S5-DIAG user manual

(english)

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S5-DIAG

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S5-DIAG

1 Description

Das S5-Diag ist entwickelt worden, um einfach, schnell und übersichtlich ein SPS im Fehlerfall zu analysieren. Der Fehler wird in klarer, verständlicher Sprache auf dem Display ausgegeben. Die Funktionstasten des S5-Diag erleichtern die Handhabung und einen schnelle Zugriff auf diverse Menüs. Sie müssen sich nur auf die PG-Buchse Ihrer S5-SPS aufstecken und die Fehleranalyse starten.

2 System requirements
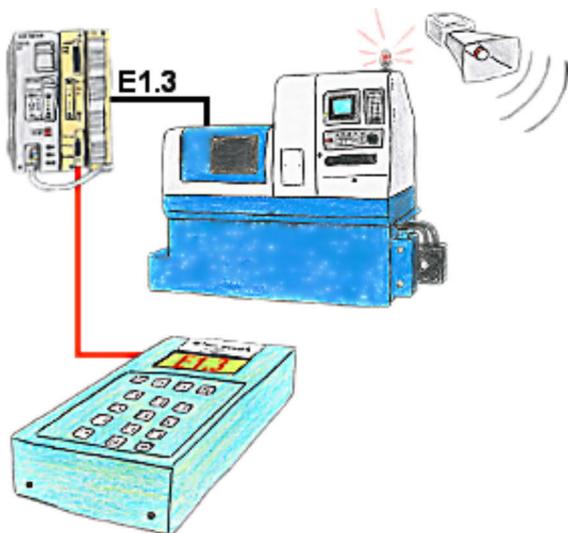
2.1 Operating system(s)

- no

2.2 Software

- no

2.3 Hardware

- 15pol. TTY interface of the S5 PLC
- 24V DC external power supply case of a PLC without 24V on the PG socket

3 Connecting options

Error analysis directly at the S5

4 Installation

4.1 Hardware

Plug in the S5-Diag with a 15 pole 1:1 cable directly to your S5 PLC. The device is powered from the PG-socket when 24V is available. Should the device not start please supply it externally with 24V DC.

5 Control elements

5.1 Keyboard and Display

Operation of the S5-DIAG effected by means of a menu and the four buttons below each call the function directly above the icon in the icon bar at the bottom of the display. The device serves for the investigation of the PLC Series 90 to 115
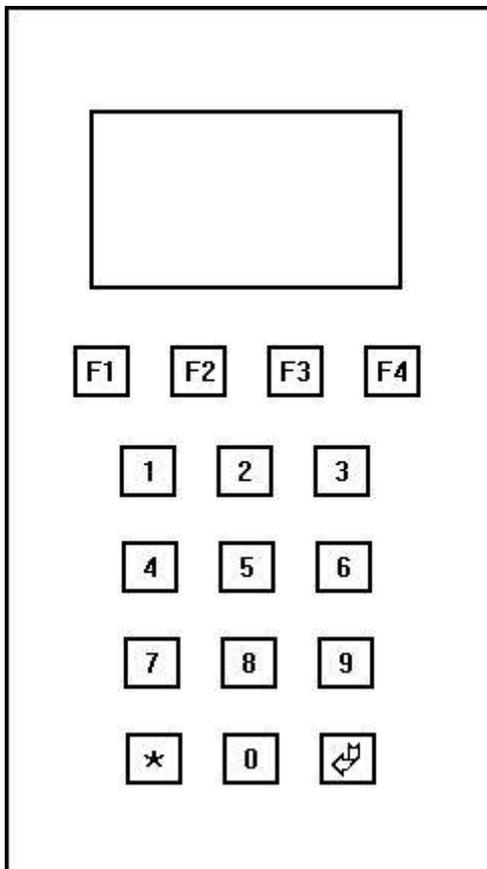
construction of the S5-Diag:

backlight graphics LCD display

F keys

number keys

enter key

The device has the F-keys [F1] to [F4], the number keys [0] to [9], star [*] and the Enter button [] for the operation. The expenditure made on the illuminated LCD graphic display.

6 Implementing

6.1 Overview of the menus

The main menu of the device is divided into four. You switch to the different parts of the main menu by pressing the [F1] key left outside. The current part of the main menu is always indicated in the first Line. If you are in a sub-menu in the first line will also be indicated the name

of the submenu and the leftmost button is reserved for the return to the main menu.

The first part of the main menu includes the functions left to the previously described main menu change, the right function and the function LAST if the DIAG DIAG function is already running in second position.

⇔	LAST		DIAG

The first part of the main menu:

- The LAST function displays out the result of the last diagnostic.
- The function DIAG starts the diagnostics of the AG.

The second part of the main menu includes as functions (from left to right) the previously described main menu change, the INFO function, the configuration menu and the function DIAG.

⇔	INFO	CONFIG	DIAG

The second part of the main menu

- The INFO function shows the technical data of the connected AG on 5 pages.
- The CONFIG menu includes the language setting of the device.
- The DIAG function also starts the diagnostics of the connected AG.

The third part of the main menu includes (from left to right) the main menu change, the "PROGRam" menu, the menu "BLOCK" and the far right menu STACK.

⇔	PROGR	BLOCK	STACK

The third part of the main menu:

These menus are not released yet.

In the fourth part of the main menu conceal the known return jump and the three menus FILE, DIAL, and TOOLS.

⇔	FILE	FLAG	TOOLS

The fourth part of the main menu:

These menus are not released yet.

6.2 The function of the S5-DIAG

The first menu point in the main menu switches to the second part of the main menu in order.

6.2.1 The function LAST

The second menu item of the first part of the main menu starts the function LAST. This function shows again the result of the last runned diagnostics. If you have since the start of the device no recently diagnosis, this feature is not available and the menu is not displayed.

6.2.2 The function DIAG

The fourth item of the first part of the main menu starts the function DIAG. This function DIAG starts the diagnostics of the connected AG.
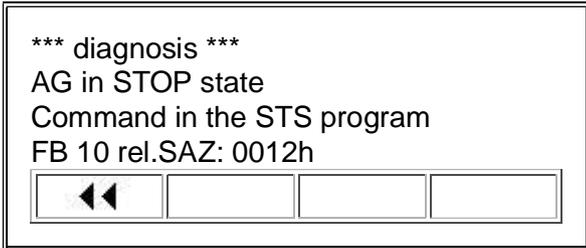
The DIAG function gives you an easy-to-use function to determine the status of the AG and to

seek the responsible cause. With this function you can display the causes of errors in a clear and understandable way.

If the AG is in STOP mode, this is showed and immediately searched for the cause of the STOP condition.

```
*** diagnosis***
AG in STOP state
seeking cause
  ◀◀
```
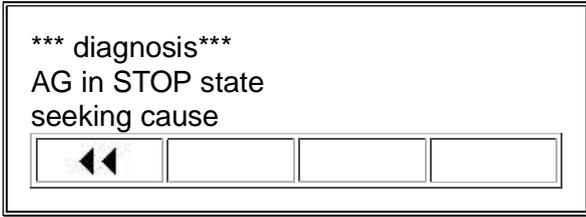
This cause the display is then output.

```
*** diagnosis ***
AG in STOP state
Command in the STS program
FB 10 rel.SAZ: 0012h
  ◀◀
```

If the AG is in RUN mode, you can investigate and specify marker, input or output that does not have the right state and why this condition is not present. You select with the F-keys the corresponding point you want to examine on the menu bar. You can choose with the F keys between FLAG, input and output, as indicated by the F-key row.

```
  ◀◀        FLAG      INPUT    OUTPUT
```

Then you can add by using the two arrows (F3 and F4) the number of the selected marker, the input or output to select the digit to be changed and then enter with the keys the desired number there

```
  ◀◀                  <=        =>
```

When you have finished, press enter. Then you will be asked which state should have the selected flag, input or output. The desired state would be specified with the F-keys [F3] or [F4].

```
*** diagnosis ***
Please enter the
desired state
to the operand
LOW /0/PASSIVE
  ◀◀            ACTIVE PASSIVE
```
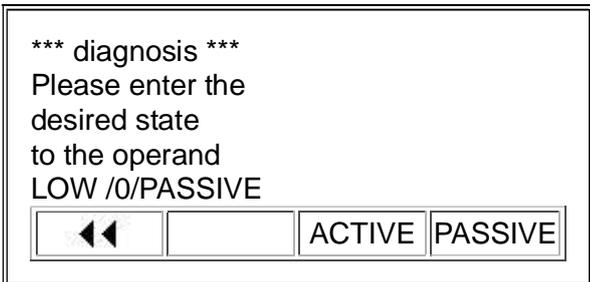
Then S5 DIAG analyze the program and the entire PLC content. S5-Diag you out there what is cause of the error. This allows you to easily find the cause of the error because you do know then which inputs are responsible.

```
*** diagnosis ***
Inputs that are not
applied correctly:
E 14.1 state: 0
E 10.0 state: 1
```

```
┌──────────────────────────────────────┐
│  ┌──────┬──────┬──────┬──────┐       │
│  │  ◀◀  │      │      │      │       │
│  └──────┴──────┴──────┴──────┘       │
└──────────────────────────────────────┘
```
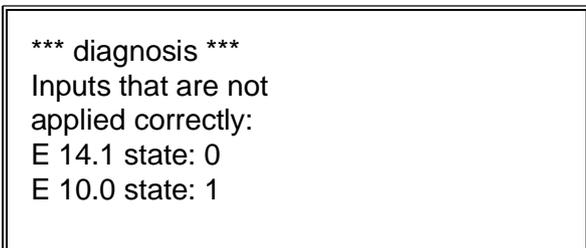
If you check now for example the listed inputs, you have to eliminate quickly the forcing function.

6.2.3 The function INFO

The second menu item of the second part of the main menu activates the function INFO.

The INFO function shows on the display the technical data for your connected AG on 5 pages as follows. Pressing any F key to switch to the next display page.

The display page 1 shows you the addresses of the peripheral inputs and outputs as well as start addresses of the process image for inputs and outputs in hexadecimal values.
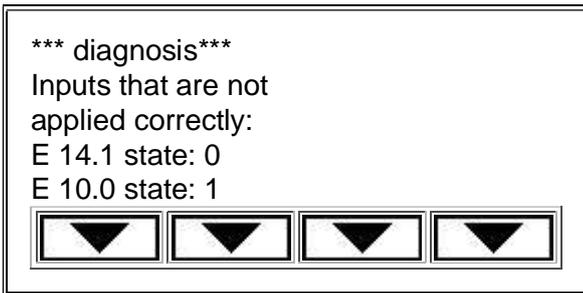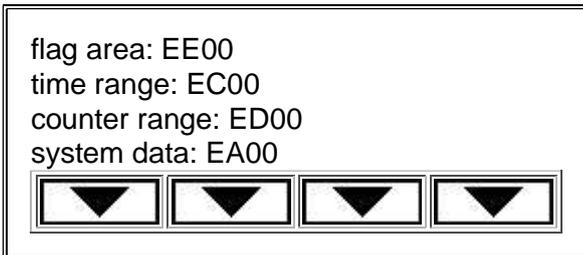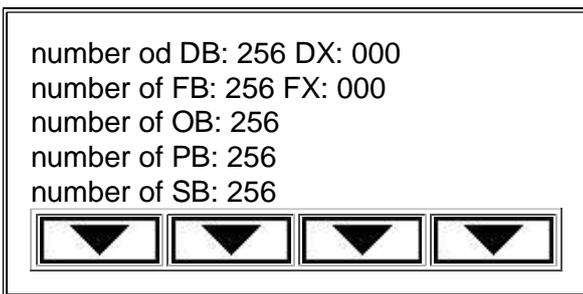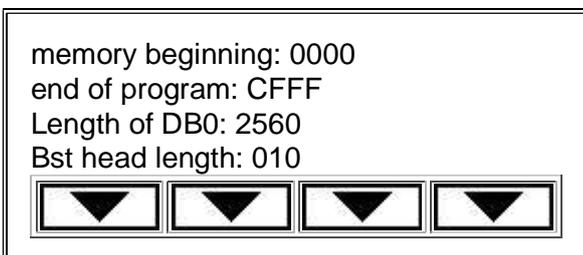
```
┌──────────────────────────────────────┐
│  *** diagnosis***                     │
│  Inputs that are not                  │
│  applied correctly:                   │
│  E 14.1 state: 0                      │
│  E 10.0 state: 1                      │
│  ┌──────┬──────┬──────┬──────┐       │
│  │  ▼   │  ▼   │  ▼   │  ▼   │       │
│  └──────┴──────┴──────┴──────┘       │
└──────────────────────────────────────┘
```

In the display page 2 you have the start addresses of memory, time and counter areas and the system data is displayed in hexadecimal values.

```
┌──────────────────────────────────────┐
│  flag area: EE00                      │
│  time range: EC00                     │
│  counter range: ED00                  │
│  system data: EA00                    │
│  ┌──────┬──────┬──────┬──────┐       │
│  │  ▼   │  ▼   │  ▼   │  ▼   │       │
│  └──────┴──────┴──────┴──────┘       │
└──────────────────────────────────────┘
```

The display page 3 lists to the AG the maximum number of different types of blocks.

```
┌──────────────────────────────────────┐
│  number od DB: 256 DX: 000            │
│  number of FB: 256 FX: 000            │
│  number of OB: 256                    │
│  number of PB: 256                    │
│  number of SB: 256                    │
│  ┌──────┬──────┬──────┬──────┐       │
│  │  ▼   │  ▼   │  ▼   │  ▼   │       │
│  └──────┴──────┴──────┴──────┘       │
└──────────────────────────────────────┘
```

On page 4 of the display will be listed the addresses of the memory beginning and end of the program in hexadecimal form. It will also outputted the length of DB0 (accountant) and the block length of the head.

```
┌──────────────────────────────────────┐
│  memory beginning: 0000               │
│  end of program: CFFF                 │
│  Length of DB0: 2560                  │
│  Bst head length: 010                 │
│  ┌──────┬──────┬──────┬──────┐       │
│  │  ▼   │  ▼   │  ▼   │  ▼   │       │
│  └──────┴──────┴──────┴──────┘       │
└──────────────────────────────────────┘
```

The display page 5 will be displayed the software version and the identifications of the CPU in hexadecimal form.

```
┌─────────────────────────────────────────┐
│                                          │
│  Software version: 8B03                  │
│  2.CPU ID.: EF04                         │
│  CPU ID: 0002                            │
│  ┌──────┐ ┌──────┐ ┌──────┐ ┌──────┐     │
│  │  ▼   │ │  ▼   │ │  ▼   │ │  ▼   │     │
│  └──────┘ └──────┘ └──────┘ └──────┘     │
│                                          │
└─────────────────────────────────────────┘
```
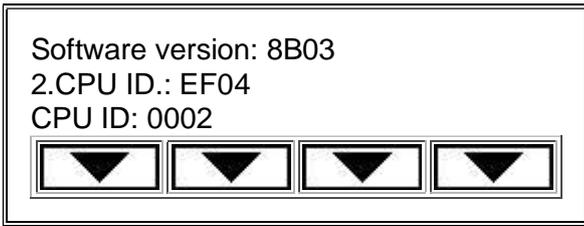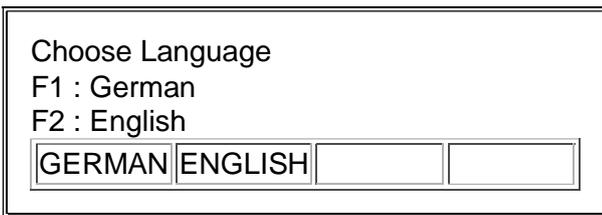
If no AG is connected or the connected AG is not turned on, the function returns to the main menu after a futile search for the AG.

6.2.4 The function LANGUAGE

The third item of the second part of the main menu takes you to the CONFIG menu. This menu contains the function to adjust the language of S5 Diags.

```
┌──────────┐┌──────────┐┌──────────┐┌──────────┐
│    ◀◀    ││ LANGUAGE ││          ││          │
└──────────┘└──────────┘└──────────┘└──────────┘
```

The language can be set in the LANGUAGE function in the first main menu submenu configuration and is to be made in all editions of the diagnostic device. When you choose this menu item, the following screen appears where you will be prompted to press the F key. The language chosen is active immediately and will be permanently stored in the device. Thus, this language is active in the device also the next time.

```
┌─────────────────────────────────────────┐
│                                          │
│  Choose Language                         │
│  F1 : German                             │
│  F2 : English                            │
│  ┌───────┐┌────────┐┌──────┐ ┌──────┐    │
│  │GERMAN ││ENGLISH ││      │ │      │    │
│  └───────┘└────────┘└──────┘ └──────┘    │
│                                          │
└─────────────────────────────────────────┘
```

The fourth item of the second part of the main menu starts the previously described function DIAG diagnostics of the connected AG.

6.2.5 the function PROGRam

The second menu item in the third part of the main menu activates the menu PROGRam, whose functions have not been released yet.

- The menu PROGR contains the functions (from left to right)
ST.VAR (tax variables), STATUS Output and data logger
to return to the main menu.

```
┌──────────┐┌──────────┐┌──────────┐┌──────────┐
│   ◁─▷    ││  ST.VAR  ││  STATUS  ││  LOGGER  │
└──────────┘└──────────┘└──────────┘└──────────┘
```

6.2.6 The function BLOCK

The third menu item in the third part of the main menu activates the menu modules whose functions are not released yet.

- The BLOCK menu contains (in the same sequence of keys)
the return to the main menu, MC5 code output
Program STRUCTure and MEMORY of the AG issue.

```
┌──────────┐┌──────────┐┌──────────┐┌──────────┐
│   ◁─▷    ││   MC5    ││  STRUCT  ││  MEMORY  │
└──────────┘└──────────┘└──────────┘└──────────┘
```

6.2.7 The function STACK

The fourth item in the third part of the main menu activates the menu STACK.

- The menu STACK contains the functions USTACK and BSTACK view and MANUAL.
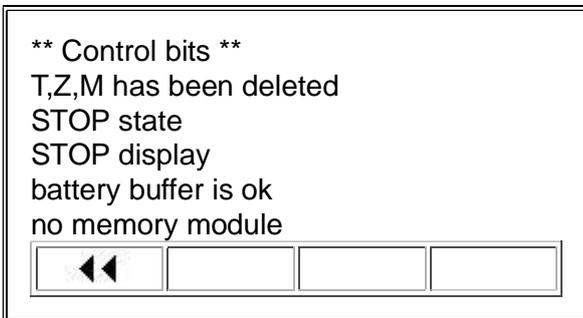
| ⟨⟩ | USTACK | BSTACK | MANUAL |

6.2.7.1 The function USTACK

The function ISTACK is the second item of the menu PROGRam.

This function represents the interrupted stack on the display of your connected AG. The interrupt stack, you can see the reasons which led to termination of the program processing on the AG.

The information contained herein is presented as follows:

The display page control bits set the control bits are outputted. If more than 5 control bits are set, you can scroll downwards and upwards by using the [F3] and [F4], as indicated by the F-key bar at the bottom of the display. Pressing the [F1] switch on the far left side of the next screen.

```
** Control bits **
T,Z,M has been deleted
STOP state
STOP display
battery buffer is ok
no memory module

  ◀◀
```

The result display lists the results of the setted display bits. If more than 5 results display bits are set, you can scroll downwards and upwards by using the [F3] and [F4], as indicated by F-key bar at the bottom of the display. Pressing the [F1] key on the far left side of the next screen.

```
** results display **
combination result
last instruction initial interrogation

  ◀◀
```
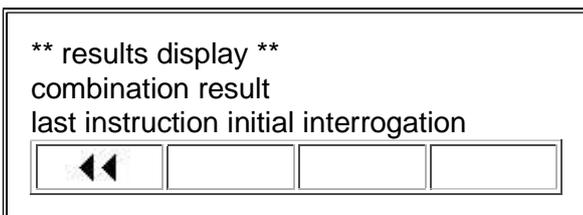
In the following screen page fault cause are listed the fault causes. If more than 5 causes of faults are set, you can browse downward and upward by pressing [F3] and [F4], as illustrated in the F-key bar at the bottom of the display. Pressing the [F1] switch on the far left side of the next screen.

```
** fault cause**
receipt directory peripheral

  ◀◀
```
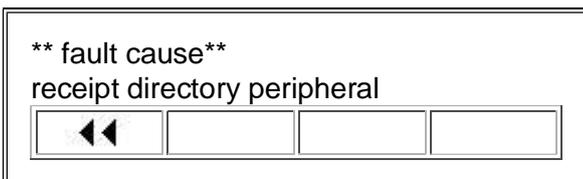
The following pages displays the contents of the battery pack given out and registered from the AG. The output of the display page 4 will look something like this:

```
 battery pack 1              0000
```

battery pack 2	0000
nesting depth	001
command register	7211
step address counter	3A13
relative step address counter	000C

```
◀◀
```

The output of the display page 5 looks at this AG in the example is as follows:

```
block:
FB 113
DB adress:          0000
DB number :         0000
blockStackP :       EB07
◀◀
```

Following the issue of the data to return to the menu STACK.

6.2.7.2 The function BSTACK

This function is the second item of the menu PROGRam.

This function represents the "processing stack" of your connected AG on the display . The processing stack can find all the block and return addresses in the order in which they were called. As the number 1 is the block in which you are now.

The display in the first line contains the number on the stack processing of the output on the display module.

The third line contains the number of the block, the number of actual valid data block and the absolute address of the actual valid data block.

In the fifth line, the absolute address of the block stand in the memory of the AG, the absolute return address for the call to the calling block and the relative return address block.

```
number :   0001
block      DBNr        DBAdr
OB 021
adress     return      relative
           jump
4351       4353        0002
◀◀                     ▼
```

You can press the F - 3 and 4 buttons to scroll up and down through the entries in BStack, as presented in the F-key bar at the bottom of the display. The current number in BStack is always displayed in the first row. With the F-1 key left you quit the BSTACK and return to the menu STACK.

The fourth item of the menu STACK is the MANUAL function which is not released yet.

6.2.8 The function FILE

The second menu item in the fourth Part of the main menu activates the FILE menu, whose functions have not been released yet.

- The FILE menu offers functions as BACKUP, RESTORE and COMParing data.

◀◀	BACKUP	RESTORE	COMP

6.2.9 The function DIAL Ü

The third menu item in the fourth Part of the main menu activates the menu DIAL, whose functions have not been released yet.
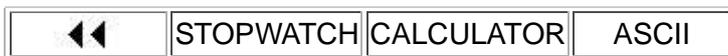
- The menu DIAL contains the functions EMBED and REPORT printout.

◀◀		EMBED	REPORT

6.2.10 The function TOOLS

The fourth item in the fourth Part of the main menu activates the TOOLS menu, whose functions have not been released yet.

- In the TOOLS menu you can select a STOPWATCH, a CALCULATOR and the display of the ASCII table.

◀◀	STOPWATCH	CALCULATOR	ASCII

7 Technical data

Supply voltage:	24V DC +/- 20%
Power consumption:	3,5 watt
Display:	LCD-display
Handling/Configuration:	integrated keypad with function keys
Interfaces:	**to the PLC:** TTY/20mA current loop
Operating temperature:	0 - 55°C
Case:	powder coated metal case
Dimensions:	187 x 110 x 49 mm
Scope of delivery:	
	S5-DIAG Cable 15pin 1to1 Power connector 3pins big

7.1 pin assignment power supply
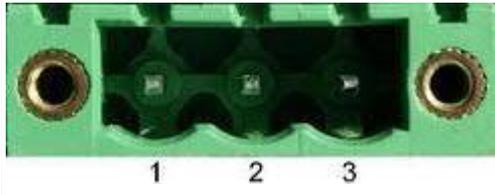
Pin number	Short form	Designation	Direction
1	P24V	24V DC voltage	input
2	PE	earthing	input
3	M24V	mass	input

7.2 Pin assignment TTY / 20 mA current loop

Pin number	Short form	Designation	Direction
1	Mext	external mass	input
2	TTY OUT +	send data +	output
3	NC	not used	
4	+24V	power supply +24V	input
5	GND	internal mass	input
6	TTY IN –	received data –	input
7	GND	internal mass	input
8	Mext	external mass	input
9	I-Tx	20mA current source transmitter	output
10	M24V	mass +24V	input
11	NC	not used	
12	GND	internal mass	input
13	NC	not used	
14	NC	not used	
15	GND	internal mass	input