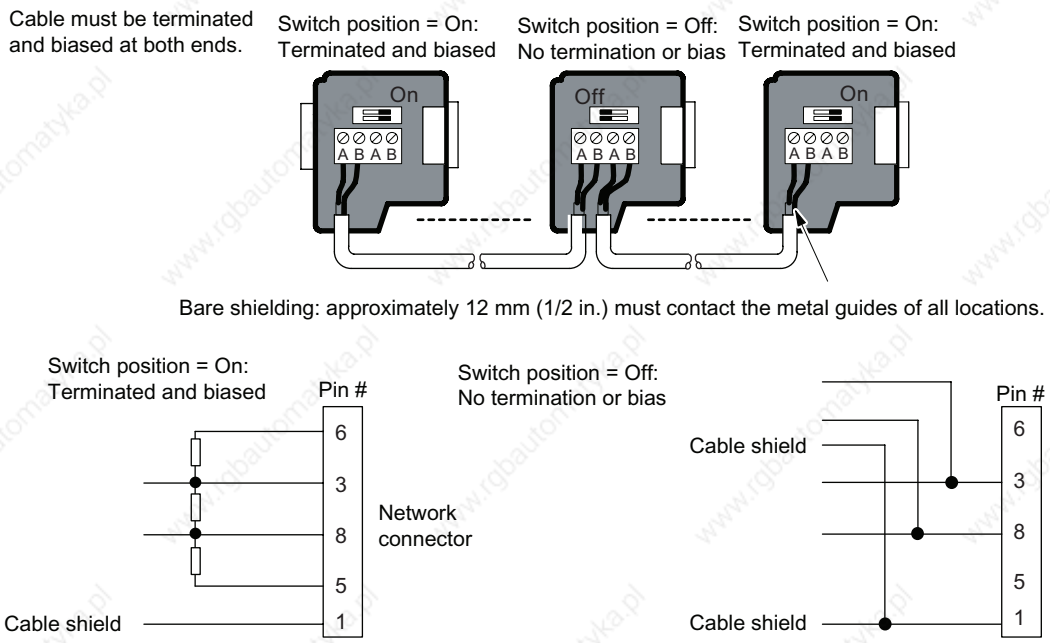

Figure B-3 Bias and Termination of the Network Cable

B.6 Building a TD/CPU Cable

Building a TD/CPU Cable

The TD/CPU cable is used for connecting a display device to an S7-200 CPU. If you do not have a TD/CPU cable, refer to Figures B-4 and B-5 to create your own cable.

Making a Cable That Supplies Power to the TD Device

CAUTION

Connecting the 24 VDC power output (pin 7 of communication port) of multiple S7-200 CPUs may cause erratic operation of the I/O, which could potentially cause personal injury and/or property damage.

The 24 VDC power supply is also the sensor supply for the I/O. Interconnecting the output power supplies of multiple CPUs could possibly overload the sensor supply, which could cause the I/O to operate incorrectly.

When networking S7-200 CPUs, connect only the communication lines (pins 3, 5, and 8). You must not connect the power output (pin 7).

Tip
The TD 100C must use the TD/CPU cable shown in Figure B-4.

Figure B-4 shows you the pin-out of TD/CPU cable with power supplied to the TD device. Use this option when you want the TD device to receive power from an S7-200 CPU.

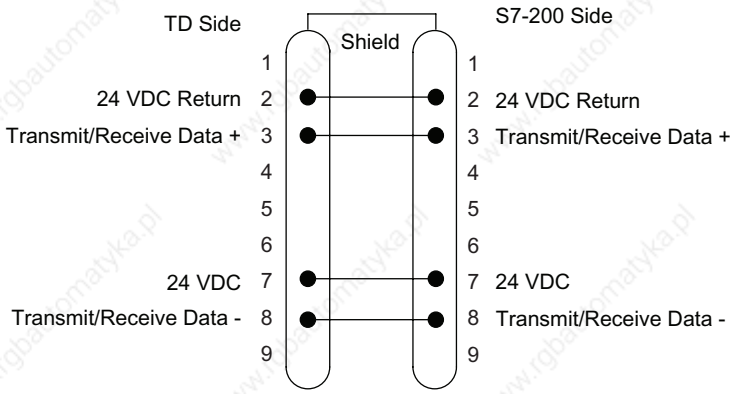

Figure B-4 TD/CPU Cable with Power Connections

Making a Cable That Does Not Supply Power to the TD Device (TD 200, TD 200C, and TD400C only)

Figure B-5 shows you the pin-out of a TD/CPU cable without power supplied to the TD device. Use this option when you want the TD device to receive power from an external power supply. The maximum length for the cable is 1200 meters.

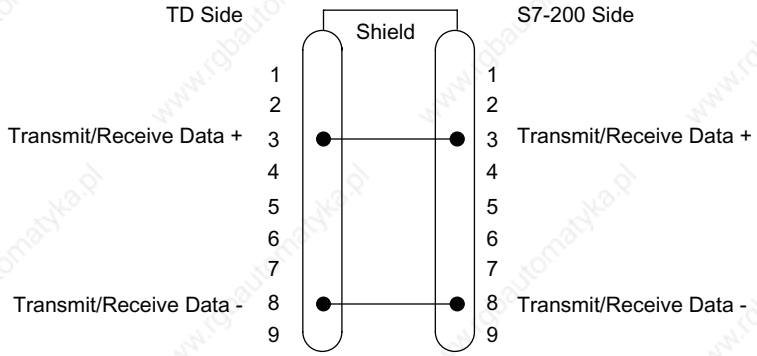

Figure B-5 TD/CPU Cable without Power Connections

B.7 CPU Grounding and Circuit Reference Point Guidelines for Using Isolated Circuits

CPU Grounding and Circuit reference Point Guidelines for Using Isolated Circuits

The following items are CPU grounding and circuit guidelines for using isolated circuits:

- You should identify the reference point (0 voltage reference) for each circuit in the installation, and the points at which circuits with possibly different references can connect together. Such connections can result in unwanted current flows that can cause logic errors or can damage circuits. A common cause of different reference potentials is grounds that are physically separated by long distances. When devices with widely separated grounds are connected with a communication or sensor cable, unexpected currents can flow through the circuit created by the cable and the ground. Even over short distances, load currents of heavy machinery can cause differences in ground potential or can directly induce unwanted currents by electromagnetic induction. Power supplies that are improperly referenced with respect to each other can cause damaging currents to flow between their associated circuits.
- When you connect CPUs with different ground potentials to the same PPI network, you should use an isolated RS-485 repeater.
- S7-200 products include isolation boundaries at certain points to help prevent unwanted current flows in your installation. When you plan your installation, you should consider where these isolation boundaries are provided, and where they are not provided. You should also consider the isolation boundaries in associated power supplies and other equipment, and where all associated power supplies have their reference points.
- You should choose your ground reference points and use the isolation boundaries provided to interrupt unneeded circuit loops that could allow unwanted currents to flow. Remember to consider temporary connections which may introduce a new circuit reference, such as the connection of a programming device to the CPU.
- When locating grounds, you must also consider safety grounding requirements and the proper operation of protective interrupting devices.

- In most installations, you will have the best noise immunity if you connect the CPU sensor supply M terminal to ground.

The following descriptions are an introduction to general isolation characteristics of the S7-200 family, but some features may be different on specific products. Consult your product specifications in the appropriate manual for information about which circuits include isolation boundaries and the ratings of the boundaries. Isolation boundaries rated less than 1,500 VAC are designed as functional isolation only, and should not be depended on as safety boundaries.

- Logic circuit reference is the same as DC sensor supply M.
- Logic circuit reference is the same as the input power supply M on a CPU with DC power supply.
- CPU communication ports have the same reference as logic circuit.
- Analog inputs and outputs are not isolated from logic circuit. Analog inputs are full differential to provide low voltage common mode rejection.
- Logic circuit is isolated from ground to 500 VAC.
- DC digital inputs and outputs are isolated from logic circuit to 500 VAC.
- DC digital I/O groups are isolated from each other by 500 VAC.
- Relay outputs are isolated from logic circuit to 1,500 VAC.
- Relay output groups are isolated from each other by 1,500 VAC.
- AC power supply line and neutral are isolated from ground, the logic circuit, and all I/O to 1,500 VAC.

Troubleshooting

C

C.1 Troubleshooting Guide

Troubleshooting

Refer to Table C-1 for a list of the problems that could occur with the TD device and possible causes and solutions.

Table C-1 Error Messages

Problem	Possible Cause	Possible Solution
NO PARAMETER BLOCK	The TD device could not find a parameter block in the programmable logic controller.	Configure a parameter block for the TD device using the Text Display wizard, and download it to the S7-200. Be sure the parameter block address in the TD device matches the actual address of the parameter block.
	The TD device found a parameter block in the programmable logic controller, but it contains errors.	Be sure all fields are within range. Be sure all addresses are valid for the S7-200 CPU.
No CPU COMM	Address of the S7-200 CPU is incorrect	Correct the address error
	S7-200 CPU does not have power	Power up the CPU
	Cable problems	Check the cable connections
	Wrong baud rate configured	Correct the baud rate
	Multiple CPUs at the same address	Remove other CPUs and retry
	May need network terminations	Refer to Appendix B
	Network too long or too many devices on network	Refer to Appendix B
HARDWARE ERROR	TD device is inoperable	The TD device could be defective Replace with a new TD device.
NETWORK ERROR TD device cannot establish a network connection or enter an existing network	Multiple masters with the same address.	Remove other masters and retry
	Cable problems	Check the cable connections
	Multiple CPUs at the same address	Remove the other CPUs and retry
CPU BUSY	Some other master has locked the S7-200 CPU by uploading or downloading a program to that CPU	Wait - The message disappears in a few seconds
CPU IN STOP MODE	RUN/STOP switch is in STOP	Put CPU in RUN mode

Problem	Possible Cause	Possible Solution
Display backlight is on, but no message is displayed	Program checksum failure	Defective hardware: Replace with a new TD device
User cannot access the TD system menus	The custom keypad does not contain the ESC and ENTER buttons	To restore the standard TD keypad: 1. Power down the TD device 2. Press and hold the lower right corner (where ENTER key is located on the standard keypad) 3. Power up the TD device The default keypad is restored until the TD device is power cycled again.

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