GB

Operating instructions (supplement)
SmartPLC SafeLine with interface

AC422S
AC424S

Firmware:
CODESYS Development System:

11566224 / 00 09 / 2023

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1 Preliminary note

You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at documentation.ifm.com.

1.1 Legal and copyright information

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1.2 Symbols used

✓	Requirement
▶	Instructions
▷	Reaction, result
[...]	Designation of keys, buttons or indications
→	Cross-reference
	Important note Non-compliance may result in malfunction or interference.
	Information Supplementary note

1.3 Warnings

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:

WARNING

Warning of serious personal injury

▷ If the warning is not observed, fatal and serious injuries are possible.

CAUTION

Warning of minor to moderate personal injury

▷ If the warning is not observed, minor to moderate injuries are possible.

ATTENTION

Warning of damage to property

▷ If the warning is not observed, damage to property is possible.

1.4 Applicable documents

Document	Content / description
Data sheet	Technical data
Original operating instructions	• Notes on mounting and electrical installation • Set-up, description of the operating and display elements, maintenance information • Scale drawing
Programming manual	• Project creation in CODESYS • Device configuration in CODESYS • Programming of the standard PLC of the device • Programming the safety PLC in CODESYS • Description of the device-specific CODESYS function libraries

All documents are available on the ifm website: documentation.ifm.com

1.5 Change history

Issue	Subject	Date
00	New creation of the document	09 / 2023

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
  - The system architect is responsible for the safety of the system.
  - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.

2.1 Required background knowledge

This document is for specialists. Specialists are people who are qualified by their appropriate training and their experience to see risks and to avoid possible hazards that may be caused during operation or maintenance of the device.

For programming these people should also have knowledge of control technology experience in PLC programming to IEC 61131-3.

The document gives information concerning the correct handling of the product.

3 System description

3.1 Overview

3.1.1 Navigation and function keys

Below the display is the key panel with 2 function keys and 4 navigation keys. The operator uses the keys to control the device's graphical user interface (GUI).

Notes on use: Operation (→ 🗋 38)

3.1.2 Display

The display shows the graphical user interface (GUI) of the device.

Notes on use: Operation (→ 🗋 38)

3.1.3 Status LEDs

The device features the status LEDs that display the current status of system components.

Notes on the behaviour of the status LEDs: Status LEDs (→ 🗋 129)

3.1.4 Ethernet interfaces

The Ethernet interface X3 is located behind the front flap of the device.

The Ethernet interface X8 is located below the fieldbus ports (X6 / X7).

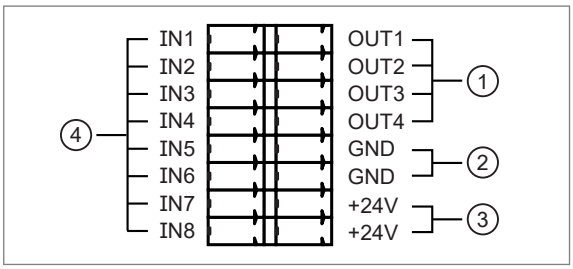
The user can access the following functions via both interfaces:

- web interface for device configuration and diagnostics
- Programming the device's internal standard PLC and the fail-safe PLC with CODESYS
- Operation as additional fieldbus interface

3.1.5 Local I/O interface

The local input/output interface X4 is located behind the front flap of the device. Safe and non-safe peripherals without AS-i interface can be connected to the local inputs and outputs.

Connections of the local I/O interface:



1: Output channels OUT1…OUT4
2: Ground GND
3: Supply voltage +24V
4: Input channels IN1…IN8

▶ Observe the instructions for connecting peripheral devices: Supported device types (→ 🗋 26)

Supply voltage / ground

The +24V and GND connections of the local I/O interface are used to supply power to the safety IO PCB of the device's safety module.

Input channels

The local I/O interface provides 8 input channels for the connection of devices (e.g. sensors, switches, light curtains). Each input channel can be used as safety or standard input.

Output channels

The local I/O interface provides 4 output channels for connecting devices (e.g. actuators, relays). Each output channel can be used as safety or standard output.

3.1.6 SD card slot

The SD card slot X5 is located behind the front flap of the device.

Supported card types:

- SD (max. 2 GB)
- SDHC (max. 32 GB)

Supported file systems:

- FAT16
- FAT32

3.1.7 EtherNet/IP interface

The device communicates with the higher-level controller of the EtherNet/IP network via the EtherNet/IP interfaces X6 and X7.

The EtherNet/IP interface supports the following functions:

- Device profile: EtherNet/IP adapter
- Protocols: DHCP, BOOTP, Static
- Topologies: Line, ring
- Medium redundancy: DLR (Device Level Ring); requirement: separate ring supervisor available (controller, switch)
- Object directory
  - Identity Object (0x01)
  - Message Router Object (0x02)
  - Assembly Object (0x04)
  - Connection Manager Object (0x06)
  - TCP/IP Object (0xF5)
  - Ethernet Link Object (0xF6)

3.2 Hardware

3.2.1 Safety architecture

The hardware structure of the device's safety module corresponds to an implementation in accordance with DIN EN ISO 13849-1:2015, IEC 62061:2010 + Cor.: 2010 + A1:2013 + A2:2015 with a two-channel architecture with hardware fault tolerance (HFT = 1).

The device achieves the following characteristic safety values:

- SIL 3 / SIL CL 3 referred to IEC 61508:2010 and IEC 62061:2010 + Cor.: 2010 + A1:2013 + A2:2015

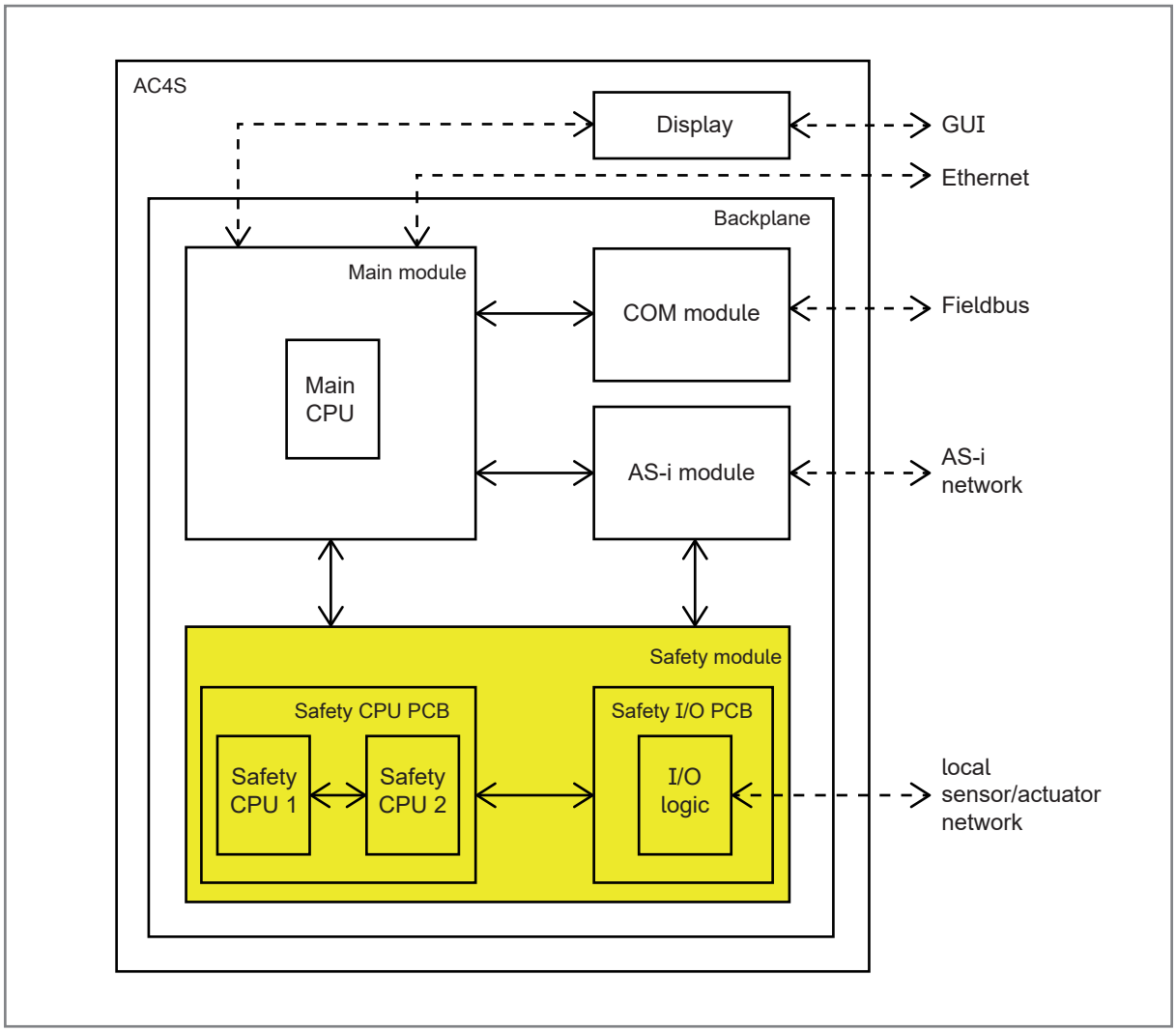
- Performance Level e (DIN EN ISO 13849-1:2015)
- Category 4 (DIN EN ISO 13849-1:2015)

The specific achievable safety parameters of the automation system implemented with the device depend on the following components:

Safety classification of the installed peripheral devices on the local I/O interface: Supported device types (→ 🗋 26)

Safety classification of the installed safe AS-i slaves

The device has the following system architecture:



3.2.1.1 Main module

The main module is the central component of the device. It contains the recovery system and the firmware of the device and controls the communication between the individual system components via the backplane. The main module has interfaces to the following components:

- Display (→ 🗋 14)
- COM module (→ 🗋 14)
- Ethernet interface
- AS-i module (→ 🗋 14)
- Safety module (→ 🗋 14)

3.2.1.2 Display

The display provides the device's graphical user interface the user can use to configure and diagnose the device. The display exchanges the resulting data with the main module.

3.2.1.3 COM module

The COM module provides the fieldbus functionality of the device. This includes the fieldbus connection as well as the necessary firmware. The COM module receives the fieldbus data from the main module via an interface and transfers it to the fieldbus. Simultaneously it receives data from the fieldbus and transfers it to the main module for further processing.

3.2.1.4 AS-i module

The AS-i module provides the AS-i functionality of the device, such as receiving, evaluating and transmitting AS-i telegrams without any logical preprocessing. It contains 2 AS-i masters controlling 2 separate AS-i circuits.

The following number of AS-i slaves can be connected to each AS-i master:

- up to 62 non safe AS-i slaves or
- up to 31 safe AS-i input slaves or
- up to 15 AS-i control slaves to control safe AS-i output slaves

The AS-i module exchanges the data of the safe AS-i slaves with the safety module via the backplane.

All AS-i data is made available to the main module for visualisation on the display.

3.2.1.5 Safety module

The safety module contains the safety-related hardware of the device. The architecture of the safety module provides the following structural features:

- 1oo2 hardware architecture (1 out of 2 architecture)
- 2-channel structure with separate diagnostics in both channels
- 2-channel safe inputs selectable
- 1-channel and 2-channel safe outputs selectable
- Built-in tests on both safe processing units (safety CPU 1/2)
- Hardware failure tolerance (HFT) = 1

The safety module consists of the following components:

- Safety CPU PCB with 2 processors for the control technology signal processing (safety CPU1/2)
- Safety I/O PCB with a separate voltage supply for the local I/O interface

Both PCBs are separated from each other galvanically. They are supplied from separate voltage sources.

Both safety CPUs have separate watchdogs and reset circuits. They are interconnected via cross communication.

Both PCBs are interconnected via a serial interface for bidirectional data exchange.

The safety module has interfaces to the main module and the AS-i module.

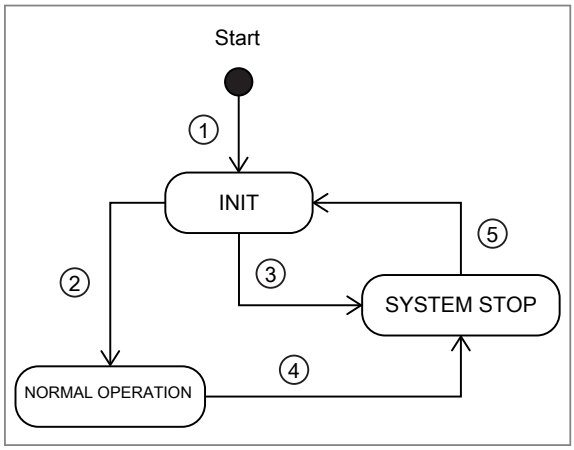
3.2.2 Operating states

The device has the following operating states:

- INIT
- NORMAL OPERATION

- SYSTEM STOP

Below the state chart:



INIT

The device automatically assumes the INIT state after start-up (①). In the INIT state the device undergoes the different hardware and integration tests (PBIT = Power-up Built-In Test). If the PBIT test is successfully passed, the device takes the state NORMAL OPERATION (②). If the PBIT test is not passed, the device passes into the SYSTEM STOP (③).

NORMAL OPERATION

In NORMAL OPERATION, the device provides a working environment for the standard PLC and the safety PLC. The states and operating modes of the PLC applications (→ programming manual) apply. At the same time and independently of the processing of the PLC applications, the device constantly undergoes various hardware tests (CBIT = Continuous Built-In Test). If this CBIT is not passed, the device assumes the SYSTEM STOP status (④).

SYSTEM STOP

In SYSTEM STOP the device is in the safe state. To leave the SYSTEM STOP state the operator has to carry out a power-on reset. The device then switches to the INIT state (⑤).

3.2.3 Process safety time

The process safety time depends on the source and the objective of the request, the signal processing and the transmission length.

- ▶ When setting up the safety function, also consider the process safety time of the application!
- ▶ Take into account other potential delays caused by upstream and downstream components (sensors, actuators) for time-related considerations. These times increase the failure response time.
- ▶ Process safety time of the other components of the safety function: → the manufacturers' data sheets

If the safety time is shorter than the process safety time required by the safety function of the plant, a single fault can in the worst case lead to a faulty output signal for a short time but not to a loss of the safety function.

A loss of the safety function can only occur if the faulty signal cannot be corrected within the process safety time.

In the following cases a single fault cannot lead to a hazardous situation:

if the safe state is assumed

if the fault detection and the reaction to the fault happen within the process safety time

3.2.4 Monitoring and securing mechanisms

System start / power on reset

When the voltage supply has been applied, the safety module of the device automatically undergoes a power-on built-in test (PBIT). The PBIT consists of the following routines:

- Test and installation of the safety-relevant hardware modules
- Test of the program, configuration and user data in SDRAM (CRC test)

If at least one of these partial tests is failed, the system reacts as follows:

- The safety module goes into the safe state
- The transition from the fail-safe PLC to the safe operation is prevented
- An error message is provided in the online support centre (OSC) of the device

Normal operation

During normal operation, the device's safety module continuously undergoes a Continuous Built-in Test (CBIT). The CBIT detects accidental hardware errors. It monitors all safety-relevant hardware modules. The CBIT consists of the following routines:

- Monitor the safety-relevant hardware modules with the required DC
- Monitor all diagnostic data that is relevant for the safe functions
- Monitor the program process

The device triggers certain measures depending on the error class: Error classes (→ 16)

3.2.5 Error detection and error processing

3.2.5.1 Error classes

The device recognises the following error classes:

fatal error

The following errors are classified as fatal errors:

- Error in the device (e.g. temperature exceeded)
- error in the channels

Response to fatal errors:

- The safety module goes into the safe state (→ Safe state 17).

Serious error

Following errors are classified as serious errors:

- Errors occurring in the periphery which do not affect the processing logic of the device

Response to serious errors:

- The safety module goes into the safe state (→ Safe state 17).

Exception errors

An exception error occurs when the device software is in a non foreseen state.

Response to exception errors:

- The safety module goes into the safe state (→ Safe state 17).

Scheduling errors

The following errors are classified as scheduling errors:

- Errors in the correct processing of the various tasks, as a result of which the operating system can no longer execute a task change, so that the watchdog is triggered.

Response to scheduling errors:

- The safety module goes into the safe state (→ Safe state 17).

3.2.5.2 Error message

The device signals occurring errors via the following mechanisms:

- Status LEDs (→ 129)
- Online Support Center (OSC) (→ 111)

3.2.5.3 Safe state

The safety module of the device is always in the safe state. Exceptions are the following operating states of the fail-safe PLC:

- debug operation
- download operation
- Safe operation

If a fatal, serious or exceptional fault occurs during these operating states, the device's safety module automatically assumes the safe state.

The safe state is characterised by the following features:

- All safe output channels of the local I/O interface are already power-free
- All safe AS-i control slaves have stopped sending code sequences
- the fail-safe PLC is in the STOP mode
- the cyclic data transfer between safety module and basic device is interrupted
- the data packages of the safe cross communication between the two safety CPUs are filled with zero sequences and marked as "invalid"
- the basic device detects that the safety module is in the safe state and provides this information in the OSC and on the fieldbus interface and Ethernet interface

All non safety-relevant functions of the basic device continue to be available in the safe state.

3.2.5.4 Resetting errors

All error states (→ Error classes 16) may only be exited by one of the following measures.

▶ Reboot the device (power-on reset)

3.3 Software

3.3.1 Software modules

The device has the following software modules:

Software module	Description
Recovery system	Environment for the firmware installation
Firmware	Firmware of the device
CODESYS standard runtime system (standard PLC)	Runtime environment for the execution of CODESYS applications to IEC 61131

Software module	Description
CODESYS safety runtime system (safety PLC)	Certified runtime environment for the execution of safety applications
Standard application	CODESYS application for standard PLCs
Safe application	CODESYS application for safety PLC (= safety function)

The user is responsible for creating the safety application (= safe application).

▶ If necessary, he must also obtain an approval from the supervisory and test organisations according to the national regulations.

3.3.2 Safety functions

The device has the following security functions:

- Freely programmable safety PLC
- Fail-safe reading of local digital inputs and linking via the safety PLC
- Fail-safe control of local digital outputs via the safety PLC
- Fail-safe reading of fail-safe AS-i input slaves and linking via the safety PLC
- Control of fail-safe AS-i output slaves via the safety PLC
- Fail-safe transfer of data between at least 2 devices
- Fail-safe data transfer from and to EtherCAT slaves (FSoE)

The device provides the programmer with a safe environment that is suitable for executing a safety application in accordance with SIL3. The user is responsible for programming the safety application.

3.3.3 Certified software components

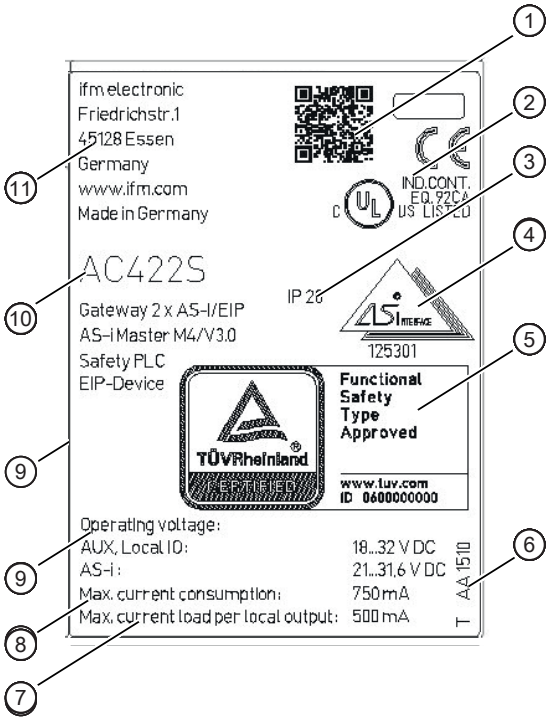
To program safety applications for the device, ifm electronic provides certified software components for the CODESYS Safety 3.5 programming environment. In addition, the user can use the function libraries supplied with CODESYS safety.

Information on the device-specific software components and on programming the standard PLC and the fail-safe PLC: → Programming manual

3.4 Type label

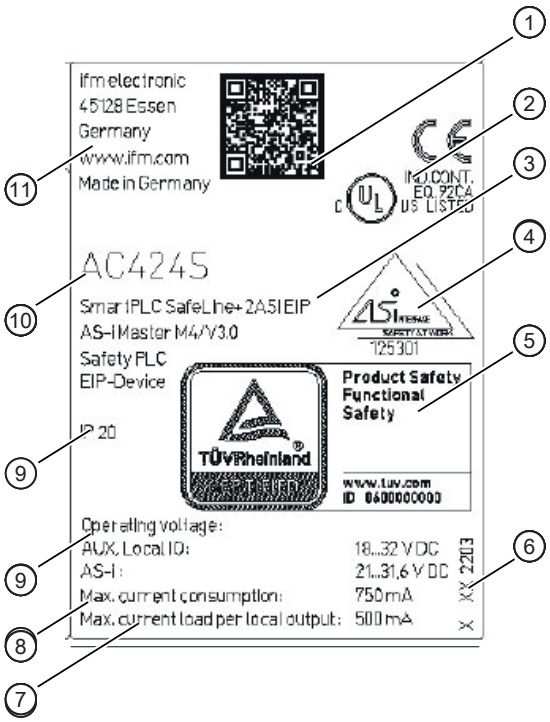
The type label is on the right housing side of the device. It provides the following information:

- AC422S:



1: QR code for product website
2: CE/cULus marking
3: Protection class
4: AS-i certification
5: TÜV certification
6: Hardware status and production date
7: Max. load per output channel of the local I/O interface
8: Max. current consumption of the device
9: Operating voltage for AUX / local IO PCB and AS-i
10: Type designation incl. device functionality
11: Manufacturer identification

- AC424S:



1: QR code for product website
2: CE/cULus marking
3: AS-i certification
4: TÜV certification
5: Hardware status and production date
6: Max. load per output channel of the local I/O interface
7: Max. current consumption of the device
8: Operating voltage for AUX / local IO PCB and AS-i
9: Protection class
10: Type designation incl. device functionality
11: Manufacturer identification

4 Set-up

4.1 Installing the device

▶ Install the device correctly (→ Installing the device 🗋 23).

4.2 Integrating the device into networks

4.2.1 EtherNet/IP network

If the device is to be operated as an EtherNet/IP device:

▶ Connect the device to the EtherNet/IP network via the EtherNet/IP ports X6/X7.

4.2.2 Additional fieldbus network

If the device is to be operated as a participant in an additional fieldbus network:

▶ Connect the device to the fieldbus network via a free Ethernet interface X3 or X8.

▶ Configure an additional fieldbus stack in CODESYS Development System (→ programming manual).

4.2.3 Ethernet interfaces

To access the web interface or the programming interface of the device-internal PLC of the device:

▶ Connect the device to the Ethernet network or the PC/laptop via Ethernet interface X3 or X8.

4.2.4 Local I/O interface

If peripheral devices without an AS-i interface are part of the system configuration:

▶ Connect non-safe and fail-safe peripheral devices to the local I/O interface.

Installation instructions for the local I/O interface: Connecting devices to local I/O interface (→ 🗋 26)

The installation of the fail-safe peripheral devices on the local I/O interface has an influence on the achievable safety figures (PL / SIL / Cat.) of the overall system.

Observe the obtainable characteristic safety figures of the connection types for the installation of the safer peripherals on the local I/O interface.

4.3 Connecting the device

▶ Connect the device to the supply voltage (→ Electrical connection 🗋 24).

▷ Device starts.

4.4 "Basic settings" start screen

The “Basic settings” start screen appears after the following actions or events:

- initial start-up
- firmware update

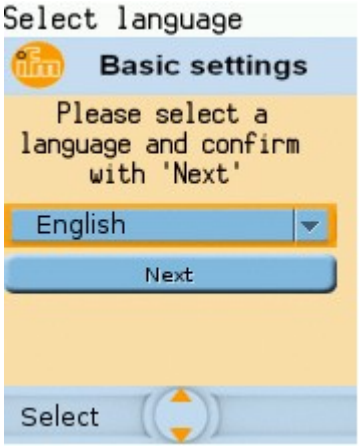
- data loss due to battery failure

The view provides access to the basic settings of the device (user interface language, network settings, system time).

The same operating instructions as for the page view (→ Page view 🗋 40) apply to the “Basic settings” start screen.

4.4.1 Changing the basic settings of the device

Set language



▶ Connect the device to the supply voltage.

▷ Device starts.

▷ Display shows start screen [Basic settings].

▷ List shows the active language.

▶ Select the required language for GUI texts from the list, List (→ 🗋 43).

▷ The GUI texts appear in the selected language.

▶ Click on [Next] to go to the next page.

Option 1: Set the system time manually



▶ Deactivate the checkbox [Activate NTP].

▷ The status LED lights up grey.

▶ In the group [Time], set the time one position at a time, Numerical field (→ 🗋 47).

▶ In the group [Date], set the date one position at a time, Numerical field (→ 🗋 47).

▶ Click on [Finish] to activate the changed values.

▷ The new system time is active.

▷ The display shows the standard start screen.

Option 2: Synchronise the system time with an NTP server



- ▶ Activate the checkbox [Activate NTP].
  - ▷ The status LED lights up yellow.
- ▶ Enter the IP address of the NTP server in the IP address field.
- ▶ Pick the time zone of the NTP server from the list (UTC format).
  - ▷ The NTP client of the device synchronises the system time with the selected NTP server.
  - ▷ In case of a successful synchronisation: The status LED is green
  - ▷ The groups [Date] and [Time] show the synchronised values.
- ▶ Click on [Finish] to activate the changed values.
- ▷ The new system time is active.
- ▷ The display shows the standard start screen.

5 Installation

5.1 Installing the device

The device must only be installed, connected and put into operation by a qualified electrician as the safe function of the device and machinery is only guaranteed when installation is correctly carried out.

- ▶ The installation and connection must comply with the applicable national and international standards.
- ▶ Responsibility lies with the person installing the device.
- ▶ Fix the device onto a 35 mm raised rail.
- ▶ Vertical installation (upright).
- ▶ Adhere to a minimum distance of 30 mm between the ventilation holes (perforated sheet) and other parts.
- ▶ Maximum operating altitude: 2000 m above sea level
- ▶ The protection rating of the device is IP 20. The device must be installed in a control cabinet with at least IP 54 protection.
- ▶ Lay the cables in a cable duct.
- ▶ Keep the installation space of the device free from electrically-conductive particles.

Ensure a condensation-free environment. Avoid excessive dust, vibration and shock. The air circulation through the vents must not be impeded. Installation in environments with ionising radiation is not permitted.

Avoid installation in direct vicinity of frequency inverters or other interfering sources.

6 Electrical connection

▶ The device must be connected by a qualified electrician.

▶ Disconnect the plant from the mains supply before installation.

▶ Observe the national and international regulations for the installation of electrical equipment.

▶ Connect the device as indicated on the terminals.

▶ Ensure an electrical connection between the device (X1, terminal FE) and the ground of the installation.

▶ Ground the X3, X6, X7 and X8 interfaces on both sides.

6.1 Wiring

Terminal X1	Pin	Designation
• AS-i 2 +	1	AS-i + for AS-i line 2
• AS-i 2 -	2	AS-i - for AS-i line 2
• AS-i 1 +	3	AS-i + for AS-i line 1
• AS-i 1 -	4	AS-i - for AS-i line 1
• FE	5	Functional earth
	6	Not used

Terminal X2	Pin	Designation
• 24 V	1	+24 V device supply
• GND	2	GND

Terminal X4	Pin	Designation
• IN1…IN8	1…8	Input channels
• OUT1…OUT4	9…12	Output channels
• GND	13, 14	Safety IO module mass
• +24V	15, 16	+24 V power supply safety IO module

6.2 Connecting the supply voltages

6.2.1 Standard configuration: 24 V power supply and AS-i power supply/ supplies

▶ Connect the supply voltage inputs of the device to the power supply intended for this purpose.

- AS-i bus 1
  - – Connect the AS-i 1+ and AS-i 1- pins of terminal X1 to the AS-i power supply (e.g. AC1254) of the first AS-i bus.
- AS-i bus 2
  - – Connect the AS-i 2+ and AS-i 2- pins of terminal X1 to the AS-i power supply (e.g. AC1254) of the second AS-i bus.

Power must be applied simultaneously to the Safe-IO module (terminal X4) and to the device (terminal X2).

24V device supply:

Connect the pins 24 V and 0 V of terminal X2 to a 24 V DC power supply (18...32 V SELV/ PELV).

24 V Safe-IO power supply:

Connect the pins 24 V and GND of terminal X4 to a 24 V DC power supply (18...32 V SELV/ PELV).

- ▶ Ensure a low-resistance connection of the symmetry point of the device (terminal X1, pin 5 FE) to the ground of the installation.
- ▶ For the 24 V power supply (device, Safe-IO), select a power supply which supplies an output current of at least 3 A.
- ▶ The cable length of the DC supply between power supply and the device is to be limited to max. 3 m.

6.3 Connecting devices to local I/O interface

- ▶ Only connect supported devices (→ Supported device types 26)!
- ▶ To obtain a certain safety integrity level to EN ISO 13849 or performance level to EN 62061, observe the max. obtainable SIL / cat. /PL values when devices are installed on the local I/O interface.

6.3.1 Supported connection types

The local I/O interface of the device supports the connection of fail-safe and non-safe devices. The following connection methods are possible:

Connection type	Description
Input, 1 channel, non-safe	• corresponds to a standard input • The input value is read in the safe application by means of an FB.
Input, 2 channels, safe	• Consists of 2 standard inputs • The 2 logical input signals are monitored by means of a logical device and linked with a safe process signal. • The safe process signal can be used in the safe application.
Input, 2 channels with test pulse, safe	• Consists of 2 standard inputs • The 2 logical input signals are monitored by means of a logical device and linked with a safe process signal. • To detect cross-bridging the input signals are also checked for the presence of a test pulse. • The safe process signal can be used in the safe application.
Output, 1 channel, non-safe	• corresponds to a standard output • The output value is generated in the safe application by means of an FB.
Output, 1 channel, safe	• A safe process signal is provided on 1 output without additional monitoring.
Output, 2 channel, safe	• A safe process signal is provided on 2 outputs without additional monitoring

6.3.2 Supported device types

The local I/O interface (X4) supports the connection of the following safe device types.

The signals of the clock outputs of fail-safe sensors are not evaluated by the device.

Note possible effects of the obtainable SIL/PL of the entire system.

The proper function of a connected local device can only be obtained by selecting a logical device interface in CODESYS suitable for the operating conditions.

Follow the instructions for integrating fail-safe devices into a CODESYS project: → Programming manual

6.3.2.1 Mechanical switches

Device type MS-1

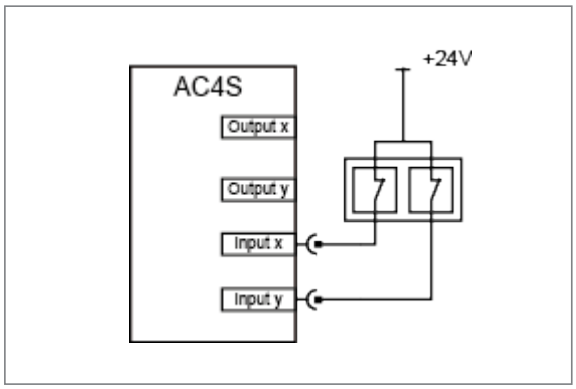


Fig. 1: Device type MS-1 wiring diagram

- Description:
  - Mechanical switch
  - 2-channel connection
  - not tested
- Safety classification:
  - max. SIL 3
  - max. PL: e
  - max. category: 4

The indicated safety classifications can only be obtained with protected wiring between switch and device.

▶ Observe the current standards of the country in which the device is to be operated.

Switch must meet the conditions of the standard IEC 60947-5-1 (Appendix K).

▶ Select the input and output circuits according to the max. safety classification (SIL / cat. / PL).

Device type MS-2

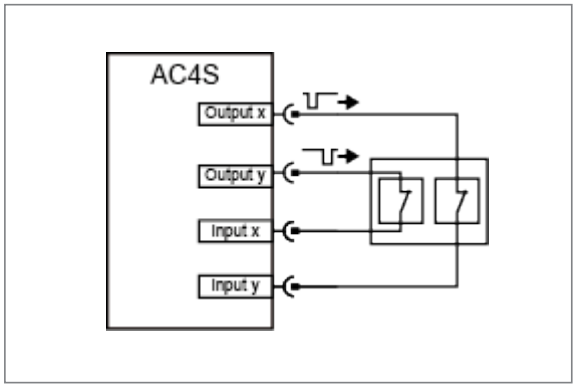


Fig. 2: Device type MS-2 wiring diagram

- Description:
  - Mechanical switch
  - 2-channel connection
  - Test with 2 time-shifted switch-off pulses on the input channels
  - Test signals are generated by the device
- Safety classification:
  - max. SIL 3
  - max. PL: e
  - max. category: 4

Switch must meet the conditions of the standard IEC 60947-5-1 (Appendix K).

▶ Select the input and output circuits according to the max. safety classification (SIL / cat. / PL).

▶ If several switches of device type MS-2 are connected, define the test signals differently.

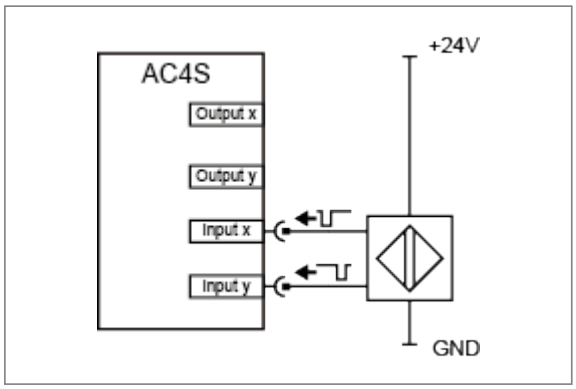
▶ Observe the current standards of the country in which the device is to be operated.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

6.3.2.2 Electronic sensors

Device type S-1



- Device type S-1 wiring diagram
- Description:
  - Electronic sensor
  - 2-channel connection (4-wire operation)
  - Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by the device)
- Safety classification:
  - max. SIL 3
  - max. PL: e
  - max. category: 4
- Examples (ifm devices):
  - GI701S
  - GM701S
  - GM705S

▶ Note the supply voltage limits of the sensor.

▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

The maximum safety classification in accordance with the specified SIL/Cat/PL values can be achieved by using the ifm articles mentioned. Note the current standards.

▶ If other than the indicated products are used, note the current standards.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

Device type S-2

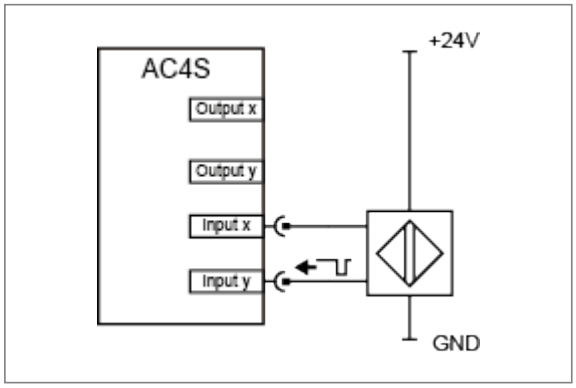


Fig. 3: Device type S-2 wiring diagram

- Description:
  - Electronic sensor
  - 2-channel connection (4-wire operation)
  - Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by the device)
- Safety classification:
  - max. SIL 2
  - max. PL: d
  - max. category: 4
- Examples (ifm devices):
  - GF711S
  - GG711S
  - GI711S
  - GG712S
  - GI712S
  - GG851S

▶ Note the supply voltage limits of the sensor.

▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

The maximum safety classification in accordance with the specified SIL/Cat/PL values can be achieved by using the ifm articles mentioned. Note the current standards.

▶ If other than the indicated products are used, note the current standards.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

6.3.2.3 Safety light curtains

Device type SLV-1

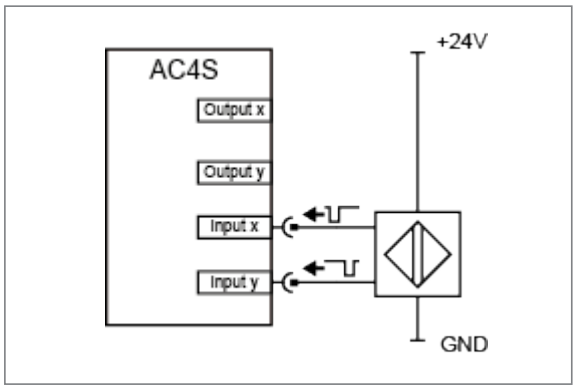


Fig. 4: Device type SLV-1 wiring diagram

- Description:
  - Safety light curtains type 2
  - Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by the device)
- Safety classification:
  - max. SIL 1
  - max. PL: c
  - max. category: --
- Examples (ifm devices):
  - OY431S to OY440S
  - OY031S to OY040S
  - OY051S to OY060S
  - OY072S to OY080S
  - OY094S to OY100S

▶ Note the supply voltage limits of the safety light curtain.

▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

The maximum safety classification in accordance with the specified SIL/Cat/PL values can be achieved by using the ifm articles mentioned. Note the current standards.

▶ If other than the indicated products are used, note the current standards.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

Device type SLV-2

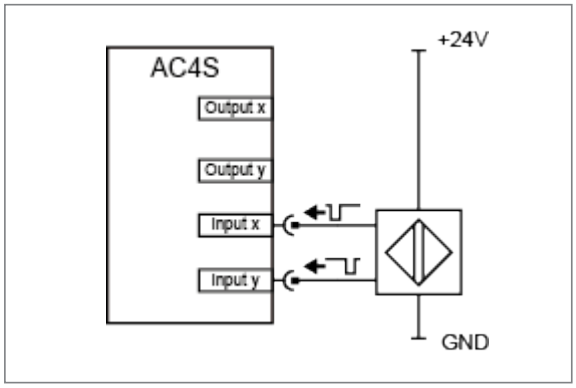


Fig. 5: Device type SLV-2 wiring diagram

- Description:
  - Safety light curtains type 4
  - Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by the device)
- Safety classification:
  - max. SIL 3
  - max. PL: e
  - max. category: --
- Examples (ifm devices):
  - OY431S to OY440S
  - OY031S to OY040S
  - OY051S to OY060S
  - OY072S to OY080S
  - OY094S to OY100S

▶ Note the supply voltage limits of the safety light curtain.

▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

The maximum safety classification in accordance with the specified SIL/Cat/PL values can be achieved by using the ifm articles mentioned. Note the current standards.

▶ If other than the indicated products are used, note the current standards.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

6.3.2.4 Safety light grids

Device type SLG-1

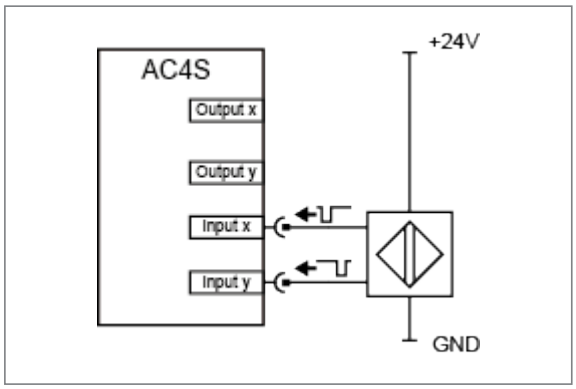


Fig. 6: Device type SLG-1 wiring diagram

- Description:
  - Safety light grids type 2
  - Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by the device)
- Safety classification:
  - max. SIL 1
  - max. PL: c
  - max. category: --
- Examples (ifm devices):
  - OY411S to OY413S
  - OY111S to OY113S

▶ Note the supply voltage limits of the safety light grid.

▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

The maximum safety classification in accordance with the specified SIL/Cat/PL values can be achieved by using the ifm articles mentioned. Note the current standards.

▶ If other than the indicated products are used, note the current standards.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

Device type SLG-2

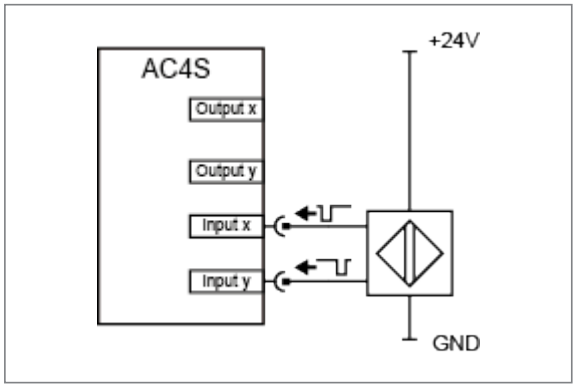


Fig. 7: Device type SLG-2 wiring diagram

- Description:
  - Safety light grids type 4
  - Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by the device)
- Safety classification:
  - max. SIL 3
  - max. PL: e
  - max. category: --
- Examples (ifm devices):
  - OY114S to OY116S
  - OY901S to OY903S
  - OY421S to OY423S
  - OY120S to OY122S
  - OY951S to OY953S

▶ Note the supply voltage limits of the safety light grid.

▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

The maximum safety classification in accordance with the specified SIL/Cat/PL values can be achieved by using the ifm articles mentioned. Note the current standards.

▶ If other than the indicated products are used, note the current standards.

The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

▶ Test the safety function within the second error occurrence time.

6.3.2.5 Output relay

Device type AR-1

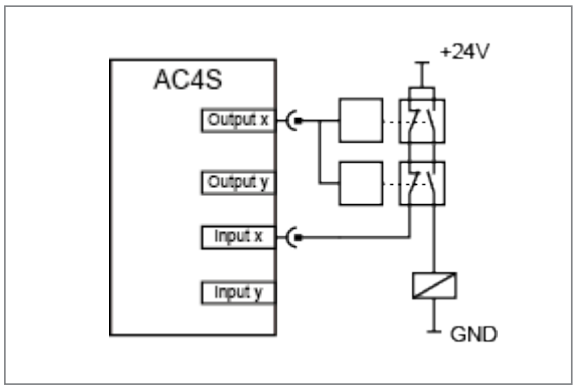


Fig. 8: Device type AR-1 wiring diagram

- Description:
  - 2 positively-guided relays with signal contact
  - 2 output relays in series connection; common triggering of the relays via one output
  - Check-in of the signal contact via local input channel of the device
- Safety classification:
  - max. SIL 2
  - max. PL: d
  - max. category: 3

The indicated safety classifications can only be obtained with protected wiring between switch and device.

- ▶ Observe the current standards of the country in which the device is to be operated.
- ▶ Carry out suitable start-up tests.
- ▶ Note the supply voltage limits of the relays.
- ▶ Select the input and output circuits according to the max. safety classification (SIL / cat. / PL).
- ▶ Test relays for correct operation once a year.

- ▶ Note the supply voltage limits of the relays.
- ▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

Device type AR-2

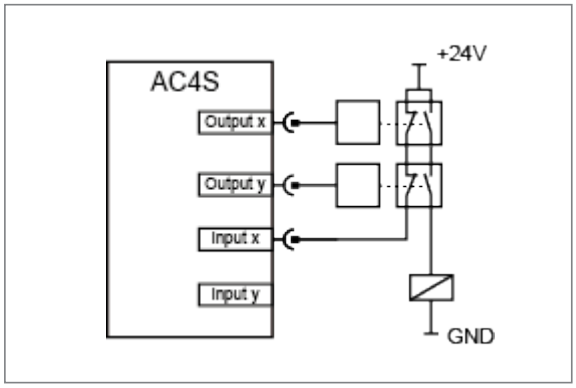


Fig. 9: Device type AR-2 wiring diagram

- Description:
  - 2 positively-guided relays with signal contact
  - 2 output relays in series connection; Separate triggering of the relays via 2 outputs
  - Check-in of the signal contact via local input channel of the device
- Safety classification:
  - max. SIL 3
  - max. PL: e
  - max. category: 4

- ▶ Observe the current standards of the country in which the device is to be operated.
- ▶ Carry out suitable start-up tests.
- ▶ Lay output signal cables protected against damage or test output signals.
- ▶ Note the supply voltage limits of the relays.
- ▶ Test relays for correct operation once a month.
- ▶ Select the input and output circuits according to the max. safety classification (SIL / cat. / PL).

- ▶ Note the supply voltage limits of the relays.
- ▶ Select the input circuits according to the max. safety classification (SIL / cat. / PL).

6.3.3 Connecting sensors / actuators

The sensors or actuators are connected to the local (safe) inputs and outputs via terminal X4.

Valid combinations of the local input channels for the connection of 2-channel sensors:

- IN1 and IN8
- IN2 and IN7
- IN3 and IN6
- IN4 and IN5

WARNING

Invalid combination of the local inputs for the connection of 2-channel sensors

▷ Safety-related functions are ineffective

▷ Required SIL / cat. / PL is not achieved

▶ When connecting 2-channel sensors for the implementation of safety-related functions according to SIL3 / cat.4 / PL e, use a valid input combination.

▶ Connect the sensor switching signals to the pins IN1...IN8 of terminal X4.

▶ Connect the actuators to the pins OUT1...OUT4 of terminal X4.

▶ When external sensors / actuators are connected, their supply voltage and/or reference potential of terminal X4 (Safe-IO module supply) must be tapped.

▶ When external sensors are connected, observe the max. permitted supply voltage of the sensor and select the Safe-IO module supply accordingly.

▶ The signal cable length for external devices (sensors, actuators) is to be limited to max. 10 m. The signal cables must not leave the building.

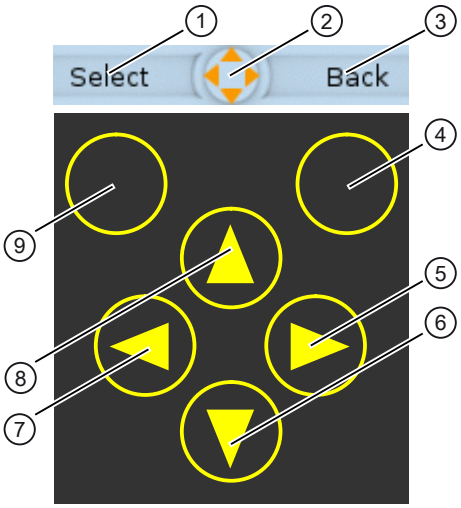
▶ Do not exceed the maximum output current of 0.5 A per output.

▶ Do not exceed a switching frequency of 25 Hz when connecting the inductive loads (DC-13).

7 Operation

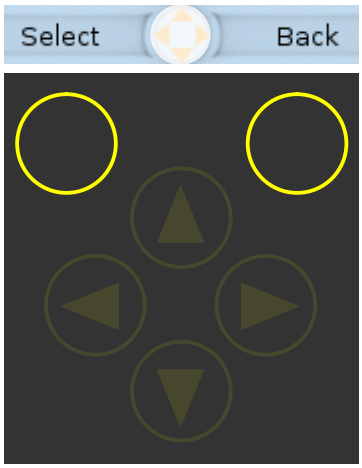
7.1 Overview: Operating elements

Below the display is the key panel with six membrane keys. The operator can use these keys to control the local graphical user interface of the device. The function of the keypad is closely linked to the navigation status bar in the menu view (→ Menu view 🗋 39) and the page view (→ Page view 🗋 40).



1: Label left function key
2: Navigation compass
3: Label right function key
4: Right function key
5: Navigation button [▶]
6: Navigation button [▼]
7: Navigation button [◀]
8: Navigation button [▲]
9: Left function key

7.2 Function keys



The operator can trigger defined actions with the 2 function keys (e.g. activate checkbox). The function key assignment depends on the context.

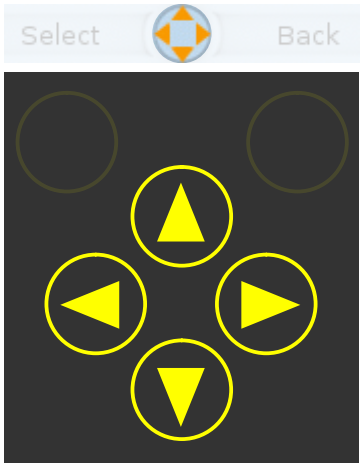
The text fields in the navigation status bar are assigned to the function keys below them. They show which action is triggered by pressing the function key in the current operating context. If the text field remains empty, the function key has no function in the current operating context.

Example:

▶ Press the left function key to start the [Select] action.

▶ Press the right function key to start the [Back] action.

7.3 Navigation buttons



The 4 navigation keys [▲], [►], [▼] and [◄] can be used for navigation and selection.

The navigation compass in the navigation status bar shows which of the navigation keys can be used in the current operating context.

Examples:



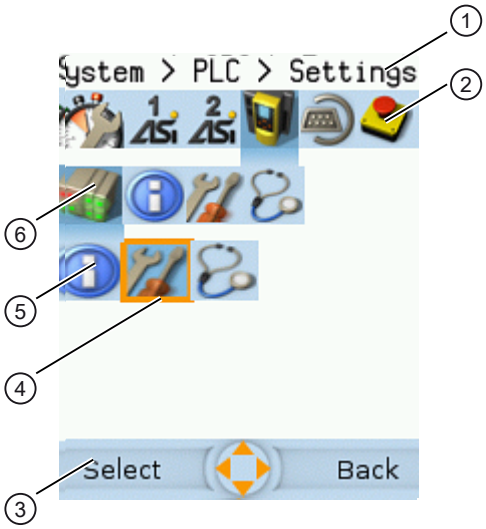
All navigation keys are active and will trigger a device response when activated.



Only the navigation keys [►] and [▼] are active and trigger a response from the device when activated.

7.4 Menu view

The operator can select the required menu page in the menu view.



1: Info bar
2: Main navigation bar
3: Navigation status bar with labelling of the function keys and navigation compass
4: Selected menu item (focus)
5: 2. Subnavigation bar
6: 1. Subnavigation bar

7.4.1 Navigating in the menu view

The central elements in the menu view are the navigation bars. They represent the menu structure of the graphical user interface. Each navigation bar represents a menu level. The symbols in a navigation bar represent the submenus and menu pages.

Rules for navigation in the menu view:

► Click on [◄] / [►] to navigate within a menu level.

▷ The selected symbol has the focus (= orange frame).

▷ If the selected symbol has a submenu, the corresponding subnavigation bar will appear automatically.

▷ The **info bar** shows the selected navigation path.

▷ The **navigation compass** shows all navigation keys that are active in the current operating context.

▶ Click on [▼] to switch to the next lower menu level.

▶ Click on [▲] to switch to the next higher menu level.

At the lowest menu level:

▶ Click on the function key [Auswahl] to switch to the menu page (→ Menu view 🗋 39) of the selected menu item.

In the main navigation bar:

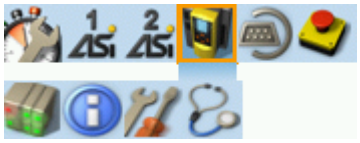
▶ Click on the [Back] function key to switch to the start screen (→ Start screen 🗋 53).

7.4.2 Example

Goal: Call up the menu page for the settings of the device's internal PLC.



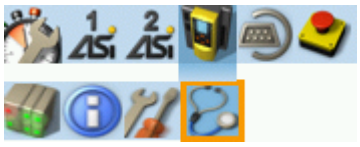
Initial position when accessing the menu screen.



▶ Use [▶] to select the [System] menu icon.

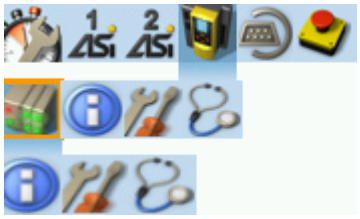
▷ The focus is on the [System] menu symbol.

▷ The first subnavigation bar appears.



▶ Use [▼] to change into the 1st subnavigation bar.

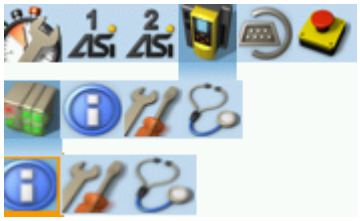
▷ The focus is on the [Diagnostics] menu icon.



▶ Use [◀] to select the [PLC] menu symbol.

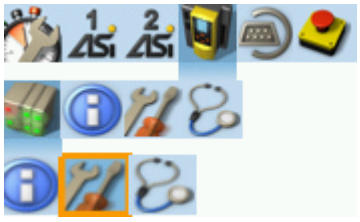
▷ The focus is on the [PLC] menu symbol.

▷ 2nd subnavigation bar appears.



▶ Use [▼] to change into the 2nd subnavigation bar.

▷ The focus is on the [Information] menu symbol.



▶ Use [▶] to select the [Settings] symbol.

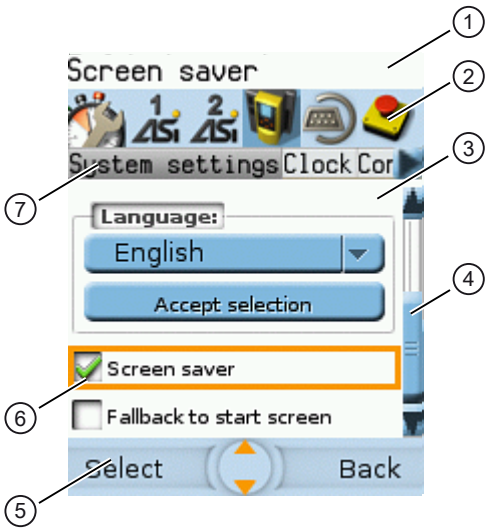
▷ The focus is on the [Settings] menu symbol.

▶ Press the function key [Selection] to go to the page view of the [Settings] submenu.

▷ The page shows the configuration options of the device's internal PLC.

7.5 Page view

The page view shows the functions and information on a menu page.



1: Info bar
2: Main navigation bar
3: Page
4: Scroll bar
5: Navigation status bar with
   - Labelling of the function keys
   - Navigation compass
6: Page element with focus
7: Register

7.5.1 Navigating in the page view

The page view contains elements of a menu page with which the operator can control the device or call up information.

Rules for navigation in the page view:

▶ Optional: Click on [◀] / [▶] to switch between the tabs.

▷ The menu page shows the available elements.

▷ A **scroll bar** appears on the right side of the screen if the elements do not fit on the page.

▶ Click on [▲] / [▼] to navigate on the menu side.

▷ The focus (= orange frame) is on the selected page element.

▷ The info bar shows the designation of the selected element.

▷ The navigation compass shows all navigation keys that are active in the current operating context.

▷ The text fields in the navigation status bar show the current assignment of the function keys.

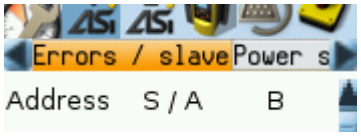
▶ Click on the [Back] function key to quit the page view.

7.5.2 Operating elements

7.5.2.1 Tab menu / tab

A tab menu groups together the different functions of a menu page. A tab menu consists of at least two tabs. A tab combines related functions.

Example:



- The focused tab has an orange background
- The info bar displays the name of the active tab (in this example: `Fehler/Slave`).
- The icons ◂ and ▸ indicate that there are more tabs on the left and right sides of the visible tabs.
- The page shows the control elements that belong to the currently selected tab.

Tabs can have the following background colours:

- `Version`: Tab has the focus

- Version: Tab is active
- Version: Tab is inactive

Operation:

▶ Go to the menu item with the tab menu.
  ▷ The tab menu appears.
  ▷ The focus is on the left-hand tab.
▶ Select the required tab using the navigation key [◀] / [▶].
  ▷ The focus (= orange background) moves to the selected tab:
  ▷ The page shows the functions of the selected tab.
▶ Use the [Select] function key to switch to the page belonging to the active tab.
  ▷ When going to the page, the tab menu remains visible.
  ▷ The background colour of the active tab turns grey.
▶ Use the navigation key [▼] to select and execute the required function.
▶ Press the [Back] function key to switch to the tab.
▷ The focus (= orange background) moves to the active tab.

7.5.2.2 Button

A button allows the operator to carry out a specified action once. The caption on the button describes the action.

- Accept: Button is disabled
- Accept: Button has the focus

Operation:

▶ Use the navigation key [▲] / [▼] to select the button.
  ▷ The selected button gets an orange frame:
▶ Enable the selected button using the [Selection] function key.
▷ The function is executed.

7.5.2.3 Checkbox

A checkbox permits the user to activate/deactivate a parameter. A checkbox control element consists of a checkbox and a caption.

Example:

Fallback to start screen

Operation:

▶ Use the navigation key [▲] / [▼] to select the checkbox
  ▷ The focus (= orange frame) moves to the selected checkbox
▶ Use the [Select] function key to activate or deactivate the selected checkbox.
▷ The status change is indicated:

Screen saver: Checkbox is checked

OR:



: Checkbox is unchecked

The set value will not always become effective immediately. The change often has to be confirmed separately (e.g. with the [Accept selection] button).

7.5.2.4 List

A list provides a set of defined values. The operator can select precisely one value from this set (= 1 of n selection).

Examples:

- 

: List without caption
- 

: List with caption

Operation:

▶ Use the navigation key [▲] / [▼] to select the list.

▷ The focus (= orange frame) moves to the selected list.

▷ The list shows the active value.

▶ Use the [Select] function key to open the list.

▷ The opened list shows the selectable values.

▶ Use the navigation key [▲] / [▼] to select the required value in the list.

▷ The background colour of the selected value turns orange.

▶ Press the [Select] function key to accept the selected value.

OR:

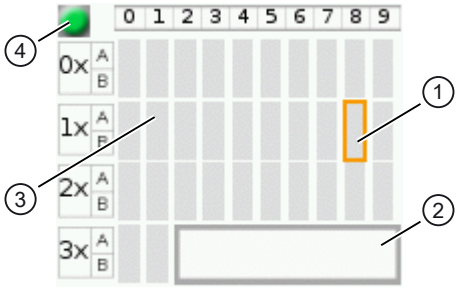
▶ Use the [Back] function key to cancel the process and close the list.

▷ The list shows the selected value.

The set value will not always become effective immediately. The change often has to be confirmed separately (e.g. with the [Accept selection] button).

7.5.2.5 Slave selector

The slave selector is used to select an AS-i slave or an AS-i address.



1: Highlighted AS-i address
2: Status message of highlighted AS-i address
3: AS-i address symbol
4: Indicator of AS-i master operating mode

The status LED indicates the active operating mode of the AS-i master:

- : AS-i master in “Protected” mode
- : AS-i master in “Projection” mode

Every field represents an AS-i address. An AS-i address can be occupied by:

- a single slave symbol
- an A/B slave pair symbol

The row and column headers help to locate the AS-i address.

Example: address of the field selected in the picture

- Row header: `1x` (= tens digit of the AS-i address)
- Column caption: `8` (= units digit of the AS-i address)
- Type of slave: single slave (= symbol fully occupies the address field)
- Resulting AS-i address: 18

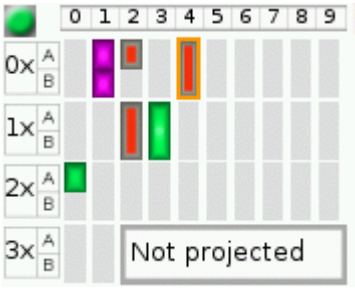
The symbol of the A/B slave pair appears when an A or B slave is used on this address

The slave selector is used in the following views:

- View: Slave status (→ 🗋 44)
- View: Free slave addresses (→ 🗋 45)

View: Slave status

The view shows an overview of the slaves in the selected AS-i network.



The symbol colour signals the slave status. Meaning of symbols and colours: Slave status: colour code and symbols (→ 🗋 44)

The text field displays the status of the selected AS-i slave. Possible status messages:

- `Slave active`
- `Not projected` (= configuration error)
- `Double address` (= double address error)
- `Periphery` (= periphery fault)

Operation:

▶ Use the navigation buttons [▲], [►], [▼] or [◄] to select the AS-i slave.

▷ The focus (= orange frame) is on the selected AS-i slave.

▷ The info bar shows the address of the selected AS-i slave.

▷ The text field shows a status message about the selected AS-i slave.

▶ Use the [Select] function key to select the AS-i slave and switch to the next menu page.

OR

▶ Press the [Back] function key to cancel the process and exit the slave selector.

Slave status: colour code and symbols

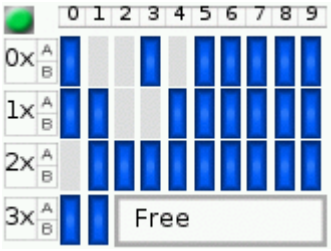
Single slave	A/B slave	Colour	Description
		Grey	No slave found: • slave address neither in the LPS nor in the LDS
		Green	Slave is activated (in LAS)
		Red	Configuration error type 1: • the slave is projected (in LPS) but not found (in LDS)
		Yellow	Peripheral fault
		Pink	Double address error: • there are several slaves with the same address
		Grey red	Configuration error type 2: • The found slave (in LDS) is not projected (in LPS) • The found slave has another profile than projected

Meaning of the colour combinations

Symbol	Colour	Description
	Grey red Grey	Configuration error type 2: • Single slave is projected (in LPS) but not found (in LDS). • Instead, a new A slave with the same address was installed.
	Grey Grey red	Configuration error type 2: • Single slave is projected (in LPS) but not found (in LDS). • Instead, a new B slave with the same address was installed.
	Grey red	Configuration error type 2: • A or B slave is projected (in LPS) but not found (in LDS). • Instead, a new single slave with the same address was installed.

View: Free slave addresses

The view shows the free and occupied AS-i addresses.



The symbol colour indicates the state of the AS-i address. Meaning of symbols and colours: Free slave addresses: colour code and symbols (→ 🗋 45)

The text field displays the status of the selected AS-i slave. Possible status messages:

- `Free`
- `Slave not present`

Operation:

▶ Use the navigation buttons [▲], [►], [▼] or [◄] to select the AS-i slave.

▷ The focus (= orange frame) is on the selected AS-i slave.

▷ The info bar shows the address of the selected AS-i slave.

▷ The text field shows a status message about the selected AS-i slave.

▶ Use the [Select] function key to select the AS-i slave and switch to the next menu page.

OR

▶ Press the [Back] function key to cancel the process and exit the slave selector.

Free slave addresses: colour code and symbols

Single slave	A/B slave	Colour	Description
		Grey	Slave address is already used.
		Cyan	Address is free according to LDS (= no slave found), however: address belongs already to a stored projection (= application profile).
		Blue	Address is free according to LDS (= no slave found). Address is not used in a stored projection (= application profile).

Meaning of the colour combinations

Symbol	Colour	Description
	Blue Blue	Slave to be addressed is an A/B slave: • A address is free. • B address is free.
	Blue Grey	Slave to be addressed is an A/B slave: • A address is free. • B address is used.

Symbol	Colour	Description
	Grey Blue	Slave to be addressed is an A/B slave: • A address is used. • B address is free.
	Cyan Cyan	Slave to be addressed is an A/B slave: A and B addresses are free, but already used in a stored projection.
	Cyan Grey	Slave to be addressed is an A/B slave: • A address is free, but already used in a stored projection. • B address is used.
	Grey Cyan	Slave to be addressed is an A/B slave: • A address is used. • B address is free, but already used in a stored projection.
	Cyan Blue	Slave to be addressed is an A/B slave: • A address is free, but already used in a stored projection. • B address is free.
	Blue Cyan	Slave to be addressed is an A/B slave: • A address is free. • B address is free, but already used in a stored projection.

7.5.2.6 Confirmation message

The confirmation message is a security prompt. It appears when important changes are made to the system settings. The confirmation message shows the changes made. The operator must acknowledge the message for the changes to take effect.

Example:



Changing the AS-i slave address from 1A to 1B

- Confirmation message shows:
  - Action (= changing the AS-i address)
  - Slave address prior to change
  - Slave address after change
- Input options for operators:
  - [Selection] function key
  - [Back] function key

Operation:

▶ Change the system settings.

▷ The confirmation message appears.

▶ Use the [Select] function key to confirm the changes and accept the new value.

▷ AS-i address is changed.

▷ The page displays the valid settings.

OR:

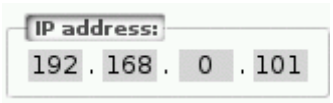
▶ Use the [Back] function key to discard the changes and continue using the old value.

▷ AS-i address is not changed.

▷ The page displays the valid settings.

7.5.2.7 Numerical field

The numerical field allows the operator to enter integer values. The value range is context-specific. Numeric fields are components of the following elements:

Element	Example	Description
IP address		Entry of an IP address (IPv4) in `w.x.y.z` format • `w` | `x` | `y` | `z` : Network segments (value range: 0…255)
Date		Date entry in `JJJJ-MM-TT` format • `JJJJ` : Year (value range: 0000…9999) • `MM` : Month (value range: 01…12) • `TT` : Day (value range: 01…31)
Time		Enter a time in the `hh:mm:ss` format • `hh` : Hours (value range: 00…23) • `mm` : Minutes (value range: 00…59) • `ss` : Seconds (value range: 00…59) **NOTE! The numerical field for seconds (ss) cannot be edited!**
Analogue value		Input of an analogue output value Value range (per numeric field): 0…9

Operation (using the numeric field “Date” as an example):

▶ Use the navigation button [▲] / [▼] to select the date control element.

▷ The focus (= orange frame) is on the selected date control element.

▷ The date control element displays the current date.



▶ Use the [Select] function key to start editing mode.

▷ The focus (= orange frame) is on the right element



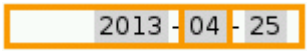
▶ Use the navigation button [▲] / [▼] to set the required value step by step.

▷ The segment displays the new value.

▶ Optional: Large value ranges can be bridged quickly by pressing and holding the ▲ / ▼ arrow key.

▶ Use the navigation button [◀] / [▶] to select the segment to be edited.

▷ The focus (= orange frame) moves to the selected segment



▶ Optional: Repeat the steps until all segments have the required value.

▶ Use the [Select] function key to accept the set values and exit edit mode.

OR:

▶ Use the [Back] function key to reset the values already set and exit edit mode.

▷ The date control element displays the valid date

The set value will not always become effective immediately. The change often has to be confirmed separately (e.g. with the [Accept selection] button).

7.5.2.8 Binary field

The binary field allows the operator to change a digital value bit-wise.

Example:



Display of the 4-bit digital value:

- Binary representation
  - : Bit is on (= `1`).
  - : Bit is off (= `0`).
- Hexadecimal representation: `0xf` = 1111

Operation:

▶ Use the navigation button [▲] / [▼] to select the binary field.

▷ The focus (= orange frame) is on the selected binary field.

▷ The control element shows the current value (digital and hexadecimal).

▶ Use the navigation button [◀] / [▶] to select the segment to be edited.

▷ The focus (= orange frame) is on the selected segment.

▶ Use the [Select] function key to start editing mode.

▷ The focus (= orange frame) is on the right segment

▶ Use the navigation button [▲] / [▼] to set the required value.

▷ The control element shows the new value in digital and hexadecimal format.

▶ Optional: Repeat the steps until all segments have the required value.

▶ Use the [Select] function key to accept the set values and exit edit mode.

OR:

▶ Use the [Back] function key to reset the values already set and exit edit mode.

▷ The binary field displays the current value (binary and hexadecimal).

7.6 Web interface of the device

The device has an integrated web server The web server generates a graphical user interface (web HMI) that allows remote access to the device via a web browser. This allows the operator to conveniently configure and monitor the device in continuous operation via an Ethernet network.

The web interface is accessed via the Ethernet interfaces X3 and X8.

7.6.1 General notices

The operating concept of the web interface follows the same philosophy as the operating concept of the graphical user interface of the local display. The web interface uses the same menu structure and the same menu elements and icons as the graphical user interface of the local display.

7.6.2 Supported browsers

To display the web interface correctly, use one of the following Internet browsers:

- Microsoft Internet Explorer (version 8.0 or higher)
- Mozilla Firefox (version 3.5 or higher)
- Google Chrome
- Microsoft Edge (Chromium – Chrome-based)

7.6.3 Notes on operation

7.6.3.1 Calling up the web interface

To access the web interface of the device:

Requirements:

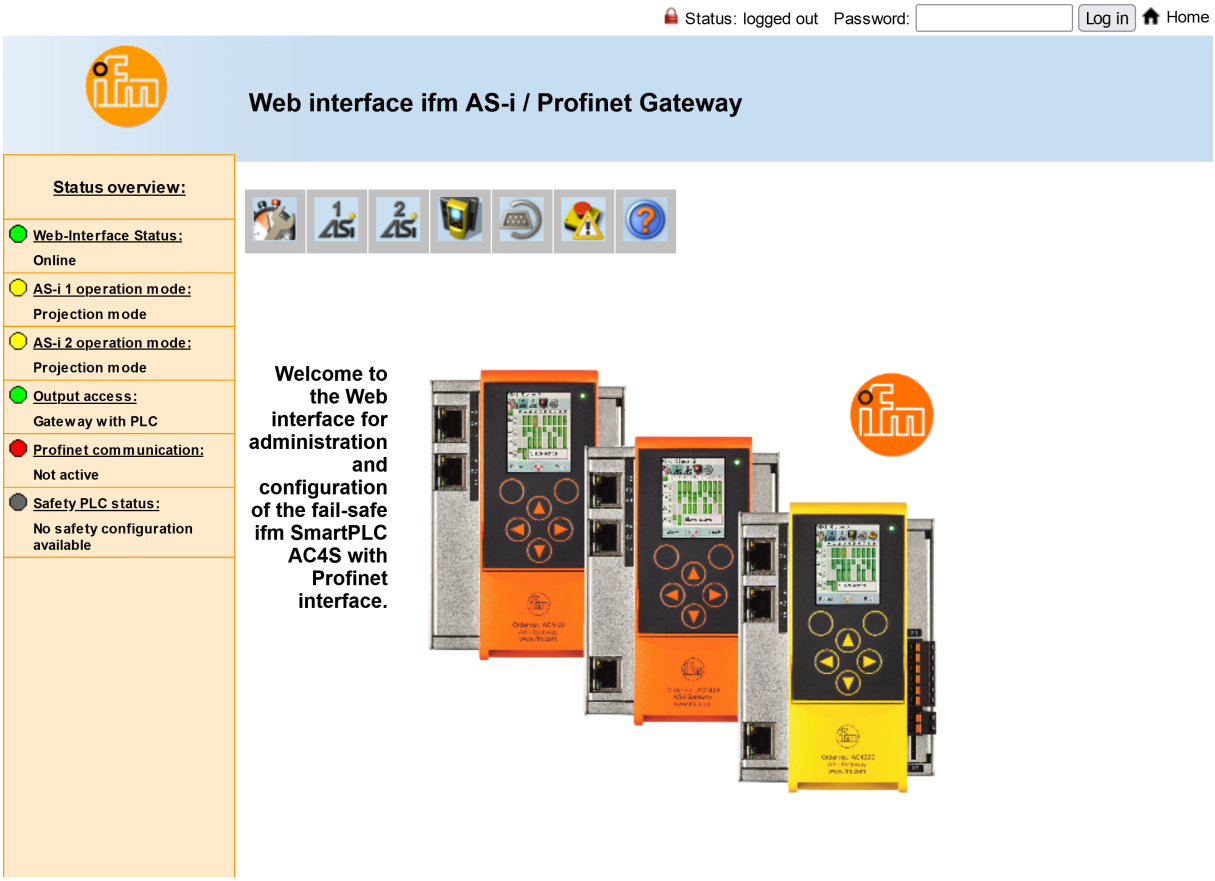
✓ the PC / laptop is connected to the device via Ethernet.

▶ start the web browser.

▶ Enter the IP address of the device in the address line (e.g. `192.168.82.2`).

▷ The web browser shows the start page of the web interface.

Overview



7.6.3.2 Navigating the web interface

On the web interface, the pointing device (e.g. PC mouse, touchpad) replaces the following button functions:

- Navigation function of the navigation keys [▲], [▼], [◀], [▶]
- Selection function of the [Select] and [Back]function buttons

Example: Call up the menu  > 

▶ Position the cursor on the  icon in the main navigation bar.

▷ Focus shifts to the  icon.

▷ The subnavigation bar 1 appears.

▷ The navigation path shows the current position in the menu: [AS-i 1]

▶ In the subnavigation bar 1, position the cursor on the  icon.

▷ Focus shifts to the  icon.

▷ Navigation path shows current position in the menu: [AS-i 1] > [Diagnostics]

▶ Click on the  icon.

▷ The web browser shows the [Diagnostics] menu page

7.6.3.3 Using password protection

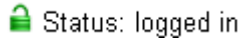
The web interface has password protection to prevent unwanted or unauthorised changes to the device settings via the web interface.

The default password is: CAFE

The password protection cannot be deactivated.

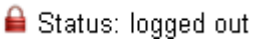
The password can be changed: Changing the password (→ 86)

When the web interface is called up, a status bar in the upper area shows whether the user is logged in or logged out:



The operator is logged in:

- Full access to device settings
- Full access to diagnostics and information data



The operator is logged out:

- No access to device settings
- Full access to diagnostics and information data

Logging in to the web interface

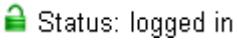
Requirements:

✓ The operator is not logged in to the web interface.

▶ Enter the password in the [Password] field.

▶ Click on the [Log in] button.

▷ The operator is logged in to the web interface.

▷ The status bar displays the changed status: 

▷ The operator has unlimited access to all menus and functions of the web interface.

The operator remains logged in to the web interface even after the following actions:

- restart of the web browser
- restart of the PC / laptop
- restart of the device

To prevent unauthorised access to the device settings:

▶ Log out of the device's web interface before closing the web browser.

▶ Deactivate the password saving function of the web browser before accessing the web interface.

▶ If the password saving function of the web browser is not deactivated: Delete the passwords stored in your browser settings.

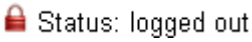
Logging out of the web interface

Requirements:

✓ The operator is logged in to the web interface.

▶ Click on the [Logout] button.

▷ The operator is logged out of the web interface.

▷ The status bar displays the changed status: 

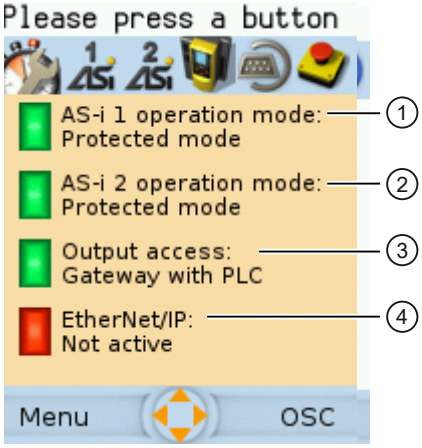
▷ The operator can only access menus with diagnostic and information data in the web interface.

▷ An error message appears when the operator calls up a menu with device settings in the web interface.

8 Menu

8.1 Start screen

When starting the device, the start screen of the graphical user interface appears. The start screen displays the status information of important system components. The user can access the menu functions of the device via the start screen.



1: Operating mode AS-i master 1
2: Operating mode AS-i master 2
3: Control instance of the AS-i slave outputs
4: Status of the EtherNet/IP connection

Requirements.

✓ Basic settings after first set-up or firmware update are active.

▶ Connect the device to the voltage supply.

▷ The display shows the start screen.

▶ Press the [Menu] function key to switch to the menu view.

OR

▶ Press the [OSC] function key to switch to the Online Support Centre.

8.2 Menu functions

The menu icons in the main navigation bar provide access to the following functions:

Icon	Description / functions
	Access to the most important device functions
	Configuration and diagnostics of the AS-i 1 network (AS-i master, AS-i slaves)
	Configuration and diagnostics of the AS-i 2 network (AS-i master, AS-i slaves)
	Configuration and diagnostics of the gateway, control of the CODESYS PLC
	Configuration and diagnostics of the interfaces (, Ethernet)
	Status and switching states of the fail-safe AS-i slaves and local devices, status of the safe connections
	Online Support Center [1]

[1] Menu only available via the web interface of the device

8.3 Quick setup

Navigation path	Functions
	Quick setup: project AS-i networks (→ 🗋 55) Quick setup: Setting the operating mode of the AS-i masters (→ 🗋 55) Quick setup: Setting the control instance for the outputs (→ 🗋 56) Quick setup: Accessing the device via the QR code (→ 🗋 56) Quick setup: Setting the EtherNet/IP interface parameters (→ 🗋 57) Quick setup: Setting the configuration mode of the EtherNet/IP interface (→ 🗋 58) Quick setup: setting the device number (→ 🗋 58) Quick setup: setting the X3 Ethernet interface (→ 🗋 59) Quick setup: setting the X8 Ethernet interface (→ 🗋 60) Quick setup: addressing the AS-i slaves connected to the AS-i master 1 (→ 🗋 61) Quick setup: addressing the AS-i slaves connected to the AS-i master 2 (→ 🗋 61)

8.3.1 Quick setup: project AS-i networks

Function available: display, web interface

During projection adaptation, the AS-i master carries out the following actions:

- The configuration data of all detected AS-i slaves (LDS) is saved
- The detected AS-i slaves are added to the list of projected slaves (LPS)

Available parameters:

Name	Description	Value range
[AS-i Master 1]	Select AS-i master 1 for projection adaptation	• ☐: Do not project AS-i master 1 • ☑: Project AS-i Master 1
[AS-i Master 2]	Select AS-i master 2 for projection adaptation	• ☐: Do not project AS-i master 2 • ☑: Project AS-i Master 2

During a projection adaptation, all output parameters of the AS-i slaves that are not connected are set to their default value (single/A slaves: 0xF, B slaves: 0x7).

Requirements:

✓ AS-i slaves are connected to AS-i masters.

▶ 

▶ Select the [Config. all] tab.

▷ The menu page for the projection adaptation appears.

▶ Select the AS-i masters on which a projection adaptation is to be executed.

▶ Click on [Start projection process].

▷ The selected AS-i masters switch to the “projection mode” operating mode.

▷ A projection process is carried out on the selected AS-i masters.

▷ When the projection process was successful, the AS-i masters switch to the “protected mode” operating mode.

8.3.2 Quick setup: Setting the operating mode of the AS-i masters

Function available: display, web interface

In the “protected mode” operating mode, the AS-i master operates in normal mode.

In the “projection mode” operating mode, the AS-i slaves connected to the AS-i master can be addressed and configured.

Available parameters:

Name	Description	Value range
[Projection mode]	Operating mode of the AS-i master	• ☐: Protected mode (normal operation) • ☑: Projection mode
[No slave reset]	Behaviour of the AS-i slaves when the operating mode changes ‘projected mode’ >> ‘protected mode’	• ☐: AS-i slaves are reset (reset or offline phase) • ☑: AS-i slaves continue to work without interruption

▶ 

▶ Select the [Operation modes] tab.

▷ The menu page for selecting the operating mode appears.

▶ For AS-i master 1, select the required operating mode and the behaviour of the AS-i slaves.

▶ Click on [Accept].

▷ AS-i master 1 changes to the selected operating mode.

▶ For AS-i master 2, select the required operating mode and the behaviour of the AS-i slaves.

▶ Click on [Accept].

▷ AS-i master 2 changes to the selected operating mode.

8.3.3 Quick setup: Setting the control instance for the outputs

Function available: display, web interface

Only one control instance at a time can have write access to the outputs of the connected AS-i slaves. The user must select this control instance.

Available parameters:

Parameter	Description	Value range
[Output control]	Control instance of the AS-i slave outputs	• [Gateway]: The PLC of a higher control level controls the outputs. • [Manually]: The operator on LocalHMI or WebHMI controls the outputs. • [PLC]: The device’s internal soft PLC controls the outputs.

▶ 

▶ Select the [Operation modes] tab.

▷ The menu page shows the current settings.

▶ Select the control instance of the AS-i slave outputs.

▶ Click on [Accept].

▷ The selected instance controls the outputs of the AS-i slaves.

8.3.4 Quick setup: Accessing the device via the QR code

Function available: Display

Using the QR code, the operator can access the web interface of the device using a smartphone / tablet PC.

Requirements:

✓ The device is connected to a WiFi-capable router with switch functionality.

✓ The smartphone / tablet PC is connected to the WiFi-enabled router.

✓ The smartphone / tablet PC has a camera function.

✓ An app for reading QR codes is installed on the smartphone / tablet PC.

▶ 

▶ Select the [QR code] tab.

▷ The menu page shows the QR code.

▶ Scan the QR code with your smartphone / tablet PC.

▷ The smartphone / tablet PC shows the web interface of the device (→ Web interface of the device 🗋 49).

8.3.5 Quick setup: Setting the EtherNet/IP interface parameters

Available parameters:

Parameter	Description	Value range
[IP mode]	Configuration mode	• Static: manual configuration • DHCP: automatic configuration via DHCP • BOOTP: automatic configuration via BOOTP
[IP address]	IP address of the EtherNet/IP interface	e.g. 192.168.10.100
[Subnet mask]	Subnet mask of the network segment	e.g. 255.255.255.0
[Gateway address]	IP address of the network gateway	e.g. 192.168.10.1

To configure the IP parameters of the EtherNet/IP interface:

▶ 

▶ Select the [Ethernet/IP] tab.

▷ The menu page shows the current IP settings of the interface.

To configure the IP parameters manually:

▶ For [IP mode], select the value “Static”.

▷ The following input fields can be edited: IP address, subnet mask and gateway address.

▶ Set the IP parameters.

▶ Click on [Accept].

▷ The device saves the changed parameter values.

▷ The menu page shows the current IP settings of the interface.

To configure the IP parameters automatically:

The automatic configuration of the interface takes approx. 10 seconds.

Requirements:

✓ The device is connected to a DHCP or BOOTP server via the fieldbus interface X6 / X7.

▶ For [IP mode], select the DHCP or BOOTP value.

▶ Click on [Accept].

▷ The device attempts to obtain the IP parameters from a DHCP or a BOOTP server in the network.

▷ The menu page shows the changed interface settings.

8.3.6 Quick setup: Setting the configuration mode of the EtherNet/IP interface

Function available: display, web interface

The EtherNet/P interface can be configured in 2 different ways:

- Top-Down mode:

  The device-specific parameters and the module configuration are set via the projection software of the EtherNet/IP controller.

- Independent mode:

  The parameters of the EtherNet/IP interface are set via the graphical user interface of the device.

Available parameters:

Name	Description	Value range
[Configuration mode]	Configuration mode of the EtherNet/IP interface	• Top-Down: The device-specific parameters and the module configuration are set via the projection software of the EtherNet/IP controller. • Independent: The parameters of the EtherNet/IP interface are set via the graphical user interface of the device.

▶ 

▶ Select the [EtherNet/IP] tab.

▷ The menu page shows the currently set configuration mode of the EtherNet/IP interface.

▶ Set the configuration mode.

▶ Click on [Accept].

▷ The configuration mode of the EtherNet/IP interface is set.

8.3.7 Quick setup: setting the device number

Function available: Display

The device number can be used to address the device in 1:N communication with SafeNetVars. The device address is calculated from the base address n and the set device number (offset).

The 1:N communication is configured in the safety application in CODESYS (→ programming manual).

The system architect must ensure that the safety address is set correctly.

▶ Before set-up, check that the active safety address of the device is correct.

Available parameters:

Name	Description	Value range
[Device number SafeNetVars]	Offset to the base address for calculating the device address	0…50

To set the device number of the device:

Requirements:

✓ at least one 1:N communication is configured.

▶ 

▶ Select the [Device number SafeNetVars] tab.

▷ The menu page shows the current settings.

▶ Set the device number in the [Device number] field.

▶ Click on [Accept].

▷ The set device number is saved.

▶ Click on [Restart].

▷ The confirmation prompt appears.

▶ Click on [OK] to confirm the message.

▷ The device restarts.

8.3.8 Quick setup: setting the X3 Ethernet interface

The device is integrated into Ethernet networks via the X3 Ethernet interface (e.g. access to the programming interface of the CODESYS PLC).

The IP parameters of the interface can be set manually or automatically via Dynamic Host Configuration Protocol (DHCP). If the configuration via DHCP fails, the device automatically generates the IP parameters via Zero Configuration Networking (Zeroconf).

Available parameters:

Parameter	Description	Value range
[Obtain an IP address automatically]	Configuration method for IP parameters	•  : Manual configuration •  : Automatic configuration
[IP status]	Configuration protocol currently in use	• [Static]: Manual configuration • [DHCP]: Automatic configuration via DHCP • [Zeroconf]: Automatic configuration via Zeroconf
[IP address]	IP address of the interface	e.g. 192.168.0.100
[Subnet mask]	Subnet mask of the network segment	e.g. 255.255.255.0
[Gateway address]	IP address of the network gateway	e.g. 192.168.0.1

Configure the IP parameters automatically:

Requirements:

✓ The device is connected to the DHCP server via X3 Ethernet interface.

▶ 

▶ Select the [Config. interface X3] tab.

▷ The menu page shows the current settings of the X3 Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▶ Click on [Accept].

▷ The device tries to obtain the IP parameters from a DHCP server in the network.

▷ If the configuration via DHCP server fails, the device generates the IP parameters via the Zeroconf protocol.

▷ The menu page shows the changed settings.



The automatic configuration of the interface takes approx. 10 seconds.

Configuring the IP parameters manually:

▶ 

▶ Select the [Config. interface X3] tab.

▷ The menu page shows the current settings of the X3 Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▷ The input fields [IP address], [Subnet mask] and [Gateway address] can be edited.

▶ Set the IP parameters.

▶ Click on [Accept].

▷ The device saves the changed parameter values.

▷ The menu page shows the current settings.

8.3.9 Quick setup: setting the X8 Ethernet interface

The device is integrated into Ethernet networks via the X8 Ethernet interface (e.g. access to the programming interface of the CODESYS PLC).

The IP parameters of the interface can be set manually or automatically via Dynamic Host Configuration Protocol (DHCP). If the configuration via DHCP fails, the device automatically generates the IP parameters via Zero Configuration Networking (Zeroconf).

Available parameters:

Parameter	Description	Value range
[Obtain an IP address automatically]	Configuration method for IP parameters	•  : Manual configuration •  : Automatic configuration
[IP status]	Configuration protocol currently in use	• [Static]: Manual configuration • [DHCP]: Automatic configuration via DHCP • [Zeroconf]: Automatic configuration via Zeroconf
[IP address]	IP address of the interface	e.g. 192.168.0.100
[Subnet mask]	Subnet mask of the network segment	e.g. 255.255.255.0
[Gateway address]	IP address of the network gateway	e.g. 192.168.0.1

Configure the IP parameters automatically:

Requirements:

✓ The device is connected to the DHCP server via the X8 Ethernet interface.

▶ 

▶ Select the [Config. Interface X8] tab.

▷ The menu page shows the current settings of the X8 Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▶ Click on [Accept].

▷ The device tries to obtain the IP parameters from a DHCP server in the network.

▷ If the configuration via DHCP server fails, the device generates the IP parameters via the Zeroconf protocol.

▷ The menu page shows the current settings.

The automatic configuration of the interface takes approx. 10 seconds.

Configuring the IP parameters manually:

▶ 

▶ Select the [Config. Interface X8] tab.

▷ The menu page shows the current settings of the X8 Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▷ The input fields [IP address], [Subnet mask] and [Gateway address] can be edited.

▶ Set the IP parameters.

▶ Click on [Accept].

▷ The device saves the changed parameter values.

▷ The menu page shows the current settings.

8.3.10 Quick setup: addressing the AS-i slaves connected to the AS-i master 1

Requirements:

✓ The AS-i slaves are connected to the AS-i master 1.

▶ 

▶ Select the [Addressing AS-i 1] tab.

▷ The menu page shows a view with the current addressing and status of the AS-i slaves on the AS-i master 1. Notes on the colour codes: View: Slave status (→ 🗋 44)

▶ Select the AS-i slave whose address is to be changed. (→ Slave selector 🗋 43).

▶ Click on [Select] to activate the selected AS-i slave.

▷ The menu page provides an overview of the free AS-i slave addresses. Note on the colour codes: View: Free slave addresses (→ 🗋 45)

▶ Select the address to be assigned to the AS-i slave.

▶ Click on [Select] to assign the selected address to the AS-i slave.

▷ Safety warning appears.

▶ Click on [OK] to confirm the warning.

▷ The AS-i master assigns the selected address to the AS-i slave.

▷ The menu page shows a view with the changed addressing.

▷ The menu page shows configuration errors because the current configuration does not match the saved configuration.

▶ Carry out a projection adaptation (→ Quick setup: project AS-i networks 🗋 55).

▷ The AS-i network is projected.

8.3.11 Quick setup: addressing the AS-i slaves connected to the AS-i master 2

Requirements:

✓ AS-i slaves are connected to AS-i Master 2.

▶ 

▶ Select the [Addressing AS-i 2] tab.

▷ The menu page shows a view with the current addressing and the status of the AS-i slaves on the AS-i master 2. Notes on the colour codes: View: Slave status (→ 🗋 44)

▶ Select the AS-i slave whose address is to be changed. (→ Slave selector 🗋 43).

▶ Click on [Select] to activate the selected AS-i slave.

▷ The menu page provides an overview of the free AS-i slave addresses. Note on the colour codes: View: Free slave addresses (→ 🗋 45)

▶ Select the address to be assigned to the AS-i slave.

▶ Click on [Select] to assign the selected address to the AS-i slave.

▷ Safety warning appears.

▶ Click on [OK] to confirm the warning.

▷ The AS-i master assigns the selected address to the AS-i slave.

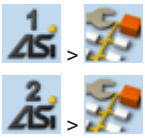
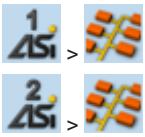
▷ The menu page shows a view with the changed addressing.

▷ The menu page shows configuration errors because the current configuration does not match the saved configuration.

▶ Carry out a projection adaptation (→ Quick setup: project AS-i networks 🗋 55).

▷ The AS-i network is projected.

8.4 AS-i 1 / AS-i 2 network

Navigation path	Functions
	AS-i master settings Setting the operating mode of the AS-i master (→ 🗋 64) Carrying out a projection adaptation (→ 🗋 64) Setting the monitoring functions of the AS-i master (→ 🗋 64)
	AS-i network diagnostics Display and reset the error counters (→ 🗋 65) Displaying the error statistics of the AS-i slaves (→ 🗋 65) Displaying the status of the power supply (→ 🗋 66) Displaying and resetting performance data (→ 🗋 66)
	AS-i slave settings Displaying the process data of an AS-i slave (→ 🗋 67) Changing the digital output values manually (→ 🗋 69) Changing the analogue output data manually (→ 🗋 69) Displaying AS-i slave information (→ 🗋 70) Change the address of an AS-i slave (→ 🗋 70) Changing the parameter output of an AS-i slave (→ 🗋 71) Changing the extended ID1 of an AS-i slave (→ 🗋 71)

8.4.1 Settings

8.4.1.1 Setting the operating mode of the AS-i master

Available parameters:

Parameter	Description	Value range
[Projection mode]	Active operating mode of the AS-i master	• ☐: Protected mode (normal operation) • ☑: Projection mode
[No slave reset]	Behaviour of the AS-i slaves when the operating mode changes “Projection mode” >> “Protected mode”	• ☐: AS-i slaves are reset (reset or offline phase) • ☑: AS-i slaves continue to work without interruption

To set the operating mode of the AS-i master:

▶  >  or  > 

▷ The menu page shows the current settings of the AS-i master.

▶ Set the [Projection mode] parameter.

▶ Set the [No slave reset] parameter

▷ The set values are active.

8.4.1.2 Carrying out a projection adaptation

During the projection adaptation, the AS-i master stores the configurations of the AS-i slaves currently detected in the AS-i network in its memory In addition, the AS-i master assigns a valid address to each detected AS-i slave.

During the projection adaptation, all parameter outputs of the AS-i slaves that are not connected are reset to their default value (single/A slaves: 0xF, B slaves: 0x7) in the AS-i master.

Requirements:

✓ The “Projection mode” operating mode is enabled (→ Setting the operating mode of the AS-i master 64).

▶  >  or  > 

▷ The menu page shows the current settings of the AS-i master.

▶ Click on [Start projection adaptation].

▷ The AS-i master performs the projection adaptation.

▷ All AS-i slaves on the AS-i network are projected.

8.4.1.3 Setting the monitoring functions of the AS-i master

The device offers various monitoring and service functions.

Available parameters:

Parameter	Description	Value range
[Automatic addressing]	Automatic addressing when replacing AS-i slaves	• ☐: no automatic addressing • ☑: automatic addressing is enabled
[Earth fault detection]	Detection of earth faults	• ☐: no detection of earth faults in the AS-i network • ☑: detection of earth faults in the AS-i network

Parameter	Description	Value range
[Double address recognition]	Detection of double addressing	• ☐: no detection of AS-i slaves with the same address • ☑: detection of AS-i slaves with the same address

To set the monitoring functions of the AS-i master:

▶  >  or  > 

▷ The menu page shows the current settings of the AS-i master.

▶ Set the [Automatic addressing] parameter.

▶ Set the [Earth fault detection] parameter.

▶ Set the [Double address detection] parameter.

▷ The set values are active.

8.4.2 Diagnostics

8.4.2.1 Display and reset the error counters

Available information:

Name	Description
Telegrams	Number of telegram errors that occurred
Configuration	Number of configuration errors that occurred
Voltage < 22.5V	Number of voltage errors “voltage < 22.5 V”
Voltage < 19.0V	Number of voltage errors “voltage < 19.0 V”
Earth faults	Number of detected earth faults

▶  >  or  > 

▶ Select the [Error counters] tab.

▷ The menu page shows the error counters.

▶ Optional: Click on [Reset].

▷ All error counters are reset to 0.

8.4.2.2 Displaying the error statistics of the AS-i slaves

Available information:

Name	Description
[Address]	Address of the AS-i slave
[S/A]	Number of errors of the single/A-slave at this address.
[B]	Number of errors of the B slave at this address

▶  >  or  > 

▶ Select the [Errors / slave] tab.

▷ Menu page shows error statistics for all AS-i slaves.

8.4.2.3 Displaying the status of the power supply

Available information:

Name	Description	Value range
[Power supply]	Method of voltage supply	• Aux: The device is supplied separately by the AS-i network and AUX 24 V • AS-i: The device is supplied by the AS-i network. • Power 24: The device is supplied via data decoupling module.
[AS-i voltage]	Current AS-i voltage (in volts)	e.g. 30.3 V
[DC earth fault]	Evaluation of the network symmetry	• : AS-i network is symmetrical • : AS-i network is asymmetrical • : AS-i network has earth fault
		Graphical display of the network symmetry: 

Requirements:

✓ The device is connected electrically.

▶ > or >

▶ Select the [Power supply] tab.

▷ The page shows the status of the power supply to the AS-i master.

8.4.2.4 Displaying and resetting performance data

The AS-i master supplies the performance data of the connected AS-i slaves in the network.

Available information:

Name	Description
[Active AS-i slaves]	Number of active AS-i slaves on the AS-i network
[AS-i cycle time [ms]] • [minimum] • [maximum] • [current]	AS-i cycle time (value in ms) Shortest measured cycle time Longest measured cycle time Current cycle time

Requirements:

✓ The AS-i network is projected.

▶ > or >

▶ Select the [Performance] tab.

▷ Page shows performance data.

▶ Optional: Click on the [Reset] button.

▷ The saved statistic data for minimum and maximum cycle times are deleted.

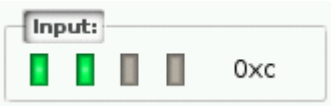
8.4.3 AS-i slaves

8.4.3.1 Displaying the process data of an AS-i slave

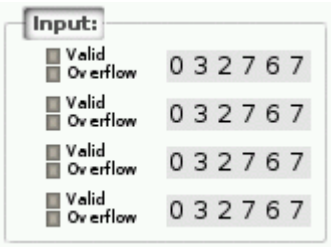
The user can display the process data of the selected AS-i slave via the menu page. The displayed process data corresponds to the type of AS-i slave.

Available information:

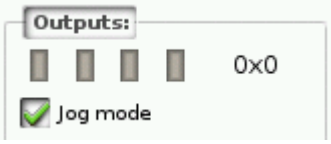
Digital input data

Name	Description	Value range
[Inputs]	Current values of the digital inputs (binary and hexadecimal representation)	 • : Data bit is switched off (0 / OFF) • : Data bit is switched on (1 / ON)

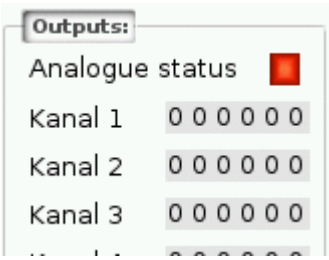
Analogue input data

Name	Description	Value range
[Inputs]	Current values of the analogue input channels and information about their status	
• [Valid]	The Valid bit indicates whether the displayed value is valid.	• : Invalid value • : Valid value
• [Overflow]	The Overflow bit indicates whether the displayed value is within the value range.	• : Value within valid value range • : Valid value range exceeded

Digital output data

Name	Description	Value range
[Outputs]	Current values of the digital outputs (binary and hexadecimal representation)	 • : data bit is switched off (`0` / OFF) • : Data bit is switched on (`1` / ON)
• [Jog mode]	The parameter controls the behaviour of the outputs in the event of a changed output value.	• : Jog mode disabled (“switch mode”); The changes do not affect the output until you quit the editing mode. • : Jog mode enabled (“momentary switch mode”) The changes immediately affect the output.

Analogue output data

Name	Description	Value range
[Outputs]	Current values of the analogue output channels and information about their status	
• [Analogue status]	Current status of the analogue outputs	• : Invalid value • : Valid value
• [Channel x]	Current value of the analogue output channel x (x: 1...n; n: number of channels per AS-i slave)	per digit: • 0…9

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

▶  > or >

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Data] tab.

▷ The page shows the process data of the AS-i slave.

8.4.3.2 Displaying the parameter input of an AS-i slave

The parameter input shows the configured parameter image of an AS-i slave.

Available information:

Name	Description	Value range
[Parameter input]	Current value of the parameter input (binary and hexadecimal representation)	 • : Data bit is switched off (0 / OFF) • : Data bit is switched on (1 / ON)

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

▶  > or >

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Data] tab.

▷ The [Parameter input] group shows the configured parameter image of the AS-i slave.

8.4.3.3 Changing the digital output values manually

WARNING

Manual changes to the initial values

▷ Unwanted behaviour of the application

▷ Material damage to the machine / system

▷ Possible personal injury

▶ Secure the concerned area.

▶ Only use trained personnel to manually change the outputs.

If jog mode is disabled, slave outputs remain in the new state.

▶ After completing the test, restore the outputs to their original state.

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

✓ The [Output access] parameter is set to [Manual].

▶  >  or  > 

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Outputs] tab.

▷ The page shows the current value of the digital output.

▶ Set the [Jog mode] parameter.

▶ Change the digital output value digit by digit (→ Binary field 🗋 47).

▷ The set value is output.

8.4.3.4 Changing the analogue output data manually

WARNING

Manual changes to the initial values

▷ Unwanted behaviour of the application

▷ Material damage to the machine / system

▷ Possible personal injury

▶ Secure the concerned area.

▶ Only use trained personnel to manually change the outputs.

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

✓ The [Output access] parameter is set to [Manual].

▶  > or >

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Outputs] tab.

▷ The page shows the current values of the analogue output channels.

▶ Change the analogue value of the output channel digit by digit (→ Numerical field 🗋 47).

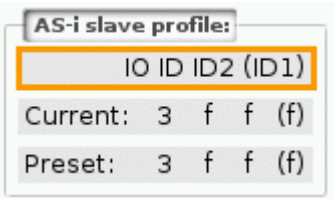
▷ The set value is output.

▶ Optional: Repeat this step to change the value of other channels.

8.4.3.5 Displaying AS-i slave information

The user can display status information of an AS-i slave.

Available information:

Name	Description	Value range
[Slave address]	Address of the AS-i slave	E.g. `13B`
[Status of the slave]	Status of the AS-i slave	• : AS-i slave enabled • : AS-i slave missing • : not projected • : double address error • : Peripheral fault
[AS-i slave profile]	Recognised (= actual) and expected (= target) AS-i slave profile (value in hexadecimal representation)	

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

▶  > or >

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Information] tab.

▷ The page shows status information of the AS-i slave.

8.4.3.6 Change the address of an AS-i slave

Function available: display, web interface

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

▶  >  or  > 

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Settings] tab.

▶ Click on [Change AS-i slave address].

▷ The menu page shows overview of free addresses. Notes on colour codes: View: Free slave addresses (→ 🗋 45)

▶ Select the address to be assigned to the AS-i slave.

▶ Click on [Select] to assign the selected address to the AS-i slave.

▷ Safety warning appears.

▶ Click on [OK] to confirm the warning.

▷ The AS-i master assigns the selected address to the AS-i slave.

▷ The menu page shows a view with the changed addressing.

▷ The menu page shows configuration errors because the current configuration does not match the saved configuration.

▶ Carry out a projection adaptation (→ Carrying out a projection adaptation 🗋 64).

8.4.3.7 Changing the parameter output of an AS-i slave

The parameter output shows the parameter image of an AS-i slave stored in the AS-i master.

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

✓ The [Output access] parameter is set to [Manual].

▶  >  or  > 

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Settings] tab.

▷ The [Parameter output] group shows the parameter image of the AS-i slave currently stored in the AS-i master.

▶ Set the value of the parameter output digit by digit (→ Binary field 🗋 47).

▷ The parameter output is configured.

8.4.3.8 Changing the extended ID1 of an AS-i slave

Requirements:

✓ The AS-i network is projected.

✓ The AS-i slave is connected to the AS-i master.

▶  >  or  > 

▷ The slave selector appears.

▶ Select the AS-i slave (→ Slave selector 🗋 43).

▷ Detailed view of the selected AS-i slave appears.

▶ Select the [Settings] tab.

▷ The [ID 1] list shows the currently set extended ID1 of the AS-i slave.

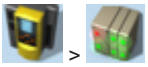
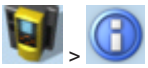
▶ Set the [ID 1] parameter.

▷ The extended ID1 of the AS-i slave is configured.

▷ The AS-i master shows the “Wrong profile” error. Notes on colour codes: View: Slave status (→ 🗋 44)

▶ Carry out a projection adaptation (→ Carrying out a projection adaptation 🗋 64).

8.5 System

Navigation path	Functions
	Internal PLC System: PLC (→ 🗋 74)
	System information Displaying identification information (→ 🗋 79) Displaying host names (→ 🗋 79) Displaying the device checksum (→ 🗋 79)
	System settings Configuring the output access (→ 🗋 80) Setting the host name (→ 🗋 80) Setting the device cycle (→ 🗋 81) Changing the menu language (→ 🗋 81) Setting the behaviour of the display (→ 🗋 82) Rebooting the system (→ 🗋 82) Saving the device configuration (→ 🗋 83) Restoring the device configuration (→ 🗋 84) Setting the system time (→ 🗋 85) Changing the password (→ 🗋 86)
	System diagnostics Displaying diagnostic data (→ 🗋 100) Storing the diagnostic protocol (→ 🗋 88) Saving the diagnostic package (→ 🗋 89)

8.5.1 System: PLC

Navigation path	Functions
	System information Display the status of the CODESYS PLC (→ 🗋 75) Displaying information about CODESYS projects (→ 🗋 75)
	System settings Controlling a single application (→ 🗋 76) Controlling all applications (→ 🗋 76)
	System diagnostics Displaying the memory usage (→ 🗋 78)

8.5.1.1 PLC: Information

Display the status of the CODESYS PLC

Function available: display, web interface

Available information:

Name	Description	Value range
Status LED	Status of the device-internal CODESYS PLC	• : The CODESYS PLC is inactive. • : The CODESYS PLC is active.
[Version]	CODESYS version	
[Node name]	Designation of the device node in the CODESYS project	E.g.

▶  >  > 

▶ Select the [Status] tab.

▷ The menu page shows status information of the CODESYS PLC.

Displaying information about CODESYS projects

Function available: display, web interface

Available information:

Name	Description
[Project]	Name of the CODESYS project
[Title]	Designation of the CODESYS project
[Version]	Version of the CODESYS project
[Author]	Author of the CODESYS project

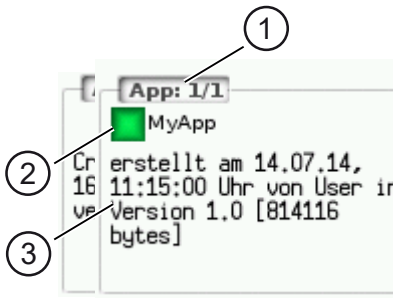
▶  >  > 

▶ Select the [Project] tab.

▷ The menu page shows information about the CODESYS project.

8.5.1.2 PLC: settings

Controlling a single application



1: App x/y
- x: number of the app displayed
- y: total number of apps stored

2: Status and name of the application
- : application has been stopped
- : application has been started

3: Information about the application (creation date, author, application version and size)

The following options are available to control an application stored on the device:

Name	Description
[Start]	• Start an application • Only available if the application is in STOP state
[Stop]	• Stop an application • Only available if the application is in the RUN state

To control an application:

▶ > >

▷ The menu page shows information on the saved application.

▶ Use [▼] to select the message field.

▷ The focus (orange frame) is on the message field.

▶ Use [▼] / [▲] to select the requested application.

To start an application:

▶ Click on [Start].

▶ Acknowledge the safety query.

▷ The application is started.

To stop an application:

▶ Click on [Stop].

▶ Acknowledge the safety query.

▷ The application is stopped.

Controlling all applications

The following options are available to control all applications stored on the device at the same time:

Name	Description
[Start all applications]	• Set all applications to the RUN state • Only available if at least one application is in STOP state
[Stop all applications]	• Set all applications to the STOP state • Only available if at least one application is in the RUN state
[Reset all applications]	Reset all applications

Available information:

Name	Description
[Total]	Number of applications stored on the device

Name	Description
[Started]	Number of applications running

To control all applications simultaneously:

▶  >  > 

▷ The menu page shows information on saved applications.

To start all applications:

▶ Click on [Start].

▶ Confirm security prompt.

▷ All applications are started.

To stop all applications:

▶ Click on [Stop].

▶ Confirm security prompt.

▷ All applications are stopped.

To reset all applications:

▶ Click on [Reset].

▶ Confirm security prompt.

▷ All applications are reset.

8.5.1.3 PLC: Diagnostics

Displaying the memory usage

The device provides information on the memory utilisation of the CODESYS application.

Available information:

Name	Description
[CODESYS]	Size of memory occupied by the CODESYS application (in kBytes)
[free]	Free memory (in kBytes)

To display the memory usage:

▶  >  > 

▶ Select the [Memory] tab.

▷ The menu page shows the status of the memory.

The current usage of memory space is read out once when calling up the menu page. Changes to the memory usage during the display of the menu page are not taken into account.

To update the displayed values:

▶ Exit the menu page  .

▶ Open the menu page  again.

▷ The menu page displays the current memory usage of the device.

8.5.2 System: Information

8.5.2.1 Displaying identification information

Function available: display, web interface

Available information:

Name	Description	Value range
[Model]	Article number of the device	• AC422S: AC422S • AC424S: AC424S
[Serial number]	Serial number of the device	E.g. 000000113034
[Build]	Software revision (firmware)	E.g.
[HW version]	Hardware revision	E.g. AA

To display the identification information:

▶  > 

▶ Select the [Version] tab.

▷ The menu page shows identification information.

8.5.2.2 Displaying host names

Function available: display, web interface

Available information:

Name	Description	Value range
[Host name]	Linux device name	• Default_host: no host name set

To display the set host name:

▶  > 

▷ The menu page shows the set device name.

8.5.2.3 Displaying the device checksum

If the password for the web interface is lost, ifm electronic can generate an activation code for the device. The device checksum is required to generate the password.

Available information:

Name	Description	Value range
[Device checksum]	Checksum of the device	E.g. 0C08CCD721

To display the device checksum:

▶  > 

▷ The menu page shows device checksum.

8.5.3 System: Settings

8.5.3.1 Configuring the output access

Function available: display, web interface

To prevent conflicts when accessing the outputs of the AS-i slaves, the user must define the control instance for the output access.

Available parameters:

Name	Description	Value range
[Output control]	Control instance of the AS-i slave outputs	• Gateway: A higher-level PLC controls the outputs of the AS-i slaves. • Manually: The operator controls the outputs of the AS-i slaves via the graphical user interface. • PLC: The device-internal PLC controls the outputs of the AS-i slaves.

The outputs of the safe AS-i slaves are always controlled by the safety PLC of the device.

When the [PLC] parameter value is selected, the device automatically activates the device's internal PLC.

▶  > 

▶ Select the [System settings] tab.

▷ The menu page shows current system settings.

▶ Select the control instance for output access.

▶ Click on [Accept selection].

▷ The selected instance controls the outputs of the AS-i slaves.

8.5.3.2 Setting the host name

Function available: Web interface

The system can be assigned a WINS host name under which the device can be reached in IP networks (e.g. `http://hostname`).

Observe the following rules when selecting the device name:

- All letters are automatically converted to lower case.
- Max. number of characters: 1 to 63
- Permitted characters
  - Letters a to z
  - Digits 0 to 9
  - Characters: `-` (hyphen)
- The device name must not begin with the character `-` (hyphen).

Available parameters:

Name	Description	Value range
[Host name]	Device Name	E.g. defaulthost (default value)

To set the device name:

▶  > 

▶ Select the [System settings] tab.

▷ The menu page shows current system settings.

▶ Enter the device name in the [Host name] field.

▶ Click on [Accept].

▷ Device name is set.

8.5.3.3 Setting the device cycle

The device cycle is the time interval in which the data is completely copied between the input and output data of the AS-i slaves and the fieldbus interface.

Function available: display, web interface

Available parameters:

Parameter	Description	Value range
[Device cycle]	Device cycle of the system	• [3.0 ms]: 3.0 milliseconds • [4.5 ms]: 4.5 milliseconds • [6.0 ms]: 6.0 milliseconds • [7.5 ms]: 7.5 milliseconds • [9.0 ms]: 9.0 milliseconds

Requirements:

✓ CODESYS PLC is enabled.

▶  > 

▶ Select the [System settings] tab.

▷ The menu page shows the currently set device cycle.

▶ Set the [Device cycle] parameter.

▶ Click on [Accept selection] .

▷ The selected device cycle is active.

8.5.3.4 Changing the menu language

Function available: display, web interface

The user interface texts are provided in different languages. The operator can set the required language.

Available parameters:

Parameter	Description	Value range
[Language]	Language in which the user interface texts are displayed	• [Deutsch]: German • [English]: English • [Français]: French • [Español]: Spanish • [Italiano]: Italian • [Português]: Portuguese

▶  > 

▶ Select the [System settings] tab.

▷ The menu page shows the set language.

▶ Select the required language from the [Language] list.

▶ Click on [Accept selection].

▷ Texts on the user interface are displayed in the selected language.

Optional: changing the language with a key combination

Function available: Display

Alternatively, the menu language can be changed using a key combination. The available languages are stored in an organised list (→ table above). Based on the active language, the following key combinations apply:

▶ Simultaneously click on [▶] and [▲] to select the previous language.

OR:

▶ Simultaneously click on [▶] and [▼] to select the following language.

▷ Texts on the user interface are displayed in the selected language.

The key combination allows you to change the language from any menu page.

8.5.3.5 Setting the behaviour of the display

The behaviour of the display during inactivity can be configured.

Available parameters:

Parameter	Description	Value range
[Screen saver]	Activate/deactivate screen saver	• ☐: screen saver deactivated • ☑: screen saver activated; The display is switched off after 10 minutes of inactivity.
[Fallback to start screen]	Behaviour of the display when the operator is inactive	• ☐: The current menu page remains open • ☑: The display switches to the start screen after 10 minutes without action

▶  > 

▶ Select the [System settings] tab.

▷ The menu page shows the current display behaviour settings.

▶ Set the [Screen saver] parameter.

▶ Set the [Fallback to start screen] parameter.

▷ Behaviour of the display during inactivity is configured.

8.5.3.6 Rebooting the system

Function available: Display

▶  > 

▶ Select the [System reset] tab.

▷ The menu page shows options for restarting the device.

▶ Click on [Restart].

▷ The confirmation prompt appears.

▶ Click on [OK] to confirm the message.

▷ The device restarts.

8.5.3.7 Saving the device configuration

Function available: Display

The device offers the option of saving the current device configuration. The saved device configuration can be restored on another, identical device (→ Restoring the device configuration 🗋 84).

The device configuration is saved on an SD card.

▶ Consider the supported SD card types: SD card slot (→ 🗋 12)

A device configuration consists of the following settings:

- System settings
- AS-i settings
- EtherNet/IP setup
- Standard application (incl. PLC task configuration, variables and data)
- Safety application (incl. safety PLC task configuration, variables and data)

The backup file is saved with the following naming convention:

`ifm_DevID_xxxxxxxxxxxx_YYYYMMDDhhmmss.iconf`

- `DevID`: Article number of the device
- `xxxxxxxxxxxx` Serial number of the device
- `YYYYMMDDhhmmss` Timestamp of the storage
  YYYY: Year, MM: Month, DD: Day, hh: Hours, mm: Minutes, ss: Seconds

ATTENTION

During the backup process, the control functions of the device are not available.

▷ Risk of undesired system behaviour

▶ Do not save the device configuration while the installation is running.

▶ Set the installation to a safe state before saving the device configuration.

ATTENTION

Interruption of the backup process

▷ Risk of data loss

▶ Do not disconnect the device from the power supply during the backup process.

▶ Only start the backup process after the boot application has been successfully created.

▶ Do not remove the SD card from the device before the backup process is complete.

▶  > 

▶ Select the [Configuration] tab.

▷ The menu page shows options for backing up the device configuration.

▶ Insert the SD card into the SD card slot on the device.

▶ Click on [Export configuration]

▷ The device saves the device configuration on the SD card.

8.5.3.8 Restoring the device configuration

ATTENTION

The device will restart during the recovery process.

During the recovery process, the control functions of the device are not available.

▷ Risk of undesired system behaviour

▶ Do not restore the device configuration while the installation is running.

▶ Set the installation to a safe state before restoring the device configuration.

ATTENTION

Interruption of the recovery process

▷ Risk of data loss

▶ Do not disconnect the device from the power supply during the recovery.

▶ Do not remove the SD card from the device before the recovery is complete.

A power interruption during a restore process can lead to inconsistent data on the device. A faulty recovery is not displayed in the OSC.

▶ Repeat the restore process.

▶ After restoring and restarting the device, check whether the import was successful.

It is only possible to restore a device configuration if the firmware of the device matches the firmware of the device from which the device configuration was saved in the major and minor version (e.g. V**3**.**2**.1). In addition, both devices must have the same article number.

▶ Only save the device configuration that you want to restore in the root directory of the SD card.

▶ Before restoring, check whether the required device configuration is saved on the SD card (→ Saving the device configuration 🗋 83).

Requirements:

✓ Firmware versions of the source and target device match in the main and secondary versions.

✓ The article numbers of the source and target devices are the same.

▶ Insert the SD card with the stored device configuration into the device's SD card slot.

▶ Disconnect the device from the power supply and reconnect it to the power supply.

▷ The device reboots.

▶  > 

▶ Select the [Configuration] tab.

▷ The menu page shows options for restoring device configurations.

▶ Click on [Import configuration].

▷ A warning appears.

▶ Click on [OK] to acknowledge the message.

▷ The device configuration is loaded from the SD card and stored on the device.

▷ The device reboots.

▷ The selected device configuration is restored.

8.5.3.9 Setting the system time

The system time consists of date and time. The system time can be set using the following methods:

- Manual setting: The operator sets the date and time manually.
- Synchronisation with the NTP server: The device has an NTP client for synchronising the system time with an NTP server.
- Transfer of the system time of a PC / laptop: The device can take over the system time of a PC / laptop.

Available parameters:

Parameter	Description	Value range
[Activate NTP]	Switch the device's NTP client on / off	• ☐: NTP synchronisation deactivated; manual setting of the system time • ☑: NTP synchronisation activated; the device takes the system time from an NTP server
Status LED	Status of the NTP synchronisation	• ■: NTP inactive – manually set system time applies • ■: NTP waiting – device in synchronisation phase • ■: NTP successful – synchronisation completed successfully
[Time]	Time of the system (format: `HH:MM:SS`)	e.g. 12:23:56
[Date]	Date of the system (format: `JJJJ-MM-TT`)	e.g. 2014-04-23
IP address field	IP address of NTP server	e.g. 192.168.0.100
[NTP offset]	Time zone of the NTP server in UTC (Universal Coordinated Time).	• [No offset]: System time is taken from NTP server without offset • [UTC -12:00]: Offset -12 h … • [UTC +12:00]: Offset +12 h

Setting the system time manually

Function available: display, web interface

▶  > 

▶ Select the [Clock] tab.

▷ The menu page shows the current system time setting.

▶ Deactivate the [Activate NTP] checkbox.

▷ The status LED is grey (NTP inactive).

▶ Set the [Time] parameter.

▶ Set the [Date] parameter.

▷ The set values are active.

The seconds value cannot be changed manually. When you exit edit mode, the seconds value is automatically set to 0.

Synchronising the system time with an NTP server

Function available: display, web interface

Requirements:

✓ The device is connected to the NTP server in the network via Ethernet interface.

▶  > 

▶ Select the [Clock] tab.

▶ The menu page shows the current system time setting.

▶ Activate the [Activate NTP] checkbox.

▷ The IP address field and the [NTP offset] list can be edited.

▶ Enter the IP address of the NTP server.

▶ Set the [NTP offset] parameter.

▶ Click on [Accept selection].

▷ Status LED lights up yellow (NTP waiting).

▷ NTP synchronisation starts.

▷ If successful: Status LED lights up green (NTP successful).

▷ System time has been successfully synchronised with NTP server.

Adopting the system time from PC / laptop

Function available: Web interface

Requirements:

✓ The device is connected to a PC / laptop via an Ethernet interface.

▶  > 

▶ Select the [Clock] tab.

▶ Deactivate the [Activate NTP] checkbox.

▷ The status LED lights up grey (NTP inactive).

▶ Click on [OK] in the group [Apply date and time from the PC].

▷ The device takes the date and time from the PC / laptop.

8.5.3.10 Changing the password

Function available: Web interface

The user can change the default password for protected access to the web interface.

- Permitted characters: ASCII character set
- Max. length: 64 characters

To change the password:

▶  > 

▶ Select the [Change password] tab.

▷ The menu page for changing the password appears.

▶ Enter your current password in the [Current password] field.

▶ Enter the new password in the [New Password] field.

▶ Enter the new password again in the [Confirm new password] field.

▶ Click on [OK].

▷ Your password has been changed successfully.

The new password is only valid the next time you log in to the web interface.

- ▶ Logging out of the web interface.
- ▶ Log in again with a changed password.

8.5.4 System: Diagnostics

8.5.4.1 Displaying system information

Function available: display, web interface

Available information:

Name	Description	Value range
[Operating time]	Operating time of system and components	All times in the format `JJ-TTT-SS-MM`: • [YY]: years • [DDD]: days • [HH]: hours • [MM]: minutes
• [total]	Operating time of device	
• [current]	Operating time of device since last system start	
• [LCD]	Operating time of the display	
• [PLC]	Operating time of the CODESYS PLC	
[Temperature]	Temperature of the device	e.g. 47.3 °C (→ note)
[Power supply]	Voltage supply of device	• [Aux]: Voltage is supplied separately by AS-i network and AUX 24 V. • [AS-i]: Voltage is only supplied by the AS-i network. • [Power24]: Voltage is supplied by data decoupling module.

The device features temperature monitoring. The temperature monitoring continuously checks the system temperature of the device. The following temperature ranges apply:

- Lower critical range: ≤ -1.0°C
- Lower limit range: -0.9°C … 4°C
- Normal range: 4.1°C … 79.9°C
- Upper limit range: 80.0°C … 84.9°C
- Upper critical range: ≥ 85.0°C

If the system temperature reaches one of the critical ranges, a warning message appears in the Online Support Centre (OSC) (→ Online Support Center (OSC) 🗋 111). The warning message will not disappear until the system temperature returns to normal.

▶  > 

▶ Select the [System information] tab.

▷ The menu page shows the system information of the device.

8.5.4.2 Storing the diagnostic protocol

Function available: display, web interface

With the help of the diagnostic protocol, the user can archive the current system configuration or provide all relevant information for error analysis.

The diagnostic protocol contains the following information in the selected user language:

- AS-i configuration
- EtherNet/IP configuration
- System settings
- CODESYS information
- OSC history

To save the diagnostic protocol:

▶  > 

▶ Select the [Diagnostic protocol] tab.

▷ The menu page shows options for saving the diagnostic protocol.

▶ Click on [Generate diagnostic protocol].

▷ The device generates the diagnostic protocol.

▷ A dialogue window appears.

▶ Web interface: Select the file name and the memory location and click on [OK].

▶ Display: Insert the SD card into the SD card slot and click [OK].

▷ The diagnostic protocol is stored as an HTML file at the selected location.

8.5.4.3 Saving the diagnostic package

With the help of the diagnostic package, the user can provide all relevant information for in-depth fault analysis.

The diagnostic package provides the following information in the selected user language and in English:

- All information of the diagnostic protocol (→ Storing the diagnostic protocol 88)
- Diagnostic information on all system components
- Logs of the safety CPUs

The diagnostic package is provided as a ZIP file.

The creation of the diagnostic package can take up to 5 minutes.

▶ Wait until the diagnostic package has been created.

▶ When creating the diagnostic package via the web interface, do not refresh the menu page in the web browser.

To save the diagnostic package:

▶  > 

▶ Select the [Diagnostic protocol] tab.

▷ The menu page shows options for saving the diagnostic package.

▶ Click on [Generate diagnostic package] .

▷ Device generates the diagnostic package.

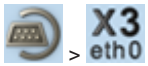
▷ A dialogue window appears.

▶ Web interface: Select the file name and the memory location and click on [OK].

▶ Display: Insert the SD card into the SD card slot and click on [OK].

▷ The diagnostic package is saved at the selected location.

8.6 Interfaces

Navigation path	Functions
	Ethernet interface X3 Configuring the IP parameters (→ 🗋 91) Displaying Ethernet information (→ 🗋 92) Enabling / disabling access to the web interface (→ 🗋 94)
	Ethernet interface X8 Configuring the IP parameters (→ 🗋 93) Displaying Ethernet information (→ 🗋 94) Enabling / disabling access to the web interface (→ 🗋 92)
	EtherNet/IP interface EtherNet/IP interface (→ 🗋 95)

8.6.1 Ethernet interface X3

8.6.1.1 Configuring the IP parameters

The IP parameters of the interface can be set manually or automatically via Dynamic Host Configuration Protocol (DHCP). If the configuration via DHCP fails, the device automatically generates the IP parameters via Zero Configuration Networking (Zeroconf).

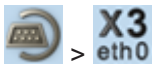
Available parameters:

Parameter	Description	Value range
[Obtain an IP address automatically]	Configuration method for IP parameters	• ☐: Manual configuration • ☑: Automatic configuration
[IP status]	Configuration protocol currently in use	• [Static]: Manual configuration • [DHCP]: Automatic configuration via DHCP • [Zeroconf]: Automatic configuration via Zeroconf
[IP address]	IP address of the interface	e.g. 192.168.0.100
[Subnet mask]	Subnet mask of the network segment	e.g. 255.255.255.0
[Gateway address]	IP address of the network gateway	e.g. 192.168.0.1

Configure the IP parameters automatically:

Requirements:

✓ The device is connected to the DHCP server via X3 Ethernet interface.

▶  > X3 eth0

▶ Select the [IP setup] tab.

▷ The menu page shows the current settings of the Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▶ Click on [Accept].

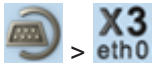
▷ The device tries to obtain the IP parameters from a DHCP server in the network.

▷ If the configuration via DHCP fails, the device automatically generates the IP parameters via Zero Configuration Networking (Zeroconf).

▷ The menu page shows the current settings.

The automatic configuration of the interface takes approx. 10 seconds.

Configuring the IP parameters manually:

▶  > X3 eth0

▶ Select the [IP setup] tab.

▷ The menu page shows the current settings of the Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▷ The input fields [IP address], [Subnet mask] and [Gateway address] can be edited.

▶ Set the IP parameters.

▶ Click on [Accept].

▷ The device saves the changed parameter values.

▷ The menu page shows the current settings.

8.6.1.2 Displaying Ethernet information

Available information:

Name	Description	Value range
[MAC ID]	MAC ID of the Ethernet interface	e.g. 00:02:01:03:74:F0

▶  > 

▶ Select the [Ethernet information] tab.

▷ The menu page shows the information about the Ethernet interface.

8.6.1.3 Enabling / disabling access to the web interface

The device offers the option of activating or deactivating access to the web interface.

Available parameters:

Name	Description	Value range
[Activate the web configuration]	Activate or deactivate access to the web interface via an Ethernet interface	•  : Deactivate access to the web interface •  : Activate access to the web interface

▶  > 

▶ Select the [Web] tab.

▷ The menu page shows the current settings.

▶ Set the [Activate the web configuration] parameter.

▶ Click on [Accept].

▷ Access to the web interface is set.

8.6.2 Ethernet interface X8

8.6.2.1 Configuring the IP parameters

The IP parameters of the interface can be set manually or automatically via Dynamic Host Configuration Protocol (DHCP). If the configuration via DHCP fails, the device automatically generates the IP parameters via Zero Configuration Networking (Zeroconf).

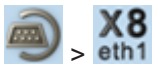
Available parameters:

Parameter	Description	Value range
[Obtain an IP address automatically]	Configuration method for IP parameters	• ☐: Manual configuration • ☑: Automatic configuration
[IP status]	Configuration protocol currently in use	• [Static]: Manual configuration • [DHCP]: Automatic configuration via DHCP • [Zeroconf]: Automatic configuration via Zeroconf
[IP address]	IP address of the interface	e.g. 192.168.0.100
[Subnet mask]	Subnet mask of the network segment	e.g. 255.255.255.0
[Gateway address]	IP address of the network gateway	e.g. 192.168.0.1

Configure the IP parameters automatically:

Requirements:

✓ The device is connected to the DHCP server via the X8 Ethernet interface.

▶  > X8 eth1

▶ Select the [IP setup] tab.

▷ The menu page shows the current settings of the Ethernet interface.

▶ Enable the [Obtain IP address autom.] parameter.

▶ Click on [Accept].

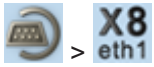
▷ The device tries to obtain the IP parameters from a DHCP server in the network.

▷ If the configuration via DHCP server fails, the device generates the IP parameters via the Zeroconf protocol.

▷ The menu page shows the changed settings.

The automatic configuration of the interface takes approx. 10 seconds.

Configuring the IP parameters manually:

▶  > X8 eth1

▶ Select the [IP setup] tab.

▷ The menu page shows the current settings of the Ethernet interface.

▶ Deactivate the [Obtain IP address autom.] parameter.

▶ Enable the [Obtain IP address autom.] parameter.

▷ The input fields [IP address], [Subnet mask] and [Gateway address] can be edited.

▶ Set the IP parameters.

▶ Click on [Accept].

▷ The device saves the changed parameter values.

▷ The menu page shows the current settings.

8.6.2.2 Displaying Ethernet information

Available information:

Name	Description	Value range
[MAC ID]	MAC ID of the Ethernet interface	e.g. 00:02:01:03:74:F0

▶  > X8 eth1

▶ Select the [Ethernet information] tab.

▷ The menu page shows the information about the Ethernet interface.

8.6.2.3 Enabling / disabling access to the web interface

The device offers the option of activating or deactivating access to the web interface.

Available parameters:

Name	Description	Value range
[Activate the web configuration]	Activate or deactivate access to the web interface via an Ethernet interface	• ☐: Deactivate access to the web interface • ☑: Activate access to the web interface

▶  > X8 eth1

▶ Select the [Web] tab.

▷ The menu page shows the current settings.

▶ Set the [Activate the web configuration] parameter.

▶ Click on [Accept].

▷ Access to the web interface is set.

8.6.3 EtherNet/IP interface

Navigation path	Functions
	EtherNet/IP information • Displaying identification information (→ 🗋 96) • Displaying EtherNet/IP data (→ 🗋 96) • Displaying the module configuration (→ 🗋 96) • Downloading the EDS and I/O description (→ 🗋 97)
	EtherNet/IP setup • Setting the configuration mode (→ 🗋 97) • Setting the device-specific parameters (→ 🗋 98) • Configuring the EtherNet/IP modules (→ 🗋 98)
	EtherNet/IP diagnostics • Displaying diagnostic data (→ 🗋 100)

8.6.3.1 EtherNet/IP: Information

Displaying identification information

Available information:

Name	Description
[Manufacturer ID]	Manufacturer identification
[Device type]	Device type
[Product code]	Product code
[Revision no.]	Revision number
[SN]	Serial number
[Product name]	Product designation

To display the information:

▶  >  > 

▶ Select the “Information” tab.

▷ The menu page shows information about the EtherNet/IP interface of the device.

Displaying EtherNet/IP data

Available information:

Name	Description	Value range
[MAC ID]	MAC ID of the EtherNet/IP interface	e.g. 00:02:01:01:27:CF
[RPI time]	Requested Packet Interval (value in ms)	
[Analogue channels/I slave]	Number of the analogue channels per input slave	Setting the device-specific parameters (→ 🗋 98)
[Analog. channels/O slave]	Number of analogue channels per output slave	Setting the device-specific parameters (→ 🗋 98)
[Failsafe state]	Behaviour of the AS-i outputs when the EtherNet/IP connection is interrupted	Setting the device-specific parameters (→ 🗋 98)
[Parameter download]	The AS-i slave parameters are transferred when an EtherNet/IP connection is established.	• ☐: Parameters are not downloaded, i.e. AS-i slaves are activated with the parameters set in the device. • ☑: Each time an EtherNet/IP connection is established, the AS-i slave parameters are loaded from the EtherNet/IP controller to the device, activated in the slaves and stored non-volatilely.
[Change byte order]	Byte order in a data word	Setting the device-specific parameters (→ 🗋 98)

To display the EtherNet/IP data:

▶  >  > 

▶ Select the [Data] tab.

▷ The menu page shows EtherNet/IP data.

Displaying the module configuration

To display the current configuration of the EtherNet/IP modules:

▶  >  > 

▶ Select the [Module configuration] tab.

▷ The menu page shows the current Module configuration (→ Configuring the EtherNet/IP modules 🗋 98).

Downloading the EDS and I/O description

Function available: Web interface

The following files are stored on the device:

- Electronic data sheet (EDS): Device description of the device
- I/O description file: Description of the process data of the device

The files can be integrated into the fieldbus projection software.

Requirements:

✓ The device is connected to a laptop/PC via Ethernet.

✓ The web interface of the device is active.

▶  >

▶ Select the [File download] tab.

▷ The menu page shows the available options.

▶ Optional: Click on [Download EDS file].

▷ A dialogue window appears.

▶ Select the storage location for the file and click on [Save].

▷ The EDS file is stored on the laptop/PC.

▶ Optional: Click on [Generate I/O description file].

▷ The device generates a description file for process data

▷ A dialogue window appears.

▶ Select the storage location for the file and click on [Save].

▷ The I/O description file is stored on the laptop/PC.

8.6.3.2 EtherNet/IP: Settings

Setting the configuration mode

Observe the notes on configuration: Configuring the device (→ 🗋 122)

Available parameters:

Name	Description	Value range
[Configuration mode]	Active configuration mode	• Top-Down: The device-specific parameters and the module configuration are set via the projection software of the EtherNet/IP controller. • Independent: The parameters of the EtherNet/IP interface are set on the device.

▶  >

▶ Select the [Fieldbus] tab.

▷ The menu page shows the active configuration mode.

▶ Select the configuration mode.

▶ Click on [Accept].

▷ The selected configuration mode is active.

Setting the device-specific parameters

For the [Independent] configuration mode, the device-specific parameters must be set on the device.

Available parameters:

Name	Description	Value range
[Analogue channels/I slave]	Number of analogue channels transmitted per input slave	• 1 channel per A/B: 1 channel per A/B slave or channels 1+3 per single slave • 1 channel: 1 channel per single slave or 1 channel per A slave • 2 channels: 2 channels per single slave or 2 channels per A slave • 4 channels: 4 channels per single slave or 2 channels per A/B slave
[Analog. channels/O slave]	Number of analogue channels transmitted per output slave	• 1 channel per A/B: 1 channel per A/B slave or channels 1+3 per single slave • 1 channel: 1 channel per single slave or 1 channel per A slave • 2 channels: 2 channels per single slave or 2 channels per A slave • 4 channels: 4 channels per single slave or 2 channels per A/B slave
[Failsafe state]	Behaviour of the AS-i outputs when the EtherNet/IP connection is interrupted	• Hold outputs: The outputs maintain the values that were present immediately before the connection was interrupted • Reset outputs: The outputs are reset to the default values
[Change byte order]	Byte order in input assembly and output assembly	• ☐: The order remains unchanged • ☑: The byte order is inverted

To set the device-specific parameters:

Requirements:

✓ The “Independent” configuration mode is active. (→ Setting the configuration mode 97)

▶  >  > 

▶ Select the [Parameters] tab.

▷ The menu page shows the current parameter settings.

▶ Set the parameters.

▶ Click on [Accept].

▷ The selected parameter values are enabled.

Configuring the EtherNet/IP modules

The EtherNet/IP modules must be set for the "Independent" configuration mode. The configuration of the modules determines the process data of the device.

ATTENTION

248 words each are available for the transmission of cyclic input and output data.

If modules 1, 3, 5, 7, 9, 10, 13 and 14 are configured so that the cyclic input data comprises more than 248 words, all data from the 249th word onwards will not be transmitted and will be lost.

If modules 2, 4, 6, 8, 11, 12 and 15 are configured so that the cyclical output data comprises more than 248 words, all data from the 249th word onwards will not be transmitted and will be lost.

▷ Data loss

▷ Unwanted behaviour of the automation system

▶ When configuring the EtherNet/IP modules, observe the maximum permissible number of words per transmission direction.

Available parameters:

Name	Description	Value range
[EtherNet/IP slot 1]	Digital inputs of the S/A slaves on AS-i master 1	Digital IN AS-i 1 S/A (→ 🗋 260)
[EtherNet/IP slot 2]	Digital outputs of the S/A slaves on AS-i master 1	Digital OUT AS-i 1 S/A (→ 🗋 261)
[EtherNet/IP slot 3]	Digital inputs of the S/A slaves on AS-i master 2 (only available for devices with 2 AS-i masters)	Digital IN AS-i 2 S/A (→ 🗋 262)
[EtherNet/IP slot 4]	Digital outputs of the S/A slaves on AS-i master 2 (only available for devices with 2 AS-i masters)	Digital OUT AS-i 2 S/A (→ 🗋 263)
[EtherNet/IP slot 5]	Digital inputs of the B slaves on AS-i master 1	Digital IN AS-i 1 B (→ 🗋 264)
[EtherNet/IP slot 6]	Digital outputs of the B slaves on AS-i master 1	Digital OUT AS-i 1 B (→ 🗋 265)
[EtherNet/IP slot 7]	Digital inputs of the B slaves on AS-i master 2 (only available for devices with 2 AS-i masters)	Digital IN AS-i 2 B (→ 🗋 266)
[EtherNet/IP slot 8]	Digital outputs of the B slaves on AS-i master 2 (only available for devices with 2 AS-i masters)	Digital OUT AS-i 2 B (→ 🗋 267)
[EtherNet/IP slot 9]	Analogue inputs, area 1	Analogue IN (area 1) (→ 🗋 268)
[EtherNet/IP slot 10]	Analogue inputs, area 2	Analogue IN (area 2) (→ 🗋 269)
[EtherNet/IP slot 11]	Analogue outputs, area 1	Analogue OUT (area 1) (→ 🗋 270)
[EtherNet/IP slot 12]	Analogue outputs, area 2	Analogue OUT (area 2) (→ 🗋 271)
[EtherNet/IP slot 13]	Diagnostic data transmitted to the EtherNet/IP controller	Diagnostic (→ 🗋 272)
[EtherNet/IP slot 14]	Scope of the data transmitted from the CODESYS PLC to the EtherNet/IP controller.	Inputs from AC424S-PLC (→ 🗋 278)
[EtherNet/IP slot 15]	Scope of the data transmitted from the EtherNet/IP controller to the CODESYS PLC.	Outputs to AC424S-PLC (→ 🗋 280)

To configure the EtherNet/IP modules:

Requirements:

✓ The “Independent” configuration mode is active. (→ Setting the configuration mode 🗋 97)

▶  >  > 

▶ Select the [Module configuration] tab.

▷ The menu page shows the current parameter settings.

▶ Set the parameters.

▶ Click on [Accept].

▷ The selected module configuration is active.

8.6.3.3 EtherNet/IP: Diagnosis

Displaying diagnostic data

Available information:

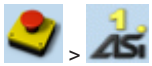
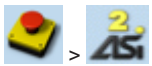
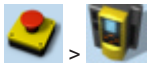
Name	Description	Value range
[EtherNet/IP connection status]	Connection status of the EtherNet/IP interfaces	
[Status port X6]	Connection status port X6	• : No connection established to the EtherNet/IP controller • : Connection to the EtherNet/IP controller established
[Status port X7]	Connection status port X7	• : No connection established to the EtherNet/IP controller • : Connection to the EtherNet/IP controller established

To display the diagnostic data of the Ethernet/IP interface:

▶ > >

▷ The menu page shows the diagnostic data.

8.7 Safety

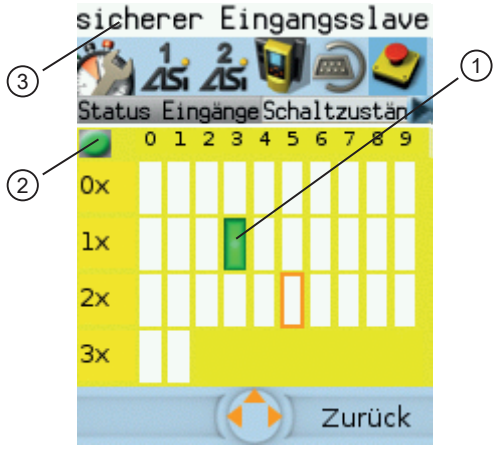
Navigation path	Functions
	Status of the fail-safe AS-i slaves on AS-i master 1 • Displaying the status of the fail-safe AS-i input slaves (→ 🗋 102) • Displaying switching states of the fail-safe AS-i input slaves (→ 🗋 103)
	Status of the fail-safe AS-i slaves on AS-i master 2 • Displaying the status of the fail-safe AS-i input slaves (→ 🗋 102) • Displaying switching states of the fail-safe AS-i input slaves (→ 🗋 103)
	Local inputs / outputs • Displaying the switching states of the local inputs (→ 🗋 105) • Displaying the switching states of the local outputs (→ 🗋 106)
	Status of the fail-safe cross communication (FSoE) • Displaying the status of the FSoE connections (→ 🗋 108) • Setting the device number (→ 🗋 108)
	System • Displaying the status information of the safety PLC (→ 🗋 110)

▶ Please note the information on the meaning of the different menu symbols in the [Safety] menu! Availability of the safety PLC (→ 🗋 131)

8.7.1 AS-i 1 / AS-i 2

8.7.1.1 Displaying the status of the fail-safe AS-i input slaves

Available information:



1: Address and status of the fail-safe AS-i input slaves on the selected AS-i master (→ Status information: Colour codes + symbols 🗋 102)
2: Current configuration status of the safety PLC (→ Configuration status: Colour codes + symbols 🗋 102)
3: Status information of the selected AS-i slave

Virtual control slaves are not represented in this view.

To display the status of the fail-safe AS-i slaves on the selected AS-i master:

Requirements:

✓ The safety application on the device is in the RUN state.

▶ > or >

▶ Select the [Status inputs] tab.

▷ The menu page shows status information for the fail-safe AS-i input slaves of the selected AS-i master.

Optional: Change the settings of the fail-safe AS-i slaves

▶ Use the navigation buttons to select the fail-safe AS-i slave.

▶ Click on [Select] to activate the selected AS-i slave.

▷ The setting options for the selected AS-i slave appear.

▶ Change settings.

▶ Click on [Back] to return to the status information display.

Configuration status: Colour codes + symbols

Icon	Colour	Description
	Yellow	No safe configuration available
	Green	safe configuration available

Status information: Colour codes + symbols

Logical devices are elements of the CODESYS Development System. They are used for the logical preprocessing of input signals.

Detailed information: → Programming manual

Icon	Colour	Description
	White	No safe AS-i input slave present

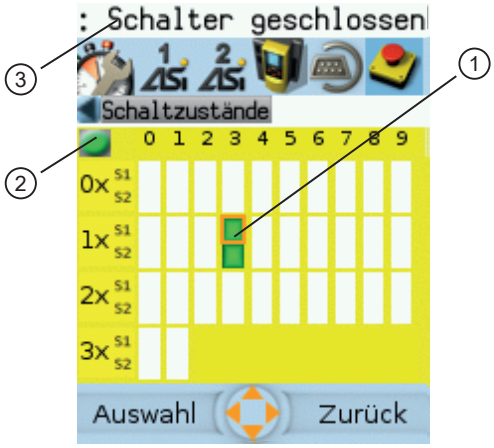
Icon	Colour	Description
	Grey	Safe AS-i input slaves present but not part of the safe configuration
	Yellow	Test requested
	Green	Safe AS-i input slave operates correctly; no test necessary
	Red	Error • No fail-safe AS-i input slave connected • AS-i slave missing • AS-i slave present but master in the protected mode and slave not projected • Logical device of the AS-i slave in the error state • Logical device of the AS-i slave in the hardware error state • Invalid or double code sequence

8.7.1.2 Displaying switching states of the fail-safe AS-i input slaves

A fail-safe AS-i input slave can assume the following switching states:

- HIGH level
- LOW level

Available information:



1: Switching states S1/S2 of the safe AS-i input slaves (evaluation of the code half-sequences) (→ Switching states: Colour codes + symbols 🗋 103)
2: Current configuration status of the safety PLC (→ Configuration status: Colour codes + symbols 🗋 103)
3: Information on the selected switching state

To display the switching states of the fail-safe AS-i slaves:

▶ > or >

▶ Select the [Switching states] tab.

▷ The menu page shows the slave selector view with the switching states of the fail-safe AS-i input slaves.

Configuration status: Colour codes + symbols

Symbol	Colour	Description
	Yellow	No fail-safe configuration available
	Green	Fail-safe configuration available

Switching states: Colour codes + symbols

Symbol	Colour	Description
	White	No safe AS-i input slave of the safe configuration

Symbol	Colour	Description
	Grey	• Switch open • Code sequence already taught
	Green	• Switch open • Code sequence not yet taught
	Red	• Switch closed • Code sequence taught • The transferred code sequence is identical with taught code sequence

Meaning of the colour combinations

Symbol	Colour	Description
	Grey Grey	• Switches S1 and S2 are open • The two code half-sequences have been taught
	Grey Green	• Switch S1 is open, code half-sequence has been taught • Switch S2 is closed, code half-sequence has been taught
	Green Grey	• Switch S1 is closed, code half-sequence has been taught • Switch S2 is open, code half-sequence has been taught
	Green Green	• Switches S1 and S2 are closed • The two code half-sequences are identical with the taught CODE half-sequences
	Red Green	• Switch S1 is open, the code half-sequence has not been taught yet • Switch S2 is closed, the code half-sequence has been taught
	Green Red	• Switch S1 is closed, the code half-sequence has been taught • Switch S2 is open, the code half-sequence has not been taught yet
	Red Red	• Switches S1 and S2 are open • The two code half-sequences have not been taught yet

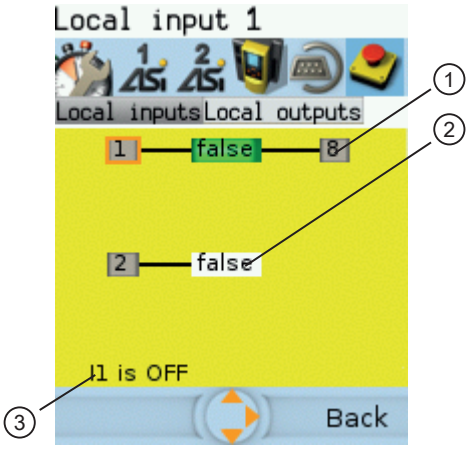
8.7.2 Local IOs

8.7.2.1 Displaying the switching states of the local inputs

The switching states of the local inputs are only displayed when the safety application is in the RUN state.

The representation of the switching states can be retained even though no safety configuration is stored on the device: Displaying the status information of the safety PLC (→ 🗋 110)

The displayed data is invalid in this case.



1: Switching states of the local inputs (→ Switching states of the local inputs: Colour codes + symbols 🗋 106)
2: Switching states of the logical devices of the local inputs (→ Switching states of the logical devices: Colour codes + symbols 🗋 105)
3: Text field with status information of the marked input

To display the switching states of the local outputs:

Requirements:

✓ The safety application on the device is in the RUN state.

▶  >

▶ Select the [Local inputs] tab.

▷ The menu page shows switching states of the local outputs.

▶ Optional: Use [▼] / [▲] to select the symbol of a local output.

▷ The text field shows additional information on the selected output.

Switching states of the logical devices: Colour codes + symbols

Logical devices are elements of the CODESYS Development System. They are used for the logical preprocessing of input signals.

Detailed information: → Programming manual

Symbol	Colour	Description
	White	The local input is configured as a non-safe input.
	Yellow	Testing of the logical devices requested
	Green	The logical device for the fail-safe input is working correctly
	Red	The logical device for the fail-safe input is in the error state

Designation	Description
[false]	The logical device provides the fail-safe value FALSE.
[true]	The logical device provides the fail-safe value TRUE.

Switching states of the local inputs: Colour codes + symbols

Symbol	Colour	Description
	Grey	Local input: LOW level
	Green	Local input: HIGH level

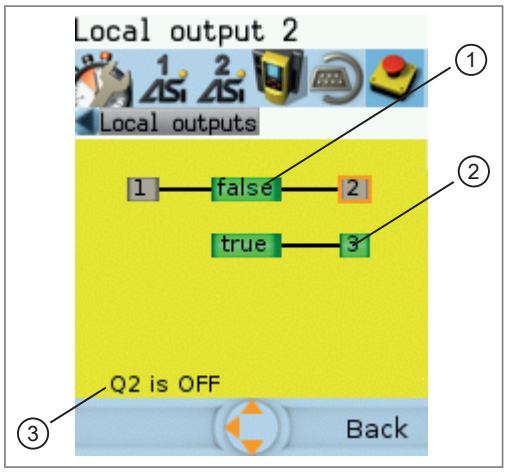
8.7.2.2 Displaying the switching states of the local outputs

The switching states of the local outputs are only displayed when the safety application is in the RUN state.

The representation of the switching states can be retained even though no safety configuration is stored on the device: Displaying the status information of the safety PLC (→ 110)

The displayed data is invalid in this case.

Available information:



1: Switching states of the logical devices of the local outputs (→ Switching states of the logical devices: Colour codes + symbols 106)
2: Switching states of the local outputs (→ Switching states of the local outputs: Colour codes + symbols 107)
3: Text field with status information of the marked output

To display the switching states of the local outputs:

Requirements:

✓ The safety application on the device is in the RUN state.

▶ >

▶ Select the [Local outputs] tab.

▷ The menu page shows switching states of the local outputs.

▶ Optional: Use [▼] / [▲] to select the symbol of a local output.

▷ The text field shows additional information about the selected output

Switching states of the logical devices: Colour codes + symbols

Logical devices are elements of the CODESYS Development System. They are used for the logical preprocessing of input signals.

Detailed information: → Programming manual

Symbol	Colour	Description
	White	Local output is configured as non-safe output
	Green	Logical device for safe output operates correctly
	Red	Logical device for safe output is in the error state

Designation	Description
[false]	The logical device provides the fail-safe value FALSE.
[true]	The logical device provides the fail-safe value TRUE.
[pulse]	A test pulse is generated on the output

Switching states of the local outputs: Colour codes + symbols

Symbol	Colour	Description
	Grey	Local output: LOW level
	Green	Local output: HIGH level

8.7.3 FSoE / SafeNetVars

The menu page [FSoE / SafeNetVars] provides access to information about the status of the fail-safe communication via EtherCAT (Failsafe over EtherCAT - FSoE) and the setting of the device number.

8.7.3.1 Displaying the status of the FSoE connections

The menu page shows the status information of the FSoE connections.

Available information:

Name	Description	Value range
Status LED	Status of the connection	• : Connection interrupted • : Connection established
[Connection-ID]	ID of the FSoE connection	1…65535
[Event]	Description of the event	

To display the status of the FSoE connection:

Requirements:

✓ at least one FSoE connection has been configured.

▶  > 

▶ Select the [FSoE slaves] tab.

▷ The menu page shows the status information of the FSoE connections.

8.7.3.2 Setting the device number

Function available: Display

The device number can be used to address the device in 1:N communication with SafeNetVars. The device address is calculated from the base address n and the set device number (offset).

The 1:N communication is configured in the safety application in CODESYS (→ programming manual).

The system architect must ensure that the safety address is set correctly.

▶ Before set-up, check that the active safety address of the device is correct.

Available parameters:

Name	Description	Value range
[Device number SafeNetVars]	Offset to the base address for calculating the device address	0…50

To set the device number of the device:

Requirements:

✓ at least one 1:N communication is configured.

▶  > 

▶ Select the [Device number SafeNetVars] tab.

▷ The menu page shows the current settings.

▶ Set the device number in the [Device number] field.

▶ Click on [Accept].

▷ The set device number is saved.

▶ Click on [Restart].

▷ The confirmation prompt appears.

▶ Click on [OK] to confirm the message.

▷ The device restarts.

8.7.4 System

8.7.4.1 Displaying the status information of the safety PLC

Available information:

Name	Description	Value range
[F PLC firmware]	Firmware version of the safety PLC	e.g. Rel:(1)01.00.243
[Safety PLC status]	Status of the safety PLC	• Invalid: Invalid state • Safe started: Safety module correctly started • No application: no safety application available • IEC task enabled: safety IEC task has been enabled • IEC task started: safety IEC task has started • IEC error: error in the safety IEC task • RUN (debug): safety application in RUN state (debug mode) • STOP (Debug): safety application in STOP state (debug mode) • RUN (safe): Safety application in RUN state (fail-safe operation) • CODESYS error: safety PLC in safe error state • Hardware error: defect in the hardware of the device
[CRC safe application]	CRC checksum of the safety application	• --: no safety application available • 78FF6A8C: CRC checksum (example) • not available: Safety application could not be opened or safety application smaller than 4 bytes

To display status information from the safety PLC:

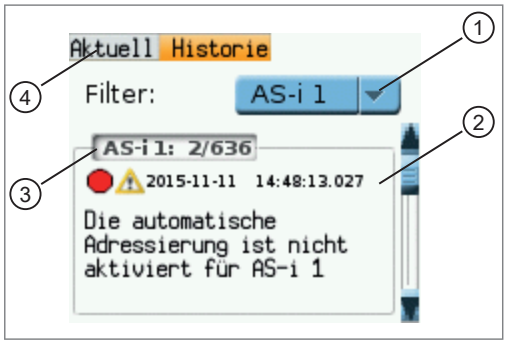
▶  > 

▷ The menu page shows status information of the safety PLC.

8.8 Online Support Center (OSC)

The online support centre (OSC) shows detailed information about occurring events, interference and errors.

The OSC appears as follows:



1: List to select the filter and the name of the selected filter
2: Message: A message consists of error symbol, time stamp and error details
3: Reference number of the displayed message and total number of messages
4: List to select the view
   - [Current]: OSC: Displaying current messages (→ 🗋 111)
   - [History]: OSC: Showing the message history (→ 🗋 112)

The following rules apply to the display of messages:

- System components of the device (hardware, firmware):
  - All message types are displayed.
- Logical devices (safe AS-i slaves and safe local devices):
  - error state messages are always displayed.
  - The programmer can disable the state messages of the fail-safe function
- FBs of the SafetyPLCopen library:
  - The programmer can enable the transfer of the messages to the OSC

8.8.1 OSC: Displaying current messages

The [Current] tab lists all current messages. The messages are shown in chronological order. Warnings and errors are displayed.

Overview of the OSC messages of the device: OSC messages (→ 🗋 290)

Only messages that are generated in the standard area of the device are displayed under [Current]. The messages generated in the safety area of the device are only displayed in the message history: OSC: Showing the message history (→ 🗋 112)

To display the latest reports:

Requirements:

✓ The start screen is active.

▶ Select [OSC]

▷ The display shows the Online Support Center.

▶ Select the [Current] tab.

▷ This page shows the messages currently being received.

▶ Select the message field using ▼.

▷ The focus (orange frame) is on the message field.

▶ Scroll through the messages using ▲ / ▼.

The displayed messages can be filtered:

Parameter	Description	Possible values
[Filter]	System component in which the message was created	• [All]: Display all messages in chronological order of their occurrence (default) • [AS-i 1]: Display messages that were created in AS-i master 1. • [AS-i 2]: Display messages that were created in AS-i master 2. • [System]: Display messages that were created in the system.

▶ In the [Filter] selection field, select the system component whose messages are to be displayed.

▷ The menu page shows the filtered messages.

8.8.2 OSC: Showing the message history

The [History] tab lists all messages that occurred during the operating time of the device. The messages are shown in chronological order. Events, warnings and errors are displayed.

The messages are stored in a ring buffer. The ring buffer can store 2000 messages. If full, the device overwrites the oldest message(s) (time stamp).

There is a message pair for each failure (warning, error). It indicates the time of occurrence of the failure and the time at which the cause of the failure was rectified. The messages symbols are correspondingly marked.

Example: Error message

- : Time at which the error occurred
- : Time at which the cause of the fault was rectified.

To display the history of messages created so far:

Requirements:

✓ The start screen is active.

▶ Select [OSC].

▷ The Online Support Center appears.

▶ Select the [History] tab.

▷ The menu page shows all previously generated error messages.

▶ Select the message field using ▼.

▷ The focus (orange frame) is on the message field.

▶ Scroll through the messages using ▲ / ▼.

The displayed messages can be filtered:

Parameter	Description	Possible values
[Filter]	System component in which the message was created	• [All]: Display all messages in chronological order of their occurrence (default) • [AS-i 1]: Display messages that were created in AS-i master 1. • [AS-i 2]: Display messages that were created in AS-i master 2. • [System]: Display messages that were created in the system.

▶ In the [Filter] selection field, select the system component whose messages are to be displayed.

▷ The menu page shows the filtered messages.

9 Acyclic data records

9.1 Principle of the data records

The device provides defined data records. Data records provide access to configuration data, process data as well as status and diagnostic information of the device and the AS-i master. The user can access the device's data records acyclically.

9.2 Available data records

Index	Contents	Data record	Access	Words
1	System: System information (DS1) (→ 🗋 133)	DS1	ro [1]	26
32	AS-i 1: Digital inputs of the slaves and master flags (DS2) (→ 🗋 135)	DS2	ro [1]	36
33	AS-i 1: Analogue inputs of slaves 1(A)...15B (DS3) (→ 🗋 139)	DS3	ro [1]	75
34	AS-i 1: Analogue inputs of slaves 16(A)...31B (DS4) (→ 🗋 140)	DS4	ro [1]	80
35	AS-i 1: Digital outputs of slaves 1(A)...31B (DS5) (→ 🗋 141)	DS5	rw [2]	32
36	AS-i 1: Analogue outputs of slaves 1(A)...15B (DS6) (→ 🗋 142)	DS6	rw [2]	60
37	AS-i 1: Analogue outputs of slaves 16(A)...31B (DS7) (→ 🗋 143)	DS7	rw [2]	64
38	AS-i 1: Status flags of the analogue outputs of slaves 1...31 (DS8) (→ 🗋 144)	DS8	ro [1]	32
39	AS-i 1: Slave lists LAS, LDS, LPF, LCE (DS9) (→ 🗋 146)	DS9	ro [1]	16
40	AS-i 1: Slave list LPS (DS10) (→ 🗋 148)	DS10	ro [1]	4
41	AS-i 1: Current configuration data CDI (DS11) (→ 🗋 149)	DS11	ro	64
42	AS-i 1: Projected configuration data PCD (DS12) (→ 🗋 151)	DS12	ro [1]	64
43	AS-i 1: Image of the input parameters of the slaves PI (DS13) (→ 🗋 153)	DS13	ro [1]	32
44	AS-i 1: Image of the output parameters of the slaves PP (DS14) (→ 🗋 154)	DS14	rw [1]	32
45	AS-i 1: Error counter and cycle counter (DS15) (→ 🗋 155)	DS15	ro [1]	72
46	AS-i 1: Error lists LCEMS, LCEAS, LDAE (DS17) (→ 🗋 158)	DS17	ro [1]	12
47	System: Fieldbus information (DS18) (→ 🗋 159) [3]	DS18	ro [1]	19
64	AS-i 2: Digital inputs of the slaves and master flags (DS2) (→ 🗋 135)	DS2	ro [1]	36
65	AS-i 2: Analogue inputs of slaves 1(A)...15B (DS3) (→ 🗋 139)	DS3	ro [1]	75
66	AS-i 2: Analogue inputs of slaves 16(A)...31B (DS4) (→ 🗋 140)	DS4	ro [1]	80
67	AS-i 2: Digital outputs of slaves 1(A)...31B (DS5) (→ 🗋 141)	DS5	rw [2]	32
68	AS-i 2: Analogue outputs of slaves 1(A)...15B (DS6) (→ 🗋 142)	DS6	rw [2]	60
69	AS-i 2: Analogue outputs of slaves 16(A)...31B (DS7) (→ 🗋 143)	DS7	rw [2]	64
70	AS-i 2: Status flags of the analogue outputs of slaves 1...31 (DS8) (→ 🗋 144)	DS8	ro [1]	32
71	AS-i 2: Slave lists LAS, LDS, LPF, LCE (DS9) (→ 🗋 146)	DS9	ro [1]	16
72	AS-i 2: Slave list LPS (DS10) (→ 🗋 148)	DS10	ro [1]	4
73	AS-i 2: Current configuration data CDI (DS11) (→ 🗋 149)	DS11	ro [1]	64
74	AS-i 2: Projected configuration data PCD (DS12) (→ 🗋 151)	DS12	ro [1]	64
75	AS-i 2: Image of the input parameters of the slaves PI (DS13) (→ 🗋 153)	DS13	ro [1]	32
76	AS-i 2: Image of the output parameters of the slaves PP (DS14) (→ 🗋 154)	DS14	rw [2]	32
78	AS-i 2: Error counter and cycle counter (DS15) (→ 🗋 155)	DS15	ro [1]	72
79	AS-i 2: Error lists LCEMS, LCEAS, LDAE (DS17) (→ 🗋 158)	DS17	ro [1]	12

[1] Read only

[2] Read and write

[3] only available via CODESYS (→ programming manual)

9.3 Accessing data sets

The user can access the data records using the following methods:

- EtherNet/IP project: Acyclical access via the attributes of assembly instance 801 (assembly object 0x04), EtherNet/IP (→ 🗋 120)
- CODESYS application: Function block ACnnnn_SysCmd, → programming manual

10 Command interface

10.1 Available command channels

The command interface consists of a request channel (Request) and a response channel (Response).

The device features the following command channels.

Index	Contents	Access	Length [words]
30	System: Command request channel (→ 🗋 116)	rw [1]	120
31	System: Command response channel (→ 🗋 116)	ro [2]	120
62	AS-i 1: Command request channel (→ 🗋 116)	rw [1]	120
63	AS-i 1: Command response channel (→ 🗋 116)	ro [2]	120
94	AS-i 2: Command request channel (→ 🗋 116)	rw [1]	120
95	AS-i 2: Command response channel (→ 🗋 116)	ro [2]	120

[1] Read and write

[2] Read only

10.1.1 Command request channel

Transmission direction: external instance ➞ device

Structure:

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	Command ID															
2…119	Command parameters															

10.1.2 Command response channel

Transmission direction: device ➞ external instance

Structure:

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	Reflected command ID															
2	Reserved								Command status (→ 🗋 116)							
3	Command error code															
4…119	Command response data															

10.1.2.1 Command status

Code	Status	Description
0x00	OK	Command execution was successful. Response data is available and valid.
0x01	FAILED	Error when executing the command. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
0x02	TO	TimeOut error: The command was cancelled due to timeout.

Code	Status	Description
0x03	UC	Unknown Command: The command number transferred is unknown in the system.
0x04	NOP	Not Valid Parameter: The transmitted command parameter is invalid.

10.2 Principle of the command processing

The processing of a command comprises the following sub-steps:

1. Send the command and any command parameters to the device via the request channel.
2. Read the status of command processing in the response channel
   – Status == 0x00: command successfully processed; read response data if necessary (→ step 3)
   – Status == 0x01…0x04: The command processing was terminated with errors; read the command error code, eliminate the cause of error and repeat the command execution
3. read the return data in the response channel

10.3 Available commands

10.3.1 AS-i master commands

Code	Command
0x0001	Changing the AS-i slave parameters (0x0001) (→ 🗋 186)
0x0003	Projecting the current AS-i network (0x0003) (→ 🗋 188)
0x0004	Changing the LPS (0x0004) (→ 🗋 189)
0x0005	Changing the operating mode of the AS-i master (0x0005) (→ 🗋 190)
0x0006	Changing the AS-i slave address (0x0006) (→ 🗋 191)
0x0007	Setting the auto address mode of the AS-i master (0x0007) (→ 🗋 193)
0x0009	Changing the extended ID1 (0x0009) (→ 🗋 194)
0x000A	Changing the PCD (0x000A) (→ 🗋 196)
0x000D	AS-i master supply voltage, symmetry, earth fault (0x000D) (→ 🗋 198)
0x0015	Reading the ID string of an AS-i profile (S-7.4) (0x0015) (→ 🗋 200)
0x001A	Reading the AS-i master info (0x001A) (→ 🗋 202)
0x001C	Disabling the slave reset (0x001C) (→ 🗋 203)
0x0021	Reading the diagnostic string of an AS-i slave (S-7.4) (0x0021) (→ 🗋 204)
0x0022	Reading the parameter string of an AS-i slave (S-7.4) (0x0022) (→ 🗋 206)
0x0023	Writing the parameter string of an AS-i slave (S-7.4) (0x0023) (→ 🗋 208)
0x0024	CTT2 Standard Read (0x0024) (→ 🗋 210)
0x0025	CTT2 standard write (0x0025) (→ 🗋 212)
0x0026	CTT2 vendor specific read (0x0026) (→ 🗋 214)
0x0027	CTT2 Vendor Specific Write (0x0027) (→ 🗋 216)
0x0040	CTT2 device group read (0x0040) (→ 🗋 218)
0x0041	CTT2 Device Group Write (0x0041) (→ 🗋 220)
0x0042	CTT2 Vendor Specific Selective Read from Buffer (0x0042) (→ 🗋 222)
0x0043	CTT2 Vendor Specific Selective Write from Buffer (0x0043) (→ 🗋 224)
0x0044	CTT2 Vendor Specific Selective Read (0x0044) (→ 🗋 226)
0x0045	CTT2 Vendor Specific Selective Write (0x0045) (→ 🗋 228)
0x0046	CTT2 Device Group Selective Read (0x0046) (→ 🗋 230)
0x0047	CTT2 Device Group Selective Write (0x0047) (→ 🗋 232)
0x0049	CTT2 Vendor Specific Exchange (0x0049) (→ 🗋 234)
0x004A	CTT2 Device Group Exchange (0x004A) (→ 🗋 236)
0x004B	CTT2 Device Group Selective Read from Buffer (0x004B) (→ 🗋 238)
0x004C	CTT2 Device Group Selective Write from Buffer (0x004C) (→ 🗋 240)
0x0050	Set AS-i master settings (0x0050) (→ 🗋 242)
0x0051	Reset error counter (0x0051) (→ 🗋 243)

10.3.2 System commands

Code	Command
0x0101	Quick set-up AS-i masters 1 + 2 (0x0101) (→ 🗋 161)
0x0103	Changing the operating language (0x0103) (→ 🗋 162)
0x0104	Changing display settings (0x0104) (→ 🗋 164)
0x0105	Setting output control (0x0105) (→ 🗋 165)
0x0109	Setting date / time (0x0109) (→ 🗋 166)
0x010A	Configuring the NTP client (0x010A) (→ 🗋 168)
0x010B	Reading date / time / NTP settings (0x010B) (→ 🗋 170)
0x010C	Rebooting the system (0x010C) (→ 🗋 172)
0x010D	Reading the fieldbus info (0x010D) (→ 🗋 173)
0x010F	Reading the OSC entry (0x010F) (→ 🗋 174)
0x0110	Displaying the target visualisation (0x0110) (→ 🗋 176)
0x0111	Reading the Safe Life BIT (0x0111) (→ 🗋 177)
0x0112	Exporting the application + the configuration (0x0112) (→ 🗋 179)
0x0113	Importing the application + the configuration (0x0113) (→ 🗋 181)
0x0114	Importing the application (0x0114) (→ 🗋 183)
0x0115	Reading the device number (0x0115) (→ 🗋 185)

10.4 Accessing the command interface

The user can access the command interface using the following methods:

- EtherNet/IP project: Acyclical access via the attributes of assembly instance 801 (assembly object 0x04), EtherNet/IP (→ 🗋 120)
- CODESYS application: Function block ACnnnn_SysCmd, → programming manual

11 EtherNet/IP

11.1 Supported EtherNet/IP functions

- Device type: Communications adapter
- 2-port switch for access to the EtherNet/IP interface
- Connection classes: 1, 3
- Connection types:
  - Exclusive owner
- Predefined objects:
  - Identity Object (0x01)
  - Message Router Object (0x02)
  - Assembly Object (0x04)
  - Connection Manager Object (0x06)
  - Device Ring Level Object (0x47)
  - Quality of Service Object (0x48)
  - TCP/IP Interface Object (0xF5)
  - Ethernet Link Object (0xF6)
- Supported protocols: DHCP, BOOTP, Static, DLR
- Supported network topologies: Line, ring (not configurable as ring supervisor)
- Device description: EDS file

11.2 Register the EDS file

For the mapping of the device in an EtherNet/IP configuration software ifm provides an Electronic Device Description (EDS). The device description file contains identification information, supported parameters, process data and fieldbus objects. The user can download the EDS file from the website documentation.ifm.com.

To add the device to the device catalogue of RSLogix 5000:

Requirements:

✓ Download the EDS file of the device.

▶ Start the EtherNet/IP projection software "RSLogix 5000”.

▶ Select [Tools] > [EDS Hardware Installation Tool].

▷ The wizard starts.

▶ Register the downloaded EDS file using the wizard.

▷ The device is added to the device catalogue of the EtherNet/IP projection software.

▷ RSLogix 5000 can access functions and data of the device.

11.3 Integrating the device into a project

The device can be integrated into an EtherNet/IP project using the EDS file or as a generic Ethernet device.

11.3.1 Integrating the device using the EDS file

Requirements:

✓ The EDS file of the device is correctly installed.

✓ RSLogix 5000 has started.

▶ Create a new EtherNet/IP project or open an existing one.

▶ Add the required components (e.g. PLC, IO scanner) to the automation network and configure them.

▶ In [Controller Organizer]: Open the [I/O Configuration] folder.

▶ Right click on the [Ethernet] node.

▷ The context menu appears.

▶ Select [New module…] in the context menu.

▷ A dialogue window appears.

▶ Select the device in the catalogue and click on [Create].

▷ A dialogue window appears.

▷ RSLogix 5000 loads the EDS file of the device.

▶ Enter the following parameter values:

Parameter	Value	Comment
[Name]	e.g. _AC424S	Name of the device in the project; the name is displayed in [Controller Organizer]
[Description]	e.g. ifm EIP AS-i Gateway	Description of the device, max. 128 characters
[IP Address]	e.g. 192.169.10.100	IP address of the device

▶ Click on [Change].

▷ The [Module Definition] window appears.

▶ Select the following parameter values under [Connections]:

Parameter	Value	Comment
[Name]	Exclusive owner	Connection type
[Remote Data]		
• [Input]	100	Input assembly instance
• [Output]	150	Output assembly instance
[Size]		
• [Input]	248 INT	Size and data type of the input assembly instance
• [Output]	248 INT	Size and data type of the output assembly instance

▶ Click on [OK] to confirm the entries.

▶ Save the project.

▷ The device has been integrated into the project.

Example:

BILD

11.3.2 Integrating the device without EDS file

The device can be integrated into the project as a generic Ethernet module for operation in the Top-Down and Independent configuration modes.

Requirements:

✓ RSLogix 5000 has started.

▶ Create a new EtherNet/IP project or open an existing one.

▶ Add the required components (e.g. PLC, IO scanner) to the automation network and configure them.

▶ In [Controller Organizer]: Open the [I/O Configuration] folder.

▶ Right click on the [Ethernet] node.

▷ The context menu appears.

▶ Select [New module…] in the context menu.

▷ A dialogue window appears.

▶ Select the device [ETHERNET-MODULE] (Generic Ethernet Module) in the catalogue and click on [Create].

▷ A dialogue window appears.

Set the following parameter values:

Parameter	Value	Comment
[Name]	e.g. _AC424S	Name of the device in the project; the name is displayed in [Controller Organizer]
[Description]	e.g. ifm EIP AS-i Gateway	Description of the device, max. 128 characters
[Comm Format]	Data - INT	Data format for communication in the EtherNet/IP network
[IP Address]	e.g. 192.169.10.100	IP address of the device
[Connection Parameters]		
• [Input]	• Assembly instance: 100 • Size: 248 (16 bits)	Instance, size and data type of the input assembly object
• [Output]	• Assembly instance: 150 • Size: 248 (16 bits)	Instance, size and data type of the output assembly object
• [Configuration]	• Assembly instance: 200 • Size: 400 (8 bits)	[Top-Down] configuration mode: instance, size and data type of the configuration assembly object
	• Assembly instance: 175 • Size: 0 (8 bits)	[Independent] configuration mode: configuration assembly is not evaluated; configuration on the device

▶ Click on [OK] to confirm the entries.

▶ Save the project.

▷ The device has been integrated into the project.

11.4 Configuring the device

A maximum of 248 words are available per transmission direction for the transmission of cyclic process data between the device and the EtherNet/IP PLC. If the EtherNet/IP modules have been configured so that the cyclic input and output data comprise more than 248 words per direction of transmission, any data from the 249th word will not be transmitted and will therefore be lost.

▷ Risk of data loss

▶ When configuring the process data via the EtherNet/IP modules, observe the maximum transmission capacity per transmission direction.

The device uses the little-endian format. Different byte orders (little-endian format, big-endian format) can lead to misinterpretation and undesired behaviour during data transmission between the controller and the device.

▶ During configuration, observe the byte order used by the controller.

▶ If necessary, use the [Swap byteorder] parameter to change the byte order in the digital process data of the device.

The device supports the following modes for configuring the EtherNet/IP interface:

- Top-Down:
  - All parameters are set in the projection software.
  - The created configuration is transferred to the device.
- Independent:
  - All parameters are set on the device.
  - The configuration assembly selected in the projection software is not evaluated.

11.4.1 Configuration mode: Top-Down mode

In "Top-Down" configuration mode, the device parameters are set in the EtherNet/IP projection software. The configuration created in this way is transferred to the device and activated when the connection is established.

Requirements:

✓ The device has been integrated into the EtherNet/IP project (→ Integrating the device into a project 🗋 120).

✓ The Top-Down configuration mode (→ Setting the configuration mode 🗋 97) has been activated on the device.

▶ Open the project.

▶ In the [Controller Organizer]: Double-click on [Controller Tags].

▷ The [Controller Tags] window appears.

▷ [Controller Tags] shows the configuration options of the device (`DeviceName.C:Data`).

▶ Set device-specific parameters and process data (Configuration assembly (instance 200) (→ 🗋 247)).

▷ The device and process data has been configured.

▶ Set the communication path to the device in RSLogix 5000.

▶ Save the project.

▶ Transfer the project to the EtherNet/IP controller and start it.

▷ The EtherNet/IP controller transfers the configuration to the device.

▷ The status LED on the device signals an active EtherNet/IP connection.

11.4.1.1 Setting the connection types

The connection types determine the type and scope of the available parameters and process data of the device.

Supported connection types:

Connection type	Configuration assembly	Input assembly	Output assembly
Exclusive owner	Instance 200	Instance 100	Instance 150

Detailed information on the assembly objects: Assembly instances (→ 🗋 247)

To set the connection type:

Requirements:

✓ The device has been integrated into the EtherNet/IP project.

▶ In [Controller Organizer]: double-click on the device node.

▷ The device configuration dialogue appears.

▶ Click on [Change…].

▷ The [Module Definition] dialogue window appears.

BILD

▶ Select the connection type in the [Connections] list.

▶ Set data type to `INT`.

▶ Click on [OK] to confirm the entries.

▷ Based on the selected connection type, RSLogix 5000 generates the controller tags of the device (`Configuration`, `Input`, `Output`).

11.4.1.2 Creating a device configuration

Requirements:

✓ The device has been integrated into the EtherNet/IP project.

✓ The connection type has been set.

▶ In Controller Organizer: Click on Controller Tags

▷ The Controller Tags window shows the current configuration of the device (`DeviceName.C:Data`).

▶ Set the device-specific parameters.

▶ Set the process data.

▶ Save the project.

▷ The device configuration has been created.

11.4.1.3 Integrating the description of the inputs and outputs

The I/O description has been stored on the device.

▶ Download the I/O description file Downloading the EDS and I/O description (→ 🗋 97).

Requirements:

✓ The device has been integrated into the EtherNet/IP project.

✓ The device has been configured.

▶ Open the project.

▶ Select[Tools] > [Import] > [Tags and Logic Comments…].

▷ A dialogue window appears.

▶ Select the downloaded I/O description file and click on [Import] .

▷ RSLogix 5000 imports the I/O description.

▶ In [Controller Organizer]: double-click on the [Controller Tags] node

▷ The [Controller Tags] view appears.

▷ The inputs (`DeviceName.I`) and outputs (`DeviceName:O`) show the descriptions of the inputs and outputs.

11.4.2 Configuration mode: Independent mode

In Independent configuration mode, the device is configured exclusively via the menu functions. The device is then integrated into the project as a generic Ethernet module.

Requirements:

✓ The device has been integrated into the EtherNet/IP project (→ Integrating the device into a project 🗋 120) without EDS.

✓ The Independent configuration mode (→ Setting the configuration mode 🗋 97) has been activated on the device.

▶ Set the device-specific parameters (→ Setting the device-specific parameters 🗋 98) on the device.

▶ Configure the process data (→ Configuring the EtherNet/IP modules 🗋 98) on the device.

▷ The device and process data has been configured.

▶ Open the project.

▶ Set the communication path in RSLogix 5000.

▶ Save the project.

▶ Transfer the project to the EtherNet/IP controller and start it.

▷ The EtherNet/IP controller transfers the configuration to the device.

▷ The status LED on the device signals an active EtherNet/IP connection.

▶ Optional: Download the I/O description file to the projection computer.

▶ In RSLogix 5000: Select[Tools] > [Import Tags and Comments …].

▷ The import wizard appears.

▶ Use the wizard to select the CSV file that matches the device.

▶ Click on Import.

▷ The description file is loaded.

▷ Controller tags of the inputs (`DeviceName.I:Data`) and outputs (`DeviceName.O:Data`) show the descriptions.

11.5 Reading and writing process data

When configuring the process data, RSLogix 5000 automatically creates objects for the cyclic transmission of the process data. The process data of the device is transmitted in the following objects:

- Input assembly (instance 100) (→ 🗋 256)
- Output assembly (instance 150) (→ 🗋 256)

To access the process data from the application:

Requirements:

✓ The device has been integrated into the EtherNet/IP project (→ Integrating the device into a project 🗋 120).

✓ The process data has been configured.

▶ In [Controller Organizer], select the device folder.

▶ Select the [Controller Tags] node.

▷ Controller Tags shows the input data of the device (`DeviceName.I:Data`).

▷ Controller Tags shows the output data of the device (`DeviceName.O:Data`).

▶ Link control signals of the process data with variables.

▷ The process data of the device can be accessed from the application via the variables.

11.6 Accessing data sets

The user can access the acyclic data sets (→ Data records 🗋 133) via assembly instance 801 of the assembly object (class code 0x04).

- Data sets: System (→ 🗋 126)
- Data sets: AS-i master 1 (→ 🗋 126)
- Data sets: AS-i master 2 (→ 🗋 126)

Acyclic read or write access to the attributes can be implemented using the MSG command (→ RSLogix 5000 user manual).

11.6.1 Data sets: System

Instance	Attribute	Content
801	1	System information (DS1) (→ 🗋 133)

11.6.2 Data sets: AS-i master 1

Instance	Attribute	Content
801	32	Digital inputs of the slaves and master flags (DS2) (→ 🗋 135)
	33	Analogue inputs of slaves 1(A)...15B (DS3) (→ 🗋 139)
	34	Analogue inputs of slaves 16(A)...31B (DS4) (→ 🗋 140)
	35	Digital outputs of slaves 1(A)...31B (DS5) (→ 🗋 141)
	36	Analogue outputs of slaves 1(A)...15B (DS6) (→ 🗋 142)
	37	Analogue outputs of slaves 16(A)...31B (DS7) (→ 🗋 143)
	38	Status flags of the analogue outputs of slaves 1...31 (DS8) (→ 🗋 144)
	39	Slave lists LAS, LDS, LPF, LCE (DS9) (→ 🗋 146)
	40	Slave list LPS (DS10) (→ 🗋 148)
	41	Current configuration data CDI (DS11) (→ 🗋 149)
	42	Projected configuration data PCD (DS12) (→ 🗋 151)
	43	Image of the input parameters of the slaves PI (DS13) (→ 🗋 153)
	44	Image of the output parameters of the slaves PP (DS14) (→ 🗋 154)
	46	Error counter and cycle counter (DS15) (→ 🗋 155)
	47	Error lists LCEMS, LCEAS, LDAE (DS17) (→ 🗋 158)

11.6.3 Data sets: AS-i master 2

Instance	Attribute	Content
801	64	Digital inputs of the slaves and master flags (DS2) (→ 🗋 135)
	65	Analogue inputs of slaves 1(A)...15B (DS3) (→ 🗋 139)
	66	Analogue inputs of slaves 16(A)...31B (DS4) (→ 🗋 140)
	67	Digital outputs of slaves 1(A)...31B (DS5) (→ 🗋 141)
	68	Analogue outputs of slaves 1(A)...15B (DS6) (→ 🗋 142)
	69	Analogue outputs of slaves 16(A)...31B (DS7) (→ 🗋 143)
	70	Status flags of the analogue outputs of slaves 1...31 (DS8) (→ 🗋 144)
	71	Slave lists LAS, LDS, LPF, LCE (DS9) (→ 🗋 146)
	72	Slave list LPS (DS10) (→ 🗋 148)

Instance	Attribute	Content
801	73	Current configuration data CDI (DS11) (→ 🗋 149)
	74	Projected configuration data PCD (DS12) (→ 🗋 151)
	75	Image of the input parameters of the slaves PI (DS13) (→ 🗋 153)
	76	Image of the output parameters of the slaves PP (DS14) (→ 🗋 154)
	78	Error counter and cycle counter (DS15) (→ 🗋 155)
	79	Error lists LCEMS, LCEAS, LDAE (DS17) (→ 🗋 158)

11.7 Accessing the command interface

The user can access the command interface (→ Command interface 🗋 116) of the device via assembly instance 801 of the assembly object (class code 0x04). Separate attribute areas are available for the command requests and the command responses of the various command types.

Available command types:

- System commands (→ 🗋 128)
- AS-i master 1 command (→ 🗋 128)
- AS-i master 2 command (→ 🗋 128)

Acyclic read and write access to the attributes can be implemented using the MSG command (→ RSLogix 5000 user manual).

Command processing consists of the following sub-steps:

1. Send command to the device (write)
2. Check if command was successfully executed (read)
3. If successful, receive the response data (read)

11.7.1 System commands

Instance	Attribute	Content
801	30	System commands: Request Channel
	31	System commands: Response Channel

11.7.2 AS-i master 1 command

Instance	Attribute	Content
801	62	AS-i master 1 commands: Request Channel
	63	AS-i master 1 commands: Response Channel

11.7.3 AS-i master 2 command

Instance	Attribute	Content
801	94	AS-i master 2 commands: Request Channel
	95	AS-i master 2 commands: Response Channel

11.8 Reading diagnostic data

The diagnostic data is transmitted in the cyclic process data:

- Diagnostic (→ 🗋 272)

12 Troubleshooting

12.1 Status LEDs

12.1.1 Status LEDs: Device

The status LEDs on the device provide information about the current status of system components.

LED	Description	Colour	State	Description
H1	Status of the base device	Green	On	The device has started and there is no warning or error message
		Yellow	Flashes (0.5 Hz)	There is a warning message
		Red	Flashes (2 Hz)	There is an error message
H2	Fieldbus interface X6: Status of the data transmission	Yellow	Off	No data transmission
			On	Data transmission
H3	Fieldbus interface X6: Status of the fieldbus connection	Green	Off	No Ethernet connection
			flashes	Ethernet connection established
H4	Fieldbus interface X7: Status of the data transmission	Yellow	Off	No data transmission
			On	Data transmission
H5	Fieldbus interface X7: Status of the fieldbus connection	Green	Off	No Ethernet connection
			flashes	Ethernet connection established
H6	Ethernet interface X8: Status of the data transmission	Yellow	Off	No data transmission
			On	Data transmission
H7	Ethernet interface X8: Status of the fieldbus connection	Green	Off	No Ethernet connection
			Flashes	Ethernet connection established

12.1.2 Status LEDs Start screen

The start screen of the graphical user interface provides the following status information:

LED	Description	Colour	State	Description
Web interface status	Status of the web interface	Red	On	Offline
		Green	On	Online
AS-i 1 operating mode	Operating mode of AS-i master 1	Red	On	Projection mode
		Green	On	Protected mode
AS-i 2 operating mode	Operating mode of AS-i master 2	Red	On	Projection mode
		Green	On	Protected mode
Output control	Control instance of the AS-i outputs	Yellow	On	Manually / manually via PLC
		Green	On	Gateway / gateway with PLC
		Blue	On	PLC
EtherNet/IP	EtherNet/IP status	Red	On	EtherNet/IP inactive
		Green	On	EtherNet/IP active

12.2 Online diagnostic function

The device has an online diagnostic function. It helps the user to localise and eliminate the causes of faults and errors that occur.

12.2.1 Message types

The device's online diagnostic function distinguishes between 3 types of messages:

Symbol	Message type	Description
	Error	• An error occurred; proper operation of the device is disturbed. • User action absolutely required
	Warning	• An irregularity has occurred • User action required
	Event	• An uncritical event has occurred • No user action required

12.2.2 Localising sources of interference

The online diagnostics function helps to determine the cause of warning and error messages. To do this, the menu symbols of the navigation path to the relevant function unit are overlaid with the corresponding message symbol. This allows the operator to easily localise the source of the fault.

Example:



- The following menu symbols are overlaid with an error symbol:
  - Main navigation bar: [AS-i 1]
  - 1st subnavigation bar: [Slaves]
- Cause of error on the menu page [AS-i 1] > [Slaves]

Error messages overlay warning messages that occur simultaneously. Example: If a functional unit causes a warning and an error message at the same time, the error symbol is displayed.

12.3 Availability of the safety PLC

The appearance of the [Safety] menu icon indicates the availability of the safety PLC.

Symbol	Description
	• The device's safety PLC is working correctly. • The operator can access all submenus and functions of the [Safety] menu.
	• The device's safety PLC runs internal hardware tests (PBIT). • The operator cannot access the submenus and functions of the [Safety] menu. • The operator can access all other menus and their sub-menus and functions.
	• The device's safety PLC is not available due to a fatal error. • The operator cannot access the submenus and functions of the [Safety] menu. • To determine the error cause: Online Support Center (OSC) (→ 🗋 111)

If the [Safety] menu symbol remains greyed out for more than 5 minutes and the status LED of the base device (H1) is simultaneously lit yellow, the device must be restarted.

▶ Reboot the device (power reset)

12.4 Storing the diagnostic protocol

To get an overview of the configuration and the current OSC messages, the operator can save the system's diagnostic protocol: Storing the diagnostic protocol (→ 🗋 88)

12.5 Saving the diagnostic package

To obtain the current configuration of the device, OSC messages, the log files of the safety CPUs and information for analysing the system components, the operator can save the system's diagnostic package: Saving the diagnostic package (→ 🗋 89)

12.6 Replacing fail-safe AS-i slaves

The device offers the option of replacing a fail-safe AS-i slave with a new fail-safe AS-i slave in 'protected mode'.

Requirements:

✓ The new and the old AS-i slave have the same AS-i device profile.

✓ The new and the old AS-i slave are of the same function type.

✓ The new AS-i slave has the address `0`.

✓ The new safe AS-i input slave is unlocked.

✓ The [Automatic addressing] parameter is enabled.

▶ Disconnect the AS-i slave to be replaced from the AS-i network.

▷ The device detects a configuration error and generates a corresponding OSC message.

▶ Connect the new AS-i slave to the AS-i network.

▷ The device detects the new AS-i slave.

▷ The device automatically assigns the new AS-i slave the address of the old AS-i slave.

▷ Device detects incorrect code sequence and requests testing of the new AS-i slave via OSC message.

▶ Carry out a test (e.g. E-STOP switch: locking ➞ unlocking).

▷ The device fills the code table with the code sequence of the new fail-safe AS-i input slave.

▷ The OSC message disappears.

▷ The new fail-safe AS-i input slave is ready for operation.

12.7 Replacing a standard AS-i slave

The device offers the option of replacing a standard AS-i slave with a new standard AS-i slave in ‘protected mode’.

Requirements:

✓ The new and the old AS-i slave have the same AS-i device profile.

✓ The new AS-i slave has the address `0`.

✓ The [Automatic addressing] parameter is enabled.

▶ Disconnect the AS-i slave to be replaced from the AS-i network.

  ▷ The device detects a configuration error and generates a corresponding OSC message.

▶ Connect the new AS-i slave to the AS-i network.

  ▷ The device detects the new AS-i slave.

  ▷ The device automatically assigns the new AS-i slave the address of the old AS-i slave.

  ▷ The OSC message disappears.

▷ The new AS-i input slave is ready for operation.

13 Appendix

13.1 Data records

13.1.1 System information (DS1)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Item number (byte 0)								Item number (byte 1)							
1	Item number (byte 2)								Item number (byte 3)							
2	Item number (byte 4)								Item number (byte 5)							
3	Device status (byte 0)								Device status (byte 1)							
4	Serial number (byte 0)								Serial number (byte 1)							
5	Serial number (byte 2)								Serial number (byte 3)							
6	Serial number (byte 4)								Serial number (byte 5)							
7	Serial number (byte 6)								Serial number (byte 7)							
8	Serial number (byte 8)								Serial number (byte 9)							
9	Serial number (byte 10)								Serial number (byte 11)							
10	Software type								Software – major version							
11	Software – minor version								Software – build version							
12	Operating hours – total (byte 3)								Operating hours – total (byte 2)							
13	Operating hours – total (byte 1)								Operating hours – total (byte 0)							
14	Operating hours – uptime (byte 3)								Operating hours – uptime (byte 2)							
15	Operating hours – uptime (byte 1)								Operating hours – uptime (byte 0)							
16	Operating hours – PLC (byte 3)								Operating hours – PLC (byte 2)							
17	Operating hours – PLC (byte 1)								Operating hours – PLC (byte 0)							
18	Operating hours – display (byte 3)								Operating hours – display (byte 2)							
19	Operating hours – display (byte 1)								Operating hours – display (byte 0)							
20	Device temperature (byte 0)								Device temperature (byte 1)							
21	Reserved								Number of AS-i masters							
22	Language (1st letter)								Language (2nd letter)							
23	Return to start screen								Screen saver							
24	Status CODESYS								Output control							
25	System cycle time (byte 1)								System cycle time (byte 0)							

Legend:

• Article number	Article number of the device Per byte: 1 character (as HEX string)	6 bytes	• 0x41 43 34 32 32 53: AC422S • 0x41 43 34 32 34 53: AC424S
• Production status of the device	Hardware version of the device e.g. AB • Device status (byte 0) = 0x41 • Device status (byte 1) = 0x42	2 bytes	Per byte: • 0x41: A … • 0x5A: Z
• Serial number	Serial number Per byte: 1 character (as HEX string)	12 bytes	Per byte: • 0x30: 0 … • 0x39: 9

• Software type	Software type	1 byte	0x56 = V (series)
• Software – major version	Main version of the firmware (e.g. V**5**.1.245)	1 byte	0x00…0xFF
• Software – minor version	Minor version of the firmware (e.g. V5.**1**.245)	1 byte	0x00…0xFF
• Software – build version	Build version of the firmware (e.g. V5.1.**245**)	1 byte	0x00…0xFF
• Operating hours - total	Total operating hours (displayed as unsigned double word, value in s) e.g. 0x000010A709F: 1080448 s	4 bytes	• 0x00 00 00 00: 0 s … • 0xFF FF FF FF: 4294967295 s
• Operating hours – uptime	Operating hours since the last start (displayed as unsigned double word, value in s) e.g. 0x000010A709F: 1080448 s	4 bytes	• 0x00 00 00 00: 0 s … • 0xFF FF FF FF: 4294967295 s
• Operating hours - PLC	Operating hours of the PLC (displayed as unsigned double word, value in s) e.g. 0x000010A709F: 1080448 s	4 bytes	• 0x00 00 00 00: 0 s … • 0xFF FF FF FF: 4294967295 s
• Device temperature	Device temperature of the device (displayed as signed word, value in 1/100°C) e.g. 0x1088: 4232 = 42.32°C	2 bytes	
• Number of AS-i masters	Number of AS-i masters in the device	1 byte	0xVAR_Code = 1
• Language	Language abbreviation of the active GUI language Per byte: 1 character (as HEX string) e.g. 0x44 45: DE	2 byte	• 0x44 45: DE • 0x45 4E: EN • 0x46 52: FR • 0x49 54: IT • 0x45 53: ES • 0x50 54: PT
• Return to start screen	Status parameter return to start screen	1 byte	• 0x00: deactivated • 0x01: activated
• Screen saver	Controlling the screen saver	1 byte	• 0x00: deactivated • 0x01: activated
• CODESYS operating mode		1 byte	• 0x00: deactivated • 0x01: activated
• System cycle time	System cycle time (value in µs)	2 bytes	0x0000…0xFFFF

13.1.2 Digital inputs of the slaves and master flags (DS2)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reserved				Slave 1(A): DI3…DI0				Reserved				Reserved			
1	Reserved				Slave 3(A): DI3…DI0				Reserved				Slave 2(A): DI3…DI0			
2	Reserved				Slave 5(A): DI3…DI0				Reserved				Slave 4(A): DI3…DI0			
3	Reserved				Slave 7(A): DI3…DI0				Reserved				Slave 6(A): DI3…DI0			
4	Reserved				Slave 9(A): DI3…DI0				Reserved				Slave 8(A): DI3…DI0			
5	Reserved				Slave 11(A): DI3…DI0				Reserved				Slave 10(A): DI3…DI0			
6	Reserved				Slave 13(A): DI3…DI0				Reserved				Slave 12(A): DI3…DI0			
7	Reserved				Slave 15(A): DI3…DI0				Reserved				Slave 14(A): DI3…DI0			
8	Reserved				Slave 17(A): DI3…DI0				Reserved				Slave 16(A): DI3…DI0			
9	Reserved				Slave 19(A): DI3…DI0				Reserved				Slave 18(A): DI3…DI0			
10	Reserved				Slave 21(A): DI3…DI0				Reserved				Slave 20(A): DI3…DI0			
11	Reserved				Slave 23(A): DI3…DI0				Reserved				Slave 22(A): DI3…DI0			
12	Reserved				Slave 25(A): DI3…DI0				Reserved				Slave 24(A): DI3…DI0			
13	Reserved				Slave 27(A): DI3…DI0				Reserved				Slave 26(A): DI3…DI0			
14	Reserved				Slave 29(A): DI3…DI0				Reserved				Slave 28(A): DI3…DI0			
15	Reserved				Slave 31(A): DI3…DI0				Reserved				Slave 30(A): DI3…DI0			
16	Reserved				Slave 1B: DI3…DI0				Reserved				Reserved			
17	Reserved				Slave 3B: DI3…DI0				Reserved				Slave 2B: DI3…DI0			
18	Reserved				Slave 5B: DI3…DI0				Reserved				Slave 4B: DI3…DI0			
19	Reserved				Slave 7B: DI3…DI0				Reserved				Slave 6B: DI3…DI0			
20	Reserved				Slave 9B: DI3…DI0				Reserved				Slave 8B: DI3…DI0			
21	Reserved				Slave 11B: DI3…DI0				Reserved				Slave 10B: DI3…DI0			
22	Reserved				Slave 13B: DI3…DI0				Reserved				Slave 12B: DI3…DI0			
23	Reserved				Slave 15B: DI3…DI0				Reserved				Slave 14B: DI3…DI0			
24	Reserved				Slave 17B: DI3…DI0				Reserved				Slave 16B: DI3…DI0			
25	Reserved				Slave 19B: DI3…DI0				Reserved				Slave 18B: DI3…DI0			
26	Reserved				Slave 21B: DI3…DI0				Reserved				Slave 20B: DI3…DI0			
27	Reserved				Slave 23B: DI3…DI0				Reserved				Slave 22B: DI3…DI0			
28	Reserved				Slave 25B: DI3…DI0				Reserved				Slave 24B: DI3…DI0			
29	Reserved				Slave 27B: DI3…DI0				Reserved				Slave 26B: DI3…DI0			
30	Reserved				Slave 29B: DI3…DI0				Reserved				Slave 28B: DI3…DI0			
31	Reserved				Slave 31B: DI3…DI0				Reserved				Slave 30B: DI3…DI0			
32	Status flags of the AS-i master (→ 🗋 136)															
33	Execution Control Flags (→ 🗋 137)															
34	Host Flags (→ 🗋 138)															
35	DAE/EE flags (→ 🗋 138)															

Status flags of the AS-i master

The status flags "AS-i master" provide information about the state of the AS-i master. After a change of state, the AS-i master immediately updates the flags.

Bit															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
ECPS				ECP				-	-	WCD	CM	-	HWDT	SER	HER

Legend:

- HER — Hardware error: Display of hardware errors during the power-on self-test
  - 0x0: no error (default)
  - 0x1: an error has occurred
- SER — Software error: Display of software errors (Stack Overflow, Stack Underflow, Undefined Opcode, Instruction Fault, Illegal Access, Watchdog Timeout)
  - 0x0: no error (default)
  - 0x1: an error has occurred
- HWDT — Host Watchdog Timeout: Display if watchdog was not triggered within 200 ms
  - 0x0: no error (default)
  - 0x1: watchdog not triggered; AS-i master is in offline mode
- CM — Configuration Missing: configuration not yet fully received from the host
  - 0x0: configuration available (PCD, PP and LPS are set)
  - 0x1: configuration missing (default)
- WCD — Watchdog Control Disabled: display whether watchdog signal is being processed
  - 0x0: WD signal is processed (default)
  - 0x1: WD signal is not processed
- ECP — Execution Control Phase:
  - 0x0000: inactive (default)
  - 0x0001: start phase:
  - 0x0010: reserved
  - 0x0011: offline phase
  - 0x0100: detection phase
  - 0x0101: activation phase
  - 0x0110: Normal operation
- ECPS — Execution Control Phase State

  If ECP = 0x0001 (start phase):
  - 0x0000: master start and initialisation
  - 0x0001: waiting for projection
  - 0x0010: waiting for start

  If ECP = 0x0110 (normal operation):
  - 0x0000: normal data exchange
  - 0x0001: slave finder activated

Execution Control Flags

The Execution Control Flags provide information about the execution control of the AS-i master. The flags are updated by the AS-i master immediately after each change.

Bit															
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
-	NOPF	CCOK	PE	-	DEA	AAE	POK	OR	APF	NOA	CA	AA	AN	S0	COK

Legend:

- COK — Config OK
  - 0x0: (default)
  - 0x1: Configuration of all AS-i slaves in the network matches the planning data
- S0 — LDS.0
  - 0x0: (default)
  - 0x1: Slave with address 0 found
- AN — Auto Address Assign
  - 0x0: (default)
  - 0x1: Auto addressing possible
- AA — Auto Address Available
  - 0x0: (default)
  - 0x1: All conditions required for auto-addressing are fulfilled
- CA — Configuration active
  - 0x0: Master in protected mode (default)
  - 0x1: Master in projection mode
- NOA — Normal Operation Active
  - 0x0: (default)
  - 0x1: Master in normal operation
- APF — AS-i Power Fail
  - 0x0: AS-i voltage is OK
  - 0x1: AS-i voltage too low (default)
- OR — Offline Ready
  - 0x0: (default)
  - 0x1: The master has gone through the offline phase and is waiting for APF = 0 and a timeout of 1 s
- POK — Periphery OK
  - 0x0: peripheral error (default)
  - 0x1: no peripheral faults detected (LPF = 0)
- AAE — Auto Address Enable
  - 0x0: auto-addressing disabled (default)
  - 0x1: auto-addressing enabled
- DEA — Data Exchange Active
  - 0x0: no data exchange; ReadID is executed continuously on all slaves
  - 0x1: data exchange enabled between master and slaves (default).
- PE — Protocol error
  - 0x0: no CTT protocol error (default)
  - 0x1: CTT protocol error recognised
- CCOK — CTT Config OK
  - 0x0: (default)
  - 0x1: configuration of all CTT slaves in the network matches projected CTT data (CDDI = PCCD for all CTT slaves)
- NOPF — No Offline Phase Flag
  - 0x0: The master goes through the offline phase when changing to the protected mode the next time (default).
  - 0x1: The master skips the offline phase if one of the following actions is performed:
    - Switch to protected mode
    - Change of the PCD
    - Change of the LPS
    - Change of the PCCD

Host Flags

Bit															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	DEA	OFF

Legend:

- OFF Offline
  - 0x0: (default)
  - 0x1: Execution control of the master changes to the offline mode; this flag is used to realise the function `Set_Offline_Flag()`
- DEA Data Exchange Active
  - 0x0:
  - 0x1: data exchange enabled between master and slaves. This flag is used to realise the function `Set_Data_Exchange()` (default)

DAE/EE flags

Bit															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	DAE	-	-	-	-	-	-	-	EE

Legend:

- DAE Double address detection status
  - 0x0: function disabled (default)
  - 0x1: function enabled
- EE Earth fault detection status
  - 0x0: function disabled
  - 0x1: function enabled (default)

13.1.3 Analogue inputs of slaves 1(A)...15B (DS3)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…4	Analogue input data of single-slave 1 or slave 1A and slave 1B															
5…9	Analogue input data of single-slave 2 or slave 2A and slave 2B															
10…14	Analogue input data of single-slave 3 or slave 3A and slave 3B															
15…19	Analogue input data of single-slave 4 or slave 4A and slave 4B															
20…24	Analogue input data of single-slave 5 or slave 5A and slave 5B															
25…29	Analogue input data of single-slave 6 or slave 6A and slave 6B															
30…34	Analogue input data of single-slave 7 or slave 7A and slave 7B															
35…39	Analogue input data of single-slave 8 or slave 8A and slave 8B															
40…44	Analogue input data of single-slave 9 or slave 9A and slave 9B															
45…49	Analogue input data of single-slave 10 or slave 10A and slave 10B															
50…54	Analogue input data of single-slave 11 or slave 11A and slave 11B															
55…59	Analogue input data of single-slave 12 or slave 12A and slave 12B															
60…64	Analogue input data of single-slave 13 or slave 13A and slave 13B															
65…69	Analogue input data of single-slave 14 or slave 14A and slave 14B															
70…74	Analogue input data of single-slave 15 or slave 15A and slave 15B															

Structure of the entrance areas (5 words):

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	Analogue value of channel 0 of single-slave x or channel 0 of slave xA															
n+1	Analogue value of channel 1 of single-slave x or channel 1 of slave xA															
n+2	Analogue value of channel 2 of single-slave x or channel 0 of slave xB															
n+3	Analogue value of channel 3 of single-slave x or channel 1 of slave xB															
n+4	TIB	--	TIA	--	TOB	--	TOA	--	O3	V3	O2	V2	O1	V1	O0	V0

Legend:

• Vn	Valid bit of the analogue value (channel n)	1 bit	• 0x0: value is invalid • 0x1: value is valid
• On	Overflow bit of the analogue value (channel n)	1 bit	• 0x0: value is in the valid range • 0x1: value is in the invalid range
• TIx	Transfer Input: Transfer to the slave	1 bit	• 0x0: slave sends data as value (15 bit + sign) • 0x1: slave sends data as bit pattern (16 bits, without sign)
• TOx	Transfer Output: Transfer from the slave	1 bit	• 0x0: slave receives data as value (15 bits + sign) • 0x1: slave receives data as bit pattern (16 bits, without sign)

13.1.4 Analogue inputs of slaves 16(A)...31B (DS4)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…4	Analogue input data of single-slave 16 or slave 16A and slave 16B															
5…9	Analogue input data of single-slave 17 or slave 17A and slave 17B															
10…14	Analogue input data of single-slave 18 or slave 18A and slave 18B															
15…19	Analogue input data of single-slave 19 or slave 19A and slave 19B															
20…24	Analogue input data of single-slave 20 or slave 20A and slave 20B															
25…29	Analogue input data of single-slave 21 or slave 21A and slave 21B															
30…34	Analogue input data of single-slave 22 or slave 22A and slave 22B															
35…39	Analogue input data of single-slave 23 or slave 23A and slave 23B															
40…44	Analogue input data of single-slave 24 or slave 24A and slave 24B															
45…49	Analogue input data of single-slave 25 or slave 25A and slave 25B															
50…54	Analogue input data of single-slave 26 or slave 26A and slave 26B															
55…59	Analogue input data of single-slave 27 or slave 27A and slave 27B															
60…64	Analogue input data of single-slave 28 or slave 28A and slave 28B															
65…69	Analogue input data of single-slave 29 or slave 29A and slave 29B															
70…74	Analogue input data of single-slave 30 or slave 30A and slave 30B															
75…79	Analogue input data of single-slave 31 or slave 31A and slave 31B															

Structure of the entrance areas (5 words):

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	Analogue value of channel 0 of single-slave x or channel 0 of slave xA															
n+1	Analogue value of channel 1 of single-slave x or channel 1 of slave xA															
n+2	Analogue value of channel 2 of single-slave x or channel 0 of slave xB															
n+3	Analogue value of channel 3 of single-slave x or channel 1 of slave xB															
n+4	TIB	--	TIA	--	TOB	--	TOA	--	O3	V3	O2	V2	O1	V1	O0	V0

Legend:

• Vn	Valid bit of the analogue value (channel n)	1 bit	• 0x0: value is invalid • 0x1: value is valid
• On	Overflow bit of the analogue value (channel n)	1 bit	• 0x0: value is in the valid range • 0x1: value is in the invalid range
• TIx	Transfer Input: Transfer to the slave	1 bit	• 0x0: slave sends data as value (15 bit + sign) • 0x1: slave sends data as bit pattern (16 bits, without sign)
• TOx	Transfer Output: Transfer from the slave	1 bit	• 0x0: slave receives data as value (15 bits + sign) • 0x1: slave receives data as bit pattern (16 bits, without sign)

13.1.5 Digital outputs of slaves 1(A)...31B (DS5)

Setting the output data of individual AS-i slaves can lead to undesirable system behaviour.

▶ Always use the data set to set the outputs of all AS-i slaves in the network.

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reserved				Slave 1(A): DO3…DO0				Reserved				Reserved			
1	Reserved				Slave 3(A): DO3…DO0				Reserved				Slave 2(A): DO3…DO0			
2	Reserved				Slave 5(A): DO3…DO0				Reserved				Slave 4(A): DO3…DO0			
3	Reserved				Slave 7(A): DO3…DO0				Reserved				Slave 6(A): DO3…DO0			
4	Reserved				Slave 9(A): DO3…DO0				Reserved				Slave 8(A): DO3…DO0			
5	Reserved				Slave 11(A): DO3…DO0				Reserved				Slave 10(A): DO3…DO0			
6	Reserved				Slave 13(A): DO3…DO0				Reserved				Slave 12(A): DO3…DO0			
7	Reserved				Slave 15(A): DO3…DO0				Reserved				Slave 14(A): DO3…DO0			
8	Reserved				Slave 17(A): DO3…DO0				Reserved				Slave 16(A): DO3…DO0			
9	Reserved				Slave 19(A): DO3…DO0				Reserved				Slave 18(A): DO3…DO0			
10	Reserved				Slave 21(A): DO3…DO0				Reserved				Slave 20(A): DO3…DO0			
11	Reserved				Slave 23(A): DO3…DO0				Reserved				Slave 22(A): DO3…DO0			
12	Reserved				Slave 25(A): DO3…DO0				Reserved				Slave 24(A): DO3…DO0			
13	Reserved				Slave 27(A): DO3…DO0				Reserved				Slave 26(A): DO3…DO0			
14	Reserved				Slave 29(A): DO3…DO0				Reserved				Slave 28(A): DO3…DO0			
15	Reserved				Slave 31(A): DO3…DO0				Reserved				Slave 30(A): DO3…DO0			
16	Reserved				Slave 1B: DO3…DO0				Reserved				Reserved			
17	Reserved				Slave 3B: DO3…DO0				Reserved				Slave 2B: DO3…DO0			
18	Reserved				Slave 5B: DO3…DO0				Reserved				Slave 4B: DO3…DO0			
19	Reserved				Slave 7B: DO3…DO0				Reserved				Slave 6B: DO3…DO0			
20	Reserved				Slave 9B: DO3…DO0				Reserved				Slave 8B: DO3…DO0			
21	Reserved				Slave 11B: DO3…DO0				Reserved				Slave 10B: DO3…DO0			
22	Reserved				Slave 13B: DO3…DO0				Reserved				Slave 12B: DO3…DO0			
23	Reserved				Slave 15B: DO3…DO0				Reserved				Slave 14B: DO3…DO0			
24	Reserved				Slave 17B: DO3…DO0				Reserved				Slave 16B: DO3…DO0			
25	Reserved				Slave 19B: DO3…DO0				Reserved				Slave 18B: DO3…DO0			
26	Reserved				Slave 21B: DO3…DO0				Reserved				Slave 20B: DO3…DO0			
27	Reserved				Slave 23B: DO3…DO0				Reserved				Slave 22B: DO3…DO0			
28	Reserved				Slave 25B: DO3…DO0				Reserved				Slave 24B: DO3…DO0			
29	Reserved				Slave 27B: DO3…DO0				Reserved				Slave 26B: DO3…DO0			
30	Reserved				Slave 29B: DO3…DO0				Reserved				Slave 28B: DO3…DO0			
31	Reserved				Slave 31B: DO3…DO0				Reserved				Slave 30B: DO3…DO0			

13.1.6 Analogue outputs of slaves 1(A)...15B (DS6)

Setting the output data of individual AS-i slaves can lead to undesirable system behaviour.

▶ Always use the data set to set the outputs of all AS-i slaves in the network.

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…3	Analogue output data of single-slave 1 or slave 1A and Slave 1B															
4…7	Analogue output data of single-slave 2 or slave 2A and slave 2B															
8…11	Analogue output data of single-slave 3 or slave 3A and slave 3B															
12…15	Analogue output data of single-slave 4 or slave 4A and slave 4B															
16…19	Analogue output data of single-slave 5 or slave 5A and slave 5B															
20…23	Analogue output data of single-slave 6 or slave 6A and slave 6B															
24…27	Analogue output data of single-slave 7 or slave 7A and slave 7B															
28…31	Analogue output data of single-slave 8 or slave 8A and slave 8B															
32…35	Analogue output data of single-slave 9 or slave 9A and slave 9B															
36…39	Analogue output data of single-slave 10 or slave 10A and slave 10B															
40…43	Analogue output data of single-slave 11 or slave 11A and slave 11B															
44…47	Analogue output data of single-slave 12 or slave 12A and slave 12B															
48…51	Analogue output data of single-slave 13 or slave 13A and slave 13B															
52…55	Analogue output data of single-slave 14 or slave 14A and slave 14B															
56…59	Analogue output data of single-slave 15 or slave 15A and slave 15B															

Structure of the output ranges (4 words):

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	Analogue value of channel 0 of single-slave x or channel 0 of slave xA															
n+1	Analogue value of channel 1 of single-slave x or channel 1 of slave xA															
n+2	Analogue value of channel 2 of single-slave x or channel 0 of slave xB															
n+3	Analogue value of channel 3 of single-slave x or channel 1 of slave xB															

13.1.7 Analogue outputs of slaves 16(A)...31B (DS7)

Setting the output data of individual AS-i slaves can lead to undesirable system behaviour.

▶ Always use the data set to set the outputs of all AS-i slaves in the network.

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…3	Analogue output data of single-slave 16 or slave 16A and slave 16B															
4…7	Analogue output data of single-slave 17 or slave 17A and slave 17B															
8…11	Analogue output data of single-slave 18 or slave 18A and slave 18B															
12…15	Analogue output data of single-slave 19 or slave 19A and slave 19B															
16…19	Analogue output data of single-slave 20 or slave 20A and slave 20B															
20…23	Analogue output data of single-slave 21 or slave 21A and slave 21B															
24…27	Analogue output data of single-slave 22 or slave 22A and slave 22B															
28…31	Analogue output data of single-slave 23 or slave 23A and slave 23B															
32…35	Analogue output data of single-slave 24 or slave 24A and slave 24B															
36…39	Analogue output data of single-slave 25 or slave 25A and slave 25B															
40…43	Analogue output data of single-slave 26 or slave 26A and slave 26B															
44…47	Analogue output data of single-slave 27 or slave 27A and slave 27B															
48…51	Analogue output data of single-slave 28 or slave 28A and slave 28B															
52…55	Analogue output data of single-slave 29 or slave 29A and slave 29B															
56…59	Analogue output data of single-slave 30 or slave 30A and slave 30B															
60…63	Analogue output data of single-slave 31 or slave 31A and slave 31B															

Structure of the output ranges (4 words):

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	Analogue value of channel 0 of single-slave x or channel 0 of slave xA															
n+1	Analogue value of channel 1 of single-slave x or channel 1 of slave xA															
n+2	Analogue value of channel 2 of single-slave x or channel 0 of slave xB															
n+3	Analogue value of channel 3 of single-slave x or channel 1 of slave xB															

13.1.8 Status flags of the analogue outputs of slaves 1...31 (DS8)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reserved															
1	Status of the analogue output data of single slave 1 or slave 1A and slave 1B															
2	Status of the analogue output data of single slave 2 or slave 2A and slave 2B															
3	Status of the analogue output data of single slave 3 or slave 3A and slave 3B															
4	Status of the analogue output data of single slave 4 or slave 4A and slave 4B															
5	Status of the analogue output data of single slave 5 or slave 5A and slave 5B															
6	Status of the analogue output data of single slave 6 or slave 6A and slave 6B															
7	Status of the analogue output data of single slave 7 or slave 7A and slave 7B															
8	Status of the analogue output data of single slave 8 or slave 8A and slave 8B															
9	Status of the analogue output data of single slave 9 or slave 9A and slave 9B															
10	Status of the analogue output data of single slave 10 or slave 10A and slave 10B															
11	Status of the analogue output data of single slave 11 or slave 11A and slave 11B															
12	Status of the analogue output data of single slave 12 or slave 12A and slave 12B															
13	Status of the analogue output data of single slave 13 or slave 13A and slave 13B															
14	Status of the analogue output data of single slave 14 or slave 14A and slave 14B															
15	Status of the analogue output data of single slave 15 or slave 15A and slave 15B															
16	Status of the analogue output data of single slave 16 or slave 16A and slave 16B															
17	Status of the analogue output data of single slave 17 or slave 17A and slave 17B															
18	Status of the analogue output data of single slave 18 or slave 18A and slave 18B															
19	Status of the analogue output data of single slave 19 or slave 19A and slave 19B															
20	Status of the analogue output data of single slave 20 or slave 20A and slave 20B															
21	Status of the analogue output data of single slave 21 or slave 21A and slave 21B															
22	Status of the analogue output data of single slave 22 or slave 22A and slave 22B															
23	Status of the analogue output data of single slave 23 or slave 23A and slave 23B															
24	Status of the analogue output data of single slave 24 or slave 24A and slave 24B															
25	Status of the analogue output data of single slave 25 or slave 25A and slave 25B															
26	Status of the analogue output data of single slave 26 or slave 26A and slave 26B															
27	Status of the analogue output data of single slave 27 or slave 27A and slave 27B															
28	Status of the analogue output data of single slave 28 or slave 28A and slave 28B															
29	Status of the analogue output data of single slave 29 or slave 29A and slave 29B															
30	Status of the analogue output data of single slave 30 or slave 30A and slave 30B															
31	Status of the analogue output data of single slave 31 or slave 31A and slave 31B															

Structure of the status flags (1 word):

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	--	TOB	--	TOA	--	OVB	--	OVA	Reserved							

Legend:

• OVx	Output valid: validity of the initial values	1 bit	CTT1 profile: • 0x0: last update of the initial value more than 3.5 s ago • 0x1: slave requests new output data within the next 3 s. CTT2...CTT5 profile: • 0x0: slave receives no new output data. • 0x1: slave receives new output data.
• TOx	Transfer Output: transfer from the slave	1 bit	• 0x0: slave receives data as value (15 bits + sign) • 0x1: slave receives data as bit pattern (16 bits, without sign)

13.1.9 Slave lists LAS, LDS, LPF, LCE (DS9)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…3	List of active slaves (LAS): Mapping: LAS (→ 🗋 146)															
4…7	List of detected slaves (LDS): Mapping: LDS (→ 🗋 146)															
8…11	List of the periphery faults (LPF): Mapping: LPF (→ 🗋 146)															
12…15	List of the configuration errors (LCE): Mapping: LCE (→ 🗋 147)															

Mapping: LAS

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

- Per slave — Activation status of the slave — 1 bit
  - 0x0: slave not activated
  - 0x1: slave activated

Mapping: LDS

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

- Per slave — Status of detected slave — 1 bit
  - 0x0: no slave detected
  - 0x1: slave detected

Mapping: LPF

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

- Per slave — Peripheral error status — 1 bit
  - 0x0: No error
  - 0x1: periphery fault

Mapping: LCE

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

- Per slave — Configuration error status — 1 bit
  - 0x0: no error
  - 0x1: configuration error

13.1.10 Slave list LPS (DS10)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…3	list of the projected slaves (LPS): Mapping: LPS (→ 🗋 148)															

Mapping: LPS

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

• Per slave	Projection status of the slave	1 bit	• 0x0: slave not projected • 0x1: slave projected

13.1.11 Current configuration data CDI (DS11)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Slave 0: ID2 code				Slave 0: ID1 code				Slave 0: ID code				Slave 0: IO code			
1	Slave 1(A): ID2 code				Slave 1(A): ID1 code				Slave 1(A): ID code				Slave 1(A): IO code			
2	Slave 2(A): ID2 code				Slave 2(A): ID1 code				Slave 2(A): ID code				Slave 2(A): IO code			
3	Slave 3(A): ID2 code				Slave 3(A): ID1 code				Slave 3(A): ID code				Slave 3(A): IO code			
4	Slave 4(A): ID2 code				Slave 4(A): ID1 code				Slave 4(A): ID code				Slave 4(A): IO code			
5	Slave 5(A): ID2 code				slave 5(A): ID1 code				Slave 5(A): ID code				Slave 5(A): IO code			
6	Slave 6(A): ID2 code				Slave 6(A): ID1 code				Slave 6(A): ID code				Slave 6(A): IO code			
7	Slave 7(A): ID2 code				Slave 7(A): ID1 code				Slave 7(A): ID code				Slave 7(A): IO code			
8	Slave 8(A): ID2 code				Slave 8(A): ID1 code				Slave 8(A): ID code				Slave 8(A): IO code			
9	Slave 9(A): ID2 code				Slave 9(A): ID1 code				Slave 9(A): ID code				Slave 9(A): IO code			
10	Slave 10(A): ID2 code				Slave 10(A): ID1 code				Slave 10(A): ID code				Slave 10(A): IO code			
11	Slave 11(A): ID2 code				Slave 11(A): ID1 code				Slave 11(A): ID code				Slave 11(A): IO code			
12	Slave 12(A): ID2 code				Slave 12(A): ID1 code				Slave 12(A): ID code				Slave 12(A): IO code			
13	Slave 13(A): ID2 code				Slave 13(A): ID1 code				Slave 13(A): ID code				Slave 13(A): IO code			
14	Slave 14(A): ID2 code				Slave 14(A): ID1 code				Slave 14(A): ID code				Slave 14(A): IO code			
15	Slave 15(A): ID2 code				Slave 15(A): ID1 code				Slave 15(A): ID code				Slave 15(A): IO code			
16	Slave 16(A): ID2 code				Slave 16(A): ID1 code				Slave 16(A): ID code				Slave 16(A): IO code			
17	Slave 17(A): ID2 code				Slave 17(A): ID1 code				Slave 17(A): ID code				Slave 17(A): IO code			
18	Slave 18(A): ID2 code				Slave 18(A): ID1 code				Slave 18(A): ID code				Slave 18(A): IO code			
19	Slave 19(A): ID2 code				Slave 19(A): ID1 code				Slave 19(A): ID code				Slave 19(A): IO code			
20	Slave 20(A): ID2 code				Slave 20(A): ID1 code				Slave 20(A): ID code				Slave 20(A): IO code			
21	Slave 21(A): ID2 code				Slave 21(A): ID1 code				Slave 21(A): ID code				Slave 21(A): IO code			
22	Slave 22(A): ID2 code				Slave 22(A): ID1 code				Slave 22(A): ID code				Slave 22(A): IO code			
23	Slave 23(A): ID2 code				Slave 23(A): ID1 code				Slave 23(A): ID code				Slave 23(A): IO code			
24	Slave 24(A): ID2 code				Slave 24(A): ID1 code				Slave 24(A): ID code				Slave 24(A): IO code			
25	Slave 25(A): ID2 code				Slave 25(A): ID1 code				Slave 25(A): ID code				Slave 25(A): IO code			
26	Slave 26(A): ID2 code				Slave 26(A): ID1 code				Slave 26(A): ID code				Slave 26(A): IO code			
27	Slave 27(A): ID2 code				Slave 27(A): ID1 code				Slave 27(A): ID code				Slave 27(A): IO code			
28	Slave 28(A): ID2 code				Slave 28(A): ID1 code				Slave 28(A): ID code				Slave 28(A): IO code			
29	Slave 29(A): ID2 code				Slave 29(A): ID1 code				Slave 29(A): ID code				Slave 29(A): IO code			
30	Slave 30(A): ID2 code				Slave 30(A): ID1 code				Slave 30(A): ID code				Slave 30(A): IO code			
31	Slave 31(A): ID2 code				Slave 31(A): ID1 code				Slave 31(A): ID code				Slave 31(A): IO code			
32	Reserved				Reserved				Reserved				Reserved			
33	Slave 1B: ID2 code				Slave 1B: ID1 code				Slave 1B: ID code				Slave 1B: IO code			
34	Slave 2B: ID2 code				Slave 2B: ID1 code				Slave 2B: ID code				Slave 2B: IO code			
35	Slave 3B: ID2 code				Slave 3B: ID1 code				Slave 3B: ID code				Slave 3B: IO code			
36	Slave 4B: ID2 code				Slave 4B: ID1 code				Slave 4B: ID code				Slave 4B: IO code			
37	Slave 5B: ID2 code				Slave 5B: ID1 code				Slave 5B: ID code				Slave 5B: IO code			
38	Slave 6B: ID2 code				Slave 6B: ID1 code				Slave 6B: ID code				Slave 6B: IO code			
39	Slave 7B: ID2 code				Slave 7B: ID1 code				Slave 7B: ID code				Slave 7B: IO code			
40	Slave 8B: ID2 code				Slave 8B: ID1 code				Slave 8B: ID code				Slave 8B: IO code			
41	Slave 9B: ID2 code				Slave 9B: ID1 code				Slave 9B: ID code				Slave 9B: IO code			

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
42	Slave 10B: ID2 code				Slave 10B: ID1 code				Slave 10B: ID code				Slave 10B: IO code			
43	Slave 11B: ID2 code				Slave 11B: ID1 code				Slave 11B: ID code				Slave 11B: IO code			
44	Slave 12B: ID2 code				Slave 12B: ID1 code				Slave 12B: ID code				Slave 12B: IO code			
45	Slave 13B: ID2 code				Slave 13B: ID1 code				Slave 13B: ID code				Slave 13B: IO code			
46	Slave 14B: ID2 code				Slave 14B: ID1 code				Slave 14B: ID code				Slave 14B: IO code			
47	Slave 15B: ID2 code				Slave 15B: ID1 code				Slave 15B: ID code				Slave 15B: IO code			
48	Slave 16B: ID2 code				Slave 16B: ID1 code				Slave 16B: ID code				Slave 16B: IO code			
49	Slave 17B: ID2 code				Slave 17B: ID1 code				Slave 17B: ID code				Slave 17B: IO code			
50	Slave 18B: ID2 code				Slave 18B: ID1 code				Slave 18B: ID code				Slave 18B: IO code			
51	Slave 19B: ID2 code				Slave 19B: ID1 code				Slave 19B: ID code				Slave 19B: IO code			
52	Slave 20B: ID2 code				Slave 20B: ID1 code				Slave 20B: ID code				Slave 20B: IO code			
53	Slave 21B: ID2 code				Slave 21B: ID1 code				Slave 21B: ID code				Slave 21B: IO code			
54	Slave 22B: ID2 code				Slave 22B: ID1 code				Slave 22B: ID code				Slave 22B: IO code			
55	Slave 23B: ID2 code				Slave 23B: ID1 code				Slave 23B: ID code				Slave 23B: IO code			
56	Slave 24B: ID2 code				Slave 24B: ID1 code				Slave 24B: ID code				Slave 24B: IO code			
57	Slave 25B: ID2 code				Slave 25B: ID1 code				Slave 25B: ID code				Slave 25B: IO code			
58	Slave 26B: ID2 code				Slave 26B: ID1 code				Slave 26B: ID code				Slave 26B: IO code			
59	Slave 27B: ID2 code				Slave 27B: ID1 code				Slave 27B: ID code				Slave 27B: IO code			
60	Slave 28B: ID2 code				Slave 28B: ID1 code				Slave 28B: ID code				Slave 28B: IO code			
61	Slave 29B: ID2 code				Slave 29B: ID1 code				Slave 29B: ID code				Slave 29B: IO code			
62	Slave 30B: ID2 code				Slave 30B: ID1 code				Slave 30B: ID code				Slave 30B: IO code			
63	Slave 31B: ID2 code				Slave 31B: ID1 code				Slave 31B: ID code				Slave 31B: IO code			

13.1.12 Projected configuration data PCD (DS12)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reserved				Reserved				Reserved				Reserved			
1	Slave 1(A): ID2 code				Slave 1(A): ID1 code				Slave 1(A): ID code				Slave 1(A): IO code			
2	Slave 2(A): ID2 code				Slave 2(A): ID1 code				Slave 2(A): ID code				Slave 2(A): IO code			
3	Slave 3(A): ID2 code				Slave 3(A): ID1 code				Slave 3(A): ID code				Slave 3(A): IO code			
4	Slave 4(A): ID2 code				Slave 4(A): ID1 code				Slave 4(A): ID code				Slave 4(A): IO code			
5	Slave 5(A): ID2 code				Slave 5(A): ID1 code				Slave 5(A): ID code				Slave 5(A): IO code			
6	Slave 6(A): ID2 code				Slave 6(A): ID1 code				Slave 6(A): ID code				Slave 6(A): IO code			
7	Slave 7(A): ID2 code				Slave 7(A): ID1 code				Slave 7(A): ID code				Slave 7(A): IO code			
8	Slave 8(A): ID2 code				Slave 8(A): ID1 code				Slave 8(A): ID code				Slave 8(A): IO code			
9	Slave 9(A): ID2 code				Slave 9(A): ID1 code				Slave 9(A): ID code				Slave 9(A): IO code			
10	Slave 10(A): ID2 code				Slave 10(A): ID1 code				Slave 10(A): ID code				Slave 10(A): IO code			
11	Slave 11(A): ID2 code				Slave 11(A): ID1 code				Slave 11(A): ID code				Slave 11(A): IO code			
12	Slave 12(A): ID2 code				Slave 12(A): ID1 code				Slave 12(A): ID code				Slave 12(A): IO code			
13	Slave 13(A): ID2 code				Slave 13(A): ID1 code				Slave 13(A): ID code				Slave 13(A): IO code			
14	Slave 14(A): ID2 code				Slave 14(A): ID1 code				Slave 14(A): ID code				Slave 14(A): IO code			
15	Slave 15(A): ID2 code				Slave 15(A): ID1 code				Slave 15(A): ID code				Slave 15(A): IO code			
16	Slave 16(A): ID2 code				Slave 16(A): ID1 code				Slave 16(A): ID code				Slave 16(A): IO code			
17	Slave 17(A): ID2 code				Slave 17(A): ID1 code				Slave 17(A): ID code				Slave 17(A): IO code			
18	Slave 18(A): ID2 code				Slave 18(A): ID1 code				Slave 18(A): ID code				Slave 18(A): IO code			
19	Slave 19(A): ID2 code				Slave 19(A): ID1 code				Slave 19(A): ID code				Slave 19(A): IO code			
20	Slave 20(A): ID2 code				Slave 20(A): ID1 code				Slave 20(A): ID code				Slave 20(A): IO code			
21	Slave 21(A): ID2 code				Slave 21(A): ID1 code				Slave 21(A): ID code				Slave 21(A): IO code			
22	Slave 22(A): ID2 code				Slave 22(A): ID1 code				Slave 22(A): ID code				Slave 22(A): IO code			
23	Slave 23(A): ID2 code				Slave 23(A): ID1 code				Slave 23(A): ID code				Slave 23(A): IO code			
24	Slave 24(A): ID2 code				Slave 24(A): ID1 code				Slave 24(A): ID code				Slave 24(A): IO code			
25	Slave 25(A): ID2 code				Slave 25(A): ID1 code				Slave 25(A): ID code				Slave 25(A): IO code			
26	Slave 26(A): ID2 code				Slave 26(A): ID1 code				Slave 26(A): ID code				Slave 26(A): IO code			
27	Slave 27(A): ID2 code				Slave 27(A): ID1 code				Slave 27(A): ID code				Slave 27(A): IO code			
28	Slave 28(A): ID2 code				Slave 28(A): ID1 code				Slave 28(A): ID code				Slave 28(A): IO code			
29	Slave 29(A): ID2 code				Slave 29(A): ID1 code				Slave 29(A): ID code				Slave 29(A): IO code			
30	Slave 30(A): ID2 code				Slave 30(A): ID1 code				Slave 30(A): ID code				Slave 30(A): IO code			
31	Slave 31(A): ID2 code				Slave 31(A): ID1 code				Slave 31(A): ID code				Slave 31(A): IO code			
32	Reserved				Reserved				Reserved				Reserved			
33	Slave 1B: ID2 code				Slave 1B: ID1 code				Slave 1B: ID code				Slave 1B: IO code			
34	Slave 2B: ID2 code				Slave 2B: ID1 code				Slave 2B: ID code				Slave 2B: IO code			
35	Slave 3B: ID2 code				Slave 3B: ID1 code				Slave 3B: ID code				Slave 3B: IO code			
36	Slave 4B: ID2 code				Slave 4B: ID1 code				Slave 4B: ID code				Slave 4B: IO code			
37	Slave 5B: ID2 code				Slave 5B: ID1 code				Slave 5B: ID code				Slave 5B: IO code			
38	Slave 6B: ID2 code				Slave 6B: ID1 code				Slave 6B: ID code				Slave 6B: IO code			
39	Slave 7B: ID2 code				Slave 7B: ID1 code				Slave 7B: ID code				Slave 7B: IO code			
40	Slave 8B: ID2 code				Slave 8B: ID1 code				Slave 8B: ID code				Slave 8B: IO code			
41	Slave 9B: ID2 code				Slave 9B: ID1 code				Slave 9B: ID code				Slave 9B: IO code			

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
42	Slave 10B: ID2 code				Slave 10B: ID1 code				Slave 10B: ID code				Slave 10B: IO code			
43	Slave 11B: ID2 code				Slave 11B: ID1 code				Slave 11B: ID code				Slave 11B: IO code			
44	Slave 12B: ID2 code				Slave 12B: ID1 code				Slave 12B: ID code				Slave 12B: IO code			
45	Slave 13B: ID2 code				Slave 13B: ID1 code				Slave 13B: ID code				Slave 13B: IO code			
46	Slave 14B: ID2 code				Slave 14B: ID1 code				Slave 14B: ID code				Slave 14B: IO code			
47	Slave 15B: ID2 code				Slave 15B: ID1 code				Slave 15B: ID code				Slave 15B: IO code			
48	Slave 16B: ID2 code				Slave 16B: ID1 code				Slave 16B: ID code				Slave 16B: IO code			
49	Slave 17B: ID2 code				Slave 17B: ID1 code				Slave 17B: ID code				Slave 17B: IO code			
50	Slave 18B: ID2 code				Slave 18B: ID1 code				Slave 18B: ID code				Slave 18B: IO code			
51	Slave 19B: ID2 code				Slave 19B: ID1 code				Slave 19B: ID code				Slave 19B: IO code			
52	Slave 20B: ID2 code				Slave 20B: ID1 code				Slave 20B: ID code				Slave 20B: IO code			
53	Slave 21B: ID2 code				Slave 21B: ID1 code				Slave 21B: ID code				Slave 21B: IO code			
54	Slave 22B: ID2 code				Slave 22B: ID1 code				Slave 22B: ID code				Slave 22B: IO code			
55	Slave 23B: ID2 code				Slave 23B: ID1 code				Slave 23B: ID code				Slave 23B: IO code			
56	Slave 24B: ID2 code				Slave 24B: ID1 code				Slave 24B: ID code				Slave 24B: IO code			
57	Slave 25B: ID2 code				Slave 25B: ID1 code				Slave 25B: ID code				Slave 25B: IO code			
58	Slave 26B: ID2 code				Slave 26B: ID1 code				Slave 26B: ID code				Slave 26B: IO code			
59	Slave 27B: ID2 code				Slave 27B: ID1 code				Slave 27B: ID code				Slave 27B: IO code			
60	Slave 28B: ID2 code				Slave 28B: ID1 code				Slave 28B: ID code				Slave 28B: IO code			
61	Slave 29B: ID2 code				Slave 29B: ID1 code				Slave 29B: ID code				Slave 29B: IO code			
62	Slave 30B: ID2 code				Slave 30B: ID1 code				Slave 30B: ID code				Slave 30B: IO code			
63	Slave 31B: ID2 code				Slave 31B: ID1 code				Slave 31B: ID code				Slave 31B: IO code			

13.1.13 Image of the input parameters of the slaves PI (DS13)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reserved				Slave 1(A): P3…P0				Reserved				Reserved			
1	Reserved				Slave 3(A): P3…P0				Reserved				Slave 2(A): P3…P0			
2	Reserved				Slave 5(A): P3…P0				Reserved				Slave 4(A): P3…P0			
3	Reserved				Slave 7(A): P3…P0				Reserved				Slave 6(A): P3…P0			
4	Reserved				Slave 9(A): P3…P0				Reserved				Slave 8(A): P3…P0			
5	Reserved				Slave 11(A): P3…P0				Reserved				Slave 10(A): P3…P0			
6	Reserved				Slave 13(A): P3…P0				Reserved				Slave 12(A): P3…P0			
7	Reserved				Slave 15(A): P3…P0				Reserved				Slave 14(A): P3…P0			
8	Reserved				Slave 17(A): P3…P0				Reserved				Slave 16(A): P3…P0			
9	Reserved				Slave 19(A): P3…P0				Reserved				Slave 18(A): P3…P0			
10	Reserved				Slave 21(A): P3…P0				Reserved				Slave 20(A): P3…P0			
11	Reserved				Slave 23(A): P3…P0				Reserved				Slave 22(A): P3…P0			
12	Reserved				Slave 25(A): P3…P0				Reserved				Slave 24(A): P3…P0			
13	Reserved				Slave 27(A): P3…P0				Reserved				Slave 26(A): P3…P0			
14	Reserved				Slave 29(A): P3…P0				Reserved				Slave 28(A): P3…P0			
15	Reserved				Slave 31(A): P3…P0				Reserved				Slave 30(A): P3…P0			
16	Reserved				Slave 1B: P3…P0				Reserved				Reserved			
17	Reserved				Slave 3B: P3…P0				Reserved				Slave 2B: P3…P0			
18	Reserved				Slave 5B: P3…P0				Reserved				Slave 4B: P3…P0			
19	Reserved				Slave 7B: P3…P0				Reserved				Slave 6B: P3…P0			
20	Reserved				Slave 9B: P3…P0				Reserved				Slave 8B: P3…P0			
21	Reserved				Slave 11B: P3…P0				Reserved				Slave 10B: P3…P0			
22	Reserved				Slave 13B: P3…P0				Reserved				Slave 12B: P3…P0			
23	Reserved				Slave 15B: P3…P0				Reserved				Slave 14B: P3…P0			
24	Reserved				Slave 17B: P3…P0				Reserved				Slave 16B: P3…P0			
25	Reserved				Slave 19B: P3…P0				Reserved				Slave 18B: P3…P0			
26	Reserved				Slave 21B: P3…P0				Reserved				Slave 20B: P3…P0			
27	Reserved				Slave 23B: P3…P0				Reserved				Slave 22B: P3…P0			
28	Reserved				Slave 25B: P3…P0				Reserved				slave 24B: P3…P0			
29	Reserved				Slave 27B: P3…P0				Reserved				Slave 26B: P3…P0			
30	Reserved				Slave 29B: P3…P0				Reserved				Slave 28B: P3…P0			
31	Reserved				Slave 31B: P3…P0				Reserved				Slave 30B: P3…P0			

13.1.14 Image of the output parameters of the slaves PP (DS14)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reserved				Slave 1(A): P3…P0				Reserved				Reserved			
1	Reserved				Slave 3(A): P3…P0				Reserved				Slave 2(A): P3…P0			
2	Reserved				Slave 5(A): P3…P0				Reserved				Slave 4(A): P3…P0			
3	Reserved				Slave 7(A): P3…P0				Reserved				Slave 6(A): P3…P0			
4	Reserved				Slave 9(A): P3…P0				Reserved				Slave 8(A): P3…P0			
5	Reserved				Slave 11(A): P3…P0				Reserved				Slave 10(A): P3…P0			
6	Reserved				Slave 13(A): P3…P0				Reserved				Slave 12(A): P3…P0			
7	Reserved				Slave 15(A): P3…P0				Reserved				Slave 14(A): P3…P0			
8	Reserved				Slave 17(A): P3…P0				Reserved				Slave 16(A): P3…P0			
9	Reserved				Slave 19(A): P3…P0				Reserved				Slave 18(A): P3…P0			
10	Reserved				Slave 21(A): P3…P0				Reserved				Slave 20(A): P3…P0			
11	Reserved				Slave 23(A): P3…P0				Reserved				Slave 22(A): P3…P0			
12	Reserved				Slave 25(A): P3…P0				Reserved				Slave 24(A): P3…P0			
13	Reserved				Slave 27(A): P3…P0				Reserved				Slave 26(A): P3…P0			
14	Reserved				Slave 29(A): P3…P0				Reserved				Slave 28(A): P3…P0			
15	Reserved				Slave 31(A): P3…P0				Reserved				Slave 30(A): P3…P0			
16	Reserved				Slave 1B: P3…P0				Reserved				Reserved			
17	Reserved				Slave 3B: P3…P0				Reserved				Slave 2B: P3…P0			
18	Reserved				Slave 5B: P3…P0				Reserved				Slave 4B: P3…P0			
19	Reserved				Slave 7B: P3…P0				Reserved				Slave 6B: P3…P0			
20	Reserved				Slave 9B: P3…P0				Reserved				Slave 8B: P3…P0			
21	Reserved				Slave 11B: P3…P0				Reserved				Slave 10B: P3…P0			
22	Reserved				Slave 13B: P3…P0				Reserved				Slave 12B: P3…P0			
23	Reserved				Slave 15B: P3…P0				Reserved				Slave 14B: P3…P0			
24	Reserved				Slave 17B: P3…P0				Reserved				Slave 16B: P3…P0			
25	Reserved				Slave 19B: P3…P0				Reserved				Slave 18B: P3…P0			
26	Reserved				Slave 21B: P3…P0				Reserved				Slave 20B: P3…P0			
27	Reserved				Slave 23B: P3…P0				Reserved				Slave 22B: P3…P0			
28	Reserved				Slave 25B: P3…P0				Reserved				Slave 24B: P3…P0			
29	Reserved				Slave 27B: P3…P0				Reserved				Slave 26B: P3…P0			
30	Reserved				Slave 29B: P3…P0				Reserved				Slave 28B: P3…P0			
31	Reserved				Slave 31B: P3…P0				Reserved				Slave 30B: P3…P0			

13.1.15 Error counter and cycle counter (DS15)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Error counter in slave 0															
1	Error counter in slave 1(A)															
2	Error counter in slave 2(A)															
3	Error counter in slave 3(A)															
4	Error counter in slave 4(A)															
5	Error counter in slave 5(A)															
6	Error counter in slave 6(A)															
7	Error counter in slave 7(A)															
8	Error counter in slave 8(A)															
9	Error counter in slave 9(A)															
10	Error counter in slave 10(A)															
11	Error counter in slave 11(A)															
12	Error counter in slave 12(A)															
13	Error counter in slave 13(A)															
14	Error counter in slave 14(A)															
15	Error counter in slave 15(A)															
16	Error counter in slave 16(A)															
17	Error counter in slave 17(A)															
18	Error counter in slave 18(A)															
19	Error counter in slave 19(A)															
20	Error counter in slave 20(A)															
21	Error counter in slave 21(A)															
22	Error counter in slave 22(A)															
23	Error counter in slave 23(A)															
24	Error counter in slave 24(A)															
25	Error counter in slave 25(A)															
26	Error counter in slave 26(A)															
27	Error counter in slave 27(A)															
28	Error counter in slave 28(A)															
29	Error counter in slave 29(A)															
30	Error counter in slave 30(A)															
31	Error counter in slave 31(A)															
32	Reserved															
33	Error counter in slave 1B															
34	Error counter in slave 2B															
35	Error counter in slave 3B															
36	Error counter in slave 4B															
37	Error counter in slave 5B															
38	Error counter in slave 6B															
39	Error counter in slave 7B															
40	Error counter in slave 8B															
41	Error counter in slave 9B															

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
42	Error counter in slave 10B															
43	Error counter in slave 11B															
44	Error counter in slave 12B															
45	Error counter in slave 13B															
46	Error counter in slave 14B															
47	Error counter in slave 15B															
48	Error counter in slave 16B															
49	Error counter in slave 17B															
50	Error counter in slave 18B															
51	Error counter in slave 19B															
52	Error counter in slave 20B															
53	Error counter in slave 21B															
54	Error counter in slave 22B															
55	Error counter in slave 23B															
56	Error counter in slave 24B															
57	Error counter in slave 25B															
58	Error counter in slave 26B															
59	Error counter in slave 27B															
60	Error counter in slave 28B															
61	Error counter in slave 29B															
62	Error counter in slave 30B															
63	Error counter in slave 31B															
64	AS-i cycle counter															
65	Configuration error counter															
66	AS-i error status: Mapping: AS-i error status (→ 157)															
67	Telegram error rate															
68	Telegram error counter															
69	Voltage error counter 22.5 V															
70	Voltage error counter 19 V															
71	Earth fault counter															

Legend:

• Error counter slave x	Counter for error in slave x	1 word	• 0x0000: 0 … • 0xFFFF: 65535
• AS-i cycle counter	Counter for completed AS-i cycles	1 word	• 0x0000: 0 … • 0xFFFF: 65535
• Configuration error counter	Counter for configuration errors	1 word	• 0x0000: 0 … • 0xFFFF: 65535
• Telegram error rate	Number of faulty telegrams during the past 2000 telegram cycles	1 word	• 0x0000: 0 … • 0x07D0: 2000

• Telegram error counter	Counter for telegram errors	1 word	• 0x0000: 0 … • 0xFFFF: 65535
• Voltage error counter 22.5 V	Counter for voltage drops below 22.5 V	1 word	• 0x0000: 0 … • 0xFFFF: 65535
• Voltage error counter 19.0 V	Counter for voltage drops below 19.0 V	1 word	• 0x0000: 0 … • 0xFFFF: 65535
• Earth fault counter	Counter for earth faults	1 word	• 0x0000: 0 … • 0xFFFF: 65535

Mapping: AS-i error status

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	-	-	PF19.0	PF22.5	EF	S0	PM	IE	-	-	-	DA	PE	CE3	CE2	CE1

Legend:

• CE1	Configuration Error Type 1: Configuration error – missing slave	1 bit	• 0x0: no error • 0x1: error
• CE2	Configuration Error Type 2: configuration error – surplus slave	1 bit	• 0x0: no error • 0x1: error
• CE3	Configuration Error Type 3: configuration error – slave with wrong profile	1 bit	• 0x0: no error • 0x1: error
• PE	Peripheral Error Peripheriefehler	1 bit	• 0x0: no error • 0x1: error
• DA	Double Address Error Doppeladressfehler	1 bit	• 0x0: no error • 0x1: error
• IE	Internal AS-i Master Error Interner AS-i Master-Fehler	1 bit	• 0x0: no error • 0x1: error
• PM	Projection mode Projektierungsmodus	1 bit	• 0x0: protected mode • 0x1: projection mode
• S0	Slave Address 0 Detected: slave with address 0 detected	1 bit	• 0x0: no slave with address 0 detected • 0x1: slave with address 0 detected
• EF	Earth Fault	1 bit	• 0x0: no error • 0x1: Error
• PF22.5	Power fail 22.5 V: Voltage drop below 19.0 V	1 bit	• 0x0: no error • 0x1: error
• PF19.0	Power Fail 19.0 V: Voltage drop below 19.0 V	1 bit	• 0x0: no error • 0x1: error

13.1.16 Error lists LCEMS, LCEAS, LDAE (DS17)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0…3	Mapping: LCEMS (list of configuration errors - missing slaves) (→ 🗋 158)															
4…7	Mapping: LCEAS (list of configuration errors - additional slaves) (→ 🗋 158)															
8…11	Mapping: LDAE (list of double address errors) (→ 🗋 158)															

Mapping: LCEMS (list of configuration errors - missing slaves)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

• per slave	Configuration error status – missing slave	1 bit	• 0x0: no error • 0x1: configuration error

Mapping: LCEAS (list of configuration errors - additional slaves)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

• per slave	Configuration error status – additional slave	1 bit	• 0x0: no error • 0x1: configuration error

Mapping: LDAE (list of double address errors)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

• per slave	Double address error status	1 bit	• 0x0: no error • 0x1: double address error

13.1.17 Fieldbus information (DS18)

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Fieldbus status								Fieldbus type							
1	Ethernet connection status								Reserved							
2	IP address (byte 2)								IP address (byte 1, MSB)							
3	IP address (byte 4, LSB)								IP address (byte 3)							
4	Fieldbus subnet mask (byte 2)								Fieldbus subnet mask (byte 1, MSB)							
5	Fieldbus subnet mask (byte 4, LSB)								Fieldbus subnet mask (byte 3)							
6	Fieldbus gateway address (byte 2)								Fieldbus gateway address (byte 1, MSB)							
7	Fieldbus gateway address (byte 4, LSB)								Fieldbus gateway address (byte 3)							
8	MAC0 (byte 2)								MAC0 (byte 1, MSB)							
9	MAC0 (byte 4)								MAC0 (byte 3)							
10	MAC0 (byte 6, LSB)								MAC0 (byte 5)							
11	MAC1 (byte 2)								MAC1 (byte 1, MSB)							
12	MAC1 (byte 4)								MAC1 (byte 3)							
13	MAC1 (byte 6, LSB)								MAC1 (byte 5)							
14	MAC2 (byte 2)								MAC2 (byte 1, MSB)							
15	MAC2 (byte 4)								MAC2 (byte 3)							
16	MAC2 (byte 6, LSB)								MAC2 (byte 5)							
17	Reserved								Reserved							
18	Reserved								Reserved							

Legend:

- Fieldbus type — Name of the fieldbus — 1 byte
  - 0x00: no fieldbus available
  - 0x03: EtherNet/IP
- Fieldbus status — Status of the fieldbus connection — 1 byte
  - 0x00: initialising
  - 0x01: waiting for connection
  - 0x02: connection is established
  - 0x03: configuration of the connection in progress
  - 0x04: parameter setting in progress
  - 0x05: waiting for module configuration
  - 0x06: cyclic data exchange with the fieldbus controller/ host
  - 0x07: connection establishment
- Ethernet connection status — Status of the Ethernet connections on ports X6 and X7 — 1 byte
  - 0x00: no connection
  - 0x01: connection on port X7 established, no connection on port X6
  - 0x02: connection on port X6 established, no connection on port X7
  - 0x03: connection on ports X6 and X7 established
- Fieldbus address — Device address — 4 bytes

  One segment of the IP address per byte

  e.g. 192.168.0.102
  - Byte 1: 0xC0(192)
  - Byte 2: 0xA8 (= 168)
  - Byte 3: 0x00 (= 0)
  - Byte 4: 0x66 (= 102)

• Fieldbus subnet mask	Subnet mask of the network segment	4 bytes	One segment of the subnet mask per byte e.g. 255.255.255.0 • Byte 1: 0xFF (= 255) • Byte 2: 0xFF (= 255) • Byte 3: 0xFF (= 255) • Byte 4: 0x00 (= 0)
• Fieldbus gateway address	IP address of the network gateway	4 bytes	One segment of the gateway address per byte e.g. 192.168.0.1 • Byte 1: 0xC0(192) • Byte 2: 0xA8 (= 168) • Byte 3: 0x00 (= 0) • Byte 4: 0x01 (= 1)
• MAC0	MAC ID of the EtherNet/IP interface; MAC is fixed	6 bytes	One MAC segment per byte 00:00:00:00:00:00 • Byte 1: 0x00 ... • Byte 6: 0x00
• MAC1	MAC of Ethernet port X6	6 bytes	One MAC segment per byte e.g. 00:02:01:01:98:D2 • Byte 1: 0xD2 ... • Byte 6: 0x00
• MAC2	MAC of Ethernet port X7 MAC2 = MAC1 (→ MAC1)	6 bytes	One MAC segment per byte e.g. 00:02:01:01:98:D2 • Byte 1: 0xD2 ... • Byte 6: 0x00

13.2 Commands

13.2.1 Quick set-up AS-i masters 1 + 2 (0x0101)

Execute the “Quick Setup” function on one or more AS-i masters.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0101															
2	Reserved								Reserved						M2	M1
3...119	Reserved															

Legend:

• M1	AS-i master 1	1 bit	• 0x0: do not execute a quick setup on master • 0x1: execute a quick setup on the AS-i master
• M2	AS-i master 2	1 bit	• 0x0: do not execute a quick setup on master • 0x1: execute a quick setup on the AS-i master

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0101															
2	Reserved								Command status							
3	M2: error code								M1: error code							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

13.2.2 Changing the operating language (0x0103)

Setting the language of the display and web interface

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0103															
1	LANG_ID															
3...119	Reserved															

Legend:

• LANG_ID	User language	1 word	• 0x0000: no language switching, only query • 0x4445: DE, German • 0x454E: EN, English (default) • 0x4652: FR, French • 0x4954: IT, Italian • 0x4553: ES, Spanish • 0x5054: PT, Portuguese

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0103															
2	Reserved								Command status							
3	Error code															
1	LANG_ID															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• LANG_ID	User language	1 word	• 0x0000: no language switching, only query • 0x4445: DE, German • 0x454E: EN, English (default) • 0x4652: FR, French • 0x4954: IT, Italian • 0x4553: ES, Spanish • 0x5054: PT, Portuguese

Error codes

- 0x0000 no error
- 0x0001 Language is unknown or not available in this software version

When querying the currently set language (`LANG_ID = 0x0000`), the error code `0x0001` is displayed.

13.2.3 Changing display settings (0x0104)

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0104															
2	Reserved								Reserved						RS	DS
3...119	Reserved															

Legend:

• DS	Screen saver for device display	1 bit	• 0x0: deactivated • 0x1: activated
• RS	Return to start screen after timeout	1 bit	• 0x0: no return • 0x1: return

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0104															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

none

13.2.4 Setting output control (0x0105)

Setting the control instance for the outputs of the non-safe AS-i slaves

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0105															
2	Reserved								OC							
3...119	Reserved															

Legend:

• OC	Output Control Ausgangssteuerung	1 byte	• 0x01: gateway (GW) • 0x02: manual (MAN) • 0x03: PLC (PLC)

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0105															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0001 Invalid parameter value transferred for OC or output control could not be set

13.2.5 Setting date / time (0x0109)

Setting the system time of the device

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0109															
2	MM								DD							
3	YYYY (byte 1, MSB)								YYYY (byte 0, LSB)							
4	mm								hh							
5	Reserved								ss							
6…119	Reserved															

Legend:

• DD	Day	1 byte	• 0x01: 1 • 0x02: 2 … • 0x1F: 31
• MM	Month	1 byte	• 0x01: January • 0x02: February … • 0x0C: December
• YYYY	Year	1 word	• 0x07B3: 1971 • 0x07B4: 1972 … • 0x07F5: 2037
• hh	hours	1 byte	• 0x00: 0 • 0x01: 1 … • 0x17: 23
• mm	Minutes	1 byte	• 0x00: 0 • 0x01: 1 … • 0x3B: 59
• ss	Seconds	1 byte	• 0x00: 0 • 0x01: 1 … • 0x3B: 59

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0109															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0001 The transferred values are invalid and could not be set.
- 0x0002 NTP is active; transferred values could not be set

13.2.6 Configuring the NTP client (0x010A)

Enabling or disabling the NTP client and configuring the NTP client

The duration of the synchronisation process depends on the NTP server settings. The synchronised system time is not available immediately after activating the NTP client.

▶ Do not query synchronised system time immediately after enabling the NTP client.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x010A															
2	NTP_OFF								Reserved							NTP
3	NTP_IP (high byte)								NTP_IP							
4	NTP_IP								NTP_IP (low byte)							
5…119	Reserved															

Legend:

- NTP — Enable or disable the NTP client — 1 bit
  - 0x0: disable
  - 0x1: enable
- NTP_OFF — Offset for the time provided by the NTP server; NTP_OFF is the difference between UTC and the local time — 1 byte
  - 0x00: local time
  - 0x01: UTC -12:00
  - 0x02: UTC -11:00

  …
  - 0x09: UTC -04:00
  - 0x0A: UTC -03:30
  - 0x0B: UTC -03:00

  …
  - 0x0E: UTC +00:00
  - 0x0F: UTC +01:00

  …
  - 0x11: UTC +03:00
  - 0x12: UTC +03:30
  - 0x13: UTC +04:00
  - 0x14: UTC +04:30
  - 0x15: UTC +05:00
  - 0x16: UTC +05:30
  - 0x17: UTC +05:45
  - 0x18: UTC +06:00
  - 0x19: UTC +06:30
  - 0x1A: UTC +07:00

  …
  - 0x1C: UTC +09:00
  - 0x1D: UTC +09:30
  - 0x1E: UTC +10:00
  - 0x1F: UTC +11:00
  - 0x20: UTC +12:00
- NTP_IP — IP address of the NTP server (Iv4)
  Example: `192.168.150.5`
  - 0xC0: 192 (high byte)
  - 0xA8: 168
  - 0x96: 150
  - 0x05: 5 (low byte)

  — 2 words — One segment of the IP address per byte
  - 0x00: 0

  …
  - 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x010A															
2	Reserved								Command status							
3	Error code															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0001 invalid parameter values were transferred, settings not adopted

13.2.7 Reading date / time / NTP settings (0x010B)

Reading NTP settings and system time

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x010B															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x010B															
2	Reserved								Command status							
3	Error code															
4	MM								DD							
5	YYYY (byte 1, MSB)								YYYY (byte 0, LSB)							
6	mm								hh							
7	Reserved								ss							
8	NTP_OFF								Reserved							NTP
9	NTP_IP (high byte)								NTP_IP							
10	NTP_IP								NTP_IP (low byte)							

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
- DD — Day — 1 byte
  - 0x01: 1
  - 0x02: 2

  …
  - 0x1F: 31
- MM — Month — 1 byte
  - 0x01: January
  - 0x02: February

  …
  - 0x0C: December

• YYYY	Year	1 word	• 0x07B3: 1971 • 0x07B4: 1972 … • 0x07F5: 2037
• hh	hours	1 byte	• 0x00: 0 • 0x01: 1 … • 0x17: 23
• mm	Minutes	1 byte	• 0x00: 0 • 0x01: 1 … • 0x3B: 59
• ss	Seconds	1 byte	• 0x00: 0 • 0x01: 1 … • 0x3B: 59
• NTP	Enable or disable the NTP client	1 bit	• 0x0: disable • 0x1: enable
• NTP_OFF	Offset for the time provided by the NTP server; NTP_OFF is the difference between UTC and the local time	1 byte	• 0x00: local time • 0x01: UTC -12:00 • 0x02: UTC -11:00 … • 0x09: UTC -04:00 • 0x0A: UTC -03:30 • 0x0B: UTC -03:00 … • 0x0E: UTC +00:00 • 0x0F: UTC +01:00 … • 0x11: UTC +03:00 • 0x12: UTC +03:30 • 0x13: UTC +04:00 • 0x14: UTC +04:30 • 0x15: UTC +05:00 • 0x16: UTC +05:30 • 0x17: UTC +05:45 • 0x18: UTC +06:00 • 0x19: UTC +06:30 • 0x1A: UTC +07:00 … • 0x1C: UTC +09:00 • 0x1D: UTC +09:30 • 0x1E: UTC +10:00 • 0x1F: UTC +11:00 • 0x20: UTC +12:00
• NTP_IP	IP address of the NTP server (Iv4) Example: `192.168.150.5` • 0xC0: 192 (high byte) • 0xA8: 168 • 0x96: 150 • 0x05: 5 (low byte)	2 words	One segment of the IP address per byte • 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error

13.2.8 Rebooting the system (0x010C)

Rebooting the device.

To prevent an unintentional or unauthorised restart of the system, a signature must also be transferred when the command is called. The signature is: BOOT

The command execution is stopped when a wrong signature is transmitted.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x010C															
2	0x4F (= O)								0x42 (= B)							
3	0x54 (= T)								0x4F (= O)							
4	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x010C															
2	Reserved								Command status							
3	Error code															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0001 Command error: the device could not be restarted

13.2.9 Reading the fieldbus info (0x010D)

Reading the fieldbus informaton.

The information read has the structure of the DS18 (→ Fieldbus information (DS18) 159) data record.

The command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x010D															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x010D															
2	Reserved								Command status							
3	Error code															
4…22	FB_INFO (→ Fieldbus information (DS18) 159)															
23...119	Reserved															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 — no error

13.2.10 Reading the OSC entry (0x010F)

Reading the message text of an OSC entry.

Command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x010F															
2	RH (Low Word)															
3	RH (High Word)															
4…119	Reserved															

Legend:

• RH	Record Handle: Address of the OSC entry	2 Word	RH (Low Word): • 0x0000: current OSC entry RH (High Word): • 0x0000: current OSC entry

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x010F															
2	Reserved								Command status							
3	Error code															
4…n	RMT															
(n+1)... 119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• RMT	Record Message Text: message text of the OSC entry	n byte	• Message text is UTF-8 encoded • Display of the end of the text: zero terminated (= `0x00`)

Error codes

- 0x0001 Internal database error
- 0x0002 No entry found; either the database is empty or there is no entry with the specified record handle

13.2.11 Displaying the target visualisation (0x0110)

Switch between the standard GUI of the device display and a target visualisation of a CODESYS project and activate or deactivate the key combination [◄] + [►]

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0110															
2	TV															
3	HK															
4…119	Reserved															

Legend:

• TV	Target Visu: enable or disable the target visualisation	1 word	• 0x0000: show GUI of the device display • 0x0001: display target visualisation
• HK	Hotkey: enable or disable the key combination [◄] + [►] for switching between target visualisation and GUI of the device display	1 word	• 0x0000: enable • 0x0001: disable

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0110															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0001 Target visualisation cannot be displayed because CODESYS PLC is not active

13.2.12 Reading the Safe Life BIT (0x0111)

Reading the Safe Life BIT of the safety PLC

The command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0111															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0111															
2	Reserved								Command status							
3	Error code															
4	Reserved								SAFEAPP_STATUS_FLAG							
5…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• SAFEAPP_STATUS_ FLAG	Status of the safety application	1 byte	• 0x00: Wrong state • 0x01: Connected to Main - 1st OSC state • 0x02: CODESYS BG task started • 0x03: CODESYS SSC task started • 0x04: CODESYS SSC task activated (ON) • 0x05: CODESYS RUN (debug) • 0x06: CODESYS STOP (debug) • 0x07: CODESYS SSC deactivated (OFF) • 0x08: CODESYS fail-safe operation • 0x09: CODESYS fail-safe state • 0x0A: BIT Error Safe State

Error codes

- 0x0000 no error

13.2.13 Exporting the application + the configuration (0x0112)

Exporting the device configuration and application of the device

The command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0112															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0112															
2	Reserved								Command status							
3	Error code															
4...119	Reserved															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x5000 EXPORT_SD_CARD_MISSING: SD card missing
- 0x5001 EXPORT_SD_CARD_READ_ONLY: SD card is write-protected
- 0x5002 EXPORT_INTERNAL_ERROR: Internal fault
- 0x5003 EXPORT_CRC_CREATION: CRC error
- 0x5004 EXPORT_XML_WRITING: error when creating the XML files
- 0x5005 EXPORT_UNSUPPORTED_COM_TYPE: fieldbus is not supported
- 0x5006 EXPORT_FILE_IO: a file operation failed during export
- 0x5007 EXPORT_FRAM_IO: read operation failed when accessing FRAM

- 0x5008 EXPORT_SAFE_APP_COPY_NOT_FINISHED: safety module did not transfer file in time

13.2.14 Importing the application + the configuration (0x0113)

Importing the device configuration and the application of the device.

The command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

The system architect must ensure that the SafetyNetVars addresses are set correctly after importing the application and configuration.

- ▶ Evaluate the CRC checksum of the application.
- ▶ Before setting up the device, check the active SafetyNetVars address of the device.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0113															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0113															
2	Reserved								Command status							
3	Error code															
4...119	Reserved															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x5100 IMPORT_SD_CARD_MISSING: SD card missing
- 0x5101 IMPORT_SD_CARD_NO_CFG: no configuration on SD card
- 0x5102 IMPORT_SD_CARD_MULTIPLE_CFG: more than one configuration on the SD card
- 0x5103 IMPORT_INTERNAL_ERROR: Internal fault

- 0x5104 IMPORT_CORRUPTED_ARCHIVE: archive file is corrupted: CRC probably not correct
- 0x5105 IMPORT_ORDER_NUMBER_MISMATCH: item number of the device does not match the configuration
- 0x5106 IMPORT_SW_REVISION_MISMATCH: configuration was created with a firmware that does not match the firmware of the current device
- 0x5107 IMPORT_XML_PROCESSING: error during the processing of the configuration
- 0x5108 IMPORT_XML_LOADING: could not load the configuration
- 0x5109 IMPORT_UNSUPPORTED_COM_TYPE: fieldbus is not supported
- 0x510A IMPORT_FILE_IO: file operation failed
- 0x510B IMPORT_FRAM_IO: failed to read and merge data from the FRAM
- 0x510C IMPORT_SAFE_APP_COPY_NOT_FINISHED: safety module could not complete the safety application in time
- 0x510E IMPORT_DENIED_BY_TOO_LOW_ACCESS_LEVEL: user rights not sufficient for importing the application

13.2.15 Importing the application (0x0114)

Importing the application of the device.

The command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0114															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0114															
2	Reserved								Command status							
3	Error code															
4...119	Reserved															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x5100 IMPORT_SD_CARD_MISSING: SD card missing
- 0x5101 IMPORT_SD_CARD_NO_CFG: no configuration on SD card
- 0x5102 IMPORT_SD_CARD_MULTIPLE_CFG: more than one configuration on the SD card
- 0x5103 IMPORT_INTERNAL_ERROR: Internal fault
- 0x5104 IMPORT_CORRUPTED_ARCHIVE: archive file is corrupted: CRC probably not correct
- 0x5105 IMPORT_ORDER_NUMBER_MISMATCH: item number of the device does not match the configuration
- 0x5106 IMPORT_SW_REVISION_MISMATCH: configuration was created with a firmware that does not match the firmware of the current device
- 0x5107 IMPORT_XML_PROCESSING: error during the processing of the configuration

- 0x5108 IMPORT_XML_LOADING: could not load the configuration
- 0x5109 IMPORT_UNSUPPORTED_COM_TYPE: fieldbus is not supported
- 0x510A IMPORT_FILE_IO: file operation failed
- 0x510B IMPORT_FRAM_IO: failed to read and merge data from the FRAM
- 0x510C IMPORT_SAFE_APP_COPY_NOT_FINISHED: safety module could not complete the safety application in time
- 0x510E IMPORT_DENIED_BY_TOO_LOW_ACCESS_LEVEL: user rights not sufficient for importing the application

13.2.16 Reading the device number (0x0115)

Reading the device number of the device for 1:N communication

The command can only be executed with the `ACnnnn_SysCmd` function block in the CODESYS development system.

Information: → Programming manual

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0115															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0115															
2	Reserved								Command status							
3	Error code															
4	NETVARS_OFFSET															
5...119	Reserved															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
- NETVARS_OFFSET — NetVars Offset — 1 word
  - 0x0000: 0

    …
  - 0x0032: 50

Error codes

- 0x0000 no error

13.2.17 Changing the AS-i slave parameters (0x0001)

Changing the parameters of an AS-i slave

The AS-i master must be in “protected mode”.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0001															
2	Reserved								res.		ST	SLA				
3	Reserved								Reserved				PARA_OUT			
4…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• PARA_OUT	Parameter output of the AS-i slave	4 bit	• 0x0: 0 … • 0xF: 15

If the requested slave address (SLA) is not in the list of activated slaves (LAS), the new parameters are stored in the AS-i master despite error message (error code 0x0A). If an AS-i slave with this address is added to the AS-i network at a later point, the slave automatically adopts the saved parameters.

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0001															
2	Reserved								Command status							
3	Error code															
4	Reserved								Reserved				PARA_IN			
5…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• PARA_IN	Parameter input of the AS-i slaves	4 bit	• 0x0: 0 … • 0xF: 15

Error codes

- 0x0000 no error
- 0x0001 no slave response OR:
  master is in the offline mode when calling the command
- 0x000A slave is not in the LAS
- 0x000B parameter or address invalid
- 0x000E invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
- 0x0018 master not in “protected mode”

13.2.18 Projecting the current AS-i network (0x0003)

Projecting the AS-i network and AS-i slaves

The AS-i master must be in “projection mode”.

The command resets the fieldbus connection.

▶ Restart the device.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0003															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0003															
2	Reserved								Command status							
3	Error code															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0003 Slave with address 0 is connected
- 0x0019 Master not in “projection mode”

13.2.19 Changing the LPS (0x0004)

Changing the list of configured slaves (LPS)

The AS-i master must be in “projection mode”.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0004															
2	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
3	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
4	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
5	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
6...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0004															
2	Reserved								Command status							
3	Error code															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0019 Master not in “projection mode”

13.2.20 Changing the operating mode of the AS-i master (0x0005)

Changing the operating mode of the AS-i master

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0005															
2	Reserved								MOD							
3...119	Reserved															

Legend:

• MOD	Operating mode of the AS-i master	1 bit	• 0x00: protected mode • 0x01: projection mode

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0005															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0003 Slave with address 0 is connected

13.2.21 Changing the AS-i slave address (0x0006)

Changing the address of an AS-i slave

The AS-i master must be in “protected mode”.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0006															
2	Reserved								res.		ST	OLD_SLA				
3	Reserved								res.		ST	NEW_SLA				
5…119	Reserved															

Legend:

• OLD_SLA	Old Slave Address: old address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• NEW_SLA	New Slave Address: New address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0006															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error

- 0x0001 no slave response OR:
  master is in the offline mode when calling the command
- 0x0002 no slave found with the old address
- 0x0003 Slave with address 0 is connected
- 0x0004 slave with the new address already exists
- 0x0005 error when deleting the old address
- 0x0006 error when reading the extended ID code 1
- 0x0007 error when writing the new address or extended ID code 1
- 0x0008 new address could only be saved temporarily
- 0x0009 extended ID code 1 could only be saved temporarily
- 0x0018 master not in “protected mode”

13.2.22 Setting the auto address mode of the AS-i master (0x0007)

Enabling or disabling the “auto addressing” function

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0007															
2	Reserved								AA							
3...119	Reserved															

Legend:

• AA	“Automatic addressing” function	1 byte	• 0x0: deactivate function • 0x1: activate function

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0007															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error

13.2.23 Changing the extended ID1 (0x0009)

Changing the extended ID1 of an AS-i slave

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0009															
2	Reserved								res.		ST	SLA				
3	Reserved								ExID1							
4…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• ExID1	Extended ID1 of the AS-i slave	1 byte	• 0x0: 0 … • 0xF: 15

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0009															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0002 no slave found with the old address

- 0x0003 Slave with address 0 is connected
- 0x0005 error when deleting the old address
- 0x0006 error when reading the extended ID code 1
- 0x0007 error when writing the new address or extended ID code 1
- 0x0009 extended ID code 1 could only be saved temporarily
- 0x000E Invalid AS-i slave address 0 or 0B, or address 0 indicated twice
- 0x0018 master not in “protected mode”
- 0x0021 Invalid ID code 1 (if bit 3 is set for A/B slave)

13.2.24 Changing the PCD (0x000A)

Changing the projected configuration data (PCD) of the AS-i slaves of an AS-i network

The AS-i master must be in “projection mode”.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x000A															
2	Reserved															
3	Slave 1(A): PCD															
4	Slave 2(A): PCD															
5…33	…															
34	Slave 31(A): PCD															
35	Reserved															
36	Slave 1B: PCD															
37…65	…															
66	Slave 31B: PCD															
67…119	Reserved															

Legend:

• PCD	Projected configuration data	1 word	• 0x0000 … • 0xFFFF

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x000A															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0019 Master not in “projection mode”

13.2.25 AS-i master supply voltage, symmetry, earth fault (0x000D)

Reading the status of the supply voltage, symmetry and earth fault

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x000D															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x000D															
2	Reserved								Command status							
3	Error code															
4	Reserved								res.		PF1	PF2	SE	EF	PM	PS
5	PWR_ASI															
6	PWR_FE															
7	SYM															
8…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• PS	Power Source	1 bit	• 0x0: AUX • 0x1: AS-i
• PM	Power Module: data decoupling module	1 bit	• 0x0: data decoupling module not plugged in • 0x1: data decoupling module plugged in
• EF	Earth Fault	1 bit	• 0x0: no earth fault detected • 0x1: earth fault detected
• SE	Status Earth Fault: status of the earth fault detection	1 bit	• 0x0: no earth fault detection possible (e.g. AS-i voltage missing) • 0x1: earth fault detection provides valid data
• PF2	Power Fail 2: AS-i voltage < 19 V (24V-APF)	1 bit	• 0x0: no AS-i power fail • 0x1: AS-i power fail (AS-i voltage < 19 V)

• PF1	Power Fail 1: AS-i voltage < 22.5 V (classic APF)	1 bit	• 0x0: no AS-i power fail • 0x1: AS-i power fail (AS-i voltage < 22.5 V)
• PWR_ASI	Voltage AS-i+ to AS-i- (value in mV)	1 word	
• PWR_FE	Voltage AS-i+ to FE (value in mV)	1 word	
• SYM	Symmetry of the AS-i network (value in %)	1 word	-100 … 100

Error codes

- 0x0000 no error

13.2.26 Reading the ID string of an AS-i profile (S-7.4) (0x0015)

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0015															
2	Reserved								res.		ST	SLA				
3...119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0015															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA								res.		ST	REF_SLA				
5	IO	2D	DT_START			DT_COUNT			MUX			E_TYPE				
6	PARA_RD								EDT_RD			res.		DI	res.	
7	EDT_WR		Reserved						PARA_WR							
8	DEV_INFO								DEV_VENDOR							
9…m	DEV_INFO								DEV_INFO							
(m+1)… 119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_BYTE	Number of Earth Fault bytes: earth fault	1 bit	• 0x0: no earth fault detected • 0x1: earth fault detected
• SE	Status Earth Fault: status of the earth fault detection	1 bit	• 0x0: no earth fault detection possible (e.g. AS-i voltage missing) • 0x1: earth fault detection provides valid data
• PF2	Power Fail 2: AS-i voltage < 19 V (24V-APF)	1 bit	• 0x0: no AS-i power fail • 0x1: AS-i power fail (AS-i voltage < 19 V)
• PF1	Power Fail 1: AS-i voltage < 22.5 V (classic APF)	1 bit	• 0x0: no AS-i power fail • 0x1: AS-i power fail (AS-i voltage < 22.5 V)
• PWR_ASI	Voltage AS-i+ to AS-i- (value in mV)	1 word	
• PWR_FE	Voltage AS-i+ to FE (value in mV)	1 word	
• SYM	Symmetry of the AS-i network (value in %)	1 word	-100 … 100

Error codes

- 0x0000 no error
- 0x0001 no slave response OR:
  master is in the offline mode when calling the command
- 0x000D S-7.4 protocol aborted (timeout)
- 0x000E invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
- 0x0010 AS-i S-7.4 slave deleted from LAS during transfer
- 0x0011 Another S-7.4 transfer to the addressed AS-i slave is already active
- 0x0017 At least one start condition for the command is not fulfilled:
  - Wrong slave profile
  - Slave is not in LAS
  - Master not in “protected mode”

13.2.27 Reading the AS-i master info (0x001A)

Reading the information about an AS-i master

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x001A															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x001A															
2	Reserved								Command status							
3	Error code															
4	M12								Reserved							
5	FW_MAJOR															
6	FW_MINOR															
7…119	Reserved															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
- M12 — Number of AS-i masters of the device — 1 byte
  - 0x00: 1 AS-i master
  - 0x01: 2 AS-i master
- FW_MAJOR — Major version of the device firmware (**x**.y) — 1 word
  Example:
  - 0x0006: 6.y
- FW_MINOR — Minor version of the device firmware (x.**y**) — 1 word
  Example:
  - 0x0001: x.1

Error codes

- 0x0000 no error

13.2.28 Disabling the slave reset (0x001C)

When switching the operating mode from “projection mode” to “protected mode”, all slaves are briefly reset (reset or offline phase). This can cause problems when the plant is running. In such cases, disabling the slave reset prevents temporary shutdown of the slave outputs during the change of operating mode.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x001C															
2	Reserved								OLP							
3...119	Reserved															

Legend:

• OLP	Offline Phase: Slave Reset	1 byte	• 0x00: slave reset active • 0x01: slave reset deactivated

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x001C															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error

13.2.29 Reading the diagnostic string of an AS-i slave (S-7.4) (0x0021)

Reading the diagnostic text of an AS-i slave with profile S-7.4

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0021															
2	Reserved								res.		ST	SLA				
3...119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0021															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5…m	DIAG_DATA n								DIAG_DATA n-1							
(m+1)… 119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave

• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• DIAG_DATA n	Diagnostic data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x0001 no slave response OR:
  master is in the offline mode when calling the command
- 0x000D S-7.4 protocol aborted (timeout)
- 0x000E invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
- 0x0010 AS-i S-7.4 slave deleted from LAS during transfer
- 0x0011 Another S-7.4 transfer to the addressed AS-i slave is already active
- 0x0017 At least one start condition for the command is not fulfilled:
  - Wrong slave profile
  - Slave is not in LAS
  - Master not in “protected mode”

13.2.30 Reading the parameter string of an AS-i slave (S-7.4) (0x0022)

Reading the parameter data of an AS-i slave with profile S-7.4

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0022															
2	Reserved								res.		ST	SLA				
3...119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0022															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5…m	PARA_DATA n								PARA_DATA n-1							
(m+1)… 119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave

• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• PARA_DATA n	Parameter data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x0001 no slave response OR:
  master is in the offline mode when calling the command
- 0x000D S-7.4 protocol aborted (timeout)
- 0x000E invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
- 0x0010 AS-i S-7.4 slave deleted from LAS during transfer
- 0x0011 Another S-7.4 transfer to the addressed AS-i slave is already active
- 0x0017 At least one start condition for the command is not fulfilled:
  - Wrong slave profile
  - Slave is not in LAS
  - Master not in “protected mode”

13.2.31 Writing the parameter string of an AS-i slave (S-7.4) (0x0023)

Writing the parameter of an AS-i slave with profile S-7.4

The number of the bytes to be sent must be divisible by 2 since the system always transmits only multiples of 2 bytes in the S7.4 protocol.

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0023															
2	NUM_DATA_SND								res.		ST	SLA				
3…m	PARA_DATA n								PARA_DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_SND	Number of bytes to be transmitted	1 byte	• 0x00: 0 … • 0x72: 114
• PARA_DATA n	Parameter data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0022															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5…m	PARA_DATA n								PARA_DATA n-1							
(m+1)… 119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• PARA_DATA n	Parameter data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x0001 no slave response OR:
  master is in the offline mode when calling the command
- 0x000C 7.4 sequence failed. Slave generates wrong 7.4 sequence
- 0x000E invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
- 0x000F Slave cancels the 7.4 communication.
- 0x0010 AS-i S-7.4 slave deleted from LAS during transfer
- 0x0011 Another S-7.4 transfer to the addressed AS-i slave is already active
- 0x0012 7.4 host sequence interrupted. Host interrupts transmission with more than one sequence of another command.
- 0x0013 Invalid S-7.4 data length (= 0 or > 160 bytes)
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Wrong slave profile
  - Slave is not in LAS
  - Master not in “protected mode”

13.2.32 CTT2 Standard Read (0x0024)

CTT2-Standard read command for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0024															
2	Reserved								res.		ST	SLA				
3	DATA_LEN								INDEX							
4…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0024															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x50: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data • 0x90: CTT2 error on command execution: – The byte DATA 0 contains the Standard CTT2 error codes (→ 🗋 244) – The content of the bytes DATA 1...119 is irrelevant
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.33 CTT2 standard write (0x0025)

CTT2 standard write for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0025															
2	Reserved								res.		ST	SLA				
3	DATA_LEN								INDEX							
4…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0025															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number n of received bytes	1 byte	• 0x00: 0
• RC	CTT2 Response Code	1 byte	• 0x51: no CTT2 error on command execution: – The content of the bytes DATA 0...119 is irrelevant. • 0x91: CTT2 error on command execution: – The byte DATA 0 contains the Standard CTT2 error codes (→ 🗋 244) – The content of the bytes DATA 1...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.34 CTT2 vendor specific read (0x0026)

CTT2 Vendor Specific Read for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0026															
2	Reserved								res.		ST	SLA				
3	DATA_LEN								INDEX							
4…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0026															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x52: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x92: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.35 CTT2 Vendor Specific Write (0x0027)

CTT2 Vendor Specific Write for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0027															
2	Reserved								res.		ST	SLA				
3	DATA_LEN								INDEX							
4…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0027															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number n of received bytes	1 byte	• 0x00: 0
• RC	CTT2 Response Code	1 byte	• 0x53: no CTT2 error on command execution: – The content of the bytes DATA 0...119 is irrelevant. • 0x93: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 244). – The content of the bytes DATA 6...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.36 CTT2 device group read (0x0040)

CTT2 Device Group Read for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0040															
2	Reserved								res.		ST	SLA				
3	DATA_LEN								INDEX							
4…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0040															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x54: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x94: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.37 CTT2 Device Group Write (0x0041)

CTT2 Device Group Write for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0041															
2	Reserved								res.		ST	SLA				
3	DATA_LEN								INDEX							
4…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0041															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number n of received bytes	1 byte	• 0x00: 0
• RC	CTT2 Response Code	1 byte	• 0x55: no CTT2 error on command execution: – The content of the bytes DATA 0...119 is irrelevant. • 0x95: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 244). – The content of the bytes DATA 6...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.38 CTT2 Vendor Specific Selective Read from Buffer (0x0042)

CTT2 Vendor Specific Selective Read from Buffer for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0042															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0042															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x58: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x98: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.39 CTT2 Vendor Specific Selective Write from Buffer (0x0043)

CTT2 Vendor Specific Selective Write from Buffer for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0043															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0043															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x59: no CTT2 error on command execution: – The DATA 0 byte contains the number of bytes to be read (block length); valid values: 0x00…0xFF (→ data sheet of the AS-i slave) • 0x99: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 244). – The content of the bytes DATA 6...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.40 CTT2 Vendor Specific Selective Read (0x0044)

CTT2 Vendor Specific Selective Read for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0044															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0044															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x58: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x98: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.41 CTT2 Vendor Specific Selective Write (0x0045)

CTT2 Vendor Specific Selective Write for AS-i slaves S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0045															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0045															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x59: no CTT2 error on command execution: – The DATA 0 byte contains the number of bytes to be read (block length); valid values: 0x00…0xFF (→ data sheet of the AS-i slave) • 0x99: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 244). – The content of the bytes DATA 6...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.42 CTT2 Device Group Selective Read (0x0046)

CTT2 Device Group Selective Read for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0046															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0046															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x5A: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x9A: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.43 CTT2 Device Group Selective Write (0x0047)

CTT2 Device Group Selective Write for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0047															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0047															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x5B: no CTT2 error on command execution: – The DATA 0 byte contains the number of bytes to be read (block length); valid values: 0x00…0xFF (→ data sheet of the AS-i slave) • 0x9B: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 244). – The content of the bytes DATA 6...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.44 CTT2 Vendor Specific Exchange (0x0049)

CTT2 Vendor Specific Exchange for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x004C															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0046															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x5D: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x9D: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.45 CTT2 Device Group Exchange (0x004A)

CTT2 Device Group Exchange for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x004C															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0046															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x5E: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x9E: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.46 CTT2 Device Group Selective Read from Buffer (0x004B)

CTT2 Device Group Selective Read from Buffer for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x004B															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x004B															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	DATA n								DATA n-1							

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x5A: no CTT2 error on command execution: – The bytes DATA 0...119 contain the requested data. • 0x9A: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 🗋 244). – The content of the bytes DATA 6...119 is irrelevant.
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.47 CTT2 Device Group Selective Write from Buffer (0x004C)

CTT2 Device Group Selective Write from Buffer for AS-i slaves with profile S-7.5.5, S-7.A.5 or S-B.A.5

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x004C															
2	Reserved								res.		ST	SLA				
3	SUBINDEX								INDEX							
4	Reserved								DATA_LEN							
5…m	DATA n								DATA n-1							
(m+1)… 119	Reserved															

Legend:

• SLA	Slave Address: Address of the AS-i slave	5 bit	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• INDEX	Index of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• SUBINDEX	Subindex of the entry (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 … • 0xFF: 255
• DATA_LEN	Number n of bytes to be transmitted (→ data sheet of the AS-i slave)	1 byte	• 0x00: 0 bytes … • 0xFF: 255 bytes
• DATA n	Data (byte n)	1 byte	• 0x00: 0 … • 0xFF: 255

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x004C															
2	Reserved								Command status							
3	Error code															
4	NUM_DATA_RCV								res.		ST	REF_SLA				
5	DATA 0								RC							
6…119	Reserved															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.
• REF_SLAVE	Reflected slave address	5 bits	• 0x00: 0 … • 0x1F: 31
• ST	Slave Type: type of the AS-i slave	1 bit	• 0x0: single slave or A slave • 0x1: B slave
• NUM_DATA_RCV	Number of received bytes	1 byte	• 0x00: 0 … • 0x72: 114
• RC	CTT2 Response Code	1 byte	• 0x5B: no CTT2 error on command execution: – The DATA 0 byte contains the number of bytes to be read (block length); valid values: 0x00…0xFF (→ data sheet of the AS-i slave) • 0x9B: CTT2 error on command execution: – The bytes DATA 0...5 contain the CTT2 error object (→ CTT2 error object 244). – The content of the bytes DATA 6...119 is irrelevant.

Error codes

- 0x0000 no error
- 0x000A slave is not in the LAS
- 0x0014 Invalid command The command is not accepted by the slave with the selected address.
- 0x0017 At least one start condition for the command is not fulfilled:
  - Command already started
  - Incorrect CTT2 slave profile
  - CTT2 slave is not in LAS
  - Master not in “protected mode”
- 0x00E1 Command execution error
- 0x00E2 Invalid command
- 0x00E3 Wrong response data or internal error
- 0x00E4 Wrong data length when writing
- 0x00E5 Invalid state of the CTT2 state machine when executing the command
- 0x00E6 Reset when executing the command
- 0x00E7 Wrong data length when reading
- 0x00E8 Wrong data length when reading / writing
- 0x00EF Timeout

13.2.48 Set AS-i master settings (0x0050)

Activate or deactivate the following diagnostic functions:

- earth fault detection (EE)
- Double address recognition (DAE)

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0050															
2	DIAG								Reserved							EN
3...119	Reserved															

Legend:

• DIAG	Diagnostic function	1 byte	• 0x01: earth fault detection (EE) • 0x02: double address detection
• EN	Enable or disable diagnostic function	1 bit	• 0x0: deactivate function • 0x1: activate function

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0050															
2	Reserved								Command status							
3	Error code															

Legend:

• Command status	status of the command execution	1 byte	• 0x00: OK: command execution was successful. Response data is available and valid. • 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid. • 0x02: TO - TimeOut error: The command was cancelled due to timeout. • 0x03: UC – Unknown Command: The command number transferred is unknown in the system. • 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

- 0x0000 no error
- 0x0001 Wrong parameter assigned; the setting was not adopted

13.2.49 Reset error counter (0x0051)

The command resets the following counters:

- Telegram errors
- All slave telegram errors
- Configuration error
- Voltage drops < 22.5 V
- Voltage drops < 19.0 V
- Earth fault
- Error distribution telegram errors

Request

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	UID															
1	0x0051															
2...119	Reserved															

Response

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Reflected UID															
1	0x0051															
2	Reserved								Command status							
3	Error code															

Legend:

- Command status — status of the command execution — 1 byte
  - 0x00: OK: command execution was successful. Response data is available and valid.
  - 0x01: FAILED - an error occurred during command execution. The exact reason for the error that has occurred can be found in the command-specific error code. The response data is invalid.
  - 0x02: TO - TimeOut error: The command was cancelled due to timeout.
  - 0x03: UC – Unknown Command: The command number transferred is unknown in the system.
  - 0x04: Not Valid Parameter: The transmitted command parameter is invalid.

Error codes

none

13.2.50 Notes on CTT2 commands

13.2.50.1 Standard CTT2 error codes

The “standard CTT2 error code” provides information about errors that have occurred during processing of a CTT2 command. It is transmitted in byte DATA 0 of the response channel of a CTT2 command.

Available error codes:

Error code	Description
0x00	No error
0x01	Invalid index
0x02	Invalid length
0x03	Command not implemented
0x04	In use – the command could not be completed in the given time frame
0x05	Command was not acknowledged
0x06	Invalid sub-index
0x07	“Selective Read Request” command is missing

13.2.50.2 CTT2 error object

The “CTT2 error object” provides the standard CTT2 error code as well as further manufacturer-specific information about errors that occurred during the processing of a CTT2 command. It is transmitted in the response channel of a CTT2 command in the bytes DATA 0...5.
The CTT2 error object has the following structure:

Byte DATA	Contents
0	Standard CTT2 error codes (→ 🗋 244)
1…4	Manufacturer-specific error information (→ data sheet of the AS-i slave)

13.3 EtherNet/IP

13.3.1 Device-specific parameters

13.3.1.1 Parameters: Top-Down mode

Parameter	Description	Value range
[Analogue channels IN]	Number of the analogue channels per input slave	• 4 channels: 4 channels per single slave or 2 channels per A/B slave (default) • 2 channels: 2 channels per single slave or 2 channels per A slave • 1 channel: 1 channel per single slave or 1 channel per A slave • 1 channel per A/B slave: 1 channel per A/B slave or channels 1+3 per single slave
[Analogue channels OUT]	Number of analogue channels per output slave	• 4 channels: 4 channels per single slave or 2 channels per A/B slave (default) • 2 channels: 2 channels per single slave or 2 channels per A slave • 1 channel: 1 channel per single slave or 1 channel per A slave • 1 channel per A/B slave: 1 channel per A/B slave or channels 1+3 per single slave
[Failsafe state]	Behaviour of the standard AS-i slave outputs in the event of a detected interruption of the fieldbus connection	• Reset outputs: The outputs are reset to the default values (default) • Hold outputs: The outputs maintain the values that were present immediately before the connection was interrupted
[Swap byteorder]	Change the byte order in a word; the setting affects all data in input assembly and output assembly	• Disabled: Byte order in word remains unchanged. • Enabled: Byte order in word is inverted.
[Analogue IN order]	The order of analogue input slaves can be changed	• Disabled: The order of the slaves remains unchanged (default) • Enabled: The order of the slaves can be changed.
[1. analogue IN slave (slot 9)] ... [15. analogue slave (slot 9)] [1. analogue IN slave (slot 10)] ... [15. analogue IN slave (slot 10)]	Assignment of analogue input slaves 1 to 15 of AS-i masters 1 and 2 to the AS-i slave addresses	Per parameter: • Slave 1 AS-i master 1 ... • Slave 31 AS-i master 1 • Slave 1 AS-i master 2 ... • Slave 31 AS-i master 2
[Analogue OUT order]	The order of the analogue output slaves can be changed	• Disabled: The order of the slaves remains unchanged (default) • Enabled: The order of the slaves can be changed.
[1. analogue OUT slave (slot 11)] ... [15. analogue OUT slave (slot 11)] [1. analogue OUT slave (slot 12)] ... [15. analogue OUT slave (slot 12)]	Assignment of analogue output slaves 1 to 15 of AS-i masters 1 and 2 to the AS-i slave addresses	Per parameter: • Slave 1 AS-i master 1 ... • Slave 31 AS-i master 1 • Slave 1 AS-i master 2 ... • Slave 31 AS-i master 2 (default)
[AS-i Parameter -Download]	Transmission of AS-i slave parameters from the host to the device	• Disabled: The following AS-i parameter data is NOT sent to the AS-i system. • Enabled: The following AS-i parameter data is sent to the AS-i system.

Parameter	Description	Value range
[Param. Slave 1(A) AS-i Master 1] … [Param. Slave 31(A) AS-i Master 1] [Param. Slave 1B AS-i Master 1] … [Param. Slave 31B AS-i Master 1] [Param. Slave 1(A) AS-i Master 2] … [Param. Slave 31(A) AS-i Master 2] [Param. Slave 1B AS-i Master 2] … [Param. Slave 31B AS-i Master 2]	Parameters P3...P0 of the individual AS-i slaves	• 0x0: 0b0000 ... • 0x7: 0b0111 (default for A/B slaves) … • 0xF: 0b1111 (default for single slaves)

13.3.1.2 Parameters: Independent mode

Parameter	Description	Value range
[Analogue channels IN]	Number of the analogue channels per input slave	• 4 channels: 4 channels per single slave or 2 channels per A/B slave (default) • 2 channels: 2 channels per single slave or 2 channels per A slave • 1 channel: 1 channel per single slave or 1 channel per A slave • 1 channel per A/B slave: 1 channel per A/B slave or channels 1+3 per single slave
[Analogue channels OUT]	Number of analogue channels per output slave	• 4 channels: 4 channels per single slave or 2 channels per A/B slave (default) • 2 channels: 2 channels per single slave or 2 channels per A slave • 1 channel: 1 channel per single slave or 1 channel per A slave • 1 channel per A/B slave: 1 channel per A/B slave or channels 1+3 per single slave
[Failsafe state]	Behaviour of the standard AS-i slave outputs in the event of a detected interruption of the fieldbus connection	• Reset outputs: The outputs are reset to the default values (default) • Hold outputs: The outputs maintain the values that were present immediately before the connection was interrupted
[Swap byteorder]	Change the byte order in a word; the setting affects all data in input assembly and output assembly	• Disabled: Byte order in word remains unchanged. • Enabled: Byte order in word is inverted.

13.3.2 Assembly instances

13.3.2.1 Configuration assembly (instance 200)

Byte	Description	Value range
0…3	C.Slot1 digital IN AS-i 1 (S/A)	• 0x00 00 00 00: empty module • 0x00 00 10 02: slaves 01(A) ... 03(A) • 0x00 00 10 04: slaves 01(A) ... 07(A) • 0x00 00 10 06: slaves 01(A) ... 11(A) • 0x00 00 10 08: slaves 01(A) ... 15(A) • 0x00 00 10 0A: slaves 01(A) ... 19(A) • 0x00 00 10 0C: slaves 01(A) ... 23(A) • 0x00 00 10 0E: slaves 01(A) ... 27(A) • 0x00 00 10 10: slaves 01(A) ... 31(A) (default)
4…7	C.Slot2 digital OUT AS-i 1 (S/A)	• 0x00 00 00 00: empty module • 0x00 00 20 02: slaves 01(A) ... 03(A) • 0x00 00 20 04: slaves 01(A) ... 07(A) • 0x00 00 20 06: slaves 01(A) ... 11(A) • 0x00 00 20 08: slaves 01(A) ... 15(A) • 0x00 00 20 0A: slaves 01(A) ... 19(A) • 0x00 00 20 0C: slaves 01(A) ... 23(A) • 0x00 00 20 0E: slaves 01(A) ... 27(A) • 0x00 00 10 10: slaves 01(A) ... 31(A) (default)
8…11	C.Slot3 digital IN AS-i 2 (S/A)	• 0x00 00 00 00: empty module • 0x00 02 10 02: slaves 01(A) ... 03(A) • 0x00 02 10 04: slaves 01(A) ... 07(A) • 0x00 02 10 06: slaves 01(A) ... 11(A) • 0x00 02 10 08: slaves 01(A) ... 15(A) • 0x00 02 10 0A: slaves 01(A) ... 19(A) • 0x00 02 10 0C: slaves 01(A) ... 23(A) • 0x00 02 10 0E: slaves 01(A) ... 27(A) • 0x00 02 10 10: slaves 01(A) ... 31(A) (default)
12…15	C.Slot4 digital OUT AS-i 2 (S/A)	• 0x00 00 00 00: empty module • 0x00 02 20 02: slaves 01(A) ... 03(A) • 0x00 02 20 04: slaves 01(A) ... 07(A) • 0x00 02 20 06: slaves 01(A) ... 11(A) • 0x00 02 20 08: slaves 01(A) ... 15(A) • 0x00 02 20 0A: slaves 01(A) ... 19(A) • 0x00 02 20 0C: slaves 01(A) ... 23(A) • 0x00 02 20 0E: slaves 01(A) ... 27(A) • 0x00 02 10 10: slaves 01(A) ... 31(A) (default)
16…19	C.Slot5 digital IN AS-i 1 (B)	• 0x00 00 00 00: empty module • 0x00 01 10 02: slaves 01B ... 03B • 0x00 01 10 04: slaves 01B ... 07B • 0x00 01 10 06: slaves 01B ... 11B • 0x00 01 10 08: slaves 01B ... 15B • 0x00 01 10 0A: slaves 01B ... 19B • 0x00 01 10 0C: slaves 01B ... 23B • 0x00 01 10 0E: slaves 01B ... 27B • 0x00 01 10 10: slaves 01B ... 31B (default)

Byte	Description	Value range
20…23	C.Slot6 digital OUT AS-i 1 (B)	• 0x00 00 00 00: empty module • 0x00 01 20 02: slaves 01B ... 03B • 0x00 01 20 04: slaves 01B ... 07B • 0x00 01 20 06: slaves 01B ... 11B • 0x00 01 20 08: slaves 01B ... 15B • 0x00 01 20 0A: slaves 01B ... 19B • 0x00 01 20 0C: slaves 01B ... 23B • 0x00 01 20 0E: slaves 01B ... 27B • 0x00 01 20 10: slaves 01B ... 31B (default)
24…27	C.Slot7 digital IN AS-i 2 (B)	• 0x00 00 00 00: empty module • 0x00 03 10 02: slaves 01B ... 03B • 0x00 03 10 04: slaves 01B ... 07B • 0x00 03 10 06: slaves 01B ... 11B • 0x00 03 10 08: slaves 01B ... 15B • 0x00 03 10 0A: slaves 01B ... 19B • 0x00 03 10 0C: slaves 01B ... 23B • 0x00 03 10 0E: slaves 01B ... 27B • 0x00 03 10 10: slaves 01B ... 31B (default)
28…31	C.Slot8 digital OUT AS-i 2 (B)	• 0x00 00 00 00: empty module • 0x00 03 20 02: slaves 01B ... 03B • 0x00 03 20 04: slaves 01B ... 07B • 0x00 03 20 06: slaves 01B ... 11B • 0x00 03 20 08: slaves 01B ... 15B • 0x00 03 20 0A: slaves 01B ... 19B • 0x00 03 20 0C: slaves 01B ... 23B • 0x00 03 20 0E: slaves 01B ... 27B • 0x00 03 20 10: slaves 01B ... 31B (default)
32…35	C.Slot9: analogue IN, area 1	• 0x00 00 00 00: empty module • 0x00 00 50 08: 4 words • 0x00 00 50 10: 8 words • 0x00 00 50 18: 12 words • 0x00 00 50 20: 16 words • 0x00 00 50 28: 20 words • 0x00 00 50 30: 24 words • 0x00 00 50 38: 28 words • 0x00 00 50 40: 32 words • 0x00 00 50 48: 36 words • 0x00 00 50 50: 40 words • 0x00 00 50 58: 44 words • 0x00 00 50 60: 48 words • 0x00 00 50 68: 52 words • 0x00 00 50 70: 56 words • 0x00 00 50 78: 60 words (default)

Byte	Description	Value range
36…39	C.Slot10: analogue IN, area 2	• 0x00 00 00 00: empty module • 0x00 00 50 08: 4 words • 0x00 00 50 10: 8 words • 0x00 00 50 18: 12 words • 0x00 00 50 20: 16 words • 0x00 00 50 28: 20 words • 0x00 00 50 30: 24 words • 0x00 00 50 38: 28 words • 0x00 00 50 40: 32 words • 0x00 00 50 48: 36 words • 0x00 00 50 50: 40 words • 0x00 00 50 58: 44 words • 0x00 00 50 60: 48 words • 0x00 00 50 68: 52 words • 0x00 00 50 70: 56 words • 0x00 00 50 78: 60 words (default)
40…43	C.Slot11: analogue OUT, area 1	• 0x00 00 00 00: empty module • 0x00 00 20 08: 4 words • 0x00 00 20 10: 8 words • 0x00 00 20 18: 12 words • 0x00 00 20 20: 16 words • 0x00 00 20 28: 20 words • 0x00 00 20 30: 24 words • 0x00 00 20 38: 28 words • 0x00 00 20 40: 32 words • 0x00 00 20 48: 36 words • 0x00 00 20 50: 40 words • 0x00 00 20 58: 44 words • 0x00 00 20 60: 48 words • 0x00 00 20 68: 52 words • 0x00 00 20 70: 56 words • 0x00 00 20 78: 60 words (default)
44…47	C.Slot12: analogue OUT, area 2	• 0x00 00 00 00: empty module • 0x00 00 60 08: 4 words • 0x00 00 60 10: 8 words • 0x00 00 60 18: 12 words • 0x00 00 60 20: 16 words • 0x00 00 60 28: 20 words • 0x00 00 60 30: 24 words • 0x00 00 60 38: 28 words • 0x00 00 60 40: 32 words • 0x00 00 60 48: 36 words • 0x00 00 60 50: 40 words • 0x00 00 60 58: 44 words • 0x00 00 60 60: 48 words • 0x00 00 60 68: 52 words • 0x00 00 60 70: 56 words • 0x00 00 60 78: 60 words (default)

Byte	Description	Value range
48…51	C.Slot13: diagnosis	• 0x00 00 00 00: empty module • 0x00 00 D0 32: AC14 AS-i 1 (5 words) • 0x00 02 D0 64: AC14/AC4S AS-i 1+2 (50 words) (default) • 0x00 00 D0 1A: AC13x7 AS-i 1 (13 words) • 0x00 02 D0 34: AC13x7 AS-i 1+2 (26 words)

Byte	Description	Value range
52…55	C.Slot14: inputs from CODESYS-PLC	• 0x00 00 00 00: empty module (default) • 0x00 04 10 08: 4 words • 0x00 04 10 10: 8 words • 0x00 04 10 18: 12 words • 0x00 04 10 20: 16 words • 0x00 04 10 28: 20 words • 0x00 04 10 30: 24 words • 0x00 04 10 38: 28 words • 0x00 04 10 40: 32 words • 0x00 04 10 48: 36 words • 0x00 04 10 50: 40 words • 0x00 04 10 58: 44 words • 0x00 04 10 60: 48 words • 0x00 04 10 68: 52 words • 0x00 04 10 70: 56 words • 0x00 04 10 78: 60 words • 0x00 04 10 98: 76 words • 0x00 04 10 B8: 92 words • 0x00 04 10 D8: 108 words • 0x00 04 10 F0: 120 words
56…59	C.Slot15: outputs to CODESYS-PLC	• 0x00 00 00 00: empty module (default) • 0x00 04 20 08: 4 words • 0x00 04 20 10: 8 words • 0x00 04 20 18: 12 words • 0x00 04 20 20: 16 words • 0x00 04 20 28: 20 words • 0x00 04 20 30: 24 words • 0x00 04 20 38: 28 words • 0x00 04 20 40: 32 words • 0x00 04 20 48: 36 words • 0x00 04 20 50: 40 words • 0x00 04 20 58: 44 words • 0x00 04 20 60: 48 words • 0x00 04 20 68: 52 words • 0x00 04 20 70: 56 words • 0x00 04 20 78: 60 words • 0x00 04 20 98: 76 words • 0x00 04 20 B8: 92 words • 0x00 04 20 D8: 108 words • 0x00 04 20 F0: 120 words
60	C.Failsafe state	• 0x00: reset AS-i outputs (default) • 0x01: hold AS-i outputs
61	C.Swap byteorder	• 0x00: deactivated - the order remains unchanged (default) • 0x01: activated - byte order in word is changed
62	C.Analogue channels IN	• 0x01: 1 channel per single slave or 1 channel per A slave • 0x02: 2 channels per single slave or 2 channels per A slave • 0x04: 4 channels per single slave or 2 channels per A/B slave (default) • 0x0B: 1 channel per A/B slave or channels 1+3 per single slave
63	C.Analogue channels OUT	• 0x01: 1 channel per single slave or 1 channel per A slave • 0x02: 2 channels per single slave or 2 channels per A slave • 0x04: 4 channels per single slave or 2 channels per A/B slave (default) • 0x0B: 1 channel per A/B slave or channels 1+3 per single slave

Byte	Description	Value range
64	C.Analogue IN order	• 0x00: deactivated - order of the slaves remains unchanged (default) • 0x01: activated - order of the slaves can be changed (following parameters)
65	C.1st analogue IN Slot 9	• 0x41…0x5F: AS-i 1 slave 1 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
66	C.2nd analogue IN Slot 9	• 0x41…0x42…0x5F: AS-i 1 slave 1…2 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
67	C.3rd analogue IN Slot 9	• 0x41…0x43…0x5F: AS-i 1 slave 1…3 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
68	C.4th analogue IN Slot 9	• 0x41…0x44…0x5F: AS-i 1 slave 1…4 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
69	C.5th analogue IN Slot 9	• 0x41…0x45…0x5F: AS-i 1 slave 1…5 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
70	C.6th analogue IN Slot 9	• 0x41…0x46…0x5F: AS-i 1 slave 1…6 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
71	C.7th analogue IN Slot 9	• 0x41…0x47…0x5F: AS-i 1 slave 1…7 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
72	C.8th analogue IN Slot 9	• 0x41…0x48…0x5F: AS-i 1 slave 1…8 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
73	C.9th analogue IN Slot 9	• 0x41…0x49…0x5F: AS-i 1 slave 1…9 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
74	C.10th analogue IN Slot 9	• 0x41…0x4A…0x5F: AS-i 1 slave 1…10 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
75	C.11th analogue IN Slot 9	• 0x41…0x4B…0x5F: AS-i 1 slave 1…11 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
76	C.12th analogue IN Slot 9	• 0x41…0x4C…0x5F: AS-i 1 slave 1…12 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
77	C.13th analogue IN Slot 9	• 0x41…0x4D…0x5F: AS-i 1 slave 1…13 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
78	C.14th analogue IN Slot 9	• 0x41…0x4E…0x5F: AS-i 1 slave 1…14 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
79	C.15th analogue IN Slot 9	• 0x41…0x4F…0x5F: AS-i 1 slave 15 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
80	C.1st analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x9F: AS-i 2 slave 1 (default)…31
81	C.2nd analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x82…0x9F: AS-i 2 slave 1…2 (default)…31
82	C.3rd analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x83…0x9F: AS-i 2 slave 1…3 (default)…31
83	C.4th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x84…0x9F: AS-i 2 slave 1…4 (default)…31
84	C.5th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x85…0x9F: AS-i 2 slave 1…5 (default)…31
85	C.6th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x86…0x9F: AS-i 2 slave 1…6 (default)…31
86	C.7th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x87…0x9F: AS-i 2 slave 1…7 (default)…31
87	C.8th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x88…0x9F: AS-i 2 slave 1…8 (default)…31

Byte	Description	Value range
88	C.9th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x89…0x9F: AS-i 2 slave 1…9 (default)…31
89	C.10th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x8A…0x9F: AS-i 2 slave 1…10 (default)…31
90	C.11th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x8B…0x9F: AS-i 2 slave 1…11 (default)…31
91	C.12th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x8C…0x9F: AS-i 2 slave 1…12 (default)…31
92	C.13th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x8D…0x9F: AS-i 2 slave 1…13 (default)…31
93	C.14th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x8E…0x9F: AS-i 2 slave 1…14 (default)…31
94	C.15th analogue IN Slot 10	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x8F…0x9F: AS-i 2 slave 1…15 (default)…31
95	C.Analogue OUT order	• 0x00: deactivated (default) • 0x01: activated
96	C.1st analogue OUT Slot 11	• 0x41…0x50…0x5F: AS-i 1 slave 1…16 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
97	C.2nd analogue OUT Slot 11	• 0x41…0x51…0x5F: AS-i 1 slave 1…17 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
98	C.3rd analogue OUT Slot 11	• 0x41…0x52…0x5F: AS-i 1 slave 1…18 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
99	C.4th analogue OUT Slot 11	• 0x41…0x53…0x5F: AS-i 1 slave 1…19 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
100	C.5th analogue OUT Slot 11	• 0x41…0x54…0x5F: AS-i 1 slave 1…20 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
101	C.6th analogue OUT Slot 11	• 0x41…0x55…0x5F: AS-i 1 slave 1…21 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
102	C.7th analogue OUT Slot 11	• 0x41…0x56…0x5F: AS-i 1 slave 1…22 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
103	C.8th analogue OUT Slot 11	• 0x41…0x57…0x5F: AS-i 1 slave 1…23 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
104	C.9th analogue OUT Slot 11	• 0x41…0x58…0x5F: AS-i 1 slave 1…24 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
105	C.10th analogue OUT Slot 11	• 0x41…0x59…0x5F: AS-i 1 slave 1…25 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
106	C.11th analogue OUT Slot 11	• 0x41…0x5A…0x5F: AS-i 1 slave 1…26 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
107	C.12th analogue OUT Slot 11	• 0x41…0x5B…0x5F: AS-i 1 slave 1…27 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
108	C.13th analogue OUT Slot 11	• 0x41…0x5C…0x5F: AS-i 1 slave 1…28 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
109	C.14th analogue OUT Slot 11	• 0x41…0x5D…0x5F: AS-i 1 slave 1…29 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
110	C.15th analogue OUT Slot 11	• 0x41…0x5E…0x5F: AS-i 1 slave 1…30 (default)…31 • 0x81…0x9F: AS-i 2 slave 1…31
111	C.1st analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x90…0x9F: AS-i 2 slave 1…16 (default)…31
112	C.2nd analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x91…0x9F: AS-i 2 Slave 1…17 (default)…31

Byte	Description	Value range
113	C.3rd analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x92…0x9F: AS-i 2 slave 1…18 (default)…31
114	C.4th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x93…0x9F: AS-i 2 slave 1…19 (default)…31
115	C.5th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x94…0x9F: AS-i 2 slave 1…20 (default)…31
116	C.6th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x95…0x9F: AS-i 2 slave 1…21 (default)…31
117	C.7th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x96…0x9F: AS-i 2 slave 1…22 (default)…31
118	C.8th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x97…0x9F: AS-i 2 slave 1…23 (default)…31
119	C.9th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x98…0x9F: AS-i 2 slave 1…24 (default)…31
120	C.10th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x99…0x9F: AS-i 2 slave 1…25 (default)…31
121	C.11th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x9A…0x9F: AS-i 2 slave 1…26 (default)…31
122	C.12th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x9B…0x9F: AS-i 2 slave 1…27 (default)…31
123	C.13th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x9C…0x9F: AS-i 2 slave 1…28 (default)…31
124	C.14th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x9D…0x9F: AS-i 2 slave 1…29 (default)…31
125	C.15th analogue OUT Slot 12	• 0x41…0x5F: AS-i 1 slave 1…31 • 0x81…0x9E…0x9F: AS-i 2 slave 1…30 (default)…31
126	C.AS-i Parameter Download	• 0x00: deactivated (default) • 0x01: activated
127	C.Parameter Slave 1(A) AS-i 1	0x00…0x0F: 0…15 (default)
128	C.Parameter Slave 2(A) AS-i 1	0x00…0x0F: 0…15 (default)
129	C.Parameter Slave 3(A) AS-i 1	0x00…0x0F: 0…15 (default)
130	C.Parameter Slave 4(A) AS-i 1	0x00…0x0F: 0…15 (default)
131	C.Parameter Slave 5(A) AS-i 1	0x00…0x0F: 0…15 (default)
132	C.Parameter Slave 6(A) AS-i 1	0x00…0x0F: 0…15 (default)
133	C.Parameter Slave 7(A) AS-i 1	0x00…0x0F: 0…15 (default)
134	C.Parameter Slave 8(A) AS-i 1	0x00…0x0F: 0…15 (default)
135	C.Parameter Slave 9(A) AS-i 1	0x00…0x0F: 0…15 (default)
136	C.Parameter Slave 10(A) AS-i 1	0x00…0x0F: 0…15 (default)
137	C.Parameter Slave 11(A) AS-i 1	0x00…0x0F: 0…15 (default)
138	C.Parameter Slave 12(A) AS-i 1	0x00…0x0F: 0…15 (default)
139	C.Parameter Slave 13(A) AS-i 1	0x00…0x0F: 0…15 (default)
140	C.Parameter Slave 14(A) AS-i 1	0x00…0x0F: 0…15 (default)
141	C.Parameter Slave 15(A) AS-i 1	0x00…0x0F: 0…15 (default)
142	C.Parameter Slave 16(A) AS-i 1	0x00…0x0F: 0…15 (default)
143	C.Parameter Slave 17(A) AS-i 1	0x00…0x0F: 0…15 (default)
144	C.Parameter Slave 18(A) AS-i 1	0x00…0x0F: 0…15 (default)
145	C.Parameter Slave 19(A) AS-i 1	0x00…0x0F: 0…15 (default)

Byte	Description	Value range
146	C.Parameter Slave 20(A) AS-i 1	0x00…0x0F: 0…15 (default)
147	C.Parameter Slave 21(A) AS-i 1	0x00…0x0F: 0…15 (default)
148	C.Parameter Slave 22(A) AS-i 1	0x00…0x0F: 0…15 (default)
149	C.Parameter Slave 23(A) AS-i 1	0x00…0x0F: 0…15 (default)
150	C.Parameter Slave 24(A) AS-i 1	0x00…0x0F: 0…15 (default)
151	C.Parameter Slave 25(A) AS-i 1	0x00…0x0F: 0…15 (default)
152	C.Parameter Slave 26(A) AS-i 1	0x00…0x0F: 0…15 (default)
153	C.Parameter Slave 27(A) AS-i 1	0x00…0x0F: 0…15 (default)
154	C.Parameter Slave 28(A) AS-i 1	0x00…0x0F: 0…15 (default)
155	C.Parameter Slave 29(A) AS-i 1	0x00…0x0F: 0…15 (default)
156	C.Parameter Slave 30(A) AS-i 1	0x00…0x0F: 0…15 (default)
157	C.Parameter Slave 31(A) AS-i 1	0x00…0x0F: 0…15 (default)
158	C.Parameter Slave 1B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
159	C.Parameter Slave 2B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
160	C.Parameter Slave 3B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
161	C.Parameter Slave 4B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
162	C.Parameter Slave 5B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
163	C.Parameter Slave 6B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
164	C.Parameter Slave 7B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
165	C.Parameter Slave 8B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
166	C.Parameter Slave 9B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
167	C.Parameter Slave 10B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
168	C.Parameter Slave 11B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
169	C.Parameter Slave 12B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
170	C.Parameter Slave 13B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
171	C.Parameter Slave 14B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
172	C.Parameter Slave 15B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
173	C.Parameter Slave 16B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
174	C.Parameter Slave 17B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
175	C.Parameter Slave 18B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
176	C.Parameter Slave 19B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
177	C.Parameter Slave 20B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
178	C.Parameter Slave 21B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
179	C.Parameter Slave 22B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
180	C.Parameter Slave 23B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
181	C.Parameter Slave 24B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
182	C.Parameter Slave 25B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
183	C.Parameter Slave 26B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
184	C.Parameter Slave 27B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
185	C.Parameter Slave 28B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
186	C.Parameter Slave 29B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
187	C.Parameter Slave 30B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
188	C.Parameter Slave 31B AS-i 1	0x00…0x07…0x0F: 1…7 (default)…15
189	C.Parameter Slave 1(A) AS-i 2	0x00…0x0F: 0…15 (default)

Byte	Description	Value range
190	C.Parameter Slave 2(A) AS-i 2	0x00…0x0F: 0…15 (default)
191	C.Parameter Slave 3(A) AS-i 2	0x00…0x0F: 0…15 (default)
192	C.Parameter Slave 4(A) AS-i 2	0x00…0x0F: 0…15 (default)
193	C.Parameter Slave 5(A) AS-i 2	0x00…0x0F: 0…15 (default)
194	C.Parameter Slave 6(A) AS-i 2	0x00…0x0F: 0…15 (default)
195	C.Parameter Slave 7(A) AS-i 2	0x00…0x0F: 0…15 (default)
196	C.Parameter Slave 8(A) AS-i 2	0x00…0x0F: 0…15 (default)
197	C.Parameter Slave 9(A) AS-i 2	0x00…0x0F: 0…15 (default)
198	C.Parameter Slave 10(A) AS-i 2	0x00…0x0F: 0…15 (default)
199	C.Parameter Slave 11(A) AS-i 2	0x00…0x0F: 0…15 (default)
200	C.Parameter Slave 12(A) AS-i 2	0x00…0x0F: 0…15 (default)
201	C.Parameter Slave 13(A) AS-i 2	0x00…0x0F: 0…15 (default)
202	C.Parameter Slave 14(A) AS-i 2	0x00…0x0F: 0…15 (default)
203	C.Parameter Slave 15(A) AS-i 2	0x00…0x0F: 0…15 (default)
204	C.Parameter Slave 16(A) AS-i 2	0x00…0x0F: 0…15 (default)
205	C.Parameter Slave 17(A) AS-i 2	0x00…0x0F: 0…15 (default)
206	C.Parameter Slave 18(A) AS-i 2	0x00…0x0F: 0…15 (default)
207	C.Parameter Slave 19(A) AS-i 2	0x00…0x0F: 0…15 (default)
208	C.Parameter Slave 20(A) AS-i 2	0x00…0x0F: 0…15 (default)
209	C.Parameter Slave 21(A) AS-i 2	0x00…0x0F: 0…15 (default)
210	C.Parameter Slave 22(A) AS-i 2	0x00…0x0F: 0…15 (default)
211	C.Parameter Slave 23(A) AS-i 2	0x00…0x0F: 0…15 (default)
212	C.Parameter Slave 24(A) AS-i 2	0x00…0x0F: 0…15 (default)
213	C.Parameter Slave 25(A) AS-i 2	0x00…0x0F: 0…15 (default)
214	C.Parameter Slave 26(A) AS-i 2	0x00…0x0F: 0…15 (default)
215	C.Parameter Slave 27(A) AS-i 2	0x00…0x0F: 0…15 (default)
216	C.Parameter Slave 28(A) AS-i 2	0x00…0x0F: 0…15 (default)
217	C.Parameter Slave 29(A) AS-i 2	0x00…0x0F: 0…15 (default)
218	C.Parameter Slave 30(A) AS-i 2	0x00…0x0F: 0…15 (default)
219	C.Parameter Slave 31(A) AS-i 2	0x00…0x0F: 0…15 (default)
220	C.Parameter Slave 1B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
221	C.Parameter Slave 2B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
222	C.Parameter Slave 3B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
223	C.Parameter Slave 4B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
224	C.Parameter Slave 5B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
225	C.Parameter Slave 6B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
226	C.Parameter Slave 7B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
227	C.Parameter Slave 8B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
228	C.Parameter Slave 9B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
229	C.Parameter Slave 10B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
230	C.Parameter Slave 11B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
231	C.Parameter Slave 12B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
232	C.Parameter Slave 13B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
233	C.Parameter Slave 14B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15

Byte	Description	Value range
234	C.Parameter Slave 15B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
235	C.Parameter Slave 16B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
236	C.Parameter Slave 17B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
237	C.Parameter Slave 18B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
238	C.Parameter Slave 19B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
239	C.Parameter Slave 20B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
240	C.Parameter Slave 21B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
241	C.Parameter Slave 22B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
242	C.Parameter Slave 23B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
243	C.Parameter Slave 24B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
244	C.Parameter Slave 25B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
245	C.Parameter Slave 26B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
246	C.Parameter Slave 27B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
247	C.Parameter Slave 28B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
248	C.Parameter Slave 29B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
249	C.Parameter Slave 30B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15
250	C.Parameter Slave 31B AS-i 2	0x00…0x07…0x0F: 1…7 (default)…15

13.3.2.2 Input assembly (instance 100)

The assembly instance has a dynamic size. The amount of data transferred depends on the selected module configuration. The assembly instance can contain a maximum of 248 words.

Word (offset)	Description	Max. length (words)
0	Digital IN AS-i 1 S/A (→ 🗋 260)	8
	Digital IN AS-i 2 S/A (→ 🗋 262)	8
	Digital IN AS-i 1 B (→ 🗋 264)	8
	Digital IN AS-i 2 B (→ 🗋 266)	8
	Analogue IN (area 1) (→ 🗋 268)	60
	Analogue IN (area 2) (→ 🗋 269)	60
	Diagnostic (→ 🗋 272)	50
	Inputs from AC424S-PLC (→ 🗋 278)	120

13.3.2.3 Output assembly (instance 150)

The assembly instance has a dynamic size. The amount of data transferred depends on the selected module configuration. The assembly instance can contain a maximum of 248 words.

Word (offset)	Description	Max. length (words)
0	Digital OUT AS-i 1 S/A (→ 🗋 261)	8
	Digital OUT AS-i 2 S/A (→ 🗋 263)	8
	Digital OUT AS-i 1 B (→ 🗋 265)	8
	Digital OUT AS-i 2 B (→ 🗋 267)	8
	Analogue OUT (area 1) (→ 🗋 270)	60

Word (offset)	Description	Max. length (words)
0	Analogue OUT (area 2) (→ 🗋 271)	60
	Outputs to AC424S-PLC (→ 🗋 280)	120

13.3.2.4 Acyclic service assembly (instance 801)

Attribute	Description	Access	Length (words)
1	System: System information (DS1) (→ 🗋 133)	r	26
30	System: Command Request Channel	rw	120
31	System: Command Response Channel	r	120
32	AS-i master 1: Digital inputs of the slaves and master flags (DS2) (→ 🗋 135)	r	35
33	AS-i master 1: Analogue inputs of slaves 1(A)...15B (DS3) (→ 🗋 139)	r	75
34	AS-i master 1: Analogue inputs of slaves 16(A)...31B (DS4) (→ 🗋 140)	rw	80
35	AS-i master 1: Digital outputs of slaves 1(A)...31B (DS5) (→ 🗋 141)	rw	32
36	AS-i master 1: Analogue outputs of slaves 1(A)...15B (DS6) (→ 🗋 142)	rw	60
37	AS-i master 1: Analogue outputs of slaves 16(A)...31B (DS7) (→ 🗋 143)	r	64
38	AS-i master 1: Status flags of the analogue outputs of slaves 1...31 (DS8) (→ 🗋 144)	r	32
39	AS-i master 1: Slave lists LAS, LDS, LPF, LCE (DS9) (→ 🗋 146)	r	16
40	AS-i master 1: Slave list LPS (DS10) (→ 🗋 148)	r	4
41	AS-i master 1: Current configuration data CDI (DS11) (→ 🗋 149)	r	64
42	AS-i master 1: Projected configuration data PCD (DS12) (→ 🗋 151)	r	64
43	AS-i master 1: Image of the input parameters of the slaves PI (DS13) (→ 🗋 153)	r	32
44	AS-i master 1: Image of the output parameters of the slaves PP (DS14) (→ 🗋 154)	rw	32
46	AS-i master 1: Error counter and cycle counter (DS15) (→ 🗋 155)	r	72
47	AS-i master 1: Error lists LCEMS, LCEAS, LDAE (DS17) (→ 🗋 158)	r	12
62	AS-i master 1: Command Request Channel	rw	120
63	AS-i master 1: Command Response Channel	r	120
64	AS-i master 2: Digital inputs of the slaves and master flags (DS2) (→ 🗋 135)	r	35
65	AS-i master 2: Analogue inputs of slaves 1(A)...15B (DS3) (→ 🗋 139)	r	75
66	AS-i master 2: Analogue inputs of slaves 16(A)...31B (DS4) (→ 🗋 140)	r	80
67	AS-i master 2: Digital outputs of slaves 1(A)...31B (DS5) (→ 🗋 141)	rw	32
68	AS-i master 2: Analogue outputs of slaves 1(A)...15B (DS6) (→ 🗋 142)	rw	60
69	AS-i master 2: Analogue outputs of slaves 16(A)...31B (DS7) (→ 🗋 143)	rw	64
70	AS-i master 2: Status flags of the analogue outputs of slaves 1...31 (DS8) (→ 🗋 144)	r	32
71	AS-i master 2: Slave lists LAS, LDS, LPF, LCE (DS9) (→ 🗋 146)	r	16
72	AS-i master 2: Slave list LPS (DS10) (→ 🗋 148)	r	4
73	AS-i master 2: Current configuration data CDI (DS11) (→ 🗋 149)	r	64
74	AS-i master 2: Projected configuration data PCD (DS12) (→ 🗋 151)	r	64
75	AS-i master 2: Image of the input parameters of the slaves PI (DS13) (→ 🗋 153)	r	32
76	AS-i master 2: Image of the output parameters of the slaves PP (DS14) (→ 🗋 154)	rw	32
78	AS-i master 2: Error counter and cycle counter (DS15) (→ 🗋 155)	r	72
79	AS-i master 2: Error lists LCEMS, LCEAS, LDAE (DS17) (→ 🗋 158)	r	12
94	AS-i master 2: Command Request Channel	rw	120
95	AS-i master 2: Command Response Channel	r	120

13.3.3 EtherNet/IP modules

13.3.3.1 Overview: AC422S modules

Slot	Description
1	Digital IN AS-i 1 S/A (→ 🗋 260)
2	Digital OUT AS-i 1 S/A (→ 🗋 261)
3	Digital IN AS-i 2 S/A (→ 🗋 262)
4	Digital OUT AS-i 2 S/A (→ 🗋 263)
5	Digital IN AS-i 1 B (→ 🗋 264)
6	Digital OUT AS-i 1 B (→ 🗋 265)
7	Digital IN AS-i 2 B (→ 🗋 266)
8	Digital OUT AS-i 2 B (→ 🗋 267)
9	Analogue IN (area 1) (→ 🗋 268)
10	Analogue IN (area 2) (→ 🗋 269)
11	Analogue OUT (area 1) (→ 🗋 270)
12	Analogue OUT (area 2) (→ 🗋 271)
13	Diagnostic (→ 🗋 272)
14	Inputs from AC422S-PLC (→ 🗋 277)
15	Outputs to AC422S-PLC (→ 🗋 279)

13.3.3.2 Overview: Modules AC424S

Slot	Description
1	Digital IN AS-i 1 S/A (→ 🗋 260)
2	Digital OUT AS-i 1 S/A (→ 🗋 261)
3	Digital IN AS-i 2 S/A (→ 🗋 262)
4	Digital OUT AS-i 2 S/A (→ 🗋 263)
5	Digital IN AS-i 1 B (→ 🗋 264)
6	Digital OUT AS-i 1 B (→ 🗋 265)
7	Digital IN AS-i 2 B (→ 🗋 266)
8	Digital OUT AS-i 2 B (→ 🗋 267)
9	Analogue IN (area 1) (→ 🗋 268)
10	Analogue IN (area 2) (→ 🗋 269)
11	Analogue OUT (area 1) (→ 🗋 270)
12	Analogue OUT (area 2) (→ 🗋 271)
13	Diagnostic (→ 🗋 272)
14	Inputs from AC424S-PLC (→ 🗋 278)
15	Outputs to AC424S-PLC (→ 🗋 280)

13.3.3.3 Digital IN AS-i 1 S/A

Slot	Description	Available modules	Words
1	Digital inputs single or A slaves, AS-i master 1	• Empty module	0
		• 01…03: digital inputs of slaves 1(A) to 3(A), AS-i master 1	1
		• 01…07: digital inputs of slaves 1(A) to 7(A), AS-i master 1	2
		• 01…11: digital inputs of slaves 1(A) to 11(A), AS-i master 1	3
		• 01…15: digital inputs of slaves 1(A) to 15(A), AS-i master 1	4
		• 01…19: digital inputs of slaves 1(A) to 19(A), AS-i master 1	5
		• 01…23: digital inputs of slaves 1(A) to 23(A), AS-i master 1	6
		• 01…27: digital inputs of slaves 1(A) to 27(A), AS-i master 1	7
		• 01…31: digital inputs of slaves 1(A) to 31(A), AS-i master 1	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	PWF	CF	OF	PF	Slave 1(A): DI3…DI0				Slave 2(A): DI3…DI0				Slave 3(A): DI3…DI0			
2	Slave 4(A): DI3…DI0				Slave 5(A): DI3…DI0				Slave 6(A): DI3…DI0				Slave 7(A): DI3…DI0			
3	Slave 8(A): DI3…DI0				Slave 9(A): DI3…DI0				Slave 10(A): DI3…DI0				Slave 11(A): DI3…DI0			
4	Slave 12(A): DI3…DI0				Slave 13(A): DI3…DI0				Slave 14(A): DI3…DI0				Slave 15(A): DI3…DI0			
5	Slave 16(A): DI3…DI0				Slave 17(A): DI3…DI0				Slave 18(A): DI3…DI0				Slave 19(A): DI3…DI0			
6	Slave 20(A): DI3…DI0				Slave 21(A): DI3…DI0				Slave 22(A): DI3…DI0				Slave 23(A): DI3…DI0			
7	Slave 24(A): DI3…DI0				Slave 25(A): DI3…DI0				Slave 26(A): DI3…DI0				Slave 27(A): DI3…DI0			
8	Slave 28(A): DI3…DI0				Slave 29(A): DI3…DI0				Slave 30(A): DI3…DI0				Slave 31(A): DI3…DI0			

Legend:

• PWF	AS-i power fail (19 V)	1 bit	• 0x0: no error • 0x1: error
• CF	configuration error in the AS-i circuit	1 bit	• 0x0: no error • 0x1: error
• OF	AS-i master is offline (AS-i data invalid)	1 bit	• 0x0: valid • 0x1: invalid
• PF	peripheral fault in the AS-i circuit	1 bit	• 0x0: no error • 0x1: error

13.3.3.4 Digital OUT AS-i 1 S/A

Slot	Description	Available modules	Words
2	Digital outputs single or A slaves, AS-i master 1	• Empty module	0
		• 01…03: digital outputs slaves 1(A) to 3(A), AS-i master 1	1
		• 01…07: digital outputs of slaves 1(A) to 7(A), AS-i master 1	2
		• 01…11: digital outputs of slaves 1(A) to 11(A), AS-i master 1	3
		• 01…15: digital outputs of slaves 1(A) to 15(A), AS-i master 1	4
		• 01…19: digital outputs of slaves 1(A) to 19(A), AS-i master 1	5
		• 01…23: digital outputs of slaves 1(A) to 23(A), AS-i master 1	6
		• 01…27: digital outputs of slaves 1(A) to 27(A), AS-i master 1	7
		• 01…31: digital outputs of slaves 1(A) to 31(A), AS-i master 1	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Reserved				Slave 1(A): DO3…DO0				Slave 2(A): DO3…DO0				Slave 3(A): DO3…DO0			
2	Slave 4(A): DO3…DO0				Slave 5(A): DO3…DO0				Slave 6(A): DO3…DO0				Slave 7(A): DO3…DO0			
3	Slave 8(A): DO3…DO0				Slave 9(A): DO3…DO0				Slave 10(A): DO3…DO0				Slave 11(A): DO3…DO0			
4	Slave 12(A): DO3…DO0				Slave 13(A): DO3…DO0				Slave 14(A): DO3…DO0				Slave 15(A): DO3…DO0			
5	Slave 16(A): DO3…DO0				Slave 17(A): DO3…DO0				Slave 18(A): DO3…DO0				Slave 19(A): DO3…DO0			
6	Slave 20(A): DO3…DO0				Slave 21(A): DO3…DO0				Slave 22(A): DO3…DO0				Slave 23(A): DO3…DO0			
7	Slave 24(A): DO3…DO0				Slave 25(A): DO3…DO0				Slave 26(A): DO3…DO0				Slave 27(A): DO3…DO0			
8	Slave 28(A): DO3…DO0				Slave 29(A): DO3…DO0				Slave 30(A): DO3…DO0				Slave 31(A): DO3…DO0			

13.3.3.5 Digital IN AS-i 2 S/A

Slot	Description	Available modules	Words
3	Digital inputs single or A slaves, AS-i master 2	• Empty module	0
		• 01…03: digital inputs of slaves 1(A) to 3(A), AS-i master 2	1
		• 01…07: digital inputs of slaves 1(A) to 7(A), AS-i master 2	2
		• 01…11: digital inputs of slaves 1(A) to 11(A), AS-i master 2	3
		• 01…15: digital inputs of slaves 1(A) to 15(A), AS-i master 2	4
		• 01…19: digital inputs of slaves 1(A) to 19(A), AS-i master 2	5
		• 01…23: digital inputs of slaves 1(A) to 23(A), AS-i master 2	6
		• 01…27: digital inputs of slaves 1(A) to 27(A), AS-i master 2	7
		• 01…31: digital inputs of slaves 1(A) to 31(A), AS-i master 2	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	PWF	CF	OF	PF	Slave 1(A): DI3…DI0				Slave 2(A): DI3…DI0				Slave 3(A): DI3…DI0			
2	Slave 4(A): DI3…DI0				Slave 5(A): DI3…DI0				Slave 6(A): DI3…DI0				Slave 7(A): DI3…DI0			
3	Slave 8(A): DI3…DI0				Slave 9(A): DI3…DI0				Slave 10(A): DI3…DI0				Slave 11(A): DI3…DI0			
4	Slave 12(A): DI3…DI0				Slave 13(A): DI3…DI0				Slave 14(A): DI3…DI0				Slave 15(A): DI3…DI0			
5	Slave 16(A): DI3…DI0				Slave 17(A): DI3…DI0				Slave 18(A): DI3…DI0				Slave 19(A): DI3…DI0			
6	Slave 20(A): DI3…DI0				Slave 21(A): DI3…DI0				Slave 22(A): DI3…DI0				Slave 23(A): DI3…DI0			
7	Slave 24(A): DI3…DI0				Slave 25(A): DI3…DI0				Slave 26(A): DI3…DI0				Slave 27(A): DI3…DI0			
8	Slave 28(A): DI3…DI0				Slave 29(A): DI3…DI0				Slave 30(A): DI3…DI0				Slave 31(A): DI3…DI0			

Legend:

• PWF	AS-i power fail (19 V)	1 bit	• 0x0: no error • 0x1: error
• CF	configuration error in the AS-i circuit	1 bit	• 0x0: no error • 0x1: error
• OF	AS-i master is offline (AS-i data invalid)	1 bit	• 0x0: valid • 0x1: invalid
• PF	peripheral fault in the AS-i circuit	1 bit	• 0x0: no error • 0x1: error

13.3.3.6 Digital OUT AS-i 2 S/A

Slot	Description	Available modules	Words
4	Digital outputs single or A slaves, AS-i master 2	• Empty module	0
		• 01…03: digital outputs of slaves 1(A) to 3(A), AS-i master 2	1
		• 01…07: digital outputs of slaves 1(A) to 7(A), AS-i master 2	2
		• 01…11: digital outputs of slaves 1(A) to 11(A), AS-i master 2	3
		• 01…15: digital outputs of slaves 1(A) to 15(A), AS-i master 2	4
		• 01…19: digital outputs of slaves 1(A) to 19(A), AS-i master 2	5
		• 01…23: digital outputs of slaves 1(A) to 23(A), AS-i master 2	6
		• 01…27: digital outputs of slaves 1(A) to 27(A), AS-i master 2	7
		• 01…31: digital outputs of slaves 1(A) to 31(A), AS-i master 2	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Reserved				Slave 1(A): DO3…DO0				Slave 2(A): DO3…DO0				Slave 3(A): DO3…DO0			
2	Slave 4(A): DO3…DO0				Slave 5(A): DO3…DO0				Slave 6(A): DO3…DO0				Slave 7(A): DO3…DO0			
3	Slave 8(A): DO3…DO0				Slave 9(A): DO3…DO0				Slave 10(A): DO3…DO0				Slave 11(A): DO3…DO0			
4	Slave 12(A): DO3…DO0				Slave 13(A): DO3…DO0				Slave 14(A): DO3…DO0				Slave 15(A): DO3…DO0			
5	Slave 16(A): DO3…DO0				Slave 17(A): DO3…DO0				Slave 18(A): DO3…DO0				Slave 19(A): DO3…DO0			
6	Slave 20(A): DO3…DO0				Slave 21(A): DO3…DO0				Slave 22(A): DO3…DO0				Slave 23(A): DO3…DO0			
7	Slave 24(A): DO3…DO0				Slave 25(A): DO3…DO0				Slave 26(A): DO3…DO0				Slave 27(A): DO3…DO0			
8	Slave 28(A): DO3…DO0				Slave 29(A): DO3…DO0				Slave 30(A): DO3…DO0				Slave 31(A): DO3…DO0			

13.3.3.7 Digital IN AS-i 1 B

Slot	Description	Available modules	Words
5	Digital inputs B slaves, AS-i master 1	• Empty module	0
		• 01B…03B: digital inputs of slaves 1B to 3B, AS-i master 1	1
		• 01B…07B: digital inputs of slaves 1B to 7B, AS-i master 1	2
		• 01B…11B: digital inputs of slaves 1B to 11B, AS-i master 1	3
		• 01B…15B: digital inputs of slaves 1B to 15B, AS-i master 1	4
		• 01B…19B: digital inputs of slaves 1B to 19B, AS-i master 1	5
		• 01B…23B: digital inputs of slaves 1B to 23B, AS-i master 1	6
		• 01B…27B: digital inputs of slaves 1B to 27B, AS-i master 1	7
		• 01B…31B: digital inputs of slaves 1B to 31B, AS-i master 1	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Reserved				Slave 1B: DI3…DI0				Slave 2B: DI3…DI0				Slave 3B: DI3…DI0			
2	Slave 4B: DI3…DI0				Slave 5B: DI3…DI0				Slave 6B: DI3…DI0				Slave 7B: DI3…DI0			
3	Slave 8B: DI3…DI0				Slave 9B: DI3…DI0				Slave 10B: DI3…DI0				Slave 11B: DI3…DI0			
4	Slave 12B: DI3…DI0				Slave 13B: DI3…DI0				Slave 14B: DI3…DI0				Slave 15B: DI3…DI0			
5	Slave 16B: DI3…DI0				Slave 17B: DI3…DI0				Slave 18B: DI3…DI0				Slave 19B: DI3…DI0			
6	Slave 20B: DI3…DI0				Slave 21B: DI3…DI0				Slave 22B: DI3…DI0				Slave 23B: DI3…DI0			
7	Slave 24B: DI3…DI0				Slave 25B: DI3…DI0				Slave 26B: DI3…DI0				Slave 27B: DI3…DI0			
8	Slave 28B: DI3…DI0				Slave 29B: DI3…DI0				Slave 30B: DI3…DI0				Slave 31B: DI3…DI0			

13.3.3.8 Digital OUT AS-i 1 B

Slot	Description	Available modules	Words
6	Digital outputs B slaves, AS-i master 1	• Empty module	0
		• 01B…03B: digital outputs of slaves 1B to 3B, AS-i master 1	1
		• 01B…07B: digital outputs of slaves 1B to 7B, AS-i master 1	2
		• 01B…11B: digital outputs of slaves 1B to 11B, AS-i master 1	3
		• 01B…15B: digital outputs of slaves 1B to 15B, AS-i master 1	4
		• 01B…19B: digital outputs of slaves 1B to 19B, AS-i master 1	5
		• 01B…23B: digital outputs of slaves 1B to 23B, AS-i master 1	6
		• 01B…27B: digital outputs of slaves 1B to 27B, AS-i master 1	7
		• 01B…31B: digital outputs of slaves 1B to 31B, AS-i master 1	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Reserved				Slave 1B: DO3…DO0				Slave 2B: DO3…DO0				Slave 3B: DO3…DO0			
2	Slave 4B: DO3…DO0				Slave 5B: DO3…DO0				Slave 6B: DO3…DO0				Slave 7B: DO3…DO0			
3	Slave 8B: DO3…DO0				Slave 9B: DO3…DO0				Slave 10B: DO3…DO0				Slave 11B: DO3…DO0			
4	Slave 12B: DO3…DO0				Slave 13B: DO3…DO0				Slave 14B: DO3…DO0				Slave 15B: DO3…DO0			
5	Slave 16B: DO3…DO0				Slave 17B: DO3…DO0				Slave 18B: DO3…DO0				Slave 19B: DO3…DO0			
6	Slave 20B: DO3…DO0				Slave 21B: DO3…DO0				Slave 22B: DO3…DO0				Slave 23B: DO3…DO0			
7	Slave 24B: DO3…DO0				Slave 25B: DO3…DO0				Slave 26B: DO3…DO0				Slave 27B: DO3…DO0			
8	Slave 28B: DO3…DO0				Slave 29B: DO3…DO0				Slave 30B: DO3…DO0				Slave 31B: DO3…DO0			

13.3.3.9 Digital IN AS-i 2 B

Slot	Description	Available modules	Words
7	Digital inputs B slaves, AS-i master 2	• Empty module	0
		• 01B…03B: digital inputs of slaves 1B to 3B, AS-i master 2	1
		• 01B…07B: digital inputs of slaves 1B to 7B, AS-i master 2	2
		• 01B…11B: digital inputs of slaves 1B to 11B, AS-i master 2	3
		• 01B…15B: digital inputs of slaves 1B to 15B, AS-i master 2	4
		• 01B…19B: digital inputs of slaves 1B to 19B, AS-i master 2	5
		• 01B…23B: digital inputs of slaves 1B to 23B, AS-i master 2	6
		• 01B…27B: digital inputs of slaves 1B to 27B, AS-i master 2	7
		• 01B…31B: digital inputs of slaves 1B to 31B, AS-i master 2	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Reserved				Slave 1B: DI3…DI0				Slave 2B: DI3…DI0				Slave 3B: DI3…DI0			
2	Slave 4B: DI3…DI0				Slave 5B: DI3…DI0				Slave 6B: DI3…DI0				Slave 7B: DI3…DI0			
3	Slave 8B: DI3…DI0				Slave 9B: DI3…DI0				Slave 10B: DI3…DI0				Slave 11B: DI3…DI0			
4	Slave 12B: DI3…DI0				Slave 13B: DI3…DI0				Slave 14B: DI3…DI0				Slave 15B: DI3…DI0			
5	Slave 16B: DI3…DI0				Slave 17B: DI3…DI0				Slave 18B: DI3…DI0				Slave 19B: DI3…DI0			
6	Slave 20B: DI3…DI0				Slave 21B: DI3…DI0				Slave 22B: DI3…DI0				Slave 23B: DI3…DI0			
7	Slave 24B: DI3…DI0				Slave 25B: DI3…DI0				Slave 26B: DI3…DI0				Slave 27B: DI3…DI0			
8	Slave 28B: DI3…DI0				Slave 29B: DI3…DI0				Slave 30B: DI3…DI0				Slave 31B: DI3…DI0			

13.3.3.10 Digital OUT AS-i 2 B

Slot	Description	Available modules	Words
8	Digital outputs B slaves, AS-i master 2	• Empty module	0
		• 01B…03B: digital outputs of slaves 1B to 3B, AS-i master 2	1
		• 01B…07B: digital outputs of slaves 1B to 7B, AS-i master 2	2
		• 01B…11B: digital outputs of slaves 1B to 11B, AS-i master 2	3
		• 01B…15B: digital outputs of slaves 1B to 15B, AS-i master 2	4
		• 01B…19B: digital outputs of slaves 1B to 19B, AS-i master 2	5
		• 01B…23B: digital outputs of slaves 1B to 23B, AS-i master 2	6
		• 01B…27B: digital outputs of slaves 1B to 27B, AS-i master 2	7
		• 01B…31B: digital outputs of slaves 1B to 31B, AS-i master 2	8

Data structure:

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Reserved				Slave 1B: DO3…DO0				Slave 2B: DO3…DO0				Slave 3B: DO3…DO0			
2	Slave 4B: DO3…DO0				Slave 5B: DO3…DO0				Slave 6B: DO3…DO0				Slave 7B: DO3…DO0			
3	Slave 8B: DO3…DO0				Slave 9B: DO3…DO0				Slave 10B: DO3…DO0				Slave 11B: DO3…DO0			
4	Slave 12B: DO3…DO0				Slave 13B: DO3…DO0				Slave 14B: DO3…DO0				Slave 15B: DO3…DO0			
5	Slave 16B: DO3…DO0				Slave 17B: DO3…DO0				Slave 18B: DO3…DO0				Slave 19B: DO3…DO0			
6	Slave 20B: DO3…DO0				Slave 21B: DO3…DO0				Slave 22B: DO3…DO0				Slave 23B: DO3…DO0			
7	Slave 24B: DO3…DO0				Slave 25B: DO3…DO0				Slave 26B: DO3…DO0				Slave 27B: DO3…DO0			
8	Slave 28B: DO3…DO0				Slave 29B: DO3…DO0				Slave 30B: DO3…DO0				Slave 31B: DO3…DO0			

13.3.3.11 Analogue IN (area 1)

Slot	Description	Available modules	Words
9	Analogue inputs of up to 31 slaves, area 1	• Empty module	0
		• 004 words: 4 words analogue inputs	4
		• 008 words: 8 words analogue inputs	8
		• 012 words: 12 words analogue inputs	12
		• 016 words: 16 words analogue inputs	16
		• 020 words: 20 words analogue inputs	20
		• 024 words: 24 words analogue inputs	24
		• 028 words: 28 words analogue inputs	28
		• 032 words: 32 words analogue inputs	32
		• 036 words: 36 words analogue inputs	36
		• 040 words: 40 words analogue inputs	40
		• 044 words: 44 words analogue inputs	44
		• 048 words: 48 words analogue inputs	48
		• 052 words: 52 words analogue inputs	52
		• 056 words: 56 words analogue inputs	56
		• 060 words: 60 words analogue inputs	60

13.3.3.12 Analogue IN (area 2)

Slot	Description	Available modules	Words
10	Analogue inputs of up to 31 slaves, area 2	• Empty module	0
		• 004 words: 4 words analogue inputs	4
		• 008 words: 8 words analogue inputs	8
		• 012 words: 12 words analogue inputs	12
		• 016 words: 16 words analogue inputs	16
		• 020 words: 20 words analogue inputs	20
		• 024 words: 24 words analogue inputs	24
		• 028 words: 28 words analogue inputs	28
		• 032 words: 32 words analogue inputs	32
		• 036 words: 36 words analogue inputs	36
		• 040 words: 40 words analogue inputs	40
		• 044 words: 44 words analogue inputs	44
		• 048 words: 48 words analogue inputs	48
		• 052 words: 52 words analogue inputs	52
		• 056 words: 56 words analogue inputs	56
		• 060 words: 60 words analogue inputs	60

13.3.3.13 Analogue OUT (area 1)

Slot	Description	Available modules	Words
11	Analogue outputs of up to 31 slaves, area 1	• Empty module	0
		• 004 words: 4 words analogue outputs	4
		• 008 words: 8 words analogue outputs	8
		• 012 words: 12 words analogue outputs	12
		• 016 words: 16 words analogue outputs	16
		• 020 words: 20 words analogue outputs	20
		• 024 words: 24 words analogue outputs	24
		• 028 words: 28 words analogue outputs	28
		• 032 words: 32 words analogue outputs	32
		• 036 words: 36 words analogue outputs	36
		• 040 words: 40 words analogue outputs	40
		• 044 words: 44 words analogue outputs	44
		• 048 words: 48 words analogue outputs	48
		• 052 words: 52 words analogue outputs	52
		• 056 words: 56 words analogue outputs	56
		• 060 words: 60 words analogue outputs	60

13.3.3.14 Analogue OUT (area 2)

Slot	Description	Available modules	Words
12	Analogue outputs of up to 31 slaves, area 2	• Empty module	0
		• 004 words: 4 words analogue outputs	4
		• 008 words: 8 words analogue outputs	8
		• 012 words: 12 words analogue outputs	12
		• 016 words: 16 words analogue outputs	16
		• 020 words: 20 words analogue outputs	20
		• 024 words: 24 words analogue outputs	24
		• 028 words: 28 words analogue outputs	28
		• 032 words: 32 words analogue outputs	32
		• 036 words: 36 words analogue outputs	36
		• 040 words: 40 words analogue outputs	40
		• 044 words: 44 words analogue outputs	44
		• 048 words: 48 words analogue outputs	48
		• 052 words: 52 words analogue outputs	52
		• 056 words: 56 words analogue outputs	56
		• 060 words: 60 words analogue outputs	60

13.3.3.15 Diagnostic

Slot	Description	Available modules	Words
13	Diagnostic data sent to the EtherNet/IP controller	• Empty module	0
		• AC14/AC4S AS-i 1+2: Diagnostic data of the device	50

Modules: AC14/AC4S AS-i 1+2

Word (offset)	Content
1	System: System diagnostics (→ 🗋 273)
2…5	AS-i master 1: AS-i diagnostics (→ 🗋 273)
6…9	AS-i master 1: LCEMS (→ 🗋 274)
10…13	AS-i master 1: LCEAS (→ 🗋 274)
14…17	AS-i master 1: LCE (→ 🗋 274)
18…21	AS-i master 1: LPF (→ 🗋 275)
22…25	AS-i master 1: LDAE (→ 🗋 275)
26…29	AS-i master 2: AS-i diagnostics (→ 🗋 273)
30…33	AS-i master 2: LCEMS (→ 🗋 274)
34…37	AS-i master 2: LCEAS (→ 🗋 274)
38…41	AS-i master 2: LCE (→ 🗋 274)
42…45	AS-i master 2: LPF (→ 🗋 275)
46…49	AS-i master 2: LDAE (→ 🗋 275)
50	Reserved

Contents of the diagnostic ranges

System diagnostics

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	-	-	-	-	-	-	-	-	-	-	-	-	PS	GI	OT	ISE

Legend:

• ISE	Internal system error: detection of internal system errors	1 bit	• 0x0: no error • 0x1: internal system error detected
• OT	Over temperature: detection of device temperature exceeding limit value	1 bit	• 0x0: device temperature is OK • 0x1: device temperature has exceeded upper limit value or fallen below lower limit value
• GI	Gateway inactive: detection of gateway mode inactivity	1 bit	• 0x0: Gateway mode active • 0x1: gateway mode deactivated
• PS	PLC Stop: detection of the STOP state of the PLC	1 bit	• 0x0: PLC not in STOP state • 0x1: PLC in STOP state

AS-i diagnostics

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	-	-	PF19	PF22.5	EF	S0	PM	IME	-	-	-	DAE	PE	CEIP	CE-AS	CEMS
n+1	Uasi															
n+2	Ufe															
n+3	RELsymmetry															

Legend:

• CEMS	Configuration error – missing slave: detection of projected but non-existant AS-i slaves	1 bit	• 0x0: no error • 0x1: at least 1 projected AS-i slave non existant
• CEAS	Configuration error – additional slave: detection of non-projected AS-i slaves	1 bit	• 0x0: no error • 0x1: at least 1 non-projected AS-i slave detected
• CEIP	Configuration error – invalid profile: detection of AS-i slaves with invalid profile	1 bit	• 0x0: no error • 0x1: at least 1 AS-i slave with invalid profile detected
• PE	Periphery error: detection of AS-i slaves with peripheral faults	1 bit	• 0x0: no error • 0x1: at least 1 peripheral fault detected
• DAE	Duplicate address error: detection of AS-i slaves with identical addresses	1 bit	• 0x0: no error • 0x1: at least 1 multiple addressing fault detected
• IME	Internal master error: internal system error of an AS-i master	1 bit	• 0x0: no error • 0x1: internal system error of an AS-i master
• PM	Projection mode: detection of the projection mode in the AS-i master	1 bit	• 0x0: Normal operation • 0x1: projection mode active
• S0	Slave 0 detected: detection of a slave with address 0	1 bit	• 0x0: no slave 0 detected • 0x1: new slave 0 detected
• EF	Earth fault: earth fault detection	1 bit	• 0x0: no error • 0x1: earth fault detected

• PF22.5	Power fail 22.5 V: AS-i power fail detection (classic AS-i power)	1 bit	• 0x0: no error • 0x1: AS-i power fail detected
• PF19	Power fail 19 V: AS-i power fail detection (Power24)	1 bit	• 0x0: no error • 0x1: Power24 fail detected
• Uasi	Voltage AS-i+ to AS-i- (value in mV)	1 word	•
• Ufe	Voltage FE to AS-i+ (value in mV)	1 word	•
• RELsymmetry	Symmetry (value in %)	1 word	• 0x0000: 0% • … • 0x0064: 100%

LCEMS

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Value range per slave field:

- 0x0: no error
- 0x1: configured slave missing

LCEAS

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Value range per slave field:

- 0x0: no error
- 0x1: non-projected slave detected

LCE

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Value range per slave field:

- 0x0: no error
- 0x1: slave with incorrect slave profile detected

LPF

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Value range per slave field:

- 0x0: no error
- 0x1: peripheral fault detected

LDAE

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Value range per slave field:

- 0x0: no error
- 0x1: double address error detected

LDS

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
n+1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
n+2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Value range per slave field:

- 0x0: no error
- 0x1: slave detected

Master flags

Word (offset)	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	-	-	-	-	-	-	-	-	-	CNOT	-	PNOT	PF	LDS0	CACT	-

Legend:

- CACT — Configuration active: AS-i master operating mode — 1 bit
  - 0x0: protected mode
  - 0x1: projection mode
- LDS0 — LDS0: slave with address 0 detected — 1 bit
  - 0x0: no slave with address 0 detected
  - 0x1: slave with address 0 detected

• PF	AS-i_Power_Fail: AS-i voltage fault	1 bit	• 0x0: no error • 0x1: AS-i voltage too low
• PNOT	Periphery_NOT_OK: peripheral fault	1 bit	• 0x0: no error • 0x1: peripheral fault
• CNOT	Configuartion_NOT_OK: configuration error	1 bit	• 0x0: no error • 0x1: configuration error

13.3.3.16 Inputs from AC422S-PLC

Slot	Description	Available modules	Words
14	Data from CODESYS PLC to the EtherNet/IP controller	• Empty module	0
		• 004: 4 words data from CODESYS PLC ➜ EtherNet/IP controller	4
		• 008: 8 words data from CODESYS PLC ➜ EtherNet/IP controller	8
		• 012: 12 words data from CODESYS PLC ➜ EtherNet/IP controller	12
		• 016: 16 words data from CODESYS PLC ➜ EtherNet/IP controller	16
		• 020: 20 words data from CODESYS PLC ➜ EtherNet/IP controller	20
		• 024: 24 words data from CODESYS PLC ➜ EtherNet/IP controller	24
		• 028: 28 words data from CODESYS PLC ➜ EtherNet/IP controller	28
		• 032: 32 words data from CODESYS PLC ➜ EtherNet/IP controller	32
		• 036: 36 words data from CODESYS PLC ➜ EtherNet/IP controller	36
		• 040: 40 words data from CODESYS PLC ➜ EtherNet/IP controller	40
		• 044: 44 words data from CODESYS PLC ➜ EtherNet/IP controller	44
		• 048: 48 words data from CODESYS PLC ➜ EtherNet/IP controller	48
		• 052: 52 words data from CODESYS PLC ➜ EtherNet/IP controller	52
		• 056: 56 words data from CODESYS PLC ➜ EtherNet/IP controller	56
		• 060: 60 words data from CODESYS PLC ➜ EtherNet/IP controller	60
		• 076: 76 words data from CODESYS PLC ➜ EtherNet/IP controller	76
		• 092: 92 words data from CODESYS PLC ➜ EtherNet/IP controller	92
		• 108: 108 words data from CODESYS PLC ➜ EtherNet/IP controller	108
		• 120: 120 words data from CODESYS PLC ➜ EtherNet/IP controller	120

13.3.3.17 Inputs from AC424S-PLC

Slot	Description	Available modules	Words
14	Data from CODESYS PLC to the EtherNet/IP controller	• Empty module	0
		• 004: 4 words data from CODESYS PLC ➜ EtherNet/IP controller	4
		• 008: 8 words data from CODESYS PLC ➜ EtherNet/IP controller	8
		• 012: 12 words data from CODESYS PLC ➜ EtherNet/IP controller	12
		• 016: 16 words data from CODESYS PLC ➜ EtherNet/IP controller	16
		• 020: 20 words data from CODESYS PLC ➜ EtherNet/IP controller	20
		• 024: 24 words data from CODESYS PLC ➜ EtherNet/IP controller	24
		• 028: 28 words data from CODESYS PLC ➜ EtherNet/IP controller	28
		• 032: 32 words data from CODESYS PLC ➜ EtherNet/IP controller	32
		• 036: 36 words data from CODESYS PLC ➜ EtherNet/IP controller	36
		• 040: 40 words data from CODESYS PLC ➜ EtherNet/IP controller	40
		• 044: 44 words data from CODESYS PLC ➜ EtherNet/IP controller	44
		• 048: 48 words data from CODESYS PLC ➜ EtherNet/IP controller	48
		• 052: 52 words data from CODESYS PLC ➜ EtherNet/IP controller	52
		• 056: 56 words data from CODESYS PLC ➜ EtherNet/IP controller	56
		• 060: 60 words data from CODESYS PLC ➜ EtherNet/IP controller	60
		• 076: 76 words data from CODESYS PLC ➜ EtherNet/IP controller	76
		• 092: 92 words data from CODESYS PLC ➜ EtherNet/IP controller	92
		• 108: 108 words data from CODESYS PLC ➜ EtherNet/IP controller	108
		• 120: 120 words data from CODESYS PLC ➜ EtherNet/IP controller	120

13.3.3.18 Outputs to AC422S-PLC

Slot	Description	Available modules	Words
15	Data from the EtherNet/IP controller to the CODESYS PLC	• Empty module	0
		• 004: 4 words data from EtherNet/IP controller ➜ CODESYS PLC	4
		• 008: 8 words data from EtherNet/IP controller ➜ CODESYS PLC	8
		• 012: 12 words data from EtherNet/IP controller ➜ CODESYS PLC	12
		• 016: 16 words data from EtherNet/IP controller ➜ CODESYS PLC	16
		• 020: 20 words data from EtherNet/IP controller ➜ CODESYS PLC	20
		• 024: 24 words data from EtherNet/IP controller ➜ CODESYS PLC	24
		• 028: 28 words data from EtherNet/IP controller ➜ CODESYS PLC	28
		• 032: 32 words data from EtherNet/IP controller ➜ CODESYS PLC	32
		• 036: 36 words data from EtherNet/IP controller ➜ CODESYS PLC	36
		• 040: 40 words data from EtherNet/IP controller ➜ CODESYS PLC	40
		• 044: 44 words data from EtherNet/IP controller ➜ CODESYS PLC	44
		• 048: 48 words data from EtherNet/IP controller ➜ CODESYS PLC	48
		• 052: 52 words data from EtherNet/IP controller ➜ CODESYS PLC	52
		• 056: 56 words data from EtherNet/IP controller ➜ CODESYS PLC	56
		• 060: 60 words data from EtherNet/IP controller ➜ CODESYS PLC	60
		• 076: 76 words data from EtherNet/IP controller ➜ CODESYS PLC	76
		• 092: 92 words data from EtherNet/IP controller ➜ CODESYS PLC	92
		• 108: 108 words data from EtherNet/IP controller ➜ CODESYS PLC	108
		• 120: 120 words data from EtherNet/IP controller ➜ CODESYS PLC	120

13.3.3.19 Outputs to AC424S-PLC

Slot	Description	Available modules	Words
15	Data from the EtherNet/IP controller to the CODESYS PLC	• Empty module	0
		• 004: 4 words data from EtherNet/IP controller ➜ CODESYS PLC	4
		• 008: 8 words data from EtherNet/IP controller ➜ CODESYS PLC	8
		• 012: 12 words data from EtherNet/IP controller ➜ CODESYS PLC	12
		• 016: 16 words data from EtherNet/IP controller ➜ CODESYS PLC	16
		• 020: 20 words data from EtherNet/IP controller ➜ CODESYS PLC	20
		• 024: 24 words data from EtherNet/IP controller ➜ CODESYS PLC	24
		• 028: 28 words data from EtherNet/IP controller ➜ CODESYS PLC	28
		• 032: 32 words data from EtherNet/IP controller ➜ CODESYS PLC	32
		• 036: 36 words data from EtherNet/IP controller ➜ CODESYS PLC	36
		• 040: 40 words data from EtherNet/IP controller ➜ CODESYS PLC	40
		• 044: 44 words data from EtherNet/IP controller ➜ CODESYS PLC	44
		• 048: 48 words data from EtherNet/IP controller ➜ CODESYS PLC	48
		• 052: 52 words data from EtherNet/IP controller ➜ CODESYS PLC	52
		• 056: 56 words data from EtherNet/IP controller ➜ CODESYS PLC	56
		• 060: 60 words data from EtherNet/IP controller ➜ CODESYS PLC	60
		• 076: 76 words data from EtherNet/IP controller ➜ CODESYS PLC	76
		• 092: 92 words data from EtherNet/IP controller ➜ CODESYS PLC	92
		• 108: 108 words data from EtherNet/IP controller ➜ CODESYS PLC	108
		• 120: 120 words data from EtherNet/IP controller ➜ CODESYS PLC	120

13.3.4 Object directory

13.3.4.1 Identity Object (Class Code: 0x01)

Class attributes

Attr. ID	Access	Name	Data type	Description	Value
1	Get	Revision	UINT	Revision of the object	1.001
2	Get	Max. Instance	UINT	Max. number of instances of the object	1
3	Get	Number of instances	UINT	Number of instances of the object	1
6	Get	Max. ID Number Class Attributes	UINT	Max. ID number of a class attribute	7
7	Get	Max. ID Number Instance Attributes	UINT	Max. ID number of the instance attribute	8

Instance attributes

Attr. ID	Access	Name	Data type	Description	Default
1	Get	Vendor ID	UINT	Manufacturer ID	322
2	Get	Device Type	UINT	Device type	12
3	Get	Product Code	UINT	Product code of the device	• 422 • 424
4	Get	Revision	STRUCT	Revision of the device	1.001
		• Major Revision	USINT	Major revision (1...127)	1
		• Minor Revision	USINT	Minor revision (3 digits)	001
5	Get	Status	WORD	Overall status of the device	
6	Get	Serial Number	UDINT	Serial number of the device	--
7	Get	Product Name	SHORT STRING	Product name of the device	• AC422S • AC424S
8	Get	State	USINT	State of the device (State machine) • 0: Nonexistent • 1: Device Self Testing • 2: Standby • 3: Operational • 4: Major Recoverable Fault • 5: Major Unrecoverable Fault • 6-254: Reserved • 255: Default for “Get_Attributes_All” service	

Services

Code	Service	Class	Instance	Description
0x01	Get Attribute All	Yes	Yes	Read all attributes
0x05	Reset	Yes	Yes	Reset
0x0E	Get Attribute Single	Yes	Yes	Read single attribute
0x10	Set Attribute Single	Yes	Yes	Write single attribute

If an Identity Object receives a reset request, it carries out the following actions:

- It checks if it supports the requested reset type.
- It responds to the request.
- It tries to execute the requested reset type.

Supported reset types:

- 0: reboot the device (mandatory for all EtherNet/IP devices).
- 1: restore factory settings and reboot the device.

13.3.4.2 Message Router Object (Class Code: 0x02)

Class attributes

Attr. ID	Access	Name	Data type	Description	Value
1	Get	Revision	UINT	Revision of the object	1
2	Get	Max. Instance	UINT	Max. number of instances of the object	1
3	Get	Number of instances	UINT	Number of instances	1
6	Get	Max. ID Number Class Attributes	UINT	Max. ID number of a class attribute	7
7	Get	Max. ID Number Instance Attributes	UINT	Max. ID number of the instance attribute	0

Instance attributes

The object class has no instance attributes.

Services

Code	Service	Class	Instance	Description
0x0E	Get Attribute Single	Yes	Yes	Read single attribute

13.3.4.3 Assembly Object (Class Code: 0x04)

Class attributes

Attr. ID	Access	Name	Data type	Description	Value
1	Get	Revision	UINT	Revision of the object	2
2	Get	Max. Instance	UINT	Max. number of instances of the object	0x00C7
3	Get	Number of instances	UINT	Number of instances	3
6	Get	Max. ID Number Class Attributes	UINT	Max. ID number of the class attribute	7
7	Get	Max. ID Number Instance Attributes	UINT	Max. ID number of the instance attribute	4

Instance attributes

Attr. ID	Access	Name	Data type	Description	Default
1	Get	Number of Members	UINT	Number of members in list	--
2	Get	Member	UINT	List of members	--
3	Get / Set	Data	UINT	Current process data image	--
4	Get	Size	UINT	Process data length (number of bytes)	--

The following object instances are available:

- Configuration assembly (instance 200) (→ 🗋 247)
- Input assembly (instance 100) (→ 🗋 256)
- Output assembly (instance 150) (→ 🗋 256)
- Acyclic service assembly (instance 801) (→ 🗋 257)

Services

Code	Service	Class	Instance	Description
0x0E	Get Attribute Single	Yes	Yes	Read single attribute
0x10	Set Attribute Single	No	Yes	Write single attribute
0x18	Get Member	No	Yes	Read member of an instance attribute

13.3.4.4 Connection Manager Object (Class Code: 0x06)

Class attributes

Attr. ID	Access	Name	Data type	Description	Value
1	Get	Revision	UINT	Revision of the object	1
2	Get	Max. Instance	UINT	Max. number of instances of the object	1
3	Get	Number of instances	UINT	Number of instances	3
6	Get	Max. ID Number Class Attributes	UINT	Max. ID number of a class attribute	7
7	Get	Max. ID Number Instance Attributes	UINT	Max. ID number of the instance attribute	0

Instance attributes

The object class has no instance attributes.

Services

Code	Service	Class	Instance	Description
0x0E	Get Attribute Single	Yes	Yes	Read single attribute
0x10	Set Attribute Single	No	Yes	Write single attribute
0x4E	Forward Close	No	Yes	Close connection
0x54	Forward Open	No	Yes	Open new connection

13.3.4.5 TCP/IP Object (Class Code: 0xF5)

Class attributes

Attr. ID	Access	Name	Data type	Description	Value
1	Get	Revision	UINT	Revision of the object	4
2	Get	Max. Instance	UINT	Max. number of instances of the object	1
3	Get	Number of instances	UINT	Number of instances of the object	1
6	Get	Max. ID Number Class Attributes	UINT	Max. ID number of a class attribute	7
7	Get	Max. ID Number Instance Attribute	UINT	Max. ID number of the instance attribute	13

Instance attributes

Attr. ID	Access	Name	Data type	Description	Default
1	Get	Status	UINT	Status of the TCP/IP interface • 0: interface not configured • 1: interface configured with DHCP, BOOTP or non-volatile memory	
2	Get	Configuration Capability	DWORD	Configuration options for interface • Bit 0: BOOTP Client • Bit 2: DHCP Client • Bit 4: configuration adjustable • Bit 7: ACD-capable	0x95 (BOOTP, DHCP, TCP/IP configurable, ACD capable)
3	Get / Set	Configuration Control	DWORD	Configuration control Bit 0..3: startup configuration • 0: statically assigned IP address • 1: configuration via BOOTP • 2: configuration via DHCP	0
4	Get	Physical Link Object Path	STRUCT of	Logical path to the physical communication interface (Ethernet link object)	
		• Path Size	UINT	Length (number of words, little endian format)	0x02 00
		• Path	Padded EPATH	Class ID: 0xF6 (Ethernet Link Object) • Instance ID: 0x1	0x20 F6 2 4 01
5	Get / Set	Interface configuration	STRUCT of	TCP/IP interface configuration	
		• IP Address	UDINT	IP address	192.168.1.250
		• Network Mask	UDINT	Network mask	255.255.255.0
		• Gateway Address	UDINT	Gateway address	0.0.0.0
		• Name Server	UDINT	Primary name server	0.0.0.0
		• Name Server 2	UDINT	Secondary name server	0.0.0.0
		• Domain Name	STRING	Default domain name	0
6	Get / Set	Host Name	STRING	Host Name • 0: not configured	0
8	Get	TTL Value	UINT	TTL value	1
9	Get / Set	Mcast Config	UINT	Mcast configuration	0
10	Get / Set	SelectAcd	BOOL	ACD activation / deactivation • 0: deactivated • 1: activated	1
11	Get / Set	Last conflict detected	STRUCT of	Last conflict detected	0

Attr. ID	Access	Name	Data type	Description	Default
11	Get / Set	• AcdActivity	USINT	Condition of ACD activity at last conflict detected • 0: Noconflictdetected • 1: ProbeIpv4Address • 2: Ongoing Detection • 3: SemiActiveprobe	
		• Remote MAC	ARRAY(6) of USINT	MAC address of the remote node of the ARP PDU in which the conflict was detected	
		• ArpPdu	ARRAY(28) of USINT	Copy of the data of the ARP PDU in which the conflict was detected	
13	Get / Set	Encapsulation Inactivity Timeout	UINT	Inactivity before the TCP connection is deactivated (in seconds)	120

Services

Code	Service	Class	Instance	Description
0x01	Get Attribute All	No	Yes	Read all attributes
0x0E	Get Attribute Single	Yes	Yes	Read single attribute
0x10	Set Attribute Single	No	Yes	Write single attribute

13.3.4.6 Ethernet Link Object (Class Code: 0xF6)

Class attributes

Attr. ID	Access	Name	Data type	Description	Value
1	Get	Revision	UINT	Revision of the object	3
2	Get	Max. Instance	UINT	Max. number of instances of the object	2
3	Get	Number of instances	UINT	Number of instances	2
6	Get	Max. ID Number Class Attributes	UINT	Max. ID number of a class attribute	7
7	Get	Max. ID Number Instance Attribute	UINT	Max. ID number of the instance attribute	768

Instance attributes

Attr. ID	Access	Name	Data type	Description	Default
1	Get	Interface Speed	UDINT	Current transmission rate • 10: 10 Mbit/s • 100: 100 Mbit/s	100
2	Get	Interface Status Flag	DWORD	Interface status flags • Bit 0: link status • Bit 1: half/full duplex • Bit 2…4: negotiation status • Bit 5: manual change requires reset • Bit 6: local hardware error • Bit 7…31: reserved	0x20
3	Get	Physical Address	ARRAY(6) of USINT	MAC address	
4	Get	Interface Counters	STRUCT(11) of UDINT	Interface-specific counter	
5	Get	Media Counters	STRUCT(12) of UDINT	Medium-specific counter	
6	Get / Set	Interface Control	STRUCT of	Interface control	
		• Interface Settings	DWORD	Settings Bit 0: • 0: auto-negotiation on • 1: auto-negotiation off Bit 1: • 0: half duplex • 1: full duplex	0
		• Interface Speed	UINT	Transmission rate • 10: 10 Mbit/s • 100: 100 Mbit/s	
7	Get	Interface type	USINT	• 0: unknown • 1: internal interface • 2: twisted pair • 3: optical fibre	2
8	Get	Interface State	USINT	Current status of the interface • 0: unknown • 1: active; ready for transmission and reception • 2: not active • 3: test mode	0

Attr. ID	Access	Name	Data type	Description	Default
9	Get / Set	Admin State	USINT	Control of the access to the interface • 1: activate • 2: deactivate	1
10	Get	Interface Label	SHORT_STRING	Interface identifier	• port1 (instance 1) • port2 (instance 2)
11	Get	Interface Capability	STRUCT of	Interface capability	
		• Interface Speed	DWORD	Transmission rate • 10: 10 Mbit/s • 100: 100 Mbit/s	
		• Interface Duplex Mode	DWORD	Duplex mode • HD: half duplex • FD: full duplex	
768	Get / Set	MDIX	USINT	MDIX configuration • 1: MDIX_AUTO • 2: MDIX_MDI • 3: MDIX_MDIX	1

Services

Code	Service	Class	Instance	Description
0x01	Get Attribute All	No	Yes	Read all attributes
0x0E	Get Attribute Single	Yes	Yes	Read single attribute
0x10	Set Attribute Single	No	Yes	Write single attribute

13.4 OSC messages

13.4.1 OSC messages: System

Message	Type	Description / remedy
An internal device error was detected <error number>	Error	▶ Note the message and contact the ifm service centre
Permissible temperature range inside the device was exceeded (<xxx,x> °C)	Warning	▶ Check thermal conditions of the system environment
First operation after delivery	Event	No action required
The output control was set to <gateway,manual,PLC>	Event	No action required
System power-up completed, <SW version>	Event	No action required
A system reset was requested manually	Event	No action required
The user-specific message history was deleted.	Event	No action required
The device was reset to factory settings via <HMI, field-bus>.	Event	No action required
PLC used for more than 10 hours.	Event	No action required
The project <Name> was loaded.	Event	No action required
The PLC was set to the operating mode <projection mode, protected mode>.	Event	No action required
The firmware was updated from <FW version> to version <FW version>.	Event	No action required
The settings of the fieldbus interface were modified	Event	No action required
The fieldbus connection was established	Event	No action required
The fieldbus connection was aborted	Event	No action required
The IP settings of the Ethernet interface have been changed	Event	No action required

13.4.2 OSC messages: AS-i 1 / AS-i 2

Message	Type	Description / remedy
System error: AS-i master <1,2>	Error	▶ Restart the device. If the error occurs again: ▶ Make a note of the message and contact the ifm service centre.
Earth fault: AS-i <1,2>	Error	▶ Check the device for ground faults.
Incorrect profile: AS-i <1,2>, slave <1(A)..31(A), 1B..31B> with profile <S-x.x.x> expected, but <S-y.y.y> found.	Error	▶ Check the profile of the AS-i slave.
Config error: AS-i <1,2>, slave <1(A)..31(A), 1B..31B> with the profile <S-x.x.x> missing	Error	▶ Check the connections of the AS-i slave. ▶ Reconnect the AS-i slave.
Config error: AS-i <1,2>, slave <1(A)..31(A), 1B..31B> with the profile <S-x.x.x> is available but not projected	Error	▶ Carry out projection process ([Quick setup] > [Project all]).
Protocol error: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B> no data transmission	Error	▶ Improve the transmission quality on the AS-i line.
Double address detected: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Error	▶ Remove an AS-i slave with a double address from the AS-i network. ▶ Readdress an AS-i slave. ▶ Reconnect removed AS-i slave to the AS-i network.
The automatic addressing is not enabled for AS-i <1,2>.	Warning	▶ Enable automatic addressing ([AS-i 1] / [AS-i 2] > [Settings]).

Message	Type	Description / remedy
A voltage drop below 19.0 V was detected at AS-i master <1,2>.	Warning	▶ Check the voltage supply of the device and replace, if necessary.
A voltage drop below 22.5 V at AS-i master <1,2> was detected	Warning	▶ Check the voltage supply of the device and replace, if necessary.
Increased telegram error rate: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Warning	▶ Improve the transmission quality on the AS-i line.
Peripheral fault: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Warning	▶ Check the displayed AS-i slave.
AS-i slave with address 0 cannot be automatically readdressed (wrong profile)	Warning	▶ Enable automatic addressing ([AS-i 1] / [AS-i 2] > [Settings]).
Manual output change: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>, value: <0..F, 0..32768>	Event	No action required
Manual parameter change: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>, value: <0..F, 0..32768>	Event	No action required
AS-i master <1,2> was switched to the <protected mode,projection mode>	Event	No action required
AS-i projection process was carried out	Event	No action required
AS-i slave with the address 0 was detected	Event	No action required

13.4.3 OSC messages: safety module

Message	Type	Description / remedy
An internal fault in the safety board was detected <error number1>, <error number2>	Error	▶ Note the message and contact the ifm service centre.
Wrong code sequence on the safe slave AS-i <1,2>, Slave <1,...,31>	Error	▶ Replace the slave with a slave with a unique code sequence.
Configured slave missing: AS-i <1,2>, slave <1,...,31>	Error	▶ Connect the missing AS-i slave to the AS-i network. OR: ▶ Carry out projection process ([Quick setup] > [Project all]).
Cross-networking participant <Name> missing	Error	▶ Check cross networking
The safety board was switched to the operating mode <Operate, Maintenance>	Event	No action required
The safety configuration "<Name>" was loaded	Event	No action required
The safety configuration "<Name>" was deleted	Event	No action required
The safety configuration is not readable	Event	No action required
The safety configuration "<name>" was enabled by <reference>	Event	No action required

13.4.4 OSC messages: AS-i 1 / AS-i 2 (safety)

Message	Type	Description / remedy
ASi_GlobalCom_FailureAscendingAddrSequ_e; currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Note the message and contact the ifm service centre.
ASi_GlobalCom_FailureMissingBusCycleEvents _e; currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Note the message and contact the ifm service centre
At least two AS-i slaves with the same code sequence were detected: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Swap one of the slaves with the slave with a unique code sequence
The code sequence of a safe input slave is not compliant: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Replace slave with slave with unique code sequence.

Message	Type	Description / remedy
Error during the teach process (0x5820): currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Repeat the teach procedure.
Error in code sequence during the teach process (0x5827): currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Repeat the teach procedure.
Safe AS-i input slave of type positively guided waiting for testing: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Test a fail-safe AS-i slave.
ASi_SYS_ERROR_CFG_CANTADDSLAVE_e; currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Maximum number of control slaves reached; check the logical interfaces of the project.

13.4.5 OSC messages: CODESYS (safety)

Message	Type	Description / remedy
CODESYS: invalid FB parameter "ASi_Master": currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Warning	▶ Check setting of the parameter "ASi_Master"
CODESYS: multiple use of an AS-i address: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Warning	▶ Check addressing of the AS-i slaves
CODESYS: FB parameter "ASi_SlaveAdr" in invalid range: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Warning	▶ Check setting of the parameter "ASi_SlaveAdr"
Simultaneous activation of both help signals of a safe AS-i output module: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Warning	▶ Check program code
CODESYS: FB parameter "ASi_SlaveAdr" refers to a non configured AS-i address: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Warning	▶ Check configuration of the AS-i network ▶ Check setting of the parameter “ASi_SlaveAdr”
CODESYS: too many instances of "SF_OUTcontrol_ASi" created: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Warning	▶ Check configuration of the AS-i network ▶ Check the number of the created logical devices for virtual control slaves

13.4.6 OSC messages: System (safety)

Message	Type	Description / remedy
Overvoltage on the internal supply detected: tmn=%s; In=%s; p1=%s; p2=%s	Warning	▶ Check the voltage supply of the device and replace, if necessary. ▶ Note the message and contact the ifm service centre.
Undervoltage detected on the internal supply: tmn=%s; In=%s; p1=%s; p2=%s	Warning	▶ Check the voltage supply of the device and replace, if necessary. ▶ Note the message and contact the ifm service centre.
The internal device temperature has exceeded the warning threshold of 80°C: tmn=%s; In=%s; p1=%s; p2=%s	Warning	▶ Check thermal conditions of the system environment.
The internal device temperature has reached the error threshold of 85 °C: tmn=%s; In=%s; p1=%s; p2=%s	Warning	▶ Check thermal conditions of the system environment.
The internal device temperature has fallen below the error threshold of -1°C: tmn=%s; In=%s; p1=%s; p2=%s	Warning	▶ Check thermal conditions of the system environment.
Error in the file system (0x4045): Please contact the ifm service centre: tmn=%s; In=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
Error in the file system (0x4043): Please contact the ifm service centre: tmn=%s; In=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
Short circuit on a local output: tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Check connections of the local I/O interface.
Undervoltage or overvoltage detected on the internal supply: tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Check the voltage supply of the device and replace, if necessary. ▶ Note the message and contact the ifm service centre.
Overvoltage detected on the external supply: tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Check the voltage supply of the device and replace, if necessary.
Undervoltage detected on the external supply: tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Check the voltage supply of the device and replace, if necessary.
The operating mode of the safe PLC was changed (tmn=%s; ln=%s; p1=%s; p2=%s)	Note	Not necessary
The use of safe AS-i output slaves requires at least 5 active AS-i slaves in the network.	Error	▶ Configure at least 5 AS-i slaves in the network.
System error: BIT_ADC_DETERMINATION_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_ADCVOLT_INIT_HNDL_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_ADCVOLT_INIT_STRT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_ALLOC_SFB_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System information: BIT_ASI_ADD_INP_SLAVE_INFO_2; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System information:BIT_ASI_ADD_OUT_SLAVE_INFO_2; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_CANT_ADD_IN_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_CANT_ADD_OUT_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System information: BIT_ASI_ENOUGH_SLAVES_INFO_2; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_LOST_FRM-SYNC_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_M1EVENT_ORDER_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_M2EVENT_ORDER_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System information: BIT_ASI_RX_LOST_FRMSY_INFO_1; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System information: BIT_ASI_RX_WR_FRMPARI_INFO_1; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System information: BIT_ASI_RX_WRG_STA_FR_INFO_1; tmn=%s; ln=%s; p1=%s; p2=%s	Note	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_SV_QUEUE_FULL_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_SYNC_CODESEQ_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_TEACH_QUEUE_F_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_ASI_TX_FIFO_FULL_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System warning: BIT_ASI_WRONG_FRM-PARI_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_ASIUART_IRQ_INST_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_ASIUART_SETUP_BD_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BAD_CMD_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BAD_CRC_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BAD_DATA_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BAD_FORMAT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BAD_SEQUENCE_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BITSPS_INTERNAL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_CLK_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_DMA_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_DRAM_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_EXC_ABORT_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_EXC_PREFETCH_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_EXC_REENTRANCE_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_EXC_SWI_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_EXC_UNDEF_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_FPGA_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_HW_NO_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_LOWINIT_READY_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_SEU_PROT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_BSP_VER_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_CBIT_ERRCNT_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_COUNTER_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_CRC_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_FORCE_FATAL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_INTERNAL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_TASKSEND_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System error: BIT_CC_WRONG_CPUID_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_WRONG_LENGTH_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CC_WRONG_TASKID_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHALCOMM_CNCT_DENIED_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_CHALCOMM_CONNECT_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHALCSTHK_EXEC_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHALSYNC_RCV_TO_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHALSYNC_SND_TO_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_EXEC_CMD_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_FILE_LOC_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_INPARA_CHK_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_INPARA_FDE_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_INPARA_GET_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_CHFILE_MISSING_OB_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_PARA_OPENF_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_PARA_READD_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_PARA_WRFIL_WARN_0; tmn=%s; ln=%s; p1=%s;	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_READSIZE_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_RESP_CMD_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_RSP_FILE_H_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_RSP_FILENA_WARN_0; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CHFILE_WRITESIZE_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CIO_EXCHANGE_VAR_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_CNS_SETUP_FAULT_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_COM_RECV_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_COM_SEND_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System error: BIT_COMMON_MEM0_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_COMMON_MEM2_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_COMMON_STRING_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CORELIB_VERSION_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_BGINIT_READY_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_CLK_MONITOR_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_CYCLE_TIMEOUT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_INIT_1OO2_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_INTERN_ISYS_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_REMOTE_TRG_TMO_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CS_SYSTEM_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_CSP_VERSION_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_DEV_UNINIT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_DIAG_FATAL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_DIAG_INTERNAL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_DIAG_IPC_INV_DATA_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_DIAG_IPC_SND_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_DIAG_TOO_LESS_IRQS_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_DIAG_TOO_MANY_IRQS_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_DPRAM_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_EMBEX_SYSTEM_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_EXEC_RSP_TIMEOUT_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_FPGA_READY_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_FPGA_VER_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_GFS_DPRAM_READ_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_GFS_DPRAM_READ_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_DETECT_LIVE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_INPUT_FREEZE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System error: BIT_HBIT_INPUT_TST_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_OUTPUT_DIS_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_OUTPUT_ENABLE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_OUTPUT_TST_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_RSP_EVALUATION_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_RSP_MAN_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_RSP_TIMEOUT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_TST_MAN_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_TST_REQ_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_TST_RSP_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HBIT_TST_SREG_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HW_VER_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_HW_WRONG_CPUID_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_IHAL_ERROR_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_IHAL_INIT_READY_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_INIT_SFB_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_INVALID_NUMERIC_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_CONFIG_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_CPU_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_CYCLE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_IN_SHORT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_INIT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_OUT_NOT_OFF_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_OUT_SHORT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_PARA_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_RSP_HDL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_SB_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System error: BIT_LIO_SSP_BUSY_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_LIO_SSP_BUSY_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_SSP_HANDLE_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_SSP_R_BUSY_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_LIO_SSP_RNOT_EMP-TY_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_START_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_STATE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_STOP_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_TIMEOUT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_TMR_NOTRUN_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_TMR_READ_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_TMR_RUN_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_TST_HDL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_WBIT_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_LIO_WRONG_STATE_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_X_LOC_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_X_MSG_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_X_NOMSG_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_LIO_X_Q_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_MMU_INIT_PART_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_NULLPOINTER_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_BSP_EXC_INST_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_BSP_INIT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_BSP_IRQ_INIT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_BSP_IRQ_INSTL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_BSP_LOW_INIT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_EVENT_NAME_SET_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_EVT_RECV_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System error: BIT_OS_EVT_SEND_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_EVT_STRT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_INIT_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_IOC_CL_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_IOC_OPN_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_IOC_RD_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_IOC_WR_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_MEMCPY_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_MSGQ_ACC_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_MSGQ_CREATE_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_MUTEX_CREATE_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_RETURN_OSSTART_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_CREATE_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_OVERFLOW_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_OS_SEM_OVER-FLOW_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_PEND_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_POST_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_QUERY_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_SET_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SEM_TO_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SF_EXEPTION_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_SPWN_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_TASK_CREATE_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_TASK_NAME_SET_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_TASK_NOT_CALLED_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_TASK_NOT_PRES-ENT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_TASK_RESUME_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_TASK_SUSPEND_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System error: BIT_OS_TASK_TOLESS-TIMETICKS_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OS_VER_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_ACCESS_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_CACHECFG_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_MPUCFG_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_PRCSS_ASSIGN_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_PRCSS_CREATE_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_SHM_ASSIGN_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_SHM_CREATE_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_STKPATTERN_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_OSSP_STKUSAGE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_PBIT_EXT_VOLT_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_PBIT_INPUT_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_PBIT_LEVEL_2_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: IT_PBIT_LIFE_SIGNAL_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_PBIT_OUT_ENABLE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_PBIT_STAND_ORDER_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_PUT_SFB_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_READY_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_SAFESTOR-AGE_CRC_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_SAFESTORAGE_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_SAFESTOR-AGE_READ_WARN_2; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_SB_GETACTLEN_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_SB_INIT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_SB_NOBUF_AVAIL_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_SB_NOBUF_RE-LEASED_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_SB_REC_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System warning: BIT_SB_SEND_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_SB_SETACTLEN_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_SPS_ACK_TIMEOUT_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SPS_APPROM_TIME_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SPS_TMR_READ_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SW_VER_GOOD_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SYNC_SFB_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SYSLUT_CRC_MISM_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SYSLUT_GET_MAIN_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_SYSLUT_SAFE_MISM_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_SYS-LUT_VERS_MISM_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP__INIT_HNDL_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_I2C_ERROR_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_MAX_POSS_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_MIN_POSS_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_SENSOR_ERR_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_SENSOR_VAL_ERR_1; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_THRSVIOL_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_TEMP_VALUE_GOOD_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System warning: BIT_TIMEOUT_MCOOKIE_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_TL_INVALID_CMD_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_TL_RD_NOT_AC-CEPT_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_TL_WR_NOT_AC-CEPT_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_VALID_ITEM_FOUND_GOOD_0; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_VER_MISM1OO2_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_WRONG_ASiPII_CRC32_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.
System error: BIT_WRONG_CHECKSUM_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

Message	Type	Description / remedy
System warning: BIT_WRONG_CHID_MSG_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System warning: BIT_WRONG_MHEADER_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	▶ Note the message and contact the ifm service centre.
System error: BIT_WRONG_PROG_FLOW_ERR_2; tmn=%s; ln=%s; p1=%s; p2=%s	Error	▶ Note the message and contact the ifm service centre.

13.4.7 OSC messages: logical devices (safety)

Message	Type	Description / remedy
ERROR (%s): DC=%s, DC-1=%s, AS-i %s, slave %s	Error	Logical device of the safe AS-i slave in locked error state
ERROR (%s): DC=%s, DC-1=%s, terminals %s and %s	Error	Logical device of the safe local input/output in locked error state
INIT (%s): DC=%s, DC-1=%s, AS-i %s, slave %s	Note	Logical device of the safe AS-i slave in INIT state
INIT (%s): DC=%s, DC-1=%s, terminals %s and %s	Note	Logical device of the safe local input/output in INIT state
OFF (%s): DC=%s, DC-1=%s, AS-i %s, slave %s	Note	Logical device of the safe AS-i slave provides safe OFF
OFF (%s): DC=%s, DC-1=%s, terminals %s and %s	Note	Logical device of the safe local inputs/outputs provides safe OFF
ON (%s): DC=%s, DC-1=%s, AS-i %s, slave %s	Note	Logical device of the safe AS-i slave provides safe ON
ON (%s): DC=%s, DC-1=%s, terminals %s and %s	Note	Logical device of the safe local input/output provides safe ON
TESTING (%s): DC=%s, DC-1=%s, AS-i %s, slave %s	Note	Logical device of the safe AS-i slave requests testing
TESTING (%s): DC=%s, DC-1=%s, terminals %s and %s	Note	Logical device of the fail-safe local inputs/outputs requires testing

13.4.8 OSC messages: local inputs / outputs (safety)

Message	Type	Description / remedy
Test signal for cross-fault monitoring cannot be detected: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check settings of the parameter of the logical device "SF_local_testpulse"
Cross fault on a safe input: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check connection to local device.
CODESYS: dynamic parameter "IN_Channel" on FB "GetLocal...": currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check setting of the parameter "IN_Channel" on FB.
CODESYS: "local_IO" Channel A = 0: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check setting of the "Channel A" parameter on the logical device.
CODESYS: "local_IO" Channel B = 0: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check setting of the parameter "Channel B" on the logical device.
CODESYS: "local_IO" Channel A = Channel B: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check setting of the parameter "Channel A" and "Channel B" on the logical device.
CODESYS: "local_IO" multiple use of a channel in the configuration: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check channel use in the configuration.
CODESYS: simultaneous use of a channel as fail-safe and non-safe information: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check channel use in the configuration.

Message	Type	Description / remedy
CODESYS: FB parameter "IN_Channel_X" refers to a non-configured safe local input: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	▶ Check channel use in the configuration.

13.4.9 OSC messages: FSoE (safety)

Message	Type	Description / remedy
BIT_FSOE_CONNETION_LOSS_WARN_2: Param1: Connection ID, Param2: DiagCode (FSOE)	Warning	▶ Check FSoE connection.
BIT_FSOE_CONNECTION_ESTABLISHED_1: Param1: Connection ID	Note	• FSoE connection established • No action required

13.4.10 OSC messages: Safety PLCopen function blocks

Diagnostic codes of the safety PLCopen function blocks are transferred to the OSC by means of the FB Ctrl_SetDiagInfo. The resulting OSC messages have the following structure:

```
Message #LogID: [currDevice] [hwid] [currDiagState] [prevDiagState] [Addr1] [Addr2]
```

Parameter	Description	Value range
Message #LogID	ID of the source of the message	• 0x8001: CODESYS_LOG_ID
currDevice	ID of the Safety PLCopen function block whose diagnostic code is displayed; corresponds to the value defined by the programmer for "FB_Type"	→ Ctrl_SetDiagInfo, input parameter
hwid	Instant ID of the FB	→ Ctrl_SetDiagInfo, input parameter
CurrDiagState	Current state of the StateMachine of the safety PLCopen FB	→ User documentation safety PLCopen library in CODESYS
PrevDiagState	State of the StateMachine of the safety PLCopen FB in the previous PLC cycle	→ User documentation safety PLCopen library in CODESYS
Addr1	Instance number of the safety PLCopen function block the diagnostic code of which is displayed; corresponds to the value defined by the programmer for "FB_Number"	→ Ctrl_SetDiagInfo, input parameter
Addr2	Reserved	• 0x0: constant