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INNOVATION IN INTERFACE

INTERBUS

Diagnostics Guide

Designation: IBS SYS DIAG DSC UM E

Revision: CC01

Order No.: 27 47 29 3

This guide is valid for:
INTERBUS Generation 4 controller boards

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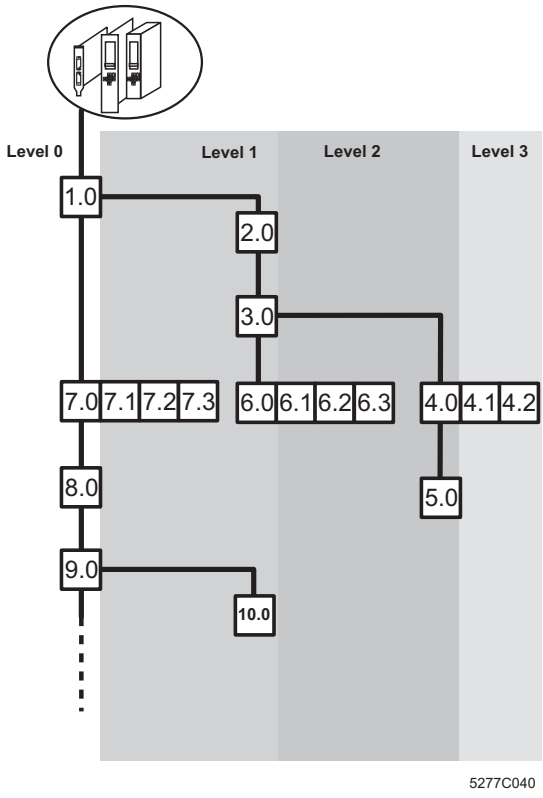


Figure 1 Example of a bus architecture

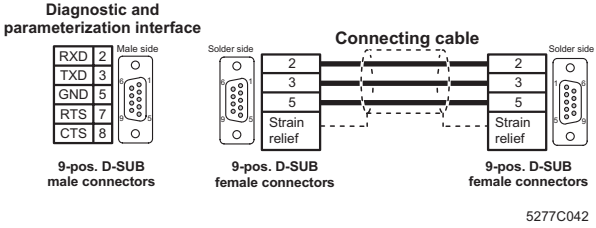


Figure 2 Assignment of the connecting cable (IBS PRG CAB)

Information About This Guide

Depending on the version, Generation 4 controller boards have a diagnostic display or LEDs for status and diagnostic indication. Diagnostics can also be provided by system messages (using driver blocks).

This guide describes the operation of the diagnostic display, the LED signal representation, and system messages indicated by driver blocks.



The back cover page provides an overview of the controller board menu structure.

The descriptions refer to firmware Version 4.x. In the text, the firmware version is indicated using the short form "FW x.x".

When using this guide, please observe the following notes:



The *attention* symbol refers to an operating procedure, which if not carefully followed, could result in damage to hardware and software or personal injury.



The *note* symbol gives you tips and advice on the use of hardware and on software optimization. It also informs you of conditions that must be strictly observed to achieve error-free operation. The symbol is also used to clarify terms.



The *text* symbol refers you to detailed sources of information (manuals, data sheets, literature, etc.) on the subject matter, product, etc. This text also provides helpful information for the orientation in the manual.

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User Interface Description

Keypad

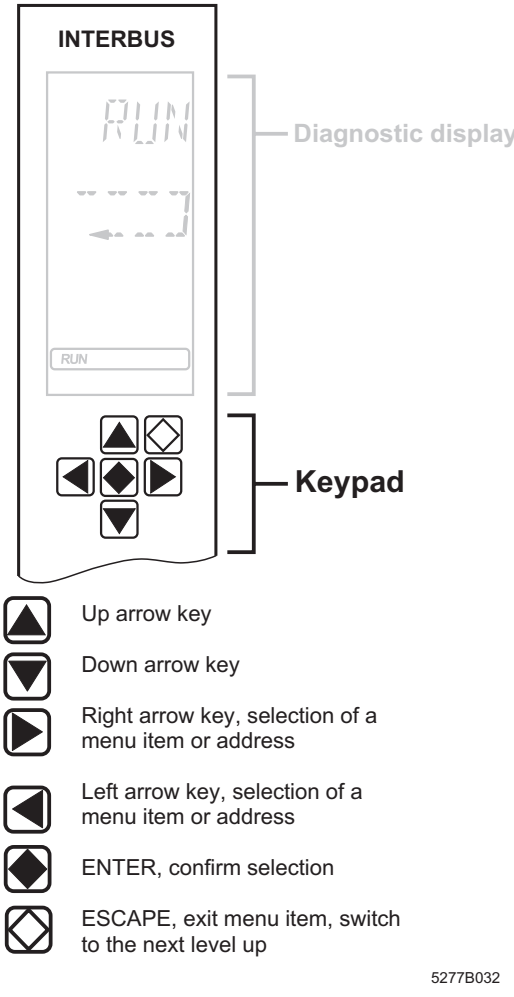


Figure 1 Keypad

The keypad enables menu-driven operation of the diagnostic display using the arrow keys.

Diagnostic Display

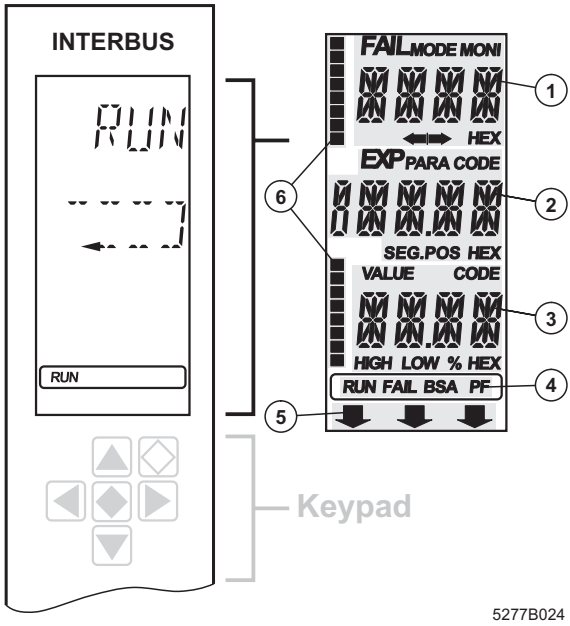


Figure 2 Diagnostic display

You can test the segments of the diagnostic display (see "LCD TEST Menu Item (Display Test)" on page 31).

The diagnostic display consists of:

– Three main lines to display operating states, addresses, and data. Messages, for example, are partly shown in clear text.
– 16 status segments on the left-hand side of the display for binary representation of input and output data.
– Red or green background illumination, depending on the operating state of the bus.

① Line 1

FAIL Indicates that an error has occurred and provides information about the error type.
CRTL: Controller error
RBUS: Remote bus error
LBUS: Local bus error
BUS: General bus error
OUT1: Error at the outgoing interface
OUT2: Error at the branching interface
DEV: Device error
PF: Peripheral fault

MODE When the MODE menu item is active, further menu items can be selected,
see "MODE Menu" on page 17.

MONI Indicates that monitor mode is activated, see "MONI Menu (Monitor)" on page 32.

HEX The value in the main line is displayed in hexadecimal notation. If the HEX segment is not activated, the value is displayed in decimal notation.

② Line 2

PARA The displayed value is a parameter of a message.

CODE The displayed value represents a code.

SEG.POS The displayed value is a device number (bus segment and position). A counting method example can be found on the inside cover page of this guide.

HEX The value in the second main line is displayed in hexadecimal notation. If the HEX segment is not activated, the value is displayed in decimal notation.

③ Line 3

VALUE The displayed number represents a value.

CODE The displayed value represents a code.

HIGH The displayed number is the high-order word of a 32-bit value.

LOW The displayed number is the low-order word of a 32-bit value.

%	The displayed number is a percentage term.
HEX	The value in the third main line is displayed in hexadecimal notation. If the HEX segment is not activated, the value is displayed in decimal notation.

④ Status Line

The status line indicates the current operating state of the controller board (see "System Startup" on page 14).

RUN	If the controller board is in the READY or BOOT state, the RUN element is not switched on. In the ACTIVE state, it flashes and in the RUN state, it is permanently on.
FAIL	Active in the event of controller, user or bus errors.
BSA	(**B**us **S**egment **A**borted) Active when a bus segment is switched off and inactive when **all** segments are switched on again.
PF	(**P**eripheral **F**ault) Active when a device indicates a peripheral fault.

⑤ Arrows Pointing Down

If the higher-level control system is in the STOP state, an arrow appears in the bottom line of the display pointing to the description on the front plate. This description is host-specific and indicates the state of the host system. Examples include:

BASP	(Siemens S5) Disable command output
SYSFAIL	(VMEbus) System failure
NETFAIL	(Ethernet) Network failure
STOP	(Allen-Bradley, Siemens S7) Control system in programming mode
CLAB	(Bosch) STOP state

⑥ 16 Status Segments

16 status segments are located on the left-hand side of the display for binary representation of input and output words. They are displayed when selecting a corresponding menu.

Diagnostics for Ethernet Controller Boards

The diagnostics for Ethernet controller boards are almost identical to the diagnostics for other controller boards.

The diagnostic display has the same menu structure. In addition, Ethernet controller boards have a menu item for setting IP addresses (see page 31). Set the IP address of the Field Controller to ensure communication via Ethernet.

For Ethernet controller boards, there are special error codes which are also provided in the list of error codes (see page 49 and onwards).

Ethernet LED Operating Indicators

The three LEDs (LINK, RECEIVE, and TRANSMIT) indicate the state of the Ethernet interface. The LEDs have the following meaning:

LINK	The *LINK* LED (yellow) indicates the state of the twisted pair link. This LED is active when two devices are properly connected via a cable.
RECEIVE	The *RECEIVE* LED (green) is on when the Ethernet interface is receiving data.
TRANSMIT	The *TRANSMIT* LED (green) is on when the Ethernet interface is transmitting data.

Diagnostics Without Display

On controller boards with no display, diagnostic information is indicated via LEDs or by using software.

In the following table, the meaning of the LEDs is shown in comparison with the corresponding display:

Table 1 Comparison of LED states/display

Name	LED State	Display	Meaning
READY/ RUN	Green, OFF	BOOT/RDY	See page 14
	Green, flashing	ACTV	
	Green, ON	RUN	
BSA	Yellow	BSA	See page 7
FAIL	Red	FAIL	
PF	Yellow	PF	
STOP	Yellow	BASP, SYS_FAIL, CLAB, STOP	

Table 2 Meaning of LED diagnostic indicators

LED	Meaning
RDY/RUN	INTERBUS ready to operate/active
BSA	Bus segment aborted
FAIL	Bus error (remote bus/local bus)
PF	Peripheral fault
STOP	Control system in the STOP state

Diagnostics Using Software

For controller boards with no display, you can use CMD software (Order No. 27 21 43 9) for diagnostics. This software runs under Windows and provides comprehensive functions for configuration, startup, and diagnostics.

PC WORX software is available for Field Controllers or Remote Field Controllers.

Meaning of LED Diagnostic Indicators

Please refer to the documentation for your controller board for the exact meaning of the LEDs.

The meaning of LED diagnostic indicators on INTERBUS devices is described in more detail on page 114.

BA	Green	Bus active
	ON	The higher-level controller board/bus is in the RUN state.
	Flashing	The higher-level controller board/bus is in the ACTIVE state.
BSA	Yellow	Error message (Bus Segment Aborted)
	ON	At least one segment in the lower-level bus is disconnected.
FAIL	Red	Error message
	ON	An error has occurred: - Bus error in the lower-level bus - User error - Controller error
FCRUN	Green	Field Controller running
	ON	IEC 61131 runtime system has been successfully initialized and a program is running.
	Flashing	IEC 61131 runtime system has been successfully initialized.
	OFF	IEC 61131 runtime system is not ready to operate.
FUSE	Red	Error message
FAIL	ON	One of the fuses tripped.
PF	Yellow	Error message (peripheral fault)
	ON	Peripheral fault on a device in the lower-level bus.
RC	Green	Remote bus connection (remote bus check)
	ON	Connection established to the higher-level controller board/bus.
RD	Yellow	Remote bus disabled
	ON	Outgoing remote bus interface is disabled.
RDY/	Green	INTERBUS ready/running
RUN	ON	(Sub)master in the RUN state.
	Flashing	(Sub)master in the READY or ACTIVE state.
START	Yellow	Status indication from the application program (message A0.1)

SYSFAIL	Yellow	Error message (system failure)
STOP	ON	A runtime error occurred in the IEC 61131 runtime system program.
TR	Green	Transmit/receive
	ON	PCP communication in progress.
UL	Green	U (logic)
	ON	The supply voltage is present.
US	Green	Supply voltage
	ON	The 24 V supply voltage for the actuators is present.

LED Indicators on the IBS ISA FC/486/DX/I-T Controller Board

1	Red	FAIL	
		ON	If the IB_RDY_RUN LED is off at the same time, a controller error has occurred on the master.
		ON	If the FC_RDY_RUN LED is off at the same time, an error has occurred on the coprocessor board.
		ON	If the IB_RDY_RUN LED and the FC_RDY_RUN LED are off at the same time, a controller error has occurred on the master and on the coprocessor board.
		ON	If the IB_RDY_RUN LED and the FC_RDY_RUN LED are on at the same time, an INTERBUS error has occurred.
		OFF	No error occurred.
2	Green	IB_RDY_RUN	
		ON	INTERBUS is in the RUN state.
		Flashing	INTERBUS is in the READY or ACTIVE state.
		OFF	Controller error on the master.
3	Green	UL	
		ON	Field Controller is supplied with voltage.
		OFF	No voltage at the Field Controller.
4	Green	FC_RDY_RUN	
		ON	The program is being processed.
		Flashing	The IEC 61131 runtime system is in the READY state (coprocessor has been started up).
		OFF	Coprocessor has not been started up. Error on the coprocessor board.

Diagnostic Register

The three diagnostic registers (diagnostic status register, diagnostic parameter register, and extended diagnostic parameter register) map the diagnostic display to the control system. They inform the control system about the current state of the INTERBUS system. In the application program, operating states, errors, and other information appear as inputs.

For certain controller boards, the diagnostic registers must be integrated in a specific way. The Quick Start Guide for your controller board provides instructions on how to proceed.

Diagnostic Status Register

The diagnostic status register contains information in the form of input bits. In the event of an error, additional information is written to the diagnostic parameter register.

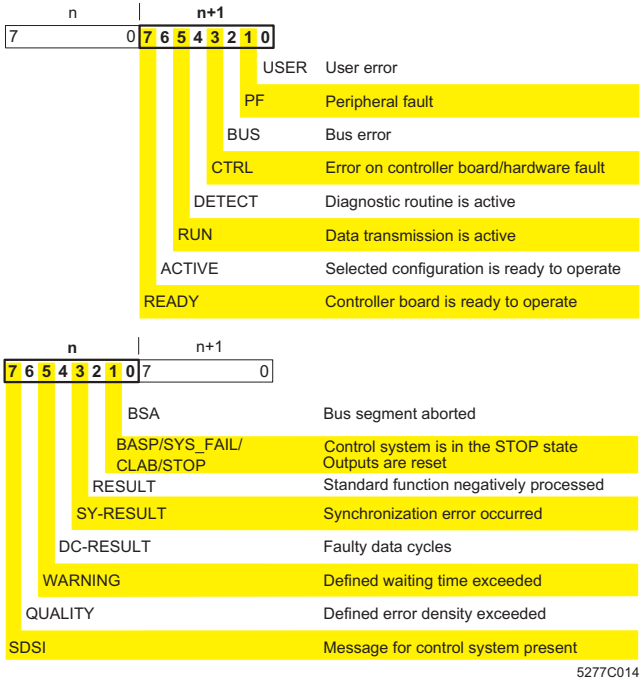


Figure 3 Diagnostic status register

Diagnostic Parameter Registers

The diagnostic parameter registers provide additional information on the error indicated in the diagnostic status register. This is either in the form of the error location or the error code.

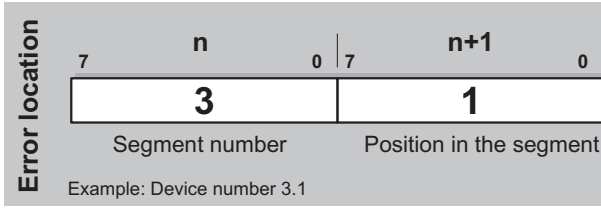


Figure 4 Diagnostic parameter register (error location)

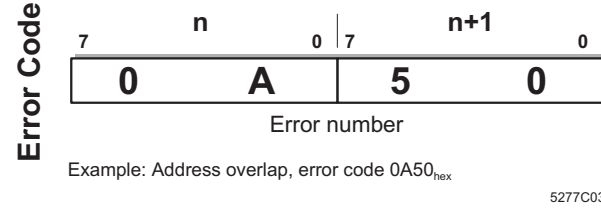


Figure 5 Diagnostic parameter register (error code)

Special case: If a local bus error cannot be located, byte n+1 of the error location indicates the value 128 or 129, or bit 7 is set.

Whenever an error bit is set, the 16-bit diagnostic parameter register is rewritten. If no error bit is set, the register has the value 0.

The extended diagnostic parameter register is only updated once the "Confirm_Diagnostics" service (0760_{hex}) has been sent.

By default, it is set in the MPM at address $37E6_{hex}$ and can also be moved to the I/O area using the "Set_Value" service (Variable_ID $010C_{hex}$).

System Startup

The controller board starts up when the power supply is connected. First, the hardware is tested. Depending on whether the parameterization memory is plugged or not, the controller board then switches to the RUN or READY state.

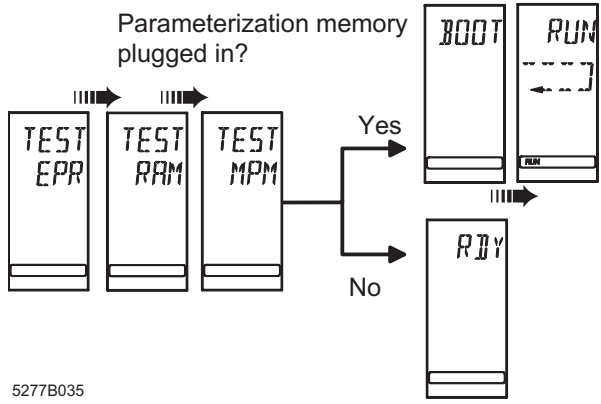


Figure 6 System startup

Operating States

BOOT Loads configured data from the parameterization memory.

READY The boot phase is complete, the system is ready to operate, all selftests have been carried out, and no errors have been detected.

ACTIVE Indicates that a bus configuration has been loaded to the controller board and that this configuration is the active configuration frame. The bus has not transmitted any data yet. However, the bus is checked using identification cycles causing the BA LEDs to flash on the INTERBUS devices. If an error occurs during this check, an appropriate indication is displayed. The RUN element flashes.

RUN The bus starts up and cyclically updates the memory image. In the status line in the lower section of the display, the RUN element is also active.
The chasing chain in the display also indicates that data is being transmitted.

In all four phases, the background color is green, if the system has been started up without any errors.

INTERBUS Startup

Troubleshooting Using the Debug Function

To simplify troubleshooting, the bus can be started up step-by-step, i.e., one device at a time.

If an error occurs during startup or the execution of cycles, the background color immediately changes from green to red. If the error has been removed, the background color changes back to green.

You can start up the bus manually or automatically.

– For manual startup, please refer to "DEBG Menu Item (Debug)" on page 23.
– For automatic startup, please refer to "ADBG Menu Item (Auto Debug)" on page 25.

Diagnostics Using the Display

Selecting a Menu Item

You can select different menu items on the display.

– You can move within a menu level using the left/right arrow keys.
– To jump to the next level down, confirm the selected menu item by pressing ENTER.
  The currently selected menu item is always shown in line 1. If there is another level under this menu item, the name of one of the available menu items will flash in line 2.
– Press ESCAPE to return to the previous level.
– You can move in the same manner in menu levels that contain device lists.

Menu Structure

To access the MODE and MONI menu items from the standard view, press the right arrow key.

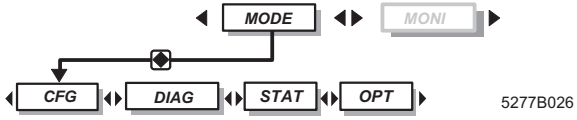


Figure 7 Main level of the menu

The MODE menu provides information about the active bus configuration (CFG menu item, configuration). You can read the current bus state or start up the bus one device at a time (DIAG menu item, diagnostics). Statistical data about the state of the bus system can also be requested, e.g., the error frequency of specific devices (STAT menu item, statistics). General information such as the firmware version or the serial number can be found under the Options (OPT) menu item.

Under the MONI menu item, you view the states of inputs and outputs. This monitor function is adapted to the addressing syntax of the control or computer system.

MODE Menu

CFG Menu (Configuration)

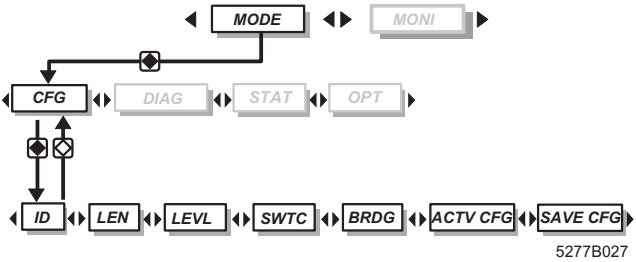


Figure 8 CFG menu item with submenus

Selecting Devices

Using the arrow keys, you can select the devices shown under the ID, LEN, and LEVL menu items.

– Right arrow key: next device
– Left arrow key: previous device
– Down arrow key: next bus segment
– Up arrow key: previous bus segment

To view the total number of devices, switch to position 1 and press the up arrow key.

ID **ID Code of the Selected Device**
Line 1: ID
Line 2: Device number (flashing)
Line 3: ID code of the device (decimal)
Flashes alternately with NACT (not active) if the selected device is switched off.

LEN **Process Data Length of the Device**
Line 1: LEN
Line 2: Device number (flashing)
Line 3: Process data length of the device in bits
Flashes alternately with NACT (not active) if the selected device is switched off.

LEVL **Bus Level of the Selected Device**
Line 1: LEVL
Line 2: Device number (flashing)
Line 3: Bus level of the device (decimal)
Flashes alternately with NACT (not active) if the selected device is switched off.

SWTC List of Switched Off Devices

Using the left/right arrow keys, you can view the device numbers of all the devices that are switched off. They are displayed in the order they were switched off.

To view the total number of devices that are switched off, switch to list position 1 and press the up arrow key. CNT (Count) is displayed in line 2 and the number of devices that are switched off is displayed in line 3.

- NO CFG: No configuration available
- NO DEV: No devices are switched off

BRDG List of Jumpered Devices

Refer to the SWTC menu item for display and operation.

ACTV CFG Active Configuration

Number of the active configuration frame.

- NO CFG: No configuration frame available

SAVE CFG **Saving the Configuration**

This menu item is only available in test mode. It is used to save the currently connected bus configuration. The controller board runs with this configuration after it has been powered up. In addition, SAVE CFG is used to save a base address, i.e., to determine the beginning of the address area for I/O data.

- Switch to test mode (e.g., via the DIP switches). For additional information, please refer to the Quick Start Guide for your controller board.
- Make sure that the parameterization memory is plugged in.

The bus must be in the RUN state, otherwise the message NOT NOW is displayed.

After selecting this menu, the number of devices is displayed in decimal notation in line 3.

- Press ENTER.
  ADDR is displayed.
  Line 1: ADDR
  Line 2: Base address (flashing)
  Line 3: Number of devices
- If you want to change the base address, use the left/right arrow keys to set the base address.
- Press ENTER.
  WAIT is displayed during the saving process and then RDY (ready). If an error occurs, test mode is stopped and an appropriate error message is displayed.

Press ESCAPE to return to the main menu. You can select this menu as often as you like, as the data that was previously saved is overwritten each time it is selected.

You must exit test mode to access the addresses.

Depending on the controller board, the base address may be changed by diagnostic and standard function registers.



For more detailed information, please refer to the Quick Start Guide for your controller board.

DIAG Menu (Diagnostics)

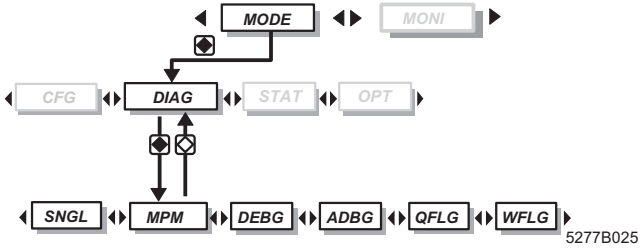


Figure 9 DIAG menu item with submenus

The **DIAG** menu item provides various diagnostic information about the current state of the bus.

MPM Menu Item

In the event of an error, additional information can be viewed under the **MPM** menu item.

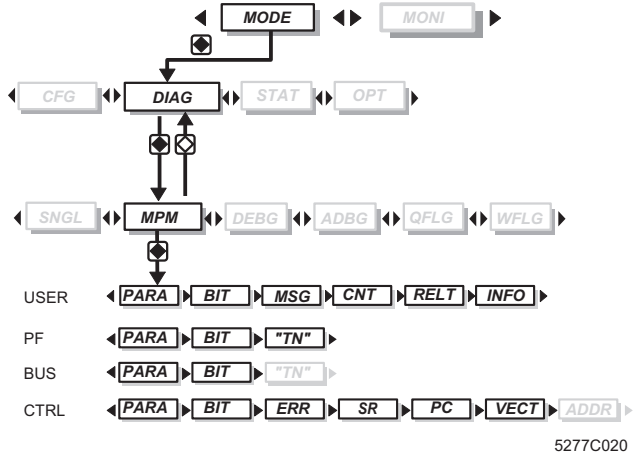


Figure 10 Submenus for MPM diagnostics

MPM Line 1: MPM
Line 2: Error type, e.g., USER, PF, etc.
If no error occurred, NO ERR is displayed.



In the event of an error, you can scroll through the submenu items using the left/right arrow keys.

USER **Line 1 - USER - User Error**

◀▶ Line 2: *PARA* (diagnostic parameter register)
Line 3: Error code or error location (seg./pos.)

◀▶ Line 2: *BIT* (diagnostic status register)
Line 3: Bits set in the status register. Value displayed in hexadecimal notation and binary representation by the status segments.

◀▶ Line 2: *MSG* (message code for negative confirmation*).* The controller board could not execute the called service and sent a negative confirmation consisting of the message code *(MSG)*, parameter count *(CNT)*, result *(RELT),* and Add_Error_Info *(INFO)*.



For more detailed information, please refer to the PCP Manual IBS SYS PCP G4 UM E, Order No. 27 45 16 9 or the Firmware Manual IBS SYS FW G4 UM E, Order No. 27 45 18 5.

Line 3: Number of the service that failed.

◀▶ Line 2: *CNT* (parameter count)
Line 3: Number of subsequent data words belonging to the negative confirmation

◀▶ Line 2: *RELT* - Result
The *Result* parameter consists of two bytes, which indicate why the request could not be processed:
Bits 15 - 8: error class, bits 7 - 0: error code.
Line 3: Error class/error code. (Please refer to the manuals indicated under *MSG* for the meaning of these values)

◀▶ Line 2: *INFO* (additional error information)
Line 3: Additional_Code (Please refer to the manuals indicated under *MSG* for the meaning of this value).

PF **Line 1 - PF - Peripheral Fault**

◀▶ Line 2: *PARA* (diagnostic parameter register)
Line 3: Error code or error location (seg./pos.)

◀▶ Line 2: *BIT* (diagnostic status register)
Line 3: Bits set in the status register. Value displayed in hexadecimal notation and binary representation by the status segments.

◀▶ Line 2: *TN* - Device number of the faulty device (seg./pos.)

BUS **Line 1 - Bus Error (RBUS, LBUS, BUS, OUT1, OUT2 or DEV)**

◀▶ Line 2: *PARA* (diagnostic parameter register)
Line 3: Error code or error location (seg./pos.)

◀▶ Line 2: *BIT* (diagnostic status register)
Line 3: Bits set in the status register. Value displayed in hexadecimal notation and binary representation by the status segments.

◀▶ Line 2: *TN* (device number);
No display: Error not located. Several errors are shown one after the other.
Line 3 Error code

CTRL **Line 1 - CTRL - Controller Error**

◀▶ Line 2: *PARA* (diagnostic parameter register)
Line 3: Error code

◀▶ Line 2: *BIT* (diagnostic status register)
Line 3: Bits set in the status register. Value displayed in hexadecimal notation and binary representation by the status segments.

◀▶ Line 2: *ERR* (error)
Line 3: Error code

The following parameters provide additional information about the controller error. This information can be analyzed by Phoenix Contact.

◀▶ Line 2: *SR* - Status register of the processor in the event of a controller error.
Line 3: Value (hexadecimal)

◀▶ Line 2: *PC* (Program Count) - Program count of the processor. Displays the address of the controller error.
Line 3: Value (hexadecimal)

◀▶ Line 2: *VECT* - Vector number of the controller error that occurred.
Line 3: Value (hexadecimal)

◀▶ Line 2: *ADDR* - Address that was accessed when the error occurred. LOW and HIGH values are displayed alternately (32-bit value).
Line 3: Value (hexadecimal)

DEBG Menu Item (Debug)

To simplify troubleshooting, the bus can be started up one device at a time using the DEBG menu item.

This menu item can only be used in the READY state (see "System Startup" on page 14).
To reach this state, start up the controller board without parameterization memory or initiate an alarm stop using the software.

As this menu can only be used in the READY controller state, there will be no conflicts with the basic diagnostics.

The background illumination of this display is dependent on this menu alone and not the basic diagnostics. If an error occurs during startup or the execution of cycles, the background color immediately changes from green to red. If the error has been removed, the background color changes back to green.

DEBG 1 Debug Is Not Possible

Line 1: DEBG (debug, troubleshooting)
Line 2: NOT NOW: The debug function can only be executed if the controller board is in the READY state (see above).

If DEBG is active and the state of the controller board changes, the cycles are stopped and NOT NOW is displayed, if necessary.

2 Connecting Devices

Line 1: DEBG (debug, troubleshooting)
Line 2: Physical bus position of the device (starting with 1)

Switching to Devices

You can switch to the devices using the left/right arrow keys. If you hold the arrow key down, the display starts to scroll in increments of one. Once a physical device number that is divisible by ten is reached, the display scrolls in steps of ten.

You can switch to the first device using the up arrow key.

The bus is started up to the selected device.

To start up the bus completely, press the down arrow key.

2.1 Unsuccessful Startup

The background illumination changes to red.

Line 2: Physical number of the device where the error occurred
0 = Error location of the controller board

Line 3: Error code

You can start ID and data cycles by pressing ENTER (see point 3).

2.2 Successful Startup

Line 2: Physical number of the device (flashing)

Line 3: ID code of the selected device (decimal)

3 Starting ID and Data Cycles

You can start ID and data cycles by switching to a bus terminal module or the last device of a local bus and pressing ENTER. The double arrow segment is then switched off.

If a device in a local bus is selected, the double arrow is switched on. This means that cycles cannot be started at that time.

3.1 Successful Start of ID and Data Cycles

Line 1: Alternating display of ID and DATA

Line 2: Physical bus position of the device up to which startup was possible

Line 3: Alternating display of the number of faulty ID and data cycles

The cycles are stopped by selecting another device (left/right arrow keys).

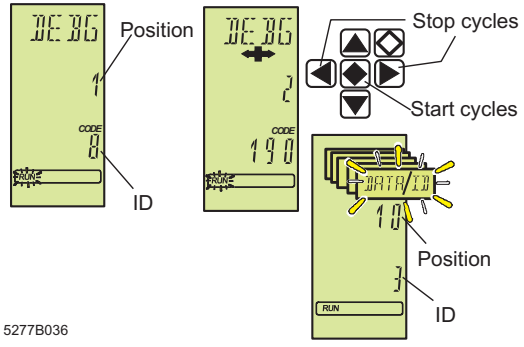


Figure 11 Starting ID and data cycles

3.2 Unsuccessful Start of ID and Data Cycles

If errors occur during the execution of cycles, which also lead to a bus error during normal operation, the background color of the display changes from green to red.

Case 1: No error was detected.

Line 2: Number of the device up to which startup was possible.

Line 3: Contents of the IPMS error register. It contains additional error information, which can be analyzed by specialists.

Case 2: An error was detected but not located.

Line 2: Bus length in words with which ID cycles are currently run. As long as errors occur, the bus is operated with its maximum length.

Line 3: Contents of the IPMS error register.

Case 3: An error was detected and located.

Line 2: Physical number of the device that detected a transmission error (plus 4000).

Line 3: Contents of the IPMS error register.

ADBG Menu Item (Auto Debug)

This menu item has the same function as the DEBG menu item. The only difference is that the functions are executed automatically.

After selecting this menu item, an attempt is made to start up the bus. If startup was possible without any errors, data and ID cycles will start after a waiting time of 1 second.

The LED diagnostic indicators on the devices enable you to determine to what extent the bus is started up. If all BA LEDs are active, the bus is running without errors.

As soon as a bus error occurs, an attempt is made to restart the bus after a waiting time of 1 second. This is repeated until startup is successful.

The display reading corresponds to that of the DEBG menu item.

QFLG Menu Item (Quality Flag)

QFLG is displayed if a specific ratio of faulty cycles to error-free cycles is exceeded.

QLFG Line 1: QFLG (quality flag)
Line 3: Status of the quality bit in the diagnostic status register
Bit set: ON
Bit not set: OFF

WFLG Menu Item (Warning Flag)

If no error-free cycles can be transmitted within a set time, this message appears. In this case, we recommend checking the bus as this message indicates that a bundled error has occurred.

WFLG Line 2: WFLG (warning flag)
Line 3: Status of the warning bit in the diagnostic status register
Bit set: ON
Bit not set: OFF

SNGL Menu Item (Single Error)

A single error does not cause the bus to be disconnected.

SNGL Line 1: SNGL
Line 2: Single errors that have occurred in relation to the active configuration frame are displayed as a decimal number.
Even if more than 9999 errors have occurred, 9999 will flash in the display.
Line 3: Contents of the IPMS error register. It contains additional error information, which can be analyzed by specialists.

STAT Menu (Statistics)

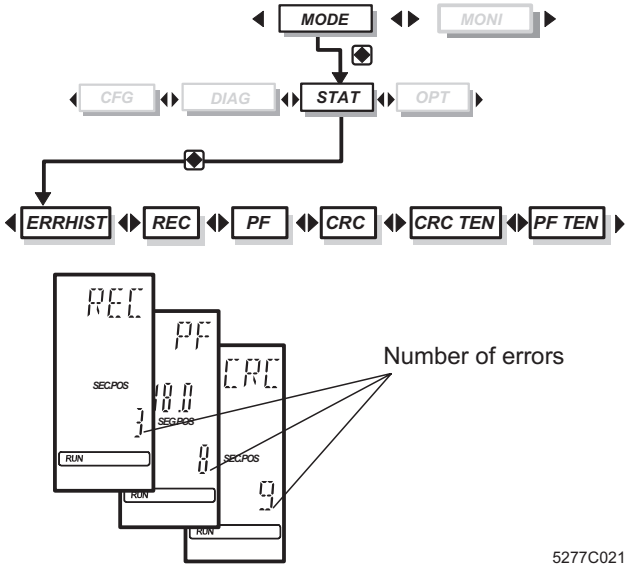


Figure 12 STAT menu with submenus

The **STAT** menu provides statistical information about the bus state, e.g., the number of errors. Each device has a separate counter for reconfiguration, peripheral faults, and CRC errors. A CRC error occurs during a check for data integrity.

Selecting Devices

Using the arrow keys, you can select the devices shown under the REC, PF, and CRC menu items.

– Right arrow key: next device
– Left arrow key: previous device
– Down arrow key: next bus segment
– Up arrow key: previous bus segment

Display the Total Number of Errors

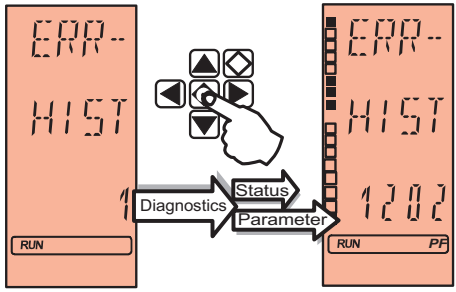
When the first device is reached, CNT flashes in line 2 after pressing the up arrow key again. The total error count for the entire bus flashes in line 3. Press the down arrow key to return to the error counter of the selected device.

ERRHIST Menu Item (Error Log)

Error log for the last ten errors. The most recent error is stored under number 1.

ERR HIST
Line 1: ERR
Line 2: HIST
Line 3: List number (1 - 10)
The right/left arrow keys can be used to scroll through the list numbers.
Line 3: 0 = No list entry available

Information About an Error



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Figure 13 ERRHIST (error log)

- Hold down the ENTER key at an entry number.

Line 3: Diagnostic parameter register (hex)

The status segments on the left-hand side of the display represent the diagnostic status register. The top status segment corresponds to the least significant bit and the bottom status segment to the most significant bit.

REC Menu Item (Reconfiguration)

REC
Line 1: REC - counter for reconfiguration requests
Line 2: Device number
Line 3: Number of reconfiguration requests initiated via the reconfiguration button of a bus terminal module.

PF Menu Item (Peripheral Fault)

PF
Line 1: PF - counter for peripheral faults
Line 2: Device number
Line 3: Number of peripheral faults

CRC Menu Item (Transmission Error)

CRC (Cyclic Redundancy Check) is a test method for data integrity. A CRC error indicates that a data cycle has been transmitted with errors. In addition to these CRC errors, other transmission errors are counted, e.g., a short-term cable interrupt.

CRC
Line 1: CRC - transmission error
Line 2: Device number
Line 3: Number of transmission errors

PF TEN Menu Item (Peripheral Fault Log)

List of the last ten devices with peripheral faults (the last device with a peripheral fault is listed in position 1). If there are more than ten messages, the oldest entry will be removed..

PF TEN
Line 1: PF
Line 2: TEN
Line 3: List containing the last ten devices with a peripheral fault
Line 2: NO CFG
No active configuration frame

Information about the Peripheral Fault

Select a message using the arrow keys. Press ENTER.
Line 2: Device number
Line 3: Error code

CRC TEN Menu Item (Error Priority)

List of the ten devices with the most transmission errors (the device with the most errors is listed in position 1). If there are more than ten messages, the oldest entry will be removed.

CRC TEN
Line 1: CRC
Line 2: TEN
Line 3: List number (1 - 10)
You can scroll through the list numbers using the right/left arrow keys.

Information About the Transmission Quality

Select a message using the arrow keys. Press ENTER.
Line 2: Device number
Line 3: Error code

OPT Menu (Options)

The OPT menu item (options) provides comprehensive firmware information.

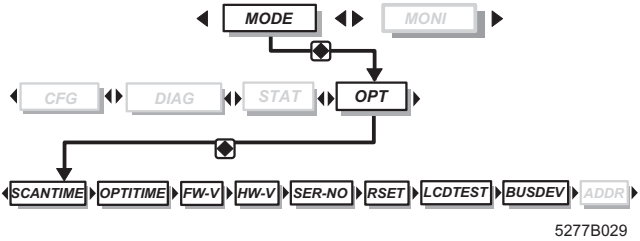


Figure 14 OPT menu with submenus

SCAN TIME Menu Item (Update Time)

The interval between two data cycles (cycle time) is displayed.
The cycle time can either be set by the user (e.g., using CMD software) or determined automatically by the controller board. The display is updated every 5 seconds.

SCAN TIME	Line 1: SCAN Line 2: TIME Line 3: Update time in milliseconds

OPTI TIME Menu Item (Optimum Update Time)

OPTI TIME	Line 1: OPTI Line 2: TIME Line 3: Optimum update time for bus operation in milliseconds

FW-V Menu Item (Firmware Version)

FW-V	Line 1: FW-V Line 3: Firmware version

HW-V Menu Item (Hardware Version)

HW-V	Line 1: HW-V Line 3: Hardware version

SER-No. Menu Item (Serial Number)

SER-No.	Line 1: SER- Line 2: No. A 12-digit serial number is displayed by pressing ENTER.

RSET Menu Item (Reset)



Only activate the reset when the application is in the STOP state, as all outputs are set to zero. (Otherwise the error code 1035_{hex} and other error messages will be generated).

RSET Line 1: RSET (Reset)
The controller board is reset (controller board attempts to boot) by holding down the left arrow, down arrow, and ESCAPE key combination for approximately 3 seconds.

LCD TEST Menu Item (Display Test)

LCD **Checking all Display Segments**
TEST Line 1: LCD
Line 2: TEST
Press ENTER. All segments of the display are activated.

BUS DEV Menu Item (Bus Device) FW 4.40 or Later

Information about the generation of protocol chips in the devices. The display refers to the active devices in the ring. Switched off or jumpered devices are not checked.

The bus must be in the ACTIVE or RUN state.

BUS Line 1: BUS
DEV Line 2: DEV
Line 3: TYPE 3 - all devices have a SUPI 3 or newer chip (LPCx, OPC, etc.), which provides improved diagnostics.
Line 3: TYPE 2 - no device has one of the protocol chips mentioned above.
Line 3: MIX - there are devices present with old and new protocol chips.

ADDR Menu Item (Setting the IP Address) FW 4.38 or Later

Only applies to IBS 24 ETH DSC/I-T and IBS 24 RFC/486DX/ETH-T controller boards. The procedure for setting addresses is described in the IBS 24 ETH QS UM E Quick Start Guide, Order No. 27 45 66 4. (In FW 4.6x or later, the IP address can also be set using CMD.)

ADDR Line 1: ADDR
Line 2: IP1-4 (IP address), SUB1-4 (subnet mask), RTR 1-4 (router address)
Line 3: Byte

MONI Menu (Monitor)

The MONI menu contains a process image monitor.

This monitor is adapted to the addressing syntax of the control or computer system and is host-specific. The display reading therefore varies depending on the controller board used (S5, S7 400 DSC, PLC5, Bosch, etc.)

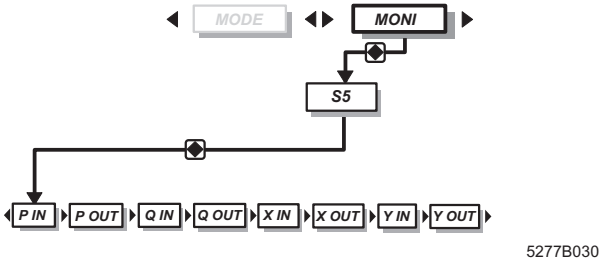


Figure 15 MONI menu, Siemens S5 example

Selecting an Address

To view the data, select the desired address area, e.g., P IN or P OUT, using the arrow keys and confirm with ENTER. The address flashes in line 2.

If you hold down the arrow key for more than 0.8 seconds, the display starts to scroll:

– First, every 0.5 seconds in increments of two. (This process is word-oriented for devices that are addressed byte by byte.)
– If you hold down the key and the display reaches an address that is divisible by ten, the display scrolls in increments of ten.

Changing the Address

After selecting the area, the most recently set address flashes. You can select addresses using the left/right arrow keys.

Address Display

Line 3 displays the contents of the address in hexadecimal notation. The value is displayed in binary notation by the status segments on the left-hand side of the display.

Error Localization

If a bus error occurs in the bus system, a diagnostic routine is automatically started on the controller board. This routine attempts to start up the bus one segment at a time in order to locate the error.

During error localization the display shows the message LOOK FOR FAIL (Figure 16).

The background illumination changes to red.

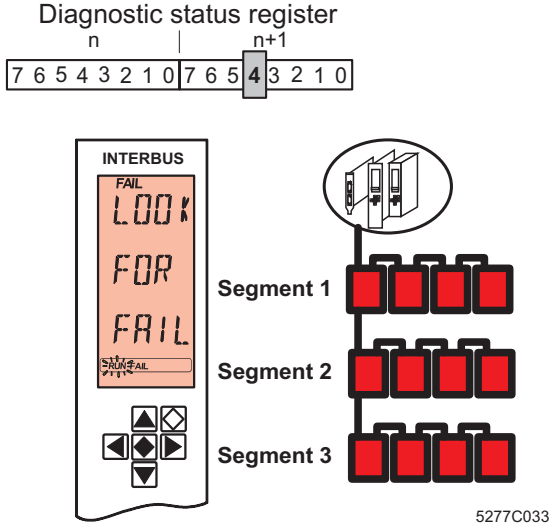


Figure 16 Message during error localization

On completion of the diagnostic routine, the detected error is shown on the display. Possible indications:

– RBUS for a remote bus error
– LBUS for a local bus error
– BUS for a general bus error
– OUT1 for an error at the outgoing interface
– OUT2 for an error at the branching interface
– DEV for an error on the device

With FW 4.35 or later, the station name can be displayed for priority 1 and 2 located errors by pressing ENTER. However, this is only possible if the name was previously assigned to the segment and position using CMD or PC WORX software.

Controller Error (CTRL)

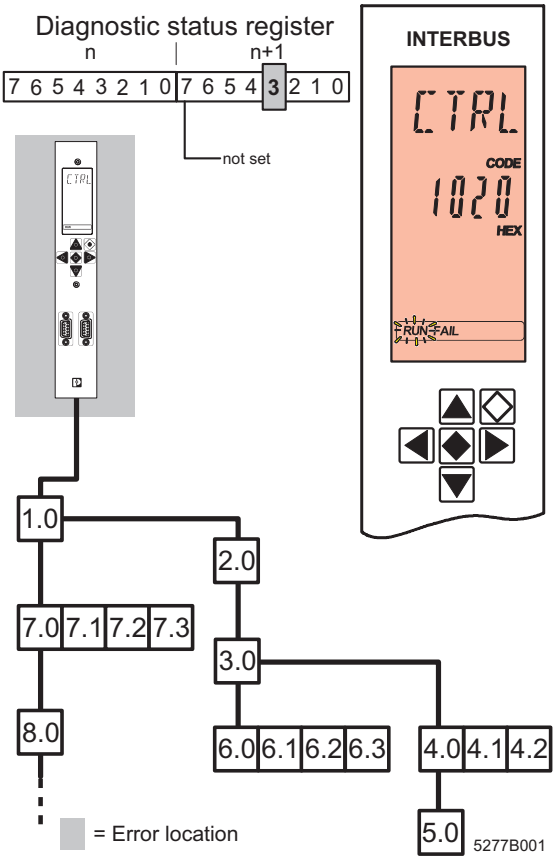


Figure 17 Controller error

The CTRL message indicates an error on the controller board. Controller errors take priority.

Display reading:

– **Line 1** - Error type (CTRL)
– **Line 2** - Error code

The background illumination changes to red.

Remote Bus Error (RBUS)

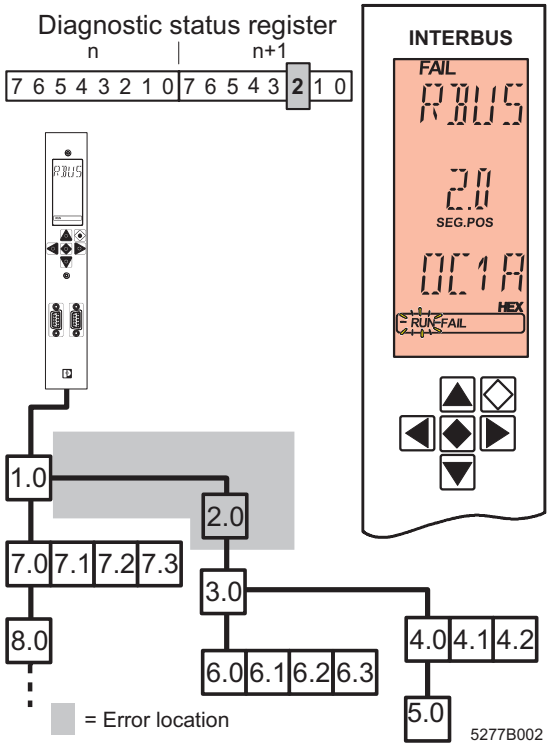


Figure 18 Remote bus error

An error occurred on the indicated remote bus device. The error may also have occurred on the transmission path leading to this device or at the outgoing interface of the module located prior to it. When detecting a remote bus error, data transmission on the bus is stopped.
The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (RBUS)
– **Line 2** - Error segment and position
– **Line 3** - Error code

The background illumination changes to red.

Local Bus Error (LBUS)

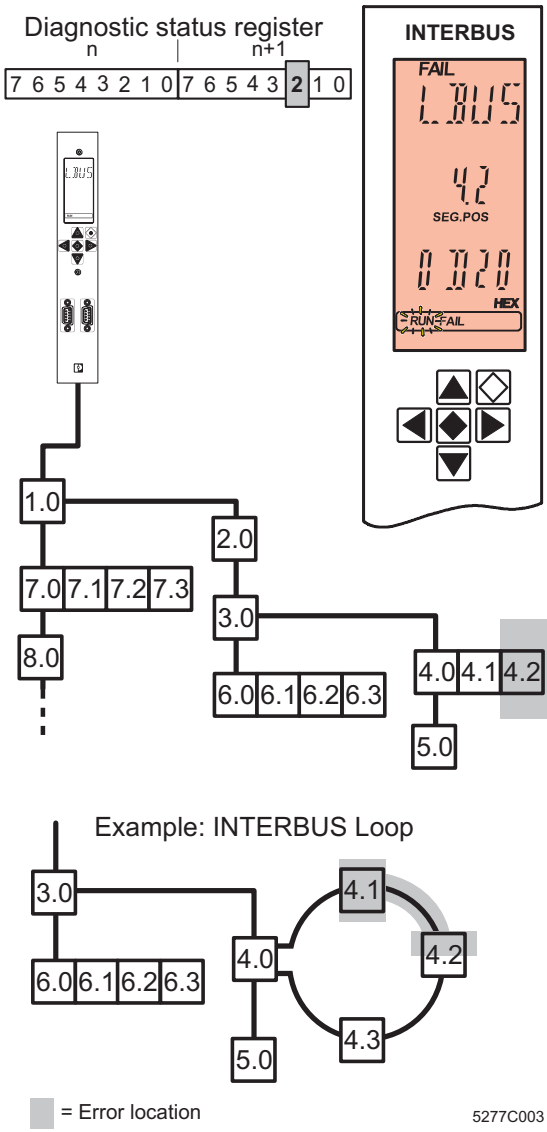


Figure 19 Local bus error

An error occurred on the indicated local bus device or the transmission path leading to this device.

When detecting a local bus error, data transmission on the bus is stopped.

The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (LBUS). If the exact location of an error within a segment cannot be found, the branching interface of the bus terminal module that belongs to this segment is indicated (OUT2).
– **Line 2** - Segment and position of the faulty device or the bus terminal module for OUT2.
– **Line 3** - Error code

The background illumination changes to red.

Bus Error (BUS)

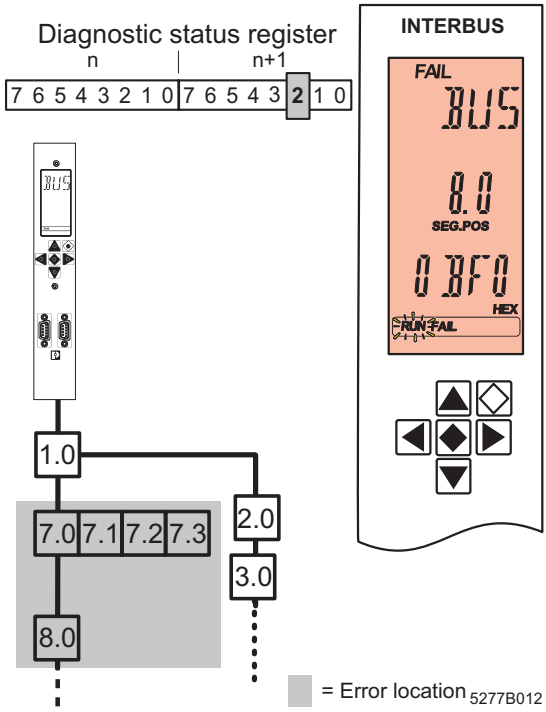


Figure 20 Bus error

A bus error is indicated if the diagnostic routine cannot clearly determine the error location but is able to limit it to an area. Data transmission on the bus is stopped.

The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (BUS)
– **Line 2** - Segment and position of the error area
– **Line 3** - Error code

The background illumination changes to red.

The error location refers to the indicated device (here 8.0), the device located prior to it (here 7.0), and all devices connected to its branch (here 7.1 to 7.3). The error may also occur on all

transmission paths between these devices. If devices were connected to the branch of the device (8.0), they would not belong to the error location.

Bus Errors E0 - EA

In general, the display indicates the error segment and position in the event of a bus error.

Error codes **$0BE0_{hex}$** to **$0BEA_{hex}$** are assigned to bus errors where the error location or area cannot clearly be defined. The controller board display only shows the last two characters, i.e., **$E0_{hex}$** to **EA_{hex}**.



The error codes are described on page 49 and onwards.

In the event of bus errors of this type, the bus stops. The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (BUS)
– **Line 2** - Corresponding error code, e.g., E1

The background illumination changes to red.



If an error of this type occurs and the diagnostic information is read from the diagnostic parameter registers with the "Read_Value" service, the error code is mapped to the diagnostic parameter register, and the value 0000_{hex} is mapped to the extended diagnostic parameter register.

OUT 1 Interface Error

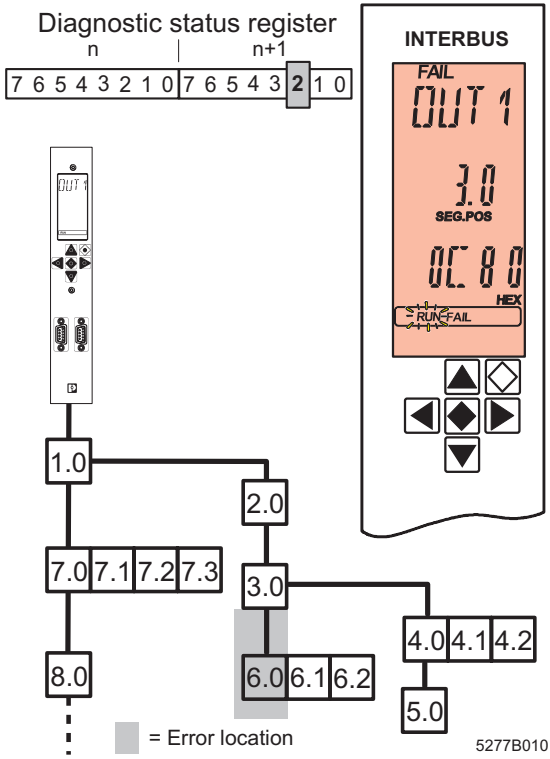


Figure 21 Error at the outgoing bus interface

An error occurred at the outgoing remote bus interface of the indicated bus segment. This may also affect the connected transmission path or the devices connected to it.

The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (OUT1)
– **Line 2** - Segment and position of the device at the OUT1 interface of which the error occurred
– **Line 3** - Error code

The background illumination changes to red.

OUT 2 Interface Error

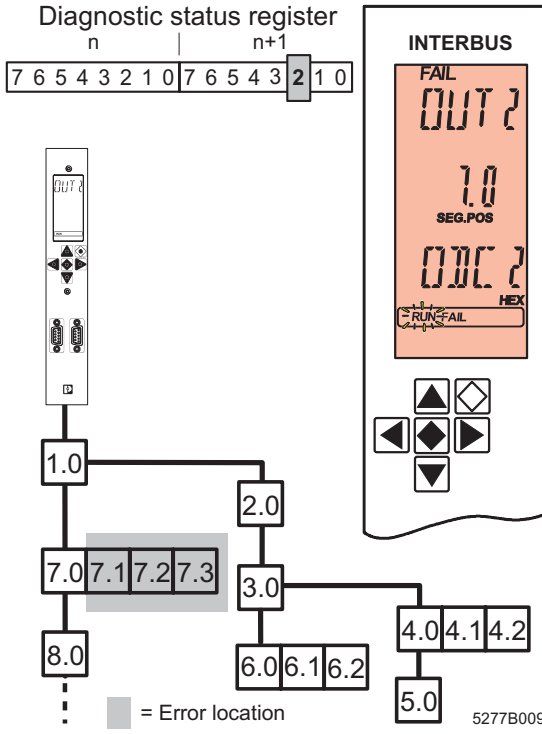


Figure 22 Error at the branching interface

An error occurred at the branching interface (remote bus or local bus) of the indicated bus segment. This may also affect the connected transmission path or the devices connected to it. For local buses, this error message refers to all transmission paths and local bus devices.

The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (OUT2)
– **Line 2** - Segment and position of the bus terminal module at the OUT2 interface of which the error occurred.
– **Line 3** - Error code

The background illumination changes to red.

Local Bus Error in INTERBUS Loop

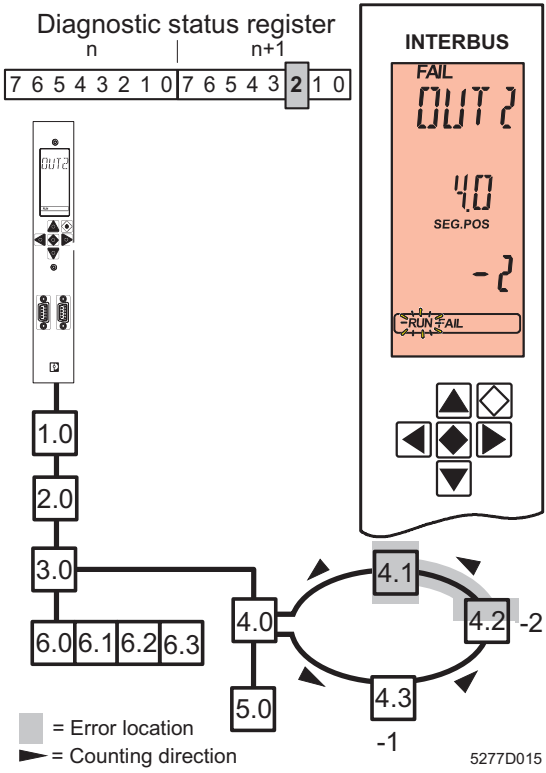


Figure 23 Error in INTERBUS Loop

If an error occurs in INTERBUS Loop while automatically reading the configuration or during test mode, there may be a special error message, as the bus configuration is not known.

Display reading:

– **Line 1** - Error type (OUT 2)
– **Line 2** - Segment and position of the bus terminal module
– **Line 3** - Counting direction and number of counting steps

In the above example, two steps are to be counted against the transmission direction (starting point of counting: pos. 4.0; counting direction: minus). The error occurred prior to this module, i.e., between the output of module 4.1 and the input of module 4.2.

Local Bus Error in an Inline Station

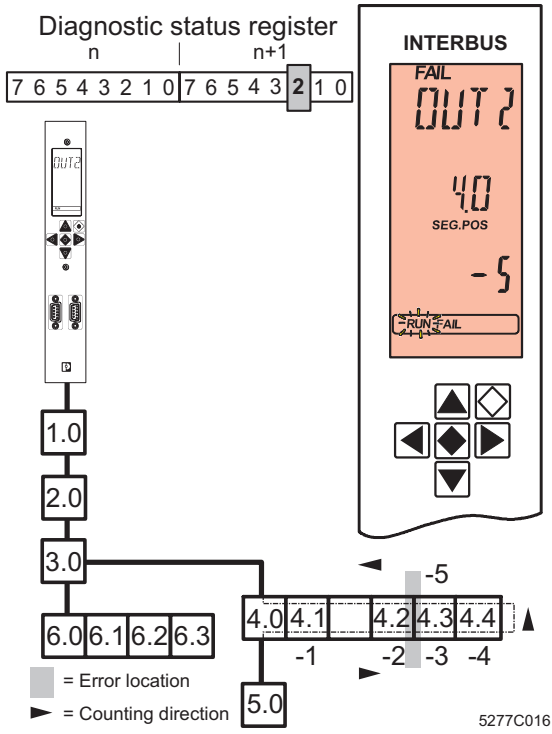


Figure 24 Error in an Inline station

If an error occurs in an Inline station while automatically reading the configuration or during test mode, the same error message as with INTERBUS Loop is displayed (see page 42). However, the counting method for Inline stations is different.

In an Inline station, the forward and return line are run in one device. Thus, the devices are counted twice, if required (on the forward and return paths). The last module in an Inline station is counted once.

Devices are counted only if they have a "D" diagnostic indicator. Supply terminals and branch terminals are not counted.

In the above example, five steps are to be counted against the transmission direction from the bus terminal module. The error occurred prior to this module, i.e., between module 4.2 and module 4.3.

Local Bus Error in an Inline Station With Loop Branch

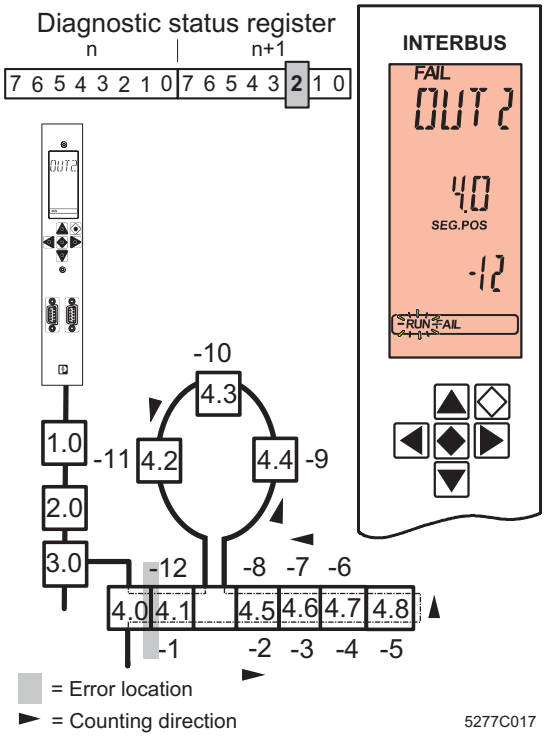


Figure 25 Error in an Inline station with Loop branch

If an error occurs in an Inline station with Loop branch while automatically reading the configuration or during test mode, an error message is output (see page 42/43).

In an Inline station with Loop branch, the Loop devices are integrated in the forward line. These devices are to be counted against the transmission direction at the end.

In the above example, twelve steps are to be counted against the transmission direction from the bus terminal module. The error occurred prior to this module, i.e., between module 4.0 and module 4.1.

Device Error (DEV)

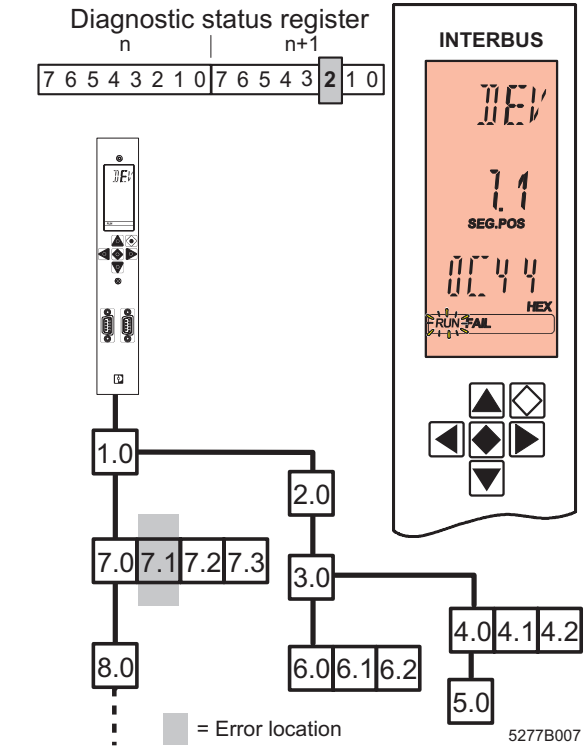


Figure 26 Device error

An error occurred on the indicated device.

This message appears, for example, if an incorrect ID code is specified. The error is directly assigned to a device. There are no transmission errors.

The outputs are reset in the LOOK FOR FAIL state. They remain reset until the bus is restarted and data cycles are transmitted without errors.

Display reading:

– **Line 1** - Error type (DEV)
– **Line 2** - Segment and position of the device
– **Line 3** - Error code

The background illumination changes to red.

Peripheral Fault (PF)

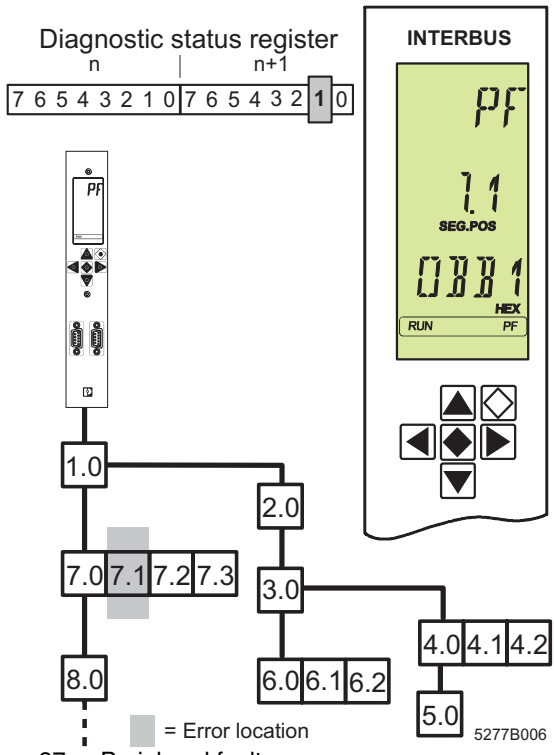


Figure 27 Peripheral fault

PF indicates an I/O error in an INTERBUS device.

Display reading:

– **Line 1** - Error type (PF)
– **Line 2** - Segment and position of the device
– **Line 3** - Error code (FW 4.4x or later)

The background illumination remains green. Data transmission on the bus is not affected. The FAIL element is not active in the status line.

PF is indicated even if the error is removed. It must be acknowledged separately by the application program.

The peripheral fault message is identical to the former "Module Error" message in Generation 3.

EVENT Message (EVNT)

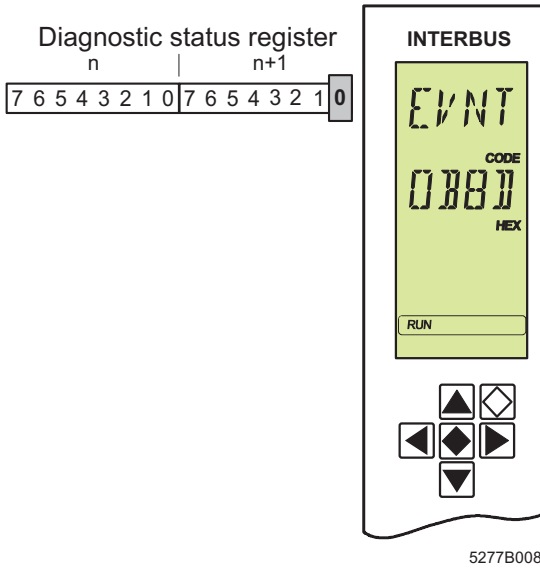


Figure 28 EVENT message

The EVENT message is assigned lowest priority. It indicates that an error occurred which, however, does not require the system to be switched off and does not affect bus operation.

Display reading:

– **Line 1** - Error type (EVNT)
– **Line 2** - Error code
– **Line 3** - Additional error information (Add_Error_Info)

The background illumination remains green.

The FAIL element is not active in the status line.

User Error (USER)

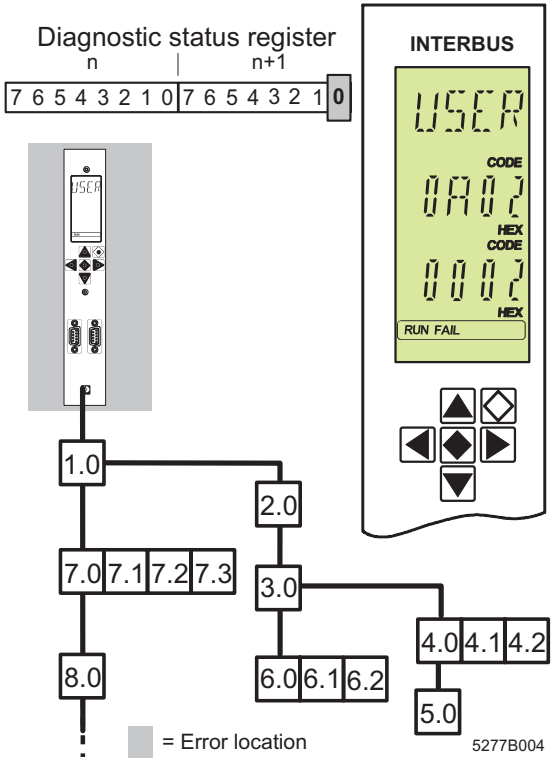


Figure 29 User error

This message indicates an error in the application program. The application program sent an incorrect service. This may include, for example, an address overlap in the PLC input or output address area. This is a negative confirmation of a sent service (request).

Display reading:

– **Line 1** - Error type (USER)
– **Line 2** - Error code
– **Line 3** - Additional error information (Add_Error_Info)

The background illumination remains green. The RUN and FAIL elements are active in the status line.

Error Codes

Code	Type	Description and Remedy
E0 **0BE0**	BUS	Error localization was stopped by the user (alarm stop during LOOK FOR FAIL). (See "Bus Errors E0 - EA" on page 39.)
E1 **0BE1**	BUS	A serious error occurred that caused the bus system to be switched off. However, no error could be found when checking the active configuration. This points to the cause being an intermittent error. **Remedy:** Check the system. – Shielding of the bus cables (connectors) – Grounding/equipotential bonding – Faulty connectors or joints – Cable breaks – Voltage dips on the communications power for remote bus devices You can view information about the error location via the PF TEN or CRC TEN menu item (page 29) ("Get_Diag_Info" service ($032B_{hex}$)). (See "Bus Errors E0 - EA" on page 39.)
E2 **0BE2**	BUS	The maximum number of INTERBUS words or devices was exceeded. (See "Bus Errors E0 - EA" on page 39.)
E4 **0BE4**	BUS	A serious error occurred when acquiring the bus configuration via the "Create_Configuration" service (0710_{hex}), which caused the bus system to be switched off. **Remedy:** Check the system (see E1). Diagnostics can be improved if the controller board knows the configuration of the bus system. – Load the desired configuration using CMD/PC WORX software. – Load the desired configuration using the "Load_Configuration" service (0307_{hex}) or the "Complete_Load_ Configuration" service ($030A_{hex}$). Activate the configuration using "Activate_Configuration" (0711_{hex}). – Search for the error with the debug function (see "Troubleshooting Using the Debug Function" on page 15). (See "Bus Errors E0 - EA" on page 39.)

Code Type Description and Remedy

E6 BUS See E1. There are too many faulty data cycles.
0BE6 **Remedy:**
- Check the system (see E1).
- Check the I/O voltage supply (voltage supply for inputs/outputs).
- Replace devices with faulty data registers.

E7 BUS The controller board could not activate the
0BE7 configuration.
Remedy: Check the system (see E1).

E8 BUS See E1 for the description.
E9 **Remedy:** Check the system (see E1).
0BE8
0BE9

EA BUS The "Control_Device_Function" service (0714_{hex})
0BEA could not be executed.
Remedy: Repeat the service if the controller board is still in the RUN or ACTIVE state. If the diagnostics function is active, you must wait for the result. The bus error indicated shows the error location.
Check the specified parameters.
(See "Bus Errors E0 - EA" on page 39.)

0902 USER The controller board could not process the service called last due to a hardware or firmware error.
Remedy: Replace the controller board.

0903 USER Insufficient memory available on the controller board, e.g., due to excessive fragmentation.
Remedy: Reset the controller board. ("Reset_Controller_Board" service (0956_{hex}))

0904 USER Invalid parameters were specified.
0905 **Remedy:** Check the parameters of the service called last.

0906 USER Access to this object is not supported.
Remedy: Check the last access.

0907 USER An attempt was made to access an object that does not exist.

Code	Type	Description and Remedy
0908	USER	The called service causes a conflict with another service called before. **Remedy:** Wait for the service called previously to be completed, and then try again. **Add_Error_Info:** Code of the service called previously.
0909	USER	The confirmation, which automatically follows a service exceeds the maximum permissible length (firmware error). **Remedy:** Check the command. If this does not solve the problem, please contact Phoenix Contact. **Add_Error_Info:** Size of the confirmation in bytes.
090A	USER	The *Parameter_Count* parameter does not correspond to the number of subsequent words. **Remedy:** Adjust the number of parameters. **Add_Error_Info:** Incorrect *parameter count*
090B	USER	The controller board cannot enable the specified service (incorrect password). **Remedy:** Use the correct password or a service, which is not disabled.
0910	USER	The service is disabled and cannot be called. **Remedy:** Enable the service before calling it or use a service, which is not disabled. **Add_Error_Info:** Code of the disabled service.
0911	USER	The controller board cannot enable the specified service (service has already been enabled). **Remedy:** Call the service. **Add_Error_Info:** Code of the already enabled service.
0912	USER	The service is disabled and cannot be called. **Remedy:** Enable the service before calling it or use a service, which is not protected. **Add_Error_Info:** Code of the disabled service.
0913	USER	The controller board cannot process the called service. The service is not supported for this controller board. **Remedy:** Use a service that is supported.

Code Type Description and Remedy

0914 USER There are too many messages in the *transmit buffer* of the controller board. This is because the control or computer system does not accept the pending messages or a lot of messages have been generated by the host in a very short time. For example, this may be caused by a loose contact in the I/O voltage for the bus modules.

Remedy: Ensure that the control or computer system accepts the pending messages.

0915 USER There are too many messages in the *receive buffer* of the controller board. This is because the control or computer system has generated a lot of services in a very short time.

0918 USER You called an unknown service code.

Remedy: Check the last call.

Add_Error_Info: Unknown service code.

0919 USER The service exceeds the maximum permissible length. It is longer than 1024 bytes.

Remedy: Use only services, which are not longer than 1024 bytes including all parameters. Call the service repeatedly to transmit the data record step by step.

091A USER You specified an unknown value for the *Action_Index* parameter.

Add_Error_Info: *Action_Index* parameter.

091B USER You specified a value for the *Action_Index* parameter, which is already in use elsewhere.

Add_Error_Info: *Action_Index* parameter.

091C USER An incorrect request occurred due to an unexpected overlap in the action handler.

Remedy: Please contact Phoenix Contact.

091C USER Unexpected overlap in the action handler.
091D
091E

Remedy: Please contact Phoenix Contact.

091F USER An error occurred due to an unknown action index.

Remedy: Create the desired action index or the desired action object before configuring the signal handler.

Code	Type	Description and Remedy
0920	USER	You specified a value for the *Signal_Index* parameter, which is already in use elsewhere. **Add_Error_Info:** *Signal_Index*
0921	USER	State conflict in the signal handler. There is insufficient memory available on the hardware or you initiated too many signals. **Remedy:** Ensure that there are not too many signals initiated.
0922	USER	State conflict in the action handler. There is insufficient memory available on the hardware or you initiated too many actions. **Remedy:** Ensure that there are not too many actions initiated.
0924	USER	State conflict in the event handler. There is insufficient memory available on the hardware or you initiated too many events. **Remedy:** Ensure that there are not too many events initiated.
0925	USER	You specified an undefined value for the *Event_Index* parameter. **Add_Error_Info:** *Event_Index* parameter.
0926	USER	You specified a value for the *Event_Index* parameter, which is already used elsewhere. **Add_Error_Info:** *Event_Index* parameter.
0928	USER	The controller board cannot process the called service. This service can only be used exclusively. **Remedy:** Change the rights for the service or use a non-exclusive service. ("Change_Exclusive_Rights" service ($014F_{hex}$))
0929	USER	A message cannot be transmitted. The bit number of the target address is not known. **Remedy:** Select a permitted bit number and send the message again. **Add_Error_Info:** Incorrect bit number.
092A	USER	Illegal indication code. **Remedy:** Enter the code of the indication that you wish to enable or disable. **Add_Error_Info:** Illegal indication code.

Code Type Description and Remedy

092B USER
- A device used a communication reference, which had not been assigned to it.
- A channel was opened via the V.24 interface that cannot be accessed.
- The interface must not be modified while a PCP channel is open.

092D USER The controller board rejected a PCP service, as another PCP service is still being processed on this communication reference.

Remedy: Wait for the PCP confirmation of the active service, and then send the new service.

092E USER Insufficient memory available on the controller board for initializing the standard signal interface (SSGI), e.g., due to excessive fragmentation.

Remedy: Use the "Reset_Controller_Board" service (0956_{hex}) to execute a warm start of the controller board, and try again.

0930 USER The controller board cannot process the "Set_Value" service (0750_{hex}), as you specified incorrect parameters when calling the service.

Remedy: Check the call.

0931 USER The controller board could not process the service called last. You used an undefined value for the *Variable_ID* parameter.

Remedy: Check the *Variable_ID.*

0932 USER The communication interface on the controller board could not enable the rights, as it is not authorized to do so.

Remedy: Use the "Change_Exclusive_Rights" service ($014F_{hex}$) to enable the exclusive rights only for the MPM accessor (→ page 116), which has these rights.

0933 USER The communication interface on the controller board could not enable the rights, as a different MPM accessor still has these rights (→ page 116).

Remedy: Use the "Change_Exclusive_Rights_Request" service ($014F_{hex}$) to enable the exclusive rights only when no other MPM accessor already has these rights.

Code Type Description and Remedy

0934 USER The communication interface on the controller board could not enable the rights, as the MPM accessor (→ page 116) already has the exclusive rights.

0935 USER You exceeded the permissible value range when specifying a communication reference (CR).

Remedy: Only assign communication references within the range of $2 \leq CR \leq 127$.

0936 USER Either the "Set_Value" or "Read_Value" service was sent with an unknown Variable_ID code.

Remedy: Send the service with the correct code.

Add_Error_Info: Incorrect Variable_ID code.

0937 USER Either the "Set_Value" or "Read_Value" service was sent with an unknown Variable_ID component.

Remedy: Send the service with the correct Variable_ID component.

Add_Error_Info: Incorrect Variable_ID component.

0938 USER You used a value for the password-protected *Variable_ID* parameter that is reserved for the firmware.

Add_Error_Info: Reserved *Variable_ID*.

0939 USER You used a value for the password-protected *Variable_ID* parameter that is not enabled.

Add_Error_Info: *Variable_ID* not enabled.

093A USER The controller board could not process the "Set_Value" service (0750_{hex}), as an incorrect value was specified for the *Variable_ID* parameter. In bits 8 to 11 of the *Variable_ID* parameter, the length of the variable in words was specified incorrectly.

Remedy: Check the call of the service.

Add_Error_Info: Incorrect *Variable_ID*.

093B USER The controller board could not process the service called last, as the length of the specified variables is not correct.

Remedy: Check the call of the service called last.

Code Type Description and Remedy

093C USER The signal object was defined incorrectly.

Remedy: Define the signal object correctly. For additional information, please refer to the services for creating functions in the IBS SYS FW G4 UM E Firmware Manual, Order No. 27 45 18 5.

093D USER You specified an invalid bit number in the signal object.

Remedy: See Error Code *093C* on page 56.

Add_Error_Info: Invalid bit number.

093E USER You exceeded the maximum permissible number of write parameters.

093F USER You exceeded the maximum permissible number of read parameters.

0940 USER You specified write parameter addresses for a resident action.

0941 USER The controller board could not process the boot sequence without errors due to a service call error.

Remedy: Check the call of the service specified in the *Add_Error_Info* parameter.

Add_Error_Info: Code of the service where the error occurred.

0942 USER The controller board could not process the "Clear_Parameterization_Memory" service (0159_{hex}), as an incorrect value was specified for the *Action_Flag* parameter.

Remedy: Check the call of this service.

Add_Error_Info: Incorrect parameter value.

0943 USER The controller board could not process the "Clear_Parameterization_Memory" service (0159_{hex}) without errors, as an incorrect address field was specified via the *Action_Flag* parameter.

Remedy: Check the call of this service.

Add_Error_Info: Incorrect parameter value.

0944 USER The controller board could not process the "Clear_Parameterization_Memory" service (0159_{hex}), as an undefined *Action_Flag* was specified.

Remedy: Check the call of this service.

Code	Type	Description and Remedy
0945	USER	The controller board could not format the parameterization memory, as it was not inserted or was incorrectly inserted. **Remedy:** Check whether the parameterization memory has been correctly inserted.
0946	USER	Access to the parameterization memory was denied, as the memory is write-protected. **Remedy:** Deactivate write protection and try again.
0947	USER	The action object was defined incorrectly. **Remedy:** Check the definition. **Add_Error_Info:** Incorrect action index.
0948	USER	The signal object was defined incorrectly. **Remedy:** Check the definition. **Add_Error_Info:** Incorrect signal index.
0949	USER	The event object was defined incorrectly. **Remedy:** Check the definition. **Add_Error_Info:** Incorrect event index.
0950	USER	The controller board cannot print the information, as the diagnostic interface of the controller board is not in print mode. **Remedy:** Switch the diagnostic interface to print mode using the "Set_Value" service (0750_{hex}).
0951	USER	The controller board cannot print the information. The buffer of the diagnostic interface is full. **Remedy:** Wait for a moment and try again.
0952	USER	You used an undefined value for the *Variable_ID* parameter. **Remedy:** Check the definition of the *Variable ID* and try again.
0953	USER	The controller board could not process the service called last, as invalid parameters were specified. **Remedy:** Check the call of this service.

Code Type Description and Remedy

0954 USER The controller board could not process the service called last for the RS-232 interface, as an incorrect value was specified for the *Parameter_Count* parameter.

Remedy: Check the call of this service. The *Parameter_Count* parameter must correspond to the number of subsequent words.

0955 USER The message was not read or sent, as the maximum permissible length of 1024 bytes for the RS-232 interfaces was exceeded.

Remedy: If the error code occurs after a request, the message can be read step by step. Some services can be called several times to read large data records. Enter an address offset for the second call.

0956 USER The message could not be read or sent, as when sending PCP services via the SSGI (Standard Signal Interface), a PCP service was written to an SSGI box with an incorrect communication reference.

Remedy: Only write a PCP service to the SSGI box, if the box number corresponds to the communication reference.

0957 USER All remote PCP services of the established connection were aborted, as the connection was interrupted due to an abort on a communication reference.

Remedy: Check the application program and start it again.

0960 USER The variable ID used for the diagnostic display is invalid.

Remedy: Set the correct variable ID.

Add_Error_Info: Invalid variable ID.

0970 USER When communicating with the controller board (e.g., via IB Loader), an error occurred in the runtime system of the controller board.

Remedy: Provide a waiting time between services.

09D0 USER You are using a parameterization memory that is not supported by your firmware.

Remedy: Replace the existing parameterization memory with a suitable one.

Code Type Description and Remedy

09D1 USER The parameterization memory is faulty.
Remedy: Replace the existing parameterization memory with a new one.

09D2 USER See Error Code *09D0* on page 58.

09D3 USER The number of open files on the parameterization memory can no longer be managed.

09D4 USER You tried to save a file on the parameterization memory that has a name with too many characters.

09D5 USER You violated the file access rights to an open file on the parameterization memory of the controller board. You tried, for example, to write to a file that has read access only.
Remedy: Note the access rights when using files.

09D6 USER Insufficient memory available on the parameterization memory of the controller board.
Remedy: Delete the files or reformat the parameterization memory.

09D8 USER Insufficient memory available on the parameterization memory, e.g., due to excessive fragmentation.
Remedy: Save the files and reformat the parameterization memory.



All information stored on the parameterization memory will be lost during formatting.

09D9 USER The desired file does not exist or cannot be found on the parameterization memory of the controller board.

09DA USER The desired file could not be read from the parameterization memory of the controlled board, as an error occurred while reading the file.

09DB USER A file cold not be written to the parameterization memory of the controller board, as an error occurred while writing the file.

Code Type Description and Remedy

09DC USER The desired file on the parameterization memory of the controller board could not be accessed. An error occurred when the file was accessed using the "File_Seek" service. The file pointer could not be positioned correctly.

09DD USER A file on the parameterization memory of the controller board could not be closed. An error occurred while closing the file.

09DE USER The desired file on the parameterization memory of the controller board could not be opened:

- The parameterization memory is faulty or write-protected or is not plugged in.
- No file exists or the file is faulty.

09DF USER The desired file on the parameterization memory of the controller board could not be deleted. An error occurred while deleting the file.

09F0 USER There is a maximum number of files that the parameterization memory of the controller board can handle. This number was exceeded.

Remedy: Delete the files and reformat the parameterization memory.



All information stored on the parameterization memory will be lost during formatting.

09F1 USER The file structure on the parameterization memory of the controller board cannot be read. The parameterization memory was written using an older firmware version.

Remedy: See Error Code *09F0* on page 60.

09F2 USER A file on the parameterization memory of the controller board cannot be processed. The file handle is incorrect or invalid.

Remedy: Enter the correct file handle for the file to be processed.

09FC USER It is not possible to write to the parameterization memory. A timeout is triggered. This may be due to a hardware defect.

Remedy: Replace the parameterization memory.

Code Type Description and Remedy

0A02 USER The controller board could not process the service called last. The sent service was not permitted in the current state of the controller board.

Remedy: Set the controller board to the required state before calling the desired service.

Add_Error_Info: Current invalid state of the controller board:

0001_{hex}: Ready (display: RDY)
0002_{hex}: Parameterization not ready
0004_{hex}: Loading the configuration (Loading CFG)
0008_{hex}: Loading the process data description list (Loading PDDL)
0010_{hex}: Loading the process data reference list
0020_{hex}: Parameterization ready
0040_{hex}: Controller board running sporadic ID cycles (display: ACTV)
0080_{hex}: Controller board running data cycles (display: RUN)
Possible remedy: Do not start the bus when it is running.
0100_{hex}: Bus fail
0200_{hex}: Controller board looking for error (display: LOOK FOR FAIL)

0A03 USER Insufficient memory available on the controller board, e.g., due to excessive fragmentation.

Remedy: Reset the controller board. ("Reset_Controller_Board" service (0956_{hex}))

0A04 USER The controller board could not process the service called last, as you specified inconsistent parameters.

Remedy: Check the call of this service.

Add_Error_Info: Number of the inconsistent parameter.

0A05 USER The controller board could not process the service called last. Invalid parameter.

Remedy: Check the call of this service.

Add_Error_Info: Number of the invalid parameter.

Code Type Description and Remedy

0A06 USER The controller board could not access the object (operating parameter). This access is not supported by the system management for the object (e.g., a write access to an object to which only read access is permitted).
("Set_Value" service (0750_{hex}))

0A07 USER The controller board could not access an object. The object does not exist.

0A08 USER You called a service, which causes a conflict with a service called previously.

Remedy: Wait for the service called first to be completed, and then try again.

Add_Error_Info: Code of the service called previously.

0A10 USER The controller board cannot process the "Set_Value" service (0750_{hex}), as an incorrect value was specified for the *Variable_ID* parameter.

Add_Error_Info: Number of the incorrect *Variable_ID*.

0A11 USER The controller board cannot process the "Set_Value" service (0750_{hex}). You exceeded the permissible value range when specifying a parameter.

Remedy: Check the parameter of this service.

0A12 USER You exceeded the value range of the *Device_Level* parameter.

Remedy: Check the *Device_Level* parameter. Permissible values: 00_{hex} to $0F_{hex}$.

Add_Error_Info: Line number of the configuration frame.

0A14 USER You entered an invalid value for the *Error_Char_Flag* parameter.

Remedy: Check the *Error_Char_Flag* parameter. Permissible values: 0000_{hex} or 0001_{hex}.

Add_Error_Info: Line number of the configuration frame.

Code Type Description and Remedy

0A15 USER You entered an invalid value for the *Position* parameter.
Remedy: Check the *Position* parameter. Permissible values: 00_{hex} to $3F_{hex}$.
Add_Error_Info: Line number of the configuration frame.

0A16 USER You specified an invalid value for a device number (Segment . Position).
Remedy: Check the device. Permissible for segment: 01_{hex} to FF_{hex} (1 to 255) for position: 00_{hex} to $3F_{hex}$ (0 to 63)
Add_Error_Info: Invalid device number.

0A17 USER You specified an unknown ID code.
Remedy: Check the parameters of the configuration frame (→ page 116).
Add_Error_Info: Line number of the configuration frame.

0A18 USER You activated an invalid bit in the *Used_Attributes* parameter.
Remedy: Check the *Used_Attributes* parameter of the corresponding service.
Add_Error_Info: Invalid parameter.

0A19 USER The maximum bus configuration was exceeded when accessing a configuration frame (→ page 116).
Remedy: Check the last access to the configuration frame.
Add_Error_Info: Number of devices.

0A1A USER The specified *Frame_Reference* does not exist or cannot be assigned.
Remedy: Check the *Frame_Reference* parameter.
Add_Error_Info: Invalid *Frame_Reference* (if specified).

0A1B USER The specified configuration frame (→ page 116) could not be deleted, as it is currently activated.
Remedy: Before deleting the configuration frame, first deactivate it using the "Deactivate_Configuration" service (0712_{hex}).
Add_Error_Info: Number of the configuration frame.

Code Type Description and Remedy

0A1C USER You exceeded the permissible number of specified or connected devices. The maximum permissible number of INTERBUS devices is 512 (254 of which are remote bus devices).

Remedy: Reduce the bus configuration.

Add_Error_Info: Number of devices.

0A1D USER The specified configuration frame (→ page 116) could not be overwritten. The number of devices is not identical to the existing frame.

If you want to create a configuration frame of a different size, create it under a new, unused *Frame_Reference*.

Remedy: Compare the existing configuration frame with the new data.

0A1E USER The new extension could not be assigned to the configuration frame (→ page 116). It is too long for the space provided in the configuration frame.

Remedy: Adapt the size of the new extension to the space provided.

0A1F USER The specified configuration frame (→ page 116) could not be deactivated, as it is already inactive.

Add_Error_Info: *Frame_Reference.*

0A20 USER You tried to switch device 0.0.

Remedy: Enter a valid device number (1.0 to 255.63). Only switch the device if a valid device number has been transferred.

0A21 USER You assigned a device number more than once.

Remedy: Check the device number in the configuration frame (→ page 116).

Add_Error_Info: Line number of the configuration frame.

0A22 USER You specified inconsistent device numbers.

Remedy: Enter a valid device number (1.0 to 255.63).

Add_Error_Info: Line number of the configuration frame.

Code Type Description and Remedy

0A23 USER You assigned inconsistent device levels.

Remedy: Check the configuration frame (→ page 116). Do not assign different device levels in a bus segment.

Add_Error_Info: Line number of the configuration frame.

0A24 USER Within one local bus segment the connected devices have different operating states.

Not all devices were switched on or off using the "Control_Active_Configuration" service (0713_{hex}).

Remedy: Switch all devices in a local bus segment on or off. Only use the Segment_On or Segment_Off commands for the service.

Add_Error_Info: Line number of the configuration frame.

0A25 USER The controller board did not accept the group definition. You assigned different group numbers for devices in one bus segment.

Remedy: Always assign the same group number to all devices in one bus segment.

Add_Error_Info: Line number of the configuration frame.

0A26 USER The controller board did not accept the definition of an alternative group. The assigned group number is invalid.

Add_Error_Info: Line number of the configuration frame.

0A27 USER The controller board did not accept the definition of an alternative group. The first device in the alternative group is not a remote bus device.

Add_Error_Info: Line number of the configuration frame.

0A28 USER The controller board could not activate the specified group. You tried to activate several alternative groups at the same time.

Add_Error_Info: Line number of the configuration frame.

Code Type Description and Remedy

0A29 USER When switching devices on or off using the "Control_Active_Configuration" service (0713_{hex}) you caused inconsistencies between mutually dependent groups.

Add_Error_Info: Line number of the configuration frame.

0A2A USER Using the "Control_Active_Configuration" service (0713_{hex}) you caused inconsistencies when switching mutually dependent devices (active/ inactive).

Add_Error_Info: Line number of the configuration frame.

0A2B USER Status conflict within a group. You assigned different statuses to devices belonging to one group.

Remedy: Always assign the same status to the devices of one group.

Add_Error_Info: Line number of the configuration frame.

0A2C USER The specified device number does not exist.

Add_Error_Info: Non-existent device number.

0A2D USER You connected too many PCP devices or you configured more than the permitted number of PCP devices.

Remedy: Reduce the number of connected or configured PCP devices. A maximum of 126 PCP devices is permitted, depending on the controller board used and the firmware version.

0A2E USER You have reached the firmware memory limit.

Remedy: Reduce the number of modules occupying less than 1 word of address space. Alternatively you can rearrange the modules. Position those devices that occupy less than 1 word one after the other.

0A2F USER The controller board could not execute the "Initiate_Load_Configuration" service (0306_{hex}), as the number of devices was specified as "0".

Remedy: Specify the correct number of devices.

0A30 USER Incorrect entry in the process data description list (PDDL).

Remedy: Check the PDDL.

Code Type Description and Remedy

0A31 USER The controller board cannot process the "Put_Process_Data_Description_List" service (0321_{hex}) or the "Get_Process_Data_Description_List" service (0323_{hex}), as the device number used does not exist.

Add_Error_Info: Non-existent device number in the format [RRLL].
RR = Remote bus segment number
LL = Local bus segment number

0A32 USER The controller board could not process the "Put_Process_Data_Description_List" service (0321_{hex}). An invalid value was specified in a process data description for the *PDD_Index* parameter.

Remedy: Assign values in the range from 0000_{hex} to $7FFF_{hex}$ for this parameter (except for 6010_{hex} and 6011_{hex}). Every PDD index must be assigned only once.

Add_Error_Info: Index of the process data description.

0A33 USER The process data direction (IN or OUT data) was defined incorrectly.

Remedy: Use the *Data_Direction* parameter to define the data direction for the process data description:
$0C_{hex}$ for IN PDD, $0D_{hex}$ for OUT PDD.

Add_Error_Info: Index of the process data description.

0A34 USER The internal address area of a device was exceeded when writing to a process data item.

Add_Error_Info: Index of the PD object.

0A35 USER A data type and a data length that do not correspond were specified when writing to a process data item.

Add_Error_Info: Index of the process data description.

Code Type Description and Remedy

0A36 USER Error when defining a process data item. Using the "Put_Process_Data_Description_List" service (0321_{hex}) a bit string process data item was defined, which exceeds the byte boundary.

Remedy: Do not exceed the byte boundaries of bit string process data (8 bits, maximum).

Add_Error_Info: Index of the process data description.

0A40 USER Incorrect entry in the process data reference list (PDRL).

Add_Error_Info: PDRL_Index of the incorrect PDRL entry.

0A41 USER Incorrect entry in the process data reference list (PDRL). There is no OUT PD specified as the target.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A42 USER Incorrect entry in the process data reference list (PDRL). There is no IN PD specified as the source.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A43 USER Incorrect entry in the process data reference list (PDRL). The specified device number does not exist.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A44 USER Incorrect entry in the process data reference list (PDRL). You specified a data consistency for a process data item, which does not correspond to its length.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A45 USER Incorrect entry in the process data reference list (PDRL). You specified a value that does not exist for the *PDD_Index* parameter.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

Code Type Description and Remedy

0A46 USER Addressing error. You specified an incorrect value for the *Address_Direction* parameter for the "Compact_Load_PDRL" service (0328_{hex}) or "Load_PDRL" service (0325_{hex}).

Remedy: Enter 1000_{hex} for input address lists or 2000_{hex} for output address lists.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A47 USER Incorrect entry in the process data reference list (PDRL). You specified an incorrect or unknown value for the *PDRL_Index* parameter.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A48 USER Incorrect direct link definition in the process data reference list (PDRL). You tried to map a process data item directly to an IN process data item of the same process data length. One of these entries is not correct (data direction or data length).

Remedy: Check the direct link definitions.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.

0A49 USER The controller board could not start up the connected bus configuration. You specified an incorrect number of devices for the "Compact_Load_PDRL" service (0328_{hex}) using the *Entry_Count* parameter.

Remedy: Use the "Compact_Read_PDRL" service (0329_{hex}) to compare the process data assignment with the actual number of devices in the bus configuration.

Add_Error_Info: Identification whether IN or OUT list.

0A4A USER The controller board could not read the process data reference list.

Remedy: Use the "Read_PDRL" service (0327_{hex}) to read process data reference lists that were loaded with the "Load_PDRL" service (0325_{hex}).

Code Type Description and Remedy

0A4B USER Error when assigning a process data item. Using the "Load_PDRL" service (0325_{hex}) you assigned a bit string process data item that exceeds the byte boundary.

Remedy: A bit string process data item must not exceed the byte boundary.

Add_Error_Info: Bit position of the incorrectly assigned bit string process data item in the MPM (→ page 116).

0A4C USER Error when assigning a process data item. You assigned an odd byte address.

Remedy: Only assign even byte addresses to process data with a data consistency of 16, 32 or 64 bits.

Add_Error_Info: PDRL_Index of the incorrect PDRL entry.

0A50 USER Error when assigning a process data item. You assigned an output process data description or an input host address several times.

Remedy: Each output process data description should only be assigned one host address and each input host address should only be assigned one process data description.

Add_Error_Info: *PDRL_Index* of the incorrect PDRL entry.



Additional information for system coupler cards
If a large bus configuration (system coupler card and number of devices > 225, all with 32 bits of DIO) is read with the "Create_Configuration" service (0710_{hex}), the default I/O data will be stored in address area 0000_{hex} to $03FF_{hex}$. This causes a conflict with system coupler address 0380_{hex}.

Remedy: Assign the system coupler to an address located after the address area of the default I/O data.

0A51 USER The controller board did not accept the *Frame_Reference* parameter.

Remedy: Values between 1 and 254 are permitted.

Code Type Description and Remedy

0A52 USER You tried to jumper an active device.

Remedy: First switch off the device using "Control_Active_Configuration" (0713_{hex}).

Add_Error_Info: Line number of the configuration frame.

0A53 USER The maximum permissible number of remote bus devices was exceeded by the user when using the "Load_Configuration" service (0307_{hex}) or when reading the connected devices using the "Create_Configuration" service (0710_{hex}).

Remedy: Reduce the number of remote bus devices to less than 254.

0A54 USER The maximum permissible number of I/O points was exceeded by the user when using the "Load_Configuration" service (0307_{hex}) or when automatically reading the connected devices using the "Create_Configuration" service (0710_{hex}).

Remedy: Reduce the number of I/O points to the maximum number of digital inputs and outputs for the input and output data area. Depending on the type of controller board, you may use up to 8192 I/O points. To obtain the exact number, refer to the documentation for your controller board.

0A55 USER The configuration data transmitted to the controller board using the "Compare_Configuration" service (0317_{hex}) does not correspond to the configuration frame specified with the *Frame_Reference* parameter (→ page 116).

The *device number (Segment . Position)* specified by the *Add_Error_Info* parameter has been entered differently.

Remedy: The detected bus configuration does not correspond to the expected bus configuration. Check the list of transmitted configuration data against the specified configuration frame.

Add_Error_Info: Line number of the configuration frame, which does not correspond to the transmitted configuration data.

Code Type Description and Remedy

0A56 USER The configuration data transmitted to the controller board using the "Compare_Configuration" service (0317_{hex}) does not correspond to the configuration frame specified with the *Frame_Reference* parameter.

The *device code (length/ID code)* specified by the *Add_Error_Info* parameter has been entered differently.

Remedy: Check the list of transmitted configuration data against the specified configuration frame (→ page 116).

Add_Error_Info: Line number of the configuration frame in which the data does not correspond to the transmitted configuration data.

0A57 USER The configuration data transmitted to the controller board using the "Compare_Configuration" service (0317_{hex}) does not correspond to the configuration frame specified with the *Frame_Reference* parameter.

Remedy: Check the list of transmitted configuration data against the specified configuration frame (→ page 116).

Add_Error_Info: Line number of the configuration frame in which the data does not correspond to the transmitted configuration data.

0A58 USER The configuration data transmitted to the controller board using the "Compare_Configuration" service (0317_{hex}) does not correspond to the configuration frame specified with the *Frame_Reference* parameter. The *group number* specified by the *Add_Error_Info* parameter has been entered differently.

Remedy: Check the list of transmitted configuration data against the specified configuration frame (→ page 116).

Add_Error_Info: Line number of the configuration frame in which the data does not correspond to the transmitted configuration data.

0A59 USER The local system coupler must not be switched. You tried to switch the slave part of the local system coupler.

Code Type Description and Remedy

0A5A USER The "Control_Active_Configuration" service (0713_{hex}) was used in an attempt to switch on an active device.

Add_Error_Info: Line number of the configuration frame.

0A5B USER The configuration data transmitted to the controller board using the "Compare_Configuration" service (0317_{hex}) does not correspond to the configuration frame data specified with the *Frame_Reference* parameter. A device (specified by the *Add_Error_Info* parameter), which is to be switched in isolation, has been entered differently.

Add_Error_Info: Line number of the configuration frame in which the data does not correspond to the transmitted configuration data.

0A5C USER The "Create_Configuration" service (0710_{hex}) was used in an attempt to read a local bus configuration, which contains too many devices (more than 63).

0A60 USER The controller board could not assign a configuration frame (→ page 116).

Remedy: Create the configuration frame first.

0A63 USER The diagnostic status or diagnostic parameter registers are in the output address area.

Remedy: Always place these registers in the input address area.

Add_Error_Info: *Variable_ID* of the incorrectly assigned register.

0A64 USER Address conflict between a diagnostic register and an IN process data item.

Remedy: Using the "Set_Value" service (0750_{hex}), place the diagnostic status register and the diagnostic parameter register in address areas, which are not occupied by IN process data.

Add_Error_Info: *Variable_ID* of the register that caused the address conflict.

Code Type Description and Remedy

0A65 USER You assigned an odd byte address to a 16, 32 or 64-bit register (only permitted for 8-bit registers).

Remedy: Only assign even byte addresses to 16, 32 or 64-bit registers.

Add_Error_Info: *Variable_ID* of the register to which the wrong byte address has been assigned.

0A70 USER The controller board could not process the "Get_Diag_Info" service ($032B_{hex}$). The reserved attribute cannot be enabled with the *Diag_Info_Attr* parameter.

0A80 USER You parameterized a bus branch for isolated disconnection even though the bus terminal module, whose interface is used to branch the bus branch, does not contain a SUPI 3 OPC protocol chip.

Remedy: Only use devices with SUPI 3 OPC as bus terminal modules.

Add_Error_Info: Line number of the configuration frame.

0AFB USER The controller board did not accept the specified data consistency.

Remedy: Check the assignments of the data consistencies.

0AFC USER Hardware fault on the controller board.

Remedy: Replace the controller board.

0AFD USER (Only applies to Siemens S5 or Bosch PLC)

This error occurs only when a configuration modification is started for the first time. The contents of the address decoder EEPROM have changed.

Remedy: Restart the controller board.

Code Type Description and Remedy

0AFE USER (Only applies to Siemens S5 or Bosch PLC)
The addresses of devices overlap the address of the communication register.

Remedy:

- The address for the communication register in CMD must correspond to the switch position on the controller board.
- Set a higher address for the communication register on the controller board that is not assigned during addressing or change the addresses of the device.
- To read in the configuration frame using the CMD software, place the communication register in a higher address area on the controller board.

0B00 USER Firmware error on the controller board.
0B01 **Remedy:** Replace the controller board.

0B02 USER Synchronous operating mode: No cycle time set or cycle time too short.
For firmware Versions ≤ 4.15 this may be because the first device after the controller board is switched off or there is an empty configuration frame.

0B03 USER Firmware error on the controller board.
Remedy: Replace the controller board.

0B80 USER The controller board cannot process the "Set_Value" service (0750_{hex}) or the "Read_Value" service (0351_{hex}), as an invalid value was specified for the *Variable_ID* parameter.
Remedy: Only use values specified in the description of the "Set_Value" service (0750_{hex}) or "Read_Value" service (0351_{hex}).

0B81 USER The controller board cannot process the "Set_Value" service (0750_{hex}). You exceeded the permissible value range when specifying a parameter.
Remedy: Only use the values specified in the description of the "Set_Value" service (0750_{hex}).

Code Type Description and Remedy

0B83 USER The controller board cannot process the "Control_Device_Function" service (0714_{hex}). You specified an invalid value for the *Device_Function* parameter.

Remedy: Only use the values specified in the description of the "Control_Device_Function" service (0714_{hex}).

0B84 USER The controller board cannot process the "Control_Device_Function" service (0714_{hex}). An error was detected in the list of physical device positions.

Remedy: Check the list of physical device positions.

0B85 USER The configuration cannot be created. An error was detected in the active configuration.

Remedy: Check the list of the active configuration.

0B86 USER The controller board could not process the "Control_Device_Function" service (0714_{hex}). The called device has no command register.

0B87 USER The controller board cannot process the "Control_Device_Function" service (0714_{hex}). You specified a number for the *Entry_Count* parameter, which is greater than the actual number of devices.

0B88 USER The controller board cannot process the "Control_Device_Function" service (0714_{hex}). A firmware error occurred on the controller board.

Remedy: Replace the controller board.

0B8A USER After activating a new or modified configuration, the controller board changed to the stop state. You sent the "Alarm_Stop" service (1303_{hex}) too early.

Remedy: Send the "Alarm_Stop" service (1303_{hex}) later.

Code Type Description and Remedy

0B8C USER The controller board could not activate the configuration frame (→ page 116). You exceeded the maximum permissible number of I/O bits.

Remedy: Reduce the number of devices. Depending on the type of controller board, you may use up to 8192 I/O points. To obtain the exact number, refer to the documentation for your controller board.

0B8D EVNT The control or computer system illegally initiated a synchronous interrupt.

Remedy: Only initiate synchronous interrupts when the bus is running or in synchronous modes.

0B8E EVNT You initiated a synchronous interrupt in the MPM (→ page 116), although the controller board was in asynchronous mode or the bus was not started.

Remedy: Only initiate synchronous interrupts when the bus is running or in synchronous modes.

0B8F EVNT This error may occur if the bus was installed incorrectly and the transmission quality is poor as a result.

In addition, this message indicates a data inconsistency.

Remedy: Check transmission paths or only access data areas with a data width that is equal to the full data consistency defined for this data area.

The INTERBUS configuration enables you to specify the data consistency in addition to the address of a device. The data consistency ensures that the process data is coherently available. Word-oriented access is set by default. If other consistency area are needed, you can define areas of 8, 16, 32, and 64 bits by entering the consistency after the PLC address for the process data definition, e.g., P12**:32** for double-word access or P12**:8** for byte-oriented access.

0B90 USER The last INTERBUS cycle was aborted. A hardware fault has occurred on the controller board.

Remedy: Replace the controller board.

Code Type Description and Remedy

0B91 USER In a bus state that is not ACTIVE or RUN, an MPM accessor (→ page 116) caused a timeout. A data consistency error occurred. This is due to the fact that not all of the bits have been accepted from the MPM.

Remedy: See Error Code *0B8F*.

0B92 USER A "Read_PD" service could not be processed completely. A data cycle could not be executed within a timeout as, for example, the bus is not in the RUN state or a bus error occurred during service execution.

Remedy: Change the bus state to RUN and then call the "Read_PD" service once again.

0B93 USER After an I/O timeout, the outputs on the device are reset. The protocol chip could not process I/O data within a specified time. The protocol chip may be faulty.

Remedy: Restart the system.

Add_Error_Info: Error location (Segment . Position).

0B94 A local bus device, which does not support local bus diagnostics, is connected to a bus terminal module with local bus diagnostics. This may cause incorrect diagnostic indications to occur.

Add_Error_Info: Physical position of the first local bus device without local bus diagnostics.

0B97 A mean cycle time (scan time) must be assigned for program-synchronous or bus-synchronous mode.

Remedy: Specify a value for the cycle time.

0BB1 PF The specified device is indicating a peripheral fault.

Remedy: Check the device.

Add_Error_Info: Error location (Segment . Position).

0BB2 Reconfiguration request of the specified device. The reconfiguration button was pressed on the specified bus terminal module.

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0BB4 The microprocessor of the indicated device performed a reset.

Remedy: Check the device.

Add_Error_Info: Error location (Segment . Position).

0BB5 Deterioration of the transmission quality on the *data forward path* at the incoming bus interface (IN) of the indicated device.

Remedy: Check device and connection.

Add_Error_Info: Error location (Segment . Position).

0BB6 Deterioration of the transmission quality on the *data return path* at the incoming bus interface (IN) of the indicated device.

Remedy: Check device and connection.

Add_Error_Info: Error location (Segment . Position).

0BB7 RBUS The specified device indicated a timeout and reset all outputs, if available. The response is identical to the response given upon a bus reset.

Add_Error_Info: Error location (Segment . Position).

Remedy: Reduce the cycle time.

0BC0 Error message for a system coupler.

- The lower-level bus changed to the STOP state due to a bus error.
- Voltage reset of the system coupler master part.

Remedy: Read the exact error cause, e.g., using the "Get_Error_ Info" service (0316_{hex}), or read the diagnostic register or diagnostics using CMD or PC WORX software.

Add_Error_Info: Error location (Segment . Position) of the INTERBUS device.

0BC2 The voltage for sensors is too low on a Loop device.

Remedy: Reduce the number of connected devices or reduce the extension of the ring.

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0BC3 The protocol chip in a Loop device is too hot.

Remedy: Reduce the ambient temperature or provide ventilation for the Loop device.

Add_Error_Info: Error location (Segment . Position).

0BC4 The internal current source is overloaded on a Loop device.

Remedy: Reduce the number of connected sensors/actuators or check the sensors/actuators for errors.

Add_Error_Info: Error location (Segment . Position).

0BC5 The output of the device is overloaded.

Remedy: Reduce the number of connected sensors/actuators or check the sensors/actuators for errors.

Add_Error_Info: Error location (Segment . Position).

0BD0 USER The controller board could not start up the connected configuration, as no bus configuration is connected.

Remedy: Connect the bus configuration.

0BD1 The process data could not be updated within the specified PD cycle time. The controller board indicates this only if it has been activated with the "Set_Value" service (0750_{hex}) before.

Remedy: Check your system or increase the value set for the PD cycle time using the "Set_Value" service (0750_{hex}).

0BD2 EVNT The bus warning time has elapsed. No data cycle could be transmitted within the specified bus warning time.

Remedy: Check the system or increase the bus warning time with the "Set_Value" service or using CMD or PC WORX software.

0BD4 USER A single bus error occurred. (The controller board indicates this only if this function has been activated before.)

Code Type Description and Remedy

0BD5 USER An error occurred in the bus segment, which is connected to the branching branch interface of the indicated device. The branching interface was switched off.

Add_Error_Info: Device number of the device that was switched off.

0BDB BUS The process preprocessing task is no longer in the RUN state. The bus was stopped to prevent data transmission without preprocessing. Error in the preprocessing program (e.g., division by zero) or preprocessing intentionally stopped by the user.

0BDC A SYSFAIL on the host system generated an alarm stop on the controller board while it was in the ACTIVE or RUN state.

0BDD BUS (This error message must already be enabled ("Set_Value" service (0750_{hex})).

The bus was stopped, as inconsistent data could otherwise have been transmitted, e.g., by a byte access to a 16-bit locked MPM address (→ page 116).

Remedy: See Error Code *0B8F* on page 77.

0BDE USER A synchronization error occurred in *bus-synchronous* mode.

Remedy: Check the system or increase the cycle time with the "Set_Value" service or using CMD or PC WORX software.

0BDF LOOK FOR FAIL A bus error occurred. The controller board has set data transmission and is searching for the error location and error cause.

Remedy: Wait for the troubleshooting results.

0BE0 BUS See Error Code *E0* on page 49.

Code Type Description and Remedy

0BF0 BUS The controller board reset all outputs and stopped data transmission.

The error cause is located in a remote bus device or a device prior to it, including all branching bus segments.

It may have been caused by the voltage reset of a device or a cable break. There may be a fault on the jumper in the connector for the outgoing remote or local bus.

Add_Error_Info: Error location (Segment . Position).

0BF1 BUS Interrupted data transmission at the specified bus terminal module. The connector for the branching remote bus branch is not plugged in or the jumper in the connector for the branching remote bus branch is faulty.

Add_Error_Info: Error location (Segment . Position).

0BF2 BUS Interrupted data transmission at the specified bus terminal module. The connector for the outgoing remote bus is not plugged in or the jumper in the connector for the outgoing remote bus is faulty.

Add_Error_Info: Error location (Segment . Position).

0BF3 BUS Interrupted data transmission at the specified bus terminal module or in its local bus.

Add_Error_Info: Error location (Segment . Position).

0BF4 BUS Transmission error (CRC error) on the *data forward path* of the incoming bus interface (IN) of the indicated device.

Remedy: Check the segment:

- Shielding of the bus cables (connectors)
- Grounding/equipotential bonding
- Faulty connectors or joints
- Voltage dips on the communications power for remote bus devices
- Faulty fiber optic assembly

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0BF5 BUS Transmission error (CRC error) on the *data return path* of the incoming bus interface (IN) of the indicated device.

Remedy: See Error Code *0BF4* on page 82.

Add_Error_Info: Error location (Segment . Position).

0BF6 BUS See Error Code *0BF0* on page 82.

Add_Error_Info: Error location (Segment . Position).

0BF8
0BF9
0BFA
0BFB A multiple error occurred on the indicated device. It was not possible to find the exact location of the error. Possible error locations:

- Indicated devices
- The complete bus located prior to the device
- All devices connected to OUT2 of the indicated device

Remedy: Check the system:

- Shielding of the bus cables (connectors)
- Grounding/equipotential bonding
- Faulty connectors or joints
- Cable breaks
- Voltage dips on the communications power for remote bus devices

You can view information about the error location via the PF TEN or CRC TEN menu item (page 28) ("Get_Diag_Info" service ($032B_{hex}$)).

Add_Error_Info: Error location (Segment . Position).

0BFC See Error Code *0BF0* on page 82, but the error may be located in several places.

The error may occur on all transmission paths and devices in the *branches* located *prior to* the indicated device.

0C10 RB
0C11
0C12
0C13 A device entered in the active configuration and not marked as switched off is missing from the connected bus configuration.

Remedy: Compare the bus configuration with the active configuration. Take the disabled bus segments into account.

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0C14 RB
0C15
0C16
0C17

Multiple errors in the segment of the indicated device caused by transmission errors.

Remedy: Check the segment:

- Shielding of the bus cables (connectors)
- Grounding/equipotential bonding
- Faulty connectors or joints
- Voltage dips on the communications power for remote bus devices
- Faulty fiber optic assembly

Add_Error_Info: Error location (Segment . Position).

0C18 RB
0C19
0C1A
0C1B

Multiple timeout in the segment of the indicated device caused by transmission errors.

Remedy: See Error Code *0C14* on page 84.

Add_Error_Info: Error location (Segment . Position).

0C1C RB
0C1D
0C1E
0C1F

Transmission error (CRC error) on the *data forward path* of the incoming bus interface (IN) of the indicated device.

Remedy: See Error Code *0C14* on page 84.

Add_Error_Info: Error location (Segment . Position).

0C20 RB
0C21
0C22
0C23

Interruption of the *data forward path* to the bus interface (IN) of the indicated device

Remedy: Check the cables, connectors, and INTERBUS connections for interruptions.

Add_Error_Info: Error location (Segment . Position).

0C24 RB
0C25
0C26
0C27

Transmission error (CRC error) on the *data return path* of the incoming bus interface (IN) of the indicated device.

Remedy: See Error Code *0C14* on page 84.

Add_Error_Info: Error location (Segment . Position).

0C28 RB
0C29
0C2A
0C2B

Interruption of the *data return path* of the incoming bus interface (IN) of the indicated device

Remedy: Check the cables, connectors, and INTERBUS connections for interruptions.

Add_Error_Info: Error location (Segment . Position).

Code	Type	Description and Remedy
0C2C **0C2D** **0C2E** **0C2F**	RB	Missing or faulty jumper (loose contact, cold junction) in the outgoing bus connector of the preceding device. **Add_Error_Info:** Error location (Segment . Position).
0C30 **0C31** **0C32** **0C33**	RB	Multiple errors in the segment of the indicated INTERBUS device. – Transmission errors. – The indicated INTERBUS device has a protocol chip, which is not supported by your controller board firmware. **Remedy:** See Error Code *0C14* on page 84 or replace the indicated device with a device that has a SUPI 3 chip. **Add_Error_Info:** Error location (Segment . Position).
0C40 **0C41** **0C42** **0C43**	DEV	The length code of the indicated device is not identical to the entry in the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position). **Remedy:** Change the length code or add a device that is suited to the length code.
0C44 **0C45** **0C46** **0C47**	DEV	The ID code of the indicated device is not identical to the entry in the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).
0C48 **0C49** **0C4A** **0C4B**	DEV	The bus can be read but not started up. – The data register of the indicated device was interrupted. – The data register length of the indicated device is not identical to the length code in the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).
0C4C **0C4D** **0C4E** **0C4F**	DEV	An incorrect device has been installed (invalid ID code). **Add_Error_Info:** Error location (Segment . Position).

Code Type Description and Remedy

0C54 DEV
0C55
0C56
0C57

The indicated device has a protocol chip, which is not supported by the controller board firmware.

Remedy: Replace the device with a device that has a SUPI 3 chip.

Add_Error_Info: Error location (Segment . Position).

0C58 DEV
0C59
0C5A
0C5B

Data transmission was interrupted at the outgoing remote bus interface (OUT1) of the indicated device.

Remedy: Check whether the connector is plugged in or whether the jumper for connector identification (RBST or LBST) is faulty.

Add_Error_Info: Error location (Segment . Position).

0C5C DEV
0C5D
0C5E
0C5F

Data transmission was interrupted at the branching bus interface (OUT2) of the indicated device.

Remedy: Check whether the connector is plugged in or whether the jumper for connector identification (RBST or LBST) is faulty.

Add_Error_Info: Error location (Segment . Position).

0C60 DEV
0C61
0C62
0C63

An error was detected at the unused, outgoing interface (OUT1) of the indicated device.

Remedy: Check the device and replace if necessary.

Add_Error_Info: Error location (Segment . Position).

0C64 DEV
0C65
0C66
0C67

An error was detected at the unused, branching interface (OUT2) of the indicated device.

Remedy: Check the device and replace if necessary.

Add_Error_Info: Error location (Segment . Position).

0C68 DEV
0C69
0C6A
0C6B

The transmission time for I/O data was exceeded on the indicated device.

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0C6C DEV
0C6D
0C6E
0C6F

The indicated device executed a reset due to a fault or insufficient voltage supply.

Remedy:

- Check the device.
- Check the voltage supply to determine whether it conforms to the nominal value and whether the permissible AC component was exceeded.
- Check the power supply unit of the bus terminal module for overload (see corresponding data sheet).

Add_Error_Info: Error location (Segment . Position).

0C70 DEV
0C71
0C72
0C73

The controller board tried to start up the bus before all devices were ready for operation.

Remedy:

- Replace the device.
- Delay the call of the "Activate_Configuration" service (0711_{hex}).
- Increase the startup delay using CMD or PC WORX software.

Add_Error_Info: Error location (Segment . Position).

0C74 DEV
0C75
0C76
0C77

An invalid operating mode has been set on the INTERBUS protocol chip of a device.

Remedy: Replace the device or set a valid operating mode.

Add_Error_Info: Error location (Segment . Position).

0C78 RB

The data length of the indicated device is not identical to the configuration frame when the dynamic PCP channel is switched on (→ page 116).

Add_Error_Info: Error location (Segment . Position).

0C79 RB

The ID code of the indicated device is not identical to the configuration frame when the dynamic PCP channel is switched on (→ page 116).

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0C7A RB The width of the dynamic PCP channel of the indicated device is not permitted.

Add_Error_Info: Error location (Segment . Position).

0C7B RB The indicated device has an ID code for devices with a dynamic PCP channel, but cannot use this channel.

– The indicated device does not have a suitable protocol chip.
– The controller board firmware does not support devices with dynamic PCP channels yet.

Add_Error_Info: Error location (Segment . Position).

0C7C RB The dynamic PCP channel of the indicated device is switched on, even though it should be switched off.

Add_Error_Info: Error location (Segment . Position).

0C7D RB The dynamic PCP channel of the indicated device is switched off, even though it should be switched on.

Add_Error_Info: Error location (Segment . Position).

0C7E RB The INTERBUS protocol chip in the indicated device cannot be operated in the specified configuration, as it does not support the necessary functions.

Remedy: Replace the device.

Code Type Description and Remedy

0C80 OUT1
0C81
0C82
0C83

Multiple errors at the outgoing bus interface (OUT1) of the indicated device caused by a fault on the bus cable connected to this bus interface, in the following device or in a device of the subsequent local bus.

Remedy: Check the segment:

- Shielding of the bus cables (connectors)
- Grounding/equipotential bonding
- Faulty connectors or joints
- Voltage dips on the communications power for remote bus devices
- Faulty fiber optic assembly

Add_Error_Info: Error location (Segment . Position).

0C84 OUT1
0C85
0C86
0C87

Multiple errors *(timeout)* at the outgoing bus interface (OUT1) due to a:

- Fault on the connected bus cable
- Fault in the following device
- Fault in a device of the subsequent local bus

Remedy: See Error Code *0C80*.

Add_Error_Info: Error location (Segment . Position).

0C88 OUT1
0C89
0C8A
0C8B

Devices were found at the outgoing bus interface (OUT1) of the indicated device, which have not been entered in the active configuration. This may also apply to INTERBUS cables to which no device is connected.

Add_Error_Info: Error location (Segment . Position).

0C8C OUT1
0C8D
0C8E
0C8F

The bus can be read but not started up.

- The data register was interrupted at the outgoing remote bus interface (OUT1) of the indicated device.
- The number of data registers for the device connected to the outgoing remote bus interface (OUT1) of the indicated device is not identical to the length code.

Add_Error_Info: Error location (Segment . Position).

Code Type Description and Remedy

0C90 OUT1
0C91
0C92
0C93

The device could not activate the bus segment that followed it, as it executed a voltage reset or is faulty.

Remedy:

1. Check the device.
2. Check the voltage supply of the device to determine whether it conforms to the nominal value and whether the permissible AC component was exceeded (see corresponding data sheet).
3. Check the power supply unit of this bus terminal module for overload (see corresponding data sheet).

Add_Error_Info: Error location (Segment . Position).

0C94 OUT1
0C95
0C96
0C97

A local bus device was detected at the outgoing remote interface (OUT1) of the indicated device.

Remedy: Connect remote bus device.

Add_Error_Info: Error location (Segment . Position).

0C98 OUT1
0C99
0C9A
0C9B

The device connected to the outgoing remote bus interface (OUT1) of the indicated device is not known (i.e., it has an invalid ID code).

Remedy: Replace the device.

Add_Error_Info: Error location (Segment . Position).

0CA0

An attempt was made to parameterize a bus for isolated disconnection, which does not contain only SUPI 3 devices.

Remedy: Only use SUPI 3 devices.

Code	Type	Description and Remedy
0CC0 **0CC1** **0CC2** **0CC3**	OUT2	Multiple errors at the outgoing bus interface (OUT2) of the device: – An INTERBUS cable is connected to OUT2 without any devices. – An INTERBUS cable connected to the indicated device is faulty. – A device connected to the indicated device is faulty. – Failure of the voltage supply (communications power U_L) for the module electronics made available by the bus terminal module. **Remedy:** Check the remote bus/local bus. **Add_Error_Info:** Error location (Segment . Position).
0CC4 **0CC5** **0CC6** **0CC7**	OUT2	Multiple errors *(timeout)* at the branching bus interface (OUT2) of the device: – An INTERBUS cable connected to the indicated device is faulty. – A device connected to the indicated device is faulty. – Failure of the voltage supply (communications power U_L) for the module electronics made available by the bus terminal module. **Remedy:** Check the remote bus/local bus. **Add_Error_Info:** Error location (Segment . Position).
0CC8 **0CC9** **0CCA** **0CCB**	OUT2	More than the configured number of devices are connected to the outgoing bus interface (OUT2) of the indicated device. This may also apply to INTERBUS cables to which no device is connected. **Remedy:** Reduce the number of devices. **Add_Error_Info:** Error location (Segment . Position).
0CCC **0CCD** **0CCE** **0CCF**	OUT2	The bus can be read but not started up. **Remedy:** Modify the length code entry in the configuration frame (→ page 116) or replace the device. **Add_Error_Info:** Error location (Segment . Position).

Code	Type	Description and Remedy
0CD0 **0CD1** **0CD2** **0CD3**	OUT2	After opening the branching bus interface (OUT2) of the indicated device, further devices, in addition to a bus terminal module, were added to the data ring. The device connected to the branching bus interface (OUT2) of the indicated device executed a voltage reset or is faulty. **Remedy:** – Check the device that is connected to OUT2 of the indicated device. – Check the voltage supply of the device to determine whether it conforms to the nominal value and whether the permissible AC component was exceeded (see corresponding data sheet). **Add_Error_Info:** Error location (Segment . Position).
0CD4 **0CD5** **0CD6** **0CD7**	RB	See Error Code *0DD4* on page 98.
0CD8 **0CD9** **0CDA** **0CDB**	RB	See Error Code *0DD8* on page 99.
0CDC **0CDD** **0CDE** **0CDF**	RB	See Error Code *0DDC* on page 99.
0D10 **0D11** **0D12** **0D13**	LB	A device which has been configured and not marked as switched off is missing from the connected bus configuration. **Remedy:** Compare the bus configuration with the active configuration. Take the disabled bus segments into account. **Add_Error_Info:** Error location (Segment . Position).

Code	Type	Description and Remedy
0D14 **0D15** **0D16** **0D17**	LB	Multiple errors in the segment of the indicated device caused by transmission errors. **Remedy:** Check the segment: – Shielding of the bus cables (connectors) – Grounding/equipotential bonding – Faulty connectors or joints – Voltage dips on the communications power for remote bus devices – Faulty fiber optic assembly **Add_Error_Info:** Error location (Segment . Position).
0D18 **0D19** **0D1A** **0D1B**	LB	Multiple timeout in the segment of the indicated device caused by transmission errors. **Remedy:**See Error Code *0D14* on page 93. **Add_Error_Info:** Error location (Segment . Position).
0D1C **0D1D** **0D1E** **0D1F**	LB	Transmission error (CRC error) on the *data forward path* of the incoming bus interface (IN) of the indicated device. **Remedy:** See Error Code *0D14*. **Add_Error_Info:** Error location (Segment . Position).
0D20 **0D21** **0D22** **0D23**	LB	Interruption of the *data forward path* to the bus interface (IN) of the indicated device **Remedy:** Check the cables, connectors, and INTERBUS connections for interruptions. **Add_Error_Info:** Error location (Segment . Position).
0D24 **0D25** **0D26** **0D27**	LB	Transmission error (CRC error) on the *data return path* of the incoming bus interface (IN) of the indicated device. For Loop devices: Transmission path from the last device to the bus terminal module. **Remedy:** See Error Code *0D14* on page 93. **Add_Error_Info:** Error location (Segment . Position).

Code	Type	Description and Remedy
0D28 **0D29** **0D2A** **0D2B**	LB	Interruption of the *data return path* of the incoming bus interface (IN) of the indicated device. For Loop devices: Transmission path from the last device to the bus terminal module. **Remedy:** Check the cables, connectors, and INTERBUS connections for interruptions. **Add_Error_Info:** Error location (Segment . Position).
0D2C **0D2D** **0D2E** **0D2F**	LB	Missing or faulty jumper (RBST or LBST) in the outgoing bus connector of the preceding device. **Add_Error_Info:** Error location (Segment . Position).
0D30 **0D31** **0D32** **0D33**	LB	Multiple errors in the segment of the indicated INTERBUS device. – Transmission errors. – The indicated device has a protocol chip, which is not supported by your controller board firmware. **Remedy:** Check the segment: – Shielding of the bus cables (connectors) – Grounding/equipotential bonding – Faulty connectors or joints – Voltage dips on the communications power for remote bus devices – Faulty fiber optic assembly – Replace the indicated device with a device that has a SUPI 3 chip. **Add_Error_Info:** Error location (Segment . Position).
0D40 **0D41** **0D42** **0D43**	DEV	The length code of the indicated device is not identical to the entry in the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).
0D44 **0D45** **0D46** **0D47**	DEV	The ID code of the indicated device is not identical to the entry in the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).

Code	Type	Description and Remedy
0D48 **0D49** **0D4A** **0D4B**	DEV	The bus can be read but not started up. – The data register of the indicated device was interrupted. – The data register length of the indicated device is not identical to the length code in the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).
0D4C **0D4D** **0D4E** **0D4F**	DEV	An incorrect device has been installed (invalid ID code). **Remedy:** Replace the device. **Add_Error_Info:** Error location (Segment . Position).
0D50 **0D51** **0D52** **0D53**	DEV	A remote bus device has been installed in a local bus. **Remedy:** Replace the device. **Add_Error_Info:** Error location (Segment . Position).
0D54 **0D55** **0D56** **0D57**	DEV	The indicated device has a protocol chip (SUPI 1), which is not supported by the controller board firmware. **Remedy:** Replace the device with a device that has a SUPI 3 chip. **Add_Error_Info:** Error location (Segment . Position).
0D58 **0D59** **0D5A** **0D5B**	DEV	Data transmission was interrupted at the outgoing remote bus interface (OUT1) of the indicated device. **Remedy:** Check whether the connector is plugged in or whether the jumper for connector identification (RBST or LBST) is faulty. **Add_Error_Info:** Error location (Segment . Position).
0D5C **0D5D** **0D5E** **0D5F**	DEV	Data transmission was interrupted at the branching bus interface (OUT2) of the indicated device. **Remedy:** See Error Code *0D58* on page 95. **Add_Error_Info:** Error location (Segment . Position).

Code Type Description and Remedy

0D60 DEV
0D61
0D62
0D63

An error was detected at the unused, outgoing interface (OUT1) of the indicated device.

Remedy: Check the device and replace if necessary.

Add_Error_Info: Error location (Segment . Position).

0D64 DEV
0D65
0D66
0D67

An error was detected at the unused, branching interface (OUT1) of the indicated device.

Remedy: Check the device and replace if necessary.

Add_Error_Info: Error location (Segment . Position).

0D68 DEV
0D69
0D6A
0D6B

The transmission time for I/O data was exceeded on the indicated device (I/O timeout).

Add_Error_Info: Error location (Segment . Position).

0D6C DEV
0D6D
0D6E
0D6F

The indicated device executed a reset due to a fault or insufficient voltage supply.

Remedy: See Error Code *0C6C* on page 87.

Add_Error_Info: Error location (Segment . Position).

0D70 DEV
0D71
0D72
0D73

The controller board tried to start up the bus before all devices were ready for operation.

Remedy:

– Replace the device.
– Delay the call of the "Activate_Configuration" service (0711_{hex}).
– Increase the startup delay using CMD software.

Add_Error_Info: Error location (Segment . Position).

0D74 DEV
0D75
0D76
0D77

Data transmission was aborted. Incorrect operating mode set for the indicated device.

Remedy: Set a valid operating mode or replace the device.

Add_Error_Info: Error location (Segment . Position).

Code	Type	Description and Remedy
0D78	LB	If the dynamic PCP channel is switched on, the data length of the indicated device is not identical to the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).
0D79	LB	If the dynamic PCP channel is switched on, the ID code of the indicated device is not identical to the configuration frame (→ page 116). **Add_Error_Info:** Error location (Segment . Position).
0D7E	LB	The INTERBUS protocol chip in the indicated device cannot be operated in the specified configuration, as it does not support the necessary functions. **Remedy:** Replace the device.
0D80 **0D81** **0D82** **0D83**	OUT1	Multiple errors at the outgoing bus interface (OUT1) of the indicated device. **Remedy:** See Error Code *0C80* on page 89. **Add_Error_Info:** Error location (Segment . Position).
0D84 **0D85** **0D86** **0D87**	OUT1	Multiple errors (*timeout)* at the outgoing bus interface (OUT1) of the indicated device. **Remedy:** See Error Code *0D80*. **Add_Error_Info:** Error location (Segment . Position).
0D88 **0D89** **0D8A** **0D8B**	OUT1	Devices were found at the outgoing bus interface (OUT1) of the indicated device, which have not been configured. This may also apply to INTERBUS cables to which no device is connected. **Add_Error_Info:** Error location (Segment . Position).
0D8C **0D8D** **0D8E** **0D8F**	OUT1	The bus can be read but not started up. **Remedy:** See Error Code *0C8C* on page 89. **Add_Error_Info:** Error location (Segment . Position).
0D98 **0D99** **0D9A** **0D9B**	OUT1	See Error Code *0C98* on page 90.

Code	Type	Description and Remedy
0D9C **0D9D** **0D9E** **0D9F**	OUT1	The installed bus configuration consists of more devices than were configured. **Add_Error_Info:** Error location (Segment . Position).
0DC0 **0DC1** **0DC2** **0DC3**	OUT2	Multiple errors at the outgoing bus interface (OUT2) of the indicated device. **Remedy:** See Error Code *0CC0* on page 91. **Add_Error_Info:** Error location (Segment . Position).
0DC4 **0DC5** **0DC6** **0DC7**	OUT2	Multiple timeout at the branching bus interface (OUT2) of the indicated device. **Remedy:** See Error Code *0CC4* on page 91. **Add_Error_Info:** Error location (Segment . Position).
0DC8 **0DC9** **0DCA** **0DCB**	OUT2	Devices were found at the outgoing bus interface (OUT2) of the indicated device, which have not been configured. This may also apply to INTERBUS cables to which no device is connected. **Add_Error_Info:** Error location (Segment . Position).
0DCC **0DCD** **0DCE** **0DCF**	OUT2	The bus can be read but not started up. **Remedy:** Modify the length code entry in the configuration frame (→ page 116) or replace the device. **Add_Error_Info:** Error location (Segment . Position).
0DD0 **0DD1** **0DD2** **0DD3**	OUT2	See Error Code *0CD0* on page 92.
0DD4 **0DD5** **0DD6** **0DD7**	OUT2	Local bus error on the 8-wire local bus connected to the indicated device. Possible causes: – Faulty device in the local bus – Faulty local bus cable – Failure of communications power U_L **Remedy:** Check the I/O bus. **Add_Error_Info:** Error location (Segment . Position).

Code	Type	Description and Remedy
0DD8 **0DD9** **0DDA** **0DDB**	OUT2	The local bus connected to the indicated bus terminal module consists of more local bus devices than were entered in the active configuration. This may also apply to INTERBUS cables to which no device is connected. **Add_Error_Info:** Error location (Segment . Position).
0DDC **0DDD** **0DDE** **0DDF**	OUT2	The device connected to the branching bus interface (OUT2) of the indicated device is unknown (invalid ID code). **Add_Error_Info:** Error location (Segment . Position).
0Fxx	CTRL	System error on the controller board (hardware or firmware error). **Remedy:** Reload the firmware. If the error message is still generated, a hardware fault has occurred. Replace the controller board.
0FA4	CTRL	Checksum error on the parameterization memory. Writing the parameterization memory was aborted. **Remedy:** Format the parameterization memory using firmware Version ≥ 4.12.
0FC3	CTRL	Incompatibility with the PLC diagnostic block when acknowledging peripheral faults (PF) automatically using firmware Version ≤ 4.15. **Remedy:** Reload the firmware. If the error message is still generated, a hardware fault has occurred. Replace the controller board.
1010	CTRL	Firmware error on the controller board. Possible causes: There is no CPU in the rack or the CPU is in the RUN state, even though the controller board is in test mode. **Remedy:** Operate the controller board in a system with CPU or place the CPU in the STOP state, if the controller board is in test mode.
1011	CTRL	Hardware fault on the controller board. **Remedy:** Replace the controller board.

Code	Type	Description and Remedy
1012	CTRL	– There is an error in the firmware. – The download of the new firmware failed during the firmware update. – A hardware fault has occurred. **Remedy:** Reload the firmware. If the error message is still generated, a hardware fault has occurred. Replace the controller board.
1013	CTRL	A firmware error occurred. (See Error Code *1012*.)
1019 **101A** **101B** **101C** **101D** **101E**	CTRL	MPM manager error - error on the controller board. **Remedy:** Replace the controller board.
1020 **1021** **1022** **1023** **1024** **1025**	CTRL	Parameterization memory error on the controller board. **Remedy:** Replace the parameterization memory or controller board.
1030 **1031** **1032** **1033** **1034** **1035** **1036**	CTRL	Power on selftest error - hardware fault on the controller board. Possible cause: The PLC is running when the controller board is reset. **Remedy:** – First stop the PLC and then reset the controller board. – Replace the controller board.
1051 **1052** **1053** **1054** **1055**	CTRL	RS-232 error - error on the controller board. **Remedy:** Replace the controller board.
1056		The firmware download was aborted. Timeout in the transmission protocol or at the RS-232/V24 interface. **Remedy:** Check the RS-232/V24 connection and restart transmission.

Code	Type	Description and Remedy
1057		The firmware download was aborted. The program initiated a restart. **Remedy:** Repeat the firmware download.
1101	CTRL	Host adaptation error - error on the controller board. **Remedy:** Replace the controller board.
1210		There is a device with faulty firmware in the INTERBUS ring. **Remedy:** Replace the device. **Add_Error_Info:** Number of faulty devices.
1211		A slave number was set that is not permitted (permitted: 0 or 1) or there is a hardware fault. **Remedy:** Enter the correct slave number (0 or 1) or replace the device. **Add_Error_Info:** Incorrect slave number.
1212		There is a device with an incorrect protocol chip in the INTERBUS ring. Only devices with protocol chip SUPI 3 (or later) are permitted.
1213		1. Data lengths have been used that are not permitted in microprocessor mode (e.g., zero words). **Remedy:** Remove the external voltage supply of the system coupler briefly to initialize the slave part again. 2. The slave part of the system coupler does not have the correct ID code. **Remedy:** Enter the correct ID code.
1217		The protocol chip has been initialized more than once. (The SUPI 3 protocol chip can only be initialized once if the *NOT-READY* ID code is present in the hardware. This does not apply to other ID codes.) **Remedy:** Ensure that the protocol chip is initialized only once. Disconnect the protocol chip from the supply and then try again.

Code Type Description and Remedy

1402 The coprocessor board could not process the service called last. A status conflict occurred in the boot loader, e.g., an "Open" service for an open file.

Remedy: Check the last and previous service calls.

Add_Error_Info: Service for which the conflict occurred: (X_X stands for "PC104_Download")

0001_{hex} "X_X _Initiate_Request" (0290_{hex})
0002_{hex} "X_X _Open_File_Request" (0291_{hex})
0003_{hex} "X_X _Send_File_Request" (0292_{hex})
0004_{hex} "X_X _Close_File_Request" (0293_{hex})
0005_{hex} "X_X _Terminate_Request" (0294_{hex})

1410 An error occurred when opening a file using the "PC104_Download_Open_File_Request" service (0291_{hex}).

Add_Error_Info: The file for which the error occurred.
0001_{hex} "bootld.ini" file
0002_{hex} Other file

1411 An error occurred when writing a file using the "PC104_Download_Send_File_Request" service (0292_{hex}).

Add_Error_Info: Always 0001_{hex}.

1412 An error occurred when closing a file using the "PC104_Download_Close_File_Request" service (0293_{hex}).

Add_Error_Info: The file for which the error occurred.
0001_{hex} "bootld.ini" file
0002_{hex} Other file

1413 An error occurred when opening the "bootld.ini" file.

Add_Error_Info: Always 0001_{hex}.

Code	Type	Description and Remedy
1414		You tried to open a file that is invalid using the "PC104_Download_Open_File_Request" service (0291_{hex}). During a firmware download, the "bootld.ini" file must always be opened first. This file must contain the names of all of the other files to be opened. **Remedy:** Check the sequence of the files for the download and the entries in the "bootld.ini" file. **Add_Error_Info:** 0001_{hex} "bootld.ini" is not the first file. 0002_{hex} File is a system file. 0003_{hex} File name is not in "bootld.ini".
1420		The firmware download was aborted using the button on the PC keyboard. **Add_Error_Info:** Abort position in the boot loader: 0001_{hex} or 0002_{hex}.
1421		The firmware download was aborted due to an error. **Add_Error_Info:** Always 0000_{hex}.
1422*	FC	The Field Controller does not contain the main firmware. **Remedy:** Send Field Controller to Phoenix Contact.
1430*	FC	Checksum error in the main firmware. **Remedy:** Send Field Controller to Phoenix Contact.
1431		
1433		
1434*	FC	Checksum error in the main firmware. The firmware download was not completed successfully. **Remedy:** Repeat firmware download.
1435*	FC	The Field Controller does not contain the main firmware. The firmware download was not completed successfully. **Remedy:** Repeat firmware download.
2002		See Error Code *1402* on page 102.
2010		See Error Code *1410* on page 102.

Code	Type	Description and Remedy
2011		An error occurred when writing a file using the "PC104_Download_Send_File_Request" service (0292_{hex}) or using the "PC104_Download_Transfer_File_Request" service ($02B6_{hex}$). **Add_Error_Info:** For (0292_{hex}) always 0001_{hex}; for ($02B6_{hex}$) error code of the relevant file system driver.
2012		See Error Code *1412* on page 102.
2013		See Error Code *1413* on page 102.
2014		See Error Code *1414* on page 103.
2015		Error when deleting a file, e.g., when deleting the boot project.
2020		You used an unknown message code. **Add_Error_Info:** Unknown message code.
2021		Unauthorized access, e.g., when accessing a protected variable with an incorrect password. **Remedy:** Use the correct password.
2022		An error occurred when writing to an INI file. You tried to delete a variable, which is not available.
2023		An error occurred when reading from an INI file. You tried to delete a variable, which is not available.
2024		An error occurred when opening a file. **Add_Error_Info:** Error code of the relevant file system driver.
2025		An error occurred when reading a file. **Add_Error_Info:** Error code of the relevant file system driver.
2026		An error occurred when closing a file. **Add_Error_Info:** Error code of the relevant file system driver.
2027		An invalid file handle was detected for a file transfer service.

Code	Type	Description and Remedy
2028		An invalid communication reference was used for the "PCP_Read_With_Name_Request" service (0098_{hex}) or the "PCP_Write_With_Name_Request" service (0097_{hex}). **Add_Error_Info:** Incorrect communication reference.
2029		An error occurred during the "PC104_File_Transfer_Ioctl_Request" service ($02B8_{hex}$). **Add_Error_Info:** Error code of the ioctl() VxWorks function.
202A		For the "PC104_File_Transfer_Ioctl_Request" service ($02B8_{hex}$), the number of subsequent bytes (*No_of_Bytes* parameter) is too great. **Add_Error_Info:** *No_of_Bytes* parameter.
202B		The "PC104_File_Transfer_Ioctl_Request" service ($02B8_{hex}$) contains a function that is not permitted in the *Function* parameter. **Add_Error_Info:** *Function* parameter.
202C		A file could not be opened using the "PC104_File_Transfer_Open_Request" service ($02B4_{hex}$). The maximum number of open files has been reached. **Remedy:** Close at least one of the open files.
202D		Incorrect entry in the SVC file. Neither the keyword "CMD" nor a hexadecimal number (0xXXXX) appears between two '#' signs. **Remedy:** Check the SVC file. **Add_Error_Info:** Line number with incorrect entry.
202E		Incorrect entry in the SVC file. The SVC file has not been logically created. **Remedy:** Check the SVC file. **Add_Error_Info:** Line number with incorrect entry.

Code	Type	Description and Remedy
202F		The maximum number of parameters was exceeded for a service in an SVC file. **Remedy:** Check the SVC file and reduce the number of parameters. **Add_Error_Info:** Line number with incorrect entry.
2030		A negative service confirmation was received.
2111*	FC	Battery supply has failed. The date and time of the realtime clock as well as the retain data may be lost. **Remedy:** Replace the battery with a new 3.6 V AA lithium battery.
2112*	FC	The IP address has not yet been parameterized or has the value "0.0.0.0". This warning is always issued for new devices. **Remedy:** Parameterize the IP address.
2113*	FC	An error occurred when transmitting configuration data from PC WORX (e.g., connection loss, voltage failure). **Remedy:** Repeat data transmission.
2211*	FC	Stack overflow in the task of the IEC 61131 runtime system. **Remedy:** Increase the stack.
2212*	FC	Memory exceeded in an array of the IEC 61131 runtime system. **Remedy:** Check access to the array and increase the size of the array, if necessary.
2214*	FC	Division by zero in the task of the IEC 61131 runtime system. **Remedy:** Remove error in the program.
2216*	FC	Value range exceeded in the task of the IEC 61131 runtime system. **Remedy:** Remove error in the program.
2217*	FC	Watchdog released in the task of the IEC 61131 runtime system. **Remedy:** Remove error in the program.

Code	Type	Description and Remedy
2218*	FC	Runtime is too long in the task of the IEC 61131 runtime system. **Remedy:** Remove error in the program.
2219		You called a function block, which does not exist in the firmware or in the IEC 61131 runtime system.
221A		One program in the IEC 61131 runtime system was stopped from the program.
221B		An unexpected breakpoint occurred.
221C		An internal exception occurred.
221D*	FC	String error. **Remedy:** Remove error in the program.
221E*	FC	– Division by zero in the task of the IEC 61131 runtime system. – Watchdog released in the task of the IEC 61131 runtime system. – Execution time is too long. **Remedy:** Remove error in the program.
2410 to 242B		Fatal error. For more detailed information, please refer to the IBS SYS FW G4 UM E Firmware Manual, Order No. 27 45 18 5, Revision C or later.
26xx		An exception occurred at the processor. The low-order byte contains the vector number of the exception.
6342	Bus error indication	The controller board has detected an error in the connected bus system during INTERBUS operation. The bus cannot be operated any longer. The controller board is searching for the error location. **Remedy:** Read the error cause using the "Get_Error_Info" service (0316_{hex}) or use the diagnostics in the CMD software.
8040		The specified device is indicating a single channel error. **Remedy:** Check the channel of the specified device. **Add_Error_Info:** Error location (Segment . Position).

Code Type Description and Remedy

8060 The specified device is indicating a short circuit at the output.

Add_Error_Info: Error location
(Segment . Position: channel).

808x
809x The specified device is indicating a *sensor supply error* in one or more groups.
The "x" stands for a group number and represents a group of four bits, in which each bits represents a group number:

	808x	809x
Bit 0:	Group 1	Group 5
Bit 1:	Group 2	Group 6
Bit 2:	Group 3	Group 7
Bit 3:	Group 4	Group 8

Example: Code 8085_{hex} indicates that the sensor supply to Group 1 and 3 is faulty.

Remedy: Check the group(s) of the specified device.

Add_Error_Info: Error location
(Segment . Position).

80A0 The specified device is indicating a *voltage supply error* in one or more groups.

Remedy: Check the group(s) of the specified device.

Add_Error_Info: Error location
(Segment . Position).

80B1 The specified device is indicating a configuration error.

Remedy: Check the parameters of the specified device.

Add_Error_Info: Error location
(Segment . Position).

80B2 The specified device is indicating an error in the I/O electronics of the connected sensors/actuators.

Add_Error_Info: Error location
(Segment . Position).

Code	Type	Description and Remedy
80B4		The specified device is indicating that the temperature has been exceeded. **Remedy:** Check the connected sensors and actuators. **Add_Error_Info:** Error location (Segment . Position).
8400		The specified device is indicating an error at the outgoing interface (OUT2). The error occurred in the lower-level installation local bus. **Remedy:** Check the modules connected to the specified device. See "Local Bus Error in INTERBUS Loop" on page 42. **Add_Error_Info:** Error location (Segment . Position).

* Applies to IBS 24 ETH DSC/I-T, IBS 24 RFC/486DX/ETH-T, and IBS ISA FC/486DX/I-T. "FC" indicates errors that only occur on Field Controllers.

Rectifying Errors in INTERBUS Components

Fuse Types for INTERBUS Devices

Nearly all INTERBUS devices with a 24 V connection have TR5 fuses. They protect the devices on the bus side and, if devices with active inputs are used, on the input side. The TR5 fuses are available from Phoenix Contact. The following table lists the fuses that are used in the modules. Fuses that are soldered in and can only be replaced at Phoenix Contact are also listed.

Table 3 Overview of fuse types

Module Ord. No.	Device	Fuse Type	Order No.	Order Designation
	IBS CT			
2722182	IBS CT 24 DIO 16/8-LK	2 A slow-blow (group 1) 4 A slow-blow (group 2)	2752505 2750374	IBS TR5 2AT IBS TR5 4AT
2722179	IBS CT 24 DIO 16/8-T	2 A slow-blow (group 1) 4 A slow-blow (group 2)	2752505 2750374	IBS TR5 2AT IBS TR5 4AT
2750497	IBS CT 24 DIO 24/16-LK	2 A fast-blow (group 1) 5 A fast-blow (group 2)	2722645 2721976	IBS TR3 2AF IBS TR3 5AF
2750507	IBS CT 24 DIO 24/16-T	2 A fast-blow (group 1) 5 A fast-blow (group 2)	2722645 2721976	IBS TR3 2AF IBS TR3 5AF
	IB ST			
2719276	IB ST 120 DI 16/3	6.3 A very fast acting (5 x 20)	2726104	SI 5X20 6,3 AFF DIN 41662
2719263	IB ST 120/230 DO 8/3-1A	6.3 A very fast acting (5 x 20)	2726104	SI 5X20 6,3 AFF DIN 41662
2721099	IB ST 230 DI 16/3	6.3 A very fast acting (5 x 20)	2726104	SI 5X20 6,3 AFF DIN 41662
2751564	IB ST 24 AI 4/BP	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2719629	IB ST 24 AI 4/I	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2754309	IB ST 24 AI 4/SF	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2750565	IB ST 24 AI 4/SF4	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2752521	IB ST 24 AO 4/BP	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2754312	IB ST 24 AO 4/SF	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2750578	IB ST 24 AO 4/SF4	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2725888	IB ST 24 BAI 2/BP	Not present; use an external fuse		
2722771	IB ST 24 BAI 2/SF	Not present; use an external fuse		
2721028	IB ST 24 BAI 8/I	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2721015	IB ST 24 BAI 8/U	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2721044	IB ST 24 BAO 8/U	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2721031	IB ST 24 BAO 8/U-8B	0.4 A slow-blow (F1)	2753478	IBS TR5 0,4AT
2750170	IB ST 24 BDI 16/4	1 A slow-blow	2806600	IBS TR5 1AT
2750808	IB ST 24 BDI 8/4	0.4 A slow-blow (2 x)	2753478	IBS TR5 0,4 AT
2750167	IB ST 24 BDO 16/3-250	1.6 A slow-blow	2767367	IBS TR5 1,6AT
2724931	IB ST 24 BDO 16/3-500	1.6 A slow-blow	2767367	IBS TR5 1,6AT

Table 3 Overview of fuse types (Continued)

Module Ord. No.	Device	Fuse Type	Order No.	Order Designation
2750824	IB ST 24 BDO 32/2	5 A slow-blow (4 x)	2767383	IBS TR5 5AT
2750811	IB ST 24 BDO 8/3	1.6 A slow-blow	2767367	IBS TR5 1,6AT
2750400	IB ST 24 CNT	4 A fast-blow	2753465	IBS TR5 4AF
2754338	IB ST 24 DI 16/4	Not present; use an external fuse		
2754927	IB ST 24 DI 32/2	2 A slow-blow	2752505	IBS TR5 2AT
2753708	IB ST 24 DIO 8/8/3-2A	4 A fast-blow	2753465	IBS TR5 4AF
2753449	IB ST 24 DIO 8/8/3-2A-S	4 A fast-blow	2753465	IBS TR5 4AF
2751849	IB ST 24 DIO 8/8/R/3	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2754914	IB ST 24 DO 16/3	4 A slow-blow	2753465	IBS TR5 4AF
2721112	IB ST 24 DO 16R/S	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2754325	IB ST 24 DO 32/2	5 A slow-blow (4 x)	2767383	IBS TR5 5AT
2754891	IB ST 24 DO 8/3-2A	5 A slow-blow	2767383	IBS TR5 5AT
2754891	IB ST 24 DO 8/3/2A	4 A slow-blow	2750374	IBS TR5 4AT
2751975	IB ST 24 INC/2	3.15 A fast-blow	2719250	IBS TR5 3,15AF
2752767	IB ST 24 PT100 4/4	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2724902	IB ST 24 UTH 8	0.2 A slow-blow	2753478	IBS TR5 0,4 AT
2725480	IB ST 24 V.24	Not present		
2721109	IB ST 48 DI 16/2	1 A slow-blow	2806600	IBS TR5 1AT
2726094	IB ST ZF 120 DI 16/3	6.3 A very fast acting (5 x 20)	2726104	SI 5X20 6,3 AFF DIN 41662
2723356	IB ST ZF 120/230 DO 8/3-1A	6.3 A very fast acting (5 x 20)	2726104	SI 5X20 6,3 AFF DIN 41662
2721293	IB ST ZF 230 DI 16/3	6.3 A very fast acting (5 x 20)	2726104	SI 5X20 6,3 AFF DIN 41662
2724737	IB ST ZF 24 AI 4/BP	0.2 A slow-blow 0.4 A slow-blow	2753452 2753478	IBS TR5 0,2AT IBS TR5 0,4AT
2721264	IB ST ZF 24 AI 4/I	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2750620	IB ST ZF 24 AI 4/SF	0.2 A slow-blow 0.4 A slow-blow	2753452 2753478	IBS TR5 0,2AT IBS TR5 0,4AT
2750594	IB ST ZF 24 AI 4/SF4	0.2 A slow-blow 0.4 A slow-blow	2753452 2753478	IBS TR5 0,2AT IBS TR5 0,4AT
2750617	IB ST ZF 24 AO 4/BP	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2750604	IB ST ZF 24 AO 4/SF	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2750581	IB ST ZF 24 AO 4/SF4	0.4 A slow-blow	2753478	IBS TR5 0,4AT
2724957	IB ST ZF 24 BAI 2/BP	Not present; use an external fuse		
2723958	IB ST ZF 24 BAI 2/SF	Not present; use an external fuse		
2721235	IB ST ZF 24 BAI 8/I	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2721222	IB ST ZF 24 BAI 8/U	0.4 A slow-blow (F1) 0.2 A slow-blow (F2)	2753478 2753452	IBS TR5 0,4AT IBS TR5 0,2AT
2750714	IB ST ZF 24 BDI 8/4	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2750727	IB ST ZF 24 BDO 16/3-250	1.6 A slow-blow	2767367	IBS TR5 1,6AT
2724915	IB ST ZF 24 BDO 16/3-500	1.6 A slow-blow	2767367	IBS TR5 1,6AT
2750691	IB ST ZF 24 BDO 32/2	5 A slow-blow (4 x)	2767383	IBS TR5 5AT
2750701	IB ST ZF 24 BDO 8/3	1.6 A slow-blow	2767367	IBS TR5 1,6AT
2750947	IB ST ZF 24 CNT	4 A fast-blow	2753465	IBS TR5 4AF
2750688	IB ST ZF 24 DI 16/4	Not present; use an external fuse		
2750675	IB ST ZF 24 DI 32/2	2 A slow-blow	2752505	IBS TR5 2AT
2750662	IB ST ZF 24 DIO 8/8/3-2A	4 A fast-blow	2753465	IBS TR5 4AF
2726023	IB ST ZF 24 DIO 8/8/3-2A-S	4 A fast-blow	2753465	IBS TR5 4AF
2726010	IB ST ZF 24 DIO 8/8/R/3	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2750646	IB ST ZF 24 DO 16/3	0.4 A slow-blow	2753465	IBS TR5 4AT
2721141	IB ST ZF 24 DO 16R/S	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2750633	IB ST ZF 24 DO 32/2	5 A slow-blow	2767383	IBS TR5 5AT
2750659	IB ST ZF 24 DO 8/3-2A	5 A slow-blow	2767383	IBS TR5 5AT
2723903	IB ST ZF 24 INC/2	3.15 A fast-blow	2719250	IBS TR5 3,15AF
2750950	IB ST ZF 24 PT100 4/4	0.4 A slow-blow	2753478	IBS TR5 0,4 AT
2724892	IB ST ZF 24 UTH 8	0.2 A slow-blow	2753478	IBS TR5 0,2 AT
2726081	IB ST ZF 48 DI 16/2	1 A slow-blow	2806600	IBS TR5 1AT

Table 3 Overview of fuse types (Continued)

Module Ord. No.	Device	Fuse Type	Order No.	Order Designation
2751218	IBS ST 24 BK DIO 8/8/3-LK	1 A slow-blow 3.15 A fast-blow	2806600 2719250	IBS TR5 1AT IBS TR5 3,15AF
2752411	IBS ST 24 BK DIO 8/8/3-T	1 A slow-blow 3.15 A fast-blow	2806600 2719250	IBS TR5 1AT IBS TR5 3,15AF
2753232	IBS ST 24 BK LB-T	1 A slow-blow	2806600	IBS TR5 1AT
2721662	IBS ST 24 BK RB-LK DIO 8/8/3-LK	1 A slow-blow 3.15 A fast-blow	2806600 2719250	IBS TR5 1AT IBS TR5 3,15AF
2753504	IBS ST 24 BK RB-T	1 A slow-blow	2806600	IBS TR5 1AT
2723453	IBS ST 24 BK RB-T DIO 8/8/3-LK	1 A slow-blow 3.15 A fast-blow	2806600 2719250	IBS TR5 1AT IBS TR5 3,15AF
2719289	IBS ST 24 BK-FT-T	1 A slow-blow	2806600	IBS TR5 1AT
2754435	IBS ST 24 BK-LK	1 A slow-blow	2806600	IBS TR5 1AT
2754341	IBS ST 24 BK-T	1 A slow-blow	2806600	IBS TR5 1AT
2750963	IBS ST 24 BKM-LK	Not present		
2750154	IBS ST 24 BKM-T	1 A slow-blow	2806600	IBS TR5 1AT
2750785	IBS ST ZF 24 BK DIO 8/8/3-LK	1 A slow-blow	2806600	IBS TR5 1AT
2750798	IBS ST ZF 24 BK DIO 8/8/3-T	1 A slow-blow	2806600	IBS TR5 1AT
2750772	IBS ST ZF 24 BK LB-T	1 A slow-blow	2806600	IBS TR5 1AT
2726052	IBS ST ZF 24 BK RB-LK DIO 8/8/3-LK	1 A slow-blow 3.15 A fast-blow	2806600 2719250	IBS TR5 1AT IBS TR5 3,15AF
2726049	IBS ST ZF 24 BK RB-T DIO 8/8/3-LK	1 A slow-blow 3.15 A fast-blow	2806600 2719250	IBS TR5 1AT IBS TR5 3,15AF
2750756	IBS ST ZF 24 BK-LK	1 A slow-blow	2806600	IBS TR5 1AT
2750769	IBS ST ZF 24 BK-RB-T	1 A slow-blow	2806600	IBS TR5 1AT
2750743	IBS ST ZF 24 BK-T	1 A slow-blow	2806600	IBS TR5 1AT
2721688	IBS ST ZF 24 BKM-LK	Not present		
2724960	IBS ST ZF 24 BKM-T	1 A slow-blow	2806600	IBS TR5 1AT
	Installation Remote Bus Modules			
2759948	IBS IP CBK 1/24-F	0.5 A slow-blow	2767370	IBS TR5 0,5AT
2753203	IBS IP CDI 3/24-F	0.5 A slow-blow	2767370	IBS TR5 0,5AT
2753216	IBS IP CDO 3/24-F	0.5 A slow-blow	2767370	IBS TR5 0,5AT
	Motor Starters			
2751742	IBS IP 500 ELR 2-6A DI 8/4	10 A slow-blow 6.3 x 32	2722690	IBS FUSE 6,3X32/10A
2722111	IBS IP 500 ELR P-6A DI 4/4	10 A slow-blow 6.3 x 32	2722690	
2751755	IBS IP 500 ELR W-6A DI 4/4	10 A slow-blow 6.3 x 32	2722690	
2751755	IBS IP 500 ELR WP-6A DI 4/4	10 A slow-blow 6.3 x 32	2722690	
	Loop BT Modules			
2719551	IBS SL 24 BK-T	3.15 A slow-blow, 5 x 20	2722386	IBS FUSE 5x20/3,15AT
2719454	IBS SL 24 BK-LK	3.15 A slow-blow, 5 x 20	2722386	
2723479	IBS SL IP 24 BK-T	3.15 A slow-blow, 5 x 20	2722386	

Replacing the INTERBUS Controller Board



Observe the safety notes for your system.



The settings on the controller board should be put down in writing, and if they are not quite clear, should be verified using the controller board user manual.

- Stop the host system.
- Switch off the operating voltage of the host system (PLC, VMEbus computer, PC).



The bus system stops.

- Unplug the remote bus cable from the controller board.
- Remove the controller board.
  (For controller boards with a plug-in parameterization memory, the memory card must be inserted in the new controller board).
- Transfer the memory settings to the new controller board (jumpers/DIP switches).
- Install the new controller board.



Only tighten the screws of the remote bus cable manually. Otherwise, the threads of the mounting elements may be torn out.

- Plug the remote bus cable into the controller board and tighten the screws.
- Switch on the operating voltage of the host system.
- Start the host system.



Special note for VMEbus systems
The front plate of the controller board for VMEbus systems must have a conductive connection with the rack. Therefore, transitions between the front plate and rack must not be anodized or painted.



Special note for PC systems
The cover plate of the PC controller board must have a conductive connection with the PC housing. Tighten the screws on the cover plate carefully.

LED Diagnostic Indicators of INTERBUS Devices

For quick and local error diagnostics, all INTERBUS devices have LED diagnostic and status indicators.

The LED diagnostic indicators (red/green) indicate the type and location of the error. A device is functioning correctly if all of the green LEDs are on.

The LEDs listed below are typical for INTERBUS devices, but not all of them are on every device. Depending on the module type, additional indicators can also indicate the status of the module.

For additional information about a specific module please refer to the corresponding data sheet.

UL	Green LED	Supply voltage of the module electronics
	ON	Supply voltage in permissible tolerance zone
	OFF	Supply voltage not present – Fuse blown – Internal power supply unit faulty – Incoming INTERBUS cable not plugged in
US	Green LED	I/O supply voltage
	ON	Supply voltage in permissible tolerance zone
	OFF	Supply voltage not present
RC	Green LED	Remote bus connection (remote bus check)
	ON	Incoming remote bus connection established
	OFF	Incoming remote bus connection faulty
BA	Green LED	Bus active (remote bus active)
	ON	Data transmission on INTERBUS active
	OFF	No data transmission
	Flashing (As of G4)	Bus active, but no cyclic data transmission

E	Red LED	Error message
	ON	Error
	OFF	No error
CC	Green LED	Incoming ST cable connection (cable check)
	ON	ST cable connection established
	OFF	ST cable connection faulty
LD	Red LED	Local bus disabled
	ON	Local bus disabled
	OFF	Local bus switched on
RD	Red LED	Remote bus disabled
	ON	Outgoing remote bus disabled
	OFF	Outgoing remote bus switched on
ID	Red LED	Installation remote bus disabled
	ON	Outgoing installation remote bus switched off
	OFF	Outgoing installation remote bus switched on

Explanation of Terms

Configuration Frame

The configuration frame defines the bus architecture including the device-specific parameters (ID code, length code, logical device number, group number). It is stored in a memory area on the controller board. The configuration frame can either be specified by the user (e.g., using CMD) or read automatically by the controller board from the bus.

Multi-Port Memory (MPM)

The MPM is a memory on the controller board, which can be accessed by several MPM accessors. The MPM accessors store all the data that is to be shared in the MPM.

Possible MPM accessors are, for example, the processor of a control or computer system, an INTERBUS controller board or the processor of a coprocessor board.

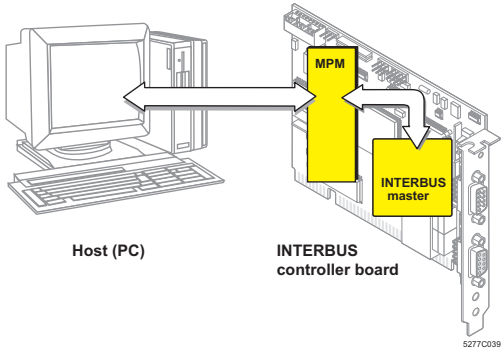


Figure 30 The MPM as the central interface

MPM Accessor

The MPM accessors write and read data to and from a shared memory, the MPM.

(For error codes 093x$_{hex}$, the V.24 interface is to be regarded as an MPM accessor.)

Services Offered by Phoenix Contact

Repairing Faulty INTERBUS Components

Information About a Faulty Device

If you need to send a faulty INTERBUS component to Phoenix Contact for repair, copy the service sheet overleaf in DIN A4 format and fill it in.

Please provide as much information as possible. In this way, servicing can be carried out much more quickly and easily.

Please enclose the completed service sheet with the component to be sent in.

Send all faulty devices manufactured by Phoenix Contact with the note "For repair" to your nearest Phoenix Contact representative.

Consultation With Phoenix Contact Representatives

Should you have any general questions concerning products, please contact your nearest Phoenix Contact representative.

Technical Support

For application problems, which cannot be solved with the help of this diagnostics guide, please contact your Phoenix Contact representative.

Phoenix Contact, Blomberg, Germany

Hotline: +49 - 52 35 - 34 18 88

Service Sheet for the Repair of Faulty INTERBUS Components

Contact Name for Phoenix Contact		
Mr/Mrs/Ms		
Company		
Department		
Address		
Zip Code/City/ State/ Country		
Phone/Fax		

General Data on the System Concerned		
Control system and CPU used		
What other boards are plugged in?		
Type and serial number of the controller board		
Version number of the controller board		
Version number of the software		
Is PCP communication used?	Yes	No

Faulty Component	
Designation	
Revision number	
Serial number	
Supplier	

Error Description	
When did the error first occur?	
How often does it occur?	
How does the error manifest itself?	

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Flowchart for Error Removal

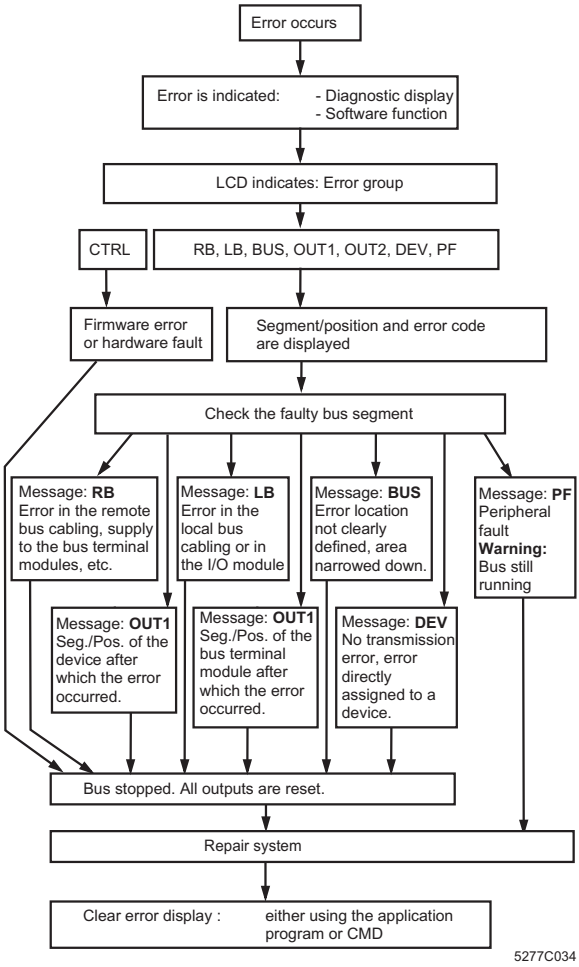


Figure 1 Flowchart for error removal

1. Detection of operating and error states; automatic diagnostics
2. Display of diagnostic data via the front plate (diagnostic display)
3. Extended diagnostic functions via the supplied driver software or the RS-232/V.24 interface using CMD or PC WORX.

Menu (Mode)

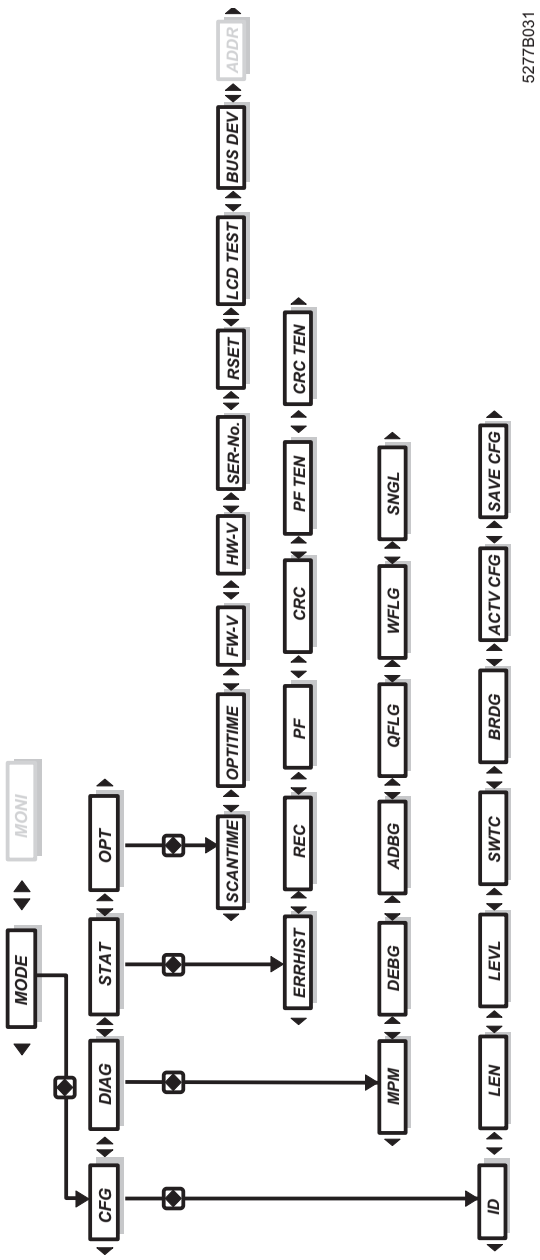


Figure 2 Menu (mode)

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Flachsmarktstr. 8
32825 Blomberg
Germany

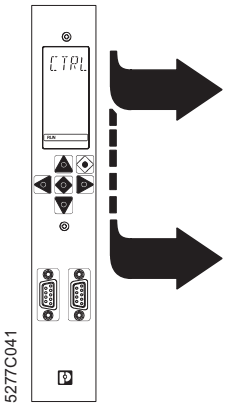

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Quick Diagnostics



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OUT2	DEV	PF	EVNT	USER
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Figure 3 Quick diagnostics

This table gives you an overview of error messages, which may occur when operating or starting up the system.

The **error codes** are listed according to their numbers on page 49 and onwards.

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