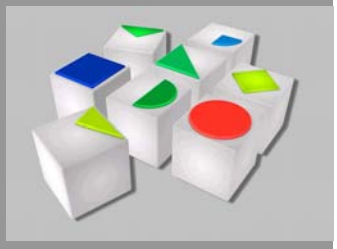
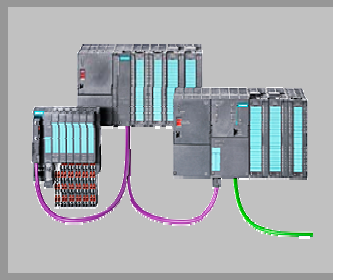


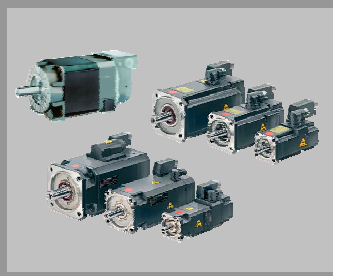
Manual

Visualization, Operation, Diagnostics

HMI Lite

Edition 2014





Solutions for Powertrain

TRANSLINE

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Solutions for Powertrain

TRANSLINE - Visualization, Operation, Diagnostics HMI Lite

Manual

Manufacturer Documentation

2014 Edition

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Status codes in the „Remarks“ column:

A .... New documentation.
B .... Unrevised reprint with new Order No.
C .... Revised edition with new status.

Edition	Order No.	Remarks
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01.07	A&D MC - Extranet	**C**
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2012	I IA&DT - E-Business Workplace	**C**
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Further information is available on the Internet under:
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This publication was produced with WinWord V 7.0 and Designer V 6.0 using the documentation tool AutWinDoc.

Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

We have checked that the contents of this document correspond to the hardware and software described. Nonetheless, differences might exist. The information contained in this document is, however, reviewed regularly and any necessary changes will be included in the next edition. We welcome suggestions for improvement.

Subject to change without prior notice.

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Contents

Figures

Tables

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1

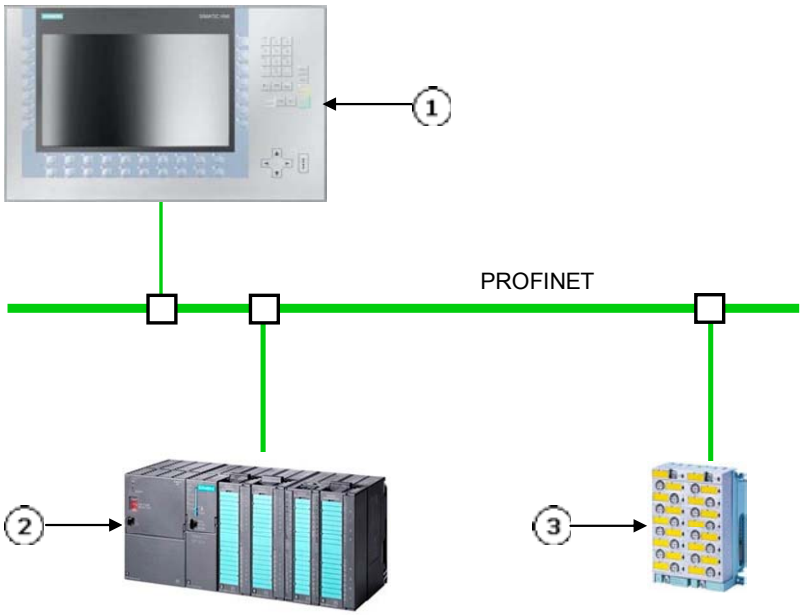
1 General Information

1.1 Product overview

HMI Lite is a user interface for the operator control and monitoring of machines. This user interface contains several screen forms for Windows CE operator panels from the SIMATIC product series and PLC blocks for supplying the screen forms.

The navigation within the individual screen forms is performed using a predefined menu structure, where the machine manufacturer also has the possibility to embed its own screens and so extend the existing menu structure.

HMI Lite is part of the "Solutions for Powertrain TRANSLINE" concept.



(1) Operator panel for displaying the HMI Lite screens
(2) SIMATIC S7-300 with the PLC program for supplying the screens
(3) External devices and I/O peripherals

Figure 1-1 System overview

1.2 Provided screens

Main menu: Preparation and setup

- Manual operation
- Power up condition
- Selecting/deselecting units
- Selecting/deselecting nut driver
- Selecting/deselecting nut driver groups
- Selecting/deselecting cycle types
- User operating screen

Main menu: Edit

- Machine overview
- Cycle times
- Workpiece count

Main menu: Diagnostics

- Messages
- Alarm Log
- Interface
- Version

Main menu: Hardware diagnostics

- PROFIBUS
- Drives
- MOBY-I
- AS-i
- Profinet
- SINAMICS

Main menu: System

- System
- Panel Control
- Status variable

1.3 Basic knowledge

To commission the HMI Lite system, the following knowledge is required:

WinCC (TIA Portal)

- TIA Portal WinCC
- Setup and operation of the SIMATIC HMI operator panels
- Configuring the interfaces and connections between HMI and the programmable controller
- Creation and parameterization of WinCC objects
- Testing the HMI configurations

STEP7 (TIA Portal or Classic)

- Programming STEP 7
- Handling the project archive files
- Working with programs that use several address types
- Working with symbolic addressing
- Creation and testing of application programs and troubleshooting
- Working with binary operations, timers, counters and comparators, and with arithmetic operations
- Development of programs that can reuse the same program block
- Working with data access functions
- Create data blocks
- Working with complex structures that contain parameters
- Including system functions (SFC) in a program
- Knowledge of the operation of SIMATIC S7 libraries
- Use of complex data structures for data storage

1.4 Hardware requirements

HMI Lite is available for the SIMATIC HMI Comfort panels listed in Table 1-1.

Operating devices

Description	Type of the installed screen	Touchscreen/keys
SIMATIC HMI KP700 Comfort	7'' TFT Widescreen Display 800x480 Pixel resolution	foil keyboard 28 system keys, 24 function keys with LED
SIMATIC HMI KP1200 Comfort	12,1'' TFT Widescreen Display 1280x800 Pixel resolution	foil keyboard 28 system keys, 24 function keys with LED

Table 1-1 Supported operator panels

SIMATIC HMI KP700 Comfort **SIMATIC HMI KP1200 Comfort**

Figure 1-2 Supported operator panels

Note

In addition to the configurations mentioned here, other project-specific configurations for other operator panels not listed here are also possible. The TIA Portal WinCC configuration tool can be used to change the operator panel type ("Change Device Type…") so it can also be used for other SIMATIC operator panels. The appropriate notes and restrictions for changing the device type are described in the WinCC documentation.

1.5 Software requirements

1.5.1 Configuration and Programming Software / Licenses

Mandatory

Description	Version
TRANSLINE HMI Lite	6.2

Description	Version
Totally Integrated Automation Portal	From V13
SIMATIC WinCC Engineering Software	From V13 Comfort/Advanced/Professional
SIMATIC STEP7	From V13 Basic/Professional (STEP7 TIA Portal) or from V5.5 (STEP7 Classic)

The S7-GRAPH programming language can be used to graphically program machine sequences. Should an error occur, a ProAgent can be used to diagnose machine sequences programmed with S7-GRAPH.

This diagnostic capability means it is desirable to execute the manual functions using a S7-GRAPH sequencer. For this reason, HMI Lite contains a function block that can be used to execute the manual functions using a sequencer.

Note

The Service Packs can be downloaded from the Siemens product support at the following Internet address: http://support.automation.siemens.com

1.5.2 Runtime software / licenses

Mandatory

Description	Version
HMI Lite copy license	current

■

2

2 Installation

2.1 HMI Lite source project

The HMI Lite source project consists of the STEP 7 Programm and the WinCC visualization project.

The WinCC visualisation for the comfort panels kann only be projected in TIA Portal WinCC. The STEP 7 program can be created either in STEP 7 Classic or in TIA Portal STEP 7.

There is a HMI Lite TIA Portal project and a HMI Lite Classic project. The HMI Lite TIA Portal project contains a STEP 7 programm and the WinCC visualization. The Classic Project contains only a STEP 7 programm.

The HMI Lite source project has the following folder structure.

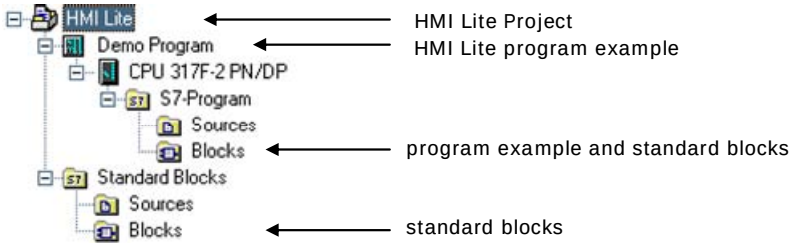


Figure 2-1 Structure of a HMI Lite Classic project

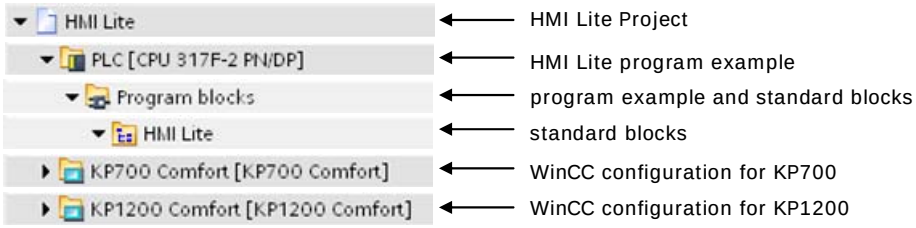


Figure 2-2 Structure of a HMI Lite TIA Portal project

2.2 Licensing

The use of HMI Lite requires a license. Licensing is realized by entering an activation code in a data block of the STEP 7 project.

Licensing via the internet

You can generate the activation code under:
https://workplace.automation.siemens.com/extranet/hmi-pro-lizenz/WSXP-EN000/lizenz/ .

Note

If you do not have a customer login for the Siemens (Powertrain) Extranet, you can request the application forms and access via e-mail to: zdenka.grosser@siemens.com.

The following data is required to generate an activation code for HMI Lite:

- License number of HMI Lite; this is printed on the Certificate of License (CoL)
- Serial number of the MMC card

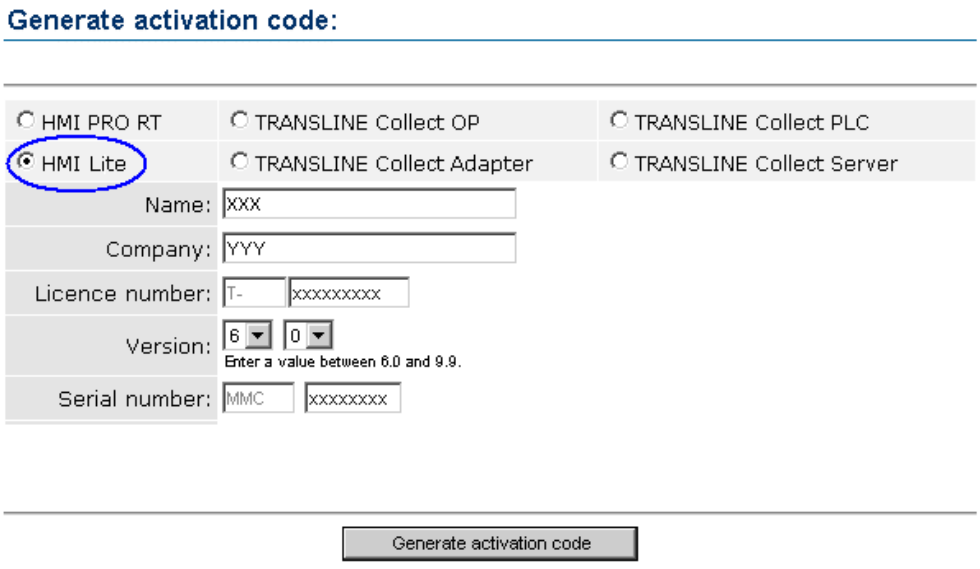


Figure 2-3 Generate activation code dialog

Enter activation code in the STEP 7 project

Enter the generated activation code in your STEP 7 project into HMI Lite data block DB_HMILITE_DATA (DB67) parameter ACTIVATION_CODE.

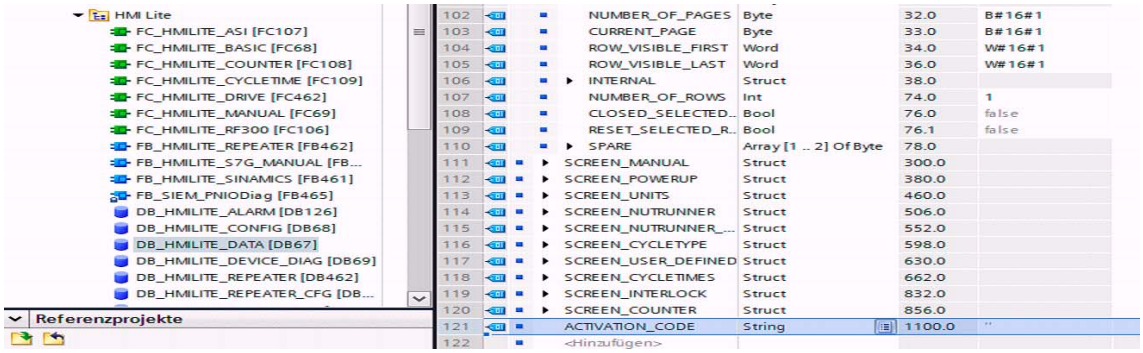


Figure 2-4 Enter the activation code into DB_HMILITE_DATA

2.3 Proceed as follows

There are two ways of binding HMI Lite and the machine-specific program:

You can use the Demo program of the HMI Lite S7 project as basis, adapt the parameterizations and configurations to the actual installation, and copy the machine-specific blocks in to the block folder.

The other method is, you use the S7 project created by the OEM as basis and copy the HMI Lite blocks and the WinCC configuration into this project. Note this procedure requires in the configuring that the operating unit and the CPU are connected using a network.

2.4 Embedding WinCC project in user project

There are two WinCC configurations integrated in the HMI Lite source project.

WinCC projects	Description
KP700 Comfort	SIMATIC HMI KP700 Comfort 7'' Widescreen Display
KP1200 Comfort	SIMATIC HMI KP1200 Comfort 12,1'' Widescreen Display

Table 2-1 WinCC projects from HMI Lite

The configuration appropriate for the used device must be copied into the user S7 project and connected with the controller.

Note

The procedure for the above-mentioned tasks is described in the online help for STEP 7 and WinCC.

2.5 Requirements in the CPU Properties

The clock memory byte of the PLC must be activated for HMI Lite. The HMI Lite standard blocks use the clock memory byte for coordination tasks.

The clock memory byte is an input variable of the FC_HMILITE_BASIC (FC68) block.

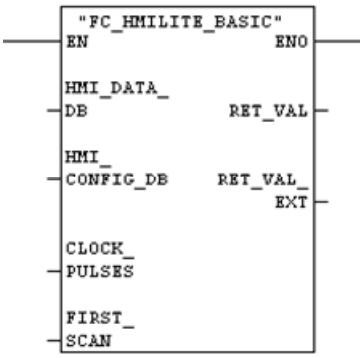


Figure 2-5 Call of FC_HMILITE_BASIC(FC68) in FC_HMILITE_MANAG(FC67)

2.6 Direct keys option

For safety reasons, the direct keys of the operating unit should not be used for the manual functions.

The direct keys functionality is available in FC_HMILITE_MANUAL (FC69).

The input word of the direct keys should be assigned to the input variable KEY_BUTTON in FC_HMILITE_MANUAL.

Note

Further notes for configuring the direct keys function are contained in the WinCC Dokumentation.
Further notes for configuring the manual screens are contained in the "Manual Operation" section of this documentation.

2.7 PLC program blocks

2.7.1 HMI Lite Standard blocks

All HMI Lite standard blocks are contained in the HMI Lite source project (see display below). The standard blocks have to be copied into the project.

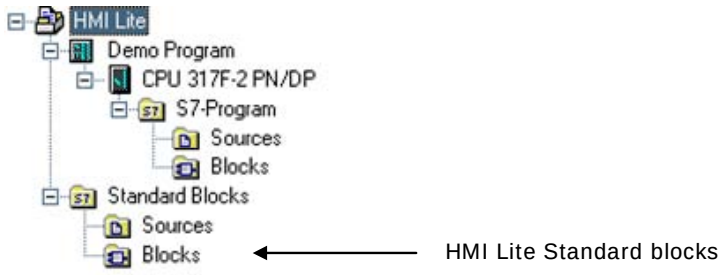


Figure 2-6 HMI Lite Classic standard blocks path

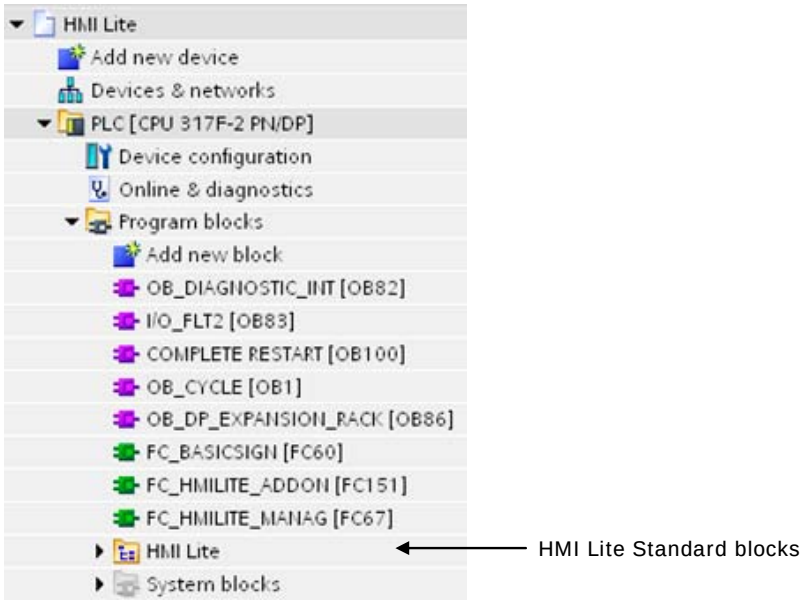


Figure 2-7 HMI Lite TIA Portal standard blocks path

Block numbers	Symbolic name of the blocks	Comment
DB67	DB_HMILITE_DATA	HMI Lite interface
DB68	DB_HMILITE_CONFIG	HMI Lite configuration
FC68	FC_HMILITE_BASIC	General PLC program
FC69	FC_HMILITE_MANUAL	PLC program for the operating screens
FB107 DB107	FB_HMILITE_S7G_MANUAL	Execution of manual functions using S7-GRAPH sequences
DB106	DB_HMILITE_S7G_CONFIG	Configuration for the FB107
DB69	DB_HMILITE_DEVICE_DIAG	Interface of the device diagnosis
FC106	FC_HMILITE_MOBY	Moby diagnostic program code
FC107	FC_HMILITE_ASI	AS-i diagnostic program code
FC108	FC_HMILITE_COUNTER	"Workpiece counter" figure
FC109	FC_HMILITE_CYCLETIME	"Cycle times" figure
FC462	FC_HMILITE_DRIVE	Drive diagnostic program code
FB461 DB461 DB70	FB_HMILITE_SINAMICS DB_HMILITE_SINAMICS DB_HMILITE_SINAMICS_CFG	HMI Lite SINAMICS diagnostic Data block with SINAMICS objects
FB462 DB462 DB71	FB_HMILITE_REPEATER DB_HMILITE_REPEATER DB_HMILITE_REPEATER_CFG	Topology determination screen and diagnostic buffer screen Data block with diagnostic repeaters
FB465 DB465	FB_SIEM_PNIODiag	PROFINET & PROFIBUS IO diagnostic

Table 2-2 PLC blocks from HMI Lite

2.7.2 Schema for calling the function blocks

Figure 2.2 shows how the HMI Lite blocks should be called (also see the Demo program). The program structure is an extract from the software guide of the "Solutions for Powertrain TRANSLINE " project manual.

OB1, FC67 and FC151 are not part of HMI Lite and must be created by the machine manufacturer.

A detailed description of the functions and function blocks for HMI Lite can be found in those sections in which the appropriate screens are described.

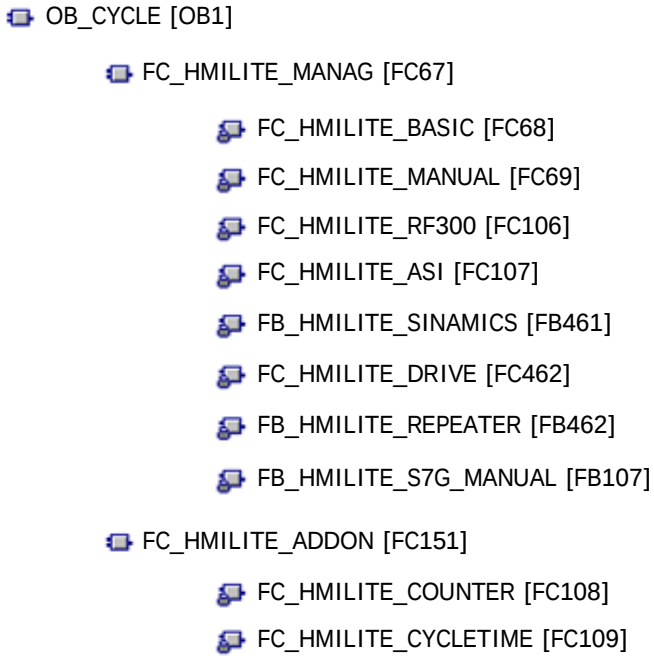


Figure 2-8 Calling hierarchy of the PLC blocks

2.8 Working with the data blocks

The two DB_HMILITE_DATA and DB_HMILITE_CONFIG data blocks form the interfaces between the HMI screens and the PLC program.

In contrast to the DB_HMILITE_DATA data block, the DB_HMILITE_CONFIG data block contains only the data for configuring the HMI masks and the PLC program.

The configuration settings for the machine must be made with STEP 7 in the DB_HMILITE_CONFIG.

2.8.1 Procedure for the configuring (Classic)

The following table shows a simple possibility for entering the configuration data.

Step 6	Proceed as follows
1	Open the DB_HMILITE_CONFIG data block with STEP 7 in the declaration view.
2	Enter the appropriate values for the machine as initial values.
3	Change to the data view of the data block ([View] ⇨ [Data view] menu).
4	Accept the initial vlaues as current values using the ([Edit] ⇨ [Initialize data block]) command.
5	Save the data block ([File] ⇨ [Save] menu).
6	Load the data block into the controller ([Target system] ⇨ [Load] menu).
7	Testing the changed configuration.

Table 2-3 Editing the DB_HMILITE_CONFIG data block

Note

A detailed description for working with data blocks is contained in the STEP 7 online help.

2.8.2 Procedure for the configuring (TIA Portal)

The following table shows a simple possibility for entering the configuration data.

1. Open the Folder “Program blocks\HMI Lite” in the project tree.

2. Open the data block DB_HMILITE_CONFIG and enter the appropriate values. Save the project.

3. Select the data block DB_HMILITE_CONFIG in the project tree.

4. Right-click on a selected data block. Select the option in the shortcut menu [Download to device]⇨[Software].

- If you had previously established an online connection, the “Load preview” dialog opens. This dialog displays messages and proposes actions necessary for downloading.
- If you had not previously established an online connection, the “Extended download to device” dialog opens, and you must first select the interfaces via which you want to establish the online connection to the device.

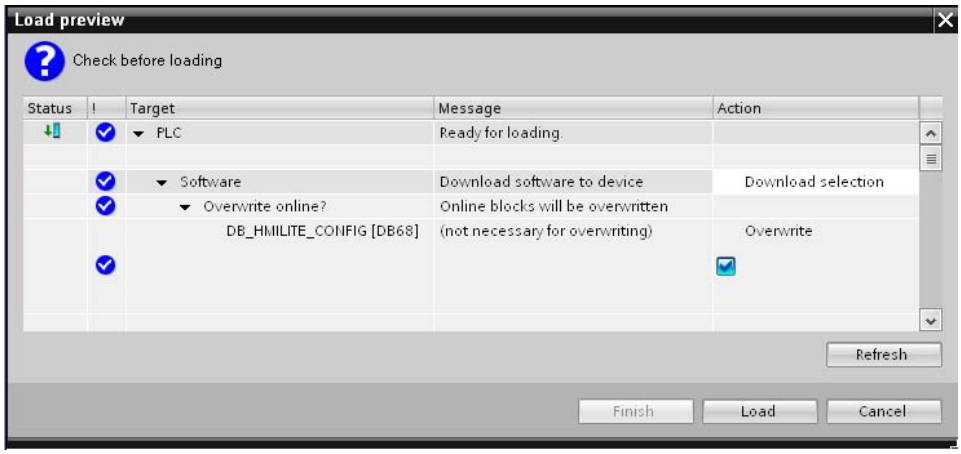


Figure 2-9 “Extended download to device” dialog for DB_HMILITE_CONFIG

5. Click the “Load” button. Test the changed configuration.

Note

A detailed description for working with data blocks is contained in the TIA Portal online help.

■

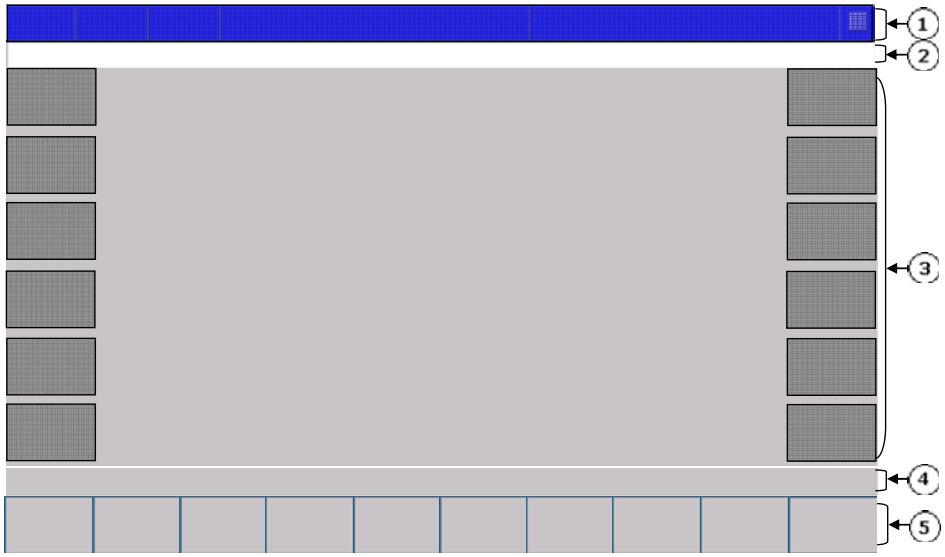
Notes

3

3 Global Settings and Functionality

3.1 Layout of the screens and basic screen elements

All screens have a standard structure (see Figure 3-1).



(1) Header information – plant status
(2) Message line for alarms and messages
(3) Working area with vertical softkeys (optional)
(4) Line for operator notes
(5) Horizontal softkeys with screen-dependent functions

Figure 3-1 Screen elements

(1) Header

The upper area of each screen contains the header. It contains significant status information, such as operating mode, initial state, etc. This area also contains the message line for alarms and messages.

The header can be configured in two different types of representation. Whereas one of the representation types shows the status information as text, the other representation type shows the status information as graphic elements. Further details about the header are contained in Chapter 4 of this manual.

(2) Message line for alarms and messages

The message line is part of the header and so is visible in each screen. All fault and operational messages are displayed with number, time, status and message text. By default, the most recently occurring message is always displayed. However, the message settings in WinCC can be changed so that the oldest associated message is always displayed.

(3) Working area

The working area shows the screen-dependent screen elements.

(4) Operator notes

Notes for the machine operation can be displayed in this line for the machine operator. The operator note is output as a single line of text.

(5) Horizontal softkeys

The horizontal softkeys are used primarily to select other screens and are always located in the lower screen area. Other than their use to call other screens, the function keys are used to scroll within the selected screen (e.g. page up / page down in the operator screens) or to activate special functions (e.g. to activate and deactivate the manual operation in the "PROFIBUS Diagnosis" screen).

By default, the menu structure is based on a two-level structure (main menu and submenu level). A third menu level is used only when a grouping of inter-related screen forms is required.

3.2 Menu structure

Although the menu structure of the HMI Lite standard project has the following form, it can at anytime be customized by the user for the specific project.
The menu structures differ according to the size of the operator panels:

- Operator panels with 12,1" screen (KP1200)
- Operator panels with 7" screen (KP700)

The menu structures for these variants depend on the number of function keys of the devices.

The following structure figures show the form of the associated standard menus for the two operator panels:

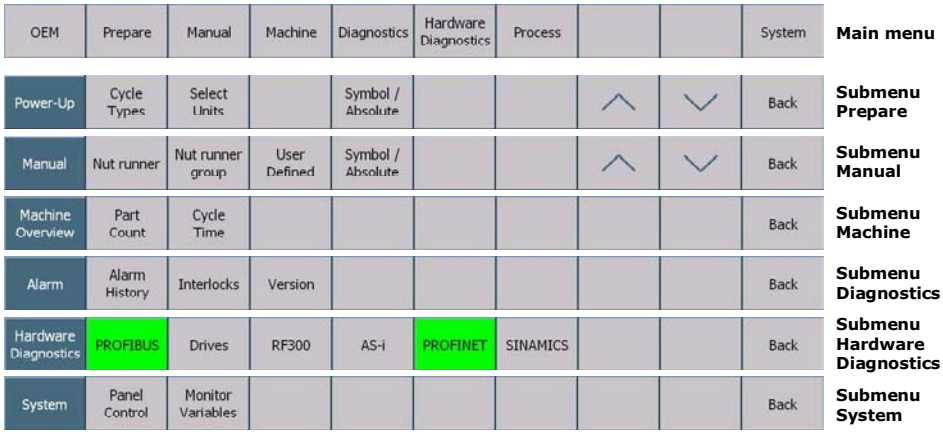


Figure 3-2 Structure of the menu for operator panels with 12,1" screen display (KP1200)

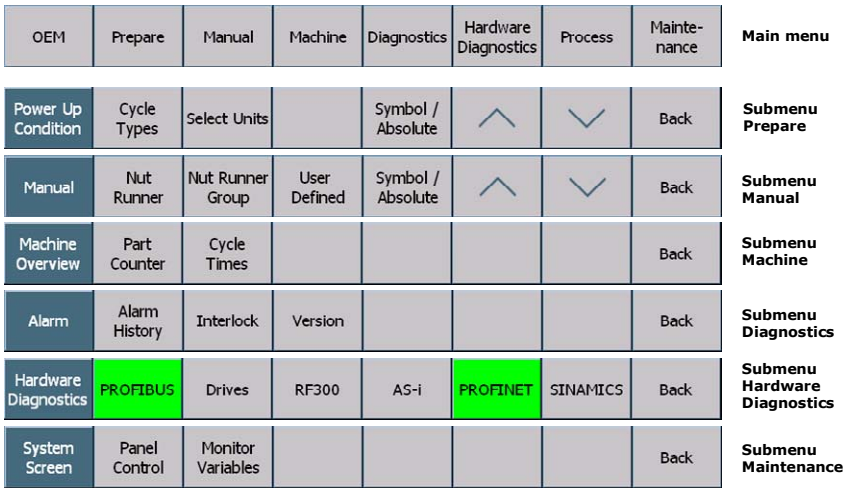


Figure 3-3 Structure of the menu for operator panels with 7" screen display (KP700)

Screen forms of the machine manufacturer

The machine manufacturer should give the operator a graphic overview of the associated machine or plant in the HMI Lite "OEM ⇨ Plant overview" main screen. From this screen, the horizontal softkeys can be used to change to one of the 8 or 10 main menus.

The 12,1-inch operator panels provide the machine manufacturer with the two main menus "OEM" and "Process" in which the machine manufacturer can include machine-specific screens and functions.

It is possible to create a third menu level.

Note

The menu structure shown here is the standard menu structure for HMI Lite. The menu structure can be customized for specific projects.

Navigation and function keys:

The gray-shaded buttons are navigation and function keys assigned to the individual screens in the corresponding submenus.

Click the "Back" button to return from the current menu to the previous menu. The "Return" button is configured in the third menu level to return to the second menu level.

The arrow keys "Page up"/"Page down"and the "Absolute/Symbolic" toggle keys required in the operating screens are described in Chapter “Manual Operating”.

3.3 "Template" screen

The "SS_90_Template" screen is used to add machine-specific screens while retaining the screen layout and the menu structure.
This results in the following procedure:

Duplicate the "SS_90_Template" screen
Rename the screen
Configure the screen
Include the screen in the menu structure

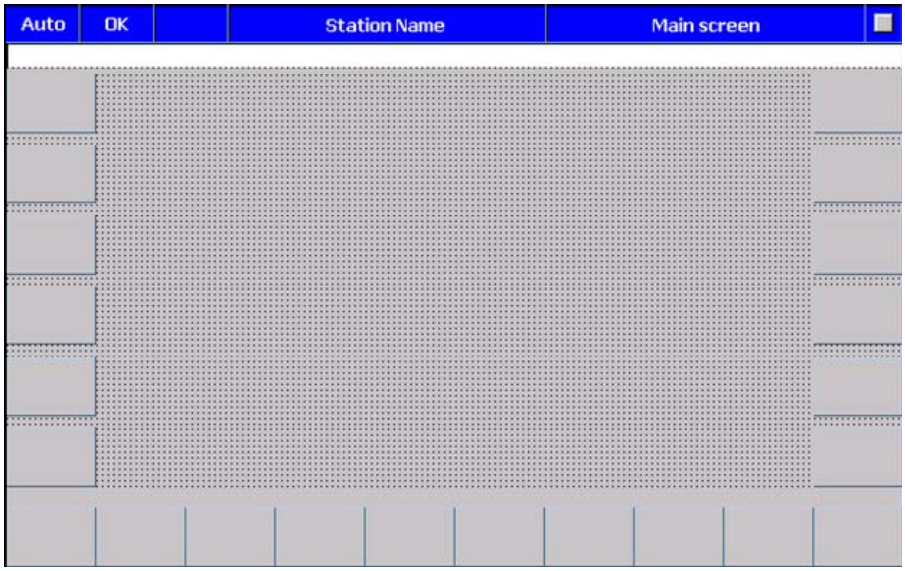


Figure 3-4 "SS_90_Template" screen for creating your own screens

3.4 Designation conventions

All WinCC elements, such as screens, variables, graphics and symbol lists have been named using uniform designation conventions.

The designation structure must provide the following information:

Who created the associated element?

Who changed the element?

How are the individual elements linked with each other?

In other words: All WinCC elements that can be changed by the user (configuring) are designated with "SO_". When the elements in WinCC are sorted according to name, these elements appear at the start of the list.

In addition, the designations can be used to determine all elements assigned to a screen.

Designation convention syntax

All WinCC elements, such as screens, variables, graphics and symbol lists must be named using these uniform designation conventions (see Table 3-1).

Name structure of the screen elements: **AB_XX_Name**	
Icon	Description
A	Who created the associated screen element? S: Siemens O: OEM (machine manufacturer) C: Customer
B	Who should change the screen element? S: Siemens O: OEM (machine manufacturer) C: Customer
XX	Assignment of the screen elements to each other (e.g. 62: means all elements of the "Workpiece counter" screen)
Name	Designation of the screen element (e.g. "PartCounter")

Table 3-1 Syntax of the designation convention for screen elements in Pro Tool

Example

S	**S**	**_**	**51**	**_**	**ASIDiagnostic**
					The name of the screen form is "ASI-Diagnosis".
					The number of the screen element is 51.
					The screen form may only be changed by Siemens.
					The screen form was created by Siemens.

All other elements only used in the "ASIDiagnostic" screen, such as variables or symbol lists, also have the identification 51.

E.g.: Variable: SS_51_ASIFlags
Variable: SS_51_SelectedMaster
Text list: SO_51_SelectedMasterIndex

Global screen elements (identification 00)

All screen elements not uniquely assigned to a specific screen have the identification 00 (e.g. the variables or symbol lists used in the header).

Screen element groups

In some cases, screen elements, e.g. variables, are used together by complete screen groups. A common group identification is then assigned to such screen elements.

For example, all screen elements used by all operating screens have the identification 10. Screen elements used only for a specific operating screen have the associated identification of the corresponding screen to which they are assigned (e.g. for the "SS_11_ManualMovement" screen).

3.5 Clock memory byte of the controller

The 8 bits of the clock memory byte change their binary value cyclically in the pulse pause ratio 1:1 with a period of 0.1 second to 2 seconds.

The clock memory byte is used by the HMI Lite blocks for internal, time-based trigger events (e.g. monitoring of the controller <> OP communication).

The clock memory byte must be transferred as input parameter to the "FC_HMILITE_BASIC". The FC_HMILITE_ BASIC function creates pulses of the individual clock signals and cyclically updates the variables of the data blocks.

3.6 PLC system time

3.6.1 System timer

To avoid using any timer of the CPU, all time functions within the HMI Lite blocks are realized using the CPU system time. The system time is fetched with the SFC64 and further processed.

3.6.2 System time and date

The SFC 1 ("READ_CLK") is used to read the date and time of the PLC from the "FC_HMILITE_BASIC" block. The system time will be written in the "AREAPOINTER.DATE_TIME_PLC [1..12]" data area of the "DB_HMILITE_DATA".

The "Controller date/time" area pointer is read from the panel with an acquisition cycle of 120 seconds and a synchronization with the OP clock is performed. If, for some reason, the synchronization of the clocks has been disabled, the "Controller date/time" area pointer must be deleted from the WinCC configuration.

Note

The acquisition cycle of the "PLC date and time" area pointer should not be chosen too small, because it affects the communications capability of the operator panel. By default, 120 seconds (2 minutes) are set for the acquisition cycle.

The area pointer is located in WinCC in the "Connections".

3.7 Identification of the selected screen

The information which screen is selected on the operator panel is made available in the WinCC "SS_00_ScreenIdentification" variable. For the screen construction, the corresponding value is written in the variable; for screen removal, the variable is set to zero.

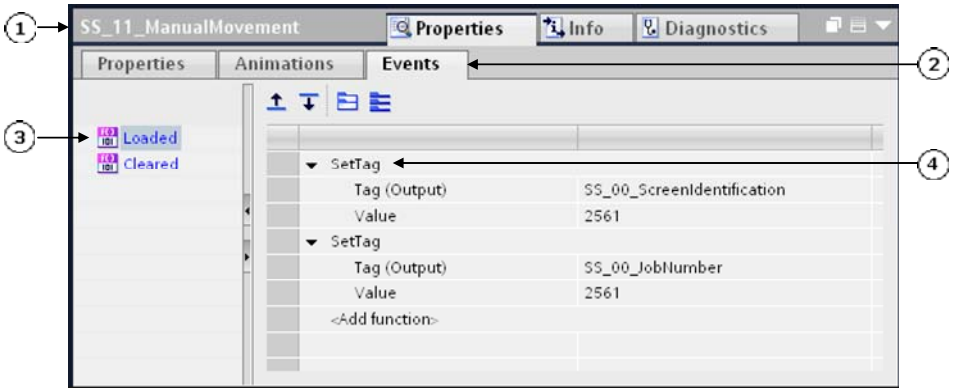
To keep the cycle time of the controller as small as possible, the program code for a specific screen should be executed only when the corresponding screen is selected.

The WinCC "SS_00_ScreenIdentification" variable is defined as follows:

Tag:	SS_00_ScreenIdentification
Format:	WORD
PLC address:	"DB_HMILITE_DATA".GLOBAL.SCREEN_ID

Configuring screen events

For details of configuring screen events, see Figure 3-5.



(1) Properties dialog of a screen
(2) Register Events
(3) Event Loaded when the function is initiated
(4) Function SetTag to be performed

Figure 3-5 Configuring the screen event to identify the selected screen

Codes to identify the individual screens

WinCC screen number	Designation of the system screen	Code to identify the screen form			
		High byte	Low byte	[dec.]	[hex.]
General screen forms					
1	SO_01_MainScreen	01	1	257	0x0101
2	SS_02_Status	01	2	258	0x0102
4	SS_04_SystemScreen	01	4	260	0x0104
5	SS_05_PanelControl	01	5	261	0x0105
6	SS_06_Version	01	6	262	0x0106
"Manual" screen forms					
11	SS_11_ManualMovement	10	1	2561	0x0A01
12	SS_12_PowerUpCondition	10	2	2562	0x0A02
13	SS_13_Unit	10	3	2563	0x0A03
14	SS_14_NutRunner	10	4	2564	0x0A04
15	SS_15_NutRunnerGroup	10	5	2565	0x0A05
16	SS_16_CycleTypes	10	6	2566	0x0A06
17	SS_17_UserDefine	10	7	2567	0x0A07
Simodrive 611 diagnosis					
21	SS_21_DriveStatus [12,1"] SS_21_DriveStatusControlWord [7"]	20	1	5121	0x1401
22	SS_22_DriveStatusStatusWord [7"]	20	2	5122	0x1402
23	SS_23_DriveSignals [12,1"] SS_23_DriveSignalsPositionStatusWord [7"]	20	3	5123	0x1403
24	SS_24_DriveSignalsPositionSignals [7"]	20	4	5124	0x1404
25	SS_25_DriveFaultsandWarnings [12,1"] SS_25_DriveFaults [7"]	20	5	5125	0x1405
26	SS_26_DriveWarnings [7"]	20	6	5126	0x1406
Alarms and messages					
31	SS_31_Alarm	30	1	7681	0x1E01
32	SS_32_AlarmHistory	30	2	7682	0x1E02
35	SS_35_ProAgentAlarm [Placeholder]	30	5	7685	0x1E05
36	SS_36_ProAgentUnit [Placeholder]	30	6	7686	0x1E06
37	SS_37_ProAgentDetail [Placeholder]	30	7	7687	0x1E07
Hardware diagnostics					
41	SS_41_HardwareDiagnostics	40	1	10241	0x2801
51	SS_51_ASIDiagnostic [12,1"] SS_51_ASIDiagnosticMaster [7"]	50	1	12801	0x3201
52	SS_52_ASIDiagnosticSlave [7"]	50	2	12802	0x3202
53	SS_53_ASIDiag_Monitor	50	3	12803	0x3203
54	SS_54_ASIDiag_Monitor_Kreis_1 [7"]	50	4	12804	0x3204
55	SS_55_ASIDiag_Monitor_Kreis_2 [7"]	50	5	12805	0x3205
57	SS_57_MobyDiagnostics [12,1"]	50	7	12807	0x3207

WinCC screen number	Designation of the system screen	Code to identify the screen form			
		High byte	Low byte	[dec.]	[hex.]
	SS_57_MobyDiagnosticsStatus [7"]				
58	SS_58_MobyDiagnosticsError [7"]	50	8	12808	0x3208
Machine information					
61	SO_61_MachineOverview	60	1	15361	0x3C01
62	SS_62_PartCounter [12,1"] SS_62_PartCounterOverall [7"]	60	2	15362	0x3C02
63	SS_63_PartCounterSpecific [7"]	60	3	15363	0x3C03
65	SO_65_CycleTimes	60	5	15365	0x3C05
67	SS_67_Interlocks	60	7	15367	0x3C07
PNIO diagnostics					
71	SS_71_StationOverview1	70	1	17921	0x4601
72	SS_72_StationOverview2	70	2	17922	0x4602
73	SS_73_StationOverview3	70	3	17923	0x4603
74	SS_74_StationOverview4	70	4	17924	0x4604
75	SS_75_StationOverview5 [7"]	70	5	17925	0x4605
76	SS_76_StationOverview6 [7"]	70	6	17926	0x4606
77	SS_77_StationOverview7 [7"]	70	7	17927	0x4607
78	SS_78_StationOverview8 [7"]	70	8	17928	0x4608
79	SS_79_StationDetail	70	9	17929	0x4609
710	SS_710_StationDetail2 [7"]	70	10	17930	0x460A
711	SS_711_HistoryTrigger	70	11	17931	0x460B
712	SS_712_Legend	70	12	17932	0x460C
713	SS_713_DiagnosticRepeater	70	13	17933	0x460D
714	SS_714_DiagnosticRepeater2 [7"]	70	14	17934	0x460E
715	SS_715_DiagnosticRepeaterBuffer	70	15	17935	0x460F
716	SS_716_DiagnosticRepeaterBuffer2 [7"]	70	16	17936	0x4610
717	SS_717_DiagnosticRepeaterTopology	70	17	17937	0x4611
718	SS_718_DiagnosticRepeaterTopology2 [7"]	70	18	17938	0x4612
SINAMICS diagnostics					
81	SS_81_ControlStatusword [12,1"] SS_81_StatusControlWord [7"]	80	1	20481	0x5001
82	SS_82_StatusStatusWord [7"]	80	2	20482	0x5002
83	SS_83_EPOSStatus [12,1"] SS_83_EPOSStatusWord [7"]	80	3	20483	0x5003
84	SS_84_EPOSPositioning [7"]	80	4	20484	0x5004
85	SS_85_FaultsAndWarnings [12,1"] SS_85_Faults [7"]	80	5	20485	0x5005
86	SS_86_Warnings [7"]	80	6	20486	0x5006
OEM-specific screen forms					
90	Customer-specific screens [Placeholder]	90	-	-	-

WinCC screen number	Designation of the system screen	Code to identify the screen form			
		High byte	Low byte	[dec.]	[hex.]
Customer-specific screen forms					
100 ff	OEM-specific screens (template) ***	100	-	-	-
12,1''	These screens are available only for the 12,1" variant.				
7''	These screens are available only for the 7" variant.				
Placeholder	Placeholder for project- or customer-specific screens (not available in the standard version).				

Table 3-2 Identification code of the individual screens

3.8 HMI Lite job mailbox

The job mailbox forms the primary interface between the HMI system and the control program for initiating an operator action.

Structure

The job mailbox has a defined length of four words. The structure is shown in the following table:

Address	Data type	Name	Description
n+0	WORD	JOBNUMBER	Job number
n+2	WORD	PARAMETER_1	1st parameter of the job
n+4	WORD	PARAMETER_2	2nd parameter of the job
n+6	WORD	PARAMETER_3	3rd parameter of the job

Table 3-3 Structure of the job mailbox

The first word always contains the job number. Depending on the associated control job, up to three parameters can be specified.

Number of the job and parameters

The job number corresponds to the screen identification number. This enables all actions initated by a specific screen to be determined exactly by the screen identification. The parameters specify the action to be performed. Details can be found in the descriptions of the associated screens.

Monitoring the connection

Because only status changes for keys and buttons can be transferred to the controller, the connection between the operator panel and the controller must be monitored for correct operation. This monitoring is performed using the sign-of-life bit of the operator panel from the "Coordination" area pointer. The sign-of-life bit is inverted by the operator panel in one second intervals.

The "FC_HMILITE_MANUAL" function checks cyclically whether the sign-of-life bit has been inverted to determine whether the connection to the operator panel still exists. If no inversion of the sign-of-life bit has been determined during a time interval, the job mailbox will be cleared. The time interval is defined by the following parameters:

DB_HMILITE_CONFIG.MANUAL_COMMON. SCREEN_ACTIVE_TIME

Important

Because the sign-of-life bit is not a real-time signal, depending on the data traffic on the network and the number of processes running on the operator panel, it can take longer than one second before the signal has changed its status. To ensure shorter response times and a faster shutdown of the manual operations, we recommend that the function keys of the operator panel are used as PROFIBUS DP direct keys.
The machine manufacturer is responsible for the reliable execution of the manual operation.

"Coordination" area pointer

The controller can use this data area to query the status of the operator panel, e.g. startup of the operator panel, current operating mode and ready for communication.

Structure of the "Coordination" area pointer

The structure of the "Coordination" area pointer with the length of one word:

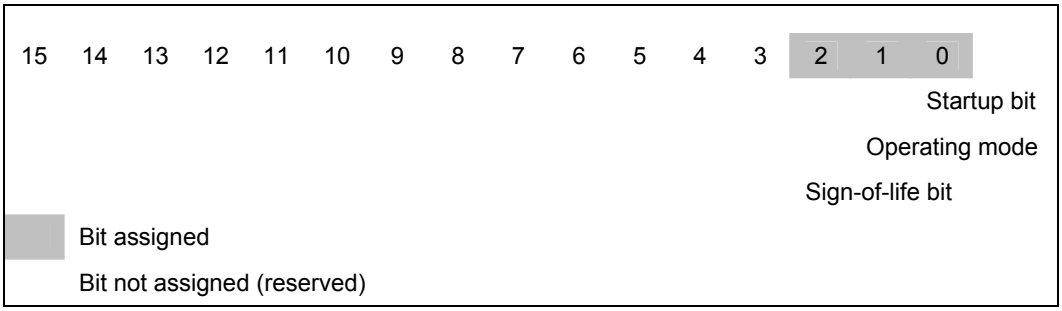


Figure 3-6 Layout of the "Coordination" area pointer

3.9 FC_HMILITE_BASIC

The basic functions of HMI Lite are realized using the "FC_HMILITE_BASIC" function. This FC is responsible for the coordination of the interface DBs and HMI screens.
Figure 3-7 shows the parameters of the FC; Table 3-4 describes its parameters.

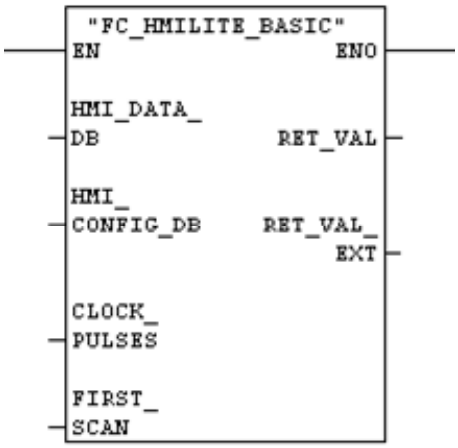


Figure 3-7 Interface of the "FC_HMILITE_BASIC" function

FC_HMILITE_BASIC parameters

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	Number of the HMI runtime data block
HMI_CONFIG_DB	INT	68	68	Number of the HMI configuration data block
CLOCK_PULSES	BYTE	MB1	MB1	Clock memory byte, configured in the object properties of the CPU (HW Config)
FIRST_SCAN	BOOL	M0.5	M0.5	Restart flag, 1 – signal for the first cycle after CPU startup
RET_VAL	WORD	-	TEMP VARIABLE	Error message of the "FC_HMILITE_BASIC" function: W#16#80C1 => internal SFC1 (READ_CLK) call with error
RET_VAL_EXT	INT	-	TEMP VARIABLE	Error message from the SFC1 "READ_CLK", see online help for the SFC1

Table 3-4 Description of the FC_HMILITE_BASIC parameters

3.10 Connection of several operator panels to a controller

If several HMI Lite operator panels are to be connected with a controller, a new DB interface must be provided in the controller for the second and each additional operator panel. This requires the duplication of the HMI Lite DBs and the modification of the numbers in Step7 and WinCC.

The following table lists the steps required to change the DB numbers.

Step	Proceed as follows
1	Duplicate the DB_HMILITE_DATA (DB67) as runtime interface for the second operator panel.
2	Duplicate the DB_HMILITE_CONFIG (DB68) for the configuration of the second operator panel.
3	The FC_HMILITE_BASIC (FC68) must be called once in the program for each operator panel. The "HMI_DATA_DB" and "HMI_CONFIG_DB" input parameters must be supplied with the appropriate DB numbers.
4	The FC_HMILITE_MANUAL (FC69) must be called once in the program for each operator panel. The "HMI_DATA_DB" and "HMI_CONFIG_DB" input parameters must be supplied with the appropriate DB numbers.
5	The number of the DB_HMILITE_DATA (DB67) is parameterized in the WinCC "SO_00_DBNumberData" variable. This number must be changed in the corresponding WinCC configuration. The new number of the duplicated DB_HMILITE_DATA must be entered as start value in the properties dialog of the WinCC "SO_00_ DBNumberData" variable for the "initial settings".
6	The number of the DB_HMILITE_CONFIG (DB68) is parameterized in the WinCC "SO_00_DBNumberData" variable. This number must be changed in the corresponding WinCC configuration. The new number of the duplicated DB_HMILITE_CONFIG must be entered as start value in the properties dialog of the WinCC "SO_00_DBNumberConfiguration" variable for the "initial settings".
7	The WinCC area pointers with the DB67 (DB_HMILITE_DATA) absolute address must receive the duplicated DB_HMILITE_DATA as new absolute address.
8	The user-specific fault and operational messages must be assigned new addresses, unless the same messages should be displayed on both operator panels.

Table 3-5 Changing the numbers of the HMI Lite standard DBs

Because at any one time only a single operator panel can access the hardware diagnosis, an operator panel change must be configured for this purpose.

! Important

Manual operations performed from both operator panels must be mutually interlocked. This remains the responsibility of the user.

■

Notes

4

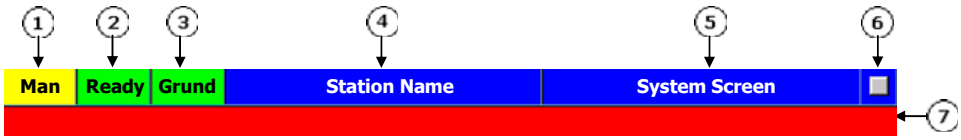
4 Header and Operator Information

4.1 Header

4.1.1 Layout of the header

The HMI Lite header shows the operator general information about the machine status.

Figure 4-1 shows the structure of the header in HMI Lite.



(1) Display of current operating mode
(2) Plant status
(3) Display of the basic position
(4) Header – text field 1
(5) Header – text field 2
(6) CPU sign-of-life display
(7) Alarm and message line

Figure 4-1 Layout of the header

4.1.2 Display of current operating mode

The currently selected operating mode is displayed.

By default, the following operating modes are defined:

Display	Operating mode
[empty]	No operating mode selected
Auto	Linked mode
Cycle clock	Single mode
Step 6	Single-step mode
Manual	Setup

Table 4-1 Display of the operating modes in the header

Each of the operating modes listed above can be subdivided as follows:

- selected but not active (gray background)
- selected and active (green or yellow background)

"No operating mode" is displayed when:

- The operating mode selection switch is in an undefined position
- The operating mode is selected using keys but no key has been pressed

Operating modes that are selected but not active will be displayed with a gray background. Operating modes that are active will be displayed with a green or yellow background.

Operating mode selected		Operating mode activated	
Text	Icon	Text	Icon
Auto		Auto	
Cycle		Cycle	
Step		Step	
Man		Man	

Table 4-2 Selected and activated operating modes

"Operating mode selection" runtime interface

The associated operating mode is displayed using the interface bits in the DB_HMILITE_DATA data block, see Table 4-3 (the operating mode is displayed when the interface bit = "TRUE").

Text	Icon	Interface	Type

Auto		DB_HMILITE_DATA.HEADER.MODE.AUTOMATIC	BOOL
Cycle		DB_HMILITE_DATA.HEADER. MODE.CYCLE	BOOL
Step		DB_HMILITE_DATA.HEADER. MODE.STEP	BOOL
Man		DB_HMILITE_DATA.HEADER. MODE.MANUAL	BOOL

Table 4-3 Display of the current operating mode

If no or several interface bits have the "TRUE" status, the "No operating mode" status will be displayed.

"Operating mode selected/active" runtime interface

If the "DB_HMILITE_DATA.HEADER. MODE.ACTIVE" interface bit is set to "TRUE", the operating mode will be displayd as active.

Configuration

No configuring required.

4.1.3 Status display

The following states are possible for the machine status display:

Text	Icon	Meaning	Description
Ready		Ready to run	No fault message or operation message is present.
Warn		Warning	One or more operation messages are present.
Alarm		Fault	One or more fault messages are present.

Table 4-4 Status display

Runtime interface

The "Status display" is controlled with the following status bits in the DB_HMILITE_DATA data block:

Meaning	Interface	Type
Ready to run	--- (if no additional status bit has the status "1"– status = ready)	BOOL
Warning	DB_HMILITE_DATA.HEADER.STATUS.WARNING	BOOL
Interrupt	DB_HMILITE_DATA.HEADER.STATUS.ALARM	BOOL

Table 4-5 Status display

By default, the status bits are not linked with other variables or objects (e.g. with alarm or message bits).

Configuration

No configuring required.

4.1.4 Display of the initial state

The following states are possible for the initial state display:

Text	Icon	Meaning	Description
		Empty	The machine is not in the "initial state"
Home		Initial state	The machine is in the "initial state"

Table 4-6 "Initial state" display (2)

Interface

The "initial state" display is made using the following bit in the DB_HMILITE_DATA data block:

Meaning	Interface	Type
Empty	---	
Initial state	DB_HMILITE_DATA.HEADER.POSITION.HOME	BOOL

Table 4-7 "Initial state" display (2)

The "initial state" status is displayed when the bit is "TRUE".

Configuration

No configuring required.

4.1.5 Text boxes

The user has two text fields available to display machine-specific text.

Runtime interface

The text is controlled using two variables in "DB_HMILITE_DATA". The text assigned to the value of the variable of the WinCC text list is displayed as text.

Address:	DB_HMILITE_DATA. HEADER.TEXTINDEX_1 DB_HMILITE_DATA. HEADER.TEXTINDEX_2
Format:	WORD
Range of values:	1..
Default setting:	W#16#0

Configuration

Text list	**SO_00_HeaderText1** **SO_00_HeaderText2**
Display Format	Text Decimal
Value	Text
1	[Text to be displayed]
…	…

The "SO_00_HeaderText2" text list is preconfigured so that the screen name of the selected screen is displayed.

This requires that the screen number of the selected screen is transferred from the WinCC "Screen number" area pointer into the "DB_HMILITE_DATA.HEADER.TEXTINDEX_2" variable.

For example:

```
L   DB_HMILITE_DATA.AREAPOINTER.SCREEN_NUMBER.SCREENNUMBER
T   DB_HMILITE_DATA.HEADER.TEXTINDEX_2
```

This is programmed in the FC67 in the Demo program.

The machine manufacturer must extend the "SO_00_HeaderText2" text list if new screens are to be added to the WinCC configuration.

4.1.6 Sign-of-life of the CPU

The sign-of-life in the header displays the operating mode of the PLC. A periodic flashing in intervals of approximately one second indicates that the controller is in the "RUN" operating mode.

The "STOP" operating mode is indicated by a red rectangle.

Field	Interface
Flashing  or 	The PLC is in the "RUN" operating mode and the Panel – PLC communication occurs.
Static  or 	The communication with the PLC has been interrupted.
	The PLC is in the "STOP" operating mode

Table 4-8 Display of the sign-of-life of the CPU (1)

Runtime interface

Field	Interface
Sign-of-life	DB_HMILITE_DATA. HEADER.WATCHDOG

Table 4-9 Display of the sign-of-life of the CPU (2)

4.1.7 Changing the display of the status signals in the header

The machine status display in the header can be displayed as a symbol or as text.

The "SS_00_SelectHeader" screen provides both views.

The replacement of the header elements in the permanent window for WinCC with the corresponding elements from the "SS_00_SelectHeader" screen can be used to change the display of the status signals.

4.2 Operator information

The operator information is a text output field used to display information for the operator. The text display is located above the horizontal buttons.

Runtime interface

Two runtime variables are used to control the dynamic behavior of the text output field.

The first variable, "DB_HMILITE_DATA. GLOBAL.PROMPT.INDEX", is used to select which text from the WinCC text list is to be displayed.

The second variable, "DB_HMILITE_DATA.GLOBAL. PROMPT.ATTRIBUT", is linked with the attribute of the text output field. The variable so controls the color change of the flashing of the text output field.

Address:	DB_HMILITE_DATA. GLOBAL.PROMPT.INDEX
Format:	WORD
Range of values:	1..
Default setting:	W#16#0

Address:	DB_HMILITE_DATA. GLOBAL.PROMPT.ATTRIBUT
Format:	WORD
Range of values:	1..
Default setting:	W#16#0

Configuration

The WinCC SO_00_OperatorPrompt text list contains the text to be displayed in the text field for operator information.

Text list		**SO_00_OperatorPrompt**
Display		Text
Type		Decimal
Value	[Text number]	[Text to be displayed]
…	…	…

■

Notes

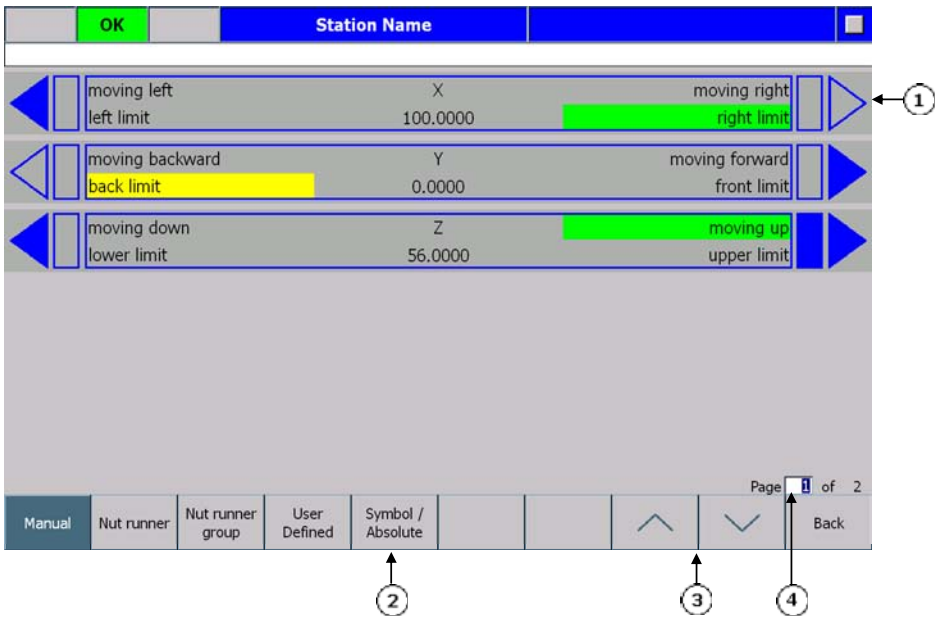
5

5 Manual Operating

5.1 Overview

5.1.1 Layout and basic functionality of the manual operating screens

The operator can use the manual operating screens to perform movements, activate/deactivate machine elements, select cycle type and perform other actions for which a selection must be made.
All screens from the manual operation area have the same general structure (see Figure 5-1).

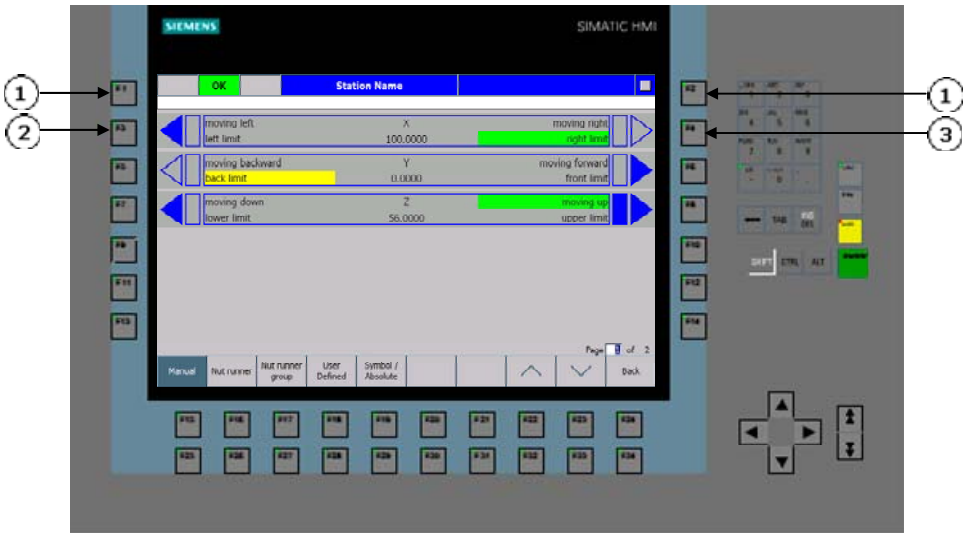


(1) Movement or function line
(2) Switch between symbolic/absolute
(3) Scroll up/down
(4) Current page/total number of pages

Figure 5-1 Layout of the manual operating screens

Movement and function line

Each movement and each function is represented by a line.
Every movement or function can be performed in two directions, such as input/output, open/close, up/down, forwards/backwards. One direction of the movement or function is shown on the left-hand side of the screen and the other direction is shown on the right-hand side of the screen.
The two keys to the immediate left or right of the function line are assigned to each movement as shown in Figure 5-2. These keys are used to activate the associated movement or function.

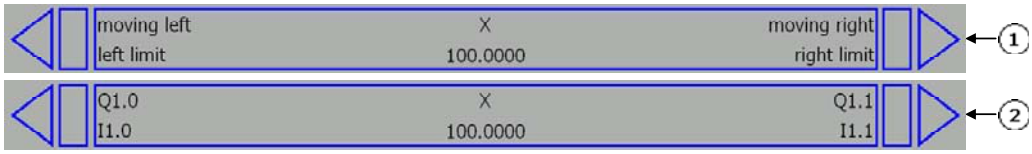


(1) The two upper vertical softkeys are not assigned to any function line.
(2) This button is assigned to the left-hand function in the first line.
(3) This button is assigned to the right-hand function in the first line.

Figure 5-2 Assignment to the corresponding function lines

Absolute and symbolic view

The "symbolic/absolute" toggle key can be used to switch between the symbolic and the absolute designation of the inputs and outputs (e.g. I1.0, O1.0) that are assigned to the corresponding movements/functions (see Figure 5-3).
The representation in absolute form is displayed only for a parameterizable time. After this time has expired, the HMI Lite system switches automatically to the symbolic representation.



(1) Symbolic view
(2) Absolute view

Figure 5-3 Manual operating screens - absolute and symbolic view

Scrolling

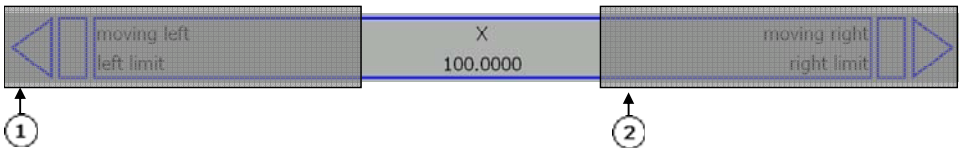
A scroll function can be used to fetch all configured actions for a maximum display of six (12,1" device) or three (7" device) movements/functions per page.
When the scroll function is performed, the complete screen is always opened (all displayed function lines will be replaced by the function lines present on the next page).
When the last page is reached and the page-up key is pressed, the display changes back to the first page. Similarly, when the first page is reached and the page-down key is pressed, the display jumps to the last page.
You cannot change the screen (the page is locked) while a movement or function is being performed.

Selection and display of the page number

The current page number and the total number of pages are displayed at the bottom in each screen. The page number field, which is an input field, can be used to directly select a page by entering the appropriate page number from the keyboard or keypad.

Touch panel support

Other than the keys at the immediate left and right of each movement or function, the screens for the manual operation also support touch panel operation (for operator panels with touch functionality).
As shown in Figure 5-4, each movement/function can be initiated by touching the corresponding function in the appropriate areas.



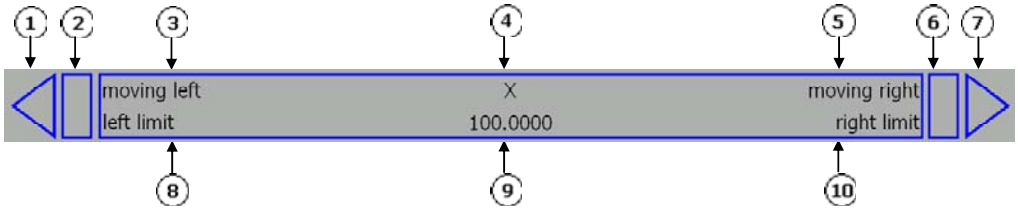
(1) Touch-sensitive area (button not visible)
(2) Button activated / display pressed

Figure 5-4 Manual operating screens – touch panel support

To prevent the inadvertent initiation of a movement, the system is designed so that to initiate a movement, it must first be selected by touching the appropriate touch-sensitive surface. The selection of the movement is confirmed by a flashing square next to the movement arrow (see number (2) in Figure 5-4).
Once the movement has been confirmed, the movement can be initiated by subsequently touching the touch-sensitive area. As confirmation, the square next to the triangle becomes dark blue.
The function remains selected until one of the following events occurs:
Another movement is selected.
Scroll to another page.
Select another screen.
The sign-of-life monitoring deactivates the movement.

5.1.2 Elements of the movement/function line

Each movement line consists of the basic elements shown in Figure 5-5:



(1) Executability, left-hand side
(2) Key/button activated, left-hand side
(3) Will be executed, left-hand side
(4) Name of function
(5) Will be executed, right-hand side
(6) Key/button activated, right-hand side
(7) Executability, right-hand side
(8) Final status (end position), left-hand side
(9) Position (optional)
(10) Final status (end position), right-hand side

Figure 5-5 Manual operating screens - elements of the individual line

Designation (4)

The "Designation" object is the title for the movements/functions. Scrolling the screen updates the designations of the functions with the associated description of the associated line on the current page.
The text items are configured in text lists for WinCC. The "Designation" element does not have any runtime interface.

Position (9)

The "Position" object can be used to display a numeric position value. The position field is optional and can be hidden for each movement or function.

Executability (1 and 7)

The "Executability" object indicates whether or not a movement can be performed.
If the motion can be executed, the triangle is filled dark blue.
If the movement cannot be performed because it is disabled or interlocked (e.g. target position reached), the triangle is displayed as an unfilled contour.
The status information must be supplied as binary signals via the runtime interface.

Final state (end position) (8 and 10)

The "Final state" element represents movement- or function-specific end positions in both directions (e.g. left/right, up/down, open/closed).
If a target position has not yet been reached, the associated text of this position appears on a gray background.
If the target position has been reached, the appropriate text is displayed with a yellow (left-hand side) or green (right-hand side) background.

Various text items for the symbolic and the absolute view can be displayed for each "Final state" element. The text items are configured in text lists for WinCC.
The status information must be supplied as binary signals via the runtime interface.

Execution (3 and 5)

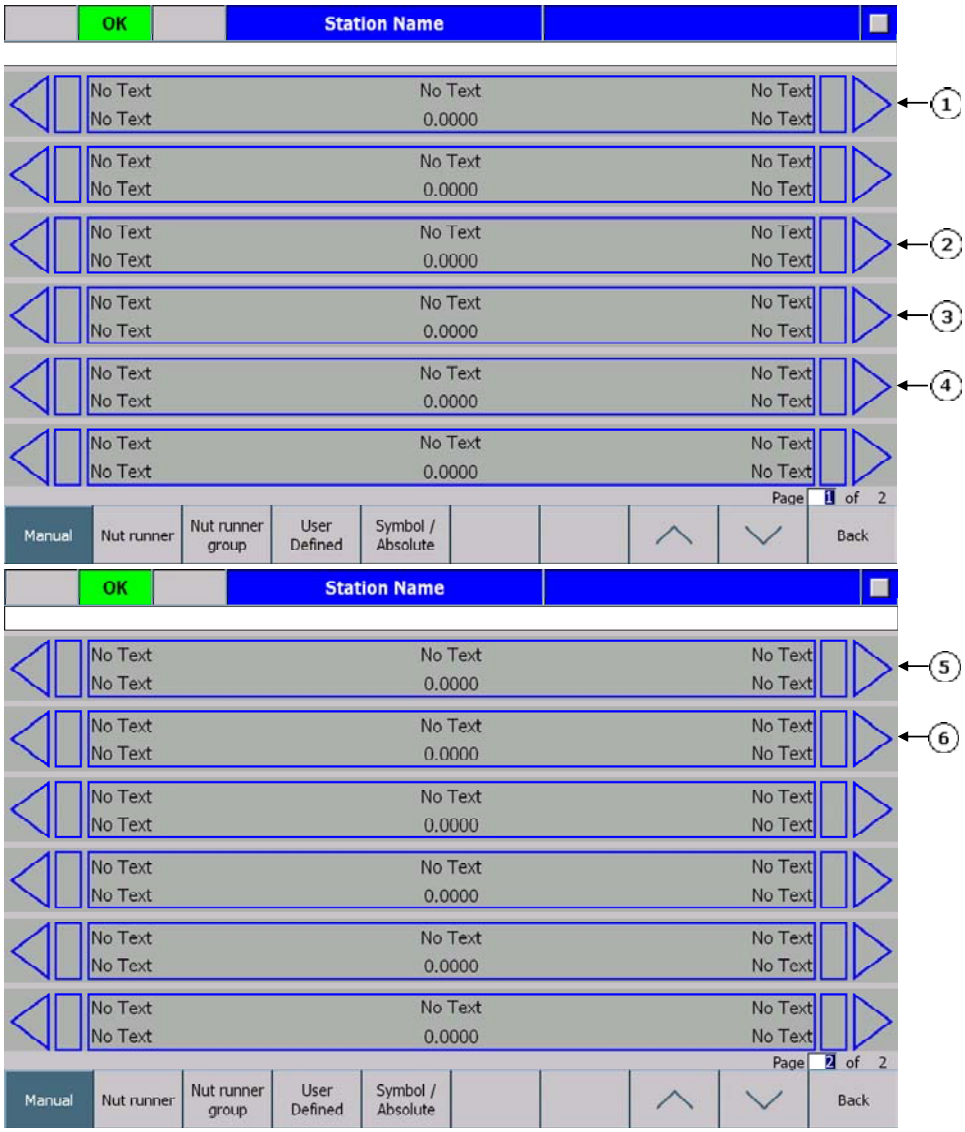
The "Execution" element shows the status of the output from which the associated movement/function is controlled.
If the output is deactivated, the associated text appears with a gray background.
If the output is activated, the appropriate text is displayed with a yellow (left-hand side) or green (right-hand side) background.
Various text items for the symbolic and the absolute view can be displayed for each "Execution" element. The text items are configured in text lists for WinCC.
The status information must be supplied as binary signals via the runtime interface.

Key/button activated (2 and 6)

The "Key/button activated" element indicates whether or a key, button or a touch-sensitive area has been confirmed by the control program (processed). The status information is supplied by the corresponding function block from HMI Lite.
The "Key/button activated" element acts as follows for a key-operated panel:
When a key is pressed and confirmed by the controller, the rectangle becomes dark blue.
If a key has not been pressed or not confirmed by the PLC, the rectangle is represented as an unfilled contour.
The "Key/button activated" element confirms the preselection or selection of a function on the touch display with the following states (further details for the preselection are contained in the "Touch panel support" section):
If a function has been preselected, this is indicated by the flashing of the rectangle (a dark-blue and contoured rectangle flashes in intervals of approximately 0.25 seconds).
If the touch-sensitive surface of a function is activated a second time and this is confirmed by the controller, the rectangle becomes dark blue.
If the function is not active or preselected, the rectangle is displayed as an unfilled contour.

5.1.3 Assignment of the function numbers

Each assigned function line is assigned to a fixed function number. The first line is assigned function number 1, the second line is assigned function number 2, etc. Lines that are not displayed (all elements hidden) do not interrupt the assignment. Figure 5-6 shows the assignment of the function numbers over several pages.



(1) Page 1, Row 1, Function 1
(2) Page 1, Row 3, Function 3
(3) Page 1, Row 4, Function 4
(4) Page 1, Row 5, Function 5
(5) Page 2, Row 1, Function 6
(6) Page 2, Row 2, Function 7

Figure 5-6 Manual operating screens – assignment of the function numbers

HMI Lite assigns the page layout of the movements or functions based on the total number of movements or functions configured in the selected screen and depending on how many movements or functions can be displayed on a page. This means the movement-specific interfaces are page-dependent.

Note

The 12,1" display can display six function lines per screen page; the 7" devices can display three function lines per page.

5.2 Purpose of the individual manual operating screens

5.2.1 Manual operation

The manual operating screen contains a maximum of 64 movement or function lines. This allows special movements to be performed manually using keys. Every movement can be performed in two directions, such as input/output, open/close, up/down, forwards/backwards.
It is also possible to track each movement during its execution.
If there are more movements than can be displayed on the screen at the same time, the movements will be displayed on several pages. The individual pages can be grouped. This means each group forms its own manual operating screen for the operator and, for example, can be assigned to a specific plant section.

5.2.2 Power up condition

The "Power up condition" screen contains up to 64 function lines. This allows special power up conditions to be performed manually using keys. Each power up condition can be controlled in two directions, such as on/off, open/close.
It is also possible to track the status of each power up condition during its execution.
If there are more power up conditions than can be displayed on the screen at the same time, the power up conditions will be displayed on several pages

5.2.3 Selecting/deselecting units

The "Units" screen contains up to 32 function lines. Each line is assigned a machine unit that can be selected or deselected manually using keys.
If there are more units than can be displayed on the screen at the same time, the units will be displayed on several pages.

5.2.4 Selecting/deselecting nut runners

The "Nut runner" screen contains up to 32 function lines. Each line is assigned a nut runner that can be selected or deselected manually using keys.
If there are more nut runners than can be displayed on the screen at the same time, the nut runners will be displayed on several pages.

5.2.5 Selecting/deselecting nut driver groups

The "Nut runner groups" screen contains up to 32 function lines. Each line is assigned a nut runner group that can be selected or deselected manually using keys.
If there are more nut runner groups than can be displayed on the screen at the same time, the nut runner groups will be displayed on several pages.

5.2.6 Selecting/deselecting cycle type

The "Cycle type" screen contains up to 16 function lines. Each line is assigned a cycle type that can be selected or deselected manually using keys.
If there are more cycle types than can be displayed on the screen at the same time, the cycle types will be displayed on several pages.

5.2.7 User operating screen

The User operating screen is a freely-configurable manual operating screen that can be used for machine- or project-specific functions not assigned to any other manual operating screen.

5.3 Configuration and runtime interface

Each manual operating screen has its own text lists, parameter records and controller interface. These parameters and text lists have the same basic structure and are defined using the name of the associated screen.
The "DB_HMILITE_CONFIG" configuration DB and the "DB_HMILITE_DATA" runtime DB have their own data area for each screen; this data area is also defined by the designation of the associated screen. The name of the variable areas of each manual operating screen in the data blocks is shown in Table 5-1.

The name of the screen in WinCC	**The name of the area in "DB_HMILITE_DATA" and "DB_HMILITE_CONFIG"**
SS_11_ManualMovement	SCREEN_MANUAL
SS_12_PowerUpCondition	SCREEN_POWERUP
SS_13_Unit	SCREEN_UNITS
SS_14_NutRunner	SCREEN_NUTRUNNER
SS_15_NutRunnerGroup	SCREEN_NUTRUNNER_GROUP
SS_16_CycleTypes	SCREEN_CYCLETYPE
SS_17_UserDefined	SCREEN_USER_DEFINED

Table 5-1 Manual operating screens – structure of the configuration interface

5.4 Configuration

Changes must be performed both in WinCC and in STEP 7.
All text items are stored in text lists for WinCC. Numeric parameters are stored in the HMI Lite DB_HMILITE_CONFIG configuration data block.

5.4.1 Global configurations

The "DB_HMILITE_CONFIG.MANUAL_COMMON" data area is used for the general configuration valid for all manual operating screens.

Display time of the absolute view

The time after which the absolute designation is switched back to the symbolic designation is stored in DB_HMILITE_CONFIG:

Address:	DB_HMILITE_CONFIG.MANUAL_COMMON. ABSOLUTE_DISPLAY_TIME
Format:	TIME
Range of values:	T#1MS…T#24D20H31M23S647MS
Default setting:	T#10S (10 seconds)

This parameter is independent of the screen.

"Touch operation preselection" timeout status

The time factor that determines how long a preselection initiated by touch remains active for a function is defined in DB_HMILITE_CONFIG in the following data address:

Address:	DB_HMILITE_CONFIG. MANUAL_COMMON. TOUCH_PRESELECTION_TIME
Format:	TIME
Range of values:	T#1MS…T#24D20H31M23S647MS
Default setting:	T#2S (2 seconds)

This parameter is required only for touch panels and does not depend on the screen (also refer to the "Touch panel support" section).

5.4.2 Number of movement or function lines

The number of required movement or function lines must be defined for each manual operating screen in the associated data block variable in DB_HMILITE_CONFIG.

Address:	DB_HMILITE_CONFIG. SCREEN_AAAAAA.NUMBER_OF_ROWS where AAAAAA = name of the screen (see Table 5-1)
Format:	INT
Range of values:	1…64 – for the "setup" and "power up condition" 1…32 – for units, nut runners and nut runner groups 1…16 – for the cycle type and the OEM screen
Default setting:	The maximum number of available lines

5.4.3 Grouping of the movement lines in the manual operating panel

To assign the manual operation to function groups, the manual operating screen can be selected more than once with different movement lines on the operator panel. When the screen is selected, the first and the last page number of the pages relevant for this screen selection must be entered for the variables specified below. This is done using the WinCC "SetTag" function that is configured in addition to the "ActivateScreen" function on the key or button that selects the manual operating screen. Note that the page number of the last page must be assigned before the page number of the first page.

Address:	WinCC variables: SS_10_NumberOfFirstPageAtManualScreen (first page) SS_10_NumberOfLastPageAtManualScreen (last page)
Format:	BYTE
Range of values:	1…Max – the maximum value depends on the number of movement lines (see Section 5.4.2) and on the number of lines per page (see Section 5.7). Example For 64 movement lines and 5 lines per page, this gives 13 pages with movement lines, consequently, the value range is 1...13.

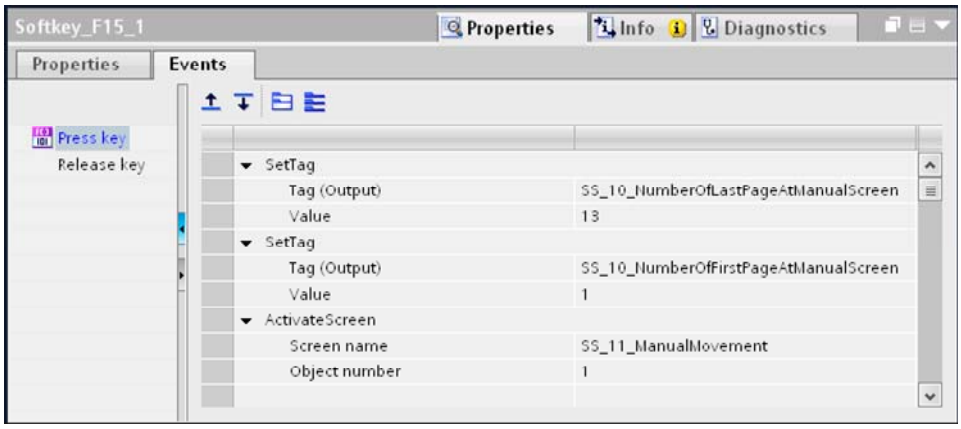


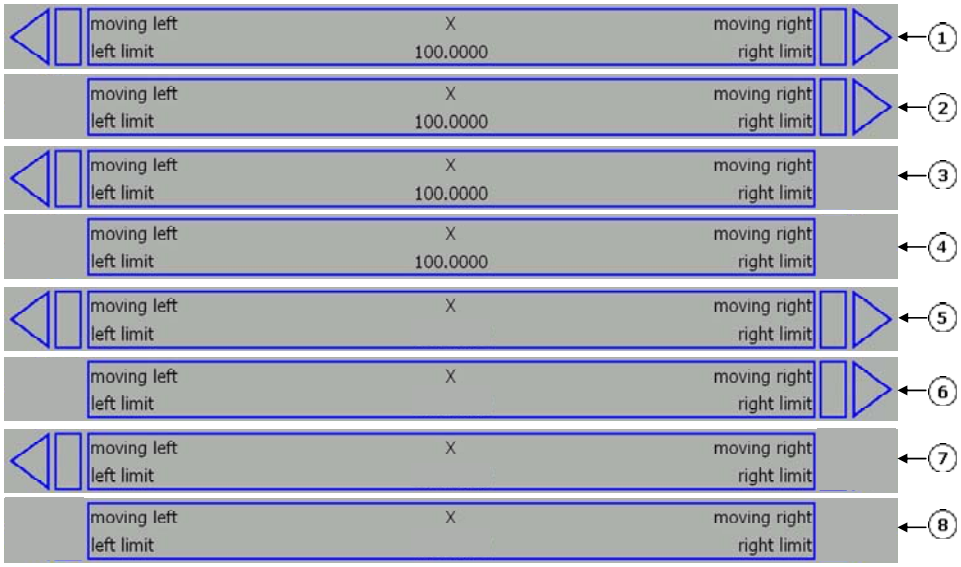
Figure 5-7 WinCC configuration of the screen selection of the manual operating screen in groups

Note

Note that the page number of the last page must be assigned before the page number of the first page.

5.4.4 Hiding elements of the function line

It is possible to hide elements from the function line (see Figure 5-8).
Depending on the associated configuration, the following elements can be hidden/displayed:
Executability and "key pressed" on the left-hand side;
Executability and "key pressed" on the right-hand side;
"Position";
All elements



(1) All elements are visible (Configuration = 0x0).
(2) The left-hand side is hidden (Configuration = 0x1).
(3) The right-hand side is hidden (Configuration = 0x2).
(4) Both sides are hidden (Configuration = 0x3).
(5) The position is hidden (Configuration = 0x4).
(6) Position and left-hand side are hidden (Configuration = 0x5).
(7) Position and right-hand side are hidden (Configuration = 0x6).
(8) Position, left- and right-hand side are hidden (Configuration = 0x7).
(9) All elements are hidden (Configuration = 0xF).

Figure 5-8 Manual operating screen – hiding screen elements

The individual function lines are configured at the following address in the DB_HMILITE_CONFIG as described above:

Address:	DB_HMILITE_CONFIG.SCREEN_AAAAAA.ROW_XX where AAAAAA = name of the screen (see Table 5-1) and XX is the number of the associated function line
Format:	BYTE
Range of values:	See Figure 5-9 and Figure 5-2
Default setting:	B#16#00

As shown in Figure 5-9, two configurations (configuration 1 and configuration 2) are possible for each movement/function.

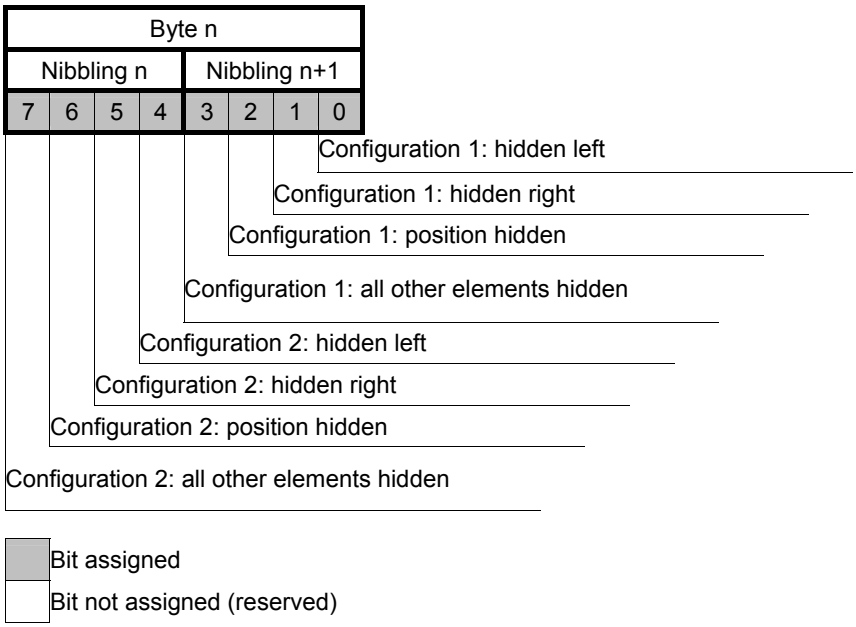


Figure 5-9 Manual operating screen – structure of the configuration interface

Only one configuration can be active for all movements or functions at any one time. The associated active configuration (configuration 1 or 2) can be selected dynamically using the "SELECT_CONFIG" input parameter for the "FC_HMILITE_MANUAL" function.
The dynamic changing of the configuration settings allows movement or function elements to be displayed or hidden depending on the associated machine status (e.g. machine in manual operation). Typical examples are:
Hide the "Executability" and "Key pressed" elements in automatic operation
manual operation ⇨ configuration 1 ⇨BIN 0000, HEX 0
automatic operation ⇨ configuration 2 ⇨BIN 0011, HEX 3
parameter value: BIN 0011 0000 = HEX 03 = B#16#30
Hide the "Position" display in automatic operation
manual operation ⇨ configuration 1 ⇨BIN 0000, HEX 0
automatic operation ⇨ configuration 2 ⇨BIN 0100, HEX 4
parameter value: BIN 0100 0000 = HEX 40 = B#16#40

Table 5-2 shows all possible parameter values for the various configurations.

All others	Item	Right-hand side	Left-hand side:	Value		
				BIN	DEC	HEX
				0000	0	0x0
			yes	0001	1	0x1
		yes		0010	2	0x2
		yes	yes	0011	3	0x3
	yes			0100	4	0x4
	yes		yes	0101	5	0x5
	yes	yes		0110	6	0x6
	yes	yes	yes	0111	7	0x7
yes	yes	yes	yes	1111	15	0xF

Table 5-2 Manual operating screens – values of the configuration interfaces

Example configurations

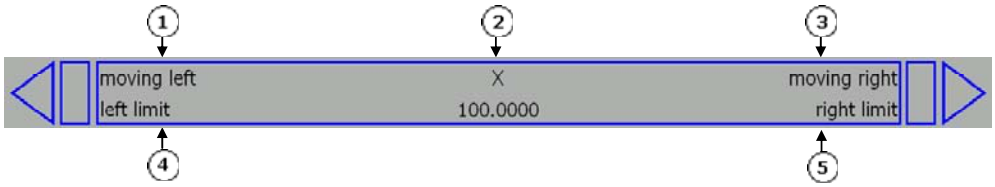
Several configuration examples follow:
The "Position" element is hidden for both configuration settings:
all types of machine elements (e.g. pumps, valves) that do not supply any confirmation of the position.
The "Executable" and "Key pressed" elements are hidden for both configuration settings: Machine elements that are not controlled from the operator panel; only the status needs to be displayed here (e.g. the "on/off" state controlled by the pushbutton).
The "Executable" and "Key pressed" elements are hidden for one configuration setting: Machine elements that can be controlled only in manual operation (e.g. machine axis); only the status of these elements (e.g. "axis moves left" ⇨ "execution" and "axis has reached the left-hand limit switch" ⇨ "end state") is displayed in automatic operation.
All elements are hidden for both configuration settings:
if this setting is made, a blank line results so that the movement or function groups (e.g. axis – blank line – clamping – blank line – lubrication) can be separated from each other.

Note

HMI Lite does not interlock the output signals with the "hidden" configuration settings. This means, even when the "Executable" and "Key pressed" elements are configured as hidden, the output signals will still be initiated by pressing the keys to the left or right of the movement or function or by touching the buttons. The machine-specific control program must realize any required interlock functionality.

5.4.5 Display text

All text items displayed in the manual operating screens are configured in the WinCC text lists. Each screen has its own text list, where the text can be specified for each element. The text lists have the structure shown in Figure 5-10.



(1) Left confirmation
(2) Name
(3) Right confirmation
(4) Left final state
(5) Right final state

Figure 5-10 Manual operating screens – text lists

All text lists have the same structure (see Table 5-3).

Text list		**SO_11_Manual** **SO_12_PowerUp** **SO_13_Unit** **SO_14_Nutrunner** **SO_15_NutrunnerGroup** **SO_16_CycleType** **SO_17_UserDefined**
Display Format		Text Decimal
Value	10	Line #1 - function name – symbolic
Value	11	Line #1 - function name – absolute
Value	12	Line #1 – left confirmation – symbolic
Value	13	Line #1 – left confirmation – absolute
Value	14	Line #1 – left final state – symbolic
Value	15	Line #1 – left final state – absolute
Value	16	Line #1 – right confirmation – symbolic
Value	17	Line #1 – right confirmation – absolute
Value	18	Line #1 – right final state – symbolic
Value	19	Line #1 – right final state – absolute
Value	20	Line #2 - function name – symbolic
Value	21	Line #2 - function name – absolute
	…	

Table 5-3 Manual operating screens – structure of the text lists

Each screen element is always assigned two text list positions:
The first position contains the text for the symbolic representation.
The second position specifies the text for the absolute view.

Example

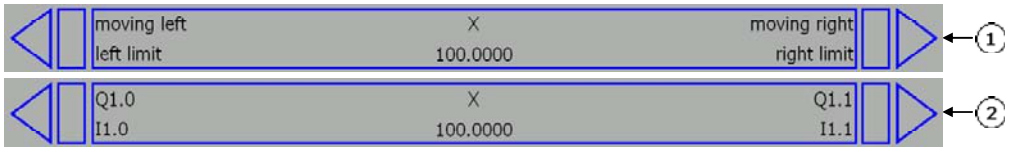
The following examples show all required steps for configuring the display text for a movement to be displayed in the third line on the first screen page.
The movement to be specified is a numeric axis that is to move left or right.
The movement is initiated by the Q0.1 and Q1.1 outputs. The movement is limited by limit switches connected to the I0.1 and I0.1 inputs. Consequently, the display text is as follows:

Text element of the movement line	Text to be displayed
"Designation" text for the symbolic view:	"X axis"
"Designation" text for the absolute view:	"X axis"
"Execution left" text for the symbolic view:	"Moves left"
"Execution left" text for the absolute view:	"Q0.1"
"Final state left" text for the symbolic view:	"Left"
"Final state left" text for the absolute view:	"I0.1"
"Execution right" text for the symbolic view:	"Moves right"
"Execution right" text for the absolute view:	"Q1.1"
"Final state right" text for the symbolic view:	"Right"
"Final state right" text for the absolute view:	"I1.1"

The following tables show all required positions of the text lists based on the above assignment:

Text list		**SO_11_Manual**
Value	30	X - Axis
Value	31	X - Axis
Value	32	Moving Left
Value	33	Q0.1
Value	34	Left
Value	35	I0.1
Value	36	Moving Right
Value	37	Q1.1
Value	38	Right
Value	39	I1.1

The specified movement is displayed as follows:

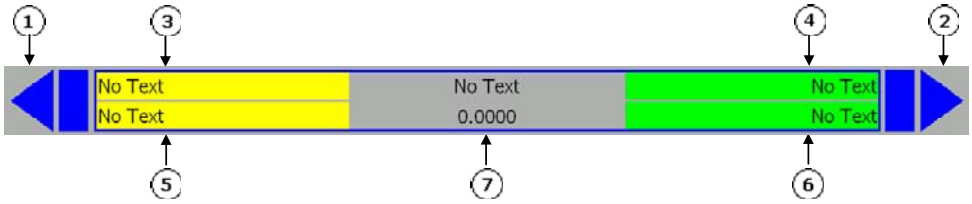


(1) Symbolic view
(2) Absolute view

Figure 5-11 Manual operating screens – example for the configuration of a text

5.5 Runtime interface

Color changes show the details of the binary state of a movement or function (see Figure 5-12). Only the "Position" element shows a numeric position value.



(1) Executable (interlock), left-hand side
(2) Executable (interlock), right-hand side
(3) "Will be performed" / "Moving" confirmation, left-hand side
(4) "Will be performed" / "Moving" confirmation, right-hand side
(5) Final status / end position, left-hand side
(6) Final status / end position, right-hand side
(7) Item

Figure 5-12 Manual operating screens – dynamic movement elements

5.5.1 Interface for information about the binary state

The data addresses in the DB_HMILITE_DATA data block control the details concerning the binary state of a movement or function.

Address:	"DB_HMILITE_DATA".SCREEN_AAAAAA.ROW[XX] where AAAAAA = name of the screen (see Table 5-1) and XX is the number of the associated function
Format:	BYTE
Range of values:	See Figure 5-13 and Figure 5-14
Default setting:	---

Each grouping element represents a movement or function.

Figure 5-13 describes the structure of the interface for the function byte.

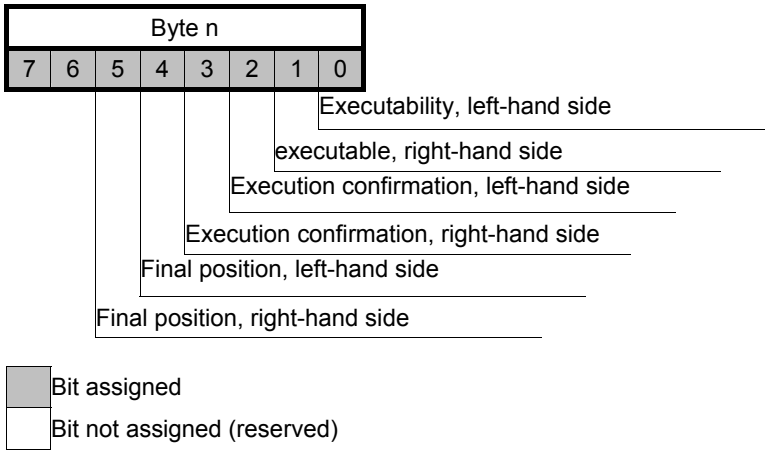


Figure 5-13 Manual operating screens – structure of the runtime interface

Bits 0…5 control the display of the information concerning the binary status (the function for bits 6 ... 7 is described in Section 8.6).

! **Important**

Bits 6 and 7 of the runtime data interface are used as control signals (operator panel ⇨ controller). This means the bits that supply information about the status must be addressed individually. If all status information was written concurrently with a single byte transfer command, the control signals would be overwritten and falsified.

Guidelines

The information items that provide the binary status are not mutually interlocked so that a real representation of the input and output signals is produced.
The following guidelines, however, provide a general statement of how the information items that provide the binary status can be used in practice:
The two "Execution" displays should never be active concurrently for a single movement. Otherwise this would provide the impression that the movement would be performed at the same time in both directions.
The two "Final status" displays should never be active concurrently for a single movement. This would provide the impression that the movement had reached both end positions (at opposite directions) at the same time.
The two "Executable" and "Final status" displays should never be active concurrently for a single movement. Otherwise this would provide the impression that the movement is executable although the final position has already been reached.
The "Execution" and "Final status" displays should never be active concurrently for a single movement. This would indicate that a movement or function is currently active although the final position has already been reached.

5.5.2 Display the actual position

In contrast to the interface for the binary status, the "Position" interface does not have its own data address for the individual movements or functions.
The following data interface is shared in the "SS_11_ManualMovement" screen:

Address:	DB_HMILITE_DATA.MANUAL_COMMON. POSITION[1] … POSITION[8]
Format:	REAL
Range of values:	Maximum 18 digits are displayed (4 decimal places)
Default setting:	---

The machine-specific program must copy the movement-specific position value into the variable for the position display.

Example

A position value should be displayed for the manual movement no. 3 (display in the "SS_11_ManualMovement" screen, page 1, line 3).
Consequently, the machine-specific program must implement the following logic:
IF (active screen == "SS_11_ManualMovement" screen) AND
IF (current page == 1), THEN
DB_HMILITE_DATA.MANUAL_COMMON.POSITION[3] = value

The selected screen and the active page can be determined using the following data addresses in the DB_HMILITE_DATA data block:

Selected screen

Address:	DB_HMILITE_DATA. GLOBAL.SCREEN_ID
Format:	WORD
Range of values:	W#16#0000 … W#16#FFFF (1…65535) for the idenitification of the screen, see Table 5-4
Default setting:	---

Current page

Address:	DB_HMILITE_DATA. MANUAL_COMMON.CURRENT_PAGE
Format:	BYTE
Range of values:	B#16#01…B#16#13 (1…13)
Default setting:	---

First and last visible line

Address:	DB_HMILITE_DATA.MANUAL_COMMON. ROW_VISIBLE_FIRST DB_HMILITE_DATA.MANUAL_COMMON. ROW_VISIBLE_LAST
Format:	WORD
Range of values:	W#16#0001…W#16#0040 (1…64)
Default setting:	---

The "first and last line" details can be used as an alternative method to determine whether the movement is currently being displayed.

! Important

The following DB_HMILITE_DATA data addresses:
GLOBAL.SCREEN_ID
MANUAL_COMMON.CURRENT_PAGE
MANUAL_COMMON.ROW_VISIBLE_FIRST
MANUAL_COMMON.ROW_VISIBLE_LAST
contain internal data for HMI Lite.
Like all other addresses, these variables should only be used read-only.

5.6 Control interface

A movement or function can be initiated using one of the following operator actions:
with the keys indicated by the corresponding triangle icon;
by touching the appropriate button for the corresponding movement.
HMI Lite provides two different interfaces that the machine-specific program can use to evaluate these operator commands.
The "job mailbox" is used as data interface to send jobs from the operator panel to the controller. A job to be performed by the control program is then initiated with an operator input. The "job mailbox" is used by all HMI Lite screens.
The other interface is screen-specific and, in contrast to the "job mailbox", uses binary signals.
Either the "job mailbox" or the "binary control interface" can be used to initiate a movement or function.

5.6.1 Job mailbox

The data addresses of the "job mailbox" belong to the DB_HMILITE_DATA.GLOBAL and defined as follows:

Address:	DB_HMILITE_DATA. GLOBAL.JOB.NUMBER GLOBAL.JOB.PARAMETER_1 GLOBAL.JOB.PARAMETER_2 GLOBAL.JOB.PARAMETER_3
Format:	WORD
Range of values:	W#16#0000…W#16#FFFF
Default setting:	---

When the operator panel initiates a movement or function (for example, an operator presses a key at the left or right of the movement), the following information will be displayed in the "job mailbox":

Job number:	Screen identification code, e.g. W#16#0A01 for the "SS_11_ManualMovement" screen (see Table 5-4)
Parameter 1:	Number of the movement/function (e.g. W#16#0001 for the first movement)
Parameter 2:	Direction of motion W#16#0001: "right" direction (bit 0) W#16#0002: "left" direction (bit 1)
Parameter 3:	Reserved for internal use

The code for identifying the screen ("job number" parameter in the job mailbox) for the manual operating screens is described in Table 5-4:

Screen	Identification code of the associated screen
SS_11_ManualMovement	W#16#0A01
SS_12_PowerUpCondition	W#16#0A02
SS_13_Unit	W#16#0A03
SS_14_NutRunner	W#16#0A04
SS_15_NutRunnerGroup	W#16#0A05
SS_16_CycleTypes	W#16#0A06
SS_17_UserDefined	W#16#0A07

Table 5-4 Operating screens - code for identifying the screen in the "job mailbox"

Example

The "SS_11_ManualMovement" screen is active and displays the first screen page. When the operator presses the left key that shows the triangle of the second movement line (function number 2), the following data will be displayed in the "job mailbox":

Job number: W#16#0A01 ⇨ "SS_11_ManualMovement" screen

Parameter 1: W#16#0002 ⇨ "Second movement line" function

Parameter 2: W#16#0001 ⇨ "Left" direction

When the operator releases the key, the values for parameter 1 and parameter 2 will be cleared (value W#16#0000).

! Important

The "job number" will not be cleared when the operator releases a key used to initiate a movement.
The "job number" will be set when one of the operating screens becomes active.

The machine-specific user program must analyze the "job mailbox" data and initiate the required commands for performing the movement or function.

5.6.2 Binary control interface

The "binary control interface" is a interface that uses binary signals. Each movement or function is assigned two binary signals that represent a possible direction of the associated movement or function.

Address:	DB_HMILITE_DATA.SCREEN_AAAAAA.ROW[XX] where AAAAAA = name of the screen (see Table 5-1) and XX is the number of the associated function
Format:	BYTE
Range of values:	See Figure 5-13 and Figure 5-14
Default setting:	---

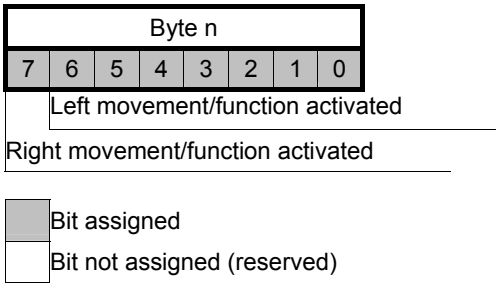


Figure 5-14 Manual operating screens – structure of the control interface

When a movement or function is initiated from the operator panel (for example, when the operator presses a key assigned to a function line), the control bits will be set; the control bit will be reset when the function key is released.

Example

A manual operating screen is active and displays the first screen page.
When the operator presses the left key that shows the triangle of the second movement line (function number 2), bit 6 for DB_HMILITE_DATA.SCREEN_MANUAL.ROW[2] will be set.
The bit will be reset when the operator releases the key.

5.7 FC_HMILITE_MANUAL

The FC_HMILITE_MANUAL function provides the following functionality:
Scroll in the manual operating screens when more movements/functions have been specified than can be displayed on the screen.
Switch between the symbolic and the absolute representation.
Switch between the first and the second configuration of the movement or function line.
Representation of the key signals on the control interfaces.
Monitor the connection between the operator panel and the controller.
Interlock the signals for the key-operated panel or the interfaces of the touch operated panels or the direct keys.

FC_HMILITE_MANUAL must be called cyclically.

FC_HMILITE_MANUAL call interface

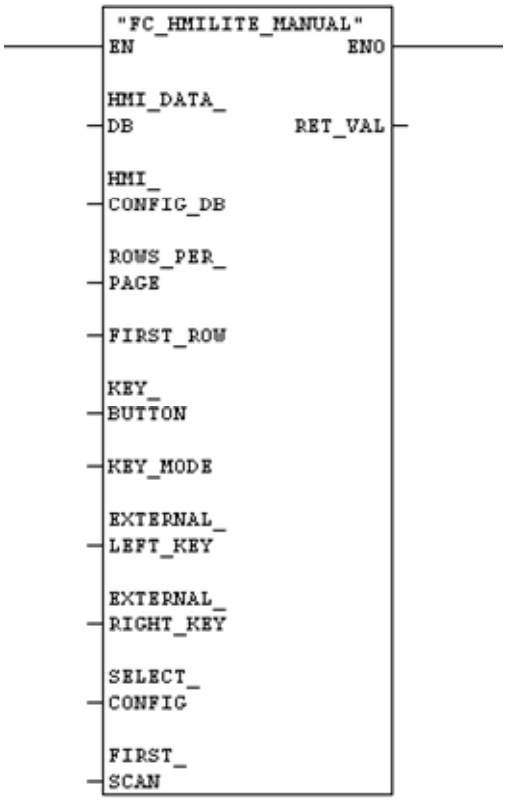


Figure 5-15 FC_HMILITE_MANUAL – interface for calling the function

FC_HMILITE_MANUAL parameters

Name	Type	Default	Example	Description
HMI_DATA_DB	Int	67	67	The number of the HMI runtime data block.
HMI_CONFIG_DB	Int	68	68	The number of the HMI configuration data block.
ROWS_PER_PAGE	Int	---	B#16#5	The number of function lines that can be displayed on the screen at the same time. Three lines for the 6-inch operator panel with header. Five lines for the 10-inch operator panel with header.
FIRST_ROW	Int	2	2	The function keys located at the side to be used for the first movement line. 1 = first movement will be performed by F1 and F2; optional for operation without header. 2 = first movement will be performed by F3 and F4; optional for operation without header.
KEY_BUTTON	Word	--	IW 5	Input word of the PROFIBUS DP direct keys. Assignment: Bit 0: line 5, left key Bit 1: line 5, right key Bit 2: line 6, left key Bit 3: line 6, right key Bit4-7: Reserve Bit 8: line 1, left key Bit 9: line 1, right key Bit 10: line 2, left key Bit 11: line 2, right key Bit 12: line 3, left key Bit 13: line 3, right key Bit 14: line 4, left key Bit 15: line 4, right key If no direct keys are used, the value W#16#FFFF must be specified.
KEY_MODE	Int	---	0	Mode for executing the operation. 0: Function active while a key remains pressed. 1: Function active while a button remains pressed. 2: Function active after the button has been clicked twice. 3: Function active while an external key remains pressed; selection of the function by the function keys located at the side. 4: Function active while an external key remains pressed; selection of the function by the function buttons.
EXTERNAL_LEFT_ KEY	Bool	---	---	Only relevant in the 3 and 4 key modes. Performs the left command of the selected function.

Name	Type	Default	Example	Description
EXTERNAL_RIGHT_ KEY	Bool	---	---	Only relevant in the 3 and 4 key modes. Performs the right command of the selected function.
SELECT_CONFIG	Bool	---	M5.3	Switch between the two configurations for hiding of individual elements of the function line.
FIRST_SCAN	Bool	---	---	Restart flag, 1 – signal for the first cycle after CPU startup
RET_VAL	Word	---	MW2	Error message: 0000: No error 7000: No operating screen selected, block will not be processed currently 7002: No sign-of-life from the OP, operation is disabled 8091: Invalid screen ID DB_HMILITE_DATA.GLOBAL.BILD_ID is invalid 8092: Invalid key mode TASTEN_MODUS < 0 or > 4

Table 5-5 Description of the FC_HMILITE_MANUAL parameters

Note

An additional safety function must be programmed for the parameterization of key mode 3 and 4 (use of external keys) for performing movements.
The program must set the DBX296.0 bit in the DB67 (DB_HMILITE_DATA) when the selection of a movement is to be disabled. For example, this can be implemented by activating a key switch.
The DB67.DBX296.1 bit causes the program code to reset the selection and re-release the selection of other movements.

5.8 FB_HMILITE_S7G_MANUAL

The FB_HMILITE_S7G_MANUAL function provides the following functionality:
Display the executability of the movements displayed on the panel.
Activate a configured S7 Graph step for the selection of a movement by pressing a key on the operating screen.
FB_HMILITE_S7G_MANUAL must be called cyclically.

FB_HMILITE_S7G_MANUALcall interface

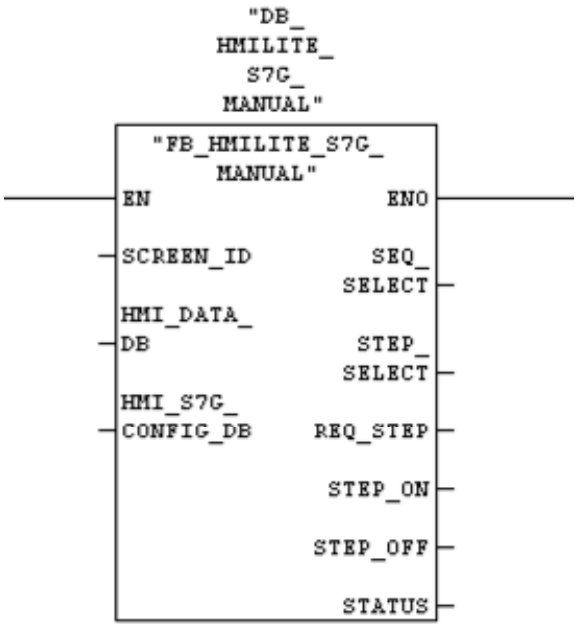


Figure 5-16 FB_HMILITE_S7G_MANUAL – interface for calling the function

FB_HMILITE_S7G_MANUAL parameters

Name	Type	Default	Example	Description
SCREEN_ID	WORD	W#16#A01	W#16#A01	Screen ID of the operating screen for which the FB call is to be valid
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block (DB67)
HMI_S7G_ CONFIG_DB	INT	106	106	The number of the S7GRAPH configuration data block (DB106)
SEQ_SELECT	INT	---	MW180	Output the sequencer DB number of the selected movement
STEP_SELECT	INT	---	MW182	Output the step number of the selected movement
REQ_STEP	BOOL	---	M184.0	Step activation/deactivation running
STEP_ON	BOOL	---	M184.1	Switch on step (activate)
STEP_OFF	BOOL	---	M184.2	Switch off step (deactivate)
STATUS	WORD	---	MW186	Fault or status message of the selected movement (see following tables)

Table 5-6 Description of the FB_HMILITE_S7G_MANUAL parameters

Status information of the Status parameter

Value (W#16# ….)	Description	S7-Graph parameter
0001	Initialize step	
0002	Select step number	S_SEL
0003	Step number correct	S_NO = S_SEL
0004	Activate step	S_ON = True
0005	Step active	S_ACTIVE = True > S_ON = False
0006	Deactivate sequencer	OFF_SQ = True
0007	Sequencer off	OFF_SQ = False

Fault information of the Status parameter

Value (W#16# ….)	Explanation
8001	No DB number entered in "HMILITE_S7G_CONFIG_DB"
8002	DB does not exist
8003	DB too short
8004	No S7-Graph DB
8005	S7-Graph version not V4.0 .. V6.9
8006	S7-Graph FB version > V6.0
8007	S7-Graph FB parameter not "Standard" or "Maximum"
8008	Step number not present
8011	Sequencer not in manual operation (MAN_ON = False)

Operation of the FB

If an operating screen is selected on the operator panel, the FB uses the SCREEN_ID to check whether the operating screen is valid for calling the FB.
If the call is valid, it copies the parameterization from the HMILITE_S7G_CONFIG_DB (DB106) for the movements displayed in the screen into its instance DB. It also checks the sequencer DB and the presence of the specified step number in the sequencer. If it detects a fault, the error number for the corresponding parameterization will be entered in the instance DB. The error number corresponds to the fault information for the Status parameter.
If the parameterization is correct, the block assigns the executability (interlock) of the movements in the HMI_DATA_DB (DB67) so that it is displayed on the screen. The triangle on the right- and left-hand edge of the movement line (refer to the description of the operating screens) shows on the screen the executability.
If a movement is initiated by pressing a key (button), the FB activates the parameterized step in the corresponding sequencer. The FB deactivates the step when the key (button) is released. This all assumes the correct parameterization.

Requirements

The sequencer must be in the manual operating mode.
The activation of a step is possible only in the manual operating mode (MAN_ON = TRUE). The operating mode is checked before the step is activated. If the sequencer is not in manual operation, the step will not be activated and an error number (STATUS = W#16#8011) will be issued.
The "OFF_SQ", "S_ON" and "S_SEL" sequencer parameters must not be overwritten by the user program.
The function uses the "OFF_SQ", "S_ON" and "S_SEL" sequencer parameters directly. These parameters must not be overwritten by the user program while the step is being activated. To ensure this, the assignments of these data bits should be bypassed using the "REQ_STEP" output signal of the FB. In addition, these parameters must not be supplied directly on the sequencer FB.
If it is not possible to bypass the assignments of the sequencer parameters, they must be connected with the "SEQ_SELECT", "STEP_SELECT", "STEP_ON" and "STEP_OFF" output signals of the FB 107 so that the function is still provided.
Prior to activating a step, all other steps should be deactivated.
It is not permitted for several steps to be active concurrently in a sequential sequencer. Consequently, the sequencer FB does not permit a second step to be activated for an active step.
Only the "Standard" or "Maximum" FB parameter types may be used.
The FB_HMILITE_S7G_MANUAL (FB107) checks the setting of the FB parameters of the sequencer. If a different parameter type is selected, an error number (STATUS = W#16#8007) will be output and the processing of this sequencer terminated.
In the TIA Portal the parameter type „Extended“ is always used.
Further you must deactivate the “Maximum interface parameters” check box of the “Default settings for new blocks -> Interface” category under “Options -> Settings -> PLC programming -> GRAPH.
Caution: The setting has an effect only on new graph blocks. Blocks, created with the “Maximum interface parameters” setting, must be created newly.
To make the FB work correctly, it is not permitted to add own parameters to the sequencer.
The "Permanent processing of all interlocks in manual operation" block setting must be selected.
To ensure that the executability (interlock) of a movement is displayed correctly, the sequencer FB must update all interlocks in manual operation.

Tips and tricks

The FB_HMILITE_S7G_MANUAL (FB107) can be used for all operating screens. It must be called with different instance DBs and a unique HMILITE_S7G_CONFIG_DB (DB106) must be created for each operating screen.

The sequencer DB number and the step number are parameterized in the "HMILITE_S7G_CONFIG_DB" (DB106)

For each configured line in the operating screen, the following variables must be parameterized in the HMILITE_S7G_CONFIG_DB (DB106) data block:

Address:	HMILITE_S7G_CONFIG_DB.ROW_XX.LEFT.SQ_DB_NO (where XX = the number of the line of the operating screen)
Format:	INT
Range of values:	The data block number of the sequencer in which the corresponding line (XX) of the step is to be activated when the left key (button) is pressed.
Default setting:	0

Address:	HMILITE_S7G_CONFIG_DB.ROW_XX.LEFT.STEP_NO (where XX = the number of the line of the operating screen)
Format:	INT
Range of values:	The step number of the step in which the corresponding line (XX) of the step is to be activated when the left key (button) is pressed.
Default setting:	0

Address:	HMILITE_S7G_CONFIG_DB. ROW_XX.RIGHT.SQ_DB_NO (where XX = the number of the line of the operating screen)
Format:	INT
Range of values:	The data block number of the sequencer in which the corresponding line (XX) of the step is to be activated when the right key (button) is pressed.
Default setting:	0

Address:	HMILITE_S7G_CONFIG_DB.ROW_XX.RIGHT.STEP_NO (where XX = the number of the line of the operating screen)
Format:	INT
Range of values:	The step number of the step in which the corresponding line (XX) of the step is to be activated when the right key (button) is pressed.
Default setting:	0

5.9 Step-by-step procedure

The following table summarizes the steps required to create a manual operating screen.
All other operating screens differ only in the listed data addresses and the WinCC text lists.

Step 6	Proceed as follows
1	Open the DB_HMILITE_CONFIG data block.
2	Specify the display time for the absolute view: MANUAL_COMMON.ABSOLUTE_DISPLAY_TIME
3	Specify the number of movements/functions for the manual operating screen: SCREEN_MANUAL.NUMBER_OF_ROWS
4	Specify which elements are to be hidden for all function lines: SCREEN_MANUAL.ROW_01 … ROW_64
5	Download the data block to device.
6	Save and close the DB_HMILITE_CONFIG data block.
7	Open the FC_HMILITE_MANAG function.
8	Call FC_HMILITE_MANUAL and set the parameters appropriately for your requirements.
10	Load all changed blocks into the controller.
11	Open the WinCC project from HMI Lite.
12	Open the SO_11_Manual text list and define for the corresponding function lines the display text for the symbolic and the absolute view.
13	Close the text list.
15	Save and compile the WinCC project, and transfer it to the operator panel.
16	To display the status of the movement/function, the corresponding signals must be assigned in the DB_HMILITE_DATA to the interface area of the operating screens.
17	The user program can use two interfaces to perform movements/functions. Binary interface: DB_HMILITE_DATA.SCREEN_MANUAL.ROW_01 … 64 Or job mailbox: DB_HMILITE_DATA.GLOBAL.JOB.NUMBER DB_HMILITE_DATA.GLOBAL.JOB.PARAMETER_1 DB_HMILITE_DATA.GLOBAL.JOB.PARAMETER_2

Table 5-7 Procedure for creating a manual operating screen

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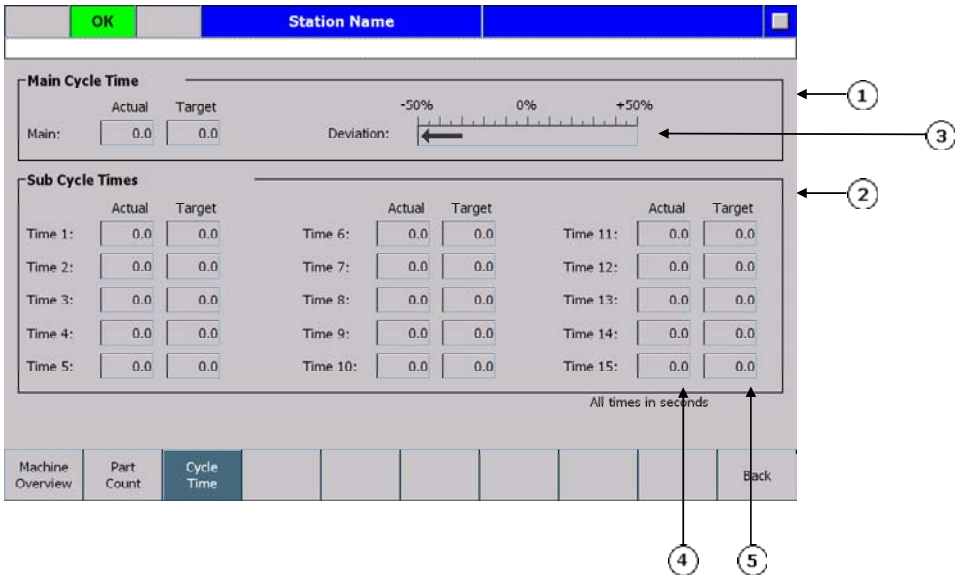
6

6 "Production Data" Screens

6.1 "Cycle times" screen

6.1.1 Layout of the screen and functionality

The "Clock times" screen displays the total clock time and the sub-clock times of the machine.



(1) "Total clock time" area
(2) "Sub-clock time" area (can optionally be hidden from the display)
(3) Deviation of the total clock time as percentage (± 50%) from the set clock time
(4) Actual clock time values
(5) Set clock time values

Figure 6-1 "Clock times" screen

Display elements

This screen is subdivided into the following two main areas:

Main clock time

Sub-clock time

The "Main clock time" area displays the values for the actual clock time and the set clock time. The deviation between the the actual clock time and the set clock time is also specified as percentage. The range of the clock time deviation is limited to ± 50%. If the deviation lies outside this range, this will be indicated by arrows at the far left- or right-hand side of the bar.

Note

The deviation is calculated using the following equation:
deviation = actual clock time / set clock time

Procedure for the clock times

The clock time must be calculated with the start and the end signal of a clock pulse or single clock pulse. This value represents the actual clock time and will be updated when it is redefined. The interruption of a clock time is possible. The evaluation of a signal (binary, change from 0 to 1) causes an interruption. The change from 1 to 0 (falling edge) causes the counting of the clock time to be continued.

Range of values

The values for the clock times are entered in 16-bit unsigned integer variables. The values are displayed in seconds with one decimal place. The displayed clock time resolution corresponds to a tenth of a second.

The maximum displayed value is 6553.5, which corresponds to 1 hour, 49 minutes, 13 seconds and 500 milliseconds.

The accuracy of the timer depends on the type of the associated controller. The documentation for the S7 CPU data provides more detailed information.

"Clock times" screen with reduced display functions

The "Single clock times" area can be hidden from the display. This function is controlled using the HIDE_SPECIFIC configuration parameter in the DB_HMILITE_CONFIG configuration data block. In this case, the complete control field with the single clock times will be hidden from the display (see Figure 6-1 Element (2)).

6.1.2 Runtime interface (FC_HMILITE_CYCLETIME)

The calculation of the clock times is realized with the FC_HMILITE _CYCLETIME (FC109) function. A total of sixteen clock times can be recorded. Each clock time acquisition can be started and stopped independent of each other clock time acquisition. The first acquisition is used for the total clock time. The other fifteen clock time acquisitions are used for the single clock times. No timers are used.

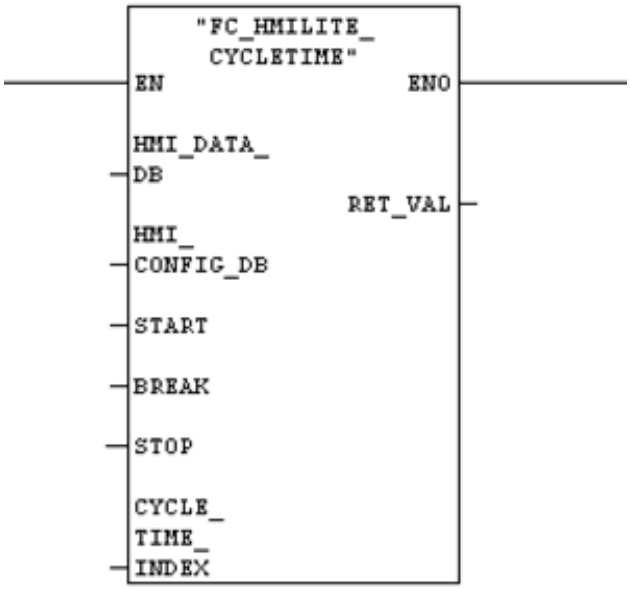


Figure 6-2 Call interface of the FC_HMILITE_CYCLETIME function

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block
HMI_CONFIG_DB	INT	68	68	The number of the HMI configuration data block
START	BOOL	---	M0.5	A positive edge starts the clock time selected by the INDEX parameter
BREAK	BOOL	---	M0.4	A positive edge interrupts the counting, a negative edge continues the clock time measurement
STOP	BOOL	---	M0.5	A positive edge stops the clock time selected by the INDEX parameter
CYCLE_TIME_ INDEX	BYTE	---	MB6	Select the clock time to be measured. Index = 0 means total clock time Index = 1 – 15 means single clock time 1 - 15
RET_VAL	WORD	---	MW2	Function return value

Table 6-1 Parameters of the FC_HMILITE_CYCLETIME (FC109) function

Note

The simultaneous measurement of different clock times is possible by calling the block several times within a cycle.

6.1.3 Configuration

DB_HMILITE_CONFIG

The area for the single clock times can be hidden by setting the following variables:

Address:	DB_HMILITE_CONFIG. SCREEN_CYCLETIMES.HIDE_SPECIFIC
Format:	BOOL
Range of values:	FALSE = single clock times will be displayed TRUE = single clock times with be hidden
Default setting:	FALSE

A set clock time can be defined for the total clock time:

Address:	DB_HMILITE_CONFIG. SCREEN_CYCLETIMES.MAIN.TARGET
Format:	BOOL
Range of values:	INT
Default setting:	1.. 65535 (0.1 seconds)

A set clock time can be defined for each single clock time:

Address:	DB_HMILITE_CONFIG. SCREEN_CYCLETIMES.SUB.TARGET_XX (where XX is the number of the corresponding single clock time: 1..15)
Format:	INT
Range of values:	1.. 65535 (seconds).
Default setting:	0

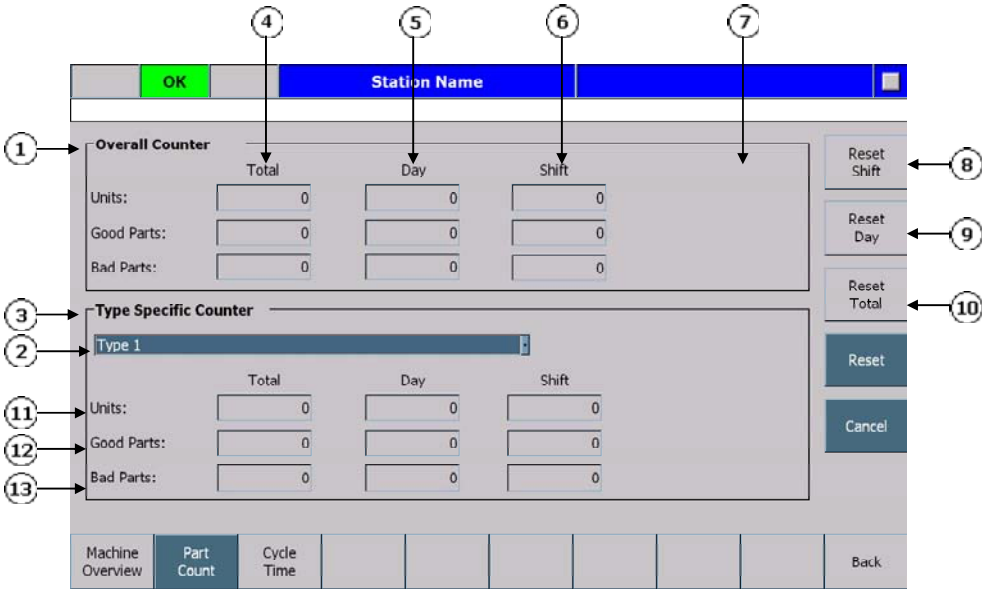
6.1.4 Step-by-step procedure

Step	Proceed as follows
1	Open the "DB_HMILITE_CONFIG" data block.
2	Set the SCREEN_CYCLETIMES.HIDE_SPECIFIC variable to the value: FALSE = when the single clock times are to be displayed FALSE = when the single clock times are to be hidden
3	Now edit the SCREEN_CYCLETIMES.MAIN.TARGET and SCREEN_CYCLETIMES.SUB.TARGET_01 to 15 variables to define the values for the set clock times.
4	Download the data block to device.
5	Save and close the DB_HMILITE_CONFIG data block.
6	Open the FC_HMILITE_ADDON (FC151) function.
7	Call FC_HMILITE_CYCLETIME (FC109) and assign the required parameters.
8	Now save and close the FC_HMILITE_ADDON (FC151) function.
9	Load all changed blocks into the controller.

6.2 "Workpiece counter" screen

6.2.1 Layout of the screen and functionality

The "Workpiece counter" screen is used to display the produced workpieces.



(1) Total workpiece counter
(2) Select the workpiece type
(3) Workpiece-related counter
(4) Total number of completed workpieces
(5) Total number of workpieces produced on this day
(6) Total number of workpieces produced during this shift
(7) Planned workpiece count during a shift
(8) Reset shift counter
(9) Reset day counter
(10) Reset total counter
(11) Total number of produced parts
(12) Number of produced parts that are correct
(13) Number of produced parts that are faulty

Figure 6-3 "Workpiece counter" screen

Display elements

This screen is subdivided into the following two main areas:

Number of total counters

Number of workpiece-related counters.

Each area contains separate values for the shift, day and total counters.

These subareas are subdivided into the following counter values:

Total workpiece counter (good and bad parts)

Workpiece counter (good parts)

Workpiece counter (bad parts)

If a setpoint is specified for the shift counter (value greater than 0), the output field for the planned workpiece number will be displayed. Otherwise the shift setpoint fields will be hidden.

The values for the type-specific workpiece counters can be selected using a selection list. A maximum of fifteen workpiece-related parts counters can be used. The text for the designaton of the workpiece must be edited by the machine manufacturer in a text list.

Procedure for counting

Depending on the machine cycle time, the user program must determine the number of produced good and bad parts.

Once these values have been determined, the counter variables in the "DB_HMILITE_DATA" data block must be updated using the following equation:

total workpieces = total workpieces old + number of produced parts

total bad parts = total bad old + number of produced bad parts

This must be performed at the same time for the shift, day and total counter of the total unit counter and the workpiece-related unit counter.

If no workpiece-related unit counters are required, only the total unit counter needs to be updated.

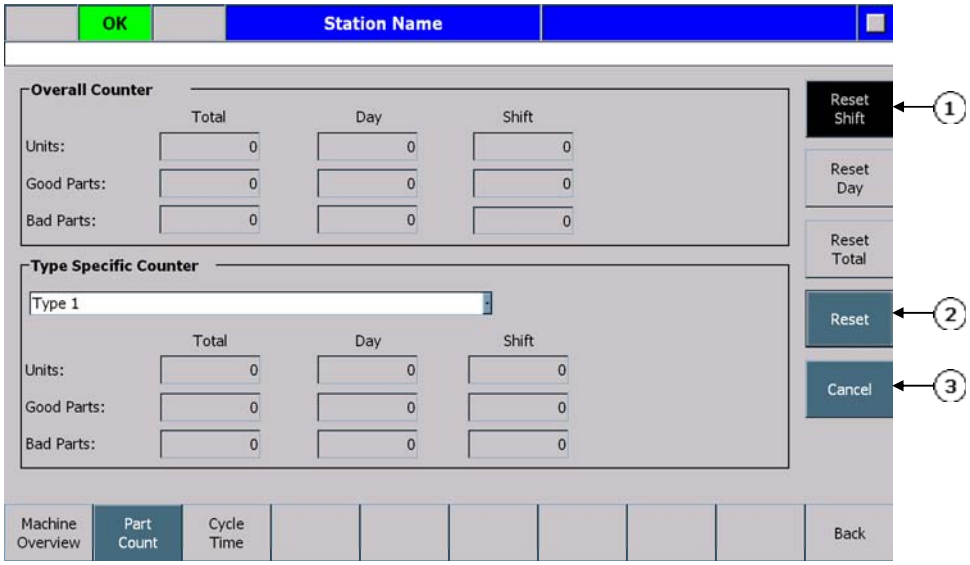
Procedure for resetting

In contrast to the procedure for counting, the procedure for resetting the counters is performed for the specific shift, day and total counters.

This means, for example, resetting the shift counter resets all shift-specific counters, the total unit counter and all workpiece-related unit counters.

The reset procedure must be initiated using the machine-specific logic. The RESET keys can also be used to initiate a manual reset. If required, the RESET keys can be hidden by setting the appropriate configuration bits in the DB_HMILITE_CONFIG.

Pressing a RESET key initiates the provided confirmation procedure.



(1) The RESET key that was pressed assumes a different color
(2) Button for confirming the RESET operation
(3) Button for canceling the RESET operation

Figure 6-4 Workpiece counter – procedure for confirming the reset

Range of values

Value ranges of the counters:

Total – sum of good/bad parts:	0 … 4.294.967.295
Total - bad parts:	0 … 65.535
Day – sum of good/bad parts:	0 … 65.535
Day - bad parts:	0 … 65.535
Shift – sum of good/bad parts:	0 … 65.535
Shift - bad parts:	0 … 65.535

The good parts counters are calculated by the operator panel.

Formula: [good parts] = [total parts] - [bad parts].

Workpiece counter screen with reduced display functions

The "Workpiece-related parts counter" area can be hidden from the display. This function is controlled using the HIDE_TYPE_SPECIFIC configuration parameter in the DB_HMILITE_CONFIG configuration data block. Hiding applies to the complete Workpiece-related parts counter (see number (3) in Figure 6-3).

Configuration parameter HIDE_TYPE_SPECIFIC has no effect in the 7" variant. Because the contents of two screens are split, reduction must be implemented by deleting the display with the single cycle times. The screen calls from screen "SS_62_PartCounterOverall" must be cleared.

6.2.2 Runtime interface (FC_HMILITE_COUNTER)

The "FC_HMILITE_COUNTER" (FC108) function uses directly the unit counter variables in the "DB_HMILITE_DATA" data block.

The user program can also access these variables (e.g. save the values for further processing or archiving before a RESET is performed).

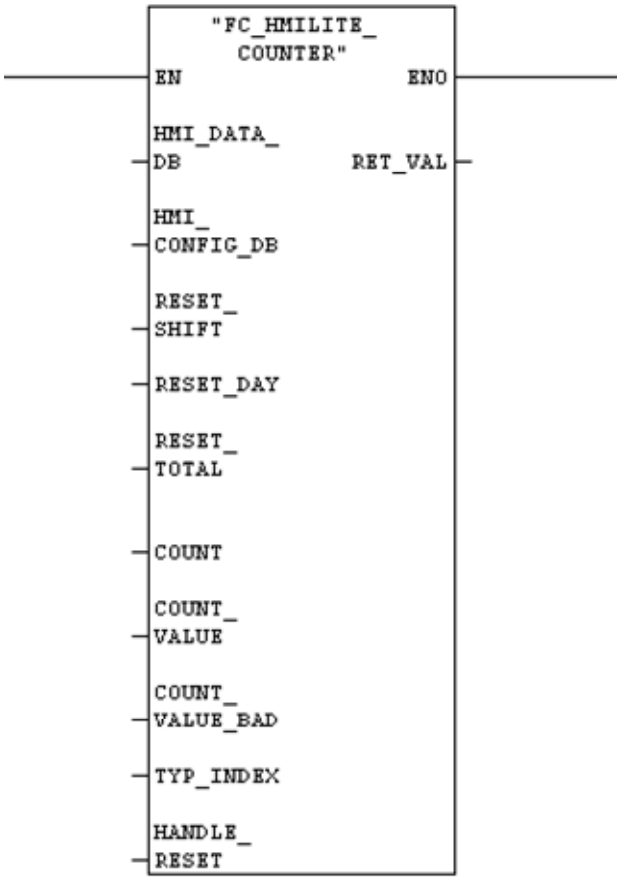


Figure 6-5 Call interface of the FC_HMILITE_COUNTER function

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block
HMI_CONFIG_DB	INT	68	68	The number of the HMI configuration data block
RESET_SHIFT	BOOL	---	M5.0	An increasing edge resets the shift counters
RESET_DAY	BOOL	---	M5.1	An increasing edge resets the day counters
RESET_TOTAL	BOOL	---	M5.2	An increasing edge resets the total counters
COUNT	BOOL	---	M5.3	An increasing edge updates the counter
COUNT_VALUE	BYTE	---	MB6	The number of the total parts to be counted (good + bad parts)
COUNT_VALUE_ BAD	BYTE		MB7	Number of bad parts to be counted
TYP_INDEX	BYTE	---	MB8	The index of the workpiece type to be counted. If value = 0, only the type-independent unit counter will be processed. Values less than 0 or greater than 15 will cause an error message to be issued
HANDLE_RESET	BOOL	---	M5.4	Release the unit counters – Reset keys and buttons in the screen (workpiece counter), the Reset function in the screen will be performed only for a 1–signal of this parameter
RET_VAL	WORD	---	MW2	Function return value 0000: no error 8001: TYP_INDEX > 15 8002: TYP_INDEX < 0

Table 6-2 Time parameters of the FC_HMILITE_COUNTER function

An increasing edge of the COUNT parameter initiates a counting action. The total and bad parts counters are incremented using the following equation:

[new counter value] = [old counter value] + [counter value].

The counter value is defined by the COUNT_VALUE (good and bad parts) and COUNT_VALUE_BAD (bad parts) parameters. The values for the "good parts" are calculated using the following equation:

[good parts value] = [total parts value] - [bad parts value].

The shift, day and total counters are incremented by the same counter value.

The INDEX parameter specifies which workpiece-related counter will be updated. Up to 15 workpiece-related counters can be selected. The workpiece-independent total counter is always updated. If a value 0 is specified for the "INDEX" parameter, only the total counter will be updated.

The "Reset counter" parameters always reset all workpiece-related counters and the total counter. For example, the RESET_SHIFT function resets all workpiece-related counters (total, good and bad parts counter) and the total shift counter (total, good and bad parts counter). If during a cycle both an increasing edge at the "RESET" parameter and at the "COUNT" parameter is detected, the counter function and then the RESET function will be performed. Within a cycle, it is possible to reset the total counter, the day counter and shift counter. Using the controller-internal RESET functions and the reset functions of the user interface do not preclude each other (e.g. the RESET_SHIFT parameter can also be used when the HANDLE_RESET parameter specifies the 1–signal at the same time).

Note

The different workpieces can be counted within a cycle by calling the function several times.

6.2.3 Configuration

DB_HMILITE_CONFIG

The area for the workpiece type can be hidden by setting the following variables:

Address:	DB_HMILITE_CONFIG. SCREEN_COUNTER.HIDE_TYPE_SPECIFIC
Format:	BOOL
Range of values:	FALSE = workpiece type-dependent area will be displayed FALSE = workpiece type-dependent area will be hidden
Default setting:	FALSE

The RESET keys can be displayed and deactivated by setting the following variables. For example for the case when the reset is to be performed automatically by the user program:

Address:	DB_HMILITE_CONFIG. SCREEN_COUNTER.HIDE_RESET_SHIFT DB_HMILITE_CONFIG. SCREEN_COUNTER. HIDE_RESET_DAY DB_HMILITE_CONFIG. SCREEN_COUNTER. HIDE_RESET_TOTAL
Format:	BOOL
Range of values:	FALSE = the corresponding RESET key is active and displayed. FALSE = the corresponding RESET key is not active and hidden.
Default setting:	FALSE

The number of parts to be produced in the current shift (planned) must be configured in DB_HMILITE_CONFIG. The complete planned count (in accordance with the sum of the setpoints for all parts) and the workpiece-related planned count can be specified for each individual workpiece type. The addresses have the following form:

Address:	DB_HMILITE_CONFIG. SCREEN_COUNTER.OVERALL.SHIFT_TARGET
Format:	INT
Range of values:	0 .. 65535
Default setting:	0

Address:	DB_HMILITE_CONFIG. SCREEN_COUNTER.TYPE_SPECIFIC.SHIFT_ TARGET_XX (where XX is the number of the corresponding workpiece type: 1..15)
Format:	INT
Range of values:	0 .. 65535
Default setting:	0

It can be specified in the following variables how long the buttons for confirmation and cancel of the Reset function are to be visible and active.

Address:	DB_HMILITE_CONFIG. SCREEN_COUNTER.TIME_VALUE_HIDE_RESET
Format:	TIME
Range of values:	T#1MS…T#24D20H31M23S647MS
Default setting:	T#5S (5s)

The RESET function will be cancelled after the specified time has expired.

Configuring the text list in WinCC

This SS_50_PartType text list contains the designations of the workpiece types to be displayed in the selection window.

Text list		**SO_62_PartCounterType**
Display		Text
Format		Decimal
Value	1	Workpiece 1 designation
Value	2	Workpiece 2 designation
…	…	…
Value	15	Workpiece 15 designation

Table 6-3 WinCC text list SS_62_PartCounterType

6.2.4 Step-by-step procedure

Step	Proceed as follows
1	Open the "DB_HMILITE_CONFIG" data block.
2	Set the SCREEN_COUNTER.HIDE_TYPE_SPECIFIC variable to the value: FALSE = when the type-specific counter is to be displayed TRUE = when the type-specific counter is to be hidden
3	Specify the shift setpoint by editing the variables for OVERALL.SHIFT_TARGET (total counter) and TYPE_SPECIFIC.SHIFT_TARGET_01 to TYPE_SPECIFIC.SHIFT_TARGET_15
4	Download the data block to the device.
5	Save and close the DB_HMILITE_CONFIG data block.
6	Open the FC_HMILITE_ADDON (FC151) function.
7	Call FC_HMILITE_COUNTER (FC108) and assign the required parameters.
8	Now save and close the FC_HMILITE_ADDON (FC151) function.
9	Load all changed blocks into the controller.
10	Open the WinCC Project in TIA Portal.
11	Edit the SO_62_PartCounterType text list and enter the meaningful designations for the workpiece types at the appropriate positions. Delete all text entries that are not used.
12	Save and compile the WinCC project, and transfer it to the operator panel.
13	Create a machine-specific logic for the counting of the workpieces by dynamically changing the parameter of the "FC_HMILITE_COUNTER" (FC108) function: COUNT_VALUE: Total count of the parts to be produced per pulse (good and bad parts) COUNT_VALUE_BAD: Bad parts to be counted TYP_INDEX: Index of the workpiece type to be counted; if only total counter, then "0" COUNT: Counting pulse (increasing edge 0⇨1).
14	Create, if required or necessary, a machine-specific logic for resetting the unit counter. The HMI screen provides the possibility for the manual reset of the workpiece counter.

■

7

7 Diagnostics

7.1 "Messages" screen and "Message archive" screen

7.1.1 Layout of the screen and functionality

The alarm screens display the alarm messages, general messages and system messages in tabular form. The "messages" screen displays the messages and alarms currently pending; the "message archive" screen displays the contents of the alarm buffer.

Alarm events are saved to an internal, non-volatile buffer. The size of this alarm buffer depends on the HMI device type.

The screen structure of the two "messages" and "message archive" screen forms is identical.

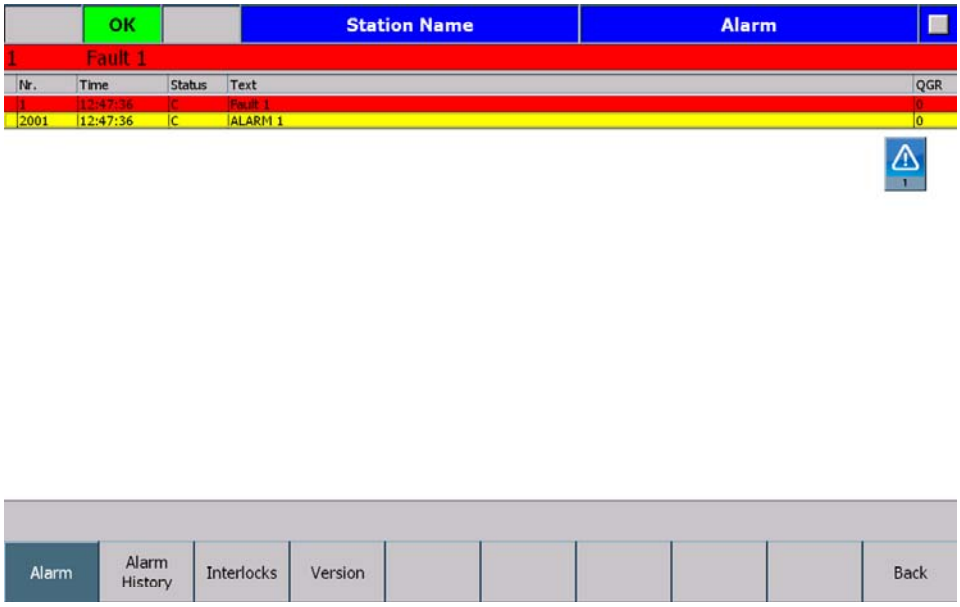


Figure 7-1 "Alarms and messages" screen

The following information is displayed in tabular form:

- whether the message can be diagnosed (yes = * / no = no entry);
- the message number;
- the time stamp of the message;
- the message status (K: arrived, G: sent, Q: acknowledged);
- the message text;
- the acknowledge group.

7.1.2 Runtime interface

The "interface for alarms and messages" data block is defined by the WinCC "SO_00_Alarm" and "SO_00_Message" variables for fault messages and operational messages, respectively.

7.1.3 Configuration

The alarm or message text is configured in the area of the message display object. For further information, refer to the documentation for WinCC.

Settings of the alarm archive

The message display of the alarm view displays selected message events from the alarm buffer. The configuration specifies which events are displayed. The alarm window shows the alarm events selected in the properties dialog.

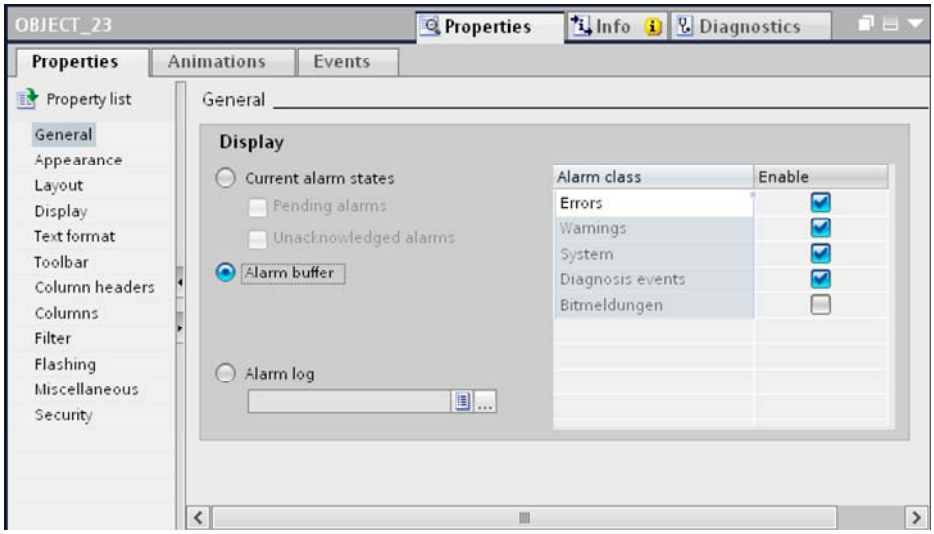
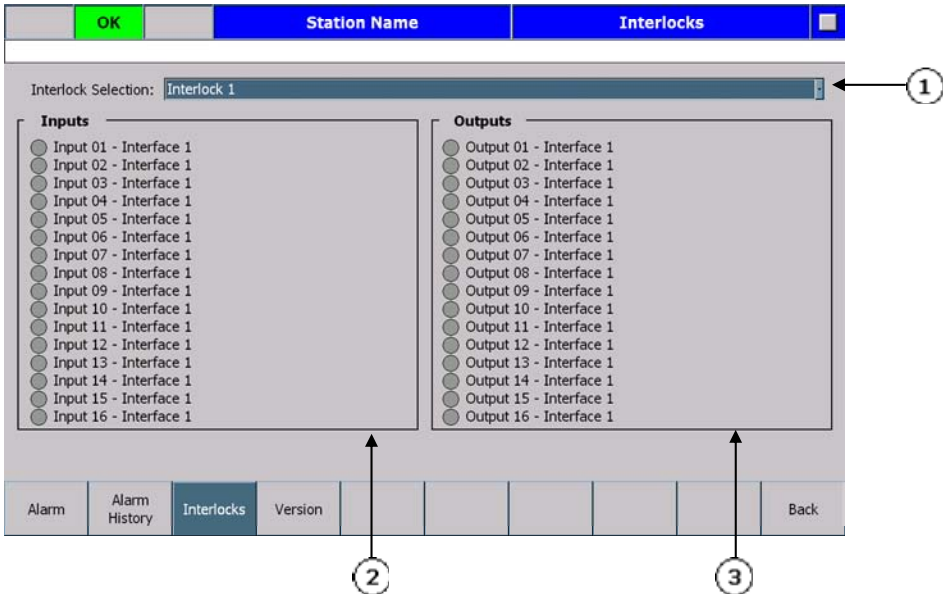


Figure 7-2 Setting for the alarm display object in the "Alarm archive" screen

7.2 "Interface" screen

7.2.1 Layout of the screen

The "Interface" screen can be used to display for diagnostic purposes the signals transferred between the controller and the external devices. Up to sixteen diagnostic interfaces with freely configurable names can be created. Each diagnostic interface can display 16 inputs and 16 outputs. The interface can be selected in a selection window.



(1) Window for selecting the interface
(2) Display of the states of the associated inputs
(3) Display of the states of the associated outputs

Figure 7-3 "Interface" screen

7.2.2 Runtime interface

The runtime interface for the "Interface" screen consists of three variables. The first, DB_HMILITE_DATA.SCREEN_INTERLOCK.SELECTION, represents the current interface selected from the selection window.

Address:	DB_HMILITE_DATA. SCREEN_INTERLOCK.SELECTION
Format:	INT
Range of values:	1..16
Default setting:	1

The inputs/outputs to be visualized must then be copied to the following addresses depending on the currently selected interface:

Address:	DB_HMILITE_DATA SCREEN_INTERLOCK.SIGNALS.INPUT
Format:	WORD
Range of values:	The status of each bit is displayed in the screen by the associated LED element.
Default setting:	-

Address:	DB_HMILITE_DATA SCREEN_INTERLOCK.SIGNALS.OUTPUT
Format:	WORD
Range of values:	The status of each bit is displayed in the screen by the associated LED element.
Default setting:	-

7.2.3 Configuration

Up to sixteen interface descriptions can be defined and selected from a selection window. A WinCC text list can be used to specify a name for each of these interfaces:

Text list		**SO_67_InterlocksSelection**
Display Format		Text Decimal
Value	01	Name for interface no. 1
Value	02	Name for interface no. 2
		…
Value	16	Name for interface no. 16

Table 7-1 Selection window for the interlocks – screen caption of the text list

The following text lists can be used to specify a designation for each input and output of all the interfaces:

Text list		**SO_67_InterlocksInput** **SO_67_InterlocksOutput**
Display Format		Text Decimal
Value	01	Name for input/output #1 of interface #1
Value	02	Name for input/output #2 of interface #1
		…
Value	16	Name for input/output #16 of interface #1
Value	17	Name for input/output #1 of interface #2

Table 7-2 Designation of the input/outputs

7.3 "Version" screen

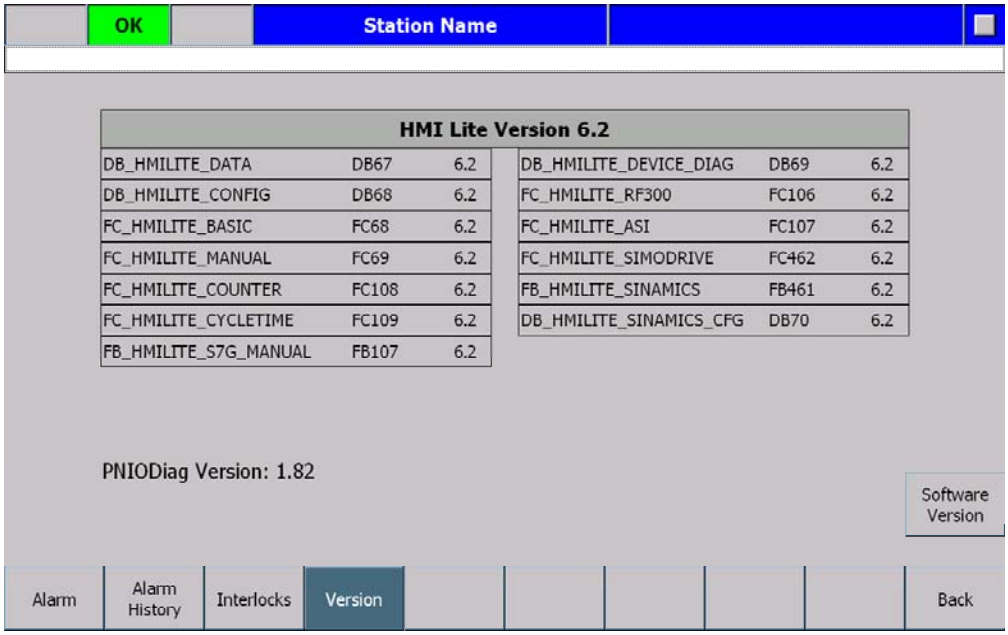


Figure 7-4 "Version display" screen

The "Version" screen displays for diagnostic purposes the associated version of the WinCC screens, the data blocks, the functions and the function blocks of HMI Lite.

The "Software version" button is used to display a window with the version of the WinCC runtime system files (not available for 7" devices!).

No configuring required.

■

8

8 Hardware Diagnostics

You can branch into the individual diagnostics screens from the hardware diagnostics overview screen. Depending on size, these may again be divided into further substructures.

In the case of PROFIBUS and PROFINET diagnostics, the state of the systems is already shown in the overview selection. The state of the networks is indicated by the color of the keys: green = all nodes OK, yellow at least one node has an error, and red = at least one node is out of operation.

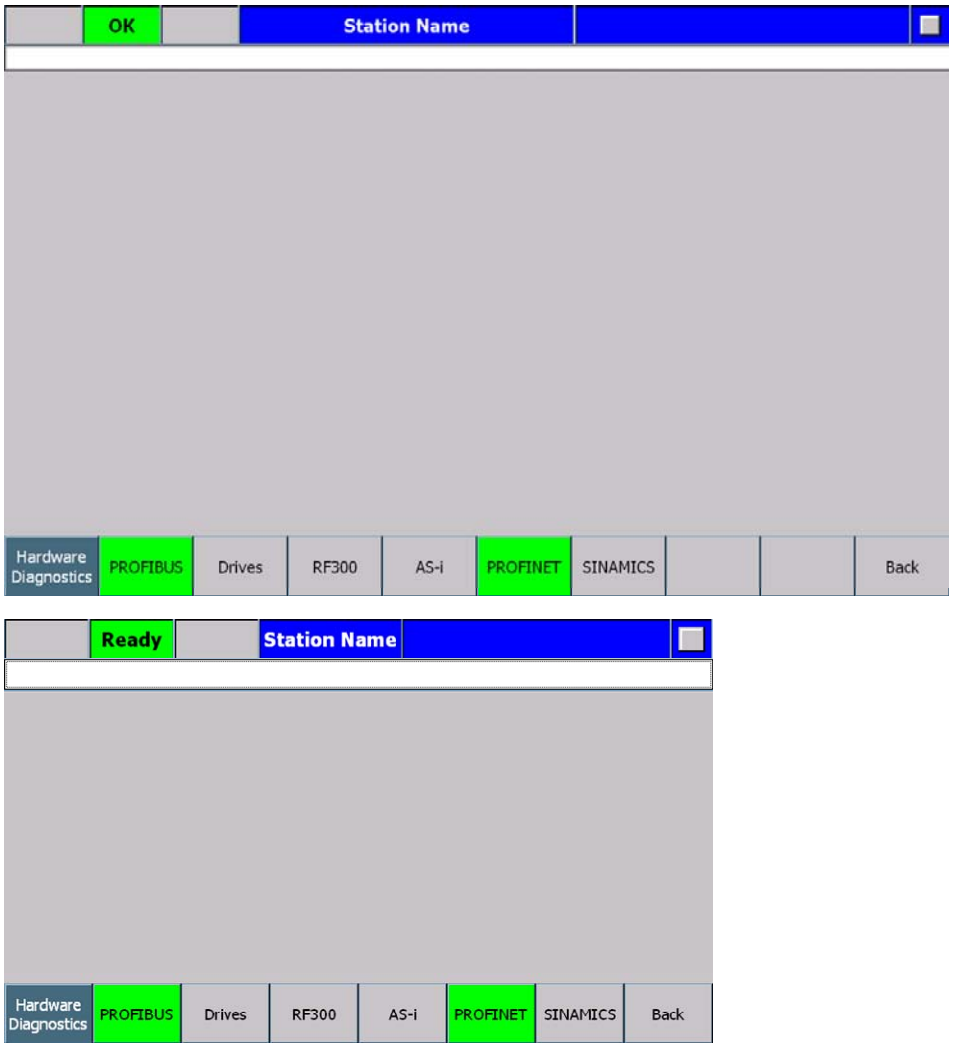


Figure 8-1 Hardware Diagnostics (KP1200 and KP700)

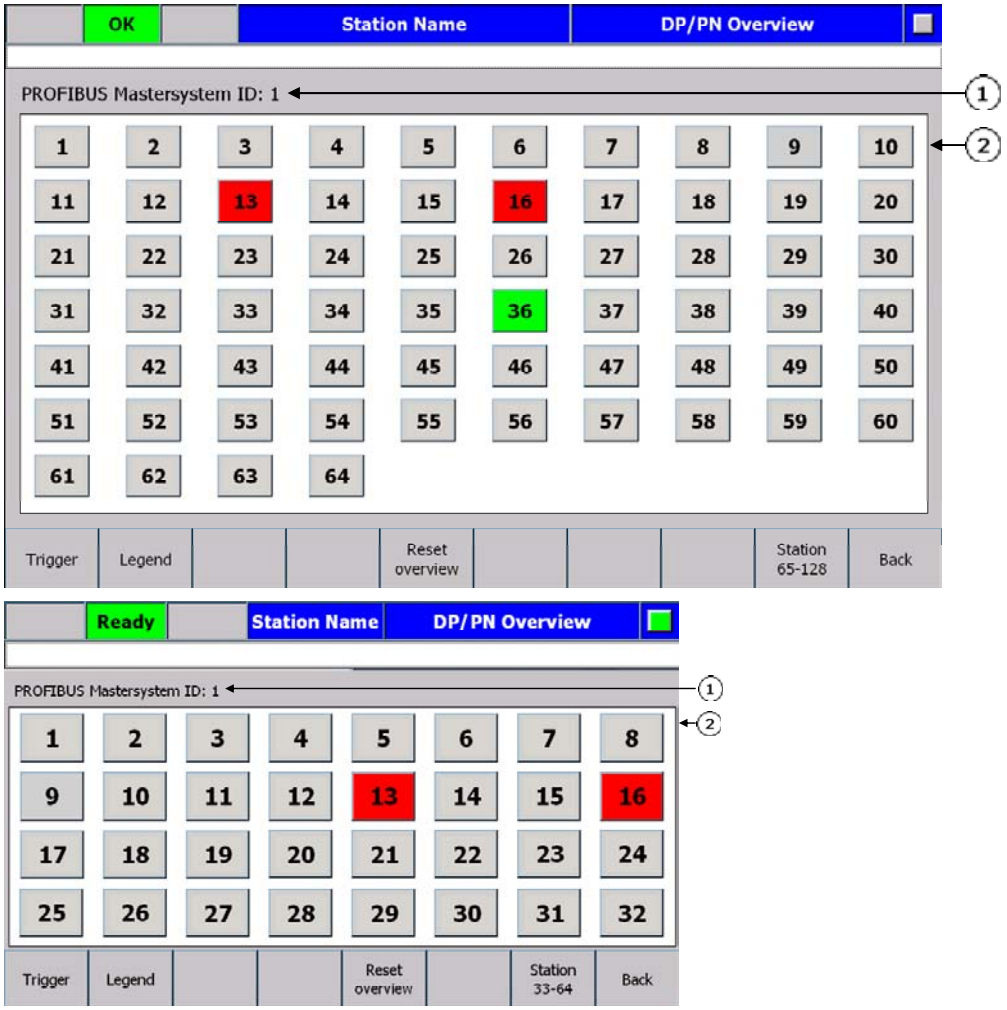
The following sections describe the hardware diagnosis functions in more detail.

8.1 PROFINET/PROFIBUS diagnosis

The "PROFINET/PROFIBUS diagnosis" screens are used to perform a diagnosis of a PROFINET IO or PROFIBUS DP network.

The diagnosis is based on the PNIODiag standard diagnostic package that can be downloaded from the article ID: 26996747 in the Siemens product support. This article ID also provides more detailed documentation.

8.1.1 "PROFINET/PROFIBUS overview" screen



(1) PROFINET or PROFIBUS station number
(2) Network overview with the configured stations

Figure 8-2 "PROFINET/PROFIBUS overview" screen (KP1200 and KP700)

The "PROFINET/PROFIBUS overview" screen provides an overview of which configured stations are present on the bus and what state they have.

The overview page of the 12,1-inch operator panel shows a maximum of 64 stations. You can navigate between the individual screens of the station overview using the relevant keys. If screens have to be divided into blocks of 64 stations each, this results in 2 overview screens for PROFIBUS networks, and a maximum of 4 for PROFINET networks.

The overview page of the 7-inch operator panel shows a maximum of 32 stations. You can navigate between the individual screens of the station overview using the relevant keys. If screens have to be divided into blocks of 32 stations each, this results in 2 overview screens for PROFIBUS networks, and a maximum of 4 for PROFINET networks.

Every station can be selected directly from the nodes recognized on the bus from the hardware configuration (SIMATIC manager) via touch device or the tab key (on the key version), in order to show detailed diagnostic data.

Further PNIO diagnostics screens are also selected from here. The trigger screen and the legend branch from the screen call hierarchy from the overview.

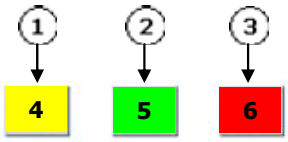
The station overview is updated by pressing the "Reset Overview" key, the status of the system is read out again and the event memory is erased.

8.1.2 Overview: Diagnostics network overview

The status of all configured PN devices of the IO system or DP slaves in the DP master system are displayed in the "Network overview" area of the PROFINET / PROFIBUS overview.

A maximum of 256 devices and maximum 126 slaves can be displayed. Each bus node is represented by its device number (PROFINET) and its address (PROFIBUS) in a status field.

The status is indicated by the background color.



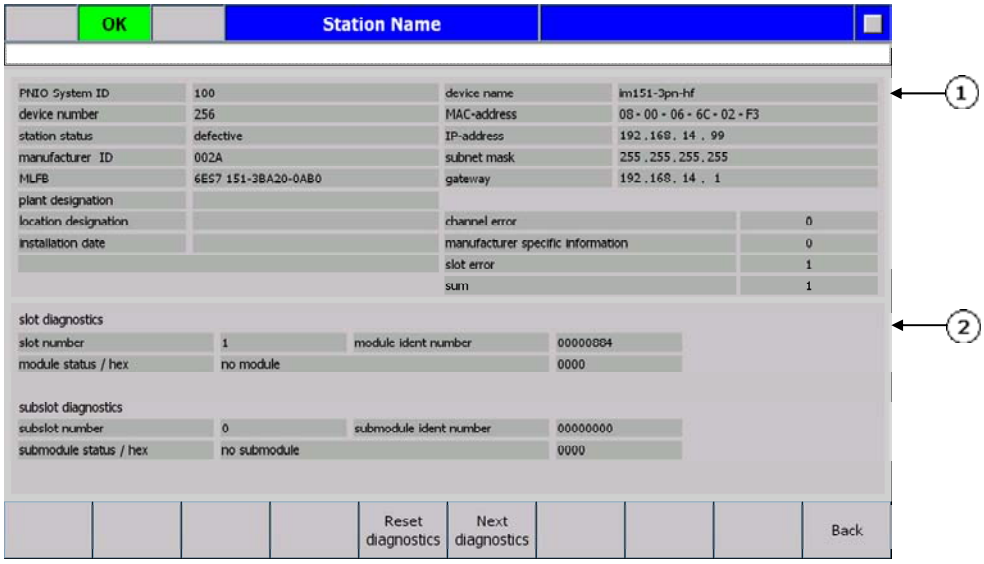
(1) Status: error (yellow background)
(2) Status: OK (green background)
(3) Status: disturbed (red background)

Figure 8-3 PROFINET/PROFIBUS diagnostics - Network overview

The status displays of the bus nodes also contain information about the history of the node. The "previous" status is indicated by a yellow or red colored border. This indicates the status from which the station entered the present status. When the overview is reset, the information is also reset/cleared.

8.1.3 "Detailed diagnosis" screen

The "Detailed diagnosis" screen displays detailed diagnostic information for the selected station and groups them into two main areas.



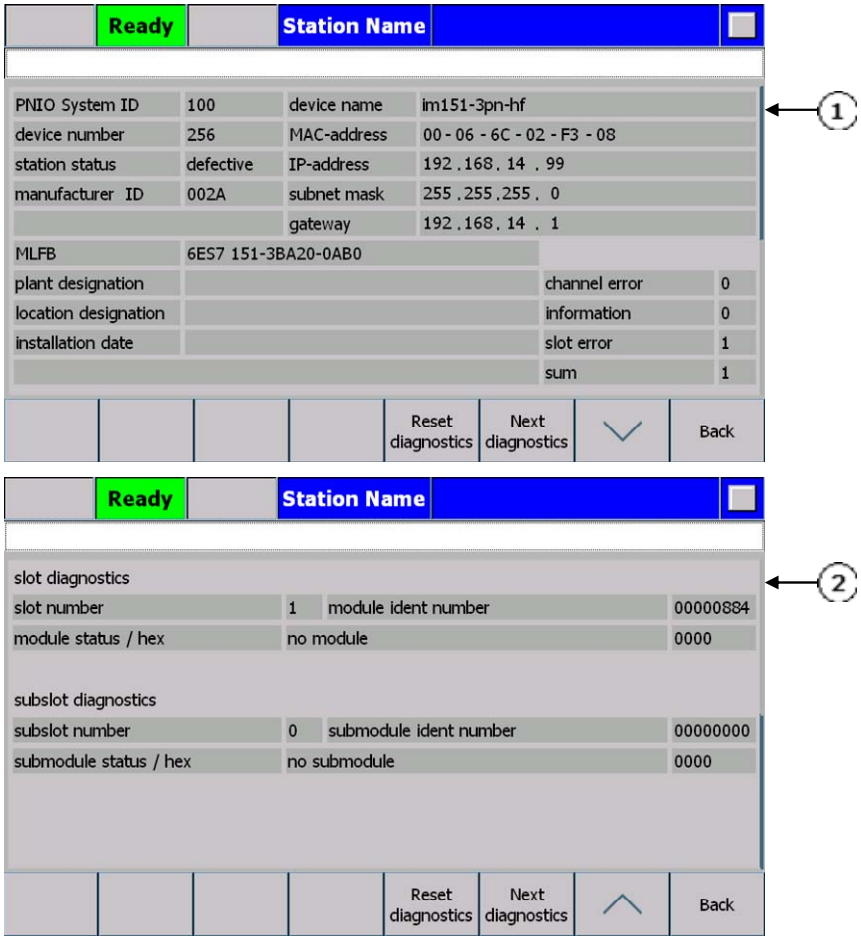
(1) Station status
(2) Detailed fault information

Figure 8-4 "Detailed diagnosis" screen (KP1200)

The "detailed diagnosis" screen opens if a station is selected from the station overview via its number. The screen is divided into several sections that are displayed subject to the status of the station.

If, for example, the station is defective and a diagnosis alarm is triggered, the type of defect and the number of errors are displayed in the top section. The individual errors are described in more detail in the lower section.

Only one diagnosis is displayed at a time. If several diagnoses exist, it is possible to switch between the pending messages using the "Next diagnostics" softkey. The display and the pending diagnosis data can be updated with the "Reset Diagnosis" key.



(1) Station status
(2) Detailed fault information

Figure 8-5 "Detailed diagnosis" screen (KP700)

The detailed diagnosis for 7'' operator panel is divided into two screens. The Layout and the functionality of these two screens is the same as for 12,1'' operator panel.It is possible to switch between the screen using the arrow softkey.

Station status for the PROFINET Device

The upper section of the display shows different information for the PROFINET device as for the PROFIBUS slave. Using this information, each PROFINET device in the network can be uniquely identified.

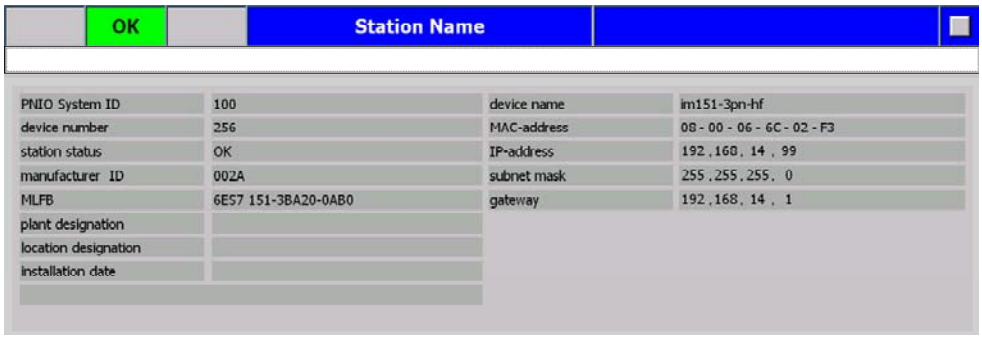
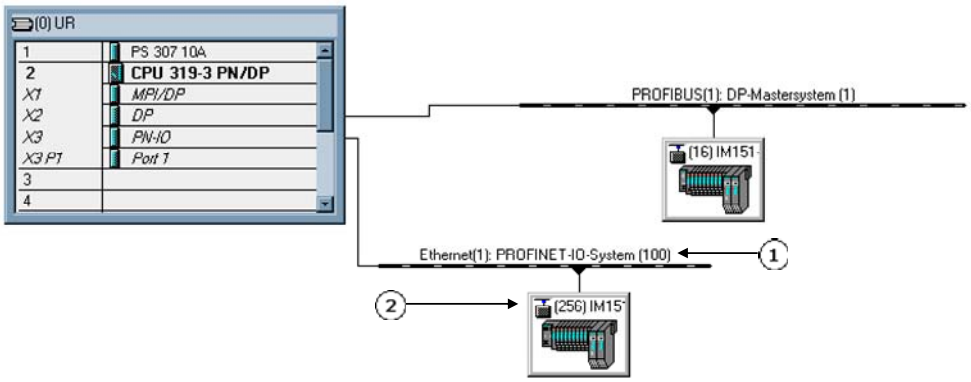


Figure 8-6 PROFINET Device

The following figure explains the fields **PNIO System ID** and **device number**. The figure shows the PROFINET device with PNIO System ID = 100 and device number = 256.



(1) PNIO System ID
(2) device number

Figure 8-7 PNIO System ID and device number

The "detailed diagnosis" screen opens if a station is selected from the station overview.

The field **station status** shows defective, failure, deactivated, maintenance or OK.

The field **manufacturer ID** is a 16-bit identifier, that uniquely identifies a manufacturer.

The field **MLFB** is an order number and can be found on the device.

As from a particular firmware version, devices on PROFINET and PROFIBUS support the option of entering identification data in the hardware configuration and loading them onto the device. The identification data can then also be read out and displayed via the PNIODiag. The following information is displayed in the Identification screen section:

plant designation

location designation

installation date

additional information

All settings for the PN interface of the device are displayed:

device name

MAC-address

IP-address

subnet mask

gateway

Station status for the PROFIBUS Slave

The upper section of the display shows different information for the PROFIBUS slave as for the PROFINET device. Using this information, each PROFIBUS slave in the network can be uniquely identified.

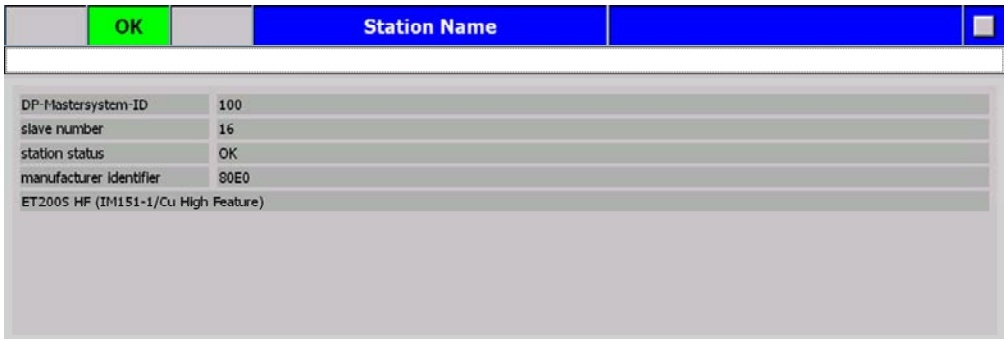
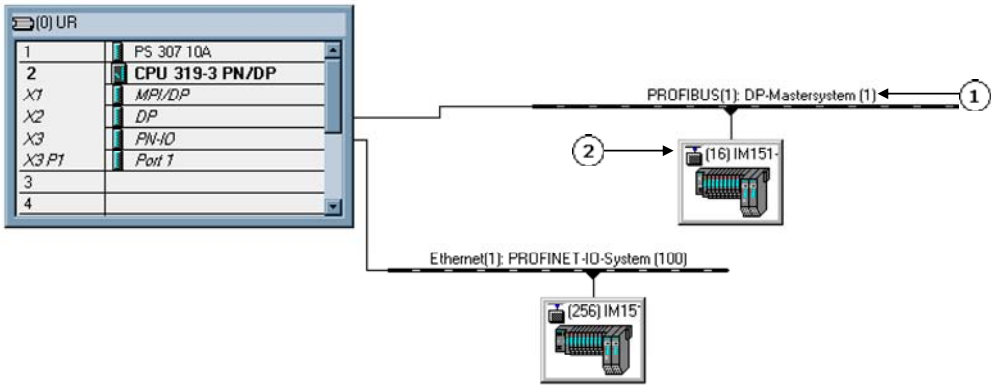


Figure 8-8 PROFIBUS Slave

The following figure explains the fields **DP-Mastersystem-ID** and **slave number**. The figure shows the PROFIBUS Slave with DP-Mastersystem-ID = 1 and slave number = 16.



(1) DP-Mastersystem-ID
(2) slave number

Figure 8-9 PNIO System ID and device number

The field **station status** shows defective, failure, deactivated, maintenance or OK.

The field **manufacturer identifier** is a 16-bit identifier, that uniquely identifies a manufacturer.

Detailed fault information

The information actually displayed in the "Detailed fault information" screen area depends on the diagnostic capabilities of the selected station.

The fault information supplies the fault location (slot number, subslot number, channel) and the designation of the fault (wire breakage). Additional details, such as the data format and the channel type, are also displayed. The fault information is also displayed in hexadecimal notation.

If required, the device manual can be consulted to obtain the meaning of the hexadecimal value.

A station diagnosis can be fetched for each detected station. The format of the displayed data depends on the station type:

For PROFIBUS DP slaves, the channel diagnosis is output in text form with the device-specific diagnosis shown in hexadecimal notation.

The diagnosis of PROFINET IO stations differentiates between direct PROFINET IO devices and PROFIBUS slaves connected with a PROFINET IO system using an IE/PB link:

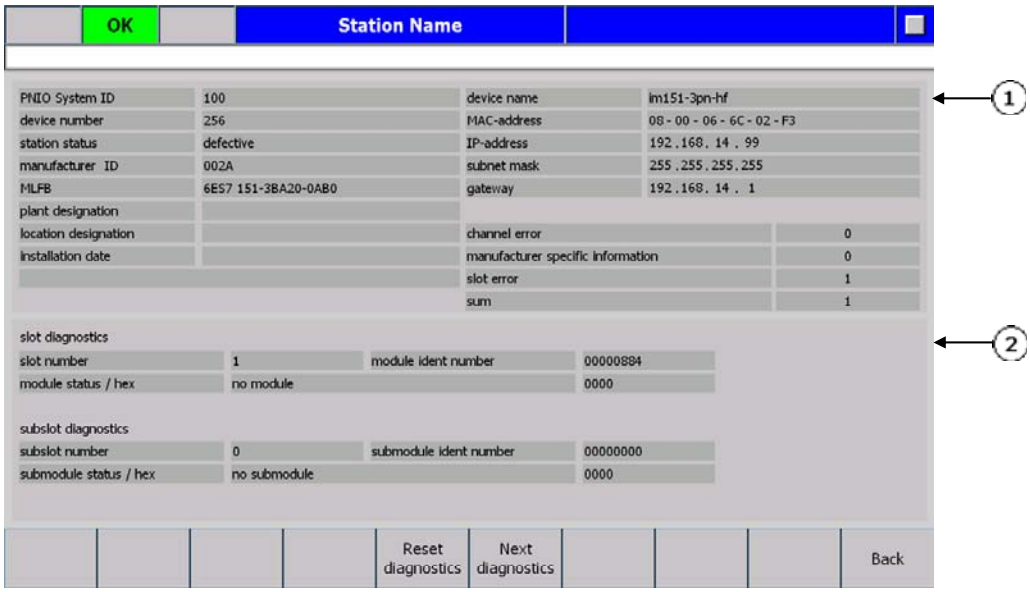
PROFINET device:

The channel and slot diagnosis is output in text form. The manufacturer-specific diagnostics are displayed in hexadecimal notation.

PROFIBUS slaves on the IE/PB link:

The diagnostic data (structure, see EN 50 170 Volume 2, PROFIBUS) is shown only in hexadecimal format. Only the status of the module is displayed for an IE/PB link itself.

Detailed fault information – the slot diagnostics example



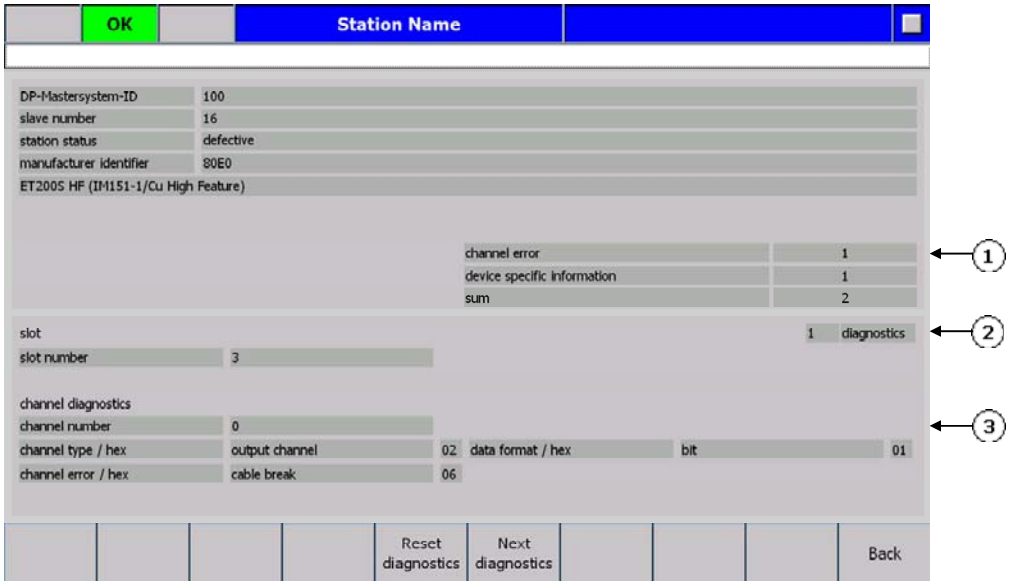
(1) number of slot faults
(2) detailed slot fault information

Figure 8-10 Slot diagnostics example

The part (1) of the screen of the defective slave shows the number of faults, the number of manufacturer specific information and the sum of all these diagnostic information.

In the example, there is one slot error on slot number 1, the part (1) of the screen shows the number of slot errors and the part (2) shows the detailed slot fault information.

Detailed fault information – the channel diagnostics and the manufacturer specific information example



(1) the number of channel errors and the device specific information
(2) the number of currently showed diagnostics
(3) the detailed channel error information or device specific information

Figure 8-11 Channel diagnostics example

The part (1) shows the number of available diagnostics. The part (2) shows the number of currently showed diagnostics. The part (3) shows the detailed diagnostics information.

In example, there are two diagnostics available. The number in the part (2) shows the currently showed diagnostics (the first from two).

The detailed fault information in part (3) shows the **channel error** cable break on the slot 3 (**slot number**), on the output channel 0 (**channel number** and **channel type**).

The softkey **Next diagnostics** shows the next diagnostics – the device specific information.

The device specific information is displayed in hexadecimal notation.

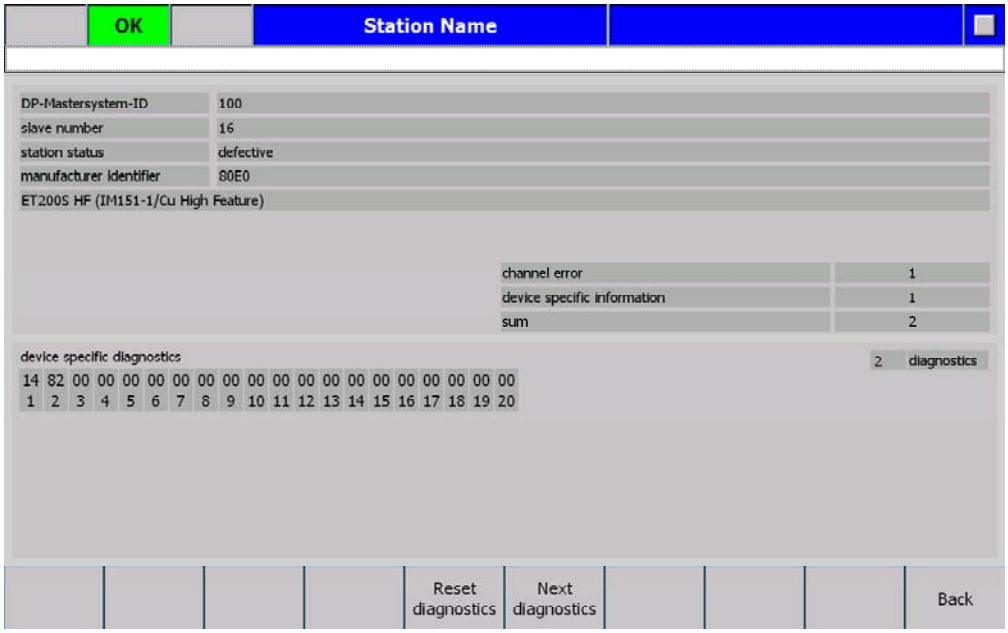
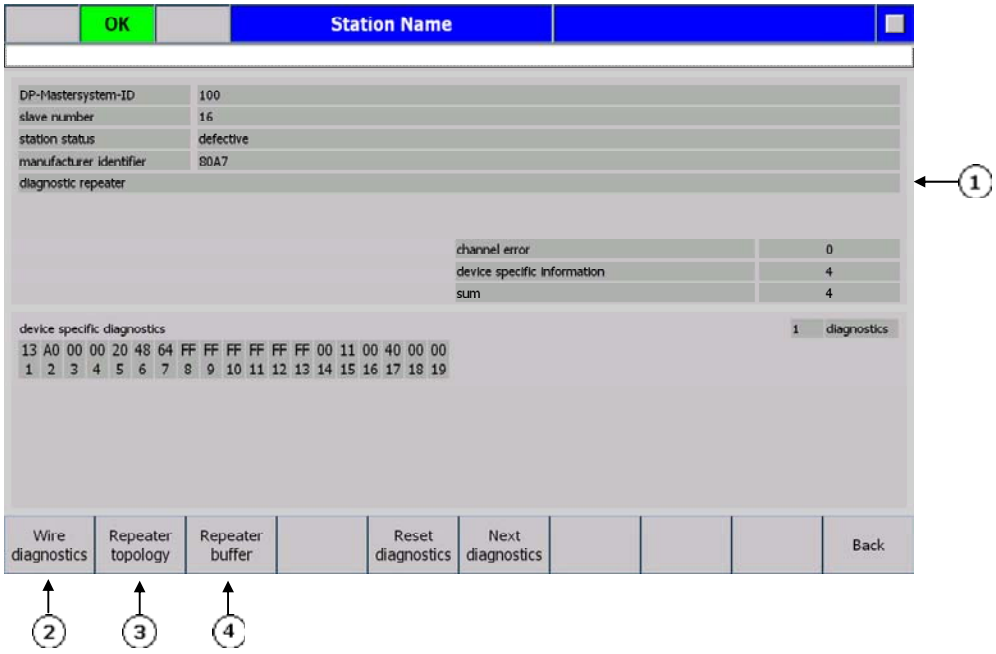


Figure 8-12 Device specific information example

If required, the device manual can be consulted to obtain the meaning of the hexadecimal value.

8.1.4 "Detailed diagnosis" screen of the diagnostic repeater

In the detailed diagnosis screen of the diagnostic repeater, there are more screens available. The screen shows three additional softkeys.

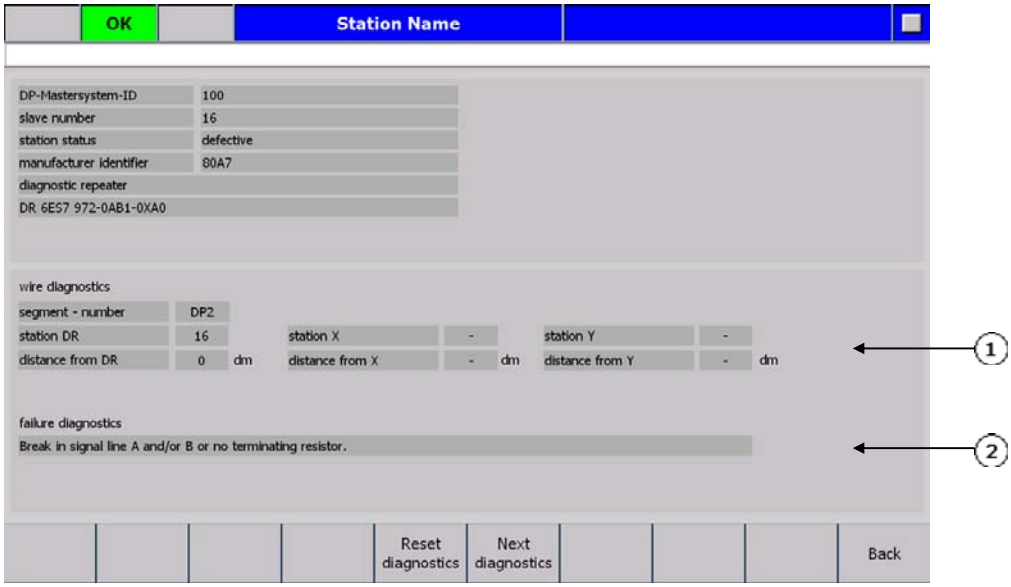


(1) the name of the slave – diagnostic repeater
(2) the screen “Wire diagnostics”
(3) the screen “Topology determination”
(4) the screen “Diagnostic buffer”

Figure 8-13 Detailed diagnosis of the diagnostic repeater

8.1.5 "Wire diagnostics" screen

The "wire diagnostics" display shows detailed diagnostics information in the PROFIBUS network for diagnostic repeaters. The upper section of the display shows the same information as the detail display, in the lower section, the cause of the error and information about the location of the error are shown for the individual diagnosable segments.



(1) the segmentinformation and the location of the error
(2) the detailed error information

Figure 8-14 “Wire diagnostics” screen (KP1200)

The diagnostics of the next segment can be displayed with the softkey **Next diagnostics**. The diagnostics can be read again with the softkey **Reset diagnostics**.

The layout and the functionality of the smaller operator panel (KP700) is the same, the screen is divided into two screens.

Segment information

The wire diagnostics contains information about the location of the fault for each segment as seen from the diagnostic repeater. The affected segment (segment number), the PROFIBUS address of the diagnostic repeater (Station DR), and the distance of the fault from the diagnostic repeater are displayed.

Fault localization

In data block Station X, information is provided about which station is the last station before the location of the fault, as seen from the diagnostic repeater. The station number (station X) and the distance between the station and the fault location (distance X) are displayed.

Data block Station Y contains information about the station detected behind the fault location. The station number (station Y) and the distance between the location of the fault and station Y (distance Y) help to locate the defect. If no station is detected behind the fault, no data is displayed.

All distances are given in decimeters (dm).

Fault diagnosis with action to be taken

A possible cause of the fault is displayed below the fault diagnosis, together with action for eliminating the fault.

Note

Please also refer to the descriptions given in the manual about the diagnosis repeater. The diagnosis repeater will only provide accurate information about the fault location if it is initialized during installation while the plant or system is running without error (ascertain topology).

8.1.6 "Topology determination" screen

The screen "Topology determination" was developed for the diagnostic repeater with the order number 6ES7 972-0AB0**1**-0XA0. For the predecessor with the order number 6ES7 972-0AB0**0**-0XA0 is the screen not valid.

The topology determination has to be carried out after making any changes to the DP network. The screen "Topology determination" shows the user, whether the topology data is valid.

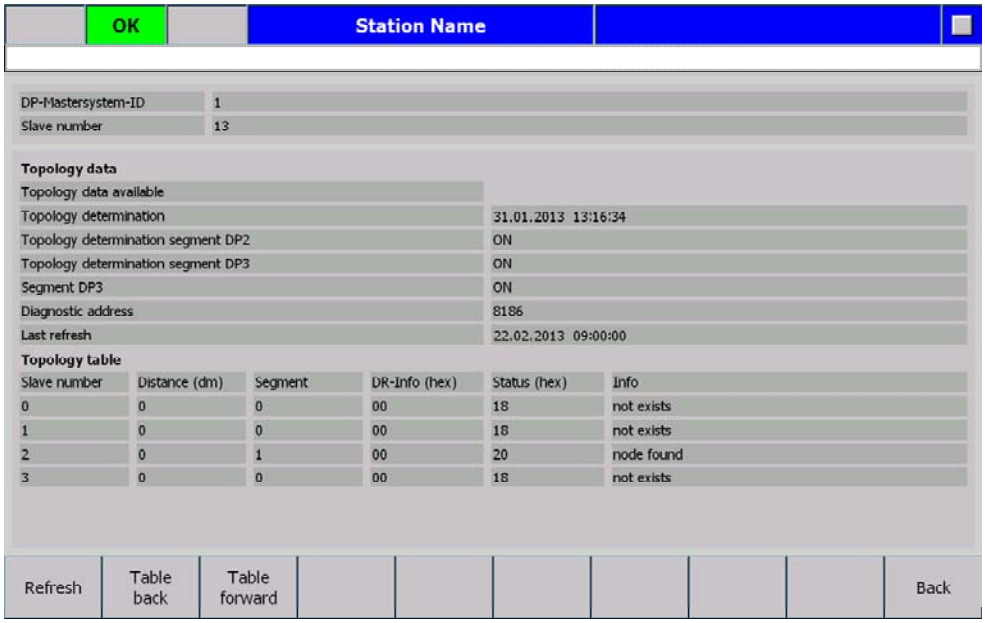


Figure 8-15 "PROFIBUS detailed diagnosis" screen

The **Slave number** of the repeater and the **DP-Mastersystem-ID** are displayed in the upper section of the display. The topology data and the topology table is displayed in the lower section of the display.

The first field shows, whether the topology determination was carried out. This field can contain two texts:

Topology data available

Topology data not available

The information, whether the topology determination was carried out, is kept retentively in the diagnostic repeater, even if the supply voltage fails. The bit remains set after the first topology determination. For this reason is the timestamp of the topology determination in the field **Topology determination** important. It shows, when the last topology determination has been carried out.

The field **Topology determination segment DP2** shows, whether the determination for the segment DP2 is ON or OFF.

The field **Topology determination segment DP3** shows, whether the determination for the segment DP2 is ON or OFF.

The topology determination can be activated/deactivated for some specific segment in the hardware configuration.

The field **Segment DP3** shows, whether the segment DP3 is activated. The segment DP3 can be activated with the switch.

The field **Diagnostic address** shows the diagnostic address of the diagnostic repeater.

The field **Last refresh** shows the last refresh of the data from diagnostic repeater. The data is refreshed, when the screen is displayed and when the user pushes the softkey **Refresh**. The timestamp displayed is the time from the CPU. The data block stores the timestamp before reading the data from diagnostic repeater.

The section **Topology table** displays the topology table. The softkeys **Table back** and **Table forward** move through the table.

If required, the device manual of the diagnostic repeater can be consulted to obtain the meaning of the columns and the detailed description of the topology table.

The user can push the softkey Refresh to get the new data from the diagnostic repeater. The following screen is displayed during the reading the data.

The user gets the information, that the new data are being read from the diagnostic repeater.

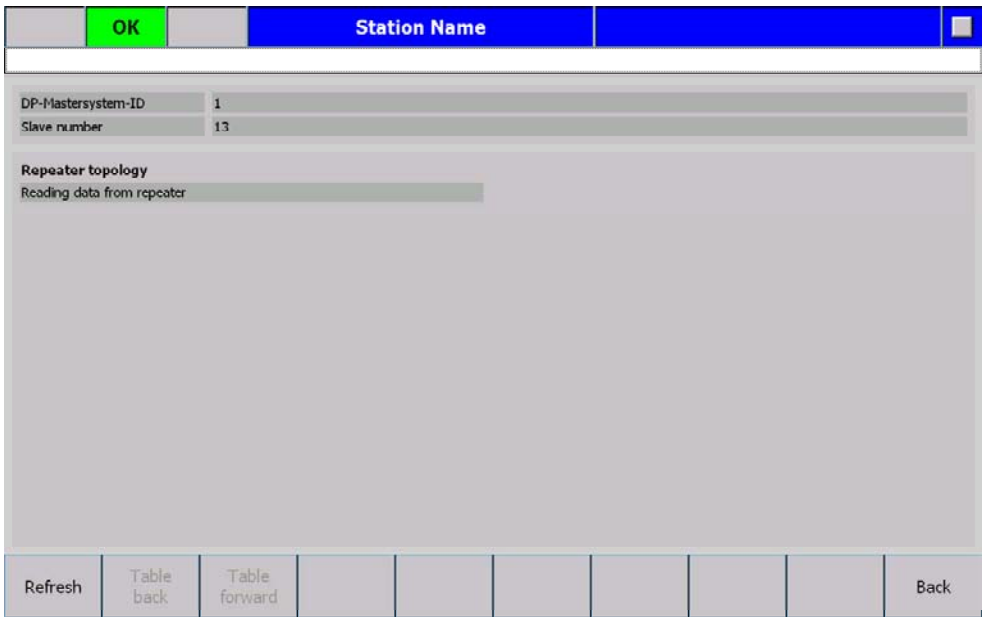


Figure 8-16 Information in screen “Topology determination”

The following screen is displayed in case of an error.

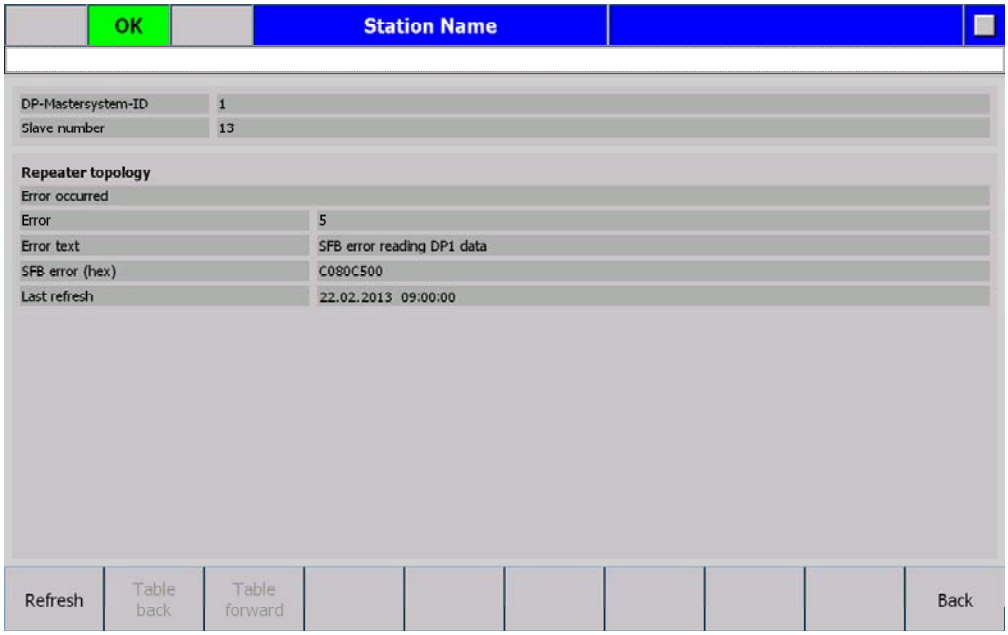


Figure 8-17 Error in screen “Topology determination”

Following errors can be displayed.

Error: 1, „The repeater data block does not exists on CPU“

Cause: The data block DB_HMILITE_REPEATER_CFG does not exists on CPU. The number of the data block is assigned to the function block FB_HMILITE_REPEATER.

Error: 2, „The repeater data block number is not correct“

Cause: The number of the data block DB_HMILITE_REPEATER_CFG, that was assigned to the function block FB_HMILITE_REPEATER is not valid.

Error: 3, „The repeater data block is empty or too short“

Cause:.The data block DB_HMILITE_REPEATER_CFG is empty or the data is not valid.

Error: 4, „The slave number could not be found in repeater data block“

Cause: The slave number can not be found in the DB_HMILITE_REPEATER_CFG data block. For example, if the screen shows the diagnostics of the repeater with the slave number 13, then this slave number 13 must be configuret in the data block DB_HMILITE_REPEATER_CFG.

Error: 5, „SFB error reading DS1 data“

Cause: After Refresh Softkey is pressed or the screen displayed, the data are read with the SFB52 function block. This call of the SFB52 function block returns the error.

Error: 6, „Unexpected error reading DS1 data“

Cause: The exact cause of the error can not be determined. This error can cause for example the overwriting of the data block during the refresh.

The error numbers 7 to 12 have the same meaning as the error number 5 and 6.

The layout and the functionality of the screen for the smaller operator panel (KP700) is the same, the screen is divided into two screens.

8.1.7 "Diagnostic buffer" screen

The screen "Diagnostic buffer" was developed for the diagnostic repeater with the order number 6ES7 972-0AB0**1**-0XA0. For the predecessor with the order number 6ES7 972-0AB0**0**-0XA0 is the screen not valid.

The current faults are displayed in the screen "Wire diagnostics". The recent faults are stored in the buffer. The screen "Diagnostic buffer" shows the buffer.

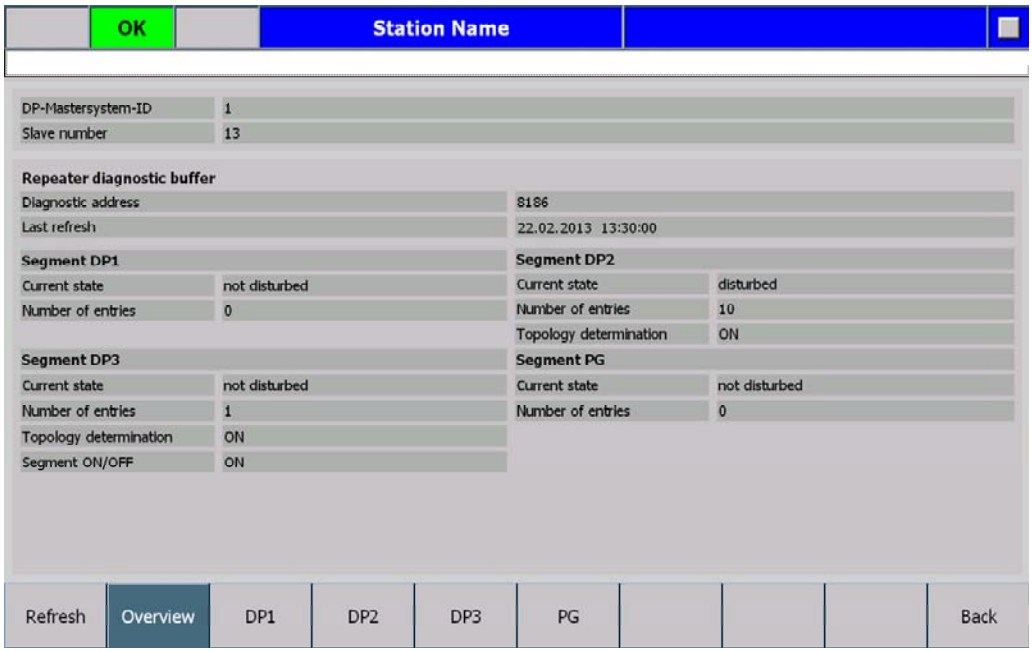


Figure 8-18 The "Diagnostic buffer" screen - Overview

The **Slave number** of the repeater and the **DP-Mastersystem-ID** are displayed in the upper section of the display. The topology data and the topology table is displayed in the lower section of the display.

The **Overview** is always displayed at first. The overview shows all segments. The information whether the segment is disturbed, is displayed for every segment.

The field **Number of entries** shows the number of stored events. The maximal number of events that can be stored is 10. If there is no event, then Number of entries is 0.

These stored events can be displayed for every segment with the softkeys DP1, DP2, DP3 and PG.

The field **Topology determination** is available only for the segments DP2 and DP3. It shows, whether the topology determination is activated for the segment.The topology determination can be activated in the hardware configuration.

The field **Segment ON/OFF** is only available for the segment DP3. The segment DP3 can be switched on with the switch.

The stored events for the particular segment can be displayed with the softkeys DP1, DP2, DP3 and PG.

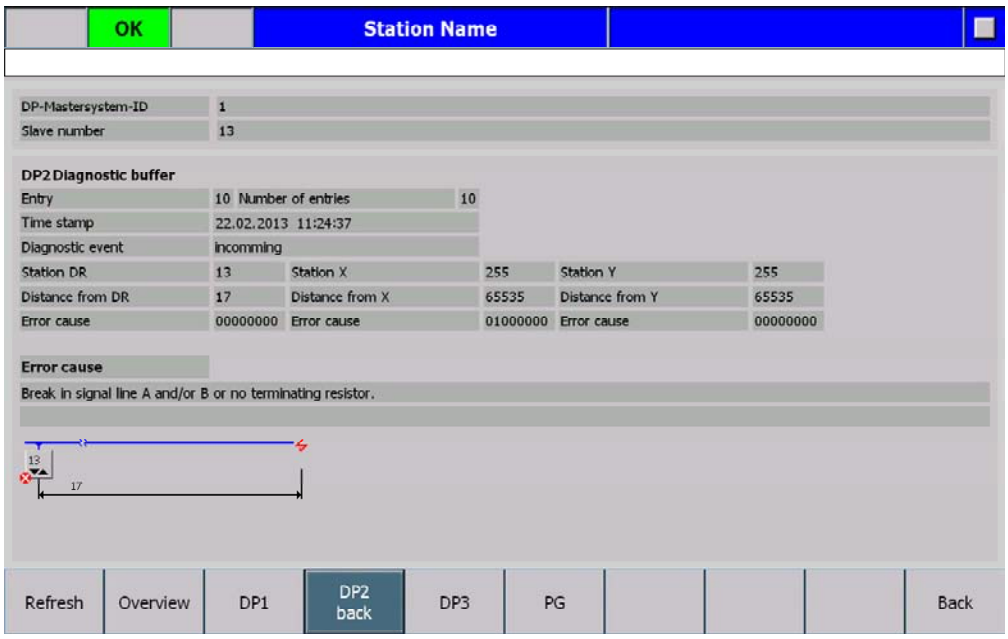


Figure 8-19 The “Diagnostic buffer” screen – DP2

The sofkey Text changes, if the specific segment is displayed, for example from DP2 to **DP back**. The reason is, the same sofkey is used to show recent entries from the buffer.

The last entry is always displayed first. The recent entries can be displayed with the softkey **DP2 back**.

The field **Entry** shows the number of the current entry displayed. The last entry in the buffer has always the highest number. The field **Number of entries** shows the number of all stored entries.

The field **Time stamp** shows the time and date, when the event is occurred.

The field **Diagnostic event** shows incomming or outgoing.

The field **Station DR** shows the slave number of the diagnosis repeater. The field **Distance from DR** shows the distance of the fault location from the diagnosis repeater in [dm]. The value 255 (FFh) means, that the distance from the fault location to the diagnostic repeater cannot be specified for the relevant diagnostic event.

The field **Station X** shows the slave number of the station X. The field **Distance from X** shows the distance of the fault location from the station X. If either 127 (7Fh) or 255 (FFh) is entered in Station X, the field Distance from X cannot be evaluated.

The field **Station Y** shows the slave number of the station Y. The field **Distance from Y** shows the distance of the fault location from the station X. If either 127 (7Fh) or 255 (FFh) is entered in Station Y, the field Distance from Y cannot be evaluated.

The fields Station DR, Distance from DR, Station X, Distance from X, Station Y, Distance from Y are displayed graphically in the lower section of the display.

The error cause is stored in the diagnostic repeater in three variables. These variables are displayed in the fields **Error cause A**, **Error cause B** and **Error cause C**. Every bit in the variable means another error cause. The error cause texts are displayed in the lower section of the display.

The screen shows also some special cases, for example “Fault location after the last station”.

The detailed description of the repeater diagnostics can be found in the manual.

If there are no data available for the segment, than the following screen will be displayed.

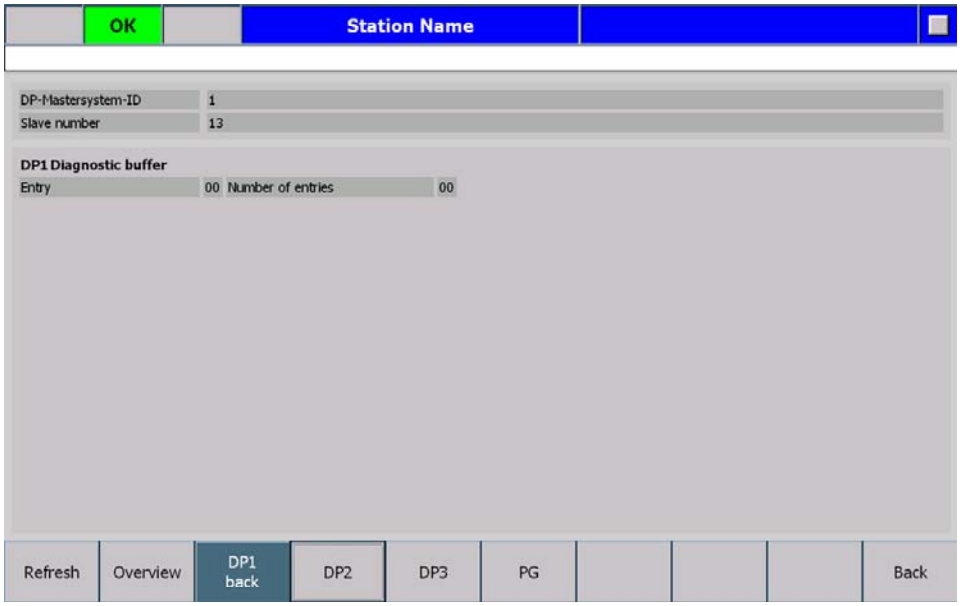


Figure 8-20 The “Diagnostic buffer” screen – no data for the segment DP1

The user can push the softkey Refresh to get the new data from the diagnostic repeater. The information will be displayed, that the new data are being read from the diagnostic repeater.

If an error occurrs, the error number and text will be displayed. The following errors can be displayed.

Error: 1, „The repeater data block does not exists on CPU“

Cause: The data block DB_HMILITE_REPEATER_CFG does not exists on CPU. The number of the data block is assigned to the function block FB_HMILITE_REPEATER.

Error: 2, „The repeater data block number is not correct“

Cause: The number of the data block DB_HMILITE_REPEATER_CFG, that was assigned to the function block FB_HMILITE_REPEATER is not valid.

Error: 3, „The repeater data block is empty or too short“

Cause:.The data block DB_HMILITE_REPEATER_CFG is empty or the data is not valid.

Error: 4, „The slave number could not be found in repeater data block“

Cause: The slave number can not be found in the DB_HMILITE_REPEATER_CFG data block. For example, if the screen shows the diagnostics of the repeater with the slave number 13, then this slave number 13 must be configuret in the data block DB_HMILITE_REPEATER_CFG.

Error: 5, „SFB error reading DP1 data“

Cause: After Refresh Softkey is pressed or the screen displayed, the data are read with the SFB52 function block. This call of the SFB52 function block returns the error.

Error: 6, „Unexpected error reading DP1 data“

Cause: The exact cause of the error can not be determined. This error can cause for example the overwriting of the data block during the refresh.

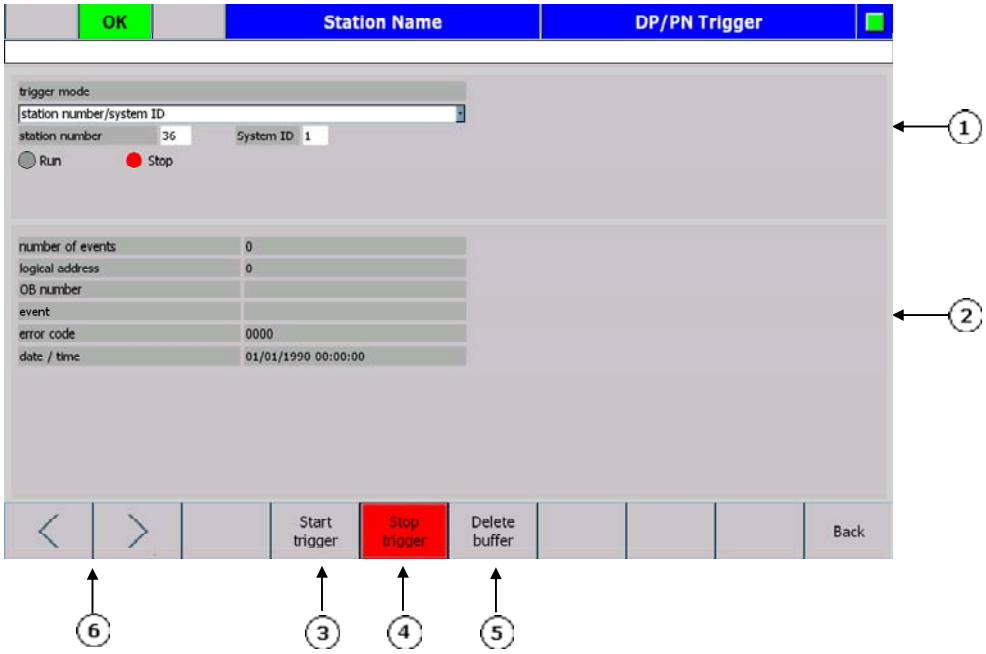
The error numbers 7 to 12 have the same meaning as the error number 5 and 6.

The layout and the functionality of the screen for the smaller operator panel (KP700) is the same, the screen is divided into two screens.

8.1.8 "Trigger history" screen

You can set in the "Trigger history" screen which station in which system is to be monitored in order to monitor transient events and also view the recorded events.

This is particularly useful when the events are too fast for them to be evaluated in the station diagnosis. Recording is performed in a ring buffer and can always be started for only one device at a time. Up to 30 events can be stored in the ring buffer.



(1) Set the trigger mode
(2) Events display
(3) Operate the trigger
(4) Stop the trigger
(5) Delete buffer
(6) Scroll through the events

Figure 8-21 “Trigger history” screen

Setting the trigger mode

First select the station to be monitored. Trigger mode is set to the selected station and the events are logged in real time. The station is selected either via its logic address or via the station number and subsystem ID. The logic address is the diagnostic address of the device in the hardware config of the SIMATIC manager. The station number corresponds to the PROFIBUS address and the device number of the PROFINET I/Os. The corresponding system ID has the standad value 1 on PROFIBUS networks and 100 on PROFINET networks.

The address can only be entered in the stop state and only one trigger event may be active at a time.

Operating the trigger

Press "Start trigger" to activate the trigger. The state remains active even for a change to a different screen and continues to run in the background. The trigger is running when the background is green.

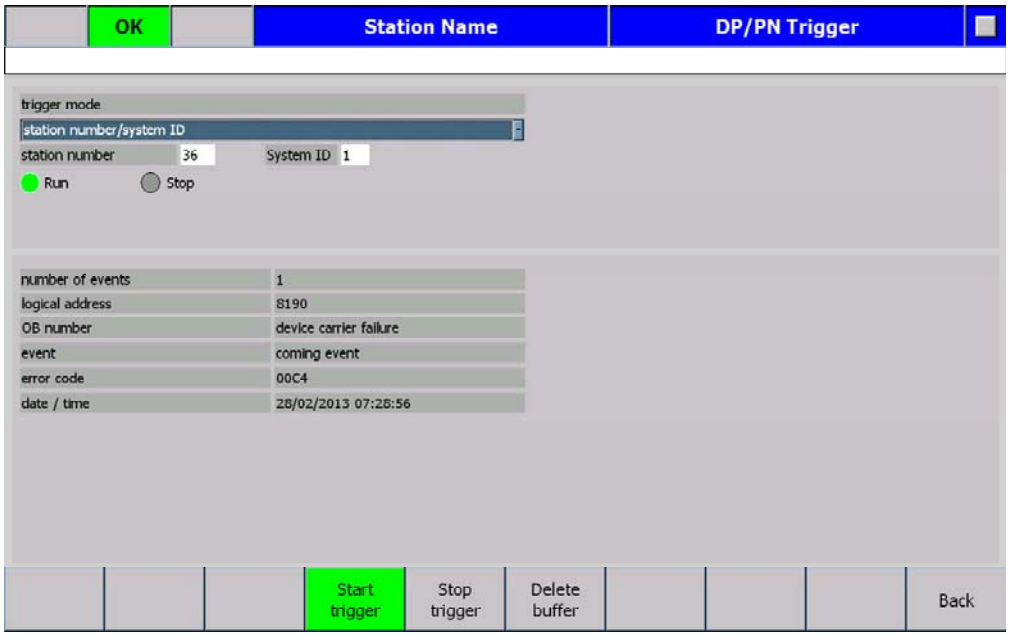


Figure 8-22 “Trigger history” screen – Trigger started

Press "Stop trigger" to deactivate the trigger after which the events can be viewed. The trigger is stopped when the background is red.

Press "Clear ring buffer" to clear the ring buffer. To prevent data falsification, clear the ring buffer before using the trigger and when the address is reset. Clearing the ring buffer places the trigger in the stopped state should it be active.

Displaying the events

In this window you can display the recorded events.

If several events are present, the arrows can be used to scroll left and right. The arrows are enabled only when the trigger is in the stopped state.

8.1.9 "Legend" screen

The "Legend" screen shows the states that a station can assume in the network overview.

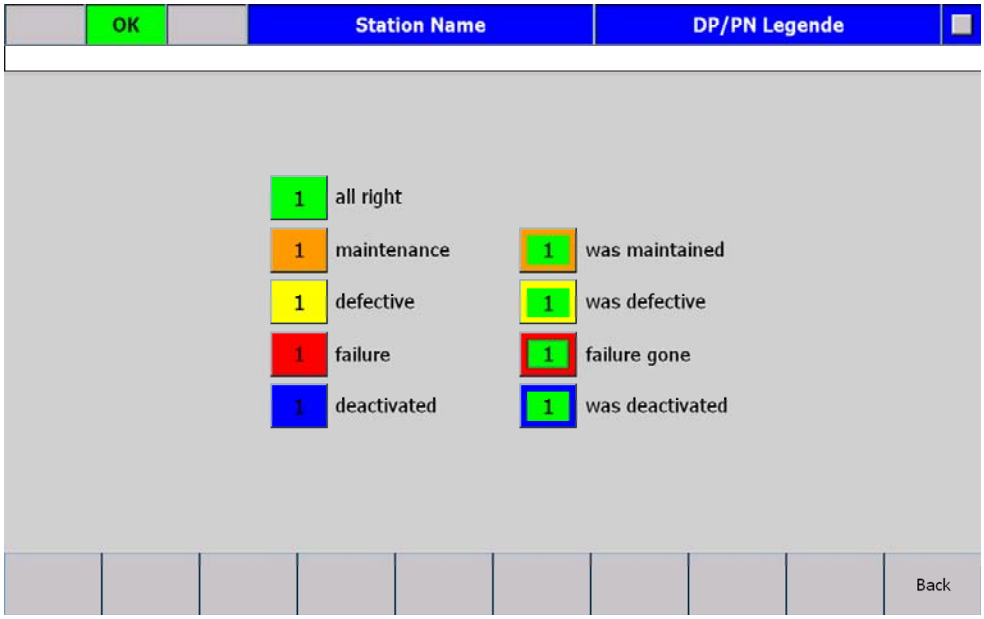


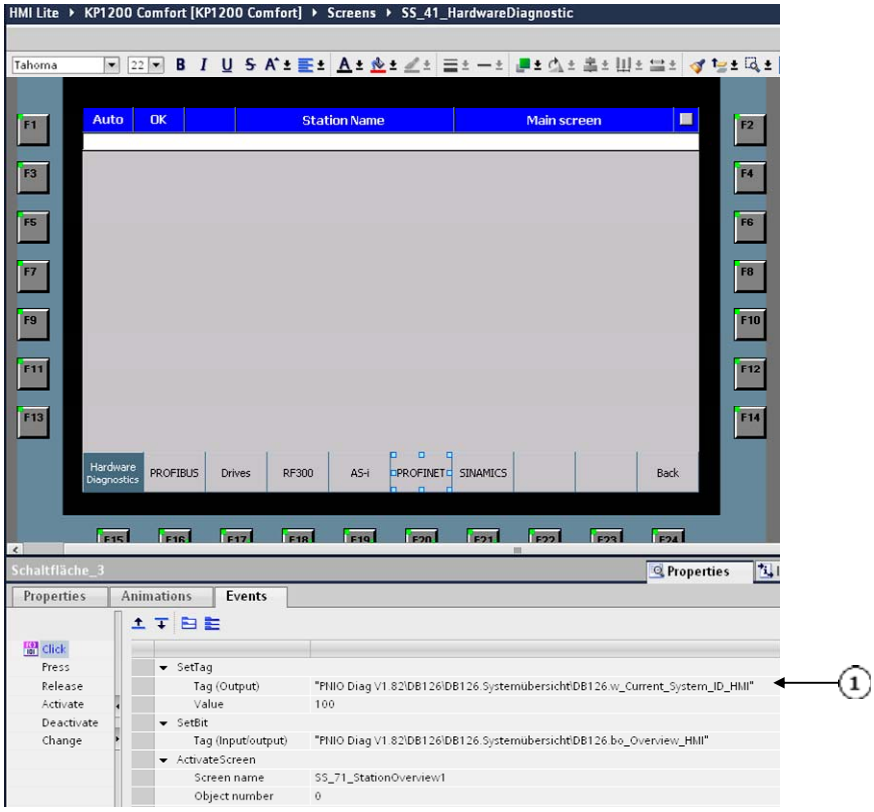
Figure 8-23 "PROFINET/PROFIBUS overview" legend screen

8.1.10 PNIODiag Info Screen

The "PNIODiag" messages are displayed in the “Alarm” and “Alarm history” screen. The PNIODiag version is displayed in the “Version” screen.

8.1.11 Configuring the WinCC screens

Selecting the PROFINET/PROFIBUS network for the diagnosis



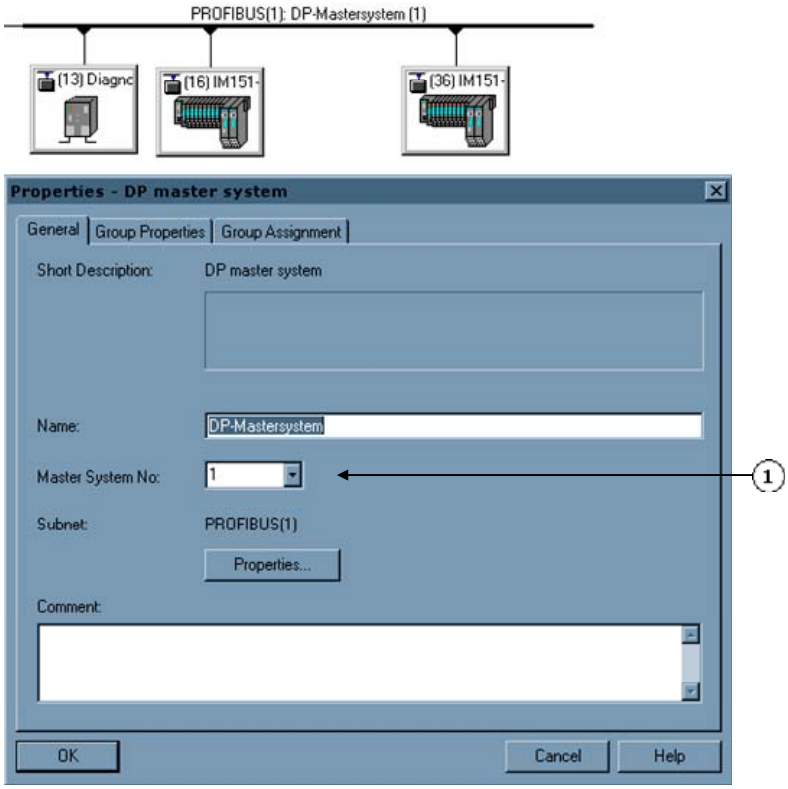
(1) Functions for selecting the PROFINET or PROFIBUS diagnosis

Figure 8-24 Functions for selecting the PROFINET or PROFIBUS diagnosis

The PROFINET/PROFIBUS diagnostic screens can be fetched for various PROFINET or PROFIBUS networks.

The WinCC "PNIO_Diagnostic\DB126\DB126.System overview\DB126.w_Current_System_ID_HMI" variable specifies the associated network for the call. This variable is set for a PROFINET network to the IO system number or for a PROFIBUS network to the master system number. These numbers are assigned in the Step7 hardware configuration. The default value of the master system number for PROFIBUS and PROFINET is 1 or 100, respectively.

When screens are called into the PNIO-Diag, the variable under Events must be supplied with the configured value from the hardware config.



(1) System-ID configuration

Figure 8-25 Defining the DP master system in the hardware configuration

.

Address:	WinCC variables: PNIO_Diagnostic\DB126\DB126.System overview\DB126.w_Current_System_ID_HMI
Format:	WORD
Values range:	For PROFINET: IO system number (default value = 100) For PROFIBUS: master system number (default value = 1) The values are configured in the hardware configuration of the SIMATIC station.

8.1.12 Runtime interface (FB_PNIODiag)

The PNIODiag function block can be used for the diagnosis of PROFINET IO and PROFIBUS DP systems. For this purpose, the PNIODiag function block determines general system status information and, if required, detailed diagnostic information. This information is then displayed using the visualization.

The PNIODiag function block provides the following functions for PROFIBUS DP and PROFINET IO systems:

Obtain an overview of the state of the individual systems

Show the station states as overview diagnosis

Detailed diagnosis of the individual stations

Save the transient state changes

Record the diagnostic events

Deactivate and activate PROFIBUS DP slaves and PROFINET IO devices

The PNIODiag function block call must be made in the OB1, OB82, OB83, OB86 and OB100 (OB101, OB102) execution levels. The order and content of the 20-byte temporary local data of the organization blocks must not be changed.

The IN0 input parameter specifies the DB number 466 for saving the diagnostic data. Because the creation of the data block for the data storage is specified in OB100, the DB number must also be specified in the OB100. If no value is specified, the DB200 data block will be created automatically.

Should an error occur while processing the block, the "OUT1" output parameter will contain an error code that helps the Support department with troubleshooting.

Note

The required S7 data blocks and the S7 function block do not contain any symbol information. An interface description for the S7 modules is not available. The S7 modules should be used only in conjunction with the provided visualization.

Note

The download of the PNIO standard package contains more detailed documentation for the FB_PNIODIAG (see Introduction).

Note

In the PNIO standard package, the FB_PNIODIAG is also provided as a variant for CPUs with a maximum block size of 16 KB.

Diagnostic repeater topology and buffer

Before the refreshing the screen data, the slave number of the diagnostic repeater is stored in the HMI variable SS_79_SlaveNumber. The slave number will be written through this variable into the data block DB_HMILITE_DEVICE_DIAG at the address SCREEN_REPEATER.SLAVE_NUMBER.

The function block FB_HMILITE_REPEATER reads the data from the diagnostic repeater with this slave number. The function data block must know the diagnostic address of the repeater with this slave number. The diagnostic addressess of all repeaters are configured in the data block DB_HMILITE_REPEATER_CFG.

There can be more diagnostic repeaters installed in the network. All diagnostic repeaters have to be configured in the data block DB_HMILITE_REPEATER_CFG.

The data block DB_HMILITE_REPEATER_CFG consists of the structures with two INT variables, SLAVE_NUMBER and DIAGADDR. For all diagnostic repeaters, the entry in this data block has to be made, with the slave number and diagnostic address.

If the function block FB_HMILITE_REPEATER does not find the slave number, then the error message will be displayed on the screen “The slave number could not be found in repeater datablock”.

Note

The time stamp of the events in the screen “Diagnostic buffer” and the time stamp of the topology determination in the screen “Topology determination” is the intern clock of the diagnostic repeater. For this reason, you have to set the time in the diagnostic repeaters. The diagnostic repeater does not have any power failure buffering. After power off/on, the clock starts again at 1994-01-01-00:00:00.

Runtime-Interface (FB_HMILITE_REPEATER)

The function block FB_HMILITE_REPEATER supplies data to the WinCC screens “Topology determination” and “Diagnostic buffer”. The function data block reads the data from the diagnostic repeater.

The user must call this function once cyclically in the OB1 or in the FC67 (FC_HMILITE_MANAG).

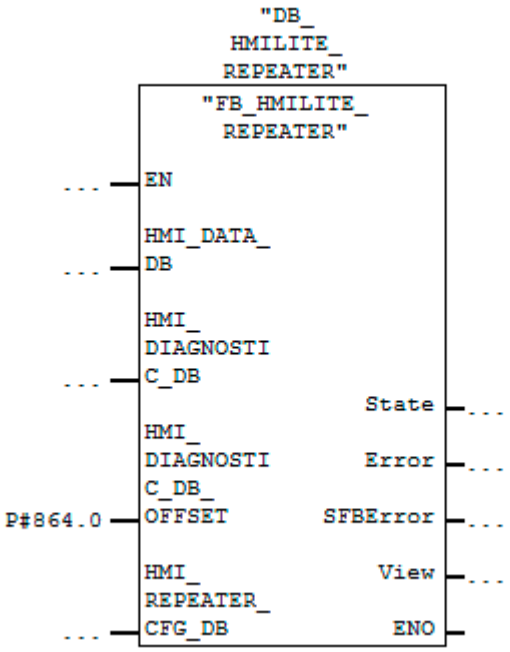


Figure 8-26 Call interface of the FB_HMILITE_REPEATER function

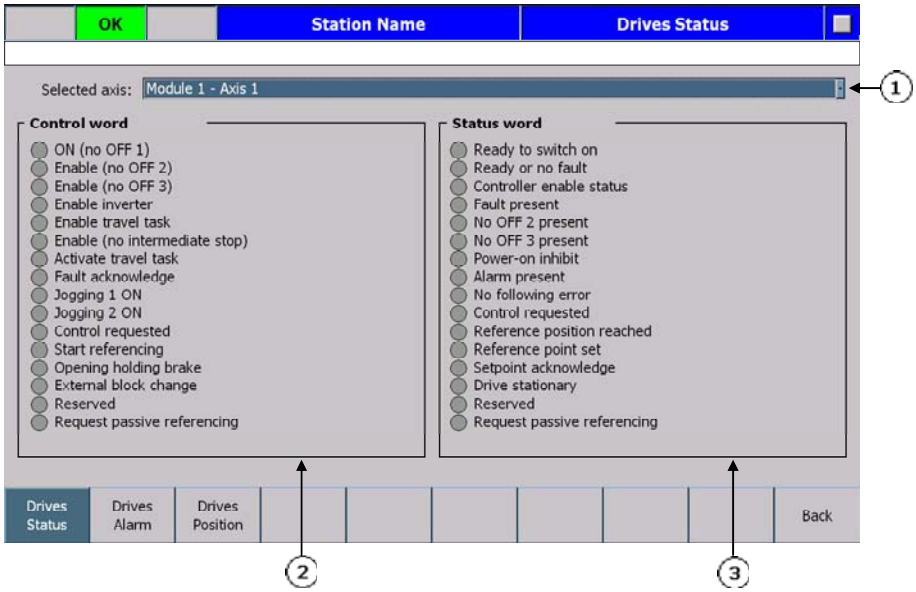
Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block
HMI_DIAGNOSTIC_DB	INT	69	69	The number of the HMI diagnostic data block
HMI_DIAGNOSTIC_DB_OFFSET	POINTER	P#864	P#864	The address of the repeater runtime interface DB_HMILITE_DEVICE_DIAG.SCREEN_REPEATER
HMI_REPEATER_CFG	INT	71	71	The number of the DB_HMILITE_REPEATER_CFG data block
State	BYTE	---	---	The internal state variable
Error	BYTE	---	---	The same error number are displayed on the screen
SFBError	DWORD	---	---	The error from the SFB52 call
View	WORD	---	---	If the screen “Topology determination” is activated, then view = 1 If the screen “Diagnostic buffer” is activated, the view = 2

Table 8-1 Parameters of the FC_HMILITE_PROFIBUS (FC105) function

8.2 “Drive” screen

8.2.1 "Drive status" screen

The "Drive status" screen displays the control and status signals of the axis selected from the selection window.

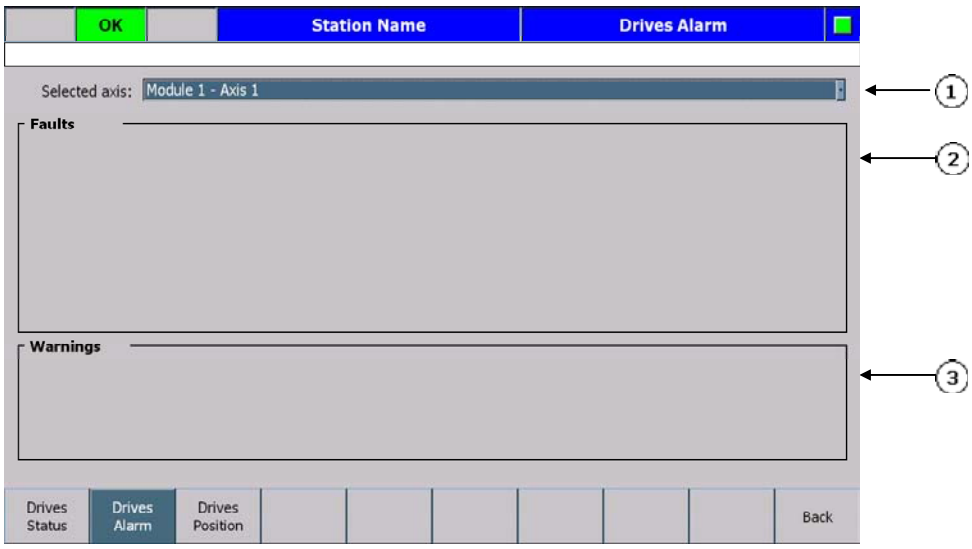


(1) Selection of the axis (selection window)
(2) Control signals of the selected axis
(3) Status signals of the selected axis

Figure 8-27 "Drive status" screen

8.2.2 "Drive alarms" screen

The "Drive alarms" screen displays the malfunctions and warnings of the selected axis.

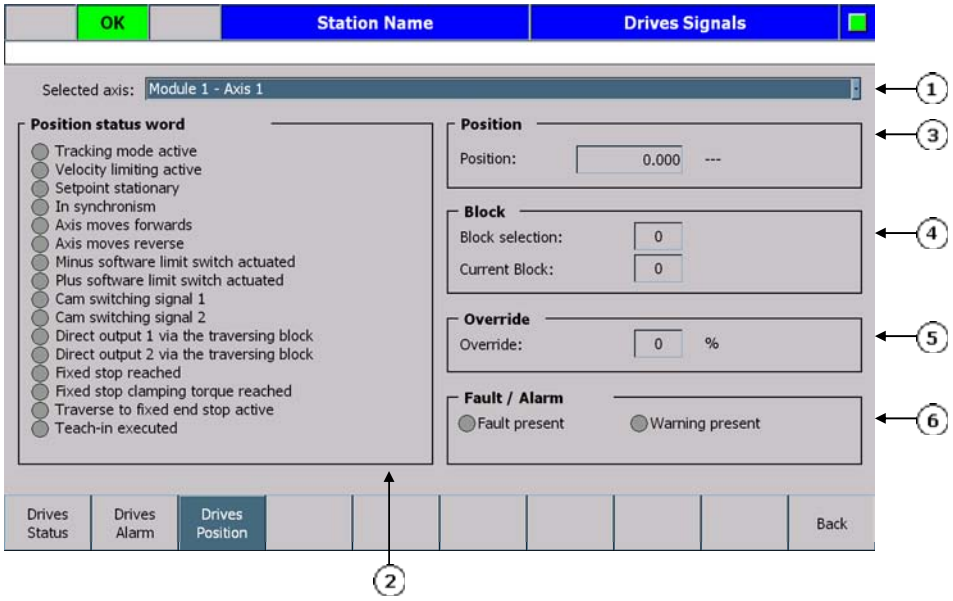


(1) Selection of the axis (selection window)
(2) Area for displaying the malfunctions
(3) Area for displaying the warnings

Figure 8-28 "Drive alarms" screen

8.2.3 "Drive position" screen

The "Drive position" screen displays the Positioning and Positioning data status signals, such as position, block and override of the selected axis. The data, however, is available only for the axes when they are operated as positioning axes.



(1) Selection of the axis (selection window)
(2) Positioning status signals
(3) Display of the axis position
(4) Number of selected block
(5) Override
(6) Display of any pending fault/warning

Figure 8-29 "Drive position" screen

Note

When a Micro Master is used, the information will not be supplied to the Position screen. Only the 611U drive supports the functionality and displays the data. The data will be cleared for other drives.

8.2.4 Configuring the WinCC screens

Configuring the text list in WinCC

The designation of the axes must be specified. The text items are stored in the WinCC "SO_20_AxisName" text list. Each configured axis must have a position in the text list.

The "SO_20_AxisName" text list has the following structure:

Text list		**SO_20_AxisName**
Display Format		Text Decimal
Value	1	Designation of the first axis
Value	2	Designation of the second axis
…	…	…

Table 8-2 Text list for the axis designations

Important

Designation text items for missing axes must be deleted!

8.2.5 Runtime interface (FC_HMILITE_DRIVE)

The FC_HMILITE_DRIVE supplies data to the WinCC screens for the drives. The displayed data is fetched directly from the drive using the PKW interface.

The user must call this function once cyclically in the OB1 for each configured axis, where ACHS_INDEX matches the corresponding values from the WinCC "SO_20_AxisName" text list (see sample program).

A message frame type with PKW interface must be specified for each axis in the HW Config. The input and output address of an axis must be identical.

When positioning axes are used on a Simodrive 611U, the following additional data must be entered in the PZD interface:

The selected block number (setpoint) and the current block number (actual value) must be transferred to the second word.

The positioning status word must be transferred to the third word.

This corresponds to the standard assignment of the 101, 108 and 109 message frames in the "positioning" operating mode.

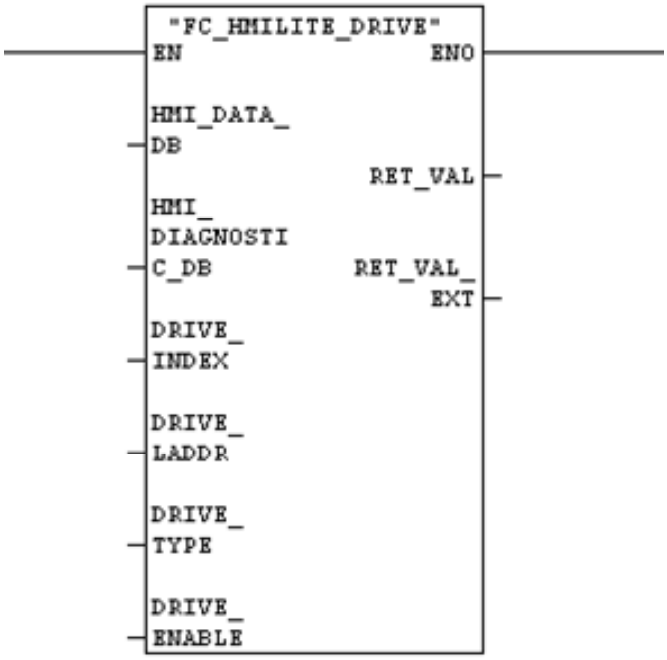


Figure 8-30 Call interface of the FC_HMILITE_DRIVE function

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block
HMI_ DIAGNOSTIC_DB	INT	69	69	The number of the HMI diagnostic data block
DRIVE_INDEX	INT	--	--	Selection of the axis (the value comes from the "SO_20_611UAxisName" text list)
DRIVE_LADDR	INT	---	---	Address of the PKW interface (the input and the output address must be identical)
DRIVE_TYPE	INT	---	---	Drive type> 0: Simodrive 611U 1: Micromaster
DRIVE_ENABLE	BOOL	TRUE	---	"TRUE" releases the communication of the block with the drive using the PKW interface.

Name	Type	Default	Example	Description
RET_VAL	WORD	---	---	Function return value 0000: no error 7000: block not processed 8096: invalid axis type 8102: invalid response from the drive 8103: drive reports error, error no. in RET_VAL_EXT 8104: run time error in the data transmission to the drive 82xx: internal error, call the screen again 8Cyy: SFC yy error, error no. in RET_VAL_EXT
RET_VAL_EXT	INT	---	---	Return value of a system function or error number of the drive (also see RET_VAL)

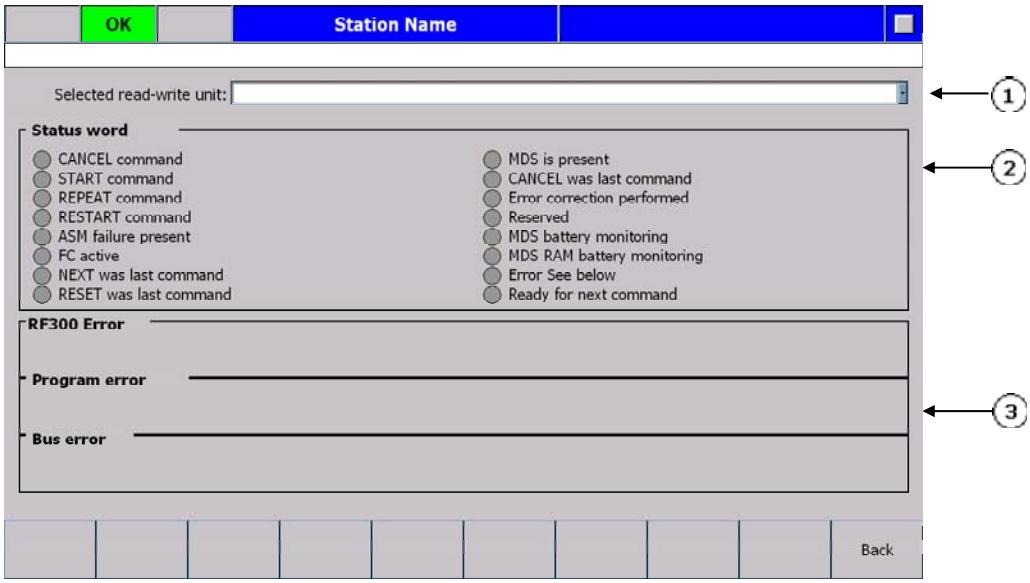
Table 8-3 Parameters of the FC_HMILITE_ANTRIEB function

8.3 "RF300" screen

The "RF300 diagnostics" screen shows the status signals and error messages of a read-write device (SLG). The data is fetched and assigned by a standard block from the Moby interface module (ASM).

The signals and error messages from several interface modules can be displayed in the screen.

8.3.1 Layout of the screen and functionality



(1) Select the RF300 read/write device (selection window)
(2) Status signals of the RF300 SLG
(3) Error messages of the RF 300 SLG

Figure 8-31 "RF300" screen

Selection of the RF300 SLG

You can select several RF300 SLGs in the selection field. Each RF300 SLG provides its own interface.

Status of the SLG

"Status of the SLG" area displays the states of the selected SLG.

RF300 SLG error messages

The "RF300 SLG error messages" area displays RF300-specific error messages.

8.3.2 Supported RF300 interface modules

The following table contains a list of all supported RF300 interface modules with the associated FC:

Interface Module	Block
ASM 450	FC 44
ASM 452 ASM 456 ASM 473 ASM 475	FC 45
ASM 452 - file handler	FC 46

Table 8-4 Supported RF300 interface modules

The data exchange between the controller and the ASM is performed using the FC44, FC45 or FC46 function, depending on the ASM type. The control and feedback signals to and from the ASM, and the error messages can be found in the so-called command data block.

The "RF300 diagnostics" screen displays the information contained in these command data blocks.

The structure of the command data block depends on the associated block.

8.3.3 Configuring the WinCC screens

Configuring the text list in WinCC

The designations of the read-write devices must be specified. The text items are stored in the WinCC "SO_57_RF300SLGName" text list. Each configured RF300 SLG must have an entry in the text list.

The "SO_57_RF300SLGName" text list has the following structure:

Text list		**SO_57_RF300SLGName**
Display Format		Text Decimal
Value	1	Designation of the first RF300 read-write device
Value	2	Designation of the second RF300 read-write device
…	…	…

Table 8-5 Text list for the designations of the RF300 SLGs

Important

The text items for non-configured (unused) RF300 SLGs must be deleted.

8.3.4 Runtime interface (FC_HMILITE_RF300)

The FC_HMILITE_RF300 supplies data to the WinCC screens for the RF300 diagnostics. The displayed data is fetched from the command data block.

The user must call this function once cyclically in the OB1 for each configured RF300 SLG, where RF300_INDEX matches the corresponding values from the WinCC "SO_57_ RF300SLGName" text list (see sample program).

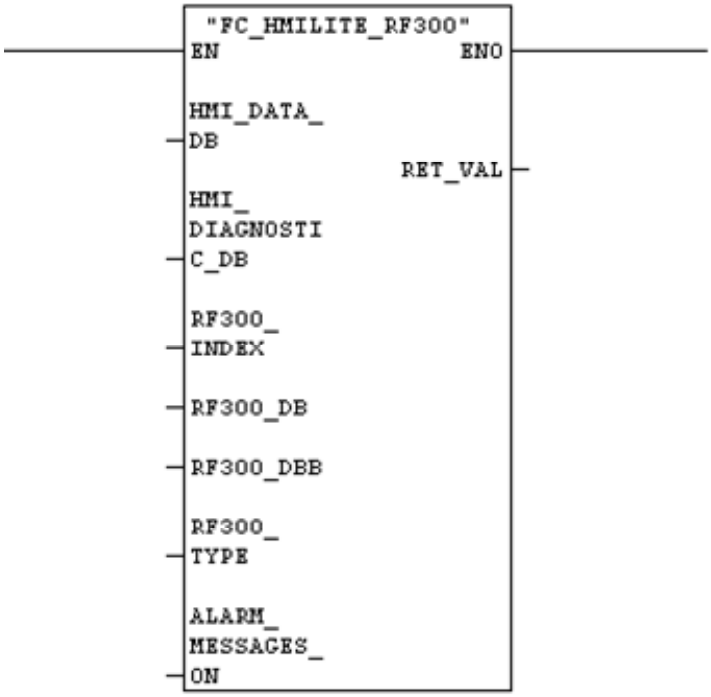


Figure 8-32 Call interface of the FC_HMILITE_RF300 function

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block
HMI_ DIAGNOSTIC_DB	INT	69	69	The number of the HMI diagnostic data block
RF300_INDEX	INT	--	--	Selection of the SLG (the value comes from the "SO_57_RF300SLGName" text list)
RF300_DB	INT	---	---	The number of the RF300 command data block
RF300_DBB	INT	0	0	The start address of the SLG in the command data block
RF300_TYPE	INT	---	---	RF300 block type: 1: FC44 - Word 2: FC45 3: FC46 5: FC44 - Byte
ALARM_ MESSAGES_ON	BOOL	---	---	When TRUE, the FC generates a message when a fault is present at the SLG.
RET_VAL	WORD	---	---	Function return value 0000: no error 7000: block not processed 8096: invalid RF300 type

Table 8-6 Parameters of the FC_HMILITE_RF300 function

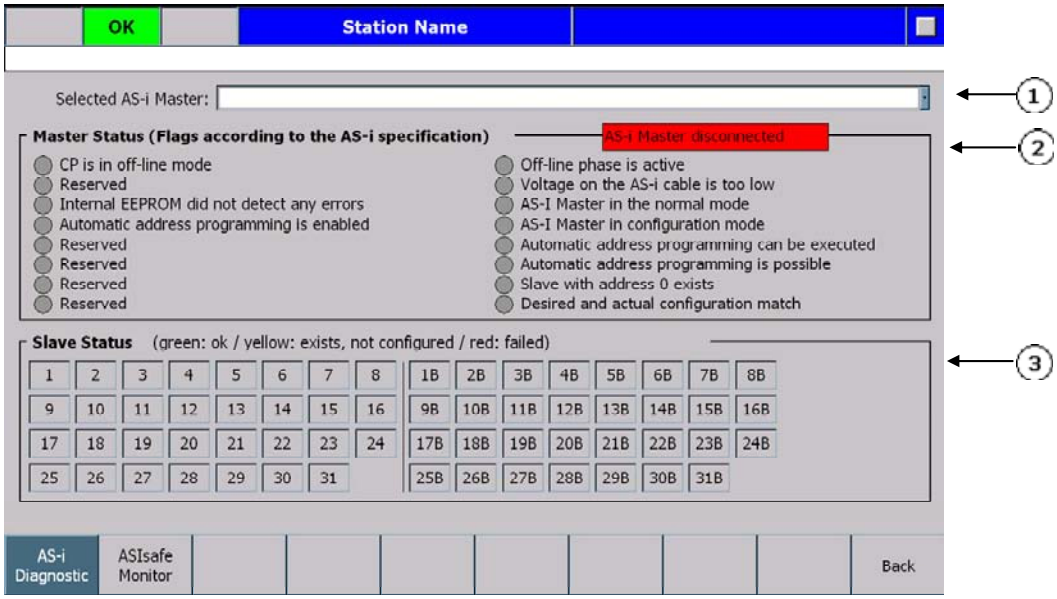
8.4 "AS-i" screen

8.4.1 "AS-i diagnostics" screen

The "AS-i diagnostics" screen provides a user interface for performing diagnostics for an AS-i master.

The screen shows the status signals and the AS-i slaves connected to the bus. The data is fetched from the AS-i master and assigned.

The screen is divided into three areas:



(1) Selection of the AS-I master
(2) Status of the AS-I master
(3) Overview and states of the slaves connected to the bus

Figure 8-33 "AS-i diagnostics" screen

Selection of the master

Several AS-i master modules can be selected in the selection field. Each AS-i master provides its own bus.

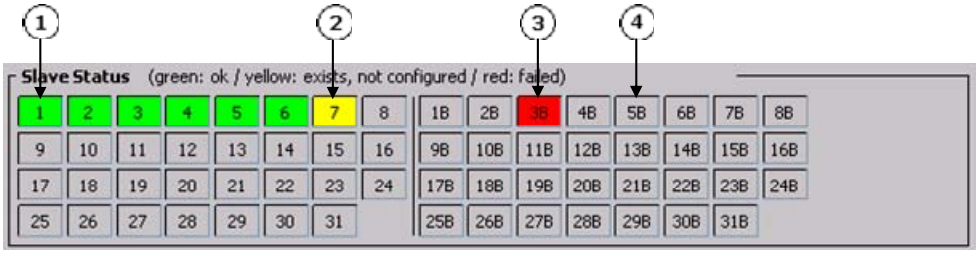
Status of the master

The states of the communications processor of the selected AS-i master are displayed in the "Status of the master" area. The status signals conform to the AS-i specification.

Status of the slaves

The "Status of the slaves" displays an overview of the addresses of the configured slaves. A maximum of 62 A/B slaves can be displayed (see AS-i description, 2.1). Each bus node is represented by its address in a status field.

The slave status is indicated using various background colors.



(1) Slave status: present (green background)
(2) Slave status: present but not configured (yellow background)
(3) Slave status: faulty (red background)
(4) Slave status: not configured (gray background)

Figure 8-34 Status of the slave on the AS-i master

8.4.2 Configuring the WinCC screens

Configuring the text list in WinCC

The designation of the communications processors of the AS-i must be configured. The text items are stored in the WinCC "SO_51_ASIIndex" text list. Each configured AS-I master must have a position in the text list.

Important

Designation text items for missing communications processors must be deleted.

Structure of the "SO_51_ASIMasterName" text list:

Text list		**SO_51_ASIIndex**
Display Format		Text Decimal
Value	1	Designation of the first AS-I communications processor
Value	2	Designation of the second AS-I communications processor
…	…	…

Table 8-7 Text list for the designations of the AS-I masters

8.4.3 Runtime interface (FC_HMILITE_ASI)

The FC_HMILITE_ASI supplies data to the WinCC screens for the AS-i diagnostics. The displayed data is fetched directly from the AS-i master.

The user must call this function just once cyclically in the OB1 for each AS-i master, where ASI_INDEX matches the corresponding values from the WinCC "SO_51_ASIIndex" text list (see sample program).

For the error diagnostics, the FC must also be called once in the OB82. In this case, the "HMI_DATA_DB" and "HMI_DIAGNOSTIC_DB" parameters must be specified appropriately for their function. The "OB82_CALL" parameter must also have the fixed value "1".

! Important

The FC_HMILITE_ASI must be called directly in the OB82 and must not be called indirectly by another FC or FB.

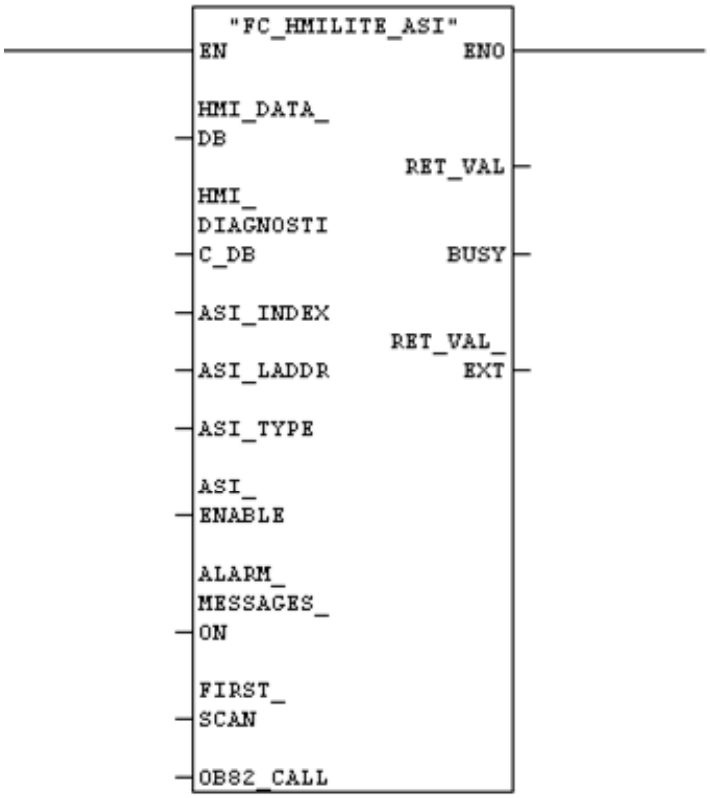


Figure 8-35 Call interface of the FC_HMILITE_ASI function

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	The number of the HMI runtime data block
HMI_ DIAGNOSTIC_DB	INT	69	69	The number of the HMI diagnostic data block
ASI_INDEX	INT	--	--	Selection of the AS-i master (the value comes from the "SO_51_ASIIndex" text list)
ASI_LADDR	INT	---	---	The start address of the AS-i master; the input and the output address must be identical
ASI_TYPE	INT	---	---	Type of the AS-i master: 1: CP142-2 (ET200X) 2: CP342-2 (S7-300, ET200M) 3: CP343-2 (S7-300, ET200M) 4: DP/AS-i Link 20E 5: DP/AS-i Link 65
ASI_ENABLE	BOOL	TRUE	---	"TRUE" releases the communication of the block with the AS-i master.
ALARM_ MESSAGES_ON	BOOL	---	---	When TRUE, the FC generates a message when a fault is present at the SLG.
FIRST_SCAN	BOOL	---	---	Indicates a restart of the controller. Must have the "TRUE" value in the first cycle.
OB82_CALL	BOOL	---	---	"TRUE" must be set when the call is made from the OB82.
RET_VAL	WORD	---	---	Function return value 0000: no error 7000: block not processed 8096: invalid ASI type 8101: unexpected AS-i master status 82xx: internal error, call the screen again 8Cyy: SFC yy error, error no. in RET_VAL_EXT
BUSY	BOOL	---	---	Indicates that the FC is communicating with the AS-i master
RET_VAL_EXT	INT	---	---	Return value of a system function or error number of the drive (also see RET_VAL)

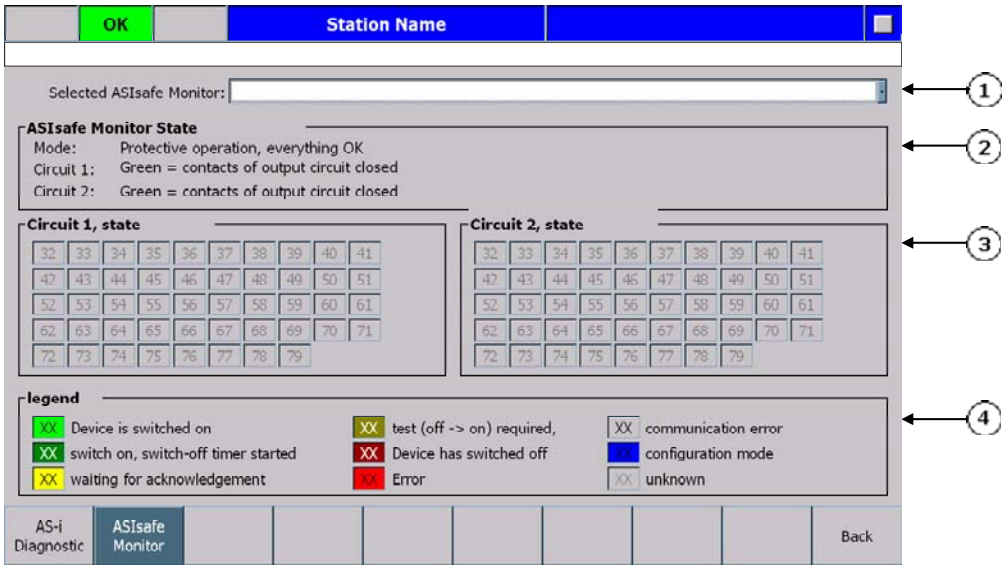
Table 8-8 Parameters of the FC_HMILITE_ASI function

8.4.4 "ASIsafe monitor" screen

The "AS-i safety monitor" screen provides a user interface for performing diagnostics of an AS-i safety monitor.

The screen displays the operating mode of the safety monitor and the status of the individual devices. The data is fetched from the AS-i safety monitor and assigned.

The screen is divided into four areas:



(1) Selection of the AS-I safety monitor
(2) Status of the safety monitor
(3) Status of the individual devices
(4) Legend

Figure 8-36 "ASIsafe Monitor" screen

Selection of the safety monitor

Several AS-i safety monitors can be selected in the selection field.

Status of the safety monitor

The "Status of the safety monitor" area displays the operating mode and the status of the two safety circuits of the selected safety monitor.

Status of the individual devices

The "Status of the individual devices" area visualizes an overview of the 32 – 79 devices of a safety monitor. Each device is represented by its address in a status field.

The slave status is indicated using various background colors.

Legend

The "Legend" area is used to specify the assignment of the color combination to the status of the device.

8.4.5 Configuring the WinCC screens for ASIsafe Monitor

Configuring the text list in WinCC

The designations of the various safety monitors of the AS-interface must be configured. The text items are stored in the "SO_53_ASIMonitor" text list. Each safety monitor that exists must have a position in the text list.

! **Important**

Designation text items for missing safety monitors must be deleted.

Structure of the "SO_53_ASIMonitor" text list:

Text list		SO_53_ASIMonitor
Display Format		Text Decimal
Value	1	Designation of the first safety monitor
Value	2	Designation of the second safety monitor
…	…	…

Table 8-9 Text list for the designations of the safety monitors

8.4.6 Runtime interface (FB_ASIMON2D)

The diagnostic data of the AS-i safety monitor is fetched using the "ASIMON2D" FB. The user must call this function block once cyclically in the OB1 for each configured AS-i safety monitor.

Depending on the safety monitor selected in the screen, the diagnostic data of the FB_ASIMON2D ("memory_copy_diagnosis" parameter) must be copied into the "DB_ASI_DIAGNOSE" (DB69) data block in the "DIAGNOSE_DATEN" (DBW154) DB area.

In the example, this is done using SFC 20 (BLKMOV).

The copying of the diagnostic data, however, can also be enabled using the following FB parameters.

"enable_copy_diagnosis" input parameter:

The input enables the copying of the diagnostic data to the "DB_ASI_DIAGNOSE" DB. It must have the TRUE value when the valid safety monitor for this FB call is selected in the screen.

"indirect_copy_diagnosis" input parameter:

The input specifies how the address is stored at the "memory_copy_diagnosis" input in the "DB_ASI_DIAGNOSE" DB. Because this is specified directly, "false" must always be specified here.

"memory_copy_diagnosis" input parameter:

A pointer to the data area of the diagnostic data in the "DB_ASI_DIAGNOSE" (DB69) DB must be specified here. The data area (DIAGNOSE_DATEN) starts at address 154 in the DB and is 182 bytes long.

Note

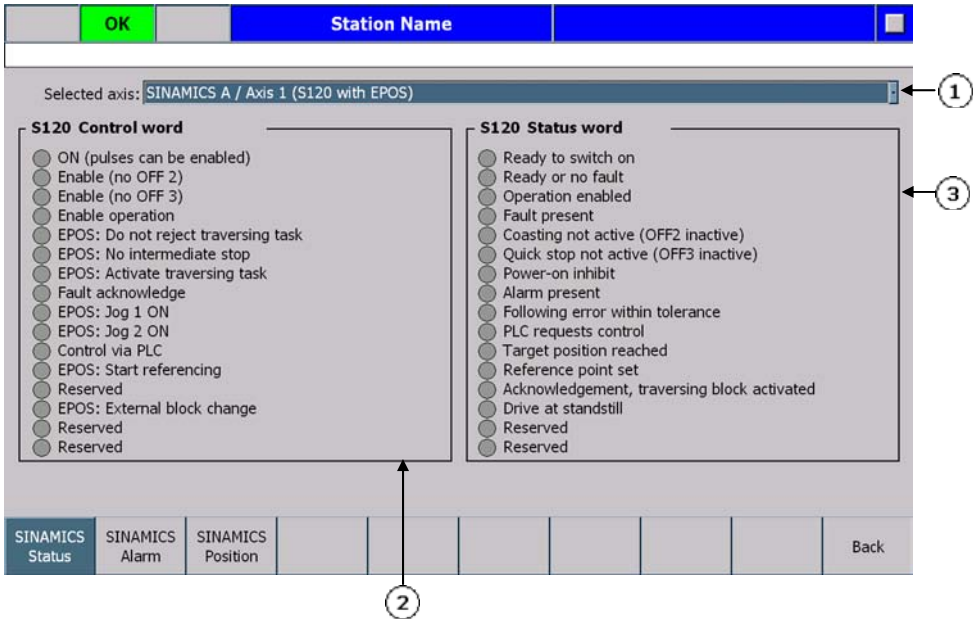
The project is contained on the Software CD with the title "Tools for Control & Distribution - AS-Interface Safety at Work". The archive file in Version 1.0 is stored with the file name "ASiMon2D-v10.zip".

The detailed description of the FB_ASIMON2D is contained in the documentation "ASIMON2D_DIAG_v1.0_deu_eng.pdf".

8.5 "SINAMICS" screen

8.5.1 "SINAMICS status" screen

The "SINAMICS status" screen shows the control and status signals of the SINAMICS axis selected from the selection window.

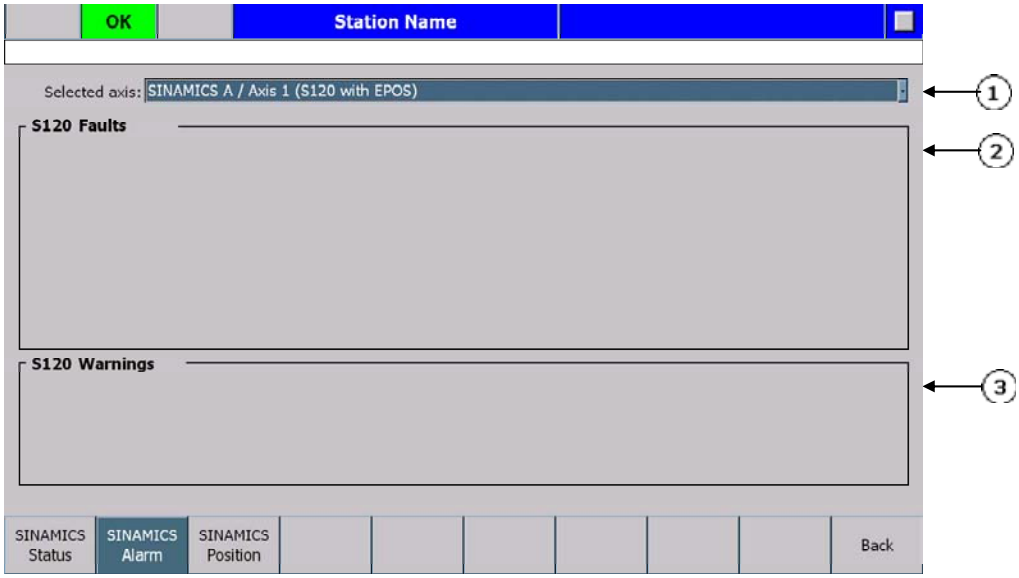


(1) Selection of the axis (selection window)
(2) Control signals of the selected axis
(3) Status signals of the selected axis

Figure 8-37 "SINAMICS status" screen

8.5.2 "SINAMICS alarms" screen

The "SINAMICS alarms" screen shows the faults and warnings of the selected SINAMICS axis.

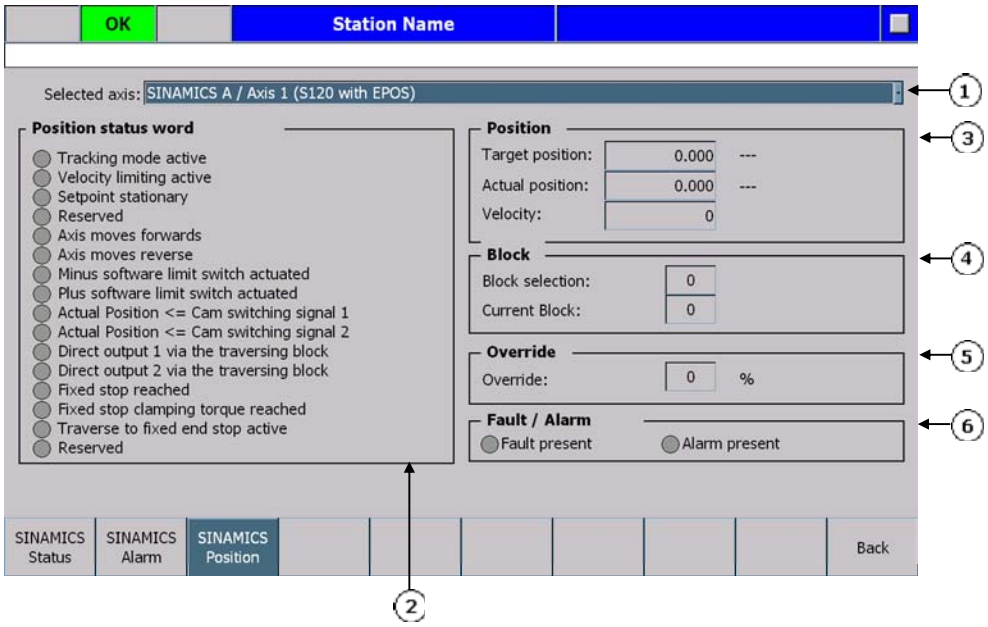


(1) Selection of the axis (selection window)
(2) Area for displaying the faults
(3) Area for displaying the warnings

Figure 8-38 "SINAMICS alarms" screen

8.5.3 "SINAMICS position" screen

The "SINAMICS position" screen shows the positioning status signals and positioning data, such as position, block and override of the selected axis. The data, however, is available only for those SINAMICS axes operated as positioning axes (EPOS).



(1) Selection of the axis (selection window)
(2) Positioning status signals
(3) Display of the axis position
(4) Number of the selected block
(5) Override
(6) Display of any pending fault/warning

Figure 8-39 "SINAMICS position" screen

Note

The "SINAMICS position" screen does not contain any information when a SINAMICS S120 without positioning functionality or SINAMICS G120 is used.

8.5.4 Configuring of the WinCC screens

Configuring of the text list in WinCC

The designations of the axes must be configured. The text items are stored in the "SO_80_SinamicsAxis" WinCC text list. For each text list there must be a drive object configured in “DB_HMILITE_SINAMICS_CFG” (DB70).

The value of the text list entry is the index of the drive object in “DB_HMILITE_SINAMICS_CFG”. The text list entry is assigned to the drive object through the value.

The "SO_80_SinamicsAxis" text list has the following structure:

Text list		**SO_80_SinamicsAxis**
Display Format		Text Decimal
Value	2	Designation of the first axis (value = drive object number)
Value	3	Designation of the second axis (value = drive object number)
…	…	…

Table 8-10 Text list for the axis designations

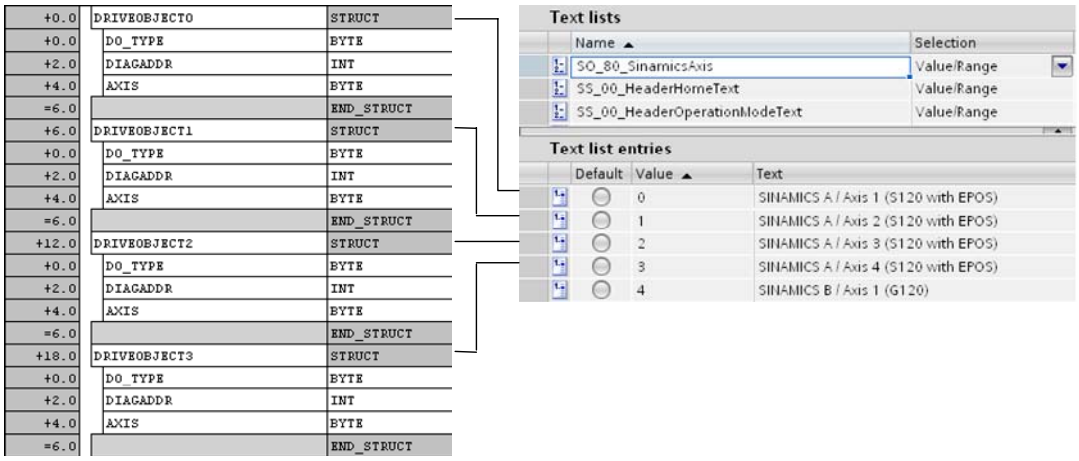


Figure 8-40 How to assign a text list to a drive object

Important

The designation text for missing axes must be deleted!

Important

The value of the text list entry must match the drive object index (order) in “DB_HMILITE_SINAMICS_CFG”.

8.5.5 Configure the drive object (DB_HMILITE_SINAMICS_CFG)

Each text list entry in "SO_80_SinamicsAxis" is assigned to a drive object in “DB_HMILITE_SINAMICS_CFG” through value. The data block “DB_HMILITE_SINAMICS_CFG” consists of the one or more configurations of drive object. Each drive object is configured in a structure:

Name	Typ	Beschreibung
DO_TYPE	BYTE	Drive object type 0 = SINAMICS S120 with positioning functionality (EPOS) 1 = SINAMICS S120 without positioning functionality (EPOS) 2 = SINAMICS G120
DIAGADDR	INT	Diagnostic address of the DP-Slave from “Devices & Networks”
AXIS	BYTE	Drive object ID

Table 8-11 Drive object structure in data block „DB_HMILITE_SINAMICS_CFG“

8.5.6 Runtime interface (FB_HMILITE_SINAMICS)

The FB_HMILITE_SINAMICS supplies the WinCC screens for the SINAMICS diagnostic screens. The displayed data is fetched directly from the drive as parameter requests using acyclical communications services.

The function block must be fetched once cyclically. The "DRIVE_ENABLE" parameter must be used to enable the FB call.

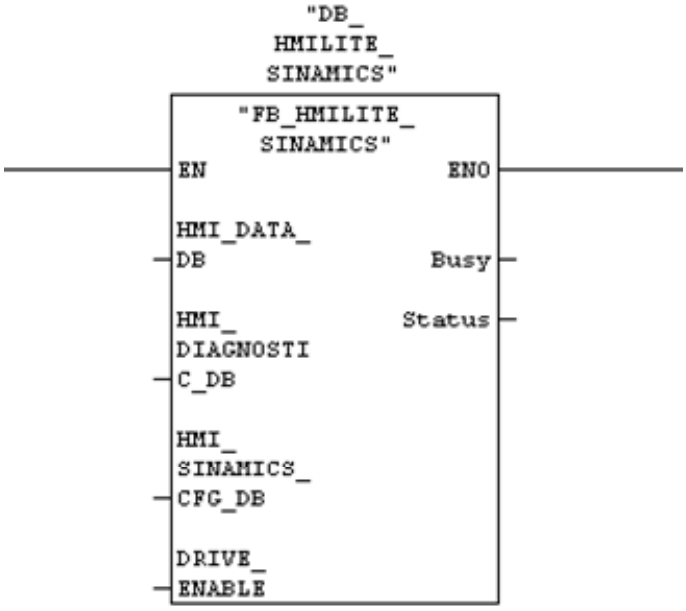


Figure 8-41 Call interface of the FB_HMILITE_SINAMICS function

Name	Type	Default	Example	Description
HMI_DATA_DB	INT	67	67	Number of the HMI runtime data block
HMI_ DIAGNOSTIC_DB	INT	69	69	Number of the HMI diagnostic data block
DRIVE_DIAGADDR	INT	---	---	SINAMICS diagnostic address (see HW Config)
DRIVE_ENABLE	BOOL	TRUE	---	"TRUE" enables the communication of the block with the drive
BUSY	BOOL	TRUE	---	"TRUE": communication with the drive is running
STATUS	WORD	---	---	Block status (0x8001 = SFB53 error, 0x8002 = SFB52 error)

Table 8-12 Parameters of the FB_HMILITE_SINAMICS function

■

9

9 System Screens

9.1 "System" screen

9.1.1 Layout of the screen and functionality

The "System" screen contains general system functions, such as password and user administration, the language setting for the user interface, lamp test and clear the alarm and message archive.

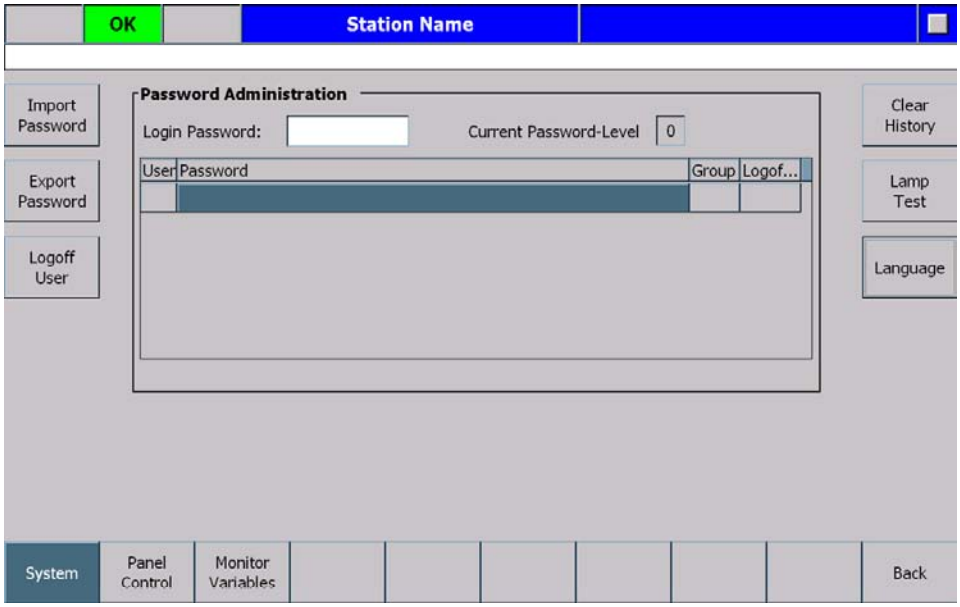


Figure 9-1 "System" screen

Import/export password

This function can be used to export the password list to a memory card or import the password list from a memory card. This makes it possible to specify the password list for only one machine and then transfer it to the other machines.

User logoff

This function is used to reset the current password level to level 0 (user without any special rights).

Delete message buffer

This function is used to clear the message buffer. This includes all messages that have occurred until this time.

Lamp test

The DB_HMILITE_DATA.GLOBAL.LAMPTEST variable has the 1-signal while the key or button remains pressed.

This variable must be further processed by the machine manufacturer.

Address:	DB_HMILITE_DATA.GLOBAL.LAMPTEST
Format:	BOOL
Range of values:	1-signal when the "Lamp test" key on the operator panel remains pressed.
Default setting:	False

Changing the language

The "Change language" button can be used to switch between the languages installed on the operator panel.

A maximum of three languages can be loaded onto the operator panel. The standard project for HMI Lite is delivered in five languages:

- Czech
- English (United Kingdom)
- French
- German
- Hungarian
- Italian
- Polish
- Portuguese (Brazil)
- Romanian
- Russian
- Spanish (international)
- Swedish

Other languages can be implemented for specific projects.

9.2 "Panel Control" screen

9.2.1 Layout of the screen and functionality

The "SS_05_PanelControl" screen provides a number of functions associated with the maintenance and the setting of the operator panel.

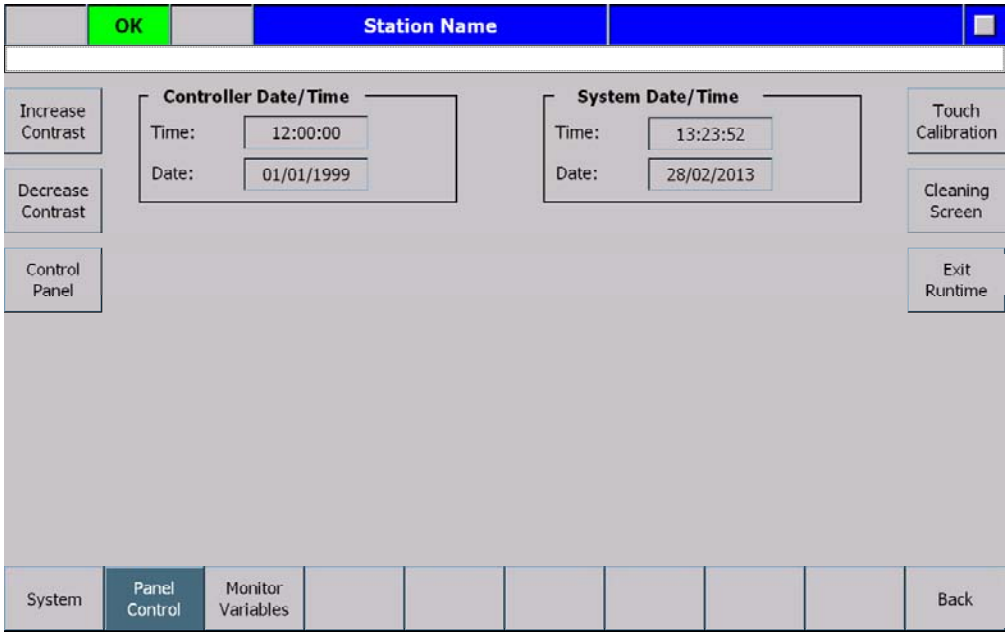


Figure 9-2 "Panel Control" screen

Increase/reduce contrast

These function keys are used to set the contrast of the operator panel.

System control

Pressing this function key opens the window for the system control of the operating system.

Clean screen (only for touchscreen operator panels)

After pressing the "Clean screen" function key, the operator panel user interface switches for a parameterizable time to an empty screen page on which the touch function is deactivated. During this time, it is possible to clean the screen without the danger of inadvertently initiating some function.

Touch calibration (only for touch screen operator panels)

Pressing the "Touch calibration" button starts the calibration of the touch screen.

Exit runtime

Pressing this button exits the WinCC runtime environment and switches to the operating system level.

9.3 "Status Variable" screen

9.3.1 Layout of the screen and functionality

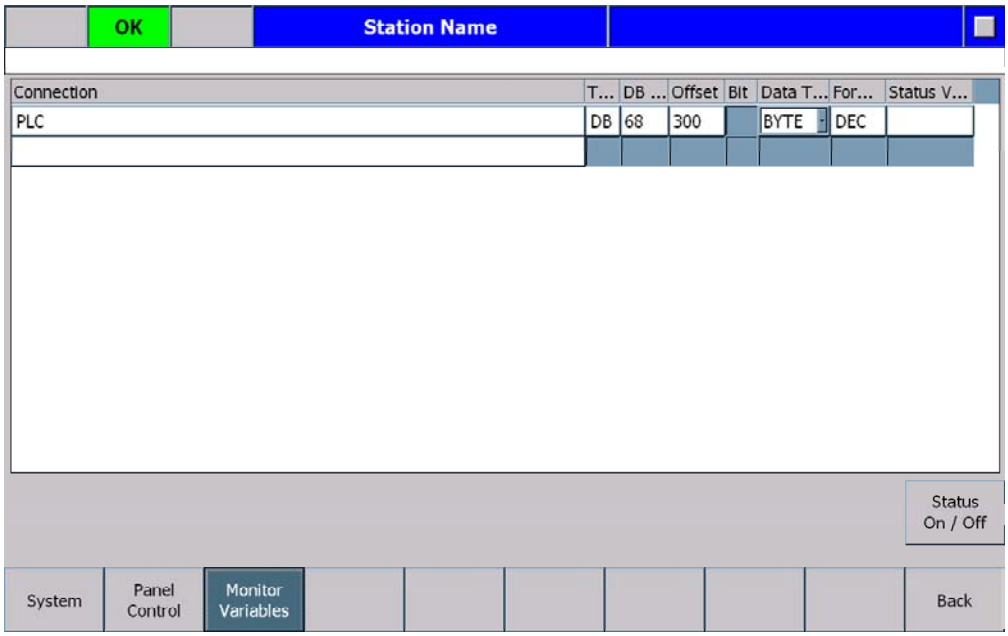


Figure 9-3 "Status Variable" screen

The user can use this screen to monitor the control variables for diagnostic or maintenance purposes.

■

Notes

A

A Appendix

A.1 Abbreviations

The list of abbreviations for the HMI Lite TRANSLINE can be found in Solutions for Powertrain TRANSLINE Manual – Appendix.

A.2 Bibliography

Description	Type
Working with STEP 7 First Steps	Manual
Programming with STEP 7 Manual	Manual
Configuration Hardware and Data Exchange Connections with STEP 7 Manual	Manual
Ladder Diagram (LAD) for Programming S7-300 and S7-400 Reference Manual	Manual
Statement List (STL) for Programming S7-300 and S7-400 Reference Manual	Manual
Function Block Diagram (FBD) for Programming S7-300 and S7-400 Reference Manual	Manual
Standard Software for S7 and M7 STEP 7 User's Guide	Manual
Standard Software for S7-300 and S7-400 Standard Functions, Part 2 Reference Manual	Manual
System Software for S7-300/400, System and Standard Functions Reference Manual	Manual
S7 Graph for S7-300/400 Programming of Sequence Controls Manual	Manual
SIMATIC NET Actuator/Sensor Interface Master Module CP 342-2	Manual
SIMATIC NET CP 343–2 Actuator/Sensor Interface Master Manual	Manual

Description	Type
PLC S7-300, CPU Descriptions; CPU 312 IFM to CPU 318-2 DP Reference Manual	Manual
S7-300 Command List – CPU Descriptions CPU 312C, 313C, 313C-2 PtP, 313C-2 DP, 314C-2 PtP, 314C-2 DP, 312, 314, 315-2 DP	Manual
Simatic HMI WinCC flexible 2008 Compact / Standard / Advanced User Manual	Manual
SIMATIC HMI WinCC flexible 2008 Communication Part 1 User Manual	Manual
SIMATIC HMI WinCC flexible 2008 Communication Part 2 User Manual	Manual
SIMATIC HMI MP 277 Operator Panel (WinCC flexible) Instruction Manual	Manual
SIMATIC HMI TP 177A, TP 177B, OP 177B Operator Panels (WinCC flexible) Instruction Manual	Manual
PROFIBUS DP FB125, FC125 Diagnostic Blocks for SIMATIC S7	Download
PROFIBUS diagnostic package for SIMATIC S7 and TD/OP and WinCC	Download
PROFINET IO diagnostic package	
SIMODRIVE 611U / POSMO SI/CD/CA V5.2 Software Package	Download

Table A-1 Bibliography

A.3 Change log

A.3.1 Edition 03/2003

First Issue

A.3.2 Changes from 03/2003 edition to 03/2004 edition

Complete revision of the manual

Chapters renumbered

Division into manual and configuration guide

A.3.3 Changes from 03/2004 edition to 05/2005 edition

Chapter 1 Introduction

Section 1.4 Hardware requirements

Formal revision

Section 1.5 Software requirements

Software versions corrected

Chapter 2 Installation

Section 2.2 Procedure

Formal revision

Section 2.3 Inclusion of your ProTool project in STEP 7

Formal revision

OP270_6 added

Section 2.5 PROFIBUS configuration with direct key option

Formal revision

Note for safety grounds that the direct keys should be used

Section 2.6 PLC program blocks

Corrected for Version 4.0

Section 2.7 Working with data blocks

Formal revision

Chapter 3 Global Settings and Functionality

Section 3.1 Layout of the screens and basic screen elements

Formal revision

Section 3.2 Menu structure

Formal revision

Section 3.3 Screen "template"

Formal revision

Section 3.4 Designation conventions

Formal revision

Section 3.5 Clock memory byte of the controller

Formal revision

Section 3.6 PLC system time

Formal revision

Section 3.7 Identification of the selected screen

Formal revision

Section 3.8 HMI Lite job mailbox

Formal revision

Section 3.9 FC_HMICE_BASIC

Formal revision

Input parameters revised

Section 3.10 Connection of several operator panels to a controller

New

Chapter 4 Header and Operator Information

Section 4.1 Header

Formal revision

Section 4.1.7 "Change of the display of the status signals in the header“ added

Chapter 5 Manual Operation

Section 5.1 Overview

Formal revision

Section 5.2 Purpose of the individual manual operation screens

Formal revision

Section 5.3 Configuration and runtime interface

Formal revision

Section 5.4 Configuring

Formal revision

Description of the "Touch-panel support activation" variable removed

Section 5.4.3 "Grouping of the movement lines in the manual operation screen" added, new function of the HMI Lite Version 4.0; this means all subsequent sections are displaced

Section 5.5 Runtime interface

Formal revision

Section 5.6 Control interface

Formal revision

Section 5.7 FC_HMICE_MANUAL

Formal revision

Description of the input and output parameters revised

Section 5.8 FB_HMICE_S7GRAPH_MANUAL

New

Section 5.9 Step-by-step procedure

Formal revision

Chapter 6 Production Data Screens

Section 6.1 "Clock times" screen

Formal revision

Section 6.2 "Workpiece counter" screen

Formal revision

Chapter 7 Diagnosis

Section 7.3 "Version" screen

Formal revision

Graphic for the version screen of the HMI Lite Version 4.0 added

Chapter 8 Hardware Diagnostics

Section 8.1 "PROFIBUS" screen

Formal revision

Graphic for the HMI Lite Version 4.0 added

Description for the "Use of the simple PROFIBUS diagnostics" added

Section 8.1.6 Runtime interface (FC_HMICE_PROFIBUS) added

Section 8.1.7 Runtime interface (FC_SIEM_DP_DIAG_OVERVIEW (FC96)) added

Section 8.2 "Drive" screen

Formal revision

"Configuring the DB_HMICE_CONFIG" description removed

Section 8.2.5 "Runtime interface (FC_HMICE_DRIVE)" added

Section 8.3 "MOBY-I" screen

Formal revision

Section 8.3.2 "Supported MOBY interface modules" extended with the ASM 452 - Filehandler

"Configuring the DB_HMICE_CONFIG" description removed

Section 8.3.4 Runtime interface (FC_HMICE_MOBY) added

Section 8.4 "AS-i" screen

Formal revision

"Configuring the DB_HMICE_CONFIG" description removed

Section 8.4.3 Runtime interface (FC_HMICE_ASI) added

Section 8.5 FC_HMICE_DIAGNOSIS and FC_DEVICE_DIAGN

Section removed

Chapter 9 System Screens

Section 9.1 "System" screen

Formal revision

Section 9.2 "Panel Control" screen

Formal revision

Section 9.3 "S7-CPU diagnostics" screen

Formal revision

Section 9.4 "Status Variable" screen

Formal revision

Main chapter

Registers reassigned

Chapter A Appendix

Appendix A.3 Structure of the DB_HMICE_DATA data block

Updated to Version 4.0

Appendix A.4 Structure of the DB_HMICE_CONFIG data block

Updated to Version 4.0

Appendix A.5 Structure of the DB_DEVICE_DIAGNOSE data block

New

Appendix A.6 Change log

New

A.3.4 Changes from 05/2005 edition to 03/2007 edition

Change of the designations, etc. through all chapters

(Function: Find - Replace)

Old designation	*New designation*
HMI Lite CE	HMI Lite
HMICE	HMILITE
ProTool	WinCC flexible
(old operator panel types)	MP277 and OP177B (TP177B)

Chapter 1 Introduction

Section 1.2 Provided screens

Notes (* and **) for the incomplete configuring in the HMI project removed;

menu tile changed and corrected (rename and delete)

Section 1.4 Hardware requirements

Table 1-1 changed for the new operator panel types

Screen 1-2 (Chp1_Panels.ppt) new and the representation of new device types added

Information text changed to the new menu text in WinCC flexible ("Change Device Type...")

Section 1.5 Software requirements

Software versions changed

Special order number added

Service Packs – table corrected

Chapter 2 Installation

Section 2.1 Unpacking the source project

Project structure in Figure 2-1 changed to the new structure (incl. WinCC flexible)

Section 2.3 Inclusion of your WinCC flexible project in STEP 7

Table 2-1 changed for WinCC flexible (name assignment, new devices and icons)

Section 2.6 PLC program blocks

Section 2.6.1 "PLC blocks from HMI Lite" adapted to the project structure

Section 2.6.2 "Schema for calling the function blocks" in Figure 2-2 (names and designation) changed for Version 5.0

Chapter 3 Global Settings and Functionality

Section 3.2 Menu structure

Figure 3-2 (Chp3_MneuStructure_6Inch.ppt) and Figure 3-3 (Chp3_MneuStructure.ppt) changed

Section 3.7 Identification of the selected screen

Configuring of screen events in Figure 3-5 (Chp3_SS_00_ScreenIdentification.ppt) changed to represent the WinCC flexible user interface

Table 3-2 changed and extended (affected screen numbers 53/54/55/57/58)

Section 3.9 FC_HMILITE_BASIC

Figure 3-7 Block representation (Chp3_FC_HMILITE_BASIC.jpg) changed

Chapter 4 Header and Operator Information

Section 4.1 Header

Section 4.1.1 "Layout of the header" changed for 6" devices from mono to color

Chapter 5 Manual Operation

Section 5.1 Overview

Figure 5-2 not replaced, old user interface for the operator panel remains the same in the basic structure, no change other than the colors

Section 5.4 Configuring

Section 5.4.3 "Grouping of movement lines in the manual operation screen" Figure 5-7 (Chp5_KeyConfig.jpg) changed to reflect the WinCC flexible user interface

Section 5.7 FC_HMILITE_MANUAL

Block representation in Figure 5-15 (Chp5_FC_HMILITE_MANUAL.jpg) changed

Note for the handling of the lock for external key mode added

Section 5.8 FB_HMILITE_S7G_MANUAL

Block representation in Figure 5-16 (Chp5_FB_HMILITE_S7G_MANUAL.jpg) changed

Chapter 6 Production Data Screens

Section 6.1 "Clock times" screen

Section 6.1.1 "Layout of the screen and functionality" Figure 6-1 (Chp6_ScreenCycleTime.ppt) key sequence changed

Text in the "Procedure for the clock time" section extended with the functionality that the measurement of the clock time can be interrupted

Section 6.1.2 "Runtime interface (FC_HMILITE_CYCLETIME)" block representation in Figure 6-2 (Chp6_FC_HMILITE_CYCLETIME.jpg) changed and Table 6-1 extended with the "BREAK" entry

Section 6.2 "Workpiece counter" screen

Section 6.2.1 "Layout of the screen and functionality" Figure 6-3 (Chp6_ScreenPartCount.ppt) and Figure 6-4 (Chp6_PartCountYesNo.ppt) key sequence changed

Section 6.2.2 "Runtime interface (FC_HMILITE_COUNTER)" block representation in Figure 6-5 (Chp6_FC_HMILITE_COUNTER.jpg) changed

Chapter 7 Diagnosis

Section 7.1 "Messages" screen and "Alarm archive" screen

Section 7.1.1 "Layout of the screen and functionality", change of the text because the alarm structure in WinCC flexible differs (no storage medium)

Section 7.1.3 "Configuration" new text, Figure 7-2 for the creation of the alarm display object in the Alarm archive screen added

Section 7.3 "Version" screen

Figure 7-4 (previously 7-3) (Chp7_ScreenVersion.ppt) changed to reflect HMI Lite Version 5.0

Chapter 8 Hardware Diagnostics

Section 8.1 "PROFIBUS" screen

Section 8.1.6 "Runtime interface (FC_HMILITE_PROFIBUS)" Figure 8-7 (Chp8_FC_HMILITE_PROFIBUS.jpg) changed

Section 8.1.7 "Runtime interface (FC_SIEM_DP_DIAG_OVERVIEW (FC96))" Figure 8-8 (Chp8_FC_SIEM_DP_DIAG_OVERVIEW.jpg) changed

Section 8.2 "Drive" screen

Section 8.2.3 "Drive position" screen, note added that the Position screen is supplied with data only for 611

Section added "Runtime interface (FC_HMILITE_DRIVE)" Figure 8-12 (Chp8_FC_HMILITE_DRIVE.jpg) changed

Section 8.3 "MOBY-I" screen

Section 8.3.2 "Supported MOBY interface modules" extended with the ASM 456

Section 8.3.4 "Runtime interface (FC_HMILITE_MOBY)" Figure 8-14 (Chp8_FC_HMILITE_MOBY.jpg) changed

Section 8.4 "AS-i" screen

Section 8.4.1 "AS-i diagnosos" screen, title changed, and Figure 8-15 (Chp8_ScreenASIDiagnose.ppt) changed because the screen selection changed with an addition

Section 8.4.3 "Runtime interface (FC_HMILITE_ASI)" Figure 8-17 (Chp8_FC_HMILITE_ASI.jpg) changed

New: Section 8.4.4 "ASIsafe Monitor" screen added

New: Section 8.4.5 Configuring the WinCC flexible screens for ASIsafe Monitor added

New: Section 8.4.6 Runtime interface (FB_ASIMON2D) added

Chapter 9 System Screens

Section 9.1 "System" screen

Section 9.1.1 "Layout of the screen and functionality" Figure 9-1 (Chp9_ScreenSystemGeneral.ppt) changed, the screen selection for S7-CPU diagnostics removed

Extension of the language scope and thus also the functionality for the "Change language" item

Section 9.2 "Panel Control" screen

Formal revision

Section 9.2.1 "Layout of the screen and functionality" Figure 9-2 (Chp9_ScreenPanelControl.ppt) changed, the screen selection for S7-CPU diagnostics removed

Section 9.3 "S7-CPU diagnostics" screen

deleted

Section 9.3 (previously 9.4) "Status Variable" screen

Section 9.3.1 "Layout of the screen and functionality" Figure 9-3 (previously 9.4) (Chp9_ScreenS7VarStatus.ppt) changed, the screen selection for S7-CPU diagnostics removed

Chapter A Appendix

Appendix A.3 Structure of the DB_HMILITE_DATA data block

Updated to Version 5.0

Appendix A.4 Structure of the DB_HMILITE_CONFIG data block

Updated to Version 5.0 (only the title, contents same as V4.0)

Appendix A.5 Structure of the DB_HMILITE_DEVICE_DIAG data block

Updated to Version 5.0

Appendix A.6.4 Changes from 05/2005 edition to 03/2007 edition

New

A.3.5 Changes from 03/2007 edition to 08/2007 edition

Chapter 2 Installation

Section 2.6 PLC program blocks

Section 2.6.1 “PLC blocks from HMI Lite“ in Table 2-2 extended by DP history blocks (FC & DB)

Section 2.6.2 “Schema for calling the function blocks“ in Figure 2-2, entry FC_HMILITE_DP_HISTORY added

Chapter 3 Global Settings and Functionality

Section 3.7 Identification of the selected screen

Table 3-2 extended by the new screen entry SS_45_ProfibusDiagnosticHistory (screen number 45)

Chapter 5 Manual Operation

Section 5.4 Configuring

Section 5.4.3 “Grouping of movement lines in the manual operation screen“, Figure 5-7 (Chp5_KeyConfig.jpg) updated

Chapter 7 Diagnosis

Section 7.3 "Version" screen

Figure 7-4 (Chp7_ScreenVersion.ppt) extended by the blocks FC_HMILITE_DP_HISTORY (FC172) and DP_HMILITE_DP_HISTORY (DB172)

Chapter 8 Hardware Diagnostics

Section 8.1 "PROFIBUS" screen

Section 8.1.1 Figure 8-1 (Chp8_ScreenProfibus.ppt) updated

Note regarding the display > first faulty slave (Chp8_Failed_slave.JPG) integrated

Section 8.1.4 “Detailed diagnostics“, Figure 8-6 (Chp8_ScreenProfibusDetail.ppt) updated

New: Section 8.1.5 “DP history“, new section added to latching PROFIBUS diagnostics

Section 8.1.6 (formerly 8.1.5), Section 8.1.7 (formerly 8.1.6) und Section 8.1.8 (formerly 8.1.7), numbers shifted due to new section entry for the DP history (8.1.5)

New: Section 8.1.9 “Runtime interface (FC_HMILITE_DP_HISTORY)“

Chapter A Appendix

Section A.3 Structure of the DB_HMILITE_DATA data block

Block version IDs for the latching PROFIBUS diagnostics have been updated

Section A.5 Structure of the DB_HMILITE_DEVICE_DIAG data block

Updated by the additional functions for the latching PROFIBUS diagnostics (DP history) regarding BILD_PROFIBUS

Section A.6.5 Changes from 03/2007 edition to 08/2007 edition

Newly created

A.3.6 Changes from 08/2007 edition to 2009 edition

Chapter 1 General

Section 1.2 Screens provided

Extended by the hardware diagnostics screens for PROFINET and SINAMICS

Section 1.5.1 Configuring and programming software / licenses

Updated to Version 5.1 and order number changed

Chapter 2 Installation

Section 2.1 Dearchiving of the source project

Updated to Version 5.1

Section 2.6 PLC programming blocks

Updated to Version 5.1

Blocks for PROFINET and SINAMICS diagnosis entered in the table and call-up scheme

Chapter 3 Global settings and functionality

Section 3.2 Menu structure

Menu structure extended by the hardware diagnostics screens for PROFINET and SINAMICS

Section 3.7 Identification of the screen selected

Table 3-2 extended by the SINAMICS and PROFINET diagnostics screens

Chapter 7 Diagnosis

Section 7.3 "Version" screen

Figure 7-4 (Chp7_ScreenVersion.ppt) extended by the block FB_HMILITE_SINAMICSCU3x0 (FB461) and block numbers adapted

Chapter 8 Hardware diagnosis

Section 8.3 "RF300" screen

Term Moby replaced by RF300.

Section 8.4 "ASIsafeMonitor" screen

Selection text list names changed.

Section 8.5 "SINAMICS" screen

Newly created

Section 8.6 "PROFINET / PROFIBUS diagnosis" screen

Newly created

Chapter A Appendix

Section A.3 Structure of the data block DB_HMILITE_DATA

Section version IDs updated for the blocks for SINAMICS diagnosis. Alarm “SINAMICS_BLOCK_DISABLE“ added

Section A.5 Structure of the data block DB_HMILITE_DEVICE_DIAG

Extended by the section SINAMICS

Section A.6.6 Changes from 08/2007 edition to 2009 edition

Newly created

A.3.7 Changes from 2009 edition to 2011 edition

Chapter 1 General

Section 1.1 Product overview

In screen “Chp1_System_overview” link changed from PROFIBUS to PROFINET

Section 1.2 Screens offered

Extended by the machine overview in the machining area

Subsection 1.5.1 Configuration and programming software / licenses

Version of configuration and programming software changed to current versions, plus order number for ProAgent license adapted

Chapter 2 Installation

Section 2.6 PLC program blocks

Subsection 2.6.1 “PLC blocks from HMI Lite” in Table 2-2, FB 465 (DB 465) renamed to FB_SIEM_PNIODiag with the comment that blocks cover PROFINET & PROFIBUS IO Diagnostics

Subsection 2.6.2 “Scheme for calling function blocks” in Fig. 2-2 slightly adjusted

Chapter 3 Global Settings and Functionality

Section 3.7 Identification of the selected screen

Table 3-2 extended by another screen of PROFINET Diagnostics, plus note that PROFIBUS Diagnostics screens in the 10" variant are no longer active

Chapter 6 Production Data Screens

Subsection 6.2.1 Screen layout and functionality

Note supplemented for implementing reduced display functions in the workpiece counter screen for 6" devices

Chapter 8 Hardware Diagnosis

Overview screen of the HW diagnosis (Chp8_ScreenHWDiagnose.ppt) inserted with short text for explanation together with status display of PROFIBUS and PROFINET from the overview already.

Section 8.1 "PROFINET / PROFIBUS diagnosis" screen

Previously Chapter 8.6

Fully revised, new screens, extended texts

Screens inserted or changed (Chp8_ScreenPNIODiagUebersicht.ppt, Chp8_ScreenPNIODiagLegende.ppt, Chp8_ScreenPNIODiagDetail.ppt, Chp8_ScreenPNIODiagLeitungsdiagnose.ppt, Chp8_ScreenPNIODiagTrigger.ppt, Chp8_ScreenPNIODiagInfo.ppt), explanations described in screen shots (Chp8_PNIODiagZustaende.ppt, Chp8_PNIODiagTNInformation.ppt, Chp8_PNIODiagDetaildiagnose.ppt) and configuration instructions added with note on the network ID (Chp8_HWKonfigMastersystem)

Subsection 8.2.5 Runtime interface (FC_HMILITE_DRIVE)

Formal review

Section 8.3 Screen "RF300"

Subsection 8.3.1 “Layout of screen and functionality” Fig. 8-17 (Chp8_ScreenRF300.ppt) changed

Subsection 8.3.4 Runtime interface (FC_HMILITE_RF300)

Formal review

Subsection 8.4.3 Runtime interface (FC_HMILITE_ASI)

Formal review

Subsection 8.4.6 Runtime interface (FC_HMILITE_ASIMON2D)

Formal review

Subsection 8.5.5 Runtime interface (FC_HMILITE_SINAMICSCU3x0)

Formal review

Section 8.6 "PROFIBUS" screen

Previously Section 8.1

Note added that screens can be used only in the 6" variant. In the 10" variant, the diagnosis is covered through the new PNIODiag

Chapter A Appendix

Subsection A.6.7 Changes from the 01/2009 Edition to the 09/2011 Edition

Newly created

A.3.8 Changes from 2011 edition to 2013 edition

Chapter 2 Installation

Section 2.6 Table 2-2, Figure 2-6

The block of the second PROFIBUS diagnostic removed, new diagnostic blocks added

Section 3.2 Figure 3-2, Figure 3-3

Menu structure of the 7'' variant changed – the same as in the 12'' variant

Chapter 3 Global Settings and Functionality

Section 3.7 Table 3-2

New screens added, for example PN/DP diagnostic for the 7'' variant

Chapter 8 Hardware Diagnosis

Section 8

Hardware diagnostic of the both variants unified. The new repeater diagnostic added

All sections

All screen figures updated
Documentation for Comfort Panels and TIA Portal added

A.3.9 Changes from 2013 edition to 2014 edition

Chapter 1 General Information

Section 1.5 Software requirements

Software versions changed
Order numbers removed

Chapter 2 Installation

Section 2.2 “Licensing“ added, description of licensing of HMI Lite, this means all subsequent sections are displaced

Chapter 5 Manual Operating

Section 5.8 FB_HMILITE_S7G_MANUAL

Fault information of the Status parameter changed

Requirements, extended texts

Chapter 8 Hardware Diagnostics

Section 8.1.12 Runtime interface (FB_PNIODiag)

Figure 8-26 Call interface of the FB_HMILITE_REPEATER function extended

Table 8-1 Parameters of the FC_HMILITE_ REPEATER function extended

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