ET 200 Handheld

Manual

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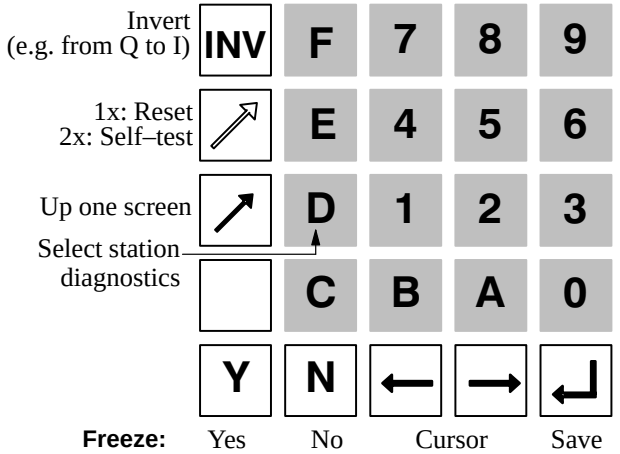
Exclusion of liability

The contents of this brochure have been checked for conformity with the hardware and software described. Nevertheless, the existence of deviations cannot be excluded so that we are not able to guarantee absolute conformity. However, the specifications in this brochure are checked at regular intervals and necessary corrections will be incorporated in subsequent editions. Suggestions for improvement would be appreciated.

Subject to change without prior notice.

Order No.: 6ES5 998–7ET21

Key Assignment



Code Table

Decimal	Hexadecimal ("KH" format)	Binary ("KM" format)
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111

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Safety Notes for the User

This manual contains important information you must observe in the interest of your own personal safety and to avoid damage to equipment and property. The notices are highlighted by a warning triangle, drawing your attention, like the example below, to various degrees of danger:



Warning

means that death, grievous bodily harm or serious damage to equipment or property **may** ensue if the appropriate precautionary measures are not taken.

The unit may be started up and operated only by **qualified personnel**. Qualified personnel, as understood by the safety notes quoted in this manual, are persons authorized to start up, ground and label units, systems and circuits in keeping with the relevant safety standards.

Application 1

The ET 200 handheld is a low–priced alternative to the programmer for system start–up and diagnostic functions in connection with

- the ET 200 slave stations ET 200B, ET 200C, ET 200K and ET 200U

  or

- a DP Standard slave

  or

- a slave station with an SPM module that can be operated on the SINEC L2–DP LAN.

With the ET 200 handheld, you can

- determine and display the number of a slave station
- Change the station number (not in the case of the ET 200B/U)
- display the status of the inputs
- force the outputs
- carry out self–test functions on the ET 200 handheld

Other ET 200 functions depend on the type of slave station connected (→ Table 1.1).

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Table 1.1 Station–specific functions of the ET 200 handheld

Station type	Functions
ET 200B ET 200B–DP	• Identification of wrong ports (only for ET 200B stations with diagnostics capability) • Transfer of user–specific parameters (user parameters, with ET 200B–DP only)
ET 200C ET 200C–DP	• Identification of wrong inputs and outputs (diagnostics)
ET 200K	• Configuring of port D for inputs and outputs • Identification of wrong inputs and outputs (diagnostics)
ET 200U ET 200U (DP Standard)	• Station diagnostics • Identification of modules plugged in (digital or analog modules) • Identification of wrong slots (slot diagnostics) • Transfer of user–specific parameters (user parameters, with ET 200U (DP Standard) only)
DP Standard slave	• Transfer of user–specific parameters (user parameters) • The following diagnostics functions: station status, device–specific diagnostics, identifier–specific diagnostics, channel diagnostics
Slave station with SPM module	• Input and output diagnostics in the case of SPM with diagnostics capability

Overview of the Display Structure

2

The following symbols appear in the various displays:

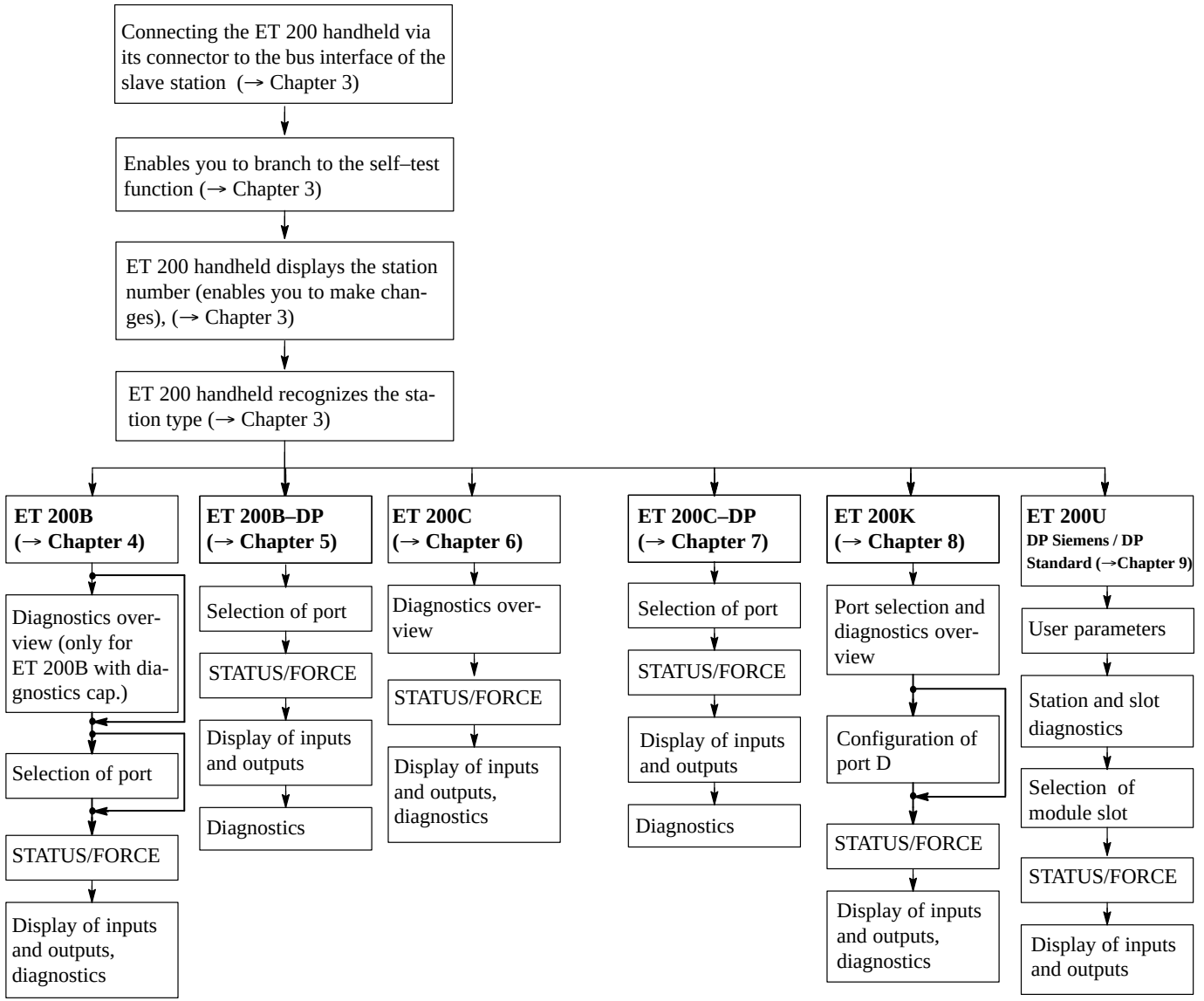
###:	The ET 200 handheld fills in this field
$$$:	The user must fill in this field
I:	Input
Q:	Output
Dia:	Diagnostics
SL:	Slot

In the following chapters, examples of some displays are used to create a better understanding of the subject matter.

Page 2–2 contains a description of the display structure if you connect the ET 200 handheld to the slave station. Depending on the type of station you have selected, you are taken into the appropriate displays:

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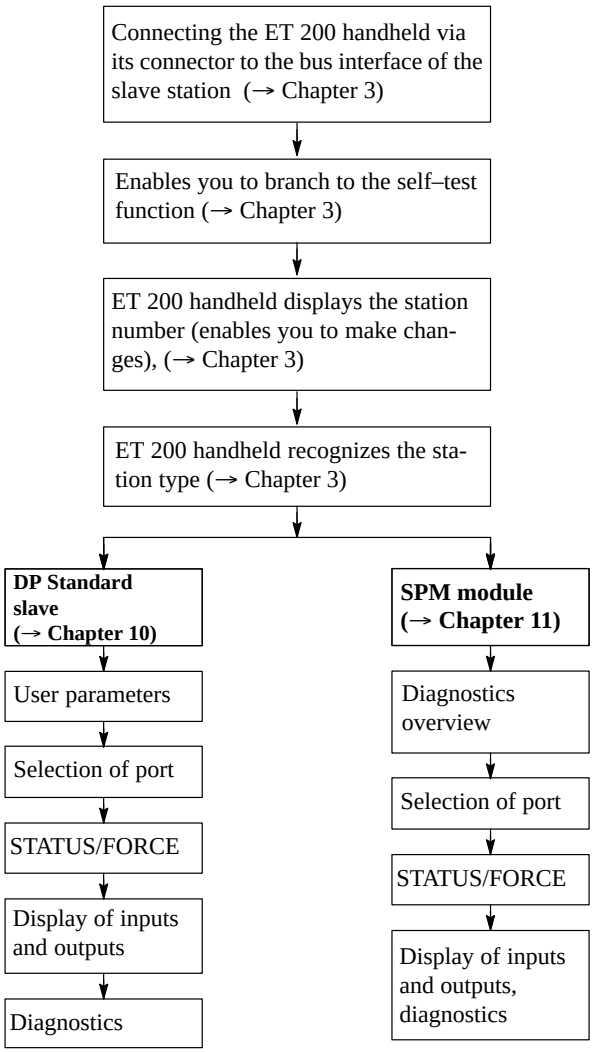
Overview of Display Structures



Continued on following page

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Connecting the ET 200 Handheld to a Slave Station

3

This chapter describes

- How to proceed after connecting the ET 200 handheld to the slave station
- How to get into the self–test function.

The self–test function is not mandatory. You only need it if you suspect, for instance, that a key is not functioning properly or that errors are appearing in the display.

Normally you **do not** need the self–test function.

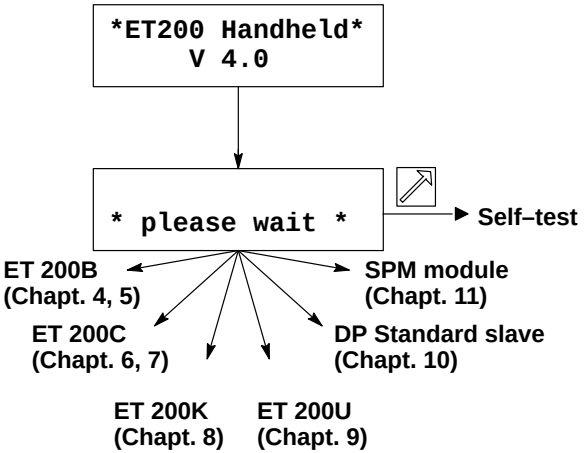


Warning

This may be a dangerous plant condition!

The ET 200 handheld cannot be operated on the active SINEC L2–DP LAN:

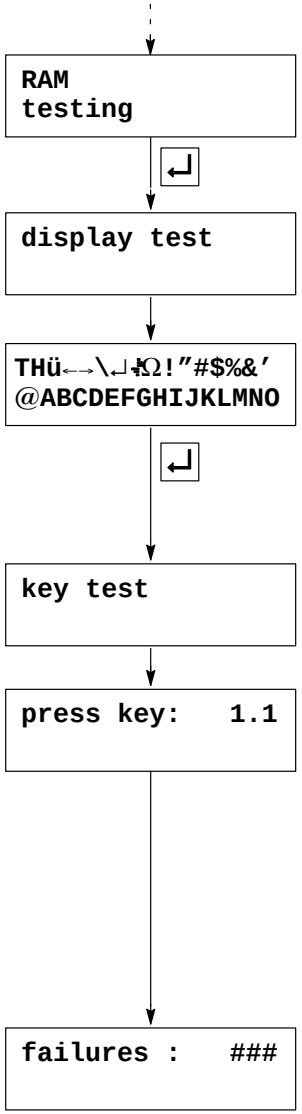
Always first unplug the SINEC L2–DP **LAN** before plugging the ET 200 handheld into the connector of the slave station.



Once you have connected the ET 200 handheld to the slave station, the version number of the operating system appears in the display.

You can branch into the self–test function by pressing ⇗ while the station number is being read in (“please wait”).

You can abort the self–test (with the exception of the key test) at any time by pressing ⇗ . You will find a description of the self–test on p. 3–4.



You can abort the self–test at any time by pressing ↗ (except during the key test).

The RAM is tested at the beginning of the self–test. The result of the RAM test is displayed.

You enter the display test from the RAM test by pressing the ↵ key.

After the “Display test” display, a string of characters and digits appear. You can shift these to the right or left with the cursor to check whether the characters are correctly displayed at each position.

Press the ↵ key to get into the key test from the display test.

You are prompted to press the keys displayed. The keypad is a 5x5 matrix with the first digit denoting the line and the second digit the column. 1.1. corresponds to the INV key and 1.3 to the 7 key. Press each key displayed within 5 seconds, proceeding line by line.

If you press the wrong key or do not press the key displayed within 5 seconds or if the key is defective, an error message appears under the “**press key: #.#**” line.

When you have checked all 25 keys, a message appears to tell you how many key errors have occurred. You can exit the test program by pressing ↗ , which returns you to the main menu.

ET 200B

4

The ET 200 handheld offers the following depending on the type of the ET 200B slave station:

- Output of the station number
- Diagnostics messages (only for ET 200B station with diagnostics capability)
- “STATUS/FORCE” function.

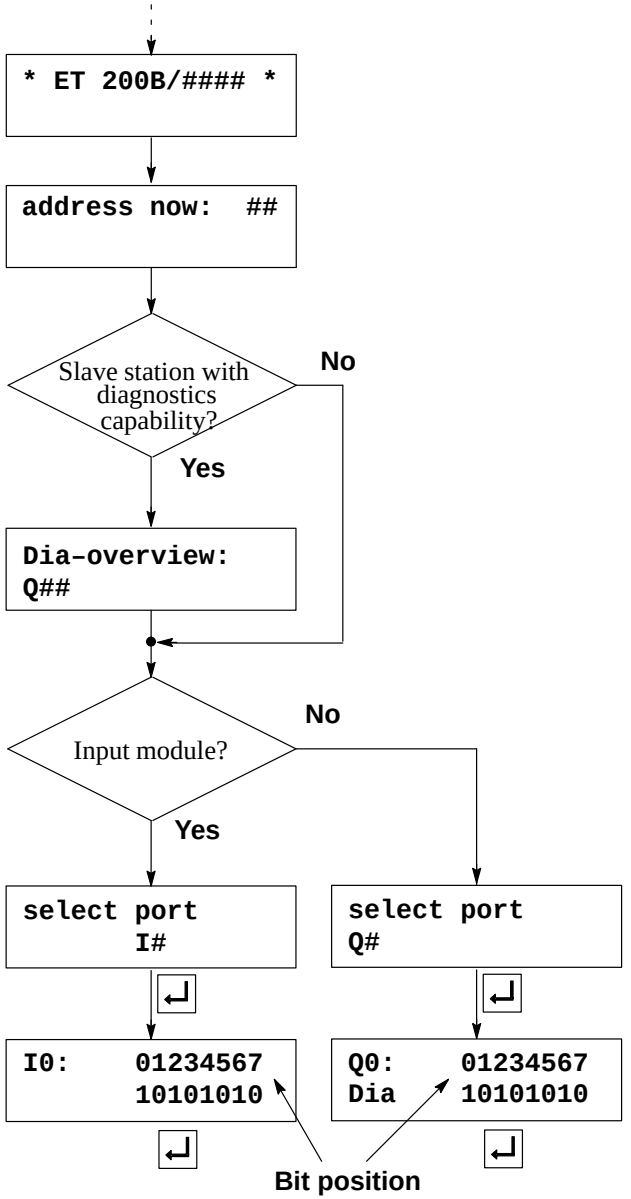


Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after approximately 1 second if you

- press or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station or
- carry out a cold restart on the ET 200B slave station with the RUN/STOP switch.

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The identifier of the ET 200B station appears.

The ET 200 handheld then displays the station number for 3 seconds.

Ports are displayed with diagnostics if the ET 200B station has diagnostics capability.

Select the port for the STATUS/FORCE function and confirm with ↵ .

The port appears on the display with the status of the connections.

Outputs: Force the outputs with 0 or 1. Use the cursor to change the output port without switching off outputs. The outputs are switched with ↵ .

Inputs: Use the cursor to change the input port. You can "freeze" the status of the inputs Y . The "frozen" status is represented by a propeller symbol. Terminate "freezing" with N.

Diagnostics: If "Dia" blinks, a diagnostic bit has been set for **another** port. If a diagnostics bit has been set on the **same** port, the diagnostics message is output instead of the status of the outputs.

Message	Meaning
fuse blown	No load voltage or defective fuse
short	Short–circuit or overload

ET 200B-DP

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The ET 200 handheld performs the following functions in connection with the ET 200B–DP slave station:

- Determines the station number,
- STATUS/FORCE function and
- Station status and device–specific diagnostics.



Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after about 2 seconds if you

- press ⇗ or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station or
- carry out a cold restart on the ET 200B slave station with the RUN/STOP switch.

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ET 200B–DP

Tips for users of the ET 200B–DP

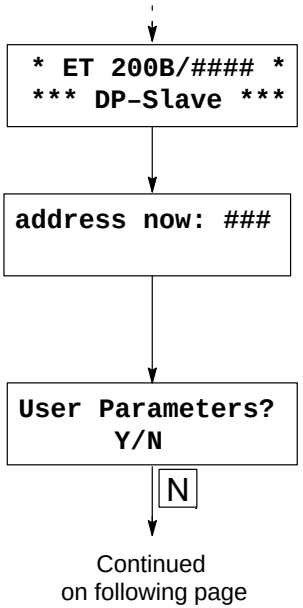
The table below indicates the modules the ET 200 handheld can access as ET 200B–DP:

Table 5.1 Modules of the ET 200B–DP which can be accessed by the ET 200 handheld

Order No. 6ES5 ...	Address identifier	Manufacturer identifier
430–2BA12	32DI	0004_H
430–2BA21	32DI	$000C_H$
431–2BA12	16DI	0001_H
451–2BA12	16DQ	0002_H
451–2BA21	32DQ	$000D_H$
454–2BA12	16DQ / 2A	0005_H
458–2BA12	8DQ	0003_H
483–2BA11	24DI/8DQ	$000F_H$
483–2BA21	24DI/8DQ	$000E_H$
487–2BA11	8DI/8DQ	$000B_H$

All modules of the ET 200B–DP not figuring in the list above are treated as DP Standard slaves by the ET 200 handheld. In this case, please refer to Chapter 10.

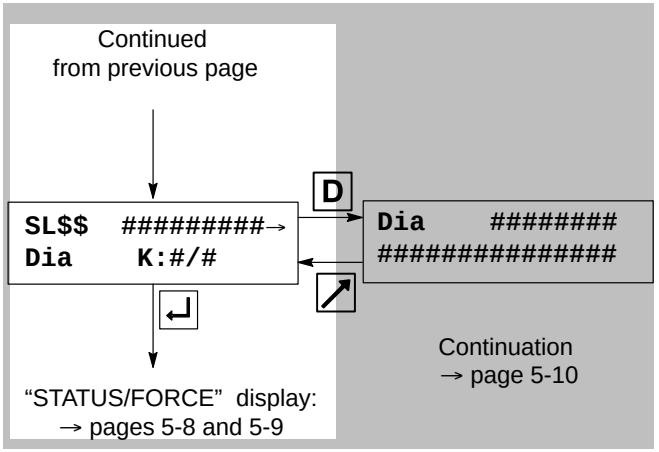
For a detailed explanation of the terms slot, identifier and consistency, please refer to Section 10.1.



First of all, the designation of the ET 200B–DP is displayed for approximately 3 seconds.

Then the ET 200 handheld displays the station number.

User Parameters: Type **N** for “No” since you cannot store user–specific parameters with the ET 200B–DP (→ Table 5.1).



The "SELECTION" display provides you with an overview of the ET 200B–DP:

Line 1: Use the cursor keys or the numerical keys "0" or "1" to select a slot. The following applies for the ET 200B–DP:

- Slot 0 ("SL00") is an identifier for an output area,
- Slot 1 ("SL01") is an identifier for an input area.

The identifier (→ Table 5.2) is output in the next field.

Line 2: The consistency of the selected identifier is output via the "**K:#/#**" parameter.

Press ↵ to select the slot for the STATUS/FORCE function.

Table 5.2 Explanation of the "SELECTION" display

Abbreviation	Significance
1st line	
SL$$	**Slot** "**SL00**" for an output **Slot** "**SL01**" for an input
#########	**Identifier**, e.g.: **I02B**: Input area comprising 2 bytes (I) **Q02B**: Output area comprising 2 bytes (Q)
2nd line	
Dia	If "Dia" is flashing, this indicates that diagnostic bits have been reported, and you can enter D to change over to the "STATION DIAGNOSTICS" display (→ page 5-10).
K:#/#	Consistency of inputs/outputs B: Consistency over one byte

Sections 5.1 and 5.2 describe the “STATUS/FORCE” display for the input and/or output area.

The first line indicates the bit or byte position, the second line contains the corresponding values.

Inputs: You can “freeze” the status of the inputs [Y] . The “frozen” status is represented by a propeller symbol. Terminate “freezing” with [N].

Outputs: Outputs are set with [↵] .

If “Dia” is flashing, diagnostic bits have been reported. Press [↗] to return to the “SELECTION” display and obtain further diagnostics messages.

5.1 Input area

Input area ≤ 1 byte

```
I       76543210
Dia     ########
```

Input area > 1 byte

```
I   00 01 02 03
Dia ## ## ## ##
```

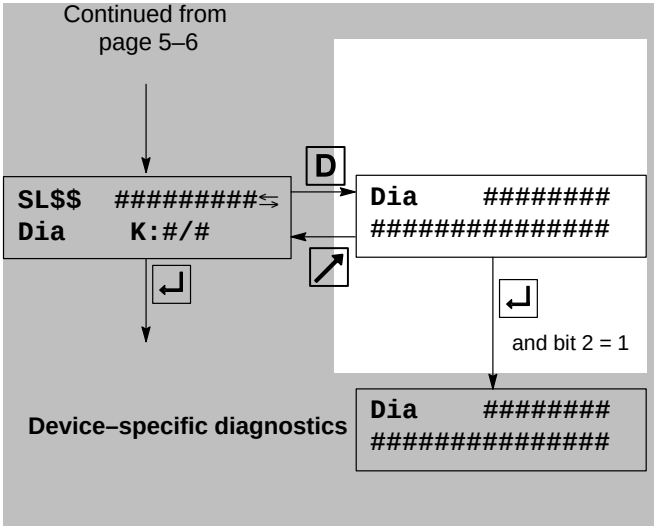
5.2 Output area

Output area ≤ 1 byte

```
Q       76543210
Dia     $$$$$$$$
```

Output area > 1 byte

```
Q   00 01 02 03
Dia ## ## ## ##
```



If “Dia” is flashing in the “SELECTION” display, you can press D for branching to “STATION DIAGNOSTICS”.

The “STATION DIAGNOSTICS” display shows you the diagnostics messages of the ET 200B–DP.

Line 1: Every “1” represents a station diagnostics message (→ Table 5.3).

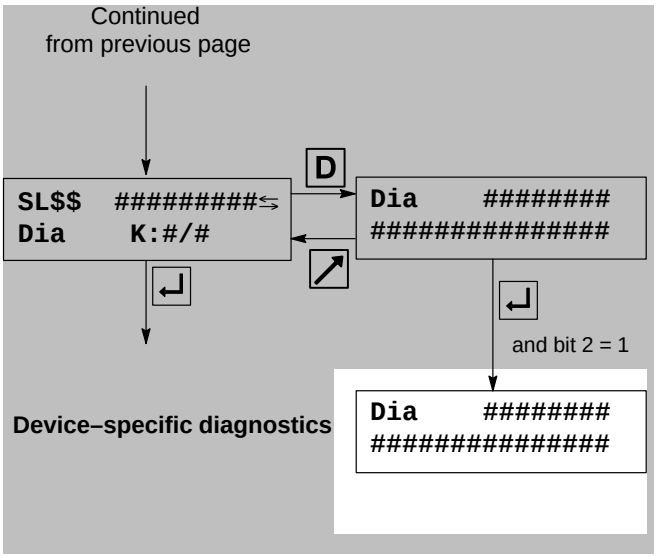
Line 2: If you use the cursor keys to select the bits in line 1, the corresponding plain–text message is displayed in line 2.

If bit 2 is set, (“external diag”) and the cursor is positioned on bit 2, then you can branch to device–specific diagnostics by pressing ↵ .

Table 5.3 Significance of station diagnostics

Message	Bit	Significance
`static diag`	0	1: Static diagnostics – the ET 200 handheld continues requesting diagnostics until this bit is reset by the slave station.
`external diag`	2	1: Device–specific diagnostic bits have been reported.
`not supported`	3	1: Function requested by the ET 200 handheld is not supported by DP Standard slave.
`extdia overflow`	6	1: DP Standard slave has sent more diagnostics messages than the ET 200 handheld can process.

Leaving the display: Press ↗ to exit this display.



After you have pressed ↵ to branch to device–specific diagnostics, the ports having a diagnostics message are displayed.

Line 1: Every “1” represents a device–specific diagnostics message.

Line 2: If you use the cursor keys to select the bits in line1, the diagnostics message (→ table below) and the corresponding channel group are displayed in line 2.

For example, “short 0” means that a short circuit or an overload has been detected in channel group 0.

Message	Significance
fuse blown	No load voltage or fuse defective
short	Short circuit or overload

Leaving the display: Press ↗ to exit this display.

ET 200C

6

The “**ET 200C Distributed I/O Station**” Manual describes how to connect the ET 200 handheld to an ET 200C module.

The ET 200 handheld performs the following functions in conjunction with the ET 200C slave station:

- Assignment and modification of the station number
- Diagnostics of inputs and outputs
- STATUS/FORCE function

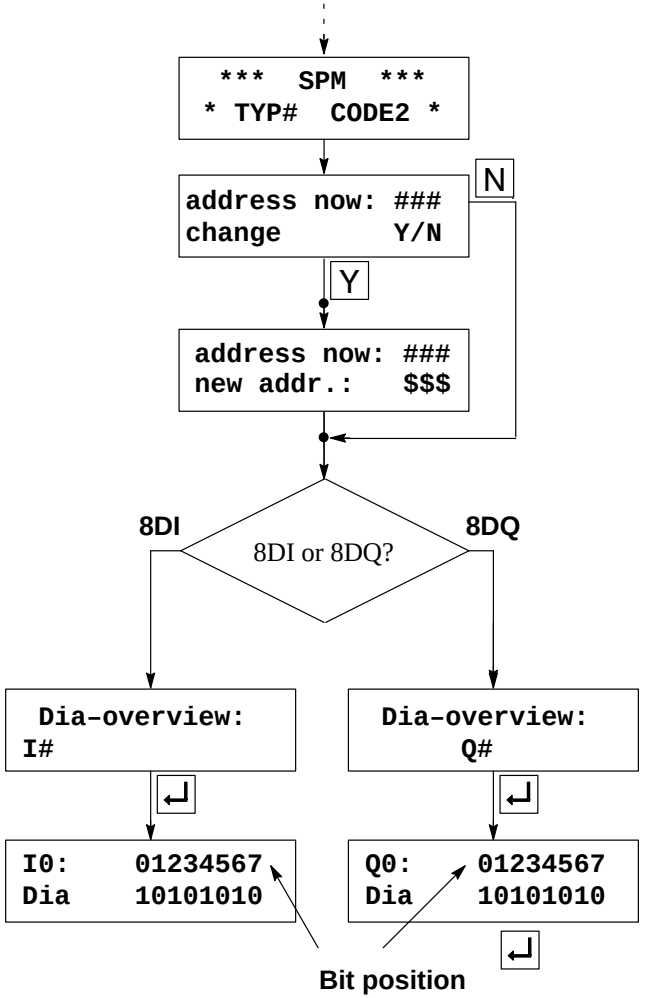


Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after about 1 second if you,

- press  or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station.

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The ET 200C slave station is accessed in the same way as an SPM module: "**TYP0**" (8DI) or "**TYP1**" (8DQ) and "**CODE2**" are inserted for the ET 200C.

Then the station number read in is displayed. If station number 126 is displayed, this means that the station has not yet been assigned a valid station number. You may change the station number by pressing [Y] for Yes (valid station numbers: 3 to 124).

If you have entered the station number correctly, it is displayed for approximately 3 seconds.

If diagnostic bits have been reported, the "**Dia–overview**" display for the input or output port concerned is displayed.

Press [↵] to branch to the STATUS/FORCE display: The connector with the corresponding configuration and the status of the connections appears on the display.

Outputs: You can change the status of the outputs with the numerical keys 0 and 1.

The outputs are set with [↵] .

Inputs: You can press [Y] to "freeze" the status of the inputs. The "frozen" state is represented by a propeller symbol. Terminate "freezing" with [N].

Diagnostics: If "Dia" **and** a 0 or 1 is flashing, the associated input or output is faulted (e.g. wire–break or short–circuit).

Leaving the display: Press [↗] to exit this display.

ET 200C-DP

7

The ET 200 handheld performs the following functions in conjunction with the ET 200C–DP slave station:

- Display and modification of the station number
- STATUS/FORCE function
- Station status and device–specific diagnostics.



Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after about 2 seconds if you,

- press  or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station.

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ET 200C–DP

Tips for users of the ET 200C–DP

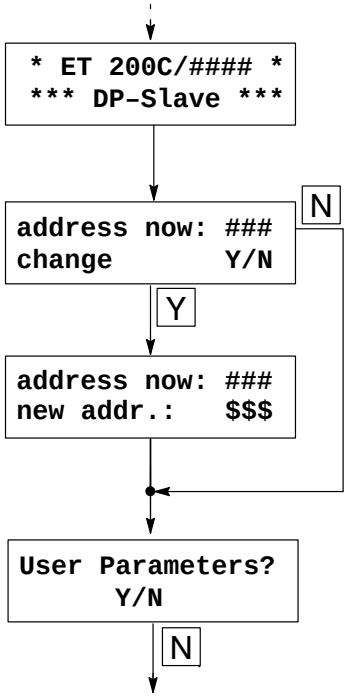
The table below indicates the modules the ET 200 handheld can access as ET 200C–DP:

Table 7.1 Modules of the ET 200C–DP that can be accessed by the ET 200 handheld

Order No. 6ES5 ...	Address identifier	Manufacturer identifier
431–2CA12	8DI	8010_H
451–2CA12	8DQ	8011_H
454–2CA11	8DQ/2A	8012_H

All modules of the ET 200C–DP not figuring in the list above are treated as DP Standard slaves by the ET 200 handheld. In this case, please refer to Chapter 10.

For a detailed explanation of the terms slot, identifier and consistency, please refer to Section 10.1.



Continued
on following page

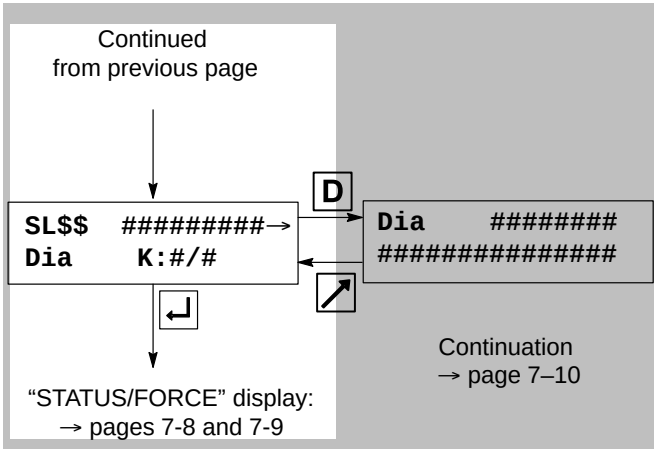
First of all, the designation of the ET 200C–DP is displayed for approximately 3 seconds.

Then the ET 200 handheld displays the station number.

Change station number: If station number 126 appears, this means that the ET 200C–DP has not yet been assigned a valid station number. You can change the station number by pressing **Y** for Yes (valid station numbers: 3 to 125).

If you have entered the station number correctly, it will appear in the display for about 3 seconds.

User Parameters: Type **N** for “No” since you cannot store user–specific parameters with the ET 200C–DP (→ Table 7.1).



The "SELECTION" display provides you with an overview of the ET 200C–DP:

Line 1: Use the cursor keys or the numerical keys "0" or "1" to select the slot. The following applies for the ET 200C–DP:

- Slot 0 ("SL00") is an identifier for an output area,
- Slot 1 ("SL01") is an identifier for an input area.

The identifier (→ Table 5.2) is output in the next field.

Line 2: The consistency of the selected identifier is output via the "**K:#/#**" parameter.

Press ↵ to select the slot for the STATUS/FORCE function.

Table 7.2 Explanation of the "SELECTION" display

Abbreviation	Significance
1st line	
SL$$	**Slot** "**SL00**" for an output **Slot** "**SL01**" for an input
#########	**Identifier**, e.g.: **I01B**: Input area comprising 1 byte (I) **Q01B**: Output area comprising 1 byte (Q)
2nd line	
Dia	If "Dia" is flashing, this indicates that diagnostic bits have been reported and you can press D to change over to the "STATION DIAGNOSTICS" display (→ page 7-10).
K:#/#	Consistency of inputs/outputs B: Consistency over one byte

Sections 7.1 und 7.2 describe the “STATUS/FORCE” display for the input and/or output area.

The first line indicates the bit or byte position, the second line contains the corresponding values.

Inputs: You can “freeze” the status of the inputs [Y] . The “frozen” status is represented by a propeller symbol. Terminate “freezing” with [N].

Outputs: Outputs are set with [↵] .

If “Dia” is flashing, diagnostic bits have been reported. Press [↗] to return to the “SELECTION” display and obtain further diagnostics messages.

7.1 Input area

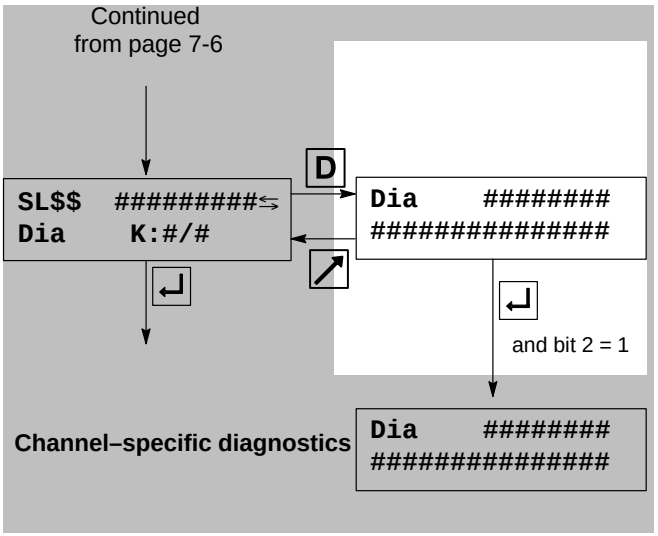
Input area ≤ 1 byte

```
I       76543210
Dia     ########
```

7.2 Output area

Output area ≤ 1 byte

```
Q       76543210
Dia     $$$$$$$$
```



If “Dia” is flashing in the “SELECTION” display, you can press [D] for branching to “STATION DIAGNOSTICS”.

The “STATION DIAGNOSTICS” display provides you with an overview of the diagnostics messages of the ET 200C–DP.

Line 1: Every “1” bit represents a station diagnostics message (→ Table 7.3).

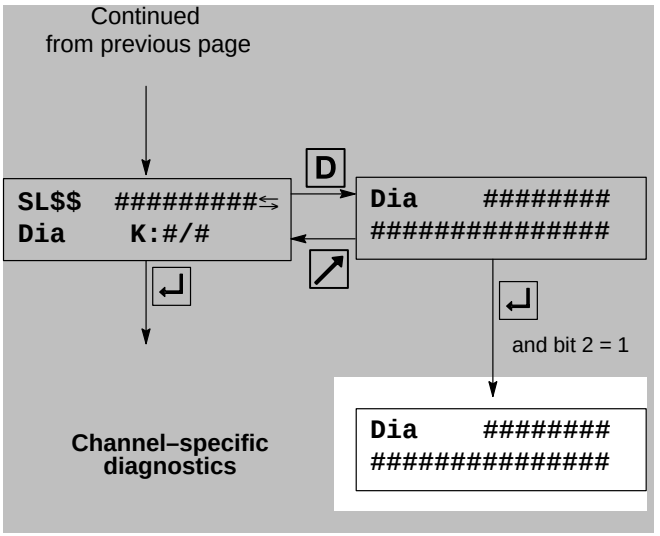
Line 2: If you use the cursor keys to select the bits in line 1, the corresponding plain–text message is displayed in line 2.

If bit 2 is set, (“external diag”) and the cursor is positioned on bit 2, then you can branch to channel–specific diagnostics by pressing [↵] .

Table 7.3 Significance of station diagnostics

Message	Bit	Significance
static diag	0	1: Static diagnostics – the ET 200 handheld continues requesting diagnostics until this bit is reset by the slave station.
external diag	2	1: Device–specific diagnostic bits have been reported.
not supported	3	1: Function requested by the ET 200 handheld is not supported by DP Standard slave.
extdia overflow	6	1: DP Standard slave has sent more diagnostics messages than the ET 200 handheld can process.

Leaving the display: Press [↗] to leave this display.



You can change over to channel–specific diagnostics if bit “2” is set and the cursor has been positioned on “bit 2”:

Line 1: Every “1” represents a channel–specific diagnostics message.

Line 2: If you use the cursor keys to select the bits in line 1, the corresponding faulty input/output appears in line 2.

“I2”, for example, means that the third input (.2) of the ET 200C–DP is faulty.

Leaving the display: Press ↗ to exit this display.

ET 200K

8

The ET 200 handheld performs the following functions in conjunction with the ET 200K slave station:

- Assignment and modification of the station number
- Configuration of the D port for inputs and outputs
- STATUS/FORCE function
- Diagnostics of inputs and outputs

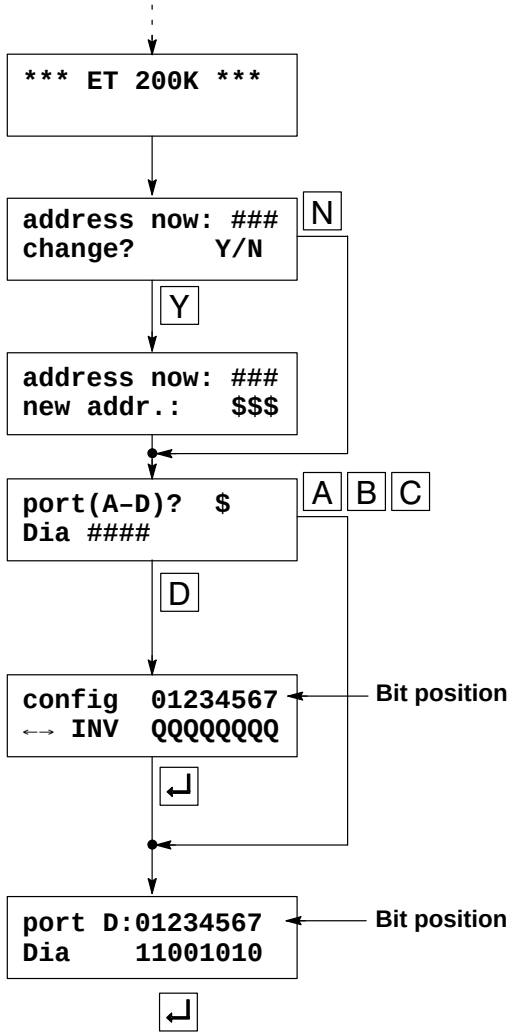


Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after about 1 second if you,

- press  or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station or
- carry out a cold restart on the ET 200K compact station with the RUN/STOP switch.

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The station number read in appears in the display. If station number 126 appears, this means that the station has not yet been assigned a valid number. You can change the station number by keying in **Y** for Yes (valid station numbers: 3 to 124).

If you have entered the station number correctly, it will appear in the display for about 3 seconds.

For the STATUS/FORCE function, enter the letter A, B, C or D to select the connector. The connectors from which diagnostic bits have been reported are displayed in the second line (wire breakage or short–circuit).

Connector D: After seperating the slave station from the SINEC L2–DP LAN, connector D must be reconfigured with the ET200 handheld. For this purpose, specify the 8 connections as inputs or outputs with the cursor control keys and INV. Confirm the configuration with ↵ . The connector with the relevant configuration and the status of the connections appears on the display.

Outputs: You can force the status of the outputs of connector C and connector D with the numerical keys 0 and 1. The outputs are switched with ↵ .

Inputs: You can “freeze” the status of the inputs **Y** . The “frozen” state is represented by a propeller symbol. Terminate “freezing” with **N**. The outputs of connector D can also be forced in the frozen state of the inputs.

Diagnostics: If “Dia” **and** a 0 or 1 blinks, the associated input or output is faulted (e.g. wire–break or short–circuit). It is also possible that diagnostic bits have been set for another port. If only “Dia” blinks, a diagnostic bit has been set for **another** port.

Leaving the display: You can exit the display by pressing ↗, and select another connector (port).

ET 200U

9

The ET 200 handheld performs the following functions for the ET 200U:

- Determines the station number
- Input of user–specific parameters; ET 200U (DP Standard) only
- Diagnostic messages from the station (station diagnostics),
- Type of module plugged in
- Slots with diagnostic messages (slot diagnostics)
- STATUS/FORCE function



Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after about 2 seconds if you

- press  or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station or
- carry out a cold restart on the ET 200U slave station with the RUN/STOP switch.

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Tips for users of the ET 200U

The modules of the ET 200U have address identifiers. There is a list of all modules and their address identifiers at the end of this chapter.

Intelligent I/O modules (IPs) and communications processors (CPs) are treated like analog modules.

The following table shows how the modules are represented:

Table 9.1 Representation of the modules

Module	Format	Represented in...
Digital	KM	Bits
Analog	KH	Bytes

The foldout at the beginning of this manual contains a table explaining the “KM” and “KH” formats in detail.

What do DP Siemens and DP Standard mean?

DP Siemens is the bus protocol developed by Siemens. In cooperation with the PROFIBUS user organisation, SIEMENS has extended the bus protocol, which is now an open, multi–vendor system. This extended bus protocol was submitted to the German Electrotechnical Commission (DKE) and adopted as national draft standard DIN E 19245, Part 3.

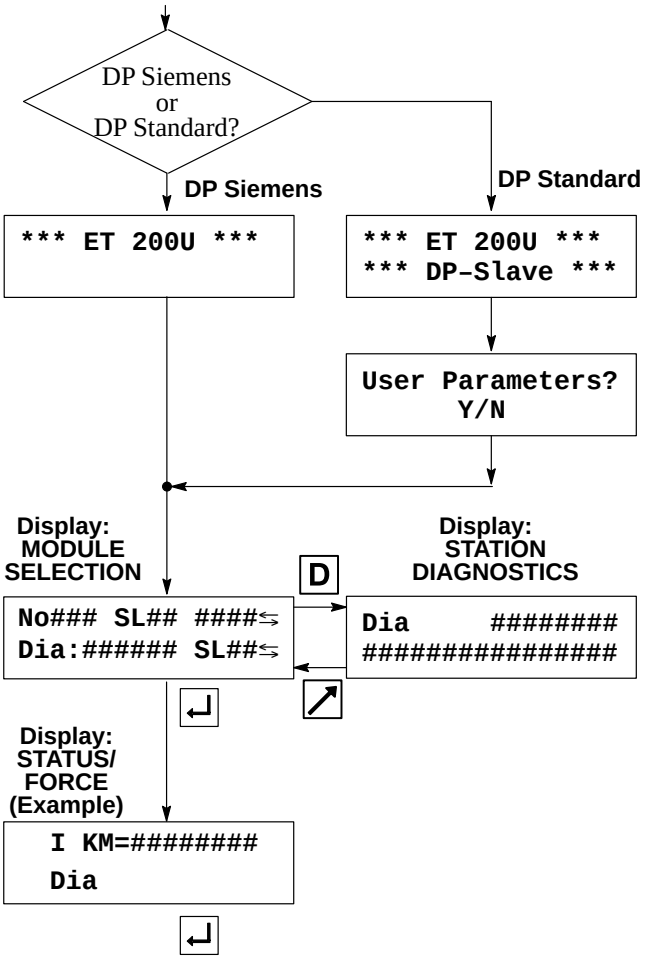
The DP Standard bus protocol complies with the draft standard PROFIBUS DIN E 19245, Part 3.

The actual advantage of the standardized bus protocol for you is that all ET 200 partners are now able to communicate provided they comply with the draft standard PROFIBUS DIN E 19245, Part 3.

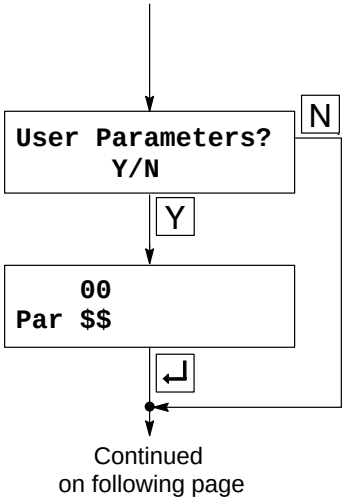
The figure below shows the sequence for an ET 200U station; a detailed description is given on the following pages.

At the beginning, it is specified whether the ET 200U acts according to either DP Siemens (ET 200U) or DP Standard (DP slave ET 200U).

All the other displays are identical for both ET 200Us.



Display: User Parameters
With ET 200U (DP Standard) only!



The “User Parameters” display is available only with the ET 200U (DP Standard)! You can enter specific parameters for the ET 200U (DP Standard) in the “User Parameters” display.

The ET 200 handheld sends “KH = 02” as default value. This means that the ET 200U (DP Standard) is not operated in slow mode and diagnostics data from modules with diagnostics capability are evaluated.

Press **N** if you want to acknowledge these parameters and continue on page 9-6.

Press **Y** if you want to change the settings. The input form for parameter data appears.

Line 1: The numbers correspond to the byte numbers in the parameterizing message.

Line 2: In this line you can enter the first byte of the user parameters:

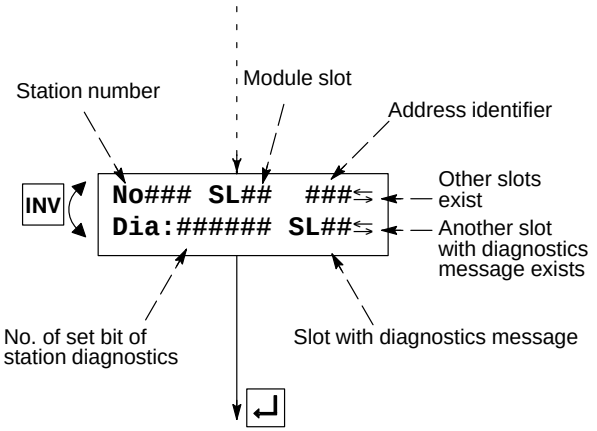
Table 9.2 Significance of user parameters

Significance
Bit 0: Behavior if modules or defective bus module are plugged in or pulled out
0: All outputs are set to “0” in the case of an error. The ET 200U (DP Standard) does not go into STOP.
1: The ET 200U (DP Standard) interrupts shifting on the I/O bus, re–reads the installed modules and resumes data transmission with the new values. The outputs remain active while shifting operations are interrupted!
Bit 1: Evaluation of diagnostics data
0: No diagnostics data from modules with diagnostics capability are evaluated.
1: The diagnostics data are evaluated provided modules with diagnostics capability are installed.
Bit 2: Mode of the IM 318–C
0: IM 318–C operating as ET 200U (DP Standard), ET 200U (FMS) or as ET 200U in mixed operation
1: IM 318–C operated as combislave.
Bit 3: I/O bus speed
0: The I/O bus is **not** operated in “slow mode”.
1: The I/O bus is operated in “slow mode”.

The other bits are reserved. The parameterizing message is subsequently transmitted to the ET 200U (DP Standard).

Each RESET of the ET 200 handheld requires the parameterizing message to be re–entered.

Display: MODULE SELECTION



The “MODULE SELECTION” display gives you an overview of the ET 200U station status:

Cursor in the first line: Select the slots with the cursor control keys or the numerical keys. The module plugged into the relevant slot is displayed in the “Address identifier” field.

Press ↵ to select the displayed module for the STATUS/FORCE function.

Change lines by pressing INV **.**

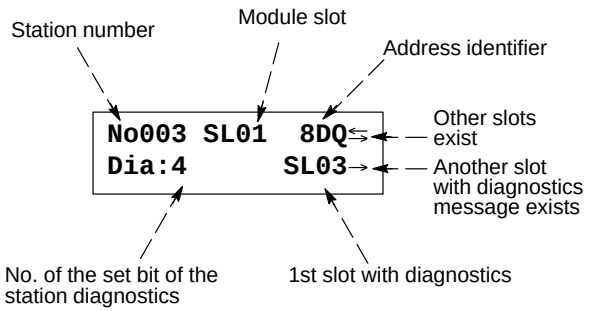
Cursor in the 2nd line: You can use the cursor keys to have the module slots displayed which have diagnostic messages.

Table 9.3 The “MODULE SELECTION” display

Abbr.	Description
1st line	
No###	**Station number** (3 to 124) of ET 200U station
SL##	**Module slot**
###	**Address identifier** of the module (→ end of this Chapter)
⇆	There are **other slots** that can be selected with the cursor keys
2nd line	
Dia ######	**Station diagnostics** If “Dia” is flashing, you can press D to change over to the “Station Diagnostics” display (→ page 9–10).
SL##	**Slot** with **diagnostics message**
⇆	There is at least one **other slot with a diagnostics message;** you can select this slot with the cursor keys.

Example

Display: MODULE SELECTION



Example of the “MODULE SELECTION” display:

Line 1:

The ET 200 handheld is connected to an ET 200U station with station number 3.

There is an 8–channel digital output module in slot 1.

There are further slots, which you can select with the cursor keys.

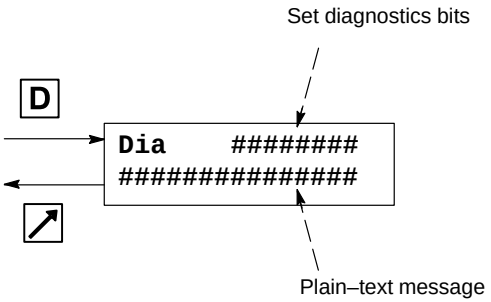
Line 2:

Bit 4 in the station diagnostic byte is set, i.e. in the case of a module with diagnostics capability there is either no load voltage or there is an output short–circuit to ground.

Slot 3 reports the setting of module diagnostics bits.

There is at least one more slot with diagnostics message, which you can select with the cursor keys.

Display: STATION DIAGNOSTICS



Line 1: All bits with “1” represent a diagnostics message.

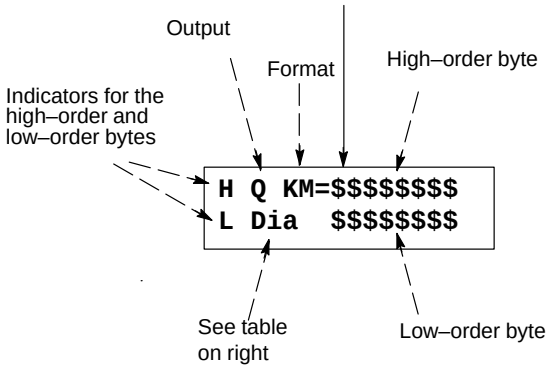
When you select the bits with the cursor, the corresponding plain–text message is displayed in the second line.

Leaving the display: You can exit the display by pressing ↗ .

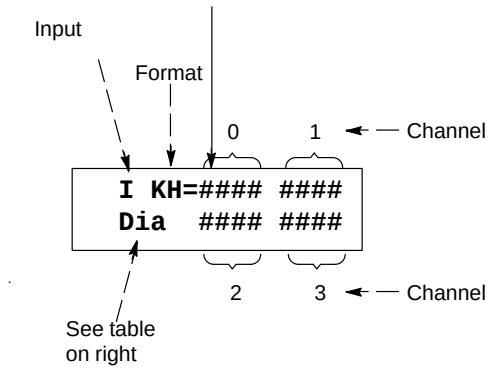
Table 9.4 Significance of plain–text messages

Message	Bit	Significance
static diag	0	1: Static diagnostics – the ET 200 handheld continues to request diagnostics until this bit is reset by the slave station.
not ready	1	1: Station cannot be controlled yet. The ET 200 handheld restarts.
external diag	2	1: This bit is always set if diagnostic bits have been reported.
not supported	3	1: Function is not supported
no load voltage	4	1: No load voltage or output short circuit to M (only for modules with diagnostics)
short circuit	5	1: Output activated incorrectly (short circuit to L+; only for modules with diagnostics)
extdia overflow	6	1: Overflow of diagnostics buffer
slow mode	7	1: Slave station in slow mode

Display: STATUS/FORCE
(Example for a digital module)



Display: STATUS/FORCE
(Example for an analog module)



When you have selected the module with the ↵ key, you are in the STATUS/FORCE display.

In this display, you can

- have the status of inputs displayed

  or

- force the outputs with the cursor keys, digits and letters.

You can "freeze" the status of the inputs with **Y** . The "frozen" status is represented by a propeller symbol. Terminate "freezing" with **N**.

"High–byte" means "byte n", "low–byte" means "byte n + 1".

You can also see whether a module diagnostics bit has been set (→ Table 9.5).

Table 9.5 Meaning of "Dia" in the STATUS/FORCE display

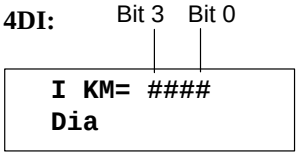
"Dia" ...	Meaning
Blinking	At least one module is reporting the setting of a diagnostics bit. Go up one display with the ↗ key in order to identify the module.
Bright, but steady	There are no modules in the slave station reporting the setting of diagnostics bits.

The STATUS/FORCE display is **independent** of the type of module (address identifier).

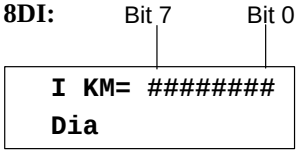
All possible displays and a list of modules with their address identifiers are to be found on the pages below.

9.1 Digitale Modules

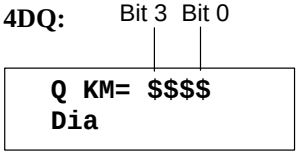
4DI:



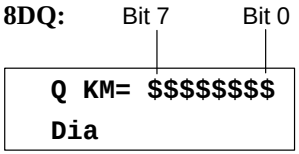
8DI:



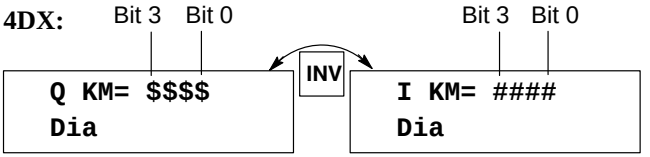
4DQ:



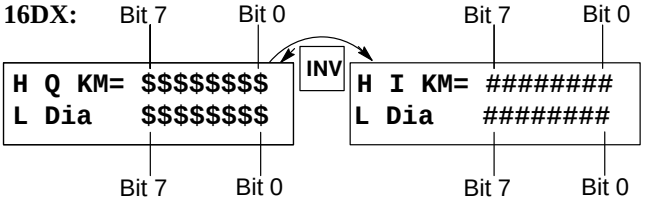
8DQ:



4DX:

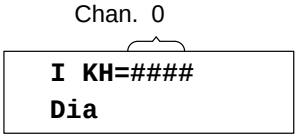


16DX:



9.2 Analog Modules

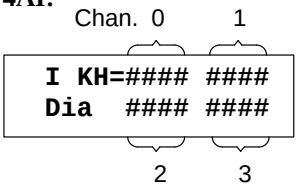
1AI:



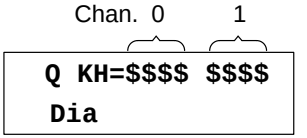
2AI:



4AI:

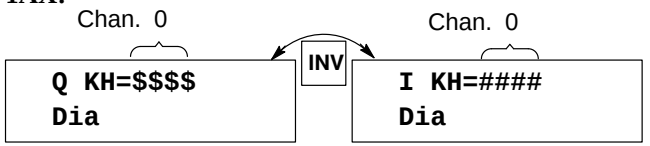


2AQ:

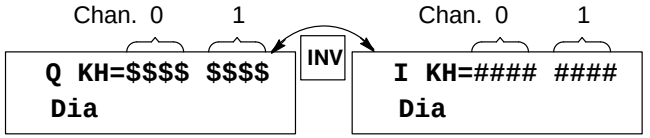


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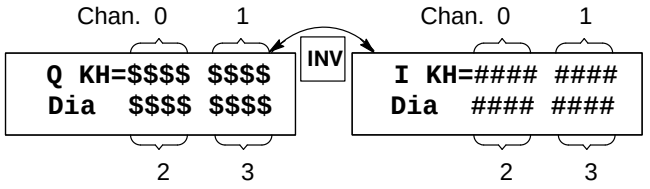
1AX:



2AX:



4AX:



The address identifiers of the ET 200U (DP Siemens) and ET 200U (DP Standard) modules are listed on the following pages:

> **Note**
>
> Some of the address identifiers listed below differ from those used by the COM ET 200!

Order No.	Address Identifier		Address Length (bytes)
	DP Siemens	DP Standard	
Digital Input Modules			
420–8MA11	4DI	8DI[3]	1
421–8MA12	8DI	8DI	1
422–8MA11	16DX	16DX	2*
430–8MB11	4DI	8DI[3]	1
430–8MC11	4DI	8DI[3]	1
430–8MD11	4DI	8DI[3]	1
431–8MA11	8DI	8DI	1
431–8MC11	8DI	8DI	1
431–8MD11	8DI	8DI	1
433–8MA11	8DI	8DI	1
437–8EA12	4DI	8DI[3]	1
Digital Output Modules			
440–8MA11	4DQ	8DQ[3]	1
440–8MA21	4DQ	8DQ[3]	1
441–8MA11	8DQ	8DQ	1
450–8MB11	4DQ	8DQ[3]	1
450–8MD11	4DQ	8DQ[3]	1
451–8MA11	8DQ	8DQ	1
451–8MD11	8DQ	8DQ	1
451–8MR11	8DQ	8DQ	1
451–8MR12	8DQ	8DQ	1
452–8MR11	4DQ	8DQ[3]	1
453–8MA11	8DQ	8DQ	1
447–8EA12	4DQ	8DQ[3]	1

Order No.	Address Identifier		Address Length (bytes)
	DP Siemens	DP Standard	
Analog Modules			
464–8MA11[1]	1–channel:	1–channel:	1–channel:
464–8MA21[1]	1AI,	1AI,	2,
464–8MB11[1]	2–channel:	2–channel:	2–channel:
464–8MC11[1]	2AI,	2AI,	4,
464–8MD11[1]	4–channel:	4–channel:	4–channel:
464–8ME11[1]	4AI.	4AI.	8.
464–8MF11[2]	1–channel: 1AI,	1–channel: 1AI,	1–channel: 2,
464–8MF21[2]	2–channel: 2AI.	2–channel: 2AI.	2–channel: 4.
466–8MC11	2AI	2AI	4
467–8EE11[2]	1–channel: 1AI,	1–channel: 1AI,	1–channel: 2,
	2–channel: 2AI.	2–channel: 2AI.	2–channel: 4.
Analog Modules			
470–8MA11	2AQ	2AQ	4
470–8MA12	2AQ	2AQ	4
470–8MB11	2AQ	2AQ	4
470–8MB12	2AQ	2AQ	4
470–8MC11	2AQ	2AQ	4
470–8MC12	2AQ	2AQ	4
470–8MD11	2AQ	2AQ	4
470–8MD12	2AQ	2AQ	4
470–8MD21	2AQ	2AQ	4
477–8EC11	2AX	2AX	4*

Order No.	Address Identifier		Address Length (bytes)
	DP Siemens	DP Standard	
I/O Module			
482–8MA11	16DX	16DX	2*
482–8MA12	16DX	16DX	2*
Power Supply Module			
935–8ME11[4]	4DI/4DI	8DI/8DI[3]	2
Simulation Module			
788–8MA11	8DQ 8DI	8DQ 8DI	1
Timer Module			
380–8MA11	4DX	8DX[3]	1*
Counter Module			
385–8MA11	4DX	8DX[3]	1*
385–8MB11	2AX	2AX	4*
Comparator Module			
461–8MA11	4DI	8DI[3]	1
Positioning Module			
263–8MA11[4]	4AX/000	4AX/000	8*
266–8MA11	4AX	4AX	8*
267–8MA11	2AX	2AX	4*
Electronic Cam Controller IP 264			
264–8MA11[4]	4AX/000	4AX/000	8*
PID Controller Module			
262–8MA11	4AX	4AX	8*
262–8MB11	4AX	4AX	8*

Order No.	Address Identifier		Address Length (bytes)
	DP Siemens	DP Standard	
CP 521 SI			
521–8MA21	4AX	4AX	8*
CP 521 BASIC			
521–8MB11	4AX	4AX	8*
IP 265			
265–8MA11 (in slow mode only)	4AX	4AX	8*
330–8MA11 **or** no module plugged in	000	000	0

* This length is required for both inputs and outputs. That is, a two–byte address needs two bytes for the digital inputs and two for the digital outputs.

1 These analog modules can be operated with one, two or four channels.

2 These analog modules can be operated with one or two channels.

3 4–channel digital modules are always read in as 8–channel digital modules.

4 This module occupies 2 slots.

DP Standard Slave 10

The ET 200 handheld performs the following functions in connection with the DP Standard slave:

- Display and modification of station number
- Sending of user–specific parameters (user parameters)
- Output of identifier
- STATUS/FORCE function and
- Station status, device–specific, identifier–specific and channel–specific diagnostics.



Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant conditions.
Set outputs are reset after about 2 seconds if you

- press  or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station.

10.1 Tips for users of the DP Standard slave

The ET 200 handheld can evaluate a maximum of 32 bytes of inputs and 32 bytes of outputs of the DP Standard slave.

The ET 200 handheld does not distinguish digital and analog areas of the DP Standard slave.

All message frames are transferred in the HIGH–LOW format; when the ET 200 handheld displays one word, the bits have the following values:

2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}

What is an identifier?

An identifier is assigned to each input/output area of a DP Standard slave. The identifier contains the following parameters:

- Input and/or output area
- Length of input/output area
- Length unit for input/output area (byte or word).

What is a slot?

In this chapter, the various consecutive identifiers are referred to as slots. If the ET 200 handheld, for example, indicates that an output is on slot 0, this means identifier 0.

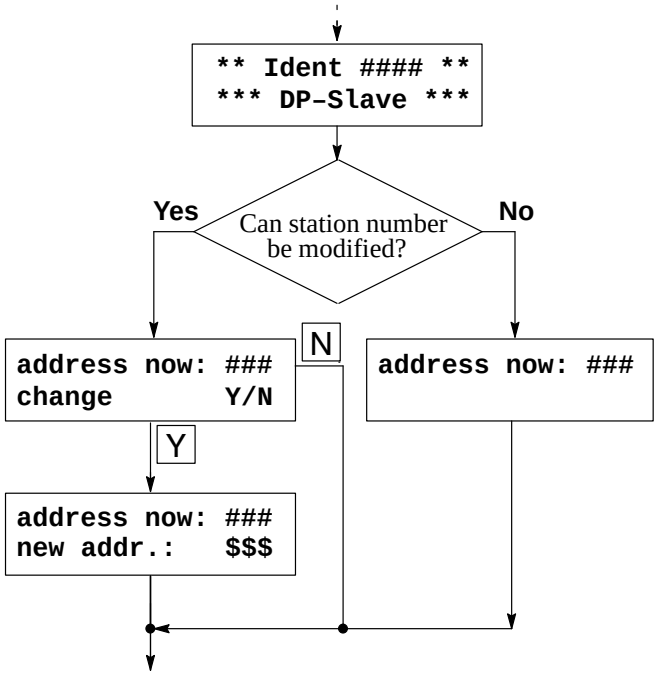
What is meant by consistency?

This chapter often deals with the term “consistency”. Data are called consistent when they have matching contents.

The consistency displayed by the ET 200 handheld means the consistency required by a specific slot.

The ET 200 handheld always transfers input and output data together so that consistency is ensured for the entire input/output area.

10.2 Connection to DP Standard slave



Continued
on following page

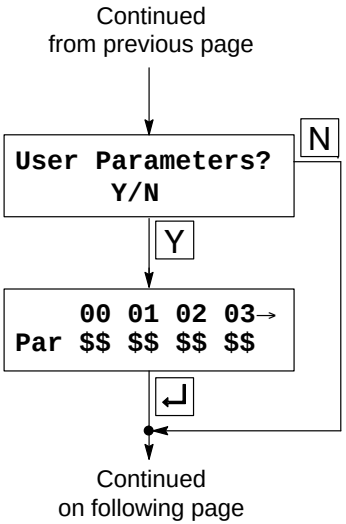
First of all, the manufacturer identifier of the DP Standard slave is displayed for approximately 3 seconds.

Then the ET 200 handheld displays the station number.

Further inputs are possible if you can change the station number of the slave station:

Change station number: If station number 126 is displayed, this means that the DP Standard slave has not yet been assigned a valid station number. You may change the station number by pressing **Y** for Yes (valid station numbers: 1 to 125).

If you have entered the station number correctly, it is displayed for approximately 3 seconds.



User Parameters: If the DP Standard slave requires user parameters, you have to press [Y] to enter them. The input display for user parameters appears.

Line 1: The numbers correspond to the byte numbers in the parameterizing message.

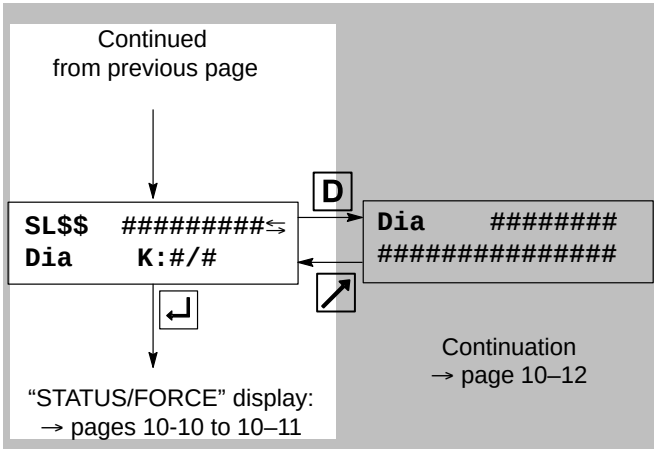
Line 2: You can enter up to 25 bytes of a parameterizing message in this line. Please refer to the "DP Standard Slave" manual for the significance of the user parameters. "←" or "→" indicate that there are more data to the left or to the right of the area displayed.

Fill in all bytes required and press [↵] to confirm the parameterizing message.

The parameterizing message is then transferred to the DP Standard slave.

> **Note**
>
> Each RESET of the ET 200 handheld requires the parameterizing message to be re–entered.

Then branch to the "SELECTION" display.



The "SELECTION" display provides you with an overview of the DP Standard slave:

Line 1: Use the cursor keys or the numerical keys to select the slots. The identifier is output in the next field.

Line 2: The consistency of the selected identifier is output via the "**K:#/#**" parameter.

Press ↵ to select the slot for the STATUS/FORCE function.

Table 10.1 Explanation of the "SELECTION" display

Abbreviation	Significance
1st line	
SL##	**Slot of identifier**
#########	**Identifier**, for example.: **I02B**: Input area comprising 2 bytes (I) **Q04W**: Output area comprising 4 words (Q) **I02B/Q02B**: Input area comprising 2 bytes (I) and output area comprising 2 bytes (Q)
⇆	There exist **further identifiers**, which you can select with the cursor or the numerical keys.
2nd line	
Dia	If "Dia" is flashing, this indicates that diagnostic bits have been reported and you can press D to change over in the "STATION DIAGNOSTICS" display (→ page 10–12).
K:#/#	Consistency of inputs/outputs empty: No consistency B: Consistency over one byte W: Consistency over one word A: Consistency over the entire input/output area

Sections 10.3 to 10.5 describe the “STATUS/FORCE” display for the input and/or output area.

The first line indicates the bit or byte position, the second line contains the corresponding values.

“←” or “→” indicate that there are more data to the right or to the left of the displayed area; you can use the cursor keys to select these data.

Inputs: You can “freeze” the status of the inputs [Y] . The “frozen” status is represented by a propeller symbol. Terminate “freezing” with [N].

Outputs: Outputs are set with [↵] .

If “Dia” is flashing, diagnostic bits have been reported. Press [↗] to return to the “SELECTION” display and obtain further diagnostics messages.

10.3 Input area

Input area ≤ 1 byte

```
I       76543210
Dia     ########
```

Input area > 1 byte

```
I   00 01 02 03→
Dia ## ## ## ##
```

Input area ≥ 1 word

```
I   0000 0001  →
Dia #### ####
```


10.4 Output area

Output area ≤ 1 byte

```
Q       76543210
Dia     $$$$$$$$
```

Output area > 1 byte

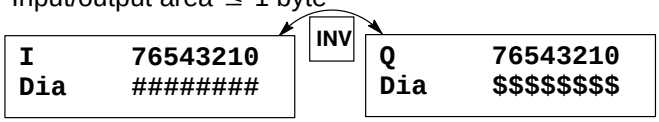
```
Q   00 01 02 03→
Dia ## ## ## ##
```

Output area ≥ 1 word

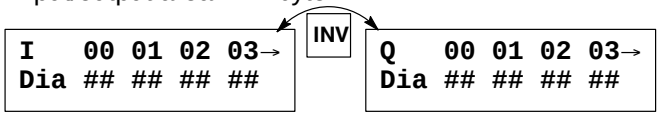
```
Q   0000 0001  →
Dia #### ####
```

10.5 Input/output area

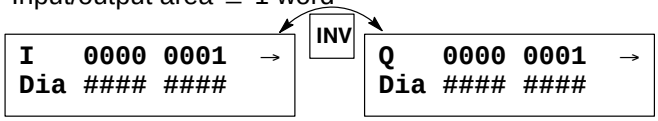
Input/output area ≤ 1 byte

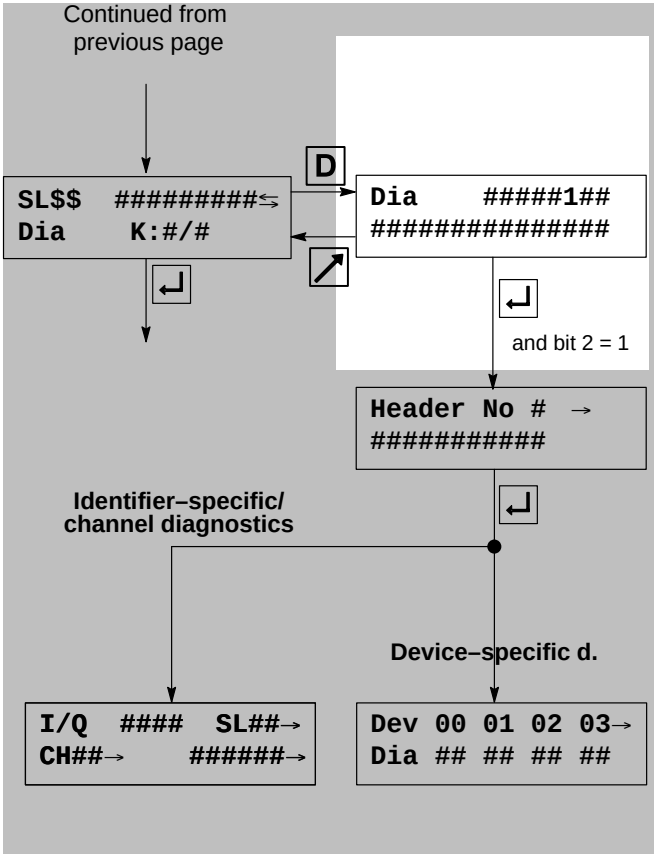


Input/output area > 1 byte



Input/output area ≥ 1 word





If “Dia” is flashing in the “SELECTION” display, you can press D for branching to “STATION DIAGNOSTICS”.

The “STATION DIAGNOSTICS” display shows you the diagnostics messages of the DP Standard slave.

Line 1: Every “1” represents a station diagnostics message (→ Table 10.2).

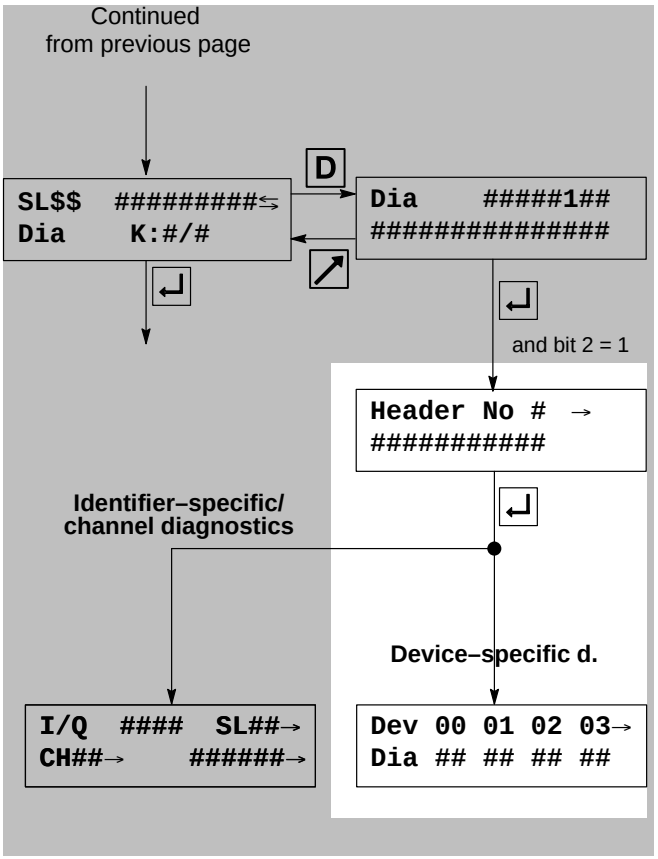
Line 2: If you use the cursor keys to select the bits in line 1, the corresponding plain–text message is displayed in line 2.

If bit 2 is set, (“external diag”) and the cursor is positioned on bit 2, then you can branch to device–specific or identifier–specific/channel diagnostics by pressing ↵ .

Table 10.2 Significance of station diagnostics

Message	Bit	Significance
`static diag`	0	1: Static diagnostics – the ET 200 handheld continues requesting diagnostics until this bit is reset by the slave station.
`external diag`	2	1: Device–specific and/or identifier–specific/channel diagnostic bits have been reported.
`not supported`	3	1: Function requested by the ET 200 handheld is not supported by DP Standard slave.
`extdia overflow`	6	1: DP Standard slave has sent more diagnostics messages than the ET 200 handheld can process.

Leaving the display: Press ↗ to exit the display.



You can change over to the following displays provided bit "2" is set and the cursor is positioned on "bit 2":

Header No.: You can select the existing diagnostics messages with the cursor keys. The abbreviations have the following meanings:

DeviceDia	Device–specific diagnostic bits have been reported.
SlotDia	Identifier–specific or channel diagnostic bits have been reported.

The Header No. is not displayed unless device–specific diagnostic bits as well as identifier–specific/channel diagnostic bits have been reported. Otherwise the ET 200 handheld branches immediately to the diagnostics message.

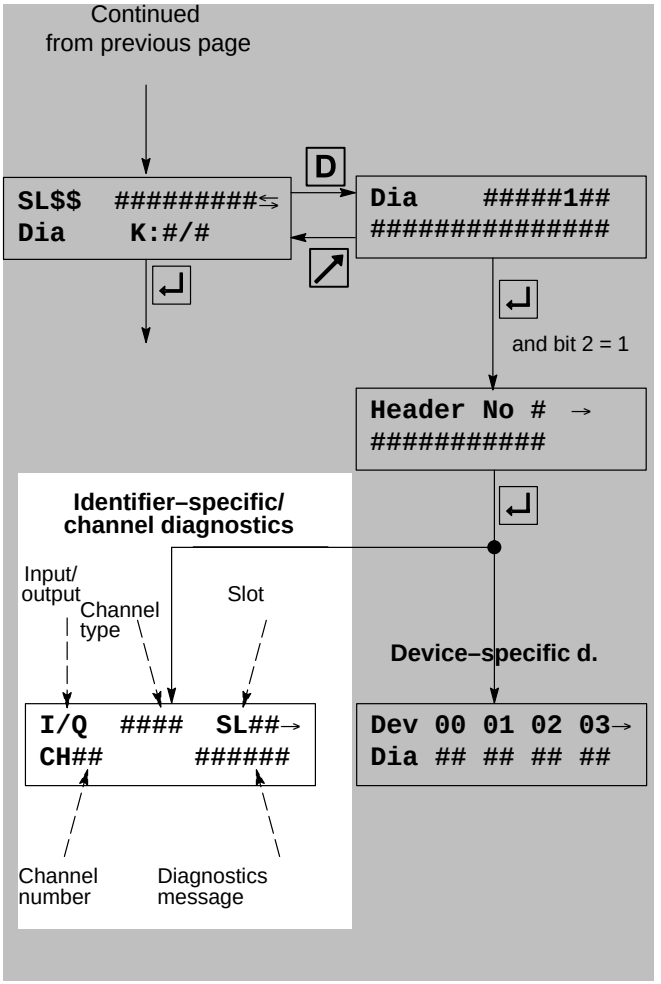
Use the cursor keys and ↵ for branching to device–specific or identifier–specific/channel diagnostics.

Device–specific diagnostics: Device–specific diagnostics comprises up to 25 bytes. For length and significance of device–specific diagnostics, please refer to the DP Standard Slave manual.

Line 1 indicates the byte position, line 2 displays the corresponding values as hexadecimal numbers.

"←" or "→" indicate that there are further data to the right or to the left of the area displayed; you can use the cursor keys to select these data.

Leaving the display: Press ↗ to exit this display.



Identifier–specific diagnostics, line 1: All slots for which diagnostic bits have been reported are displayed. Use the cursor keys to select a slot:

- Input (I), output (Q) or input/output area (I/Q).
- Channel type: Length of a channel (2 bits for example)

The following channel types are possible:

Message	Significance	Message	Significance
Bit	Length = 1 bit	**Byte**	Length = 1 byte
2Bit	Length = 2 bits	**Word**	Length = 1 word
4Bit	Length = 4 bits	**DWrd**	Length = 2 words
???	Unknown channel type		

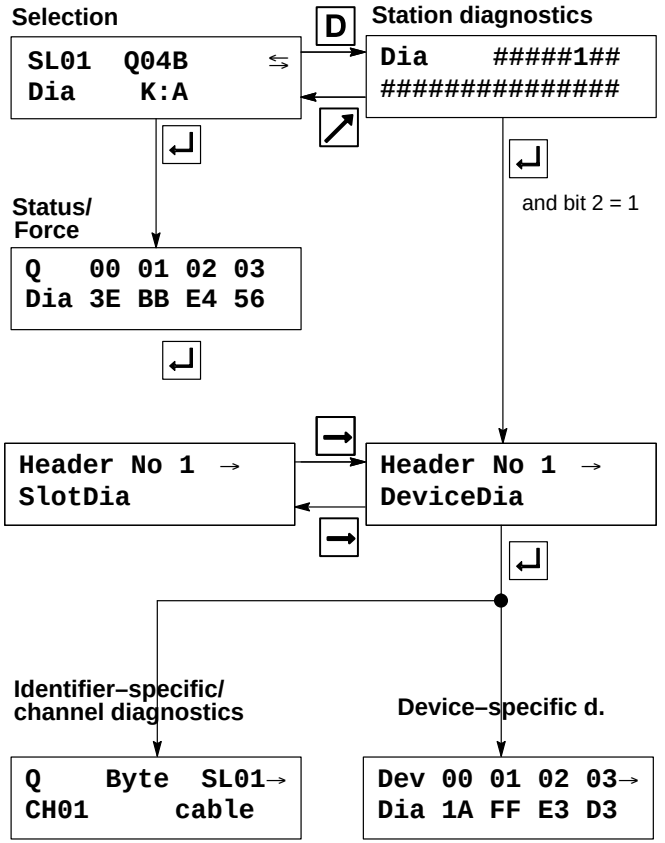
Channel diagnostics, line 2: The first channel (channel number) reporting diagnostics is indicated in line 2. The first channel refers to the slot indicated in line 1. The corresponding diagnostics message is also displayed.

The following diagnostics messages are possible:

Message	Significance	Message	Significance
short	Short circuit	**u.volt**	Voltage low
o.volt	Overvoltage	**overld**	Overload
o.temp	Overtemperature	**cable**	Wire break
upper l	Upper limit exceeded	**lower l**	Lower limit exceeded
??????	Unknown diagnostics message		

Leaving the display: Press ↗ to exit this display.

Example



Selection:

Line 1: An output comprising 4 bytes is on slot 1 of the DP Standard slave.

There exist further slots, which you can either enter directly or select with the cursor keys.

Line 2: If “Dia” is flashing, you can change over to station diagnostics.

The output is consistent over the entire output area.

Status/Force:

You can set outputs and press ↵ to confirm.

Station diagnostics:

Device–specific and identifier–specific/channel diagnostic bits have been reported.

Device–specific diagnostics (DeviceDia):

You can read the manufacturer–specific diagnostics data.

Identifier–specific/channel diagnostics (SlotDia):

Line 1: Output on slot 1 has 1 byte per channel. Diagnostic bits have been reported for at least one further slot.

Line 2: Channel 1 reports wire break.

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SPM Module

11

Siemens can also provide the ASIC SPM module (SIEMENS PROFIBUS Multiplexer) to support the connection of programmable controllers to the SINEC L2–DP local area network.

The ET 200 handheld implements the following functions in conjunction with the SPM module:

- Assignment and/or modification of the station number (not possible with all slave stations)
- STATUS/FORCE function
- Input and output diagnostics

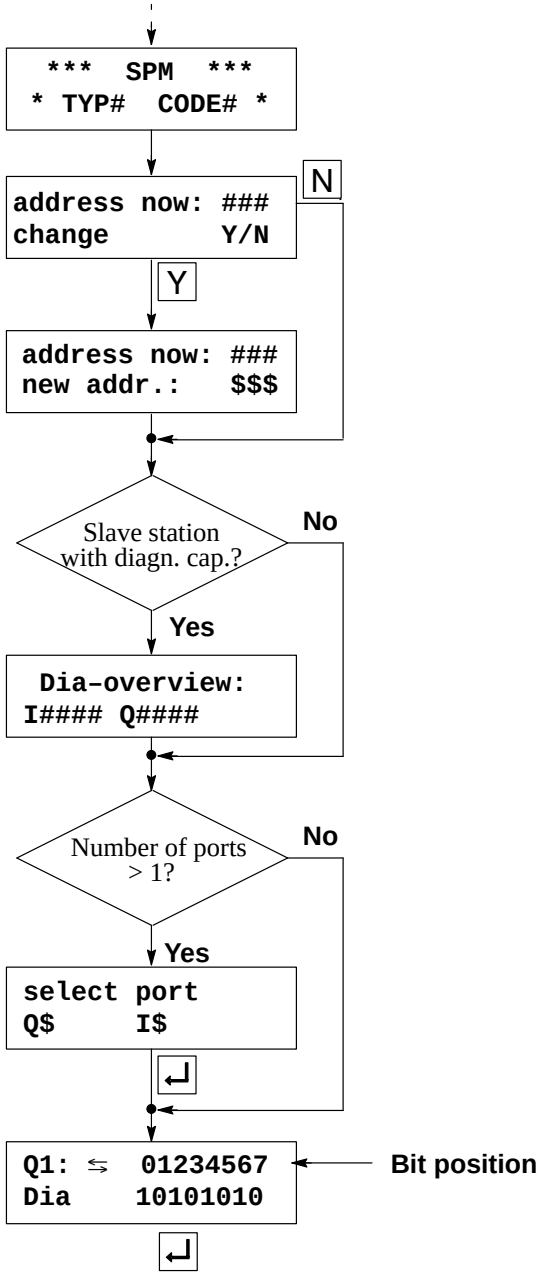


Warning

The setting of outputs when the load circuit is closed may lead to dangerous plant condtions.
Set outputs are reset after about 1 second if you,

- press  or
- plug the connector of the ET 200 handheld in or disconnect it from the slave station.

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SPM and the associated type and code appear for an SPM. The SPM module data is listed in Table 11.1 and Table 11.2.

The station number read in appears in the display. If station number 126 appears, this means that the station has not yet been assigned a number. In the case of some slave stations, you can change the station number with [Y] for Yes (valid station numbers: 3 to 124).

If you have correctly entered the station number, it will appear in the display for about 3 seconds.

In the case of slave stations with diagnostic capability, the display tells you for which input or output ports diagnostic bits have been set.

Then select the port with the cursor, digit key and [↵] .

Outputs: The port with the appropriate configuration and pin status appears in the display. You can force the status of the outputs by pressing the digit keys 0 and 1. You can use the cursor to change over from one output port to another without setting outputs. Pressing [↵] sets the outputs.

Inputs: You can use the cursor to change over from one input port to another. You can “freeze” the status of the inputs with [Y] . The “frozen” state is represented by a propeller symbol. Terminate “freezing” with [N].

Diagnostics: If “Dia” **and** a 0 or 1 blinks, the associated input or output is faulted (e.g. wire–break or short–circuit). It is also possible that diagnostic bits have been set for another port. If only “Dia” blinks, a diagnostic bit has been set for **another** port.

Leaving the display: You can exit the display by pressing [↗] , and select another port.

SPM Module

Table 11.1 Number of inputs and outputs for CODE "**0**" (pin CODE 0 = "0" and pin CODE 1 = "0") depending on the SPM types

CODE "0" SPM type (pin 2/1/0)	**Diagnostics**		**Number of outputs**	**⇒ Number of max. possible inputs**
0 (0/0/0)	No		0	8×8bits
1 (0/0/1)	No		1×8bits	7×8bits
2 (0/1/0)	No		2×8bits	6×8bits
3 (0/1/1)	No		3×8bits	5×8bits
4 (1/0/0)	No		4×8bits	4×8bits

Table 11.2 Number of inputs and outputs for CODE "**2**" (pin CODE 0 = "0" and pin CODE 1 = "1") depending on the SPM types

CODE "2" SPM type (pin 2/1/0)	**Diagnostics**		**Number of outputs**	**⇒ Number of max. possible inputs**
0 (0/0/0)	Yes		0	4×8bits
1 (0/0/1)	Yes		1×8bits	3×8bits
2 (0/1/0)	Yes		2×8bits	2×8bits
3 (0/1/1)	Yes		3×8bits	1×8bits
4 (1/0/0)	Yes		4×8bits	0

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12 Error Messages

The table below lists possible error messages, their causes and remedies:

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Error Messages

Message	Possible cause		Remedy
3<=addr<=124	Invalid station number.		Key in a valid station number (3 to 124; 3 to 125 in the case of the DP Standard slave) **or** set a valid number at the slave station. The particular remedy always depends on the **station type**.
cfg fault	Configuration error		Get in touch with your SIEMENS representative or the manufacturer of the slave station. The ET 200 handheld restarts.
change address	Invalid station number.		Set a valid number at the slave station.
EEPROM error	The E(E)PROM of the slave station is defective.		Get in touch with your SIEMENS representative or the manufacturer of the slave station.
internal error	Error in the ET 200 handheld.		Get in touch with your SIEMENS representative.
no answer	The slave station does not reply to a frame from the ET 200 handheld.		Perform a cold restart with the slave station.
not ready	Slave station not ready for data exchange		Get in touch with your SIEMENS representative or the manufacturer of the slave station.
prm fault	Faulty parameterizing message		DP Standard slave only: Compare the actual configuration with the parameters assigned to the slave station. Check the parameters (user parameters) you transferred with the ET 200 handheld to the slave station. The ET 200 handheld restarts.
prm request	Parameter error		DP Standard slave only: Use the ET 200 handheld to re-parameterize the slave station. The ET 200 handheld restarts.
RAM error	Error in the ET 200 handheld		Get in touch with your SIEMENS representative.
single error	The configuration of the slave station has been changed when connecting the ET 200 handheld.		The ET 200 handheld restarts. If the ET 200 handheld keeps performing cold restarts, get in touch with your SIEMENS representative or the manufacturer of the slave station.

Error Messages

Message	Possible cause		Remedy
unknown station	The slave station type cannot be determined. The wrong SPM type has been set (5, 6 or 7) or the SPM module has not been connected properly (ID byte).		Get in touch with your SIEMENS representative or the manufacturer of the slave station.
wrong telegramm	The ET 200 handheld has been plugged into the active SINEC L2–DB LAN. **or** There is excessive radiated noise in the vicinity of the ET 200 handheld.		Unplug the ET 200 handheld from the active LAN. The ET 200 handheld may only be plugged direct into a slave station. Check whether the SINEC L2–DB LAN is still operating properly, **or** check the radiated noise in the vicinity of the ET 200 handheld, and change the position of the ET 200 handheld.

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Technical Specifications

A

Display	2 LCD lines each with 16 characters
• Character matrix	• 5 × 7 dot matrix
• Character height	• 4.5 mm
Keypad	Sealed membrane keypad with 25 tactile–touch keys
Power supply	Via SINEC L2–DP port of slave station (5.2 V; 50 mA)
Ambient temperature	
• Operating	• 0 to + 45°C
• Nonoperating	• –20 to + 55°C
Degree of protection	IP 50
Dimensions (W x H x D) in mm	120 × 45 × 200
Approx. weight	0.9 kg

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From *(please complete in full)*

Name
Company/Dept.
Address

Telephone

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Order No.: 6ES5 998–7ET21

Did you come across any printing errors when reading this manual? If so, please use this form to inform us of any errors you have found.
We would also appreciate any suggestions you may have in the way of improvement.

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