

SIMATIC S5

OP 393 Operator Panel

Manual

This manual has the order number:

6ES5998-0UQ22

Edition 05

EWA 4NEB 810 1180-02f



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	 WARNING
	Hazardous voltage. Can cause death, severe personal injury, or substantial property damage. Restrict use to qualified personnel. See safety instructions.

Only qualified personnel should install or maintain this equipment after becoming thoroughly familiar with all warnings, safety notices, and maintenance procedures contained in this manual. The successful and safe operation of this equipment is dependent upon proper handling, installation, operation, and maintenance.

The following are definitions of the terms "qualified person," "danger," "warning," and "caution," as applicable for this document.

Qualified Person

One who is familiar with the installation, construction, and operation of this equipment and the hazards involved. In addition, the person should have the following qualifications:

- Be trained and authorized to use and tag circuits and equipment in accordance with established safety practices
- Be trained in the proper care and use of protective equipment in accordance with established safety practices
- Be trained in rendering first aid

DANGER

Indicates loss of life, severe personal injury, or substantial property damage will result if proper precautions are not taken.

WARNING

Indicates loss of life, severe personal injury, or substantial property damage can result if proper precautions are not taken.

CAUTION

Indicates minor personal injury or property damage can result if proper precautions are not taken.

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Fifth Printing, July 1992

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Safety-Related Guidelines for the User

1 General

This document provides the information required for the intended use of the particular product. The documentation is written for technically qualified personnel such as engineers, programmers or maintenance specialists who have been specially trained and who have the specialized knowledge required in the field of instrumentation and control.

A knowledge of the safety instructions and warnings contained in this document and their appropriate application are prerequisites for safe installation and commissioning as well as safety in operation and maintenance of the product described. Only qualified personnel as defined in section 2 have the specialized knowledge that is necessary to correctly interpret the general guidelines relating to the safety instructions and warnings and implement them in each particular case.

For the sake of clarity, not all details of all versions of the product are described in this document, nor can it cover all conceivable cases regarding installation, operation and maintenance. Should you require further information or face special problems that have not been dealt with in sufficient detail in this document, please contact your local Siemens office.

We would also point out that the contents of this product documentation shall not become a part of or modify any prior or existing agreement, commitment or legal relationship. The Purchase Agreement contains the complete and exclusive obligations of Siemens. Any statements contained in this document do not create new warranties or restrict the existing warranty.

2 Qualified Personnel

Persons who are **not qualified** should not be allowed to handle the equipment/system. Non-compliance with the warnings contained in this document or appearing on the equipment itself can result in severe personal injury or damage to property. Only **qualified personnel** should be allowed to work on this equipment/system.

Qualified persons as referred to in the safety guidelines in this document as well as on the product itself are defined as follows:

- System planning and design engineers who are familiar with the safety concepts of automation equipment;
- Operating personnel who have been trained to work with automation equipment and are conversant with the contents of the document in as far as it is connected with the actual operation of the plant;
- Commissioning and service personnel who are trained to repair such automation equipment and who are authorized to energize, deenergize, clear, ground and tag circuits, equipment and systems in accordance with established safety practices.

3 Danger Notices

The notices and guidelines that follow are intended to ensure personal safety, as well as protect the product and connected equipment against damage.

The safety notices and warnings for protection against loss of life (the users or service personnel) or for protection against damage to property are highlighted in this document by the terms and pictograms defined here. The terms used in this document and marked on the equipment itself have the following significance:

Danger

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

Warning

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

Caution

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

Note

contains important information about the product, its operation or a part of the document to which special attention is drawn.

Important

If "Important" should appear in this document in bold type, drawing attention to any particular information, the definition corresponds to that of "Warning", "Caution" or "Note".

4 Proper Usage

- The equipment/system or the system components may only be used for the applications described in the catalog or the technical description, and only in combination with the equipment, components and devices of other manufacturers as far as this is recommended or permitted by Siemens.
- The product described has been developed, manufactured, tested and the documentation compiled in keeping with the relevant safety standards. Consequently, if the described handling instructions and safety guidelines described for planning, installation, proper operation and maintenance are adhered to, the product, under normal conditions, will not be a source of danger to property or life.



Warning

- After the housing or the protective cover is opened or after the system cabinet is opened, certain parts of this equipment/system will be accessible, which could have a dangerously high voltage level.
- Only suitably qualified personnel should be allowed access to this equipment/system.
- These persons must be fully conversant with any potential sources of danger and maintenance measures as set out in this document.
- It is assumed that this product be transported, stored and installed as intended, and maintained and operated with care to ensure that the product functions correctly and safely.

5 Guidelines for the Planning and Installation of the Product

The product generally forms a part of larger systems or plants. These guidelines are intended to help integrate the product into its environment without it constituting a source of danger.

The following facts require particular attention:



Note

Even when a high degree of safety has been designed into an item of automation equipment by means of multichannel configuration, it is still imperative that the instructions contained in this document be exactly adhered to. Incorrect handling can render ineffective the preventive measures incorporated into the system to protect it against dangerous faults, and even create new sources of danger.

The following advice regarding installation and commissioning of the product should - in specific cases - also be noted.



Warning

- Follow strictly the safety and accident prevention rules that apply in each particular case.
- Units which are designed as built-in units may only be operated as such, and table-mounted or portable equipment only with its casing closed.
- In the case of equipment with a permanent power connection which is not provided with an isolating switch and/or fuses which disconnect all poles, a suitable isolating switch or fuses must be provided in the building wiring system (distribution board). Furthermore, the equipment must be connected to a protective ground (PE) conductor.
- For equipment or systems with a fixed connecting cable but no isolating switch which disconnects all poles, the power socket with the grounding pin must be installed close to the unit and must be easily accessible.
- Before switching on the equipment, make sure that the voltage range setting on the equipment corresponds to the local power system voltage.
- In the case of equipment operating on 24 V DC, make sure that proper electrical isolation is provided between the mains supply and the 24 V supply. Only use power supply units to IEC 364-4-41 or HD 384.04.41 (VDE 0100 Part 410).
- Fluctuations or deviations of the power supply voltage from the rated value should not exceed the tolerances specified in the technical specifications. Otherwise, functional failures or dangerous conditions can occur in the electronic modules/equipment.
- Suitable measures must be taken to make sure that programs that are interrupted by a voltage dip or power supply failure resume proper operation when the power supply is restored. Care must be taken to ensure that dangerous operating conditions do not occur even momentarily. If necessary, the equipment must be forced into the "emergency off" state.
- Emergency tripping devices in accordance with EN 60204/IEC 204 (VDE 0113) must be effective in all operating modes of the automation equipment. Resetting the emergency off device must not result in any uncontrolled or undefined restart of the equipment.



Caution

- Install the power supply and signal cables in such a manner as to prevent inductive and capacitive interference voltages from affecting the automation functions.
- Automation equipment and its operating elements must be installed in such a manner as to prevent unintentional operation.
- Automation equipment can assume an undefined state in the case of a wire break in the signal lines. To prevent this, suitable hardware and software measures must be taken when interfacing the inputs and outputs of the automation equipment.

6 Active and Passive Faults in Automation Equipment

- Depending on the particular task for which the electronic automation equipment is used, both **active** as well as **passive** faults can result in a **dangerous** situation. For example, in drive control, an active fault is generally dangerous because it can result in an unauthorized startup of the drive. On the other hand, a passive fault in a signalling function can result in a dangerous operating state not being reported to the operator.
- This differentiation of the possible faults and their classification into dangerous and non-dangerous faults, depending on the particular task, is important for all safety considerations in respect to the product supplied.



Warning

In all cases where a fault in automation equipment can result in severe personal injury or substantial damage to property, i.e., where a dangerous fault can occur, additional external measures must be taken or equipment provided to ensure or force safe operating conditions even in the event of a fault (e.g., by means of independent limit monitors, mechanical interlocks etc.).

7 Procedures for Maintenance and Repair

If measurement or testing work is to be carried out on an active unit, the rules and regulations contained in the "VBG 4.0 Accident prevention regulations" of the German employers liability assurance association (Berufsgenossenschaften) must be observed. Particular attention is drawn to paragraph 8 "Permissible exceptions when working on live parts". Use only suitable electrical tools.



Warning

- Repairs to an item of automation equipment may only be carried out by **Siemens service personnel** or **repair shops authorized by Siemens to carry out such repairs**. For replacement purposes, use only parts or components that are contained in the spare parts list or listed in the "Spare parts" section of this document. Unauthorized opening of equipment and improper repairs can result in loss of life or severe personal injury as well as substantial property damage
- Before opening the equipment, always remove the power plug or open the disconnecting switch.
- Only use the fuse types specified in the technical specifications or the maintenance instructions of this document.
- Do not throw batteries into an open fire and do not carry out any soldering work on batteries (danger of explosion). Maximum ambient temperature 100°C. Lithium batteries or batteries containing mercury should not be opened or recharged. Make sure that the same type is used when replacing batteries.
- Batteries and accumulators must be disposed of as classified waste.
- The following points require attention when using monitors:
Improper handling, especially the readjustment of the high voltage or fitting of another tube type can result in excessive X-ray radiation from the unit. The license to operate such a modified unit automatically lapses and the unit must not be operated at all.

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Preface

The OP 393 is an easy-to-use operator panel for SIMATIC® S5 programmable controllers of the lower to mid performance range.

It can be connected to various programmable controllers, and allows you to reference timers and counters and to display message texts.

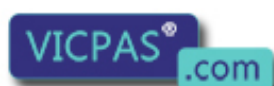
Additional diagnostics messages can be displayed and the contents of data words can be entered and displayed from version V2.0 onward.

From Version V3.0 onward you can do the following:

- Configure texts for the TIMER, COUNTER and DB input functions
- Force flags
- Protect all input functions with a password

Using the 6ES5 984-1UAxx cable adapter and power supply unit, the operator panel can be connected to the S5-150U programmable controller and cables longer than 3 m (10 ft.) can be used.

This manual is designed to give you comprehensive information and make working with the operator panel easier. However, not even a manual can deal with all the problems that can arise in the various applications. Appendix B contains a list of contacts who are always available to answer your questions.



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Introduction

The following pages provide information on the layout and use of the manual.

Contents

The contents of the manual can be broken down subject-wise into a number of blocks:

- Technical Description
- Operator Control and Programming

You will find additional information, on error messages for example, in tabular form in the appendices.

Please use the forms at the back of the manual for any suggestions or corrections you may have and return the form to us. This will help us to make the necessary improvements in the next edition.

Conventions

In order to improve the readability of the manual, a menu-style breakdown was used, i.e.:

- The individual chapters can be quickly located by means of a thumb register.
- There is an overview containing the headings of the individual chapters at the beginning of the manual.
- Each chapter is preceded by a breakdown of its subject matter.
The individual chapters are subdivided into sections. **Boldface** type is used for further subdivisions.
- Figures and tables are numbered separately in each chapter.
The page following the chapter breakdown contains a list of the figures and tables appearing in that particular chapter.

Certain conventions were observed when writing the manual. These are explained below.

- A number of abbreviations have been used.
Example: Programmer (PG)
- Footnotes are identified by superscripts consisting of a small digit (e.g. "1") or "*". The actual footnote is generally at the bottom left of the page or below the relevant table or figure.
- Cross references are shown as follows:
"(→ 2.1.2)" refers to Section 2.1.2.
No references are made to individual pages.
- All dimensions in drawings etc. are given in millimetres followed by inches.
Example 100/3.9.
- Value ranges are indicated as follows: 17 to 21
- Values may be represented as binary, decimal or hexadecimal numbers. The hexadecimal number system is indicated with a subscript (example F000_H).
- Information of special importance is printed in black-framed "windows":

Note

Additional information: emphasizes a special feature or characteristic.



Important

Precautions which must be taken to prevent damage to hardware or software.



Caution

Failure to observe these precautionary measures may result in personal injury.

Manuals can only describe the current version of the operator panel. Should modifications or supplements become necessary in the course of time, a supplement will be prepared and included in the manual the next time it is revised. The relevant version or edition of the manual appears on the cover. In the event of a revision, the edition number will be incremented by "1".

1 System Overview

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1 System Overview

The OP 393 Operator Panel allows you to enter, modify and display all internal timers and counters during operation. In addition, process-dependent message texts can be displayed. You can also display diagnostic messages and the contents of data words from version V2.0 onward.

From Version V3.0 onward you can do the following:

- Configure texts for the TIMER, COUNTER and DB input functions
- Force flags
- Protect all input functions with a password

The OP 393 offers an especially user-friendly operator communication facility with the S5-90U, S5-95U, S5-100U, S5-101U, S5-115U and S5-135U programmable controllers and can be used as a replacement for analog timer and counter modules.

The following table shows you the ways of connecting to the programmable controllers

- for the various versions of the OP 393
- using the 984 adapter

OPs AGs	OP 393 / OP 393-II		OP 393-IIC	
	without 984 adapter	with 984 adapter	without 984 adapter	with 984 adapter
S5-90U		•	•	•
S5-95U	•	•	•	•
S5-100U	•	•	•	•
S5-101U	•	•	•	•
S5-115U	•	•	•	•
S5-135U		•	•	•
S5-150U		•		•

Note

- You must use the 984 cable adapter with cables longer than 3 m.
- The OP 393-IIC/OP 393-III operator panels have improved connection facilities. The functionality of the OP 393-IIC is the same as that of the OP 393-II.

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2 Technical Specifications

This chapter deals with the technical specifications of the OP 393 operator panel.

2.1 Technical Specifications

Power supply:	6ES5 393-0UA11 } 6ES5 393-0UA12 } 6ES5 393-0UA13 } 6ES5 393-0UA14 }	→ 5.2V/0.5A → 5.2V/0.1A
Interface:	Power supply via cable from PC	
Ambient temperature:	Serial TTY 20 mA current loop	
Non operating temperature:	0° to 45° C	
VDE 0160	- 20° C to + 55° C	
Degree of protection:	IP 50 (no protection against water)	
Degree of protection if installed in switchboard etc.:	IP 54 (splash proof)	
Dimensions:	200 mm x 120 mm x 45 mm	
Weight:	(7.8 in. x 4.7 in. x 1.8 in.) approx. 700 g (1.5 lb)	

2.2 Ordering Data

● OP 393

OP 393-III operator panel:	6ES5 393-0UA14
Mounting frame:	6ES5 982-3UA11

Manual	English:	6ES5 998-0UQ22
	German:	6ES5 998-0UQ12
	French:	6ES5 998-0UQ32
	Spanish:	6ES5 998-0UQ42
	Italian:	6ES5 998-0UQ52

● 984 cable adapter

984 cable adapter	(220/240V)	6ES5 984-1UA31
with power supply unit:	(110/120V)	6ES5 984-1UA41
(see table on page 1-1)		

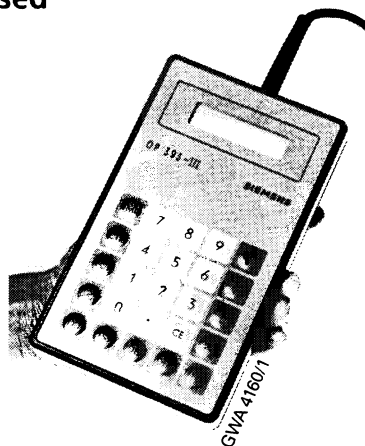
Connecting cable	
for S5 - 135U (3m)*	6ES5 728-0BD00
for S5 - 100U, S5 - 115U, S5 - 135U (longer than 3m),	6ES5 728-0xxx0**
for S5 - 150U (3m)	6ES5 728-1BD00
for S5 - 150U (longer than 3m)	6ES5 728-1xxx0**

* Not required for OP 393-II/OP 393-III

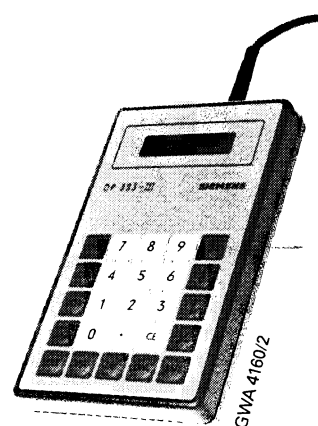
** See catalog ST 59, ST 80 for length key

2.3 Positions in which the OP 393 Can be Used

Handheld



Desktop



Hinge the stand up for hanging on the wall

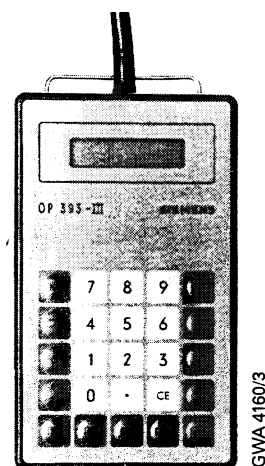
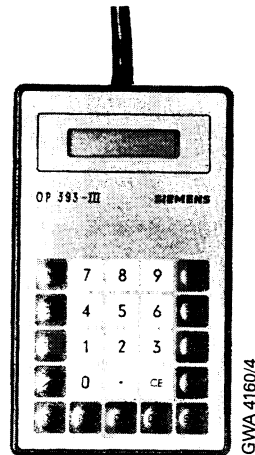


Figure 2-1. Positions in which the OP 393 Can be Used

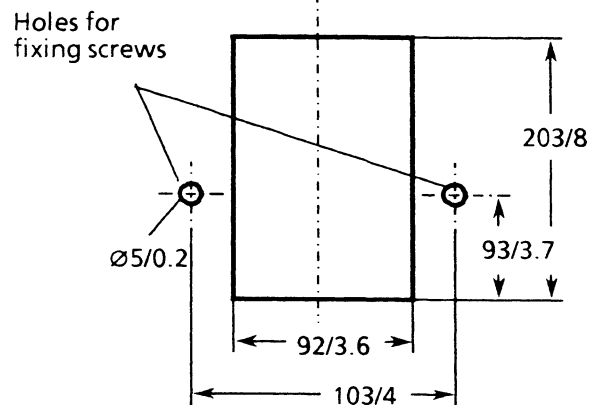
Panel mounting



Cutout dimensions without mounting frame:

There are two mounting threads on the lower part of the back of the unit. These accept the following screws:
M4, maximum length 8 mm (0.3 in.)

Cutout dimensions with mounting frame:
214 mm (8.4 in.) high, 135 mm (5.3 in.) wide



Dimensions for mounting frame:
Thickness of the mounting frame 5mm
Mounting depth 45mm

Maximum thickness of the panel 5 mm
Front panel cutout:
214 mm (8.4 in.) x 135 mm (5.3 in.)

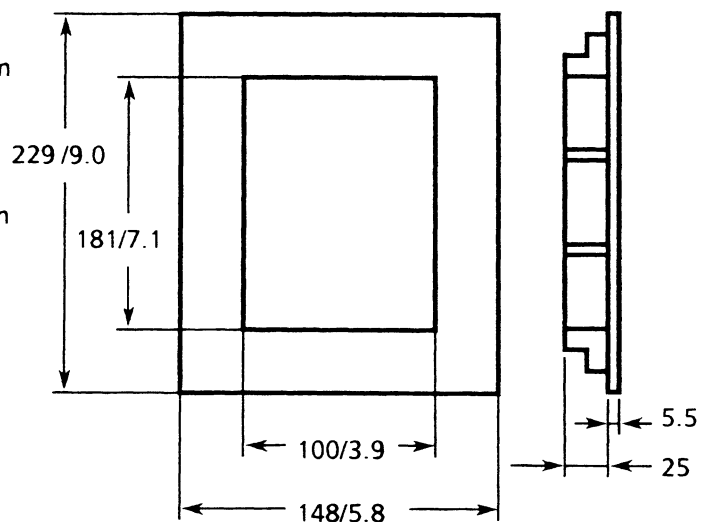


Figure 2-2. Cutout Dimensions (in mm/in.) for Panel Mounting

2.4 Connecting the OP 393 to the Programmable Controller

Plug the connector of the OP 393 into the Cannon subminiature D connector of the PLC and secure it. This establishes all the necessary connections.

The following display appears during power up:

OP 393 III
Vx.y

After power up, the operator panel assumes the initial state if no function is automatically selected in the DB 6 initialization data block (→ 3.2):

TMR/CTR/TXT/FCT
DIA/_DB/TST?

The OP awaits the selection of one of the functions listed.

The OP 393 is switched off by undoing the lock and unplugging the connector.

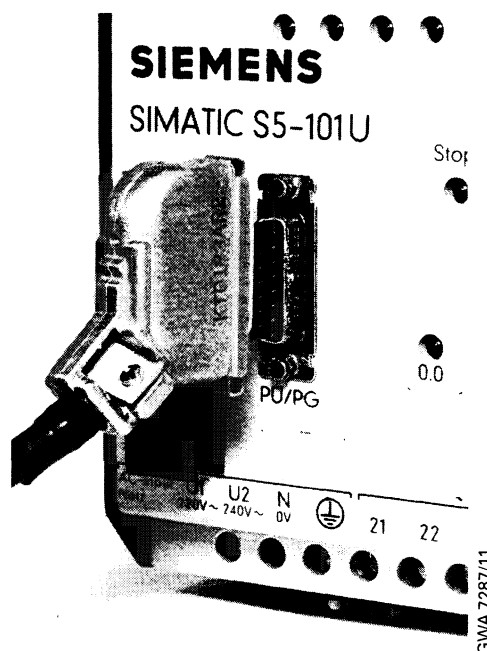


Figure 2-3. Connecting the OP 393 to an S5-101U

2.5 Keypad

The function keys (→ Table 2-1.) allow you to call a selected function. Press any other function key to quit the function.

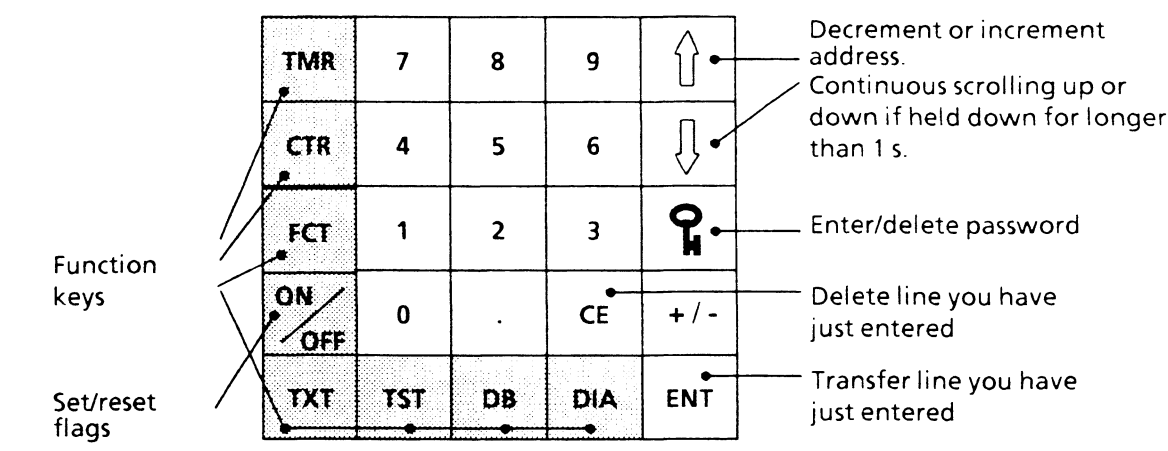


Figure 2-4. OP 393-II Keypad

Table 2-1. Overview of the OP 393 Function Keys

Key	Function
<TMR>	Preselect timer display/timer input (→ 4.2)
<CTR>	Preselect counter display/counter input (→ 4.3)
<FCT>	Preselect forcing of flag**
<TXT>	Display message texts (→ 6.3)
<TST>	Preselect test function (→ 9.1)*
<DB>	Preselect data word input and display (→ 5.2)*
<DIA>	Preselect diagnostic function (→ 7.3)*

* From V2.0 onward

** From V3.0 onward

2.6 Display

The OP 393 has an LCD display with two-lines of 16 characters each.

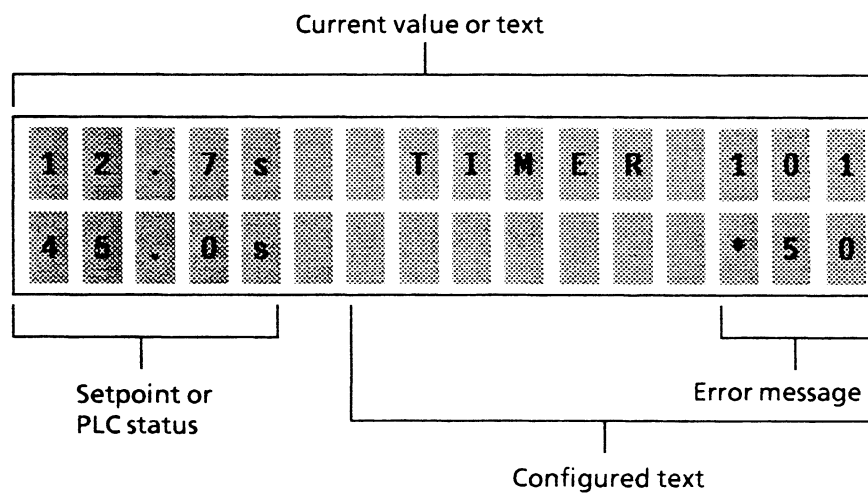


Figure 2-5. Typical Display

2.7 Principle of Operation

Defaults for operating the OP 393 can be stored in a DB 6 initialization data block (from Version V2.0 onward):

- Data block and flag word numbers (cannot be changed from the OP 393)
- Automatic selection of the diagnostics function or message display
- Function interlock with password

If DB 6 is not available or if it is wrongly structured, the OP 393 returns automatically to the initial state.

In the user program, timers, counters, flags and data words must be loaded with the relevant values of the assigned data words.

Note

The S5-101U is restricted to the following functions since it only has DB 1:

- Manipulation of timers and counters
- Diagnostic function

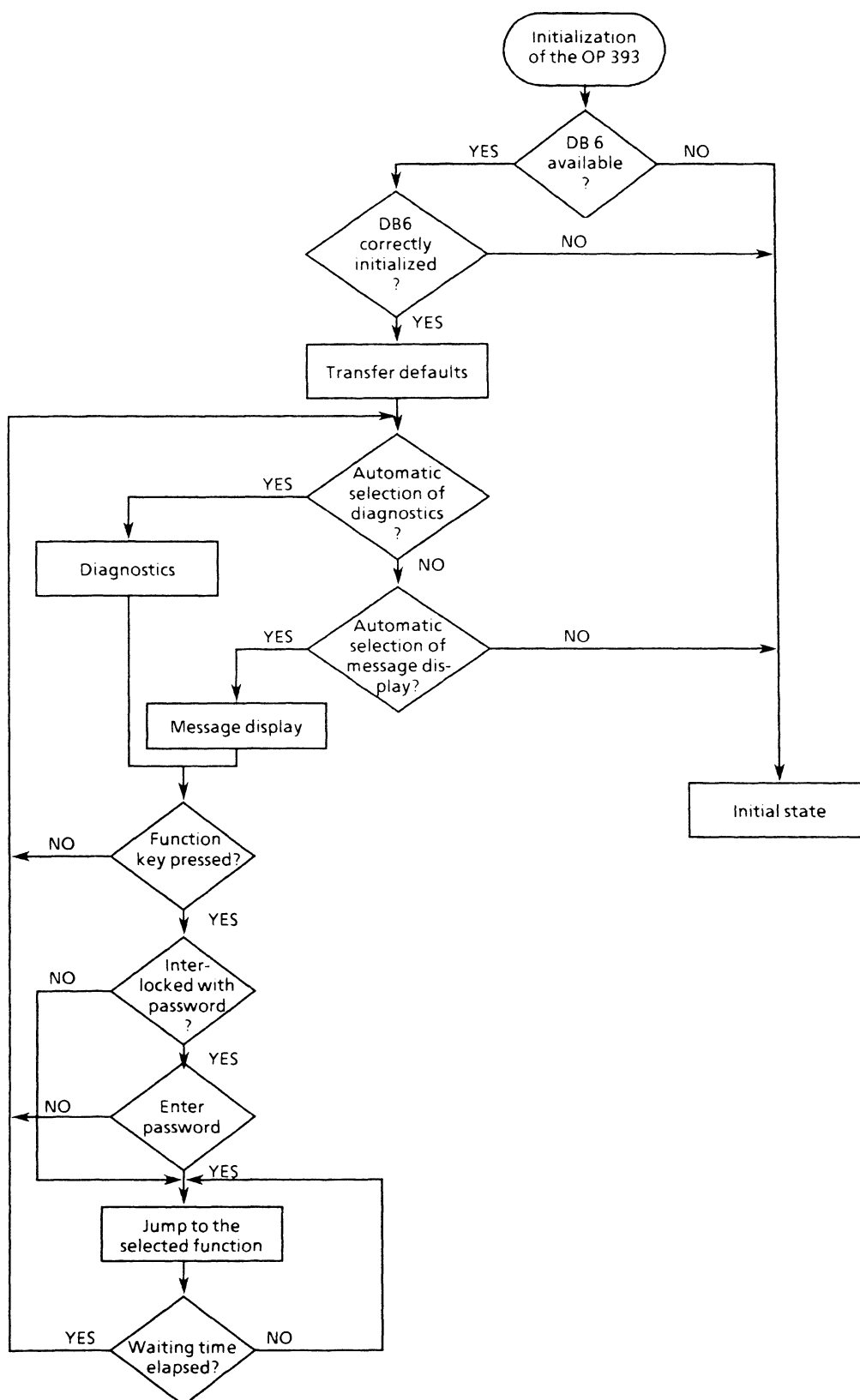


Figure 2-6. Flowchart: Principle of Operation of the OP 393

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3 Initializing the OP 393 (From Version V2.0 Onward)

The OP starts up as soon as the connection between it and the programmable controller is established.

3.1 DB6 Initialization Block

The PC is scanned during power-up to determine whether or not DB6 is stored in PLC memory. Changes during operation of the OP 393 are not recognized.

3.1.1 Notes on Initialization

If the DB6 initialization block is not available or if it is incorrectly structured, the message "*89" is displayed (→ Appendix A) and the OP returns to the initial state.

Note

If you want to replace an OP 393 V2.0 with an OP 393 V2.1, you must note that bytes DL3, DL4 and DL6 in the configuration DB are initialized with 00_H.

If you want to replace an OP 393 V2.1 with an OP 393 V3.0, nothing need be adapted to continue using the functions of the OP 393 V2.1.

However, if you want to use the new functions of the OP 393 V3.0, you must expand and configure parameter setting block DB6 accordingly.

3.1.2 Structure of DB6

DB6 must be structured as follows.

Note

Parameter setting block DB6, up to Version V2.1, must not exceed a length of eight data words (DW0 to DW7). A DB length of more than 8 data words produces an error message.

From Version V3.0 onward, parameter setting block DB6 is used for the new functions up to DW14, i.e. DB6 is freely available from DW15 onward.

Version V2.1			Version V3.0		
	DL	DR		DL	DR
DW0	00 _H	DIA.AUTO	DW0	00 _H	DIA.AUTO
DW1	00 _H	TMR	DW1	00 _H	TMR
DW2	00 _H	CTR	DW2	00 _H	CTR
DW3	TXT.MRK1	TXT.MRK2	DW3	TXT.MRK1	TXT.MRK2
DW4	TXT.ANZ	TXT.DBNR	DW4	TXT.ANZ	TXT.DBNR
DW5	00 _H	TXT.AUTO	DW5	00 _H	TXT.AUTO
DW6	DB.ANZ	DB.DBNR	DW6	DB.ANZ	DB.DBNR
DW7	FF _H	FF _H	DW7	KOMDB.ANZ	KOMDB.DBNR
End identifier			DW8	KOMTMR.ANZ	KOMTMR.DBNR
			DW9	KOMCTR.ANZ	KOMCTR.DBNR
			DW10	FCT.MRK1	FCT.MRK2
			DW11	KOMFCT.ANZ	KOMFCT.DBNR
			DW12	PASSW1	PASSW2
			DW13	00 _H	PASSVER
			DW14	FF _H	FF _H
					End ident.

Table 3-1. Parameter Setting Block DB6

Data word	Meaning	
	Up to Version V2.1	Version V3.0
DR0:	= DIA.AUTO = FF _H : Triggers an automatic jump to the diagnostics function. The other functions are selected by pressing the relevant function keys. Press the "DIA" key to return to the diagnostics function. If no key is pressed, the system returns to the diagnostics function after a period of two minutes. ≠ FF _H : No automatic jump. Press the "DIA" key to return to the diagnostics function.	
DR1*:	= TMR The number of the DB assigned to the TMR function is stored in this byte.	
DR2*:	= CTR The number of the DB assigned to the CTR function is stored in this byte.	
DW3**:	The flags for message text display are defined in data word DW3.	
DL3:	= TXT.MRK1 DL3 = 00 _H (corresponding to Version V2.0) The value in DR3 is interpreted as a flag doubleword, i.e. up to 32 message texts are displayed. More than 32 message texts can be configured from Version V2.1 onward. The number of flag bytes is specified in DL3.	
DR3:	= TXT.MRK2 Number of the flag byte or flag doubleword (DL3 = 00 _H) from which message texts are accessed.	

* Permissible input: 07_H - FF_H (corresponding to DB 7 to DB 255)

** N.B. DL + DR < 256, since flags or data blocks greater than 255 are not permissible.

Table 3-1. Parameter Setting Block DB6 (Continued)

Data Word	Meaning	
	Up to Version V2.1	Version V3.0
DW4**: DL4: DR4*:	The data words for message text display are specified in data word 4. = TXT.ANZ From Version V2.1 onward: If more than 32 message texts are configured, the number of data blocks required is entered here. (V 2.0: DL4 = 00_H) = TXT.DBNR Number of the first data block for message text display.	
DR5:	= TXT.AUTO = FF_H: Triggers an automatic jump to message display if no automatic jump to the diagnostics function has been programmed. The other functions are selected via the keypad. Press the "TXT" key to return to message display. If no key is pressed, the system returns to message display after approximately two minutes. ≠ FF_H: No automatic jump. Press the "TXT" key to select message display.	
DW6**: DL6: DR6*:	The data blocks for entering fixed-point numbers are configured in data word DW6. = DB.ANZ: Version V 2.0: DL6 = 00_H Only values in one data block can be changed. The number of blocks to be processed can be entered here from Version V2.1 onward. DL6 = 00_H or DL6 = 01_H → only the data block entered in DR6 is set. = DB.DBNR: Number of the first data block for input.	
DW7: DL7: DR7:	End of the parameter setting DB6 up to Version V2.1. = FF_H = FF_H	= KOMDB.ANZ Number of data blocks required for user text data block = KOMDB.DBNR Number of first data block for user text data block

* Permissible input: 07_H - FF_H (corresponding to DB 7 to DB 255)

** N.B DL + DR < 256, since flags or data blocks greater than 255 are not permissible.

Table 3-1. Parameter Setting Block DB6 (Continued)

Data Word	Meaning	
	Up to Version V2.1	Version V3.0
DL8:	DB6 exactly 8 DWs long	= KOMTMR.ANZ Number of data blocks required for TIMER user text
DR8:		= KOMTMR.DBNR Number of the first data block for TIMER user text
DL9:		= KOMCTR.ANZ Number of data blocks required for COUNTER user text
DR9:		= KOMCTR.DBNR Number of the first data block for COUNTER user text
DW10:		The command flags are defined in data word DW10.
DL10:		= FCT.MRK1 DL10 = 00 _H The value in DR10 is interpreted as a flag doubleword, i.e. up to 32 com- mand flags are displayed. If you want to configure more than 32 command flags, you must specify the number of flag bytes in DL10.
DR10:		= FCT.MRK2 Number of the flag byte or flag double- word (DL10 = 00 _H) from which the command flags are addressed.
DL11:		= KOMFCT.ANZ Number of data blocks required for command flags user text
DR11:		= KOMFCT.DBNR Number of the first data block for command flags user text
DW12:		= PASSWORD 5-digit password (1 to 32727)
DR13:		= PASSVER Password protection for the TIMER, COUNTER and DBs functions and for forcing flags

Table 3-1. Parameter Setting Block DB6 (Continued)

Data Word	Meaning	
	Up to Version V2.1	Version V3.0
DW14:	DB6 exactly 8 DWs long	End of the parameter setting block DB6 Version V3.0
DL14:		= FF _H
DR14:		= FF _H

Note

1. The OP 393 can only jump to the diagnostics function if DB5 is available and has the correct structure (→ 7.5.1).
2. If the number of a non-existent data block is entered in DW1, DW2, DW4, DW6, DW7, DW8, DW9 or DW11, the respective function is inhibited. If the function is selected, the message "*89" is output.
3. Any ranges exceeded when setting the DB6 parameters are not recognized by the OP 393.
4. In DR1, DR2, DR4, DR6, DR7, DR8, DR9 and DR11, data block numbers within the range 07_H to FF_H are permissible. With this you can address data blocks DB7 to DB255.
5. From Version V3.0 onward, the length of parameter setting block DB6 is not specified. This means that you can use all data words from DW15 in DB6 for further applications.
6. From Version V3.0 onward, selected password locking of the input functions is possible.

3.1.3 Priority of the Programmable Functions

If automatic jumps to both the DIA function and the TXT function have been programmed in DB6, DIA has priority. The diagnostics function is started automatically after the OP 393 is connected.

3.2 Principle of Operation without DB6

If DB6 is not available, the system jumps to the initial state.

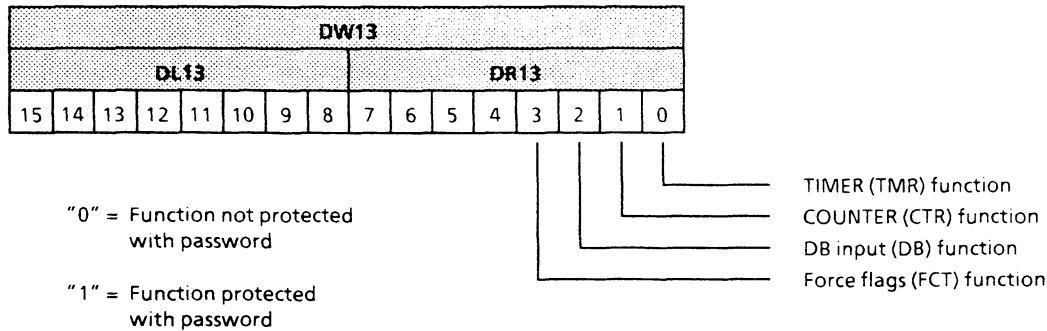
The following defaults apply for selecting the individual functions:

TMR	→	DB11	
CTR	→	DB12	
TXT	→	DB13 and MW0/2	(32 message texts)
DB	→	DB14	(Only one data block for fixed-point input)
FCT	→	DB15 and MW4/6	(32 command flags)

3.3 Password Protection (from Version 3.0)

All OP 393-III input functions can be protected selectively with a password.

Assignment of the password to the individual functions is stored in parameter setting block DB6, DR13.



You can enter the relevant password in DB6, DW12. The password can have up to five digits and can be stored in the range 1 to 32767 (16-bit fixed-point format).

Note

If there is no DB6 in the PLC, all input functions TMR, CTR, DB and FCT remain enabled.

3.3.1 Logging In the Password

Press the key on the OP 393-III to log in the configured password.

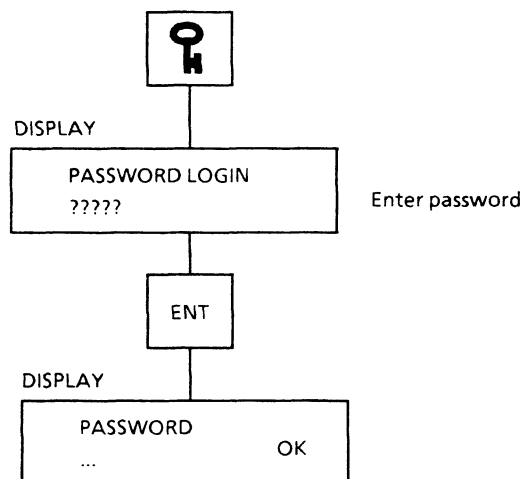


Figure 3-1. Logging In the Password

After pressing the ENTER key on the OP, the message "OK" is displayed for approximately 3 s. The OP then displays the basic screen form (function selection). If automatic selection has been configured, the OP jumps to "DIA" or "TXT".

If a wrong password is entered, error message "*91" appears.

The password function is aborted by pressing another function key or the CE key. The OP jumps to the selected function or to the basic screen form (CE key).

Note

All functions are enabled as long as the password is logged on.

3.3.2 Logging Off the Password

If you want to log off the password, press the  key.

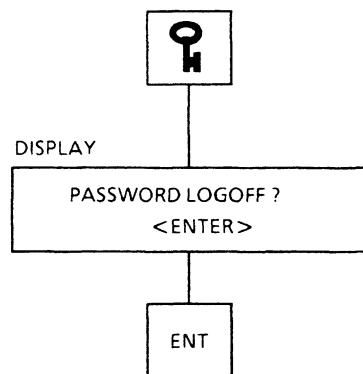


Figure 3-2. Logging Off the Password

The password is logged off when you press the ENTER key.

The OP then selects the basic screen form. If automatic selection has been configured, the OP jumps to "DIA" or "TXT".

The password function is aborted if another function key or the CE key is pressed. The password remains logged on. The OP then jumps to the selected function or to the basic screen form (CE key).

Note

After the password has been logged off, only the unlocked functions are available.

3.4 Example for DB6

Example for Version V2.0

DB6:	DW0:	KH = 0000	No automatic jump to DIA
	DW1:	KH = 000C	DB 12 for TMR
	DW2:	KH = 0017	DB 23 for CTR
	DW3:	KH = 0000	FW 0/2 for TXT
	DW4:	KH = 0012	DB 18 for TXT
	DW5:	KH = 00FF	Automatic jump to TXT
	DW6:	KH = 000E	DB 14 for DB
	DW7:	KH = FFFF	End identifier

Example for Version V2.1

DB6:	DW0:	KH = 0000	No automatic jump to DIA
	DW1:	KH = 000C	DB12 for TMR
	DW2:	KH = 0017	DB23 for CTR
	DW3:	KH = 0608	Flagbyte area FY8 to FY13 (6 flag bytes)
	DW4:	KH = 0213	DB area for message texts DB 19 and DB 20 (2 DBs)
	DW5:	KH = 00FF	Automatic jump to TXT
	DW6:	KH = 0337	DB area for DB input (DB 55 to DB 255)
	DW7:	KH = FFFF	End identifier

Example for Version V3.0

DB6:	DW0:	.	
		(see example V2.1)	
		.	
	DW7:	KH = 0232	DB area for DB texts (DB50, 51)
	DW8:	KH = 0234	DB area for TMR texts (DB52,53)
	DW9:	KH = 0136	DB for CTR texts (FY20 to FY24)
	DW10:	KH = 0414	DB for command flags
	DW11:	KH = 013C	DB for command flag texts (DB60)
	DW12:	KF = 12345	Password "12345"
	DW13:	KM = 0000000000001111	All input functions are disabled
	DW14:	KH = FFFF	End identifier

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4 Manipulating Timers and Counters

This function allows you to

- Manipulate timers and counters
- Configure your own user texts (from Version V3.0)

4.1 Measures in the User Program

A data block for counters and one for timers must be reserved in the PLC, each with a length 1 data word longer than the longest timer or counter number to be manipulated.

Example: Timer T7 and T 19 are to be manipulated.
The DB is at least 20 data words long.

Program Structure

The following sequence of operations must be programmed in the user program so that the setting to be manipulated is transferred to the timer.

Example: A DB 11 * ; The reserved data block is set
LDW 5 ; Data word 5 is loaded into the accumulator
SI T5 ; Start pulse timer T5

Note

The number of the data word must be identical with the number of the timer or counter.

Permissible parameters for timers and counters:

0 to 15	S5-100U CPU 100
0 to 31	S5-90U, S5-100U CPU 102
0 to 127	S5-95U, S5-100U CPU 103, S5-115U, S5-135U (S processor and R processor)
0 to 127	S5-135U CPU 928, S5-150U (from Version V2.0 onward: 0 to 255)

User texts

The user texts for timers and counters are configured in data blocks. The identifier "\$" in front of the text in the data word area indicates to the OP that a user text is available for the relevant TIMER or COUNTER. If this identifier has not been entered, the relevant TIMER or COUNTER will be displayed without a text.

If a fault occurs during text display, the user text currently displayed is overwritten by an error message.

* Not required in the case of the S5-101U

Note

You must note the following when configuring user texts:

- Try to use all timers and counters in consecutive order (e.g. T1, T2, T3, T4 ...).
- Try to assign the first timers and counters in each case.
- Use unassigned data words within the text DB for further applications.

These measures will help you to save memory. Memory requirements should be estimated in advance in cases of doubt.

Special Features of the S5-101U:

Since the S5-101U has only one data block for timers and counters, data words 0 to 15 are accessed for manipulating timers and data words 16 to 31 for manipulating counters.

Permissible parameters for timers and counters: 0 to 15

Assignment for timers:

```
DW 0   : T0
DW 1   : T1
      :
      :
DW 15  : T15
```

Assignment for counters:

```
DW 16  : C0
DW 17  : C1
      :
      :
DW 31  : C15
```

Special Features of the S5-135U with CPU 928 (from Version V2.0 onward)

In normal operation, only timers and counters 0 to 127 can be manipulated in the case of the S5-135U. The following function block must be processed on restart in order to be able to manipulate timers and counters 128 to 255 in the CPU 928:

FB10:

```
NAME : CPU 928
:L   BS29
:L   KH0010
:OW
:T   BS29
:BE
```

Call in the restart OBs:

OB20/21/22:

:JU FB10
NAME : CPU 928
:BE

Note

Operation with STUDOS-oriented programmers (PG 675) is no longer possible after the above change has been made.

4.2 Operator Input when Manipulating Timers

Select the TMR function with the <TMR> key. Enter the desired timer number. The number of the default data block (DB 11) is displayed. You can transfer the default with the <ENT> key or change it and then transfer it.

Press the <↑> key to display the value of the next timer (timer number + 1). Press the <↓> key to display the value of the previous timer (timer number - 1).

Note

The data block number is set only after the first function is selected on connecting the OP. If a set number has to be changed, the OP must be unplugged.

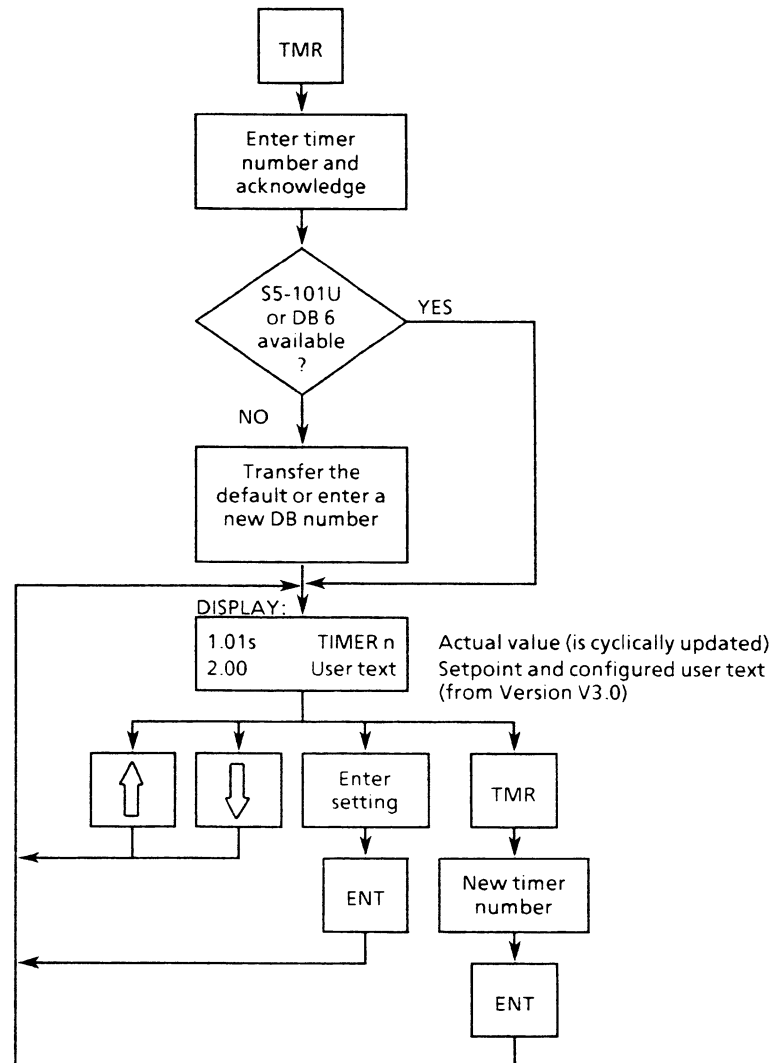


Figure 4-1. Flowchart: Manipulating Timers

Display of the times:

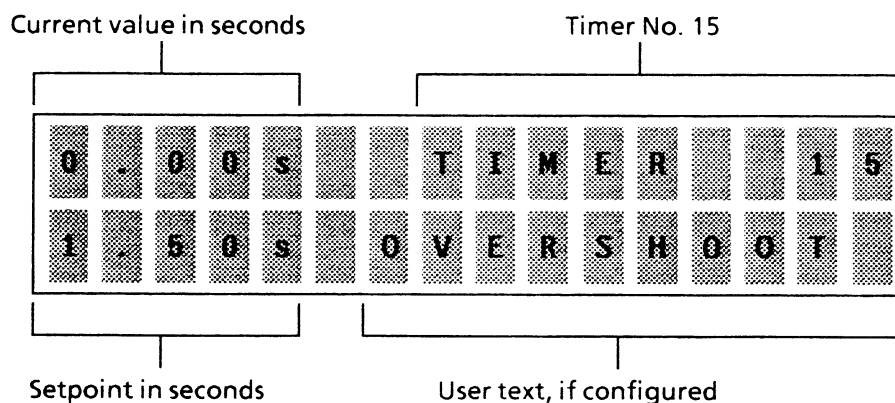


Figure 4-2. Typical Time Display

4.3 User Texts for Timers (from Version V3.0)

The defaults for this function are configured in parameter setting block DB6:

- DL8: Number of data blocks required for timer user texts
- DR8: Number of the first data block for timer user texts

Please note the following when entering the user text in the text DB:

- Every text starts with the "\$" identifier
- This is followed by exactly 10 ASCII characters of user text

Example: Entry in text DB

```
DW0:  KS = "$AAAAAAAAAA"   Text for TIMER 0
DW6:  S  = "$BBBBBBBBBB"   Text for TIMER 1
DW12: KS = "$CCCCCCCCC"    Text for TIMER 2
      .
      .
      .
```

This means that every user text has 11 characters (bytes) and requires 6 data words. You can configure 42 user texts (256/6) within one text DB. The last four data words in the text DB are not used.

The following assignments between text DBs and TIMERS apply.

Table 4-1. Assignments: Text DBs and TIMERS

DB	TIMER No.
1. Text DB	0 ... 41
2. Text DB	42 ... 83
3. Text DB	84 ... 125
4. Text DB	126 ... 167
5. Text DB	168 ... 209
6. Text DB	210 ... 251
7. Text DB	252 ... 255

Table 4-2 shows the fixed assignments between TIMER No. and relevant user text in each text DB:

Table 4-2. Offset Table for TIMERS

User Text in Data Word Area	TIMER Number in						
	1. Text DB	2. Text DB	3. Text DB	4. Text DB	5. Text DB	6. Text DB	7. Text DB
0 ... 5	T 0	T 42	T 84	T 126	T 168	T 210	T 252
6 ... 11	T 1	T 43	T 85	T 127	T 169	T 211	T 253
12 ... 17	T 2	T 44	T 86	T 128	T 170	T 212	T 254
18 ... 23	T 3	T 45	T 87	T 129	T 171	T 213	T 255
24 ... 29	T 4	T 46	T 88	T 130	T 172	T 214	
30 ... 35	T 5	T 47	T 89	T 131	T 173	T 215	
36 ... 41	T 6	T 48	T 90	T 132	T 174	T 216	
42 ... 47	T 7	T 49	T 91	T 133	T 175	T 217	
48 ... 53	T 8	T 50	T 92	T 134	T 176	T 218	
54 ... 59	T 9	T 51	T 93	T 135	T 177	T 219	
60 ... 65	T 10	T 52	T 94	T 136	T 178	T 220	
66 ... 71	T 11	T 53	T 95	T 137	T 179	T 221	
72 ... 77	T 12	T 54	T 96	T 138	T 180	T 222	
78 ... 83	T 13	T 55	T 97	T 139	T 181	T 223	
84 ... 89	T 14	T 56	T 98	T 140	T 182	T 224	
90 ... 95	T 15	T 57	T 99	T 141	T 183	T 225	
96 ... 101	T 16	T 58	T 100	T 142	T 184	T 226	
102 ... 107	T 17	T 59	T 101	T 143	T 185	T 227	
108 ... 113	T 18	T 60	T 102	T 144	T 186	T 228	
114 ... 119	T 19	T 61	T 103	T 145	T 187	T 229	
120 ... 125	T 20	T 62	T 104	T 146	T 188	T 230	
126 ... 131	T 21	T 63	T 105	T 147	T 189	T 231	
132 ... 137	T 22	T 64	T 106	T 148	T 190	T 232	
138 ... 143	T 23	T 65	T 107	T 149	T 191	T 233	
144 ... 149	T 24	T 66	T 108	T 150	T 192	T 234	
150 ... 155	T 25	T 67	T 109	T 151	T 193	T 235	
156 ... 161	T 26	T 68	T 110	T 152	T 194	T 236	
162 ... 167	T 27	T 69	T 111	T 153	T 195	T 237	
168 ... 173	T 28	T 70	T 112	T 154	T 196	T 238	
174 ... 179	T 29	T 71	T 113	T 155	T 197	T 239	
180 ... 185	T 30	T 72	T 114	T 156	T 198	T 240	
186 ... 191	T 31	T 73	T 115	T 157	T 199	T 241	
192 ... 197	T 32	T 74	T 116	T 158	T 200	T 242	
198 ... 203	T 33	T 75	T 117	T 159	T 201	T 243	
204 ... 209	T 34	T 76	T 118	T 160	T 202	T 244	
210 ... 215	T 35	T 77	T 119	T 161	T 203	T 245	
216 ... 221	T 36	T 78	T 120	T 162	T 204	T 246	
222 ... 227	T 37	T 79	T 121	T 163	T 205	T 247	
228 ... 233	T 38	T 80	T 122	T 164	T 206	T 248	
234 ... 239	T 39	T 81	T 123	T 165	T 207	T 249	
240 ... 245	T 40	T 82	T 124	T 166	T 208	T 250	
246 ... 251	T 41	T 83	T 125	T 167	T 209	T 251	

Example: Assignment of user texts

TIMER 32

Table 4-2: The user text must be stored in the 1st text DB, data word area DW192 to DW197.

TIMER 126

Table 4-2: The user text must be stored in the 4th text DB, data word area DW0 to DW5.

TIMER 254

Table 4-2: The user text must be stored in the 7th text DB, data word area DW12 to DW 17.

4.4 Operator Input when Manipulating Counters

Select the CTR function with the <CTR> key. Enter the desired counter number. The number of the default data block (DB 12) is displayed. You can transfer the default with the <ENT> key or change it, and then transfer it.

Press the <  > key to display the value of the next counter (counter number + 1) and press the <  > key to display the value of the previous counter (counter number - 1).

Note

The data block number is set only after the first function is selected on connecting the OP. If a set number has to be changed, the OP must be unplugged.

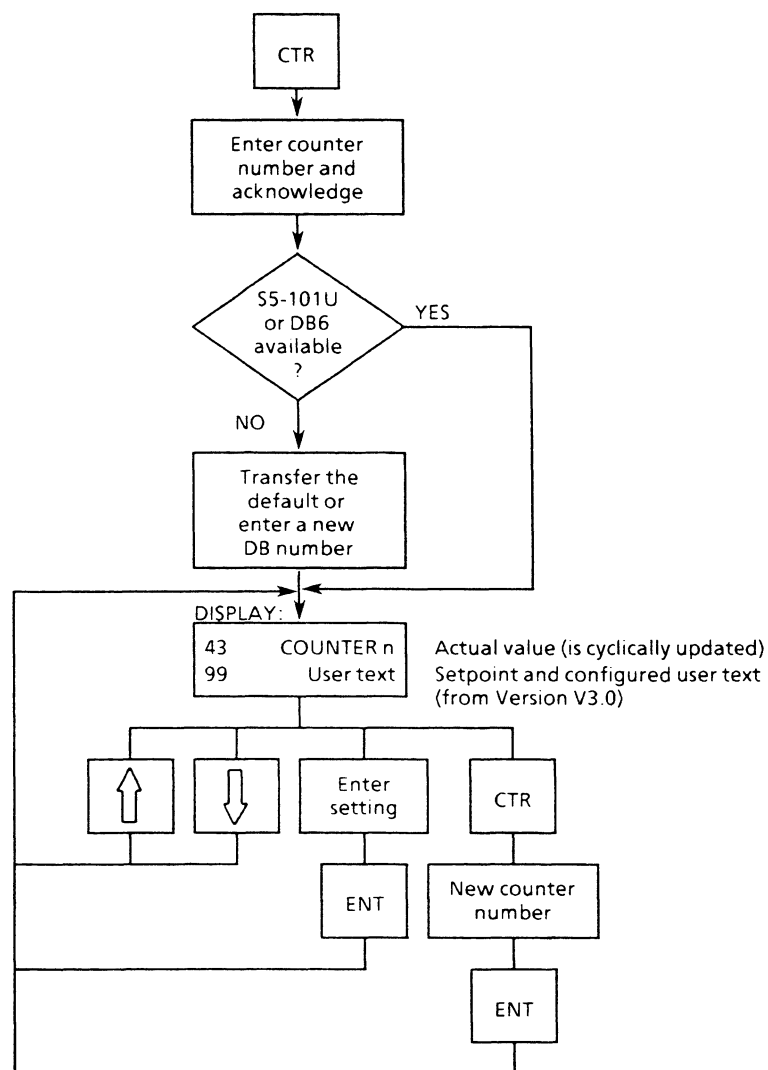


Figure 4-3. Flowchart: Manipulating Counters

Display of the counts:

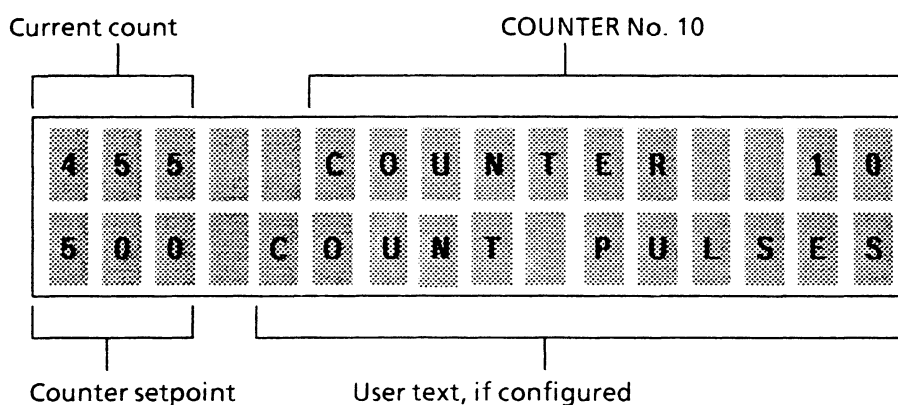


Figure 4-4. Typical Count Display

4.5 User Texts for Counters (from Version V3.0)

The defaults for this function are configured in parameter setting block DB6:

- DL9: Number of data blocks required for counter user texts
- DR9: Number of the first data block for counter user texts

Please note the following when entering the user text in the text DB:

- Every text starts with the "\$" identifier
- This is followed by exactly 12 ASCII characters of user text

Example: Entry in text DB

```
DW0:  KS = "$AAAAAAAAAAAA"  Text for COUNTER 0
DW7:   S = "$BBBBBBBBBBBB"  Text for COUNTER 1
DW14: KS = "$CCCCCCCCCCCC"  Text for COUNTER 2
.
.
.
```

This means that every user text has 13 characters (bytes) and requires 7 data words. You can configure 36 user texts (256/7) within one text DB. The last four data words in the text DB are not used.

The following assignments between text DBs and COUNTERs apply:

Table 4-3 Assignments: Text DBs and COUNTERs

DB	COUNTER No.
1. Text DB	0 ... 35
2. Text DB	36 ... 71
3. Text DB	72 ... 107
4. Text DB	108 ... 143
5. Text DB	144 ... 179
6. Text DB	180 ... 215
7. Text DB	216 ... 251
8. Text DB	252 ... 255

Table 4-4 shows the fixed assignments between COUNTER No. and relevant user text in each text DB:

Table 4.4 Offset Table for COUNTERs

User Text in Data Word Area	COUNTER Number in							
	1. Text DB	2. Text DB	3. Text DB	4. Text DB	5. Text DB	6. Text DB	7. Text DB	8. Text DB
0 ... 6	C 0	C 36	C 72	C 108	C 144	C 180	C 216	C 252
7 ... 13	C 1	C 37	C 73	C 109	C 145	C 181	C 217	C 253
14 ... 20	C 2	C 38	C 74	C 110	C 146	C 182	C 218	C 254
21 ... 27	C 3	C 39	C 75	C 111	C 147	C 183	C 219	C 255
28 ... 34	C 4	C 40	C 76	C 112	C 148	C 184	C 220	
35 ... 41	C 5	C 41	C 77	C 113	C 149	C 185	C 221	
42 ... 48	C 6	C 42	C 78	C 114	C 150	C 186	C 222	
49 ... 55	C 7	C 43	C 79	C 115	C 151	C 187	C 223	
56 ... 62	C 8	C 44	C 80	C 116	C 152	C 188	C 224	
63 ... 69	C 9	C 45	C 81	C 117	C 153	C 189	C 225	
70 ... 76	C 10	C 46	C 82	C 118	C 154	C 190	C 226	
77 ... 83	C 11	C 47	C 83	C 119	C 155	C 191	C 227	
84 ... 90	C 12	C 48	C 84	C 120	C 156	C 192	C 228	
91 ... 97	C 13	C 49	C 85	C 121	C 157	C 193	C 229	
98 ... 104	C 14	C 50	C 86	C 122	C 158	C 194	C 230	
105 ... 111	C 15	C 51	C 87	C 123	C 159	C 195	C 231	
112 ... 118	C 16	C 52	C 88	C 124	C 160	C 196	C 232	
119 ... 125	C 17	C 53	C 89	C 125	C 161	C 197	C 233	
126 ... 132	C 18	C 54	C 90	C 126	C 162	C 198	C 234	
133 ... 139	C 19	C 55	C 91	C 127	C 163	C 199	C 235	
140 ... 146	C 20	C 56	C 92	C 128	C 164	C 200	C 236	
147 ... 153	C 21	C 57	C 93	C 129	C 165	C 201	C 237	
154 ... 160	C 22	C 58	C 94	C 130	C 166	C 202	C 238	
161 ... 167	C 23	C 59	C 95	C 131	C 167	C 203	C 239	
168 ... 174	C 24	C 60	C 96	C 132	C 168	C 204	C 240	
175 ... 181	C 25	C 61	C 97	C 133	C 169	C 205	C 241	
182 ... 188	C 26	C 62	C 98	C 134	C 170	C 206	C 242	
189 ... 195	C 27	C 63	C 99	C 135	C 171	C 207	C 243	
196 ... 202	C 28	C 64	C 100	C 136	C 172	C 208	C 244	
203 ... 209	C 29	C 65	C 101	C 137	C 173	C 209	C 245	
210 ... 216	C 30	C 66	C 102	C 138	C 174	C 210	C 246	
217 ... 223	C 31	C 67	C 103	C 139	C 175	C 211	C 247	
224 ... 230	C 32	C 68	C 104	C 140	C 176	C 212	C 248	
231 ... 237	C 33	C 69	C 105	C 141	C 177	C 213	C 249	
238 ... 244	C 34	C 70	C 106	C 142	C 178	C 214	C 250	
245 ... 251	C 35	C 71	C 107	C 143	C 179	C 215	C 251	

Example: Assignment of user texts

COUNTER 32

Table 4-4: The user text must be stored in the 1st text DB, data word area DW224 to DW230.

COUNTER 126

Table 4-4: The user text must be stored in the 4th text DB, data word area DW126 to DW132.

COUNTER 254

Table 4-4: The user text must be stored in the 8th text DB, data word area DW14 to DW20.

4.6 Application Examples

4.6.1 Manipulating Timers

PB1:

SEGMENT 1

```
:C DB20      Open work DB
:
:A F100.0    Scan flags
:L DW5       Load setting
:SD T5       Start timer 5
:
:            - the current time appears in the first line of the display
:            - the setting remains in the second line
:***
```

SEGMENT 2

```
:A F100.1
:L DW35      Load setpoint
:SP T35      Start timer
:
:BE
```

Note

This example assumes that the PLC has a DB20 with a minimum length of 36 words (DW0 to DW35)!

4.6.2 Manipulating Counters

PB2:

SEGMENT 1

```
:C DB27      Open work DB
:
:A F10.0     Scan flags
:L DW17
:S Z17       Load setting into counter
:
:A F10.1     Increment counter on a positive edge
:CU C17
:
:BE
```

Note

This example assumes that the PLC has a DB27 with a minimum length of 18 words (DW0 to DW17)!

5 Input to Data Blocks (From Version V2.0 Onward)		
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5 Input to Data Blocks (From Version V2.0 Onward)

This function allows you to display and modify data words as 16-bit fixed-point numbers (value range: -32768 to + 32767) (not possible in the S5-101U).

Note

Make sure that the data blocks you wish to modify are in the CPU RAM. You cannot change data blocks that are stored in EPROM or EEPROM.

5.1 Function Selection

Press the "DB" key to select the function.

The data block to be changed can be specified in the DB6 initialization data block. If the programmed DB is not in the PLC, fixed-point number input is disabled (message *88 is displayed → Appendix A).

Error message *90 appears if the user requests access to a block outside the configured area (→ Appendix A).

From Version V3.0 onward, you can configure a user text for each data word of the first configured data block.

If there is no DB6 in the PLC, "DB 14" is taken as the default.

5.2 Operator Input

5.2.1 Operator Input without Parameter Setting DB

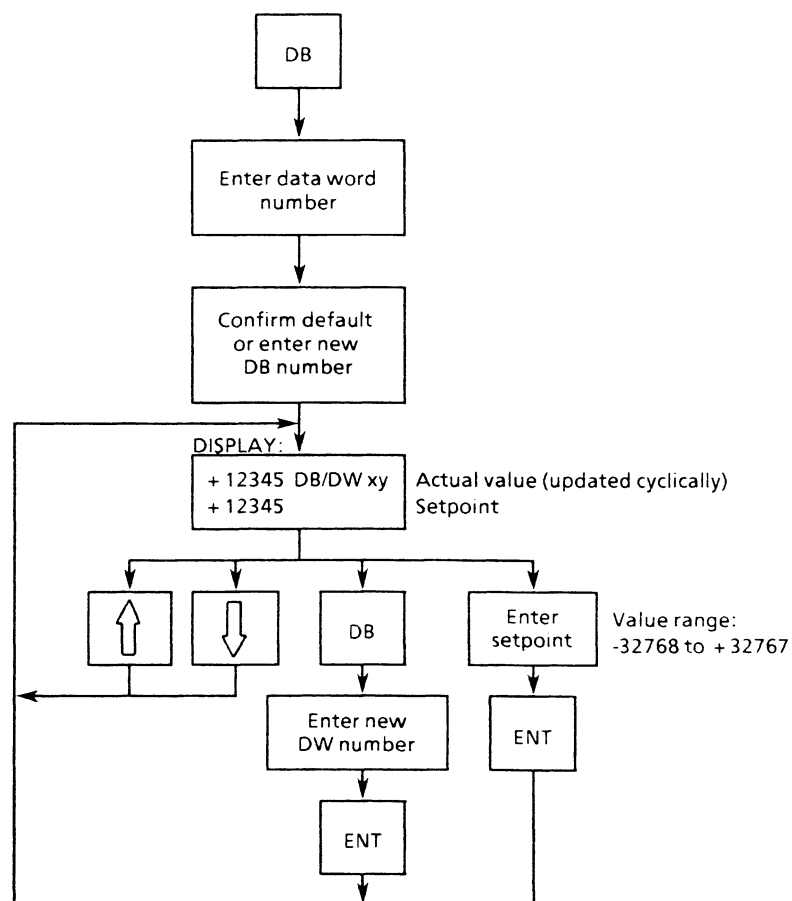


Figure 5-1. Flowchart: Input and Display of Fixed-Point Numbers without Parameter Setting DB

Incorrect entries can be deleted with the <CE> key.

5.2.2 Entry Using the Parameter Setting DB

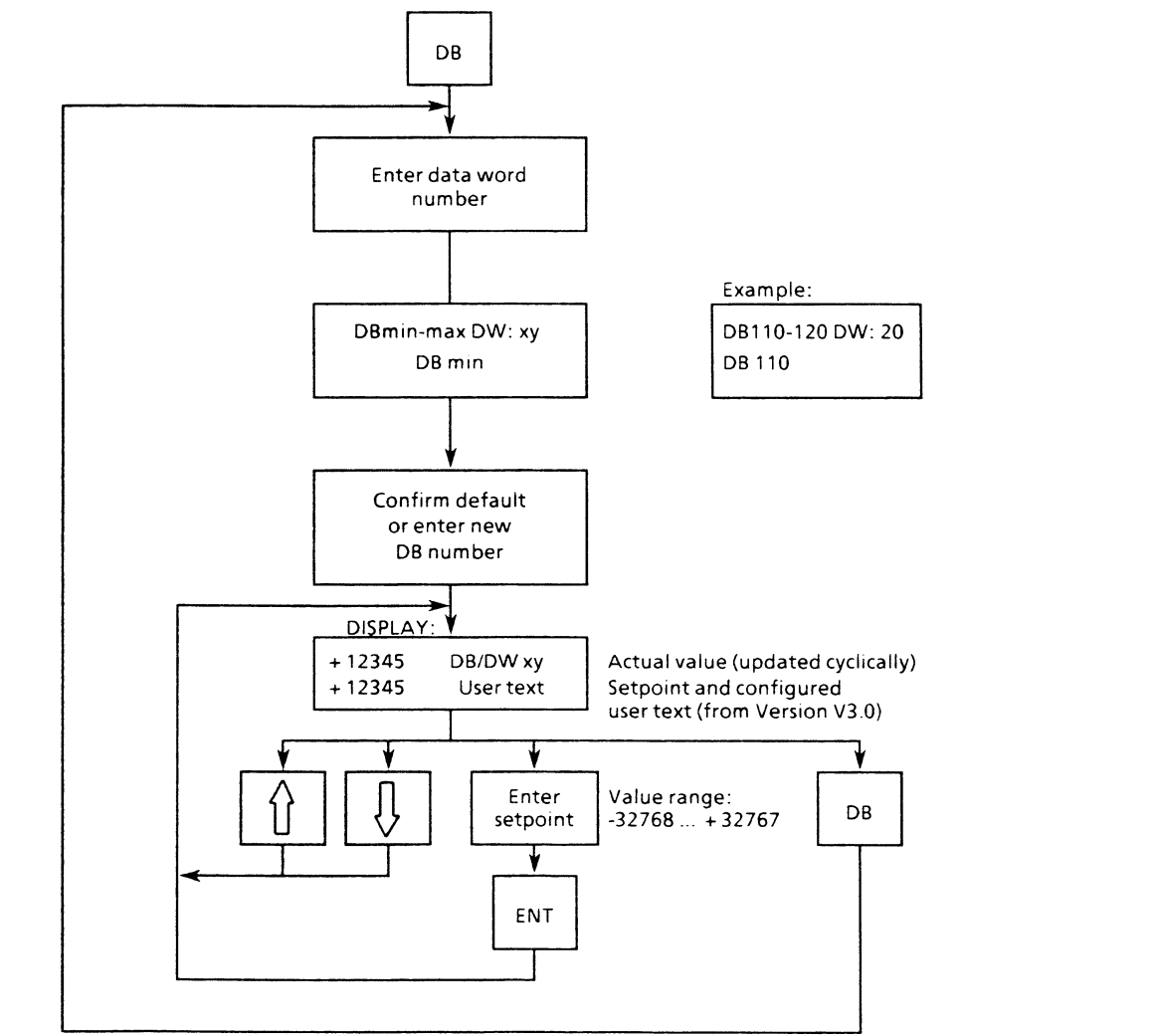


Figure 5-2. Flowchart: Input and Output of Fixed-Point Numbers with the Parameter Setting DB

Incorrect entries can be deleted with the <CE> key.

5.3 User Texts for Data Blocks

The user texts for the data words of the first configured data block (in DB6) are stored in text DBs. The "\$" identifier in front of each text in the data word area indicates to the OP that a user text is available for the relevant data word.

If this identifier has not been entered, the relevant data word will be displayed without a text.

Note

You must note the following when configuring user texts:

- Try to use all data words in consecutive order (e.g. DW1, DW2, DW3, DW4 ...).
- Try to assign the first data words in each case.
- Use unassigned data words within the text DB for further applications.

These measures will help you to save memory. Memory requirements should be estimated in advance in cases of doubt.

The defaults for this function are configured in parameter setting block DB6:

- DL7: Number of data blocks required for DB user texts
- DR7: Number of the first data block for DB user texts

Please note the following when entering the user text in the text DB:

- Every text starts with the "\$" identifier.
- This is followed by exactly 9 ASCII characters.

Example: Entry in text DB

DW0:	KS	= "\$AAAAAAAA"	Text for DBx, DW0
DW5:	S	= "\$BBBBBBBBB"	Text for DBx, DW1
DW10:	KS	= "\$CCCCCCCCC"	Text for DBx, DW2

This means that every user text has 10 characters (bytes) and requires 5 data words. You can configure 51 user texts (256/5) within one text DB.
The last data word in the text DB are not used.

The following assignments between text DBs and data words apply:

Table 5-1. Assignments: Text DBs and Data Words

DB	Data Word No.
1. Text DB	0 ... 50
2. Text DB	51 ... 101
3. Text DB	102 ... 152
4. Text DB	153 ... 203
5. Text DB	204 ... 254
6. Text DB	255

Table 5-2 shows the fixed assignments between data word No. and relevant user text in each text DB:

Table 5-2. Offset Table for Data Words

User Text in Data Word Area	Data Word Number (DBx) in					
	1. Text DB	2. Text DB	3. Text DB	4. Text DB	5. Text DB	6. Text DB
0 ... 4	DW 0	DW 51	DW 102	DW 153	DW 204	DW 255
5 ... 9	DW 1	DW 52	DW 103	DW 154	DW 205	
10 ... 14	DW 2	DW 53	DW 104	DW 155	DW 206	
15 ... 19	DW 3	DW 54	DW 105	DW 156	DW 207	
20 ... 24	DW 4	DW 55	DW 106	DW 157	DW 208	
25 ... 29	DW 5	DW 56	DW 107	DW 158	DW 209	
30 ... 34	DW 6	DW 57	DW 108	DW 159	DW 210	
35 ... 39	DW 7	DW 58	DW 109	DW 160	DW 211	
40 ... 44	DW 8	DW 59	DW 110	DW 161	DW 212	
45 ... 49	DW 9	DW 60	DW 111	DW 162	DW 213	
50 ... 54	DW 10	DW 61	DW 112	DW 163	DW 214	
55 ... 59	DW 11	DW 62	DW 113	DW 164	DW 215	
60 ... 64	DW 12	DW 63	DW 114	DW 165	DW 216	
65 ... 69	DW 13	DW 64	DW 115	DW 166	DW 217	
70 ... 74	DW 14	DW 65	DW 116	DW 167	DW 218	
75 ... 79	DW 15	DW 66	DW 117	DW 168	DW 219	
80 ... 84	DW 16	DW 67	DW 118	DW 169	DW 220	
85 ... 89	DW 17	DW 68	DW 119	DW 170	DW 221	
90 ... 94	DW 18	DW 69	DW 120	DW 171	DW 222	
95 ... 99	DW 19	DW 70	DW 121	DW 172	DW 223	
100 ... 104	DW 20	DW 71	DW 122	DW 173	DW 224	
105 ... 109	DW 21	DW 72	DW 123	DW 174	DW 225	
110 ... 114	DW 22	DW 73	DW 124	DW 175	DW 226	
115 ... 119	DW 23	DW 74	DW 125	DW 176	DW 227	
120 ... 124	DW 24	DW 75	DW 126	DW 177	DW 228	
125 ... 129	DW 25	DW 76	DW 127	DW 178	DW 229	
130 ... 134	DW 26	DW 77	DW 128	DW 179	DW 230	
135 ... 139	DW 27	DW 78	DW 129	DW 180	DW 231	
140 ... 144	DW 28	DW 79	DW 130	DW 181	DW 232	
145 ... 149	DW 29	DW 80	DW 131	DW 182	DW 233	
150 ... 154	DW 30	DW 81	DW 132	DW 183	DW 234	
155 ... 159	DW 31	DW 82	DW 133	DW 184	DW 235	
160 ... 164	DW 32	DW 83	DW 134	DW 185	DW 236	
165 ... 169	DW 33	DW 84	DW 135	DW 186	DW 237	
170 ... 174	DW 34	DW 85	DW 136	DW 187	DW 238	
175 ... 179	DW 35	DW 86	DW 137	DW 188	DW 239	
180 ... 184	DW 36	DW 87	DW 138	DW 189	DW 240	
185 ... 189	DW 37	DW 88	DW 139	DW 190	DW 241	
190 ... 194	DW 38	DW 89	DW 140	DW 191	DW 242	
195 ... 199	DW 39	DW 90	DW 141	DW 192	DW 243	
200 ... 204	DW 40	DW 91	DW 142	DW 193	DW 244	
205 ... 209	DW 41	DW 92	DW 143	DW 194	DW 245	
210 ... 214	DW 42	DW 93	DW 144	DW 195	DW 246	
215 ... 219	DW 43	DW 94	DW 145	DW 196	DW 247	
220 ... 224	DW 44	DW 95	DW 146	DW 197	DW 248	
225 ... 229	DW 45	DW 96	DW 147	DW 198	DW 249	
230 ... 234	DW 46	DW 97	DW 148	DW 199	DW 250	
235 ... 239	DW 47	DW 98	DW 149	DW 200	DW 251	
240 ... 244	DW 48	DW 99	DW 150	DW 201	DW 252	
245 ... 249	DW 49	DW 100	DW 151	DW 202	DW 253	
250 ... 254	DW 50	DW 101	DW 152	DW 203	DW 254	

Example: Assignment of user texts

DATA WORD 18

Table 5-2: The user text must be stored in the 1st text DB, data word area DW90 to DW94.

DATA WORD 153

Table 5-2: The user text must be stored in the 4th text DB, data word area DW0 to DW4.

DATA WORD 254

Table 5-2: The user text must be stored in the 5th text DB, data word area DW250 to DW254.

5.4 Example

PB5:

```
:A DB100      Open work DB
:
:L DW10       Load setting and
:T MW20       transfer it to the buffer
:
:L DW120
:T MW22
:
:BE
```

Note

This example assumes that the PLC has a DB100 with a minimum length of 121 words (DW0 to DW120).

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6 Displaying Message Texts (Not in the Case of the S5-101U)

6.1 Measures in the User Program

You can select the TXT function automatically with the relevant default in the DB6 initialization data block (→ 3.1.2).

If the DB 6 parameter setting block is not available or if it is incorrectly structured, the following defaults are entered:

Message flags : FW 0/2
Text DB : DB 13

The OP scans the set flag doubleword or the set flag area cyclically for set flags. If one or more flags are set, the text assigned to the most-significant flag is read out of the set data block and appears in the top line of the display (→ 6.2).

Example:

The bits of flag doubleword 0 are the message flags.

:			
:			
A	I	1.0	
S	Q	1.0	
S	F	0.0	"MOTOR 1 RUNNING" message displayed
:			
:			
A	I	1.1	
R	Q	1.0	
R	F	0.0	"MOTOR 1 RUNNING" message recalled
S	F	0.1	"MOTOR 1 STOPPED" message displayed

Display of message texts:

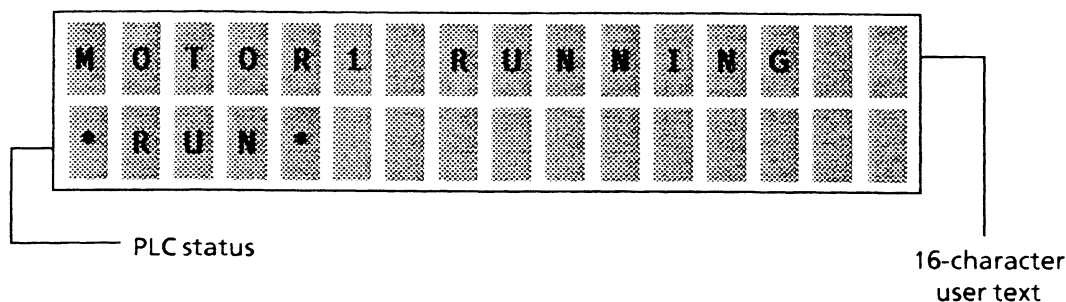


Figure 6-1. Typical Message Text Display

6.2 Assignment of Flags and Texts

6.2.1 Assignment in the Case of 32 Message Texts

There is a fixed assignment of message, message flag and relevant data area if only 32 message texts are configured.

Table 6-1. Assignment of Flags and Texts
(Max. 32 Message Texts)

Consec. Message Number	Parameter of the Message Flag	DW Containing Corresponding Text	
0	F 0.7	DW 0 to 7	Most significant
1	F 0.6	DW 8 to 15	
2	F 0.5	DW 16 to 23	
3	F 0.4	DW 24 to 31	
4	F 0.3	DW 32 to 39	
5	F 0.2	DW 40 to 47	
6	F 0.1	DW 48 to 55	
7	F 0.0	DW 56 to 63	
8	F 1.7	DW 64 to 71	
9	F 1.6	DW 72 to 79	
10	F 1.5	DW 80 to 87	
11	F 1.4	DW 88 to 95	
12	F 1.3	DW 96 to 103	
13	F 1.2	DW 104 to 111	
14	F 1.1	DW 112 to 119	
15	F 1.0	DW 120 to 127	
16	F 2.5	DW 128 to 135	Least significant
17	F 2.4	DW 136 to 143	
18	F 2.3	DW 144 to 151	
19	F 2.2	DW 152 to 159	
20	F 2.0	DW 160 to 167	
21	F 3.7	DW 168 to 175	
22	F 3.6	DW 176 to 183	
23	F 3.5	DW 184 to 191	
24	F 3.4	DW 192 to 199	
25	F 3.3	DW 200 to 207	
26	F 3.2	DW 208 to 215	
27	F 3.1	DW 216 to 223	
28	F 3.0	DW 224 to 231	
29		DW 232 to 239	
30		DW 240 to 247	
31		DW 248 to 255	

Defaults: Message flags: FW 0 / 2
Text DB: DB13

6.2.2 Assignment in the Case of More than 32 Message Texts (From Version V2.1 Onward)

If more than 32 message texts are required, a flag byte area of any size and a relevant number of data blocks for the message texts can be specified in DB6.

The following is entered in the configuration DB (DB6) in the example:

DW 3:	KH = 0608	Flag area: 6 bytes beginning FY 8
DW 4:	KH = 0213	DB area: 2 data blocks beginning DB19

Six flag bytes are preset beginning flag byte 8: FY 8 to FY 13

This makes 48 flag bits (6 × 8 bits) and therefore 48 message texts available. Each message text has a length of 16 characters (bytes). In this example, the message texts are located from (and including) DB19 in two data blocks: DB19 and DB20.

Note

Each DB must be structured with 32 message texts (32 texts of 16 characters each) before the next DB can be initialized.

The assignment of flags and texts can be seen in the following table (applicable to this example only):

**Table 6-2. Assignment of Flags and Texts
(More than 32 Message Texts)**

Consec. Mess. Nr.	Parameter of the Message Flag	The Corresponding Text is in DB xy in Data Words	
0	F 8.7	DB 19 DW 0 to 7	Most significant
1	F 8.6	DB 19 DW 8 to 15	
2	F 8.5	DB 19 DW 16 to 23	
.	.	"	
.	.	"	
.	.	"	
30	F 11.1	DB 19 DW 240 to 247	
31	F 11.0	DB 19 DW 248 to 255	
32	F 12.7	DB 20 DW 0 to 7	
33	F 12.6	DB 20 DW 8 to 15	
.	.	"	
.	.	"	
.	.	"	
47	F 13.1	DB 20 DW 112 to 119	
48	F 13.0	DB 20 DW 120 to 127	
			Least significant

6.3 Operator Input for Displaying Message Texts

Function selection (no automatic selection in DB6)

Press the <TXT> key to select the message text display function.

Set the flag double word (four bytes) for the message flags and the number of the DB containing the texts.

You can change the setting or transfer it with the <ENT> key.

Note

The DB number cannot be changed in the case of a default in DB6.

The message text of the corresponding message flag appears in the top line of the display. The bottom line shows the operating status of the PLC.

If several message flags are set, you can use the <↓> key to see the message texts of the next less significant message flag. The display remains for approximately five seconds before the text of the next most-significant flag is displayed again.

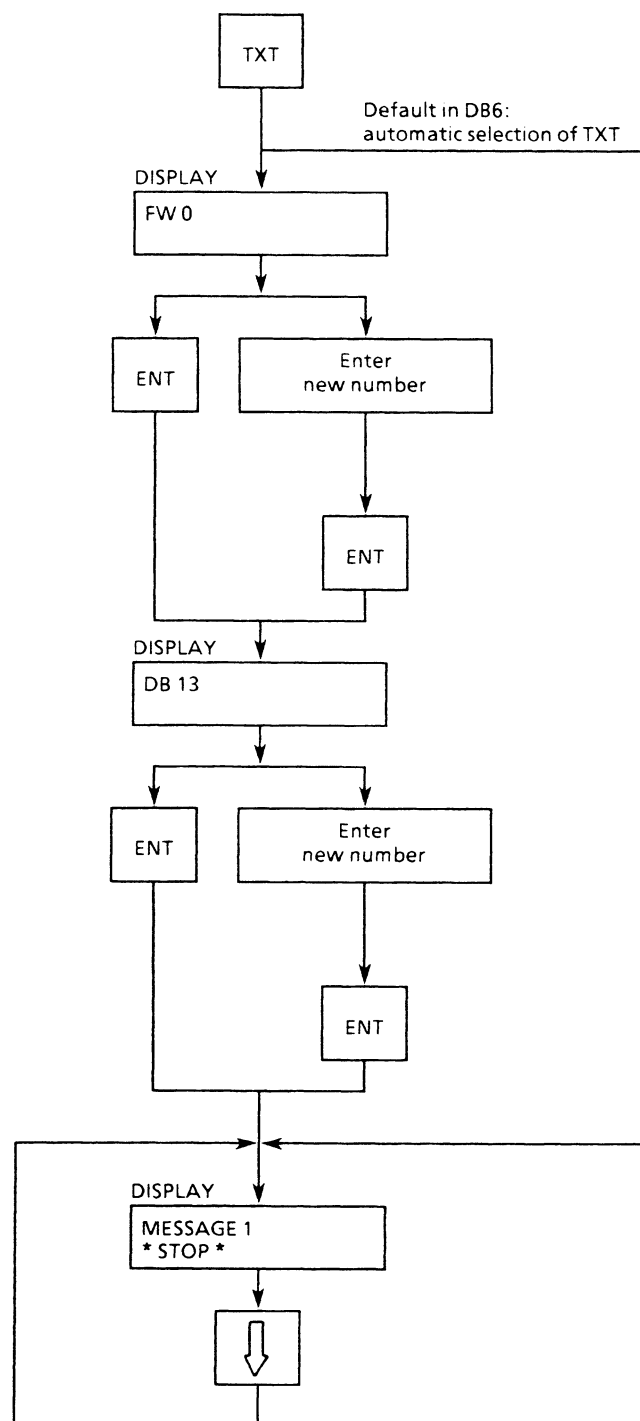


Figure 6-2. Flowchart: Displaying Message Texts

6.4 Automatic Selection in DB6

If automatic selection of the TXT function has been programmed in DB6, message texts are displayed direct after power-up provided no additional jump to DIA has been programmed. The OP 393 basic functions, i.e. TMR, CTR, DB and DIA, can be executed as before.

If no other key is pressed for about two minutes following selection of one of these functions, the system switches automatically to message text display.

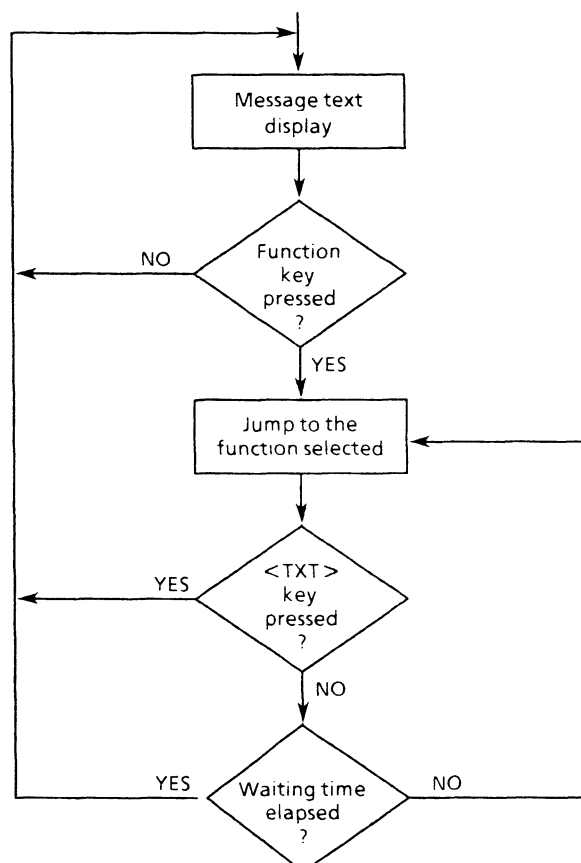


Figure 6-3. Flowchart: Automatic Selection of Message Text Display

6.5 Example of Message Text Display

FW50 and FW52 are used as message flags in the following example and the message texts are stored in DB 72.

PB3:

SEGMENT 1

```
:A I0.0      Set message flag
:= F50.7
:
:A I0.1
:= F50.6
:
:A I0.2
:= F50.5
:
:A I0.3
:= F50.4
:BE
```

DB72:

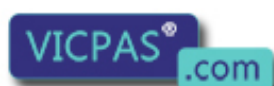
```
DW0:  KS=INPUT_0.0_ON_*
DW8:  C_=INPUT_0.1_ON_
DW16: KS=INPUT_0.2_ON_
DW24: C_=INPUT_0.3_ON_
DW32:
```

Note

Please note that the message text is **exactly** 16 characters long. Shorter texts must be padded with space characters (20H).

* " " indicates a space

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7 Diagnostics with the OP 393 (From Version V2.0 Onward)

The OP 393 operator panel can be used to monitor the active steps of one or several sequencers programmed in STEP 5 or GRAPH 5.

This function is possible in the S5-95U, S5-100U, S5-101U, S5-115U, S5-135U and S5-150U programmable controllers.

7.1 The OP 393 Display

The active steps of all sequencers to be processed appear in the top line of the OP 393 display.

If several steps are active in a sequencer, all the active steps are displayed first before any other sequencer is diagnosed.

The first line of the OP 393 display shows the number of the processed sequencer and the current step.

The second line displays the text assigned to the step displayed in the first line.

Two texts can be assigned to each step. The first text is always displayed when the step in question is active. The second text is displayed in the event of a fault during step processing if this has been provided for in the user program.

7.2 Standard Functions

You can select the basic functions of the OP 393 by pressing the relevant function key.

If you do not press any other key for approximately two seconds, the system switches automatically to DIA provided an automatic jump has been programmed in the diagnostics function (→ Figure 7-1.).

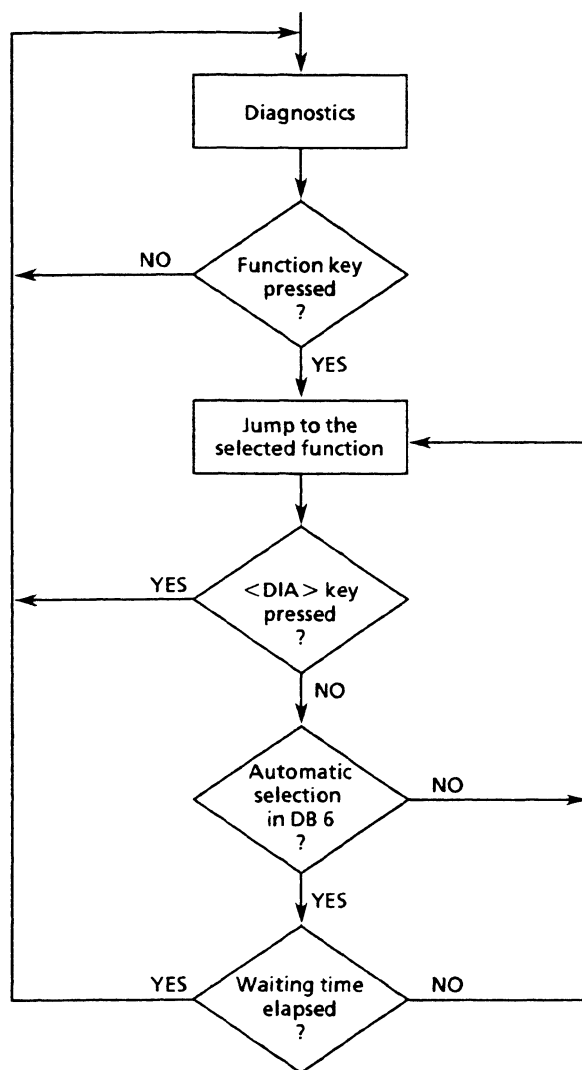


Figure 7-1. Flowchart: Selecting Standard Functions

7.3 Selecting the Diagnostics Function

The diagnostics function can be selected as follows:

- By programming an automatic jump to DB6
- By pressing the <DIA> key

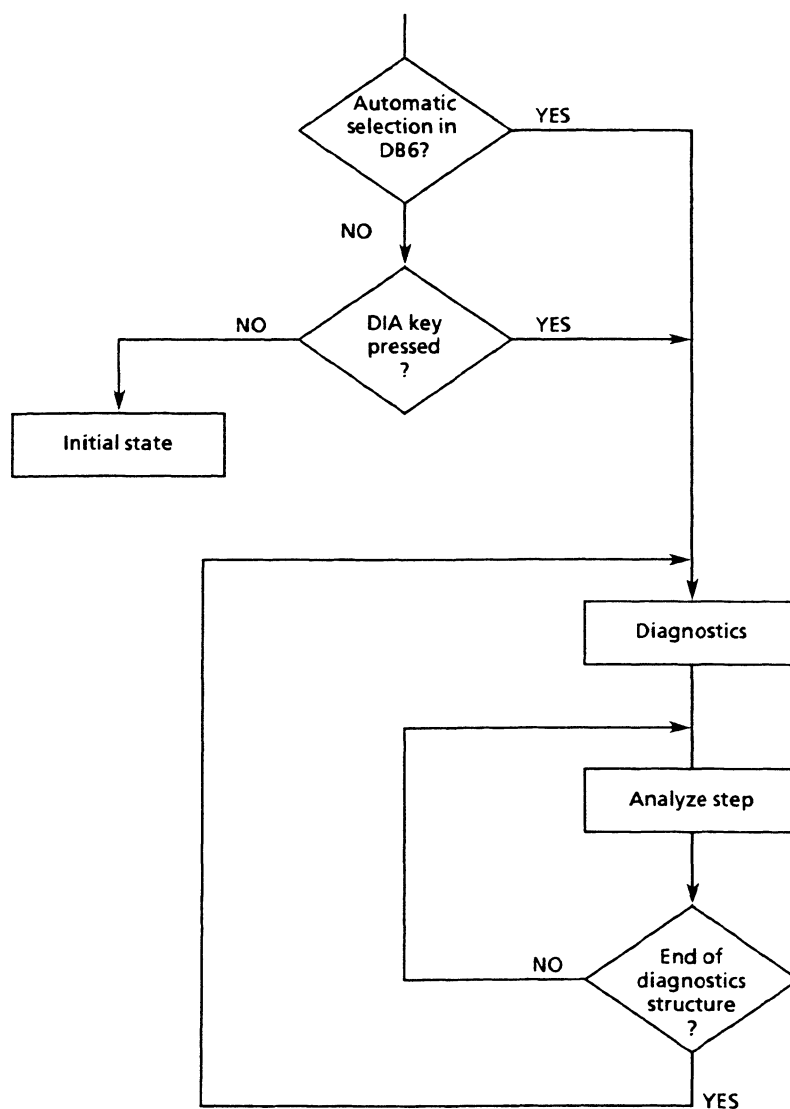


Figure 7-2. Flowchart: Selecting the Diagnostics Function

7.4 Operating Modes of the Diagnostics Function

The diagnostics function has two modes: Partial Diagnostics and Full Diagnostics.

A jump is made to the Partial Diagnostics mode after selection of the diagnostics function (either by automatic selection in DB 6 or by pressing the DIA key). Only the number of sequencers set in DB 5 are processed (→ 7.5).

Press the <CE> key to change to the Full Diagnostics mode. All sequencers for which a step DB is set in DB 5 are processed (→ 7.5).

Single step processing can be selected in both modes by pressing the <↑> and <↓> keys.

If the last step is no longer active, processing stops at the last step displayed or at the next active step.

Press the <↑> key again to show the previous active step and the <↓> key to show the next active step. If you do not press one of these keys within a minute, the OP 393 returns to the diagnostics mode last selected.

You can quit individual step processing with the <ENT> key. A jump is then made to automatic display of the active diagnostics steps.

You can switch to individual step processing in Full Diagnostics mode by pressing the <CE> key during individual step processing in Partial Diagnostics mode. If you do not press any other key within a waiting time of approximately two minutes, the OP returns to Full Diagnostics.

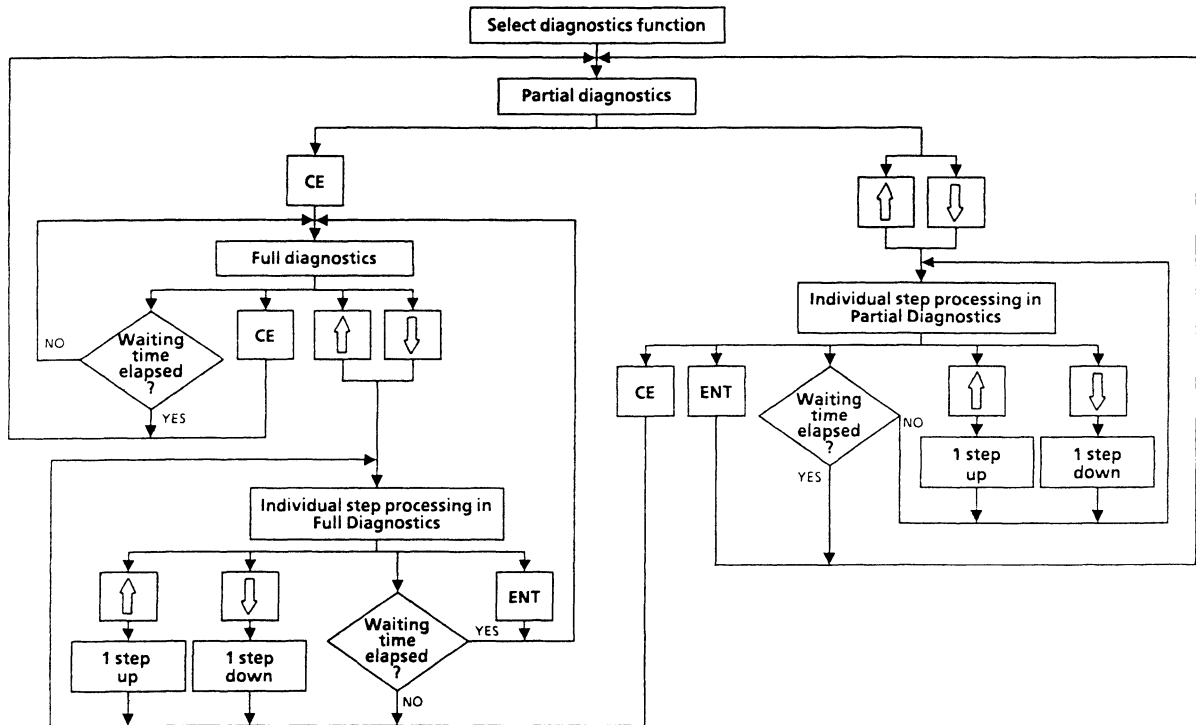


Figure 7-3. Flowchart: Diagnostics Modes

7.5 Measures in the Control Program

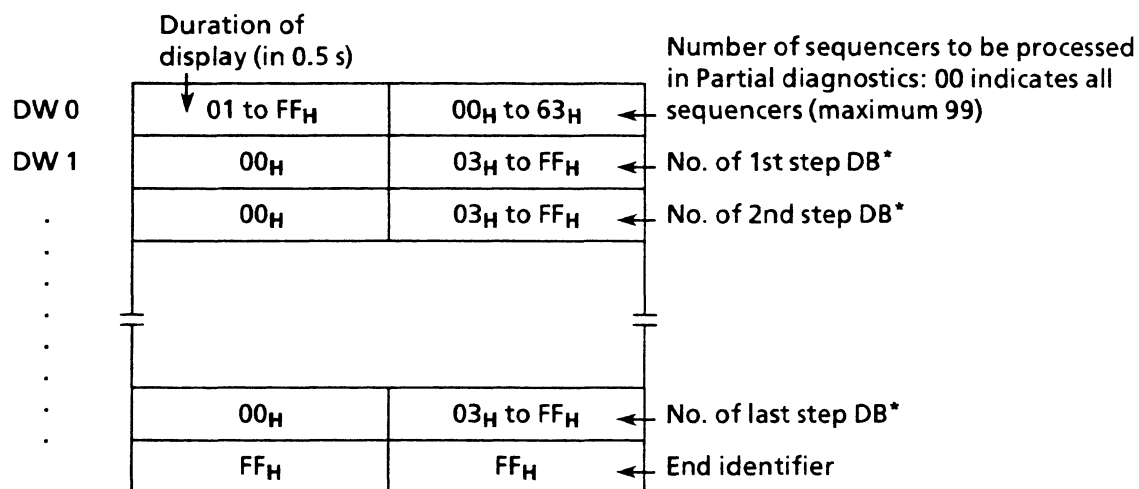
Data blocks containing the number of sequencers and the number of steps per sequencer must be stored in the PLC.

In addition, texts generated in a text DB can be assigned to each step.

7.5.1 Assignment DB

The duration of the active step display, the number of sequencers to be processed and the step DBs assigned are all defined in the assignment DB (DB 5).

Structure of DB 5



- * Permissible values: 03_H to FF_H
 Except DB5: Assignment DB for DIA
 DB6: Initialization DB

Figure 7-4. Structure of DB5

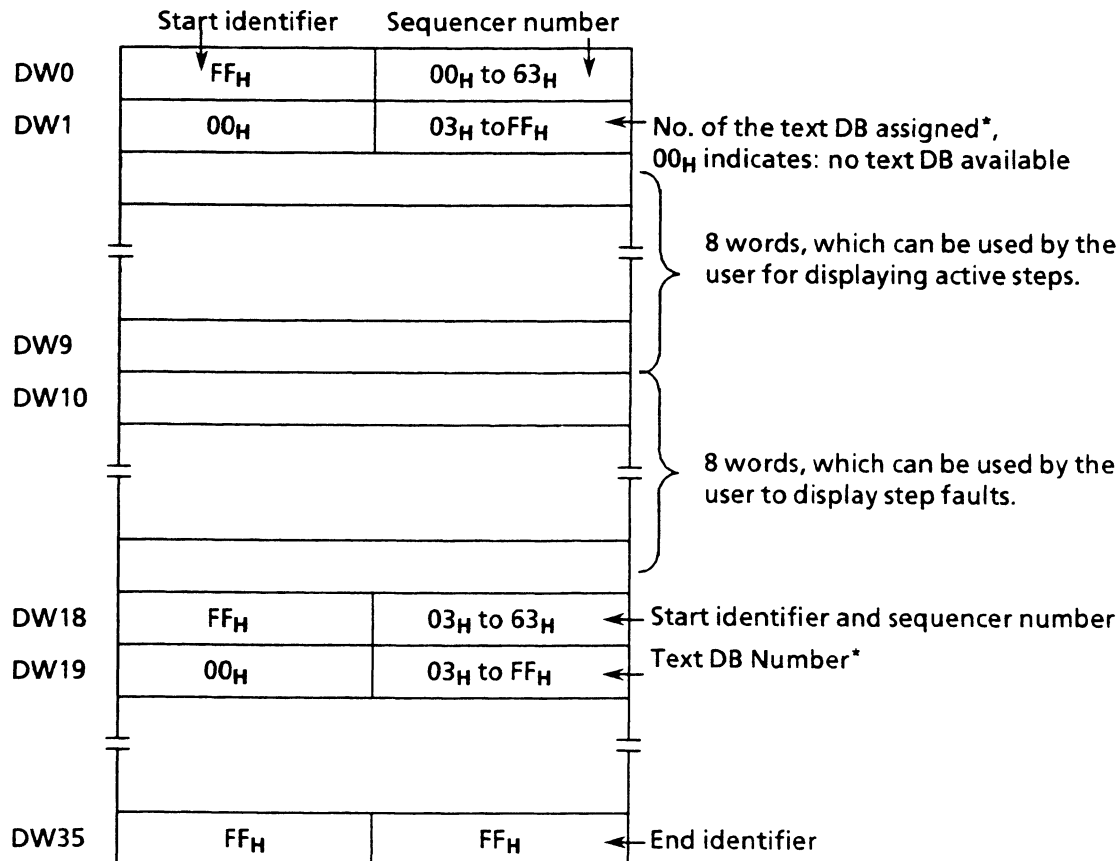
Each step DB number may only be entered once in the assignment DB. The sequencers are processed in the set order, i.e. in Partial mode, the sequencers programmed in the first step DBs entered are processed first.

7.5.2 Step DB

The active sequencer steps and step faults to be observed are defined in the step DB. A text stored in the text DB specified can be assigned to these steps.

Structure of a Step DB

Eighteen words per sequencer must be programmed in a data block to specify the structure of a sequencer. Several sequencers can be stored in one step DB.



- * Permissible values: 03_H to FF_H
 except DB5: Assignment DB for DIA
 DB6: Initialization DB

Figure 7-5. Structure of a Step DB

Table 7-1. Assignment of Step Numbers and Data Bits

Step number		Data word x
Step	0	x.8
	1	x.9
	:	:
	8	x.0
	9	x.1
	:	:
	15	x.7
	16	y.8
	:	:

Note

Please note that step 0 is ignored when using GRAPH 5 sequencers.

7.5.3 Text DB

The texts stored in the text DBs appear in the bottom line of the OP 393 display.

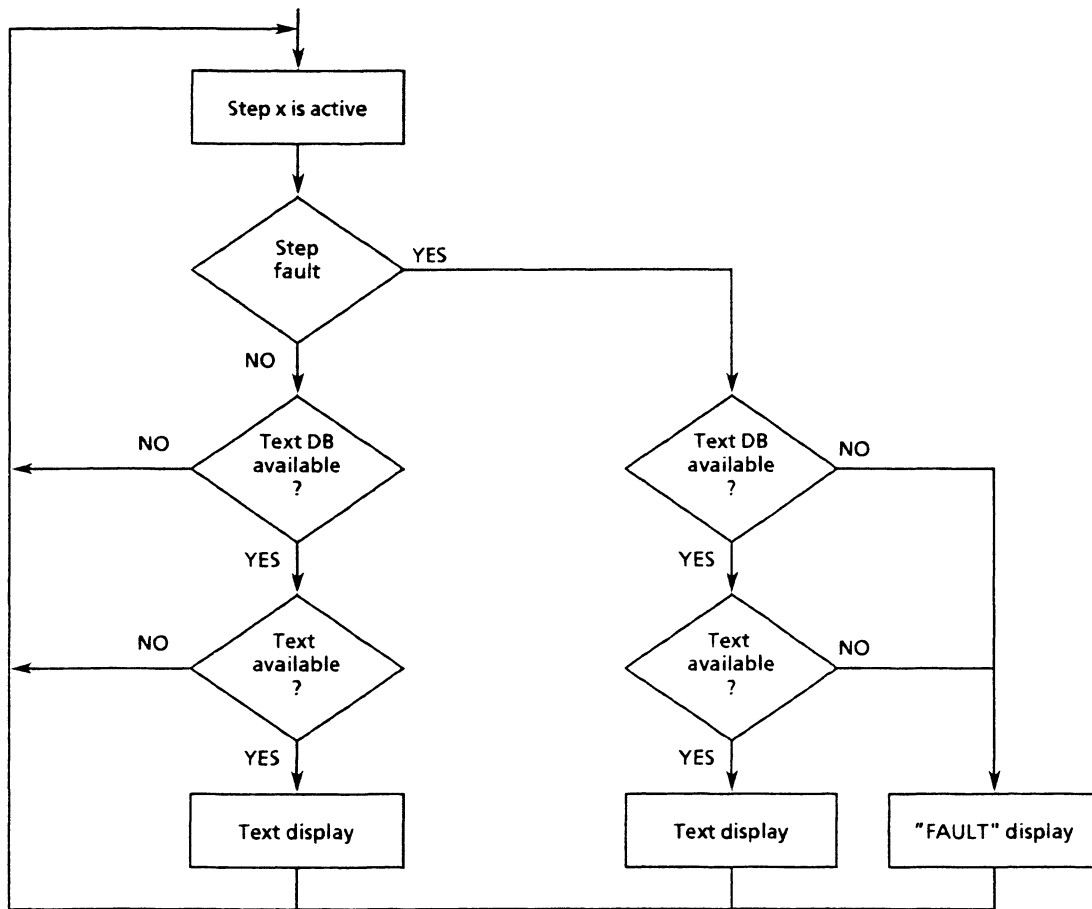


Figure 7-6. Flowchart: Text Display During Step Processing

Structure of a Text DB

A text of up to 16 characters can be assigned to each step.

The texts are displayed one after the other for the individual active steps (0 to 127).

The step texts may be shorter than eight words, but the gap to the word boundary must be padded with space characters (20_H).

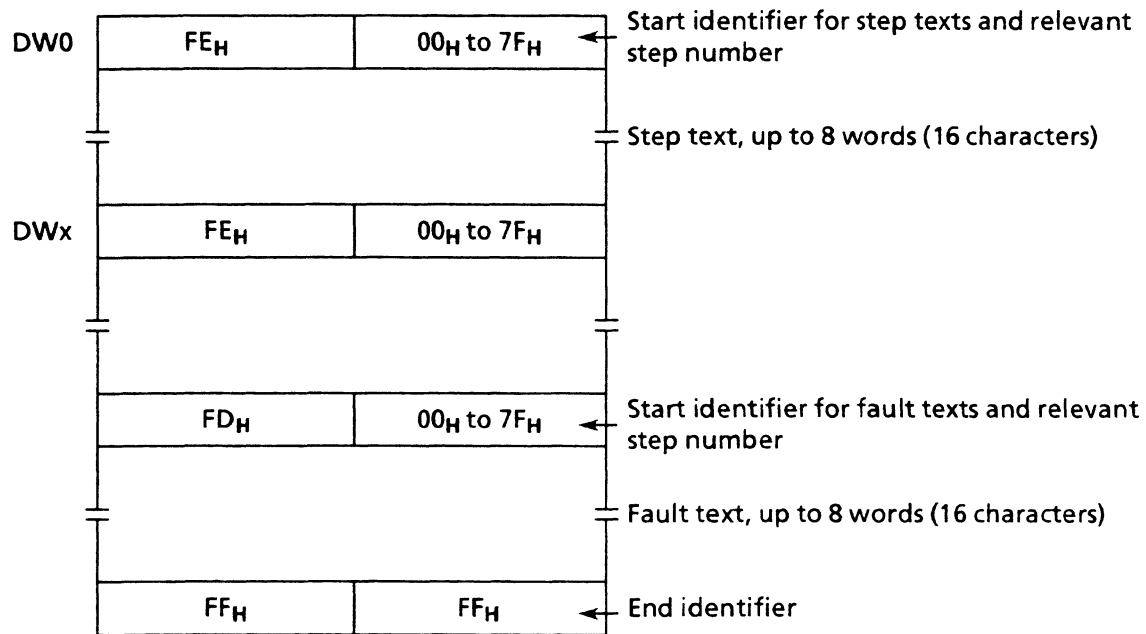


Figure 7-7. Structure of a Text DB

7.6 Application Examples

7.6.1 Assignment DB (DB5)

DW 0:	KH = 0504	Duration of display $5 \times 0.5 \text{ s} = 2.5 \text{ s}$
DW 1:	KH = 000A	4 sequencers in Partial Diagnostics mode
DW 2:	KH = 000B	The sequencers are stored in step DBs
DW 3:	KH = 000C	DB 10, DB 11 and DB 12.
DW 4:	KH = FFFF	End identifier

7.6.2 Step DB

DW 0:	KH = FF01	Start identifier, sequencer 1
DW 1:	KH = 0010	Step texts in DB 1
DW 2:	KH = 0000	8 words for active steps
.	.	
.	.	
.	.	
DW10:	KH = 0000	8 words for step faults
.	.	
.	.	
.	.	
DW18:	KH = FF02	Start identifier, sequencer 2
DW19:	KH = 0000	No step texts available
DW20:	KH = 0000	8 words for active steps
.	.	
.	.	
.	.	
DW28:	KH = 0000	8 words for step faults
.	.	
.	.	
.	.	
DW36:	KH = FFFF	End identifier

7.6.3 Assigning Steps

- STEP 5

PB7:

SEGMENT1

```
:A F10.0      Step flag 0 set?
:L KT100.0
:SD T1
:
:***
```

SEGMENT2

```
:A F10.0
:A T1
:R F10.0
:S F10.1      Set step flag 1
:
:A F10.1
:L KT100.0
:SD T2
:***
```

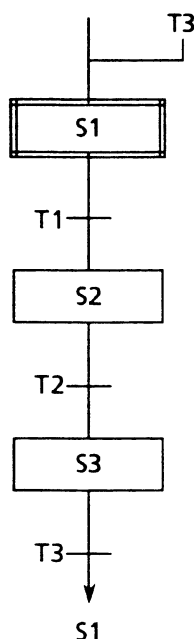
SEGMENT3

```
:A F10.1
:A T2
:R F10.1
:S F10.0      Set step flag 0
:
:C DB10       Open step DB
:L FW10
:T DW2        Assign active steps
:
:AN F50.0     Error bit set?
:BEC
:L FW10
:T DW10       Display fault messages
:BE
```

GRAPH 5

Sequential controller at overview level

Actions at zoom level
(represented without transitions)



Step 1	: A F 233.0	
	: = F 10.1	Set step flag 1
	:	
	: BE	
Step 2	: A F 233.0	
	: = F 10.2	Set step flag 2
	:	
	: BE	
Step 3	: A F 233.0	
	: = F 10.3	Set step flag 3
	:	
	: BE	

FB 7:

: JU FB 70	Call and parameterize
NAME : GPH : HKET	standard function block FB70
:	
STO : Q 0.5	FB70 output 'ERROR'
:	
:	
: Q DB 10	Open step DB
: L FW 10	
: T DW 2	Assign active step
:	
: A Q 0.5	No error?
: JC=F1	
: L KH 0000	Delete 'old' error
: T DW 10	
:	
: AN Q 0.5	Error?
: BEC	
F1 : L FW 10	Step with error
: T DW 10	
: BE	

7.6.4 Text DB

DW 0:	KH=FE01	Start ID, 1st step active
DW 1:	KC=MOTOR_1_ON_*	Step text
DW 9:	KH=FD01	Start ID, fault in 1st step
DW10:	KC=MOTOR_1_DEFECTIVE	Fault test
DW18:	KH=FFFF	End ID

* "_" signifies space

7.7 Diagnostics with the S5-101U

There is only one data block for the S5-101U.
You cannot enter step texts and fault texts.
You must store the diagnostics codes in DB1 from DW128 onward.
Displays appear for approximately three seconds.

7.7.1 Structure of DB1

DB1:

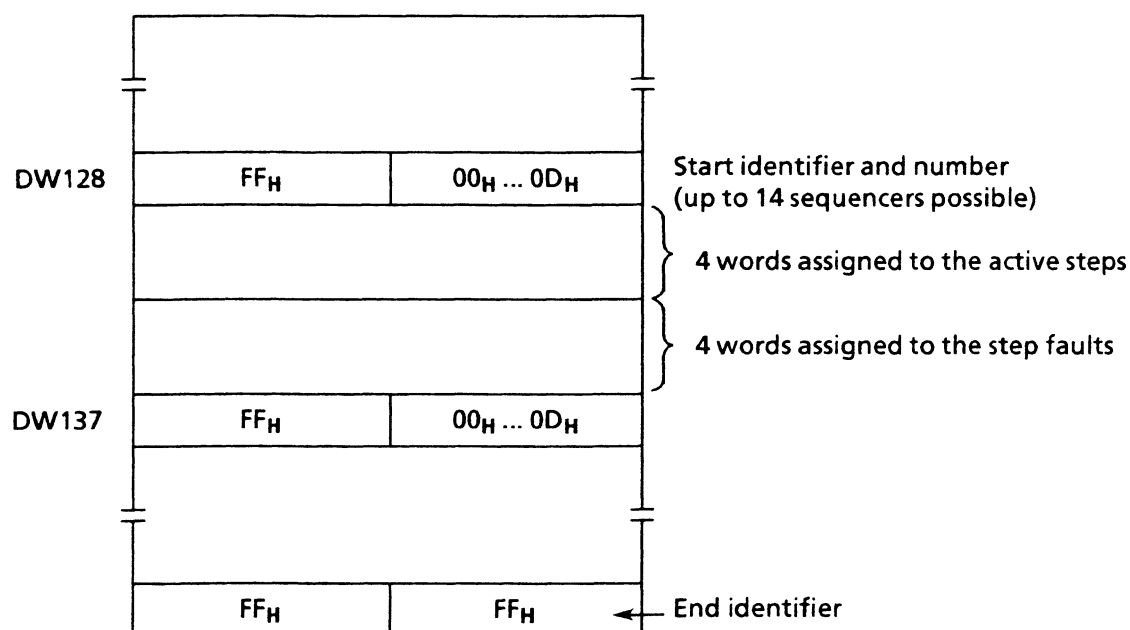


Figure 7-8. Structure of DB1 (S5-101U)

7.7.2 Example

Since DB1 cannot be entered or displayed in the case of the S5-101U, the start and end identifiers for the diagnostics structure are entered as follows:

FB1:

```

:A    F0.0
:JC   =M001
:
:L    KHFF01      Start identifier, 1st sequencer
:T    DW128
:
:L    KHFFFF      End identifier
:T    DW137
:
:AN    F0.0
:S    F0.0      Set auxiliary flag
:
M001:
:      .
:      .
:      .
:BE

```

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8 Forcing Flags

This function allows you to set and reset a specific number of flags. You can store a user text for each command flag (CF).

8.1 Function Selection

The flags to be forced (coherent area) are stored in parameter setting block DB6 (DL11 and DR11). A total of 12 flag bytes (96 force functions) can be stored in DB6. If there is no DB6 in the PLC, the following defaults apply:

- Command flag area: FW4 to FW6 → 32 command flags
- User texts: DB15

If you have not configured automatic function selection of DIA or TXT in DB6, the following appears on the display after the startup screen form:

TMR/CTR/TXT/FCT
 DIA/_DB/TST?

Press the "FCT" key on the OP 393-III to select the "Force flags" function.

Representation of the "Force flags" function:

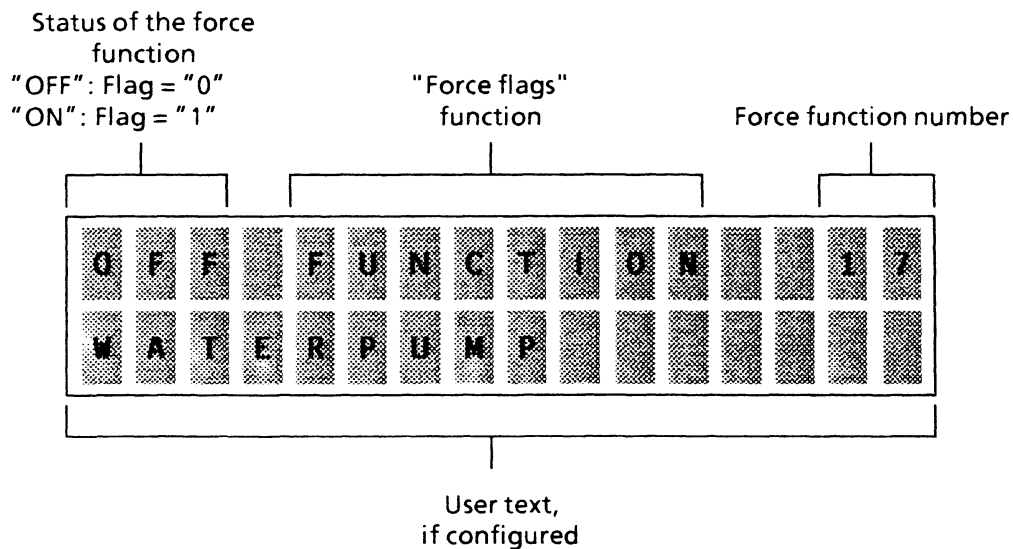


Figure 8-1. Typical Command Flag Display

The following key functions apply in this interactive screen form (Figure 8-1):

- The flag is forced (set/reset) with the "ON/OFF" key on the OP 393-III
- Press the arrow keys "⬆" and "⬇" to scroll through further command flags.

Assignment of force function numbers to command flags

There is a fixed assignment between force function numbers and the relevant command flags. The assignments are shown in Table 8-2 (→ 8.3, "User Texts for Command Flags").

Note

It is not permissible for the PLC and the OP 393 to write simultaneously to the same flag byte.

If, for example, the OP sets bit 1 in flag byte 10, the PLC may only read flag byte 10.

Please note the following in the case of byte-oriented PLCs:

If, in the case of two flag bytes, the first flag byte is written to by the OP and the second flag byte is written to by the PLC, the first flag byte must be followed by an unassigned byte.

Example: The OP 393 sets a bit in flag byte 10. The PLC may now only write to flag bytes FY0 to 8 and then again from FY12 onward. Flag bytes FY9 and FY11 may not be used either by the OP 393 or by the PLC.

8.2 Operator Entries

8.2.1 Inputs without Parameter Setting DB

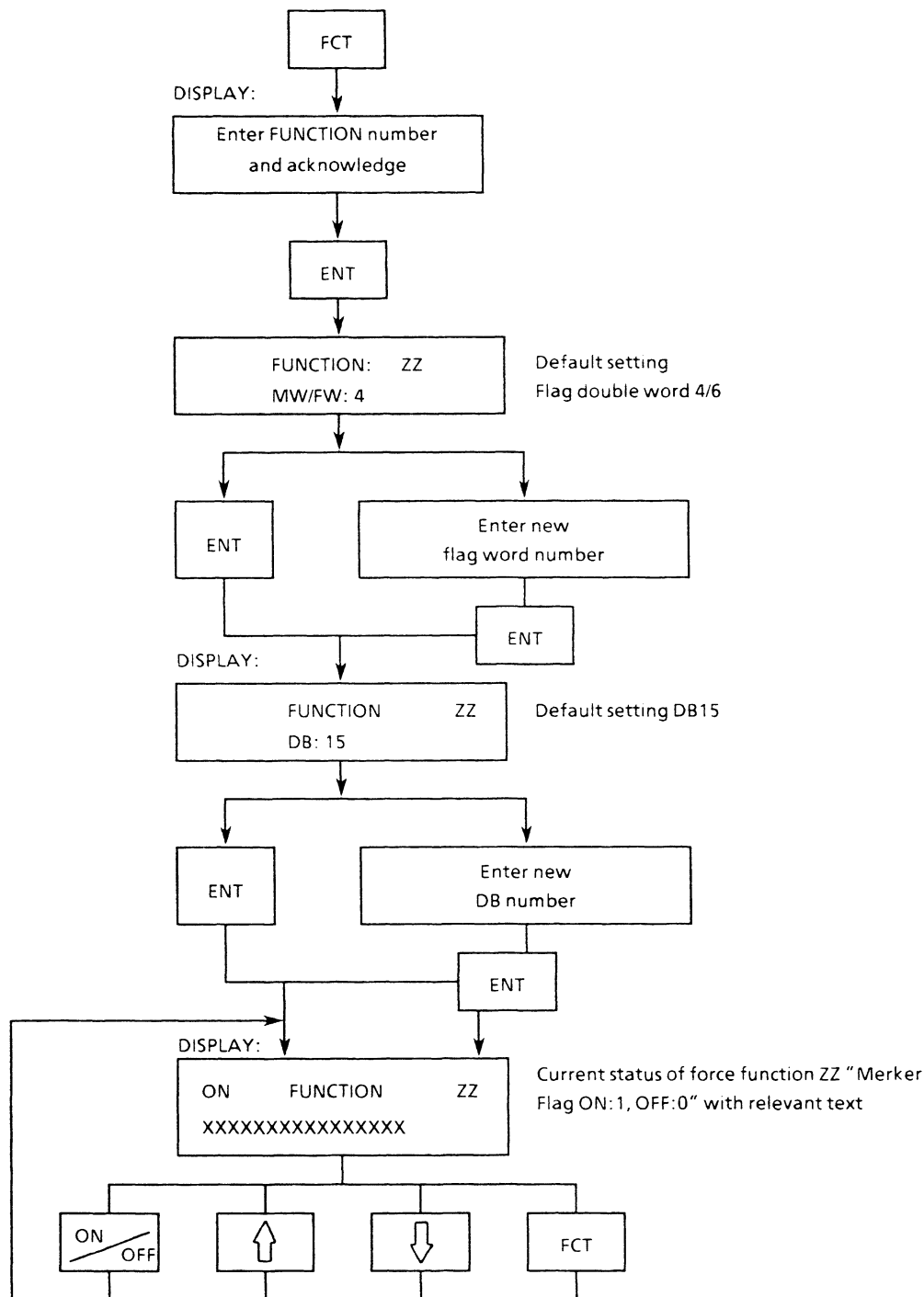


Figure 8.2 Flowchart: Command Flags Function Without Parameter Setting DB

Wrong entries can be deleted with the "CE" key.

8.2.2 Inputs with the Parameter Setting DB

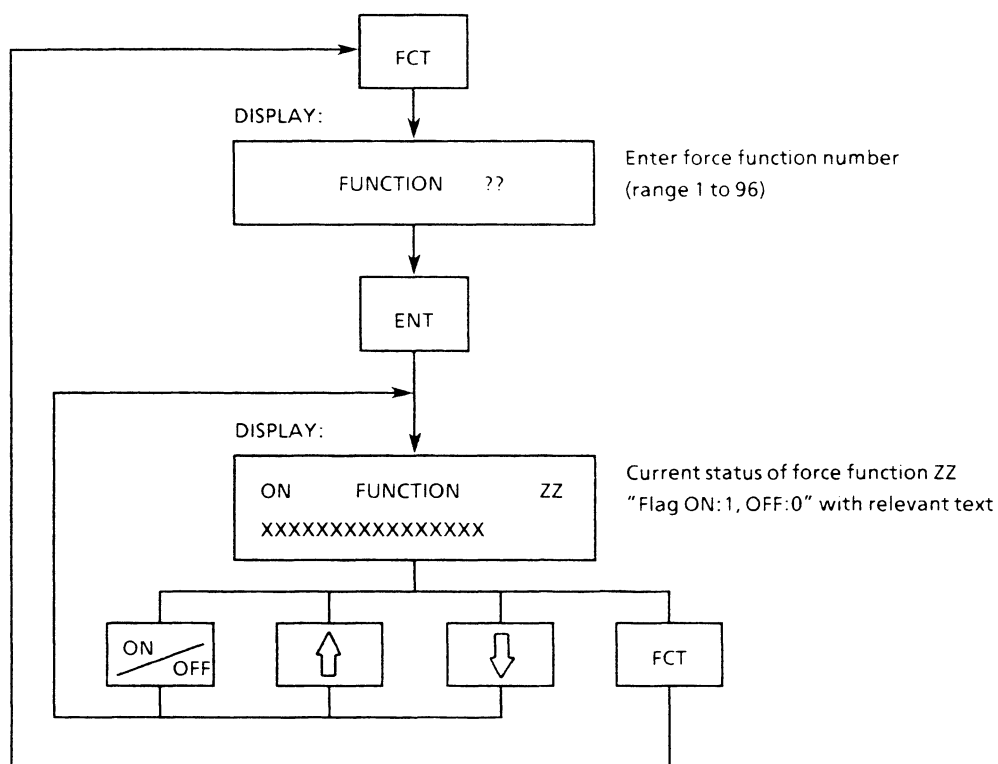


Figure 8.3 Flowchart: Command Flags Function With Parameter Setting DB

Wrong entries can be deleted with the "CE" key.

8.3 User Texts for Command Flags

The user texts for command flags are configured in data blocks.

Note

Text DBs must be assigned texts of 16 characters each. Each text DB can be shorter than 256 DWs, i.e. less than 32 texts. All remaining command flags which have not been assigned text are displayed without text.
See Table 8-2 for the assignment of text to command flags.

The defaults for the "User texts for command flags" function are configured in parameter setting block DB6.

- DL11: The number of data blocks required for command flag user texts is entered here.
- DR11: The number of the first data block for command flag user texts is specified here.

Example: Entry in text DB

```
DW0:  KS = "AAAAAAAAAAAAAAAA"   Text for CF1; Fx.7
DW8:   S = "BBBBBBBBBBBBBBBB"   Text for CF2; Fx.6
DW16: KS = "CCCCCCCCCCCCCCCC"   Text for CF3; Fx.5
.
.
.
```

Each user text has an exact length of 16 ASCII characters (bytes) and requires 8 data words.
32 user texts (256/8) can be configured within one text DB.
If you configure all 96 functions (flags), you require 3 text DBs.

The following assignments apply between force function number (CF no.) command flags (FY...) and text DBs:

Table 8-1. Assignments Between Text DBs and Command Flags

DB	CF No.	;	Flag Bytes*
1. Text DB	CF1 ... CF32	;	FBx ... FBx + 3
2. Text DB	CF33 ... CF64	;	FBx + 4 ... FBx + 7
3. Text DB	CF65 ... CF96	;	FBx + 8 ... FBx + 11

* x: number of the 1st byte for command flags in DB6 (DR10)

The following table shows the relationship between the following:

- The force function number and the relevant command flag
- The user text and the command flag
- Text DBs and command flags

Table 8-2. Offset Table for Command Flags

User Text in Data Word Area	Force Function Number CF...		; Command Flag F...*	
	1st Text D8	2nd Text D8	3rd Text D8	
0 ... 7	CF1: Fx.7	CF33: Fx + 4.7	CF65: Fx + 8.7	
8 ... 15	CF2: Fx.6	CF34: Fx + 4.6	CF66: Fx + 8.6	
16 ... 23	CF3: Fx.5	CF35: Fx + 4.5	CF67: Fx + 8.5	
24 ... 31	CF4: Fx.4	CF36: Fx + 4.4	CF68: Fx + 8.4	
32 ... 39	CF5: Fx.3	CF37: Fx + 4.3	CF69: Fx + 8.3	
40 ... 47	CF6: Fx.2	CF38: Fx + 4.2	CF70: Fx + 8.2	
48 ... 55	CF7: Fx.1	CF39: Fx + 4.1	CF71: Fx + 8.1	
56 ... 63	CF8: Fx.0	CF40: Fx + 4.0	CF72: Fx + 8.0	
64 ... 71	CF9: Fx + 1.7	CF41: Fx + 5.7	CF73: Fx + 9.7	
72 ... 79	CF10: Fx + 1.6	CF42: Fx + 5.6	CF74: Fx + 9.6	
80 ... 87	CF11: Fx + 1.5	CF43: Fx + 5.5	CF75: Fx + 9.5	
88 ... 95	CF12: Fx + 1.4	CF44: Fx + 5.4	CF76: Fx + 9.4	
96 ... 103	CF13: Fx + 1.3	CF45: Fx + 5.3	CF77: Fx + 9.3	
104 ... 111	CF14: Fx + 1.2	CF46: Fx + 5.2	CF78: Fx + 9.2	
112 ... 119	CF15: Fx + 1.1	CF47: Fx + 5.1	CF79: Fx + 9.1	
120 ... 127	CF16: Fx + 1.0	CF48: Fx + 5.0	CF80: Fx + 9.0	
128 ... 135	CF17: Fx + 2.7	CF49: Fx + 6.7	CF81: Fx + 10.7	
136 ... 143	CF18: Fx + 2.6	CF50: Fx + 6.6	CF82: Fx + 10.6	
144 ... 151	CF19: Fx + 2.5	CF51: Fx + 6.5	CF83: Fx + 10.5	
152 ... 159	CF20: Fx + 2.4	CF52: Fx + 6.4	CF84: Fx + 10.4	
160 ... 167	CF21: Fx + 2.3	CF53: Fx + 6.3	CF85: Fx + 10.3	
168 ... 175	CF22: Fx + 2.2	CF54: Fx + 6.2	CF86: Fx + 10.2	
176 ... 183	CF23: Fx + 2.1	CF55: Fx + 6.1	CF87: Fx + 10.1	
184 ... 191	CF24: Fx + 2.0	CF56: Fx + 6.0	CF88: Fx + 10.0	
192 ... 199	CF25: Fx + 3.7	CF57: Fx + 7.7	CF89: Fx + 11.7	
200 ... 207	CF26: Fx + 3.6	CF58: Fx + 7.6	CF90: Fx + 11.6	
208 ... 215	CF27: Fx + 3.5	CF59: Fx + 7.5	CF91: Fx + 11.5	
216 ... 223	CF28: Fx + 3.4	CF60: Fx + 7.4	CF92: Fx + 11.4	
224 ... 231	CF29: Fx + 3.3	CF61: Fx + 7.3	CF93: Fx + 11.3	
232 ... 239	CF30: Fx + 3.2	CF62: Fx + 7.2	CF94: Fx + 11.2	
240 ... 247	CF31: Fx + 3.1	CF63: Fx + 7.1	CF95: Fx + 11.1	
248 ... 255	CF32: Fx + 3.0	CF64: Fx + 7.0	CF96: Fx + 11.0	

* x: number of the 1st byte for command flags in DB6 (DR10)

Note

You can also use the "Force flags" function without assigning a user text. To dispense with text display, enter "0" in data word DW11 of DB6.

If a fault occurs during text display, the user text currently displayed is overwritten by an error message.

Example:

Configuring three force functions (CF1 to CF3)

Defaults in DB6:

DW10:	KH = 0114	Command flag byte (MB20)
DW11:	KH = 0136	Text DB (DB60)

The following assignments apply as per Table 8-2:

- CF1
 - Command flag: F20.7
 - User text: DB60 (1st text DB); DW8 to DW15
- CF2
 - Command flag: F20.6
 - User text: DB60 (1st text DB); DW8 to DW15
- CF3
 - Command flag: F20.5
 - User text: DB60 (1st text DB); DW16 to DW23

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9	Test Function	
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9 Test Function

The following tests are carried out:

- EPROM test
- RAM test
- Keypad test
- Display test

9.1 Sequence of the Test Function

Press the <TST> key during power up of the OP 393 to select the test function provided no automatic branch function has been programmed in DB6.

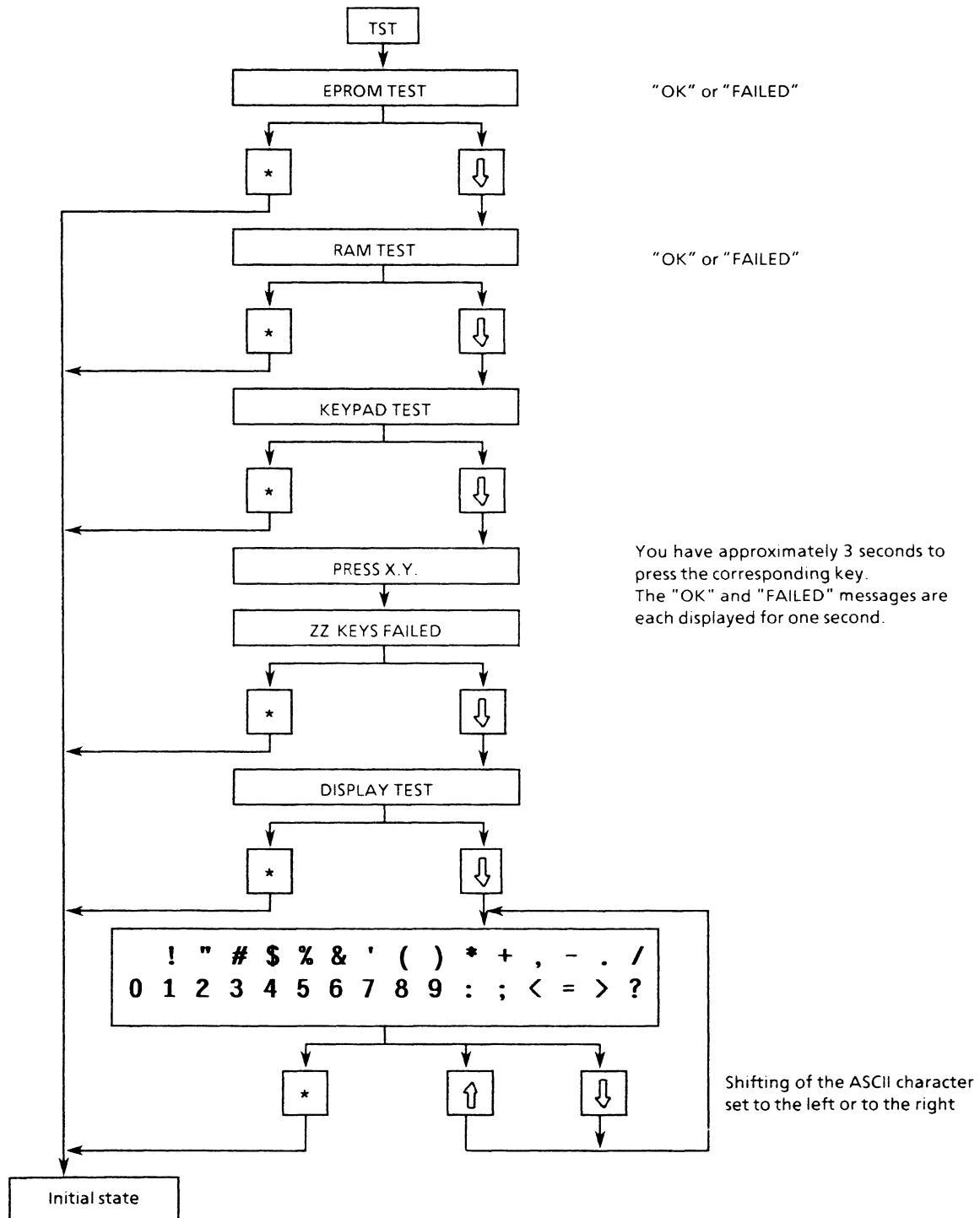


Figure 9-1. Flowchart: Test Function

9.2 EPROM Test

The OP displays "EPROM TEST". If the test runs successfully, "OK" is displayed and if not, "FAILED" appears.

Press the <  > key to initiate the RAM test. Press any other key to return to the initial state.

9.3 RAM Test

The OP displays "RAM TEST". If the test runs successfully, "OK" is displayed, if not, "FAILED" appears.

Press the <  > key to initiate the keypad test. Press any other key to return to the initial state.

9.4 Keypad Test

The OP displays "KEYPAD TEST". To start the keypad test you must press the <  > key again. Press any other key to return to the initial state.

9.4.1 OP 393 Keypad

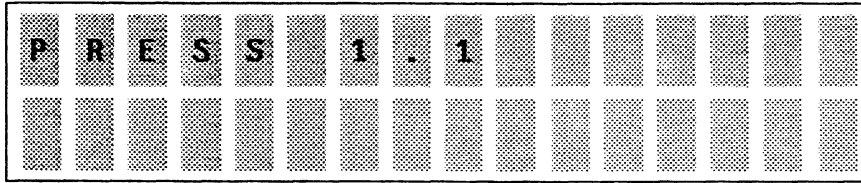
The OP 393 keypad is a 5 x 5 matrix.

TMR 1.1	7 1.2	8 1.3	9 1.4	 1.5
CTR 2.1	4 2.2	5 2.3	6 2.4	 2.5
FCT 3.1	1 3.2	2 3.3	3 3.4	 3.5
ON/ OFF 4.1	0 4.2	. 4.3	CE 4.4	+ / - 4.5
TXT 5.1	TST 5.2	DB 5.3	DIA 5.4	ENT 5.5

Figure 9-2. OP 393 Keypad Matrix

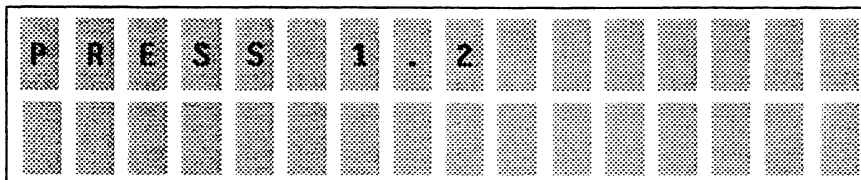
9.4.2 Test Sequence

The following appears in the display:

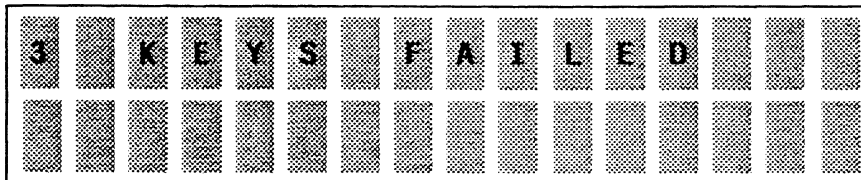


You now have approximately three seconds to press the corresponding key. If you do not press the key or if you press the wrong key, or if the key is defective, the "FAILED" message appears, otherwise "OK" is displayed.

The OP 393 then prompts you to press the next key.



When all the keys have been tested, the OP displays the number of failures counted, e.g:



Press the <↓> key to initiate the display test.

9.5 Display Test

The OP displays "DISPLAY TEST". Press the  key again to activate the display test. Press any other key to return to the initial state.

The following characters appear on the screen after the test has been started:

	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?

Hold down the  or  key to shift the ASCII character set to the right or to the left, respectively.

Press any key to abort the test and return to the initial state.

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Appendices	
Appendix A	Error Messages
Appendix B	SIEMENS Addresses Worldwide

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A Error Messages

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A Error Messages

Message/ Error	Meaning	Remedy
*** Interface Messages ***		
*04	Buffer overflow	Repeat function
*05	Parity error	Repeat function
*06	Wire break	Repeat function
*07	Timer out	Repeat function
*08	Interface not ready	Repeat function or briefly unplug OP
*15	Address list missing or wrong operating mode	Select correct operating mode and repeat function
*23	Disabled due to level	
Control Function Messages		
*46	Wrong PLC type	
*48	Wrong transmission length	
*49	No CPU	
Programmer Function Messages		
*50	Wrong key	Press correct key
*73	Parameter exceeded	Re-enter statement with correct parameter
*87	Data cannot be represented in format selected	Select another format
*88	No data block for timers, counters, messages or data word input	
*89	DB 6 not available or incorrectly structured or contains invalid data	Check DB 6; invalid DB numbers have possibly been entered
*90	Illegal input	Correct input
*91	Wrong password	Enter correct password

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