Device Manual

SmartPLC SafeLine
with EtherNet/IP device interface

AC422S

Master profile: M4
Firmware: 4.3.17

English

7391188 / 06 06 / 2021

Contents

1 Preliminary note

Content

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1.1 Legal and copyright information

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1.2 Purpose of the document

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This document applies to devices of the type "SmartPLC AC4S with EtherNet/IP" interface" (art. no.: AC422S) with the firmware version 4.3.2.

These instructions describe the following topics:

- Mounting and electrical connection of AC422S
- Installation of additional devices (sensors, actuators) to the local I/O interface
- Operation and configuration of the device via the menu (GUI and web interface)
- Command channels, cyclic and acyclic data records
- Error diagnostics and troubleshooting

1.3 Explanation of Symbols

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WARNING!
Death or serious irreversible injuries may result.

CAUTION!
Slight reversible injuries may result.

NOTICE!
Property damage is to be expected or may result.

Important note
Non-compliance can result in malfunction or interference

Information
Supplementary note

► ... Request for action

> ... Reaction, result

→ ... "see"

abc Cross-reference

123 Decimal number
0x123 Hexadecimal number
0b010 Binary number

[...] Designation of pushbuttons, buttons or indications

1.4 Overview: User documentation for AC4S

42309

ifm electronic provides the following user documentation for the models of the device class "Fail-safe SmartPLC AC4S":

Document	Content / Description
Data sheet	Technical data of AC422S as a table
Operating instructions *	▪ Notes on mounting and electrical installation of the AC422S ▪ Set-up, description of the operating and display elements, maintenance information, scale drawing
Device manual	▪ Notes on operation of AC422S via GUI and web interface ▪ Description of the cyclic and acyclic data records, fieldbus parameters and command interface ▪ Error description
Supplement device manual	▪ Description of the acyclic data sets and the command interface
Programming manual	▪ Creation of a project with the device using CODESYS ▪ Configuration of the device using CODESYS ▪ Programming of the Standard plc of the device ▪ Programming of the fail-safe PLC of the device ▪ Description of the device-specific CODESYS function libraries

Legend:
*... The operating instructions are supplied with the device.

All documents can be downloaded from ifm's website.

1.5 Modification history

34492

Version	Topic	Date
00	New creation of document	12 / 2017
01	▪ Update to firmware 4.3.1 ▪ Changed: Restore device configuration	09 / 2018
02	Deleted: chapter 5.2.2 „Device supply via a joint power supply”	01 / 2019
03	Update to firmware 4.3.2	02 / 2019
04	Update to firmware 4.3.9	11 / 2019
05	▪ Added: Grounding the device over Ethernet interfaces ▪ Added: Connecting snsors / actuators ▪ Correction: Description fieldbus interfaces ▪ Added: fieldbus interface – Setting the IP parameters manually	02 /2021
06	▪ Update to firmware 4.3.17 ▪ Added: supported SD cards	06 / 2021

2 Safety instructions

Content

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2.1 General safety instructions

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Read this document before setting up the product and keep it during the entire service life.

Only use the product for its intended purpose.

If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.

Improper or non-intended use may lead to malfunctions of the device, to unwanted effects in the application or to a loss of the warranty claims.

The manufacturer assumes no liability for any consequences caused by tampering with the device or incorrect use by the operator.

► Observe these operating instructions.

► Adhere to the warning notes on the product.

2.2 Required background knowledge

41648

This document is intended for specialists. Specialists are people who, based on their relevant training and experience, are capable of identifying risks and avoiding potential hazards that may be caused during operation or maintenance of the product.

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

The document contains information about the correct handling of the product.

2.3 Tampering with the unit

33190

WARNING!

Tampering with the unit.

> In case of non-compliance:
  - Possible affects on safety of operators and machinery
  - Expiration of liability and warranty

► Do not open the devices!

► Do not insert any objects into the devices!

► Prevent metal foreign bodies from penetrating!

3 System description

Content

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This chapter describes the structure and the components of the system.

3.1 Intended use

Content

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3.1.1 Permitted use

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The fail-safe SmartPLC SafeLine AC422S integrates two AS-i masters, a fail-safe PLC, a Standard plc, a web server and an EtherNet/IP interface with 2-port switch.

- The fail-safe SmartPLC SafeLine
- controls the exchange of data to the sensor/actuator level.
- can be used as a safe and a non-safe controller (PLC).
- communicates with the higher-level control level via EtherNet/IP.
- visualises sensor/actuator data on the integrated web server.
- allows device configuration via the web server.

3.1.2 Prohibited use

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The device may not be used beyond the limits of the technical data (→ **Technical data** (→ S. 159))!

3.2 Information concerning the device

Content

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3.2.1 Overview

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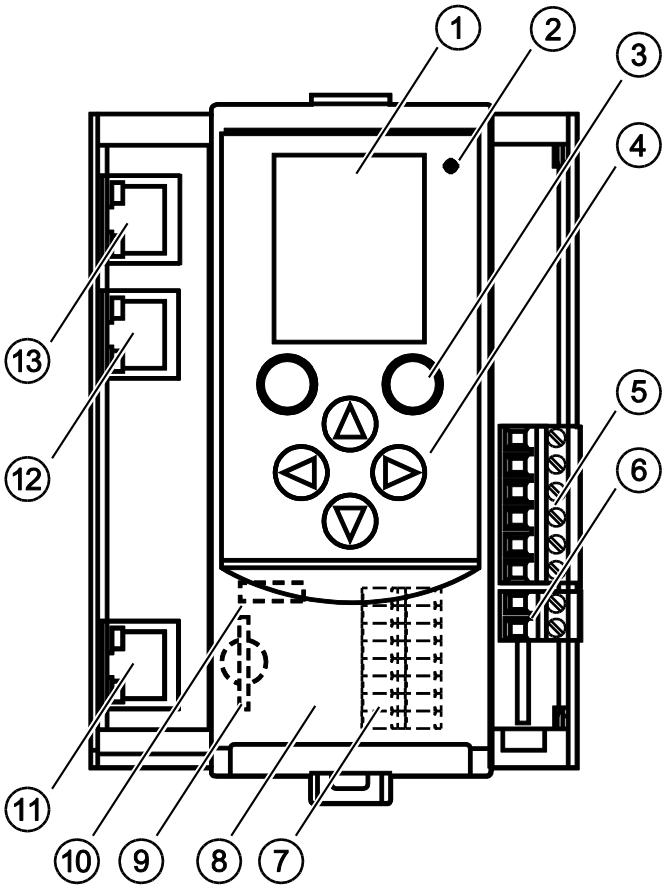

Legend:

1. Display
2. Status LED (H1)
3. 2 function keys
4. 4 arrow keys
5. Connector (X1) for AS-i 1, AS-i 2, functional earth
6. Connector (X2) for AUX
7. Local inputs and outputs (X4) (behind the front flap)
8. Front flap
9. Slot for SD card (X5) (behind the front flap)
10. Ethernet configuration interface 1 (X3) (behind the front flap)
11. Ethernet configuration interface 2 (X8) with status LED (H6, H7)
12. EtherNet/IP interface 1 (X7) with status LED (H4 H5)
13. EtherNet/IP interface 2 (X6) with status LED (H2, H3)

3.2.2 Operating elements

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The device provides the following operating elements.

Arrow and function keys

36959

Below the display is the key panel with two function keys and four arrow keys. The operator controls the Graphical User Interface (GUI) of the device with the keys.
Operating notes: → **Operation** (→ S. 44)

3.2.3 Display elements

36917

The device provides the following display elements:

Display

36894

The display is used to display the Graphical User Interface (GUI) of the device.
Operating notes: → **Operation** (→ S. 44)
Technical data: → **Technical data** (→ S. 159)

Status LEDs

36784

The device features the following status LEDs which display the current status of system components.
Meaning of the LED colours and flashing frequencies: → **Status LED** (→ S. 149)

3.2.4 Interfaces

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The device provides the following interfaces:

Ethernet configuration interfaces

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The configuration interface 1 (X3) is behind the front flap of the device.
The configuration interface 2 (X8) is underneath the EtherNet/IP interface (X6/X7).
The user can access the following functions via both interfaces:

- web interface for device configuration and diagnostics
- Programming of the device-internal Standard plc and the fail-safe PLC with CODESYS
- Operation as additional fieldbus interface

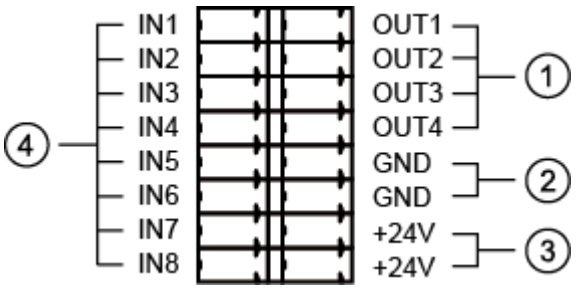
Possible network topologies: → **Configuration interfaces: Connection concepts** (→ S. 164)
Technical data: → **Technical data** (→ S. 159)

Local input/output interface

42303

The local input/output interface (X4) is 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. 4x output channels (OUT1 .... OUT4)
   → **Local outputs** (→ S. 14)
2. 2x voltage ground GND
   → **Voltage source / voltage ground** (→ S. 14)
3. 2x voltage source +24V
   → **Voltage source / voltage ground** (→ S. 14)
4. 8x input channels (IN1 ... IN8)
   → **Local inputs** (→ S. 14)

Voltage source / voltage ground

42272

+24V and GND are used as voltage supply for the safety IO PCB of the safety module of AC422S.

- Notes on the electrical connection: → **Electrical connection** (→ S. 29)

Local inputs

42304

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 safe or standard input. Configuration is effected via the programming system CODESYS.

- Connection of peripherals: → **Connect devices to local I/O interface** (→ S. 31)
- Technical data: → **Technical data** (→ S. 159)

Local outputs

42291

The local I/O interface provides 4 output channels for the connection of devices (e.g. actuators, relays). Each output channel can be used as safe or standard output. Configuration is effected via the programming system CODESYS.

- Notes on the connection of peripherals: → **Connect devices to local I/O interface** (→ S. 31)
- Technical data: → **Technical data** (→ S. 159)

Possible combinations of input and output channels

42315

The inputs IN1...IN8 can be configured both as safe and non-safe inputs.
The outputs OUT1...OUT4 can be configured both as safe and non-safe outputs.
This permits the following minimum or maximum input and output combinations:

Min. configuration	Max. configuration
▪ 8 non-safe inputs ▪ 4 non-safe outputs	▪ 4 safe inputs, 2 channels (SIL3) ▪ 4 safe outputs, 1 channel (SIL3)

SD card slot

36761

The SD card slot (X5) is located behind the front flap of the device. The following actions can be performed with an SD card:

- update the firmware of the device
- save/restore the device configuration

Supported SD card types:

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

Supported file systems: FAT16, FAT32

Technical data: → **Technical data** (→ S. 159)

EtherNet/IP fieldbus interface

36925

The device communicates with the higher-level control instance of the EtherNet/IP network via the EtherNet/IP interface (X6/X7).

- Notes regarding connection concepts: → **Configuration interfaces: Connection concepts** (→ S. 164)
- Technical data: → **Technical data** (→ S. 159)

3.2.5 Type label

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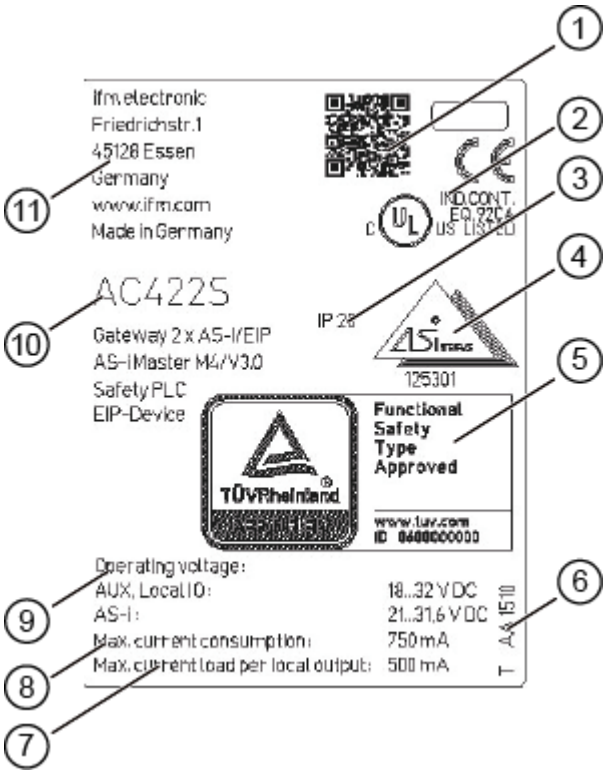
The type label is on the right housing side of the device. It provides the following information:



1. QR code for product website
2. CE/cULus marking
3. Protection class
4. AS-i certification
5. TÜV certification
6. Hardware version
7. Operating voltage for
   – Aux / local IO PCB
   – AS-i
8. max. current consumption of the device
9. max. load per output channel of the local I/O interface
10. Type designation incl. device functionality
    – number of AS-i fieldbus gateways
    – classification of the AS-i masters
    – fail-safe PLC
    – fieldbus
11. Manufacturer identification

3.3 Hardware

Content

42223

3.3.1 Safety architecture

Content

42266

System architecture

42268

The hardware structure of the safety module of AC422S corresponds to the implementation to DIN EN ISO 13849-1:2008, IEC 62061:2010 and IEC61508:2010 with a two-channel architecture with hardware fault tolerance (HFT = 1).

The device achieves the following characteristic safety values:

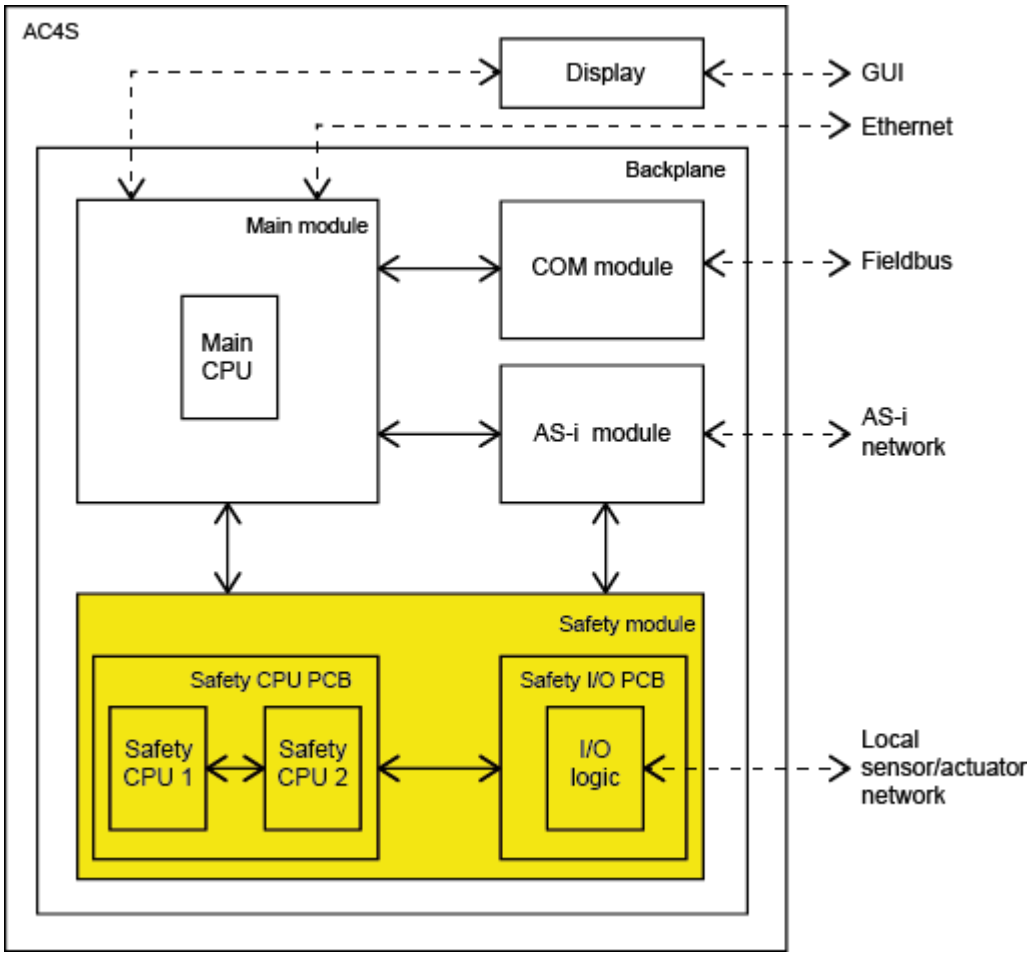
- SIL 3 / SIL CL 3 referred to IEC 61508:2010 and IEC 62061:2010
- Performance Level e EN ISO 13849-1:2008)
- Category 4 (EN ISO 13849-1:2008)

The reachable characteristic safety values of the automation system implemented with AC422S depend on the following components:

Safety classification of the peripherals installed at the local I/O interface (→**Supported device types** (→ S. 32))

Safety classification of the installed safe AS-i slaves

AC422S has the following system architecture:



Main module

42292

The main module is the central component of AC422S. 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 (→ **Display** (→ S. 19))
- COM module (→ **COM module** (→ S. 20))
- Ethernet configuration interface
- AS-i module (→ **AS-i module** (→ S. 20))
- Safety module (→ **Safety module** (→ S. 20))

Display

42230

The display is the graphic user interface of AC422S via which the user can configure and diagnose the device. The display exchanges the resulting data with the main module.

COM module

42210

The COM module provides the EtherNet/IP functionality of AC422S. This comprises the EtherNet/IP connection and 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.

AS-i module

42242

The AS-i module provides the AS-i functionality of AC422S 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 provided to the main module for representation on the display.

Safety module

42251

The safety module contains the safety-related hardware of AC422S. 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.

Process safety time

42313

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 take into account 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 extend the response time for safety-related faults.
- ► 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

3.3.2 Operating states of AC422S

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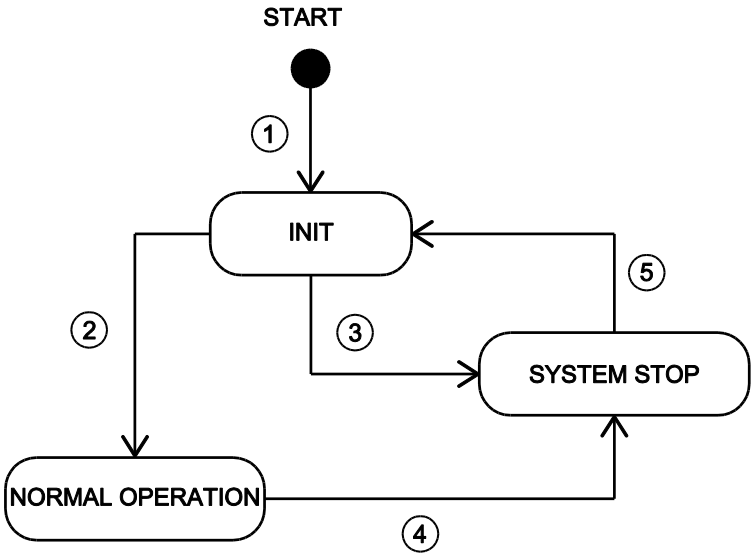
AC422S has the following operating states:

- INIT
- NORMAL OPERATION
- SYSTEM STOP

Below the state chart:



- **INIT**

  After the start the device automatically goes into the INIT state ( ). 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 ( ). If the PBIT test is not passed, the device passes into the SYSTEM STOP ( ).

- **NORMAL OPERATION**
  In NORMAL OPERATION the device of Standard plc and the fail-safe PLC provides a working environment. The states and the operation modes of the PLC applications are valid (see programming manual). Simultaneously and irrespective of the processing of the PLC applications the device continuously undergoes different hardware tests (CBIT = continuous built-in test). If this CBIT test is not passed, the device goes into the SYSTEM STOP state ( ).

- **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 changes to the INIT state ( ).

3.3.3 Monitoring and securing mechanisms

42296

System start / power on reset

42276

When the voltage supply has been applied, the safety module of AC422S 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

42297

During normal operation the safety module of AC422S 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

Depending on the error class the device triggers certain measures (→**Error classes** (→ S. 23)).

3.3.4 Error detection and processing

42221

Error classes

42218

AC422S recognises the following error classes:

Fatal error

42222

The following errors are classified as fatal errors:

- error in the device (temperature exceeded, soiling)
- error in the channels

Response to fatal errors:

- The safety module goes into the safe state (→**Safe state** (→ S. 25))

Serious error

42252

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** (→ S. 25))

Exception errors

42225

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** (→ S. 25))

Scheduling errors

42254

The following errors are classified as scheduling errors:

- Errors in the correct processing of the different tasks in the course of which the operating system cannot make a task change any more so that the watchdog is triggered.

Response to scheduling errors:

- All output channels of the local I/O interface go into the default state (= switched off)
- All safe output slaves stop sending code sequences
- Restart disable of the fail-safe PLC

Error message

42224

AC422S signals occurring errors via the following mechanisms:

- status LED (→**Status LED** (→ S. 149))
- online support Centre (→**Online Support Centre (OSC)** (→ S. 154))

Safe state

42258

The safety module of AC422S 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 exception error occurs during these operating states, the safety module of AC422S goes into 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 EtherNet/IP and configuration interface

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

Reset error

42257

All error states (→**Error classes** (→ S. 23)) can only be exited using one of the following measures.

► Reboot the device (power-on reset)

3.4 Software

Content

42280

3.4.1 Software modules of the device

42281

AC422S has the following software modules:

Software modules	Description
Recovery system	Environment for the firmware installation
Firmware	Firmware of AC422S
CODESYS standard runtime system (Standard plc)	Runtime environment for the execution of CODESYS applications to IEC 61131
CODESYS safety runtime system (fail-safe PLC)	Certified runtime environment for the execution of safe CODESYS applications
Standard application	CODESYS application for Standard plc
Safe application	CODESYS application for fail-safe PLC (= safety function)

The user is responsible for setting the safe function of the application (= safe application). If necessary, he must also obtain an approval from the supervisory and test organisations according to the national regulations.

3.4.2 Safety functions

42262

AC422S provides the following safety functions:

- Freely programmable fail-safe PLC
- Safe reading of local digital inputs and linking via the fail-safe PLC
- Safe control of local digital outputs via the fail-safe PLC
- Safe reading of safe AS-i input slaves and linking via the fail-safe PLC
- Control of safe AS-i output slaves via the fail-safe PLC
- Safe data transfer between min. 2 AC422S
- Safe data transfer from and to EtherCAT slaves (FSoE)

AC422S provides the programmer with a safe environment which is suited for the execution of a safe application to SIL3. The user is responsible for programming the safe application.

3.4.3 Certified software components for safe applications

42207

To program safe applications for AC422S ifm electronic provides certified software components for the programming environment CODESYS safety 3.5. In addition, the user can use the function libraries supplied with CODESYS safety.

Information about device-specific software components and about how to program Standard plc and the fail-safe PLC: → Programming manual fail-safe SmartPLC AC4S"

4 Mounting

Content

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4.1 Install device

42302

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 distance: 2000 m above sea level
- ► The protection rating of the device is IP 20. The installation must take place 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.

5 Electrical connection

Content

42226

The device must be connected by a qualified electrician.

- ► Disconnect power before connecting the device.
- ► 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 AC422S (X1, terminal FE) and the ground of the installation.
- ► Ground the interfaces X3, X6, X7 and X8 on both sides.

5.1 Wiring

42273

Terminal X1	Pin	Description
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 connected

Terminal X2	Pin	Description
24 V	1	+24 V device supply
GND	2	GND

Terminal X4	Pin	Description
	1...8	IN1...IN8
	9...12	OUT1...OUT4
	13,14	GND
	15,16	+24 V power supply Safe-IO module

A fixed terminal assignment is mandatory for the fail-safe inputs (IN 1...8) → **Connect sensors / actuators** (→ S. 43)

Terminal X3, X8	Configuration interfaces
Socket X6	EtherNet/IP interface 2
Socket X7	EtherNet/IP interface 1

5.2 Connect the supply voltage

42212

Supply the device with one of the following versions.

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

42279

► 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 supply (terminal X2).

- 24 V 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 AC422S is to be limited to max. 3 m.

The power supplies used must meet the standard DIN EN 60950-1 for SELV/PELV.

5.3 Connect devices to local I/O interface

Content

42211

► Only connect devices that are supported by the AC422S (→ **Supported device types** (→ S. 32))!

► 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.

5.3.1 Supported connection types

42285

The local I/O interface of AC422S supports the connection of safe and non-safe devices. The following connection methods are possible:

Connection method	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	▪ is composed 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	▪ is composed 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 channels, safe	▪ A safe process signal is provided on 2 outputs without additional monitoring

5.3.2 Supported device types

Content

42286

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

The signals of the clock outputs of safe sensors are not evaluated by AC422S.

► 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.

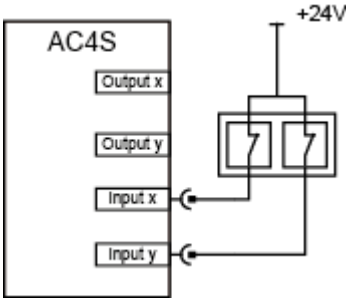
► Observe the notes of how to integrate safe devices in a CODESYS project (→ original programming manual, **Configure safe devices at local I/O interface**)!

Mechanical switches

42288

Device type MS-1

42199

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Mechanical switch ▪ Two-channel connection ▪ not tested	3	e	4

The indicated safety classifications can only be obtained with protected wiring between switch and AC422S.

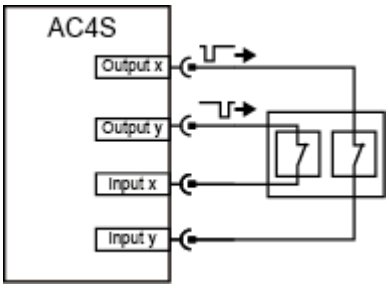
► Observe current standards of the country in which the AC422S automation system is to be operated.

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

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

Device type MS-2

42197

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Mechanical switch ▪ Two-channel connection ▪ Test with 2 time-shifted switch-off pulses on the input channels ▪ Test signals are generated by AC422S.	3	e	4

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

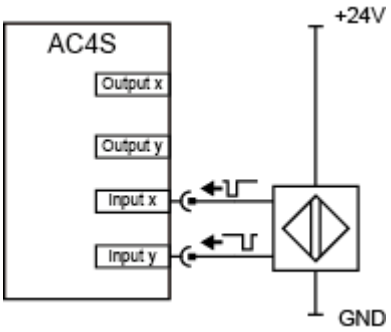
- ► Select the input and output circuits according to the max. safety classification (SIL / cat. / PL).
- ► If several MS-2 are connected, the test signals must be different.
- ► Observe current standards of the country in which the AC422S automation system is to be operated.
- ► Test the safety function within the two-error occurrence time.
  The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

Electronic sensors

42220

Device type S-1

42198

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Electronic sensor ▪ Two-channel connection (4-wire operation) ▪ Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by AC422S ▪ Examples (ifm art. no.): – GI701S – GM701S – GM705S	3	e	4

► Note the supply voltage limits of the sensor.

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

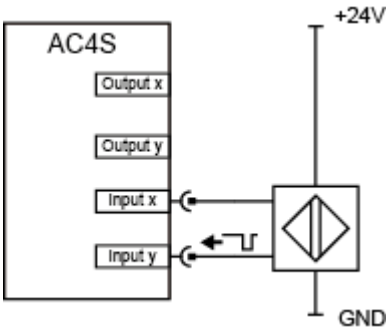
When the indicated ifm articles are used, the maximum safety classification according to the SIL/Cat./PL values listed in the table can be achieved. Note the current standards.

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

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

Device type S-2

42204

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Electronic sensor ▪ Two-channel connection (4-wire operation) ▪ Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by AC422S ▪ Examples (ifm art. no.): – GF711S – GG711S – GI711S – GG712S – GI712S – GG851S	2	d	4

► Note the supply voltage limits of the sensor.

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

When the indicated ifm articles are used, the maximum safety classification according to the SIL/Cat./PL values listed in the table can be achieved. Note the current standards.

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

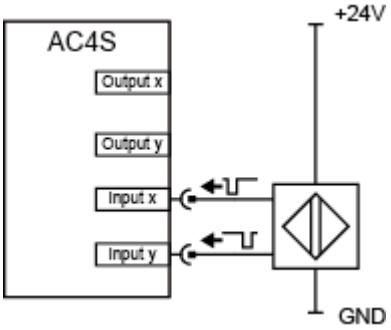
► Test the safety function within the two-error occurrence time.
The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

Safety light curtains

42263

Device type SLV-1

42201

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Safety light curtains type 2 ▪ Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by AC422S ▪ Examples (ifm art. no.): – OY431S to OY440S – OY031S to OY040S – OY051S to OY060S – OY072S to OY080S – OY094S to OY100S	1	c	--

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

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

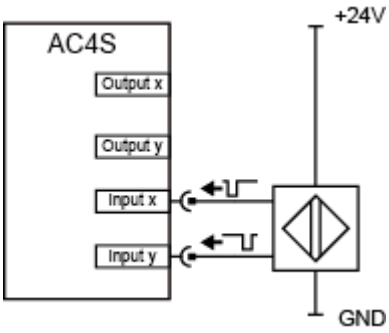
When the indicated ifm articles are used, the maximum safety classification according to the SIL/Cat./PL values listed in the table can be achieved. Note the current standards.

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

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

Device type SLV-2

42216

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Safety light curtains type 4 ▪ Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by AC422S ▪ Examples (ifm art. no.): – OY403S – OY405S – OY407S – OY001S to OY011S – OY041S to OY050S – OY061S to OY070S – OY082S to OY090S – OY104S to OY110S – OY441S to OY450S – OY221S to OY230S – OY204S to OY210S – OY241S to OY250S – OY261S to OY270S – OY282S to OY290S	3	e	--

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

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

When the indicated ifm articles are used, the maximum safety classification according to the SIL/Cat./PL values listed in the table can be achieved. Note the current standards.

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

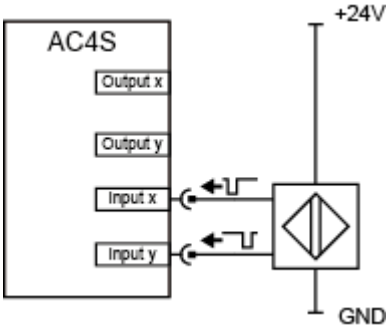
► Test the safety function within the two-error occurrence time.
The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

Safety light grids

42250

Device type SLG-1

42205

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Safety light grids type 2 ▪ Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by AC422S ▪ Examples (ifm art. no.): – OY411S to OY413S – OY111S to OY113S	1	c	--

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

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

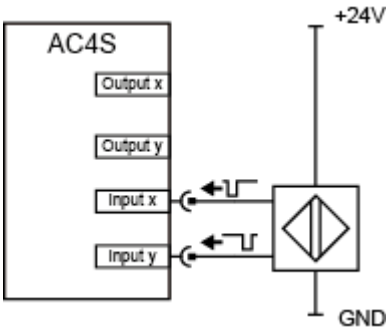
When the indicated ifm articles are used, the maximum safety classification according to the SIL/Cat./PL values listed in the table can be achieved. Note the current standards.

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

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

Device type SLG-2

42203

Circuit diagram/wiring diagram	Description	Safety classification		
		max. SIL	max. PL	max. cat.
	▪ Safety light grids type 4 ▪ Self-testing with 2 OSSD outputs (test signals are generated by the sensor and filtered or ignored by AC422S ▪ Examples (ifm art. no.): – OY114S to OY116S – OY901S to OY903S – OY421S to OY423S – OY120S to OY122S – OY951S to OY953S	3	e	--

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

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

When the indicated ifm articles are used, the maximum safety classification according to the SIL/Cat./PL values listed in the table can be achieved. Note the current standards.

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

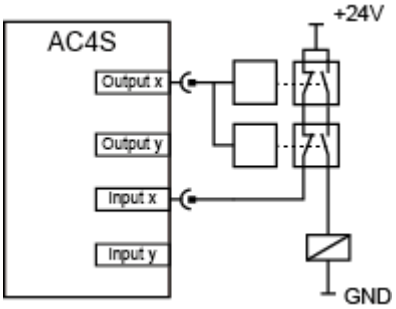
► Test the safety function within the two-error occurrence time.
The second-error occurrence time takes 24 hours. Within this time the safety function of the device should be requested once.

Output relay

42312

Device type AR-1

42206

Circuit diagram/wiring diagram	Description	Security classifications		
		max. SIL	max. PL	max. cat.
	▪ 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 AC422S	2	d	3

► Note the supply voltage limits of the relays.

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

► Test relay for correct operation once a year.

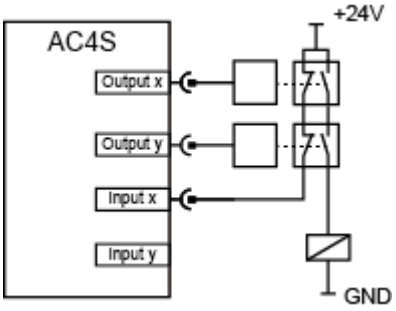
The indicated safety classifications can only be obtained with protected wiring between switch and AC422S.

► Observe current standards of the country in which the AC422S automation system is to be operated.

► Carry out suitable start-up tests.

Device type AR-2

42200

Circuit diagram/wiring diagram	Description	Security classifications		
		max. SIL	max. PL	max. cat.
	▪ 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 AC422S	3	e	4

- ► 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).
- ► Observe current standards of the country in which the AC422S automation system is to be operated.
- ► Carry out suitable start-up tests.

5.3.3 Connect sensors / actuators

42214

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

WARNING!

The use of invalid combination of local inputs can have a negative impact on the effectivness of the safety-relevant functions.

> Risk of personal injuries and/or damage to property.

► Use one of the following input combinations for the connection of 2-channel sensors to implement safety-relevant functions to SIL 3 / cat. 4 / PL e.

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

ifm electronic does not assume any guarantee for obtaining the required SIL / cat. / PL if other than the above-mentioned input combinations is used.

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

► Connect 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 are not allowed to 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).

6 Operation

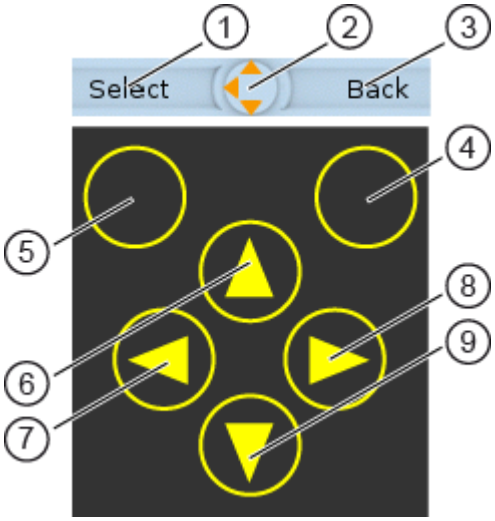
Content

41713

6.1 Control of the graphical user interface

41568

Below the display is the key panel with six membrane keys. The operator controls the graphical user interface of the device with these keys. The key panel is closely linked to the navigation status bar.

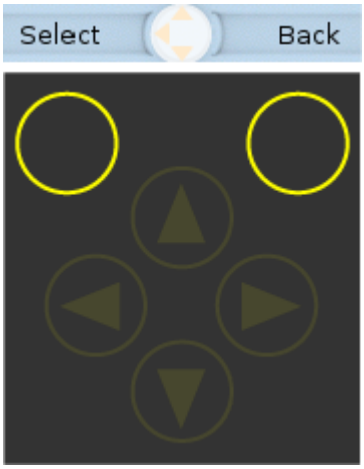


Legend:

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

6.1.1 Function keys

41476



The two **function keys** allow the operator to trigger specified actions (e.g. tick a checkbox). The function of the function keys changes depending on the context.

The two **text fields in the navigation status bar** are associated with the function keys located directly below the display. They indicate the action that will be triggered if the function key is pressed in the current work step. If the function key is not labelled, it means that it has no function in the present situation.

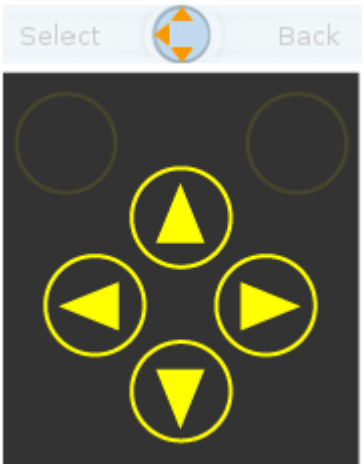
Example (→ figure):

► The left function key triggers the action [Select].

► The right function key triggers the action [Back].

6.1.2 Arrow keys

7091



The four**arrow keys** [▲], [▶], [▼] and [◀] can be used for navigation and selection.

The **navigation compass** shows which of the four arrow keys can be used in the respective work step.

Examples:

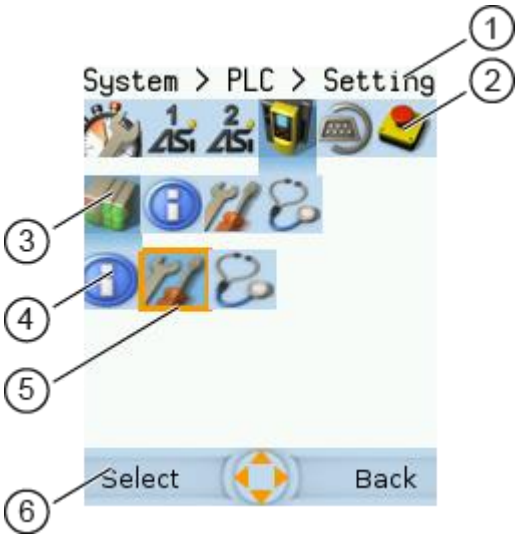
All arrow keys are active and will trigger a device response when pressed.

Only the arrow keys [▶] and [▼] are active and will trigger a device response when pressed.

6.2 Menu view

41755

The menu view allows the user to select the menu page with the required control or display function.



Legend:

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

Long texts are displayed as scrolling text in the info bar.

6.2.1 Menu navigation

41756

The central operating elements in the menu view are the three **navigation bars**. They reflect the menu structure of the device software. Each navigation bar represents a menu level. The symbols in a navigation bar represent the submenus and menu items.

Rules for menu navigation:

► Use [◀] / [▶] 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 automatically appear.

► Use [▼] to go one menu level down.

► Use [▲] to go one menu level up.

At the lowest menu level:

► Press [Select] function key to go to the page of the selected menu item (→**Page view** (→ S. 49)).

In the main navigation bar:

► Press [Back] function key to return to the start screen (→**Start screen** (→ S. 66)).

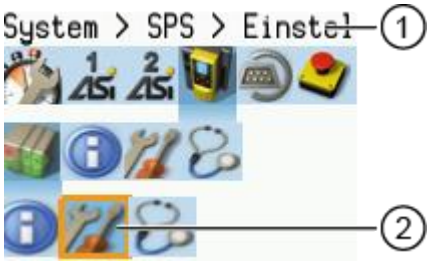
6.2.2 Navigation aids

41748

The following screen elements help you navigate through the menu:

> The **info bar** shows the navigation path of the selected menu symbol.

> The **navigation compass** shows which navigation steps are possible from the current position.



Legend:

(1) Info bar

Navigation path to the focused menu element:
[System] > [PLC] > [Setup]

(2) Menu element with focus

Navigation path to the focused menu element:

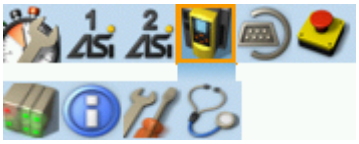

Example

41499

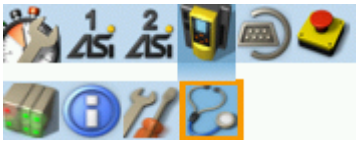
To access the menu page containing the setting options for the device-internal PLC:

1. > Initial position when accessing the menu screen

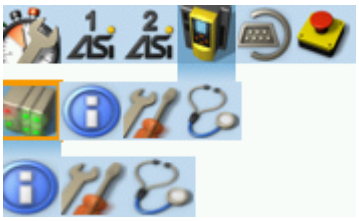
2. ► Use [▶] to select the [System] menu symbol.
   > The focus is on the [System] menu symbol.
   > The first subnavigation bar appears.



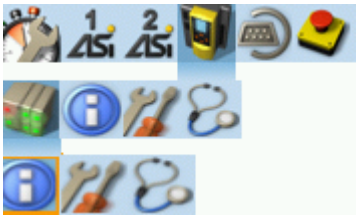
3. ► Use [▼] to change to the first subnavigation barh.
   > The focus is on the [Diagnosis] menu symbol.



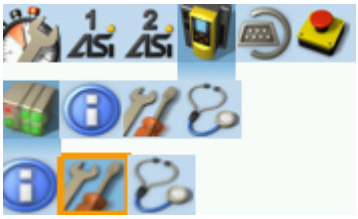
4. ► Use [◀] to select the [PLC] menu symbol.
   > The focus is on the [PLC] menu symbol.
   > The second subnavigation bar appears.



5. ► Use [▼] to change to the second subnavigation bar.
   > The focus is on the [Information] menu symbol.



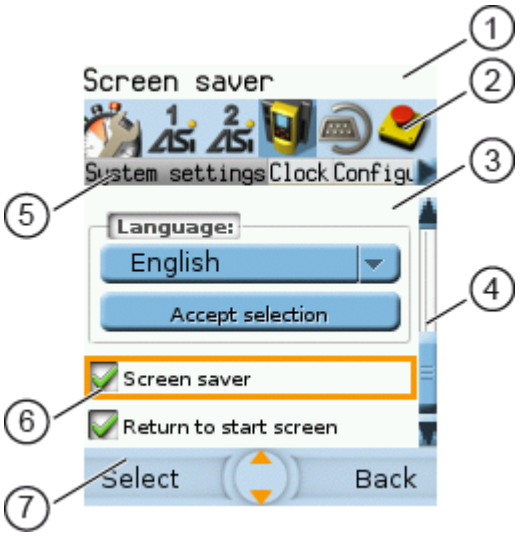
6. ► Use [▶] to select the [Settings] menu symbol.
   > The focus is on the [Settings] menu symbol.
   ► Press the [Select] function key to go to the page view of the [Settings] menu item.
   > The page shows the setting options for the device-internal PLC.



6.3 Page view

41786

The page view allows the user to select and execute a requested function.



Legend:

1. Info bar
2. Main navigation bar
3. Page
4. Scroll bar
5. Tab menu
6. Page element with focus
7. Navigation status bar with
   - labelling of function keys
   - navigation compass

6.3.1 Navigate on a page

41749

The page contains elements, that allow the operator to control the device or access information.
For page navigation, the following basic rules apply:

► Use the arrow keys [▼] / [▲] to change between the different page elements.
> The selected element is marked (= orange frame).
► Use the [Back] function key to return to the tab menu / menu view.

Rules for using the different control elements: →**Description of the control elements** (→ S. 50)

6.3.2 Use navigation aids

41678

The following aids offer navigation users additional orientation:

> The **info bar** shows detailed information about the selected element (focus).

Long texts are displayed as scrolling text in the info bar.

> The active menu symbol in the **main navigation bar** has a dark background.
> A **scroll bar** appears on the right side of the screen if the elements do not fit on the page.
> The **navigation compass** shows the navigation options in the active work step.
> The **text fields in the navigation status bar** show the current assignment of the function keys.

6.3.3 Description of the control elements

Content

41586

A page consists of different control elements.

Tab menu/Tab

41675

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: `Errors / slave`).
> The symbols ◀ and ▶ indicate that there are more tabs on the left and right sides of the visible tab.
> 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

Use:

1 Select the menu item

► Go to the menu item with the tab menu.
> The tab menu appears.
> The focus is on the left-hand tab.

2 Select a tab

► Use [◀] / [▶] arrow key to select the desired tab.
> The focus (orange background) moves to the selected tab:
Version
> The page shows the functions of the selected tab.

3 Activate the menu page

► Press [Select] arrow key to go to the page that belongs to the active tab.
> When going to the page, the tab menu remains visible.
> The background colour of the active tab turns grey.
Version

4 Carry out the desired functions

► Use [▼] to select and execute the desired function.

5 Change to tab menu

► Press [Back] function key to change to the tab menu.
> The focus (orange background) moves to the active tab.

Button

41536

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

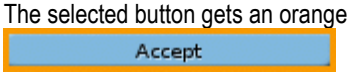
Example:

Use:

1 Select a button

► Use the arrow keys [▲] / [▼] to select a button.

> The selected button gets an orange frame:



2 Activate the button

► Use [Select] function key to activate the selected button.

> The function is executed.

Checkbox

41600

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

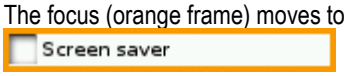
Example:

Use:

1 Select a checkbox

► Use [▲] / [▼] arrow key to select the checkbox

> The focus (orange frame) moves to the selected checkbox



OR:

2 Check/uncheck a checkbox

► Use [Select] function key to check/uncheck the selected checkbox.

> The status change is indicated:

 = checkbox is checked

OR:

 = checkbox is unchecked

The setting or clearing of a checkbox is not always immediately effective. Often the change must be confirmed by clicking a button (e.g. [Accept selection])!

List

41484

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

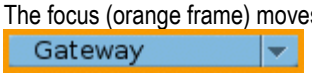
= list with caption

Use:

1 Select a list

► Use [▲] / [▼] arrow key to select the list.

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



> The list shows the active value: (in this example`Gateway`).

2 Activate the list

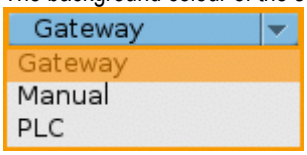
► Use [Select] function key to open the list.

> The opened list shows the selectable values.

3 Select a value

► Use [▲] / [▼] arrow key to select the desired value from the list.

> The background colour of the selected value turns orange.



4 Apply the selected value

► Use [Select] function key to apply the selected value.
OR:
Use [Back] function key to quit and close the list.

> The list shows the selected value.

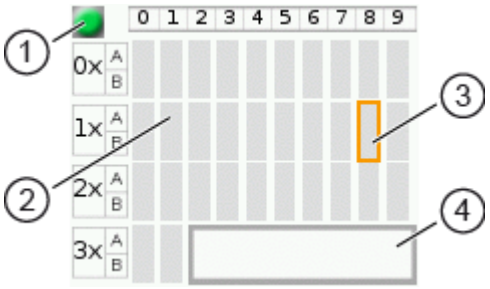
The set value will not always become effective immediately. Often the change must be confirmed by clicking a button (e.g. [Accept selection])!

Slave selector

Content

41653

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



Legend:

1. Indicator of AS-i master operating mode
2. AS-i address symbol
3. Highlighted AS-i address (focus)
4. Status message of highlighted AS-i address

> 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 header: 8 (= units digit of the AS-i address)
– type of slave: single slave (= symbol fully occupies the address field)
– resulting AS-i address: 18

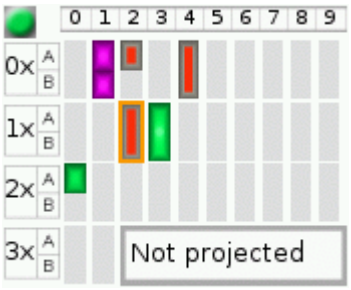
> The symbol of the A/B slave pair appears when an A or B slave is used on this address.

The slave selector is used in the following overviews:

- Overview of slave states (→ **Overview of slave states** (→ S. 55))
- Overview of free slave addresses (→ **Overview of free slave addresses** (→ S. 57))

Overview of slave states

41728



> The slave selector 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 + symbols** (→ S. 56)

> 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)

Use:

1 Select an AS-i slave

► Use the arrow keys [▲], [▶], [▼] and [◀] to select the desired 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.

2 Activate the selected AS-i slave

► Use [Select] function key to activate the selected AS-i slave and go to the next menu page.
OR:
Use [Back] function key to cancel and leave the slave selector.

Slave status: colour code + symbols

41652

Single slave	A/B slave	Colour	Meaning
		grey	No slave found: slave address is neither in the LPS nor in the LDS
		green	Slave is activated (in LAS)
		red	Configuration error type 1: slave is projected (in LPS) but was not found (in LDS)
		yellow	Slave signals a peripheral fault
		pink	Several slaves have the same address (double address error)
		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 (example: configuration error type 2)

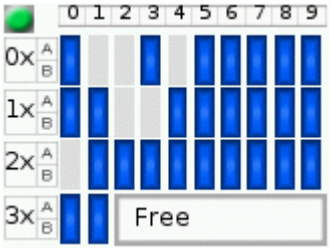
41741

Symbol	Colour	Meaning
	grey red grey	Configuration error type 2: ▪ Single slave is projected (in LPS) but was 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 was 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 was not found (in LDS). ▪ Instead, a new single slave with the same address was installed.

Overview of free slave addresses

41729

In this overview, the slave selector 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 + symbols** (→ S. 58)

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

- `Free`
- `Missing slave`

Use:

1 Select the AS-i address

► Use the arrow keys [▲], [▶], [▼] and [◀] to select the desired AS-i address.

> The focus (= orange frame) is on the selected AS-i address.

> The info bar displays the selected AS-i address.

> The text field shows a status message for the selected AS-i address.

2 Activate the selected AS-i address

► Press [Select] function key to activate the selected AS-i address and go to the next menu page.
OR:
Press [Back] function key to cancel and leave the slave selector.

Free slave addresses: colour code + symbols

41493

Single slave	A/B slave	Colour	Meaning	Prio.
		grey	Slave address is already used.	--
		turquoise	Address is free according to LDS (= no slave found), however: address already belongs to a stored projection (= application profile).	1
		blue	Address is free according to LDS (= no slave found). Address is not used in a stored projection (= application profile).	2

Meaning of the colour combinations

41736

Symbol	Colour	Meaning
	blue blue	Slave to be addressed is an A/B slave: A and B addresses are free.
	blue grey	Slave to be addressed is an A/B slave: – A address is free. – B address is used.
	grey blue	Slave to be addressed is an A/B slave: – A address is used. – B address is free.
	turquoise turquoise	Slave to be addressed is an A/B slave: A and B addresses are free, but already used in a stored projection.
	turquoise 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 turquoise	Slave to be addressed is an A/B slave: – A address is used. – B address is free, but already used in a stored projection.
	turquoise 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 turquoise	Slave to be addressed is an A/B slave: – A address is free – B address is free, but already used in a stored projection.

Confirmation message

41606

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. For the changes to become effective, they first need to be acknowledged by the operator.

Example:

> Action: Change AS-i slave address from 1a to 1b
> Confirmation message shows:
  - Action (= `Change AS-i address`)
  - Slave address prior to change
  - Slave address after change
> The operator has the following input options:
  - [Select] function key
  - [Back] function key

Use:

1 Change the settings

► Change the system settings.

> The confirmation message appears.

2 Confirm the message

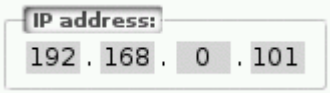
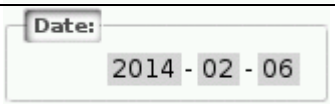
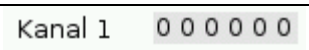
► Press [Select] function key to confirm the changes and apply the new value.
OR:
Press [Back] function key to reject the changes and continue to use the old value.

> The page displays the valid settings.

Numerical field

41720

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

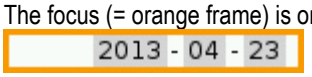
Control element	Example	Meaning
IP address		Entry of an IP address (IPv4) in [w.x.y.z] format ▪ w | x | y | z = network segments (value range: 0... 255)
Date		Date entry in [yyyy-mm-ss] format ▪ yyyy = year (value range: 0000 ... 9999) ▪ mm = month (value range: 01 ... 12) ▪ dd = day (value range: 01 ... 31)
Time		Time entry in [hh:mm:ss] format ▪ hh = hours (value range: 00 ... 12) ▪ mm = minutes (value range: 00 .... 59) ▪ ss = seconds (value range: 00 ... 59) The numerical field for seconds (ss) cannot be edited!
Analogue value		Entry of an analogue output value Value range (per numerical field): 0 ... 9

Use (using the example of the numerical date field):

1 Select a numerical field

► Use [▲] / [▼] arrow key 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

2 Activate the editing mode

► Press [Select] function key to enter the editing mode.

> The focus (orange frame) is on the right element

3 Set the desired value

► Use [▲] / [▼] arrow key to increment the desired value.

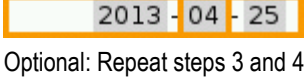
> The segment displays the new value.

Press and hold the arrow key [▲] / [▼] to rapidly move through larger value ranges.

4 Select the next segment

► Use the arrow key [◀] / [▶] to mark the segment to be edited.

> The focus (orange frame) moves to the marked segment



► Optional: Repeat steps 3 and 4 until all segments have the desired values.

5 Adopt the set values

► Use [Select] function key to confirm the set values and to leave the edit mode.
OR:
Use [Back] function key to reset the set values and to leave the edit mode.

> The date control element displays the valid date

The set value will not always become effective immediately. Often the change must be confirmed by clicking a button (e.g. [Accept selection])!

Binary field

41531

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`

Use:

1 Select the binary field

► Use [▲] / [▼] arrow key 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).

2 Activate the editing mode

► Press [Select] function key to enter the editing mode.

> The focus (orange frame) is on the right element.

3 Set the desired value

► Use [▲] / [▼] arrow key to set the desired value.

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

4 Select the next segment

► Use [◀] / [▶] arrow key to mark the segment to be edited.

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

► Optional: Repeat steps 3 and 4 until all segments have the desired values.

5 Apply the set values

► Use [Select] function key to confirm the set values and to leave the edit mode.
OR:
Use [Back] function key to reset the set values and to leave the edit mode.

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

6.4 Remote access

Content

41775

The device has an integrated web server. It generates a web interface which allows remote access to all device functions via an web browser. The web-interface allows the operator to easily configure, parameterise and monitor the device in permanent operation via an ethernet-based network.

6.4.1 General

41475

The operating concept of the web interface follows the same philosophy as the operating concept of the local display. The web interface uses the same menu items, the same menu structure and the same symbols as the graphic user interface of the local display.

Observe notes regarding the additional functionality of the web interface: → **Additional functions** (→ S. 67)

6.4.2 Recommended browsers

41777

Use one of the following Internet browsers to correctly display the HTML pages of the web interface:

- Microsoft Internet Explorer (from version 8.0)
- Mozilla Firefox (from version 3.5)

6.4.3 Operating instructions

41723

Web interface: Access

41681

► PC / Laptop / mobile device: Start Internet browser.

► Internet browser: Enter IP address of the device in the address line (e.g. `192.168.82.2`)

> Internet browser displays the start page of the web interface.

Web interface: Navigation

41680

In the web interface, the pointing device (e.g. mouse, touchpad) is used instead of the following key functions:

- Navigation functions of the arrow keys [▼], [▲], [▶], [◀]
- Selecting functiions of the function keys [Select] and [Back]

Example:

To select  >  :

► Place the cursor on symbol [AS-i 1] in the main navigation bar.

> Symbol [AS-i 1] has the focus.

> Subnavigation bar appears.

> Navigation trail shows actual position in the menu tree: `AS-i 1`

► Place the cursor on symbol [Diagnosis] in the subnavigation bar.

> Symbol [Diagnosis] has the focus.

> Navigation trail shows actual position in the menu tree: `AS-i 1 > Diagnosis`

► Click on symbol [Diagnosis]

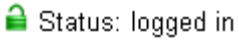
> Web browser shows menu page [Diagnosis]

Web interface: Password protection

41679

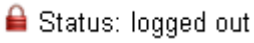
The web server has a basic password protection to prevent unwanted or unauthorised changes to the device settings via the web interface.

When the web interface is accessed, a status bar at the top shows if the user is logged in or logged out:



User is logged in:

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



User is logged out:

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

The password is: CAFE

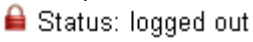
The password protection cannot be deactivated! The password cannot be changed!

Web interface login

41676

► Go to the web interface (→ **Operating instructions** (→ S. 63)).

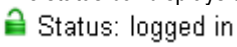
> At the top of the web interface, the status bar displays the following status message:



► Enter the fixed password in the [Password:] field.

► Click [Login] to log 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 if one of the following actions is carried out:

- the web browser is closed and reopened
- the PC/laptop is restarted
- AC422S is restarted

To prevent unauthorised access to the device settings:

► Manually log off before you leave the web interface! (→ **Disconnect from web interface** (→ S. 65))

► Remember to turn off the "Save password" function of your web browser before accessing the web interface!

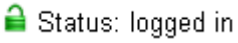
► If the "Save password" function of your web browser is not turned off: delete the stored passwords in your browser settings!

Disconnect from web interface

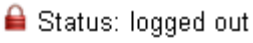
41457

To log out of the web interface:

► Start web interface

> Status line with status message is displayed at the top of the web interface:


► Log out of the web interface by clicking [Logout]

> Status bar shows changed status


> User can only access menus in the web interface containing diagnostic and information data.

> An error message is displayed when a user in the web interface accesses a menu with device settings.

The user stays logged into the web interface even when the web browser is closed and then restarted.

To prevent unauthorised access to the device settings:

► After finishing the access via the web browser manually log out of the device web interface!

► When passwort memory function of the web browser is not deactivated: Delete all saved passwords in the browser settings!

7 Menu

Content

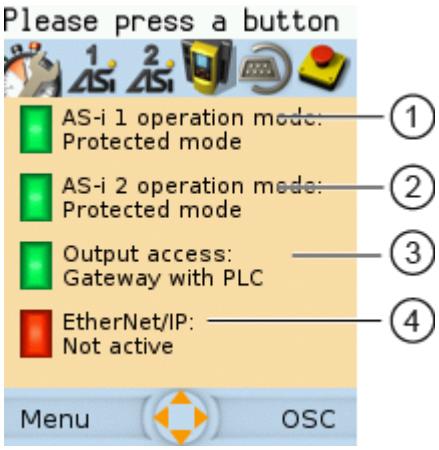
41740

This chapter describes the menu functions of the device's graphical user interface.

7.1 Start screen

42277

When starting the device, the start screen of the graphical user interface appears (special case: system start after initial commissioning or firmware update: →**Start screen 'Basic settings'** (→ S. 144)). The start screen displays the status information of important system components. The start screen is also the starting point for access to the menu functions of the AC422S.



1. AS-i Master 1 operation mode
   →**Operating mode of the AS-i master** (→ S. 151)
2. Operating mode of the AS-i Master 2
   →**Operating mode of the AS-i master** (→ S. 151)
3. Control instance of the AS-i slave outputs
   →**Control instance of the AS-i outputs** (→ S. 151)
4. Status of the EtherNet/IP connection
   →**Fieldbus status** (→ S. 152)

► Change to the menu with [Menu] function key (→**Menu functions** (→ S. 67)).

OR:

► Display the online support centre with [OSC] function key (→**Online Support Centre (OSC)** (→ S. 154)).

7.2 Menu functions

42289

The main navigation bar of the AC422S provides access to the following menus:

Icon	Description
	Access to the most important device functions →**System** (→ S. 89)
	Configuration and diagnostics of the AS-i 1 network (AS-i master, AS-i slaves) →**AS-i 1/ AS-i 2**
	Configuration and diagnostics of the AS-i 2 network (AS-i master, AS-i slaves) →**AS-i 1/ AS-i 2**
	Configuration and diagnostics of the device, control of the device-internal Standard plc →**System** (→ S. 89)
	Configuration and diagnostics of the interfaces (EtherNet/IP, configuration interface) →**Interfaces** (→ S. 109)
	Status and diagnostics of the device-internal fail-safe PLC → **Safety** (→ S. 125)
	Online Support Centre* → **Online Support Centre (OSC)** (→ S. 154)
	Control and administration of the ifm system solutions (ifm apps)* →**ifm system solutions** (→ S. 137)

* ... only available via the web interface of the device

7.2.1 Additional functions

42886

Compared to the user interface of the display, the web interface offers the following additional functions:

- Download device description file
  (→**Download the device and I/O description** (→ S. 116))
- Adopt date and time of a PC/laptop
  (→ **Adopt the system time of the PC** (→ S. 103))
- Store diagnostic protocol
  (→**Store diagnostic protocol** (→ S. 107))
- Use ifm system solutions
  (→**ifm system solutions** (→ S. 137))
- Diagnostics display
  (→**Start screen: Status LEDs** (→ S. 151))

7.3 Quick setup

41409

The [Quick setup] menu provides fast access to the most important device functions.

Navigation path	Functions
	→ **Quick setup: Project AS-i networks** (→ S. 69) → **Quick setup: Configure the operating mode of the AS-i masters** (→ S. 70) → **Quick setup: Configure the output access** (→ S. 71) → **Quick setup: Access the device via QR code** (→ S. 71) → **Quick setup: Configure the EtherNet/IP interface** (→ S. 72) → **Quick setup: Set the configuration mode** (→ S. 73) → **Quick setup: Set the Configuration interface 1** (→ S. 74) → **Quick setup: Set the configuration interface 2** (→ S. 75) → **Quick setup: Address the AS-i slaves connected to AS-i Master 1** (→ S. 76) → **Quick setup: Address the AS-i slaves connected to AS-i Master 2** (→ S. 77)

7.3.1 Quick setup: Project AS-i networks

41782

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)

During a project a projection adaptation all output parameters of the unconnected AS-i slaves are reset to their default value in the AS-i master (single /A slaves = 0xF, B slaves = 0x7).

To carry out the projection adaptation on AS-i master 1 and/or AS-i master 2:

1 Select menu page

► 

► Select tab [Project all].

2 Select the AS-i master for projection adaptation

► Set the following parameters as required:

Parameter	Description	Possible values	
[AS-i Master 1]	Select AS-i Master 1 for projection adaptation	☐	Exclude AS-i Master 1 from projection adaptation
		☑	Include AS-i Master 1 in projection adaptation
[AS-i Master 2]	Select AS-i Master 2 for projection adaptation (only available for devices with 2 AS-i masters)	☐	Exclude AS-i Master 2 from projection adaptation
		☑	Include AS-i Master 2 in projection adaptation

3 Start the projection adaptation

► Activate the button [Start projection process].

> The selected AS-i masters go into the "projection mode".

> A projection adaptation is carried out on the selected AS-i masters.

> After projection adaptation, the selected AS-i masters go into the "protected mode".

7.3.2 Quick setup: Configure the operating mode of the AS-i masters

41778

Information regarding the operating modes of an AS-i master:→ **Operating modes of the AS-i master** (→ S. 167)

To configure the operating modes of the AS-i masters:

1 Select the menu page

► 

► Select [Operation modes] tab.

2 Configure the operating mode of AS-i master 1 and the behaviour of the connected AS-i slaves

> In group [AS-i master 1], set the following parameters as required:

Parameter	Description	Possible values	
[Projection mode]	Active operating mode of the AS-i master	☐	Projection mode inactive: AS-i network runs in protected mode (normal mode)
		☑	Projection mode active: AS-i network can be projected. (→ **Quick setup: Address the AS-i slaves connected to AS-i Master 1** (→ S. 76) or → **Quick setup: Address the AS-i slaves connected to AS-i Master 2** (→ S. 77))
[No slave reset]	Behaviour of the AS-i slaves when changing the operating mode	☐	Slave is reset when changing the operating mode: When changing the operating mode, the AS-i slaves will be reset for a short moment (reset or offline phase).
		☑	Slave is not reset when changing the operating mode: When changing the operating mode, the AS-i slaves continue to operate without interruption.

> Selected values are applied.

3 Optional: set the operating mode of AS-i master 2 and the behaviour of the AS-i slaves

► Repeat step 2 for the group [AS-i master 2].

7.3.3 Quick setup: Configure the output access

41783

Only one control instance at a time can have write access to the outputs of the connected AS-i slaves. The operator configures the control instance with the parameter [Output access].

To configure the control instance of the AS-i slave outputs:

1 Select the menu page

► 

► Select [Operation modes] tab.

2 Set the control instance for the outputs of the AS-i slaves

► From the list [Output access], select the desired value:

Parameter	Description	Possible values	
[Output access]	Control instance of the AS-i slave outputs	[Gateway]	A higher-level PLC controls the outputs of the AS-i slaves.
		[Manual]	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.

3 Save the changes

► Press [Accept selection] to save the changes.

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

7.3.4 Quick setup: Access the device via QR code

41765

The QR code (**Q**uick **R**esponse Code) allows the operator to access the web interface of the device from a smartphone or tablet PC.

Requirements:

- The AS-i device must be connected to a wireless LAN router with switch functionality. (→**Connection via Ethernet network** (→ S. 165))
- The smartphone/tablet PC is connected to the wireless LAN router.
- The smartphone/tablet PC provides a camera function.
- The smartphone/tablet PC has a QR-code reader installed.

1 Select menu page

► 

► Select the [QR-Code] tab.

> The display shows the QR code.

2 Read the QR code

► Start the QR code reading app and scan the QR code.

> The smartphone displays the web interface of the device (→**Remote access** (→ S. 62)).

7.3.5 Quick setup: Configure the EtherNet/IP interface

41780

The device provides the following options for configuration of the EtherNet/IP interface:

- Manual = The operator sets the interface parameters (IP address, network mask, gateway address) manually.
- Automatic = The interface parameters are automatically set through one of the following protocols.
  – Dynamic Host Configuration Protocol (DHCP)
  – Bootstrap Protocol (BOOTP)

In order to obtain the interface parameters automatically via DHCP or BOOTP, the device must be connected to a DHCP or BOOTP server.

► Enable the DHCP/BOOTP server on the fieldbus controller.

► Connect the EtherNet/IP interface (X6/X7) to a DHCP/BOOTP server.

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

1 Select the menu page

► 

► Select [EtherNet/IP] tab.

2 Display the current settings

> The parameters below show the active settings:

Parameter	Description	Possible values	
[IP mode]	active configuration method	[Static]	The operator sets the IP parameters manually.
		[DHCP]	The interface receives the IP parameters from a DHCP server.
		[BOOTP]	The interface receives the IP parameters from a BOOTP server.
[IP address]	IP address of the interface	e.g. 192.168.10.100	
[Subnet mask]	Network 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	

► Select one of the following actions:
  – Configure the IP parameters manually: continue with → step 3
  – Configure the IP parameters automatically: continue with → step 4

3 Configure the IP parameters manually

► From the list [IP mode], select the value Static.

► Set the following parameters as required:
  – [IP address]
  – [Subnet mask]
  – [Gateway address]

► Press [Accept] to save the changes.

► Continue with → step 5

4 Configure the IP parameters automatically

► From the list [IP mode], select either DHCP or BOOTP.

► Press [Accept] to save the changes.

> The device receives the IP parameters from a DHCP or BOOTP server.

The automatic configuration of the interface can take up to 10 seconds.

5 Display the current settings

> The parameters (→ step 2) show the active IP settings of the EtherNet/IP interface.

7.3.6 Quick setup: Set the configuration mode

41774

The device can be configured in two 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.

More information:→ **Configuration mode** (→ S. 233)

1 Select the menu page

► 

► Select [EtherNet/IP] tab.

2 Set the configuration mode

► Set the following parameters as required:

Parameter	Description	Possible values	
[Configuration mode]	Active configuration mode of the device	[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.

3 Save the changes

► Press [Accept selection] to save the changes.

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

7.3.7 Quick setup: Set the Configuration interface 1

41781

The device provides the following options for configuration of the Ethernet Configuration interface 1:

- Manual = The operator sets the interface parameters (IP address, network mask, gateway address) manually.
- Automatic = The interface parameters are set automatically. The operator can choose between these protocols:
  – Dynamic Host Configuration Protocol (DHCP)
  – Zero Configuration Networking (Zeroconf)

The device must be connected to a DHCP server to automatically receive the interface parameters via DHCP.

► Connect the configuration interface (X3) to a DHCP server.

To configure the IP parameters of the configuration interface:

1 Select the menu page

► 

► Select [Config. interface X3] tab.

2 Show the active settings

> The parameters below show the active settings:

Parameter	Description	Possible values	
[Optain IP address autom.]	Active method for the configuration of the interface parameters	☐	Manual assignment of the interface parameters through the operator
		☑	Automatic assignment of the interface parameters
[IP status]	Configuration protocol used	[Static]	The operator sets the IP parameters manually.
		[DHCP]	The IP parameters are set by a DHCP server.
		[Zeroconfig]	The IP parameters are set automatically with the Zeroconf protocol.
[IP address]	IP address of the interface	e.g. `192.168.0.100`	
[Subnet mask]	Network 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`	

► Take one of the following actions:
  – Configure the IP parameters manually: continue with → step 3
  – Configure the IP parameters automatically: continue with → step 4

3 Configure the IP parameters manually

► Uncheck [Optain IP address autom].

► Set the following parameters as required:
  – [IP address]
  – [Subnet mask]
  – [Gateway address]

► Press [Accept] to save the changes.

► Continue with → step 5

4 Configure the IP parameters automatically

► Check [Optain IP address autom].

► Press [Accept] to save the changes.

> The device tries to obtain IP parameters from a DHCP server.
> If the IP parameter configuration via DHCP server fails, the device will generate the IP parameters by means of the Zeroconf protocol.

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

5 Show the current settings

> The parameters (→ step 2) show the active IP settings of the Configuration interface 1.

7.3.8 Quick setup: Set the configuration interface 2

42159

Configuration interface 2 (X8) has the same configuration options as configuration interface 1 (X3).

→ **Quick setup: Set the Configuration interface 1** (→ S. 74)

To configure configuration interface 2 (X8):

1 Select menu page

► 

► Select tab [Config interface X8].

2 Configure interface

► Set the interface as required.

7.3.9 Quick setup: Address the AS-i slaves connected to AS-i Master 1

41764

To change the address of an AS-i slave connected to AS-i Master 1:

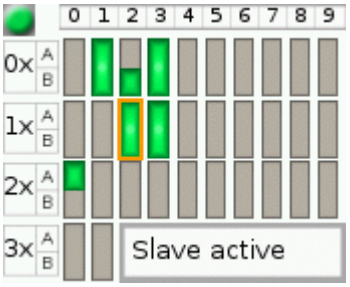
1 Select the menu page

► 

► Select [Addressing AS-i 1] tab.

2 Select the AS-i slave

> The page provides an overview of the current addressing and status of the AS-i slaves on the selected AS-i master (→ figure)
Notes on colour codes: → **Overview of slave states** (→ S. 55)

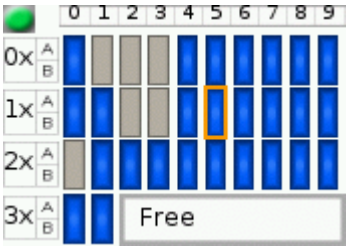


► Select the AS-i slave of which want to change the address.

► Use [Select] to activate the selected AS-i slave.

3 Select a new AS-i address

> The page provides an overview of the free AS-i addresses (→ figure)
Notes on colour codes: → **Overview of free slave addresses** (→ S. 57)



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

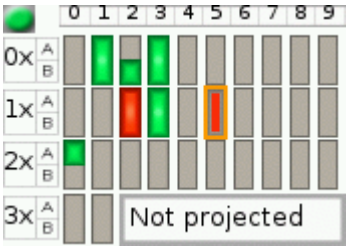
► Assign the selected address with [Select].

> The confirmation prompt appears.

► Confirm the message with [OK].

> The AS-i slave has new address.

> The page provides an overview of the current addressing and configuration errors (→ figure)



4 Address additional AS-i slaves (optional)

► Repeat steps 2 and 3 to address additional AS-i slaves.

After the address change, the present configuration no longer corresponds to the stored configuration.

> The slave status indicates a configuration error.

To eliminate the configuration error:

► Start a projection adaptation (→ **Quick setup: Project AS-i networks** (→ S. 69)).

7.3.10 Quick setup: Address the AS-i slaves connected to AS-i Master 2

41763

The procedure for addressing the AS-i slaves connected to AS-i Master 2 is the same as for addressing the AS-i slaves connected to AS-i Master 1 (→ **Quick setup: Address the AS-i slaves connected to AS-i Master 1** (→ S. 76)).

To change the address of an AS-i slave connected to AS-i Master 2

1 Select the menu page

► 

► Select [Addressing AS-i 2] tab.

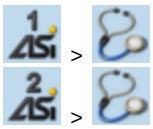
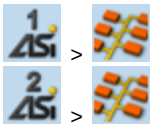
2 Change the AS-i slave address

► Address AS-i slaves.

7.4 AS-i 1 / AS-i 2

42244

The [AS-i 1] and [AS-i 2] menus provide access to configuration and diagnosis functions of the AS-i network components.

Navigation path	Content
	AS-i master settings → **Set the operating mode of the AS-i master** (→ S. 79) → **Carry out a projection adaptation** (→ S. 80) → **Set the monitoring functions of the AS-i master** (→ S. 80)
	AS-i network diagnosis → **Display and reset the error counters** (→ S. 81) → **Display the error statistics of the AS-i slaves** (→ S. 81) → **Display the voltage supply analysis** (→ S. 82) → **Display and reset performance data** (→ S. 82)
	AS-i slave settings → **Display the input/output data of the AS-i slave** (→ S. 83) → **Change the digital output values manually** (→ S. 85) → **Change the analogue output values manually** (→ S. 85) → **Show AS-i slave information** (→ S. 86) → **Change an AS-i slave address** (→ S. 87) → **Change an AS-i slave parameter output** (→ S. 87) → **Change the Extended ID1 of the AS-i slave** (→ S. 88)

7.4.1 AS-i 1 / AS-i 2: Master setup

41537

The menu item [Master setup] provides access to the configuration options of the selected AS-i master.

Set the operating mode of the AS-i master

41640

More information on the operating modes of the AS-i master: → **Operating modes of the AS-i master** (→ S. 167)

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

1 Select the menu page

►  >  or  > 

2 Set the operating mode of AS-i master 1 and the behaviour of the connected AS-i slaves

> Set the following parameters as required:

Parameter	Description	Possible values	
[Projection mode]	Active operating mode of the AS-i master	☐	Projection mode inactive: AS-i network operates in protected mode (normal mode)
		☑	Projection mode active: AS-i network can be projected.
[No slave reset]	Behaviour of the AS-i slaves when changing the operating mode	☐	Slave is reset when changing the operating mode: When changing the operating mode, the AS-i slaves will be reset for a short moment (reset or offline phase).
		☑	Slave is not reset when changing the operating mode: When changing the operating mode, the AS-i slaves continue to operate without interruption.

> Selected values are applied.

Carry out a projection adaptation

41535

During projection adaptation, the AS-i master stores the configuration of all AS-i slaves currently found on the AS-i network in its memory and assigns a valid AS-i address to each of them.

The projection adaptation can only be carried out in projection mode:

- ► [Projection mode] must be checked (→**Set the operating mode of the AS-i master** (→ S. 79)).
- ► During a Projection process all output parameter of not connected AS- slaves in the AS-i master will be reset to their default values (single / A slaves = 0xF, B slaves = 0x7).

To launch the projection adaptation:

1 Select the menu page

►  >  or  > 

2 Carry out a projection adaptation

► Press [Start projection process] button.

> The projection adaptation is carried out.

If successful:

> All slaves on the AS-i master are projected.

If not successful:

> The Online Support Center displays an error message.

► Remove the error and repeat the process.

Set the monitoring functions of the AS-i master

41641

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

1 Select the menu page

►  >  or  > 

2 Set the monitoring functions of the AS-i master

► Set the following parameters as required:

Parameter	Description	Possible values	
[Automatic addressing]	Behaviour if AS-i slave is replaced (→ **Protected mode** (→ S. 167))	☐	Automatic addressing disabled
		☑	Automatic addressing enabled
[Earth fault detection]	Detection of earth faults	☐	Do not detect earth faults in the AS-i system
		☑	Detect earth faults in the AS-i system
[Double address detection]	Double address detection	☐	Do not detect AS-i slaves with the same address
		☑	Detect AS-i slaves with the same address

> Selected values are applied.

7.4.2 AS-i 1 / AS-i 2: Diagnosis

41538

The [Diagnosis] menu provides access to the diagnostic data of the selected AS-i network.

Display and reset the error counters

41445

To display and reset the AS-i error counters:

1 Select the menu page

►  >  or  > 

► Select [Error counters] tab.

2 Display the error counters

> Page shows the following information:

Name	Description
[Telegrams]	Number of message errors that occurred
[Configuration]	Number of configuration errors that occurred
[Voltage < 22.5V]	Number of voltage errors < 22.5 V
[Voltage < 19.0V]	Number of voltage errors < 19.0 V
[Earth fault]	Number of detected earth faults

3 Optional: reset the error counters

► Press [Reset] button.

> All error counters are reset to 0.

Display the error statistics of the AS-i slaves

41437

To display the error messages of the AS-i slaves on the selected AS-i master:

1 Select the menu page

►  >  or  > 

► Select [Errors / slave] tab.

2 Display the error statistics of the AS-i slaves

> Page shows the following information:

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

► Use [▲] / [▼] to scroll through the table.

Display the voltage supply analysis

41502

To display the voltage supply analysis:

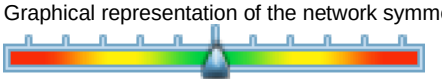
1 Select the menu page

►  >  or  > 

► Select [Power supply] tab.

2 Display the voltage supply analysis

> Page shows the following information:

Name	Description	Possible values	
[Power supply]	Method of voltage supply	[Aux]	Voltage is supplied separately by the 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.
[AS-i voltage]	AS-i voltage measured (in [V])	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 representation of the network symmetry: 	

Display and reset performance data

41460

To display the performance statistics of the selected AS-i master:

1 Select the menu page

►  >  or  > 

► Select [Performance] tab.

2 Display performance data

> Page shows the following information:

Designation	Description
[Activated slaves]	Number of active AS-i slaves on the AS-i network
[AS-i cycle time [ms]]	AS-i cycle time (value in [ms])
▪ [minimum]	shortest cycle time
▪ [maximum]	longest cycle time
▪ [current]	current cycle time

3 Optional: reset the performance data

► Press [Reset] button.

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

7.4.3 AS-i 1 / AS-i 2: AS-i slaves

41539

The [AS-i Slaves] menu provides access to information and configuration options of the AS-i slaves.

The scope of configuration options shown ([Data] and [Setup] tab) varies according to the status of the selected AS-i slaves.

Display the input/output data of the AS-i slave

41438

To display the input/output data or the parameter output of the selected AS-i slaves:

1 Select the menu page

►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

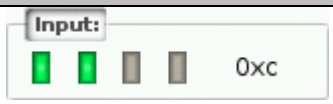
► Select [Data] tab.

2 Display input/output data

> Depending on the profile of the selected AS-i slave, the page displays the following data:

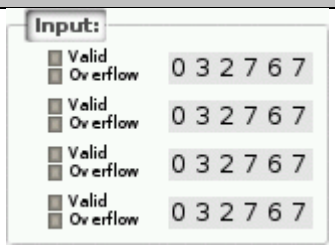
Digital input

41464

Name	Description	Example / Possible values	
[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)

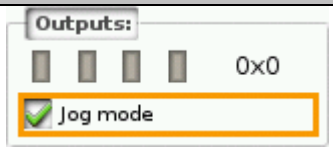
Analogue input

41528

Name	Description	Example / Possible values	
[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

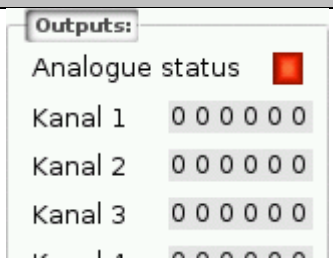
Digital output

41465

Designation	Description	Example / Possible values
[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

41521

Name	Description	Example / Possible values
[Outputs]	Current values of the analogue output channels and information about their status	
▪ [Analogue status]	Current status of the analogue outputs	Not O.K.
		O.K.
▪ [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`

Parameter input

41787

Name	Description	Example / Possible values
[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)

Change the digital output values manually

41602

WARNING!

The manual change of digital output values may cause undesired consequences to the control process.

> Risk of personal injury!

> Risk of material damage to the machine/plant!

The operator is responsible for any consequences caused by the manual change of the digital ouput values!

- ► Secure the concerned area.
- ► Only trained personnel is allowed to set outputs manually.

If the jog mode is deactivated: After changing the slave outputs the output values remain on the changed values.

- ► Change the inverted outputs again immediately to the original values after the end of the test!

To change the digital output values of an AS-i slave manually:

1 Enable manual access to the outputs

► Set [Output access] parameter = Manual (→**Set output access** (→ S. 97)).

2 Select the menu page

►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

► Select [Data] tab.

3 Set the digital output values manually

> The group [Outputs] displays the current value of the digital output (binary and hexadecimal representation).

► Set [Jog mode] as required. (→**Digital output** (→ S. 83))

► Change the desired output value bit by bit.

> Selected value is applied.

Change the analogue output values manually

41598

To change the analogue output values of an AS-i slave manually:

1 Enable manual access to the outputs

► Set [Output access] parameter = Manual (→**Set output access** (→ S. 97)).

2 Select the menu page

►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

► Select [Data] tab.

3 Set the analogue output values manually

> [Outputs] group shows the current value of the analogue output.

► Change the value of the requested channel one digit at a time (→**Numerical field** (→ S. 60)).

> Selected value is applied.

► Optional: repeat step 3 to change further channels.

Show AS-i slave information

41643

To display information about an AS-i slave:

1 Select the menu page

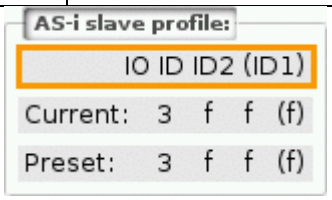
►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

► Select [Information] tab.

2 Display information about the AS-i slave

> Page shows the following information:

Name	Description	Possible values	
[AS-i slave addess]	Current address of the AS-i slave	e.g. 13B	
[Slave status]	Current status of the AS-i slave		AS-i slave is active
			AS-i slave is missing
			Not projected
			Double address error
			Periphery fault
[AS-i slave profile]	Current (= Current) and expected (= Preset) slave profile (IO, ID, ID2, ID1) in hexadecimal format		

► Use [▲] / [▼] for page navigation.

Change an AS-i slave address

41534

To change the address of an AS-i slave:

1 Select the menu page

►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

► Select [Setup] tab.

2 Change the address of the AS-i slave

► Press the [Change slave address] button.

> The page displays an overview of the free AS-i addresses (→ **Overview of free slave addresses** (→ S. 57)).

► Select the address to be assigned to the AS-i slave and confirm with [Select] function key.

> Security prompt appears.

► Press [OK] to confirm the security prompt.

> The AS-i slave has a new address.

> The page displays an overview of the AS-i slave states (→ **Overview of slave states** (→ S. 55)).

3 Optional: change further AS-i addresses.

► Repeat step 2 to change further AS-i slave addresses.

After the address change, the present configuration (LDS) no longer corresponds to the stored configuration (LPS).

> The OSC displays a configuration error.

To remove the configuration error:

► start a projection adaptation (→ **Carry out a projection adaptation** (→ S. 80)).

Change an AS-i slave parameter output

41599

To change the parameter output of an AS-i slave:

1 Enable manual access to the outputs

► Set [Output access] parameter = Manual (→**Set output access** (→ S. 97))

2 Select the menu page

►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

► Select [Setup] tab.

3 Change the parameter output of the AS-i slave

> The [Parameter output] group displays the current assignment of the parameter output (binary and hexadecimal representation).

► Adjust the desired output value one position at a time.

> Selected value is applied.

Change the Extended ID1 of the AS-i slave

41601

To set the Extended ID1 of an AS-i slave:

1 Select the menu page

►  >  or  > 

► Select an AS-i slave (→**Slave selector** (→ S. 54)).

► Select [Setup] tab.

2 Set the Extended ID1

> The [ID1] list displays the current Extended ID1 value (hexadecimal format).

► Select the desired value for Extended ID1 from the [ID1] list.

> Selected value is applied.

After changing the Extended ID1, the existing configuration no longer corresponds to the stored configuration:

> An error message appears (configuration error).

► Start a projection adaptation (→**Carry out a projection adaptation** (→ S. 80)).

7.5 System

42269

The [System] menu provides access to functions that allow configuration of the system and the device-internal Standard plc.

Navigation path	Functions
	Device-internal Standard plc →**System: Programmable Logic Controller (PLC)** (→ S. 90)
	System information →**Show version information** (→ S. 96)
	System settings →**Set output access** (→ S. 97) →**Gerätezyklus einstellen** →**Switch the menu language** (→ S. 98) →**Set the behaviour of the display** (→ S. 99) →**Set the system time manually** (→ S. 101) →**Synchronise the system time with an NTP server** (→ S. 102) →**Adopt the system time of the PC** (→ S. 103) →**Export device configuration** (→ S. 105) →**Import device configuration** (→ S. 106) →**Store diagnostic protocol** (→ S. 107)
	System diagnostics →**Display diagnostic data** (→ S. 108)

7.5.1 System: Programmable Logic Controller (PLC)

41671

The [PLC] menu provides access to the device-internal Standard plc.

Navigation path	Functions
	Standard plc information: → **Display the status of the CODESYS Standard plc** (→ S. 91) → **Display information about Standard plc projects** (→ S. 91)
	Standard plc settings → **Control a single Standard plc application** (→ S. 92) → **Control Standard plc applications** (→ S. 93) → **Show target visualisation** (→ S. 94)
	Standard plc diagnosis → **Show memory used** (→ S. 95)

For information about the programming of the device-internal Standard plc with CODESYS, please refer to the programming manual:
→ www.ifm.com > product page > [Downloads]

PLC: Information

41796

The [Information] menu item provides access to the Standard plc status and project information.

Display the status of the CODESYS Standard plc

41467

To display information about the current status of the device-internal Standard plc:

1 Select the menu page

►  >  > 

► Select [Status] tab.

2 Display the status of the CODESYS Standard plc

> Page shows the following information:

Name	Description	Possible values	
Status LED	Status of the device-internal Standard plc		The CODESYS Standard plc is disabled.
			The CODESYS Standard plc is enabled.
[Version]	CODESYS version	e.g. `3.5.3.60`	
[Node name]	Name of device in CODESYS project	e.g. `ifm_SmartPLC_SafeLine`	

Display information about Standard plc projects

41440

To obtain information about the CODESYS project stored on the device-internal Standard plc:

1 Select the menu page

►  >  > 

► Select [Project] tab.

2 Display information about Standard plc projects

> Page shows the following information:

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

PLC: Settings

41801

The [Settings] menu item provides access to the Standard plc applications (apps) on the device.

Control a single Standard plc application

41576

[App x/y]
– x ... number of the app displayed
– y ... total number of apps stored

Status and name of the application
= application has been stopped
= application has been started

Information concerning the application
– date and time of creation
– author
– version of application
– size

To control a single Standard plc application stored on the device:

1 Select the menu page

►  >  > 

► Select [Applications] tab.

2 Select an application

► Use [▼] to select the message field.

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

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

► Perform one of the following actions:
– Launch a single Standard plc application: continue with → step 3
– Stop a single Standard plc application: continue with → step 4

3 Launch a single PLC application

► Press [Start] to launch the selected Standard plc application.

> The confirmation prompt appears.

► Press [OK] to confirm the prompt.

> The Standard plc application is started.

► Continue with → step 5

4 Stop a single Standard plc application

► Press [Stop] to stop the selected application.

> The confirmation prompt appears.

► Press [OK] to confirm the prompt.

> The application is stopped.

5 Display information about the Standard plc application

> The status display of the Standard plc application is updated

Control Standard plc applications

41577

To control all Standard plc applications stored on the device:

1 Select the menu page

►  >  > 

► Select [All applications] tab.

2 Display status information about the Standard plc applications

> Page shows the following information:

Designation	Meaning
[Total]	Number of applications stored on the device
[Started]	Number of applications running

► Perform one of the following actions:
– Launch all Standard plc applications: continue with → step 3
– Stop all Standard plc applications: continue with → step 4
– Reset all Standard plc applications: continue with → step 5

3 Launch all Standard plc applications

► Press [Starten] button.

> The confirmation prompt appears.

► Press [OK] to confirm the prompt.

> All Standard plc applications are started.

► Continue with → step 6

4 Stop all Standard plc applications

► Press [Stop] button.

> The confirmation prompt appears

► Press [OK] to confirm the prompt.

> All Standard plc applications are stopped.

► Continue with → step 6

5 Reset all Standard plc applications

► Press [Reset] button.

> The confirmation prompt appears.

► Press [OK] to confirm the prompt.

> All Standard plc applications are reset and stopped.

6 Display the status of the Standard plc applications

> The page shows updated information about the stored Standard plc applications.

> The status of the [Start], [Stop] and [Reset] buttons is updated.

Show target visualisation

41662

Using the CODESYS programming system, the user can optionally program a target visualisation to create an application-specific user interface for the display of AC422S. The target visualisation is loaded onto the device together with the CODESYS project, but it must be activated manually.

If no valid target visualisation is stored on the device, a green screen appears after activating the [Activate Target-Visu] button

To exit the target visualisation and return to the menu page:

► Press [◀] and [▶] simultaneously.

If the device does not react when entering [◀] + [▶], the key combination is deactivated.

► Activate the key combination using the system command "Show target visualisation" (→ Device Manual Supplement, **Command 0x0110 – Display target visualisation**)!

To activate the target visualisation:

1 Select menu page

►  >  > 

► Select the [Activate TargetVisu] tab.

2 Start the target visualisation

► Press [Activate Target-Visu] button.

> The confirmation message appears.

► Press [OK] button to confirm the message.

> The display shows the target visualisation.

PLC: Diagnosis

41797

The [Diagnosis] menu item provides access to diagnostic data of the device-internal Standard plc.

Show memory used

41663

To display information about the memory capacity currently used:

1 Select the menu page

►  >  > 

► Select [Memory] tab.

2 Show memory used

> Page shows the following information:

Name	Description
[CODESYS]	Memory capacity occupied by CODESYS data (in Kbytes)
[free]	Free memory (in Kbytes)

The current usage of memory space is read out once when calling up the menu page. These values are not refreshed while the menu page is displayed. Any changes regarding the memory capacity (e.g. through download of a new CODESYS project) will therefore not be reflected in the displayed values.

To update the displayed values:

► Quit the [Diagnosis] menu page.

► Access the [Diagnosis] menu page again.

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

7.5.2 System: Information

41672

The [Information] menu item provides access to the version information about the system components.

Show version information

41661

To display information about the hardware and software components of the device:

1 Select the menu page

►  > 

► Select [Version] tab.

2 Show version information

> Page shows the following information:

Name	Description	Possible values
[Modell]	Article number of the device	e.g. AC422S
[SN]	Serial number of the device	e.g. 000000113034
[Build]	Version number of the installed firmware	e.g. 4.3.2
[HW version]	Version number of the device main board	e.g. AA

7.5.3 System: Setup

41670

The [Setup] menu item provides access to the configuration options of the system.

Set output access

42253

To set the control instance for the outputs of the AS-i slaves:

1 Select the menu page

►  > 

► Select [System settings] tab.

2 Set the control instance for the outputs of the AS-i slaves

► Select the required value from the [Output access] list:

Parameter	Description	Possible values	
[Output access]	Control instance for the outputs of the AS-i slaves	[Gateway]	A higher-level PLC controls the outputs of the AS-i slaves.
		[Manual]	The operator controls the outputs of the AS-i slaves via the graphical user interface.
		[PLC]	The device-internal Standard plc controls the outputs of the AS-i slaves.

3 Save the changes

► Press [Accept selection] button to save the changes.

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

The outputs of the safe AS-i slaves are always controlled by the failsafe PLC of the AC422S!

Switch the menu language

41701

To select the language of the GUI texts:

1 Select the menu page

►  > 

► Select [System settings] tab.

2 Select the menu language

> The [Language] list shows the active language in which the GUI texts are displayed.

► Set the following parameters as required:

Parameter	Description	Possible values	
[Language]	Language in which the GUI texts are displayed	[Deutsch]	German
		[English]	English
		[Français]	French
		[Español]	Spanish
		[Italiano]	Italian
		[Português]	Portuguese

3 Save the changes

► Press [Accept selection] button.

> GUI elements are displayed in the requested language.

Optional: switch the language with a key combination

41731

The languages available on the device are saved in an ordered list:

- German
- English
- French
- Spanish
- Italian
- Portuguese

To switch the language with a key combination (from the active language):

► Press [▶] + [▲] to select the previous language in the list.

OR:

► Press [▶] + [▼] to select the next language in the list.

> GUI elements are displayed in the requested language.

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

Set the behaviour of the display

41651

To set the display behaviour (screen saver, behaviour in case of inactivity):

1 Select the menu page

►  > 

► Select [System settings] tab.

2 Set the behaviour of the display

► Set the following parameters as required:

Parameter	Description	Possible values	
[Screen saver]	Status of the screen saver	☐	Screen saver is inactive: Display remains permanently switched on.
		☑	Screen saver is active: Display is switched off after 10 minutes of inactivity.
[Return to start screen]	Display behaviour in case of extended period of user inactivity	☐	The currently selected menu page stays on the screen.
		☑	When the set time has elapsed, the display automatically changes to the start screen.

> Selected values are applied.

Set the system time

41412

The system time consists of date and time. The device provides the following options for setting the system time:

- Manual: The operator sets the date and time manually.
- Via NTP server: The device has an NTP client. The system time can be synchronised with an NTP server.
- Apply the system time of a PC/laptop: The device adopts the system time of a PC/laptop (only available via the web interface of the device)

To set the system time:

1 Select the menu page

►  > 

► Select [Clock] tab.

2 Display the current system time settings

> The following parameters display the current system time settings:

Parameter	Description	Possible values	
[Activate NTP]	Activate the NTP client of the device	☐	NTP client is deactivated: Device adopts the manually set values for [Time] and [Date].
		☑	NTP client is not active: From an NTP server, the device adopts the values for [Time] and [Date].
Status LED	Status of NTP client and synchronisation with NTP server	[NTP not active]	NTP client is deactivated: Applicable are the manually set values for [Time] and [Date].
		[NTP waiting]	NTP client is active: Device waits for messages from NTP server.
		[NTP successful]	NTP client is active: Time synchronisation with NTP server was successful.
[Time]	System time (format [hh:mm:ss])	e.g. 12:23:56	
[Date]	System date (format [yyyy-mm-dd])	e.g. 2014-04-23	

3 Select the configuration method

► Select one of the following:
- **Set the system time manually** (→ S. 101)
- **Synchronise the system time with an NTP server** (→ S. 102)
- **Adopt the system time of the PC** (→ S. 103)

Set the system time manually

41411

To set the system time manually:

1 Select the menu page

►  > 

► Select [Clock] tab.

2 Deactivate the NTP client of the device

► Uncheck [Activate NTP] (→**Set the system time** (→ S. 100)).

► Press [Accept selection] button.

> The changes become effective.

> NTP status: [NTP not active]

3 Set the system time manually

► Set [Time] and [Date] (Operating notes: →**Numerical field** (→ S. 60))

> Selected values are applied.

Seconds cannot be changed manually. When leaving the edit mode, the seconds will be automatically set to 0.

Synchronise the system time with an NTP server

41424

To synchronise the system time with an NTP server:

To synchronise the system time and date via Network Time Protocol (NTP), connect the configuration interface of the device to an NTP server directly or over a network.

1 Select the menu page

►  > 

► Select [Clock] tab.

2 Deactivate the NTP client

► Uncheck [Activate NTP] (→**Set the system time** (→ S. 100)).

> The IP address field and the [NTP-Offset] list can be edited.

3 Set the IP address of the NTP server and NTP offset

► Set the following parameters as required:

Parameter	Description	Possible values	
IP address field	IP address of the NTP server	e.g. `192.168.0.100`	
[NTP-Offset] (optional)	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 ... UTC +12:00]	Adopt time zones according to UTC division (displayed number of hours will be added/subtracted)

► Press [Accept selection] button.

► The device tries to synchronise the system time with the NTP server.

> NTP status: [`NTP waiting`]

In case of a successful synchronisation:

> NTP status: [`NTP successful`]

> [Time] and [Date] show the synchronised values.

In case of a failed synchronisation:

► Check the settings of the IP parameters of the configuration interface.

► Check the IP address of the NTP server.

► Repeat the process.

Adopt the system time of the PC

41563

To adopt the date and time of a PC/laptop:

This function is only available via the web-interface of the device (→**Remote access** (→ S. 62)).

Requirements:

- ► Connect the device with PC/laptop (→ **Configuration interfaces: Connection concepts** (→ S. 164)).
- ► Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ S. 62)).

This function can only be executed via the web interface of the device.

1 Select the menu page

- ►  > 
- ► Select the [Clock] tab.

2 Adopt the system time of the PC/laptop

- ► Uncheck [Activate NTP] (→**Set the system time** (→ S. 100)).
- ► In group [Apply Time and Date from the PC]: Press [OK] button.
- > The device applies the date and time of the PC/laptop.
- > [Date] and [Time] display the system time.

Clone device configuration

42209

This function is only available via the local user interface of the device.

The device makes it possible to create an image of the current device configuration, to transfer it to another device and activate it there (clone). The export/import of the configuration file is made via an SD card.

A device configuration consists of the following settings:

- System settings
- AS-i 1/AS-i 2 settings
- EtherNet/IP settings
- Standard plc applications (incl. PLC task configuration, variables and data)
- Fail-safe PLC application (incl. safety PLC task configuration, variables and data)

Cloning a device configuration is only possible if the following conditions are met.

- The firmware versions of the source device and the target device are compatible (compatible = versions are identical in the major release and minor release, e.g. V**3.2.** is compatible with V**3.2.**2, but: V**3.2.**1 is incompatible with V**3.3.**1).
- Source and target device have the same article number.

Export device configuration

41515

NOTICE!

During the export the control functions of the device are not available.

> Risk of undesired system behaviour

► Do not export the device configuration during operation of the plant!

NOTICE!

An interruption of the export can lead to a faulty export file.

> Risk of data loss

► Do not disconnect the device during the export.

► Only start the export after the boot application has been successfully generated.

► Do not remove the SD card from the device before the export is completed.

The SD card has to be formatted with the FAT32 file system. SD cards with other file systems are not recognised by the AC422S.

To allow identification of the saved configuration the export file is saved using the following name convention:

`ifm_DevID_xxxxxxxxxxxx_YYYYMMDDhhmmss.iconf`

- DevID — Article number of the device
- xxxxxxxxxxxx — Serial number of the device
- YYYYMMDDhhmmss — Timestamp of the saved file (YYYY = year, MM = month, DD = day, hh = hours, mm = minutes, ss = seconds)

To save the current device configuration on an SD card:

1 Select menu page

►  > 

> Select [Configuration] tab.

2 Save the device configuration

► Insert an empty, formatted SD card in the SD card slot of the device.

► Activate the [Export configuration] button.

> The device saves the current configuration on the SD card. The device stores the current configuration on the SD card.

Import device configuration

42301

NOTICE!

The import of a wrong or faulty boot project can lead to a non-safe state of the plant.

> Risk of undesired system behaviour

► Check all safety functions of the installation after the import of the device configuration.

42301

NOTICE!

During the import the control functions of the device are not available. During the import the device reboots.

> Risk of undesired system behaviour

► Do not import the device configuration during operation of the plant!

NOTICE!

An interruption of the import can lead to a faulty device configuration.

> Risk of data loss

► Do not disconnect the device during the import.

► Do not remove the SD card from the device before the import is completed.

To avoid that a wrong device configuration is restored:

► Check before the import if the required device configuration is saved on the SD card (identification of the saved device configuration: → **Export device configuration** (→ S. 105)).

► Save only the device configuration to be imported in the root directory of the SD card.

To transfer a stored device configuration to the device:

1 Reboot the device

► Insert the SD card containing the stored device configuration into the SD card slot.

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

> Device reboots.

2 Select menu page

►  > 

► Select [Configuration] tab.

3 Restore the device configuration

► Activate the [Import configuration] button.

> A warning appears.

► Confirm prompt with [OK].

> The device configuration is loaded and saved onto the device.

> The device reboots.

Store diagnostic protocol

41710

Using the diagnostic protocol, the user can archive the current device configuration or provide all relevant information to the service staff via the device settings.

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

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

This function is only available via the web-interface of the device (→**Remote access** (→ S. 62)).

Requirements:

► Connect the device with PC/laptop (→ **Configuration interfaces: Connection concepts** (→ S. 164)).

► Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ S. 62)).

1 Select menu page

►  > 

► Select the [Diagnostic protocol] tab.

2 Store diagnostic protocol

► Press the [Generate diagnostic protocol] button.

> AC422S generates diagnostic protocol.

> The progress bar indicates the status of the process.

> A dialogue window appears.

► Select file name and memory location and press [OK] to confirm.

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

7.5.4 System: Diagnosis

9053:

The [Diagnosis] menu item provides access to the diagnostic data of the device.

Display diagnostic data

41435

To display the diagnostic data of the device:

1 Select menu page

▶  > 

2 Display diagnostic data

> Page shows the following information:

Name	Description	Possible values	
[Betriebszeit [JJ-TTT SS:MM]]	Operating time of system and components	All times indicated in [JJ-TTT-SS-MM] format: YY = years DD = days hh = hours mm = minutes	
▪ [gesamt]	Operating time of device		
▪ [aktuell]	Operating time of device since last system start		
▪ [LCD]	Operating time of LCD		
▪ [SPS]	Operating time of controller		
[Temperatur]	Current device temperature	Indications in [°C] (→ Note)	
[Versorgt durch]	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.
		[Power Modul]	Voltage is supplied by data decoupling module.

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

- Normal range: < 79.9 °C
- Limit range: 80 °C ... 84.9 °C
- Critical range: >= 85 °C

If the system temperature reaches the critical zone, a warning is displayed in the → **Online Support Centre (OSC)** (→ S. 154). The warning only disappears when the device temperature is again in the normal range.

7.6 Interfaces

42920

The [Schnittstellen] menu provides access to the configuration options of the device's interfaces.

Navigation path	Functions
 > 	Configuration interface 1 →**Configure the IP parameters manually** (→ S. 111) →**Configure the IP parameters automatically** (→ S. 111) →**Show Ethernet information** (→ S. 112)
 > 	Configuration interface 2 →**Interfaces: Configuration interface 2** (→ S. 112)
 > 	EtherNet/IP interface →**Interfaces: EtherNet/IP interface** (→ S. 113)

7.6.1 Interfaces: Configuration interface 1

41481

The [Configuration interface 1] menu provides access to the settings of the Ethernet Configuration interface 1 (port X3).

Notes on IP settings

41751

The device provides the following options for configuration of the Ethernet Configuration interface 1:

- Manual = The operator sets the interface parameters (IP address, network mask, gateway address) manually.
- Automatic = The interface parameters are set automatically. The operator can choose between these protocols:
  – Dynamic Host Configuration Protocol (DHCP)
  – Zero Configuration Networking (Zeroconf)

To display the current configuration method and the active IP parameters of the configuration interface:

1 Select the menu page

►  > 

► Select [IP setup] tab.

2 Show the active settings

> The parameters below show the active settings:

Parameter	Meaning	Possible values	
[Optain IP address autom.]	Active method for the configuration of the interface parameters	☐	Manual assignment of interface parameters through operator
		☑	Automatic assignment of interface parameters
[IP status]	Configuration protocol used	[Static]	The operator sets the IP parameters manually.
		[DHCP]	The IP parameters are set by a DHCP server.
		[Zeroconf]	The IP parameters are set automatically with the Zeroconf protocol.
[IP address]	IP address of the interface	e.g. `192.168.0.100`	
[Subnet mask]	Network 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`	

► Select one of the following options:
– **Configure the IP parameters manually** (→ S. 111)
– **Configure the IP parameters automatically** (→ S. 111)

Configure the IP parameters manually

41608

To configure the IP parameters of the configuration interface manually:

1 Select the menu page

►  > 

► Select [IP setup] tab.

2 Deactivate the DHCP client

► Uncheck [Obtain IP address autom.] (→**Notes on IP settings** (→ S. 110)).

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

3 Configure the IP parameters

► Configure the following parameters as required (→**Notes on IP settings** (→ S. 110)):
– [IP address]
– [Subnet mask]
– [Gateway address]

4 Save the changes

► Press [Accept] button.

> Selected values are applied.

> [IP status] displays the active configuration method: [`Static`]

Configure the IP parameters automatically

41604

The device must be connected to a DHCP server to automatically receive the interface parameters via DHCP.

► Connect the configuration interface (X3) to a DHCP server.

To configure the IP parameters of the configuration interface automatically:

1 Select the menu page

►  > 

► Select [IP setup] tab.

2 Enable the NTP client

► Activate the [Obtain IP address autom.] (→**Notes on IP settings** (→ S. 110))

3 Save the changes

► Press [Accept] button.

> The device tries to obtain the IP parameters from a DHCP server.

> If the configuration of IP parameters via DHCP server fails, the device will generate the IP parameters with the Zeroconf protocol.

> [IP address], [Subnet mask] and [Gateway address] display the set IP parameters.

> Selected values are applied.

> [IP status] displays the active configuration method: DHCP or `Zeroconf`.

The automatic configuration of the IP parameters takes approx. 10 seconds.

Show Ethernet information

41660

To show Ethernet information regarding the configuration interface:

1 Select the menu page

►  > 

► Select [Ethernet information] tab.

2 Show Ethernet information

> Page shows the following information:

Name	Description
[MAC ID]	MAC identification number of the interface

7.6.2 Interfaces: Configuration interface 2

42105

The [Configuration interface 2] menu provides access to the settings of the Ethernet configuration interface 2 (port X2).

The Ethernet configuration interfaces 1 (X3) and 2 (X8) must not be participants of the same EtherNet subnet. Non-compliance may lead to connection problems under CODESYS.

► Configure IP settings so that interfaces X3 and X8 are part of different Ethernet subnets.

The menu functions correspond to the functions of the menu [Configuration interface 1].

For information regarding the menu functions: →**Interfaces: Configuration interface 1** (→ S. 110)

► For the selection of the menu page replace the symbol  by  !

7.6.3 Interfaces: EtherNet/IP interface

41485

The [EtherNet/IP] menu provides access to information, settings and diagnostic data of the EtherNet/IP interface.

Navigation path	Functions
 >  > 	EtherNet/IP information →**Show information** (→ S. 114) →**Display EtherNet/IP data** →**Display the module configuration** (→ S. 115) →**Download the device and I/O description** (→ S. 116)
 >  > 	EtherNet/IP settings →**Configure the IP parameters manually** (→ S. 118) →**Configure the IP parameters automatically** (→ S. 118) →**Set the configuration mode** (→ S. 119) →**Set the device-specific parameters** (→ S. 120) →**Set the EtherNet/IP module configuration** (→ S. 122)
 >  > 	EtherNet/IP diagnosis →**Display diagnostic data** (→ S. 124)

EtherNet/IP: Information

41553

The menu item [Information] provides access to information regarding the EtherNet/IP interface.

Show information

41659

To display information about the EtherNet/IP interface:

1 Select the menu page

►  >  > 

► Select [Information] tab.

2 Show information about the EtherNet/IP interface

> Page shows the following information:

Designation	Description
[Manufacturer ID]	Displays the manufacturer ID
[Unit type]	Displays the device type
[Product code]	Displays the product code
[Revicion no.]	Displays the revision number
[SN]	Displays the serial number
[Product name]	Displays the product name

Display EtherNet/IP data

41459

To display the EtherNet/IP data:

1 Select the menu page

►  >  > 

► Select [Data] tab.

2 Display EtherNet/IP data

> Page shows the following information:

Designation	Meaning	Possible values	
[MAC-ID]	MAC ID of the EtherNet/IP interface	e.g. `00:02:01:01:27:CF`	
[RPI Zeit]	RPI time in milliseconds [ms] (RPI = Requested Packet Interval)		
[Analog. channels/I-slave]	Number of analogue channels per input slave	→ **Set the device-specific parameters** (→ S. 120)	
[Analog. channels/O-slave]	Number of analogue channels per output slave	→ **Set the device-specific parameters** (→ S. 120)	
[Failsafe state]	Behaviour of the AS-i outputs in case of an interrupted EtherNet/IP connection	→ **Set the device-specific parameters** (→ S. 120)	
[Parameter download]	The AS-i slave parameters are transferred when a EtherNet/IP connection is established. Parameter can only be configured via the projection software!	☐	Parameters are not downloaded, i.e. the AS-i slaves are activated using the parameters that are set in the device.
		☑	Each time a 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 The set parameter value applies to all attached tables.	→ **Set the device-specific parameters** (→ S. 120)	

Display the module configuration

41436

To display the current module configuration:

1 Select the menu page

►  >  >  .

► Select [Module configuration] tab.

2 Display the module configuration

> The page shows the active configuration of the EtherNet/IP slots (→ **Overview: EtherNet/IP modules** (→ S. 201)).

Download the device and I/O description

41500

This function is only available via the web-interface of the device (→**Remote access** (→ S. 62)).

Requirements:

- ► Connect the device with PC/laptop (→ **Configuration interfaces: Connection concepts** (→ S. 164)).
- ► Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ S. 62)).

1 Select the menu page

- ►  >  > 
- ► Select [File download] tab.
- > The [File download] menu screen appears.

2 Download the EDS file and the description of the inputs and outputs.

- ► Click the link [Download EDS-Datei] to download the device description.
- ► Click the [Download I/O Description file] button.
- > The web server creates a description file of the inputs and outputs.
- ► Save the created file.

EtherNet/IP: Setup

41552

The [Setup] menu item provides access to the configuration options of the EtherNet/IP interface.

Notes on IP settings

41752

The device provides the following options for configuration of the EtherNet/IP interface:

- Manual = The operator sets the interface parameters (IP address, network mask, gateway address) manually.
- Automatic = The interface parameters are automatically set through one of the following protocols.
  - Dynamic Host Configuration Protocol (DHCP)
  - Bootstrap Protocol (BOOTP)

To display the current configuration method for IP parameters of the EtherNet/IP interface:

1 Select the menu page

►  >  > 

► Select [Fieldbus] tab.

2 Display the current configuration method for IP parameters

> The [IP mode] list shows the active configuration method:

- [Static] = The operator sets the IP parameters manually.
- [DHCP] = The device receives the IP parameters from a DHCP server.
- [BOOTP] = The device receives the IP parameters from a BOOTP server.

3 Display the current IP parameters of the EtherNet/IP interface

> The following parameters show the current IP settings of the EtherNet/IP interface:

Designation	Description
[IP address]	IP address of the configuration interface
[Subnet mask]	Subnet mask of the network segment
[Gateway address]	IP address of the EtherNet gateway

Configure the IP parameters manually

41607

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

1 Select the menu page

►  >  > 

► Select [Fieldbus] tab.

2 Activate the manual configuration

► From the list [IP mode], select the value `Static` (→ **Notes on IP settings** (→ S. 117)).

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

3 Set the IP parameters of the EtherNet/IP interface

► Set the following parameters as required:
– [IP address]
– [Subnet mask]
– [Gateway address]

4 Save the changes

► Press [Accept] button.

> Selected values are applied.

Configure the IP parameters automatically

41603

In order to obtain the interface parameters automatically via DHCP or BOOTP, the device must be connected to a DHCP or BOOTP server.

► Connect the EtherNet/IP interfaces (X6/X7) to a DHCP/BOOTP server.

1 Select the menu page

►  >  > 

► Select [Fieldbus] tab.

2 Select the configuration method

► From the list [IP mode], select either DHCP or BOOTP.

3 Save the changes

► Press [Accept] button.

> The device receives the IP parameters from a DHCP or BOOTP server.

> Selected value is applied.

> [IP address], [Subnet mask] and [Gateway address] show the current values.

Set the configuration mode

41650

More information:→ **Configuration mode** (→ S. 233)

To set the configuration mode of the device:

1 Select the menu page

►  >  > 

► Select [Fieldbus] tab.

2 Select the configuration method for the EtherNet/IP parameters

> Set the following parameter as required:

Parameter	Description	Possible values	
[Configuration mode]	Active configuration mode of the device	[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.

3 Save the changes

> Press [Accept] button.

> Selected value is applied.

Set the device-specific parameters

41642

The parameters can only be changed if the configuration mode is set to `Independent` (→ **Set the configuration mode** (→ S. 119)).

To set the device-specific parameters: set the number of channels to be transmitted per analogue input slave:

1 Select the menu page

►  >  > 

► Select [Parameter] tab.

2 Set the number of analogue channels per input slave

► Set the following parameter as required:

Parameter	Description	Possible values	
[Analog. 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

3 Set the number of analogue channels per output slave

► Set the following parameter as required:

Parameter	Description	Possible values	
[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

4 Set the failsafe state

► Set the following parameter as required:

Parameter	Description	Possible values	
[Failsafe state]	Behaviour of the slave outputs in case of an interrupted EtherNet/IP connection	[Hold outputs]	The outputs hold the values which were present immediately before the connection was interrupted.
		[Output reset]	The outputs are reset to their initial values.

5 Set the byte order of a word

► Set the following parameter as required:

Parameter	Description	Possible values	
[Change byte order]	Byte order in a data word	☐	Byte order remains unchanged.
		☑	Byte order is inverted.

6 Save the changes

► Press [Accept] button.

> Selected values are applied.

Set the EtherNet/IP module configuration

41646

NOTICE!

For the transmission of cyclic process data between the device and the EtherNet/IP PLC, a limited number of data words is available for each direction of transmission:

- Input data (= modules 1, 3, 5, 7, 9, 10, 13, 14): 248 words
- Output data (= modules 2, 4, 6, 8, 11, 12, 15): 248 words

If the EtherNet/IP modules have been parameterised in such a way 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.

► Parameterise the EtherNet/IP modules in a way to ensure that the input and output data do not exceed the maximum number of words to be transmitted.

The EtherNet/IP modules can only be configured on the device if the configuration mode is set to `Independent` (→ **Set the configuration mode** (→ S. 119)).

To define which cyclic process data are to be transmitted in the EtherNet/IP slots:

1 Select the menu page

►  >  > 

► Select [Module configuration] tab.

2 Set the EtherNet/IP slots for the digital inputs and outputs of the AS-i slaves

> Set the following parameters as required:

Parameter	Description	Possible values
[EtherNet/IP: Slot 1]	Digital inputs of the S/A slaves connected to AS-i master 1	→ **Slot 1 – Digital input data single or A slaves, AS-i master 1** (→ S. 202)
[EtherNet/IP: Slot 2]	Digital outputs of the S/A slaves connected to AS-i master 1	→ **Slot 2 – Digital output data single or A slaves, AS-i master 1** (→ S. 202)
[EtherNet/IP: Slot 3]	Digital inputs of the S/A slaves connected to AS-i master 2 (only devices with 2 AS-i masters)	→ **Slot 3 – Digital input data single or A slaves, AS-i master 2** (→ S. 203)
[EtherNet/IP: Slot 4]	Digital outputs of the S/A slaves connected to AS-i master 2 (only devices with 2 AS-i masters)	→ **Slot 4 – Digital output data single or A slaves, AS-i master 2** (→ S. 203)
[EtherNet/IP: Slot 5]	Digital inputs of the B slaves connected to AS-i master 1	→ **Slot 5 – Digital input data B slaves, AS-i master 1** (→ S. 204)
[EtherNet/IP: Slot 6]	Digital outputs of the B slaves connected to AS-i master 1	→ **Slot 6 – Digital output data B slaves, AS-i master 1** (→ S. 204)
[EtherNet/IP: Slot 7]	Digital inputs of the B slaves connected to AS-i master 2 (only devices with 2 AS-i masters)	→ **Slot 7 – Digital input data B slaves, AS-i master 2** (→ S. 205)
[EtherNet/IP: Slot 8]	Digital outputs of the B slaves connected to AS-i master 2 (only devices with 2 AS-i masters)	→ **Slot 8 – Digital output data B slaves, AS-i master 2** (→ S. 205)

3 Set the EtherNet/IP slots for the analogue inputs and outputs of the AS-i slaves

► Set the following parameters as required:

Parameter	Description	Possible values
[EtherNet/IP: Slot 9]	Analogue inputs, area 1	→ **Slot 9 – Analogue input data** (→ S. 208)
[EtherNet/IP: Slot 10]	Analogue inputs, area 2	→ **Slot 10 – Analogue input data** (→ S. 209)
[EtherNet/IP: Slot 11]	Analogue outputs, area 1	→ **Slot 11 – Analogue output data** (→ S. 210)

[EtherNet/IP: Slot 12]	Analogue outputs, area 2	→ **Slot 12 – Analogue output data** (→ S. 211)

What data is transmitted in each word depends on the set values of the parameters [Analog. channels/I-Slave] and [Analog. channels/O-Slave].
→ **Set the device-specific parameters** (→ S. 120)

4 Configure the EtherNet/IP slot for diagnostic data

► Set the following parameters as required:

Parameter	Description	Possible values
[EtherNet/IP: Slot 13]	Diagnostic data transmitted to the fieldbus controller	→ **Slot 13 – Diagnostic data** (→ S. 216)

5 Set the EtherNet/IP slots for the data between the EtherNet/IP controller and the device-internal PLC

► Set the following parameters as required:

Parameter	Description	Possible values
[EtherNet/IP: Slot 14]	Scope of data transferred from the device-internal PLC to the EtherNet/IP controller.	→ **Slot 14 – Inputs from Standard plc** (→ S. 223)
[EtherNet/IP: Slot 15]	Scope of data transferred from the EtherNet/IP controller to the device-internal PLC.	→ **Slot 15 – Outputs to Standard plc** (→ S. 224)

6 Save the changes

► Press [Accept] button.

> Selected values are applied.

41554

The menu item [Diagnosis] provides access to the diagnostic data of the EtherNet/IP interface:

Display diagnostic data

41433

To display the diagnostic data of the EtherNet/IP interfaces:

1 Select the menu page

▶  >  > 

2 Display diagnostic data

> Page shows the following information:

Name	Description	Possible values	
[EtherNet/IP connection status]	Displays the connection status of the EtherNet/IP interfaces		
▪ [Status port X6]	Connection status port X6		No connection to fieldbus controller
			Connection to fieldbus controller established
▪ [Status port X7]	Connection status port X7		No connection to fieldbus controller
			Connection to fieldbus controller established

7.7 Safety

42265

The menu [Safety] provides access to the status and diagnostic information of the safety-relevant PLC of the device.

Navigation path	Functions
 > 	Status of the safe AS-i slaves to AS-i Master 1: →**Display the status of the safe AS-i slaves** (→ S. 126) →**Display switching states of the safe AS-i input slaves** (→ S. 128)
 > 	Status of the safe AS-i slaves to AS-i Master 2: →**Safety: Status of the fail-safe slaves at AS-i Master 2** (→ S. 130)
 > 	Local inputs/outputs: →**Display the switching states of the local inputs** (→ S. 131) →**Display the switching states of the local outputs** (→ S. 133)
 > 	Status of the fail-safe cross communication (FSoE) →**Display the status of the connection to FSoE slaves** (→ S. 135) →**Display the status of the fail-safe cross networking** (→ S. 135)
 > 	System: →**Display status information of the fail-safe PLC** (→ S. 136)

The elements of the menu [Safety] are exclusively used for diagnostic purposes. Programming and controlling of the safety-relevant functions of AC422S must only be made via the CODESYS development system (→ programming manual)

Observe the notes on the meaning of deviating menu symbols of the [Safety] menu.
→**Availability of the fail-safe PLC** (→ S. 157)

7.7.1 Safety: Status of the fail-safe slaves at AS-i Master 1

42248

The [Status of the fail-safe AS-i slaves] menu page provides access to diagnostic data and switching states of the safe AS-i input slaves on AS-i Master 1.

Display the status of the safe AS-i slaves

42235

The menu page shows status information about the safe AS-i input slaves on the selected AS-i master.

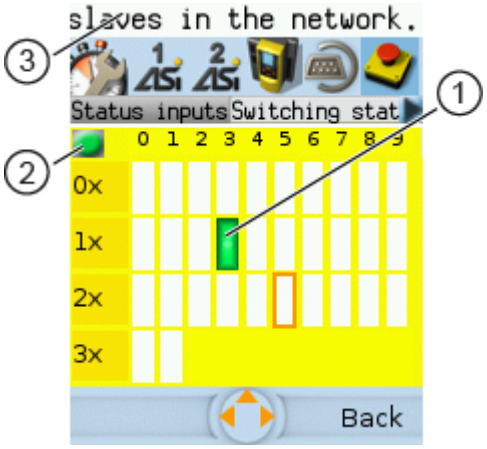
1 Select menu page

►  > 

► Select [Status inputs] tab.

2 Display the status of the safe AS-i slaves

> Menu page shows the slave selector of the safe AS-i input slaves.



Legend:

1. Address and status of the safe AS-i input slaves on the selected AS-i master → **Diagnostic data: Colour codes + symbols** (→ S. 127)
2. Current configuration status of the fail-safe PLC → **Configuration status: Colour codes + symbols** (→ S. 127)
3. Information about the marked slave

Virtual control slaves are not represented in this view.

Configuration status: Colour codes + symbols

42208

Symbol	Colour	Description
	yellow	No safe configuration available
	green	safe configuration available

Diagnostic data: Colour codes + symbols

42229

Symbol	Colour	Description
	white	No safe AS-i input slave present
	grey	Safe AS-i input slaves present but not part of the safe configuration
	green	Safe AS-i input slave operates correctly; no test necessary
	yellow	Test requested
	red	Error - no 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

Logical devices are elements of the CODESYS programming system. They are used for the logical preprocessing of input signals.
For detailed information: → Programming manual fail-safe SmartPLC AC4S

For detailed information regarding the error causes: → **Online Support Centre (OSC)** (→ S. 154)

Optional: change settings of the safe AS-i input slaves

42322

To change the settings of the selected safe AS-i input slaves:

► Use the arrow keys to mark the safe AS-i input slave.

► Use [Select] to activate the marked AS-i slave.

> Setting options of the selected safe AS-i input slave are displayed.

► Change the settings as requested.

For information about the settings of the safe AS-i slaves: →**AS-i 1 / AS-i 2: AS-i slaves** (→ S. 83)

► Use [Back] to return to the display of the diagnostic data.

Display switching states of the safe AS-i input slaves

42228

The menu page shows switching states of the safe AS-i slaves on the selected AS-i master.

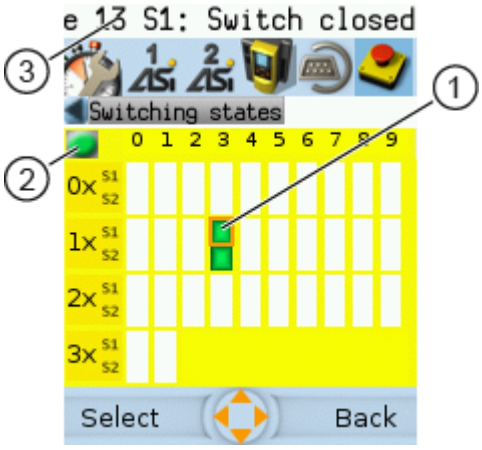
1 Select menu page

►  > 

► Select [Switching states] tab.

2 Select safe AS-i slave.

> Page shows slave selector with the switching states of the safe AS-i input slaves:



Legend:

1. Switching states S1/S2 of the safe AS-i input slaves (evaluation of the code half-sequences)
   → **Switching states: Colour codes + symbols** (→ S. 129)
   → **Meaning of the colour combinations** (→ S. 129)
2. Current configuration status of the fail-safe PLC
   → **Configuration status: Colour codes + symbols** (→ S. 127)
3. Information about the marked switching states

Configuration status: Colour codes + symbols

42208

Symbol	Colour	Description
	yellow	No safe configuration available
	green	safe configuration available

Switching states: Colour codes + symbols

42271

Symbol	Colour	Description
	white	No safe AS-i input slave of the safe configuration
	grey	– Switch open – code sequence already taught
	red	– Switch open – code sequence not yet taught
	green	– Switch closed – code sequence taught – transferred code sequence is identical with taught code sequence

Meaning of the colour combinations

42290

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, code half-sequence has not been taught yet – switch S2 is closed, 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

Optional: change settings of the safe AS-i input slaves

42322

To change the settings of the selected safe AS-i input slaves:

► Use the arrow keys to mark the safe AS-i input slave.

► Use [Select] to activate the marked AS-i slave.

> Setting options of the selected safe AS-i input slave are displayed.

► Change the settings as requested.

For information about the settings of the safe AS-i slaves: →**AS-i 1 / AS-i 2: AS-i slaves** (→ S. 83)

► Use [Back] to return to the display of the diagnostic data.

7.7.2 Safety: Status of the fail-safe slaves at AS-i Master 2

42255

The [Status of the fail-safe AS-i slaves] menu page provides access to diagnostic data and switching states of the safe AS-i input slaves on AS-i Master 2.

The menu functions correspond to the functions of the [AS-i 1 master settings] menu.
For information regarding the menu functions: →**Safety: Status of the fail-safe slaves at AS-i Master 1** (→ S. 126)

► For the selection of the menu page replace the symbol  by  .

7.7.3 Safety: Local IOs

42247

The [local IOs]menu page provides access to information about the switching states of the local inputs and outputs.

Display the switching states of the local inputs

42232

To display the switching states of the local inputs:

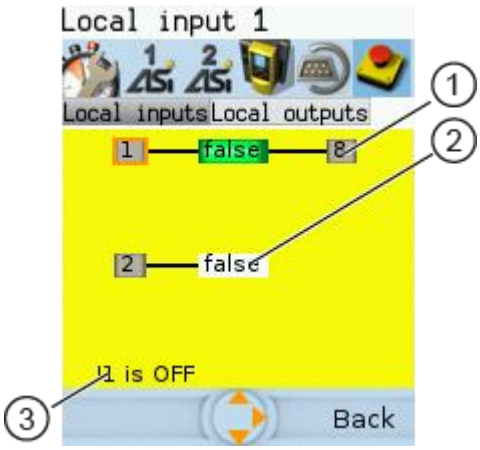
1 Select menu page

►  > 

► Select [Local inputs] tab.

2 Display switching states of the local inputs

> Menu page shows the following information:



Legend:

1. Switching states of the local inputs (→ **Switching states of the inputs: Colour codes + symbols** (→ S. 132))
2. Switching states of the logical devices of the local inputs (→ **Switching states of the logical devices: Colour codes + symbols** (→ S. 132))
3. Text field with status information of the marked input

The switching states of the local inputs are only displayed if the safe application is in the RUN mode.

The switching states may be displayed although no safe configuration is stored on the device (→ **Display status information of the fail-safe PLC** (→ S. 136)).
The displayed data is invalid in this case.

► Select the required symbol with [▼] / [▲].

Switching states of the inputs: Colour codes + symbols

42284

Symbol	Colour	Description
	grey	Local input is switched off
	green	Local input is switched on

Switching states of the logical devices: Colour codes + symbols

42283

Symbol	Colour	Description
	white	Local input is configured as a non-safe input.
	yellow	Testing of the logical devices requested
	green	Logical device for safe inputs does not operate correctly.
	red	Logical device for safe inputs is in the error state.

Designation	Description
[false]	Logical device provides the safe value FALSE.
[true]	Logical device provides the safe value TRUE.

Logical devices are elements of the CODESYS programming system. They are used for the logical preprocessing of input signals.

For detailed information: → Programming manual fail-safe SmartPLC AC4S

Display the switching states of the local outputs

42233

To display the switching states of the local outputs:

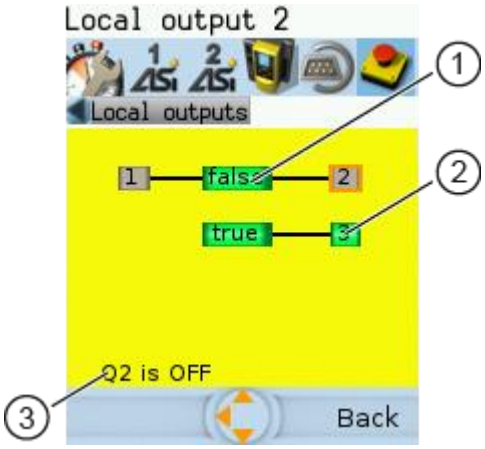
1 Select menu page

►  > 

► Select [Local outputs] tab.

2 Display the switching states of the local outputs

> Menu page shows the following information:



Legend:

1. Switching states of the logical devices of the local outputs (→ **Switching states of the logical devices: Colour codes + symbols** (→ S. 134))
2. Switching states of the local outputs (→ **Switching states of the local outputs: Colour codes + symbols** (→ S. 134))
3. Text field with status information of the marked output

The switching states of the local outputs are only displayed if the safe application is in the RUN mode.

The switching states may be displayed although no safe configuration is stored on the device (→ **Display status information of the fail-safe PLC** (→ S. 136)).
The displayed data is invalid in this case.

► Select the required symbol with [▼] / [▲].

Switching states of the local outputs: Colour codes + symbols

42282

Symbol	Colour	Description
	grey	Local output is switched off
	green	Local output is switched on

Switching states of the logical devices: Colour codes + symbols

42270

Symbol	Colour	Description
	white	Local output is configured as non-safe output
	green	Logical device for safe input operates correctly
	red	Logical device for safe output is in the error state

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

Logical devices are elements of the CODESYS programming system. They are used for the logical preprocessing of input signals.

For detailed information: → Programming manual fail-safe SmartPLC AC4S

7.7.4 Safety: FSoE

42249

The menu page [FSoE] provides access to the information about the status of the fail-safe communication via EtherCAT (FSoE).

Display the status of the connection to FSoE slaves

42231

To display the status of the connection to an FSoE slave:

1 Select menu page

►  > 

► Select tab [FSoE-Slaves].

2 Display the status of the connection to an FSoE slave

> Menu page shows list with the following information (per FSoE connection):

Name	Description	Possible values	
Status LED	Status display of the connection		Connection interrupted
			Connection established
[Connection-ID]	ID of the FSoE connection	1...65535	
Event	Description of the event		

The menu page shows information about 32 FSoE connections.

Display the status of the fail-safe cross networking

42234

To display the status of the fail-safe cross networking to the other AC422S:

1 Select menu page

►  > 

► Select tab [FSoE-Slaves].

2 Display the status of the connection to an FSoE slave

> Menu page shows list with the following information (per Safety NetVar connection):

Name	Description	Possible values	
Status LED	Status display of the connection		Connection interrupted
			Connection established
[Connection-ID]	ID of the FSoE connection	1...65535	
Event	Description of the event		

The menu page shows information about 32 FSoE connections.

7.7.5 Safety: System

42256

The [System] menu page provides access to status information of the fail-safe PLC of AC422S.

Display status information of the fail-safe PLC

42227

To display status information of the fail-safe PLC:

1 Select menu page

▶  > 

2 Display status information of the fail-safe PLC

> Menu page shows the following information:

Name	Description	Possible values	
[F PLC firmware]	Firmware version of the fail-safe PLC	e.g. Rel:(1)01.00.243	
[Safety PLC status]	Status of the fail-safe PLC	Invalid	Invalid state
		Safe started	Safety module correctly started
		No application	No safe configuration available
		IEC task enabled	Safe IEC task enabled
		IEC task started	Safe IEC task started
		IEC error	Error in the safe IEC task
		RUN (debug)	Safe application in the RUN mode (debug operation)
		STOP (debug)	Safe application in the STOP mode (debug operation)
		RUN (safe)	Safe application in the RUN mode (safe operation)
		CODESYS error	Fail-safe PLC in the safe error state
		Hardware error	Error in the hardware of AC422S

7.8 ifm system solutions

41480

This menu is only available via the web interface of AC422S.
→ **Remote access** (→ S. 62)

The [ifm system solutions] menu provides access to information and installation options for ifm system solutions.

Navigation path	Functions
	ifm system solutions: → **Show information about installed ifm apps** (→ S. 139) → **Install single/basic app** (→ S. 140) → **Install multi app** (→ S. 141) → **Update ifm apps** (→ S. 142) → **Uninstall ifm apps** (→ S. 142)

7.8.1 Notes on ifm system solutions

42295

With the AC422S, ifm electronic offers different system solutions for the simple implementation of typical applications. System solutions consist of applications which are processed by the device-internal CODESYS Standard plc.

ifm system solutions and user-created Standard applications must not be stored and run simultaneously on the AC422S!

► Delete all CODESYS system solutions stored on the device before installing new ifm system solutions or user applications!

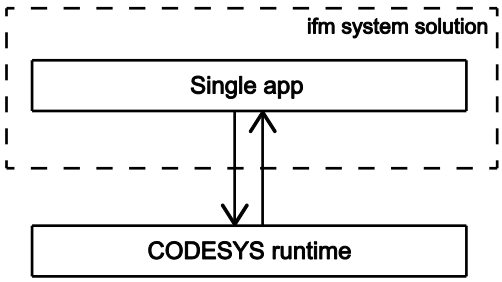
Users can download the available ifm system solutions from ifm's website.
↓www.ifm.com > Service > Download > Industrial communication

Types of ifm system solutions

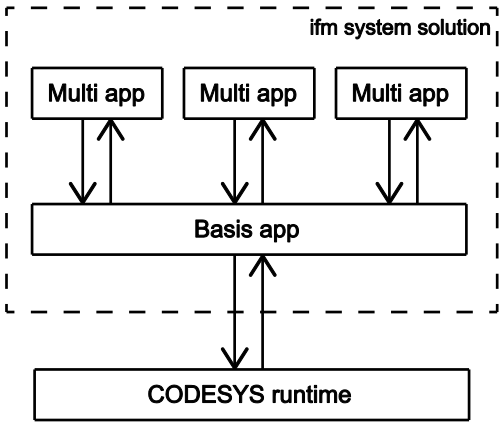
41684

There are 2 types of ifm system solutions:

- **Single apps**
  Single apps provide the user with a CODESYS-based solution. Single apps directly access the I/O mechanisms of the CODESYS Standard plc. Only one single app must be stored and executed on the device.



- **Basic app + multi apps**
  Multi apps provide the user with the possibility to execute different CODESYS-based solutions in parallel. The multi apps use the services of the basic app in order to be able to access the inputs and outputs of AC422S at the same time. They operate as a pure communication layer between the I/O mechanisms of the CODESYS Standard plc and the connected multi apps.
  Maximum 5 multi apps at a time can be stored and executed in parallel on the device.



7.8.2 Show information about installed ifm apps

41658

In order to display information about the ifm system solutions installed on the device:

1 Select menu page

► 

► Select the [Information] tab.

2 Show information about installed ifm apps

> The browser window displays an overview of the installed ifm apps. The following information is displayed for each ifm app:

Information	Meaning
[Name]	Designation of the ifm system solution app
[Version]	Version number of the ifm system solution app
[Type]	Type of ifm app (single, basic, multi)
[Description]	Description of the functionality of the ifm system solution app
[Licence information]	Licence information about the ifm system solution in the selected user language
[Link to the ifm system solution app]	Hyperlink for web visualisation of the ifm system solution app

7.8.3 Install single/basic app

41487

Only one single app, basic app or CODESYS Standard plc application must be stored on the device.
When installing a single/basic app, all ifm system solutions and CODESYS Standard plc applications stored on the device are deleted.

To install a single or basic app on the device:

1 Select menu page

► 

► Select the [Installation] tab.

2 Select single/basic app

► Activate the [Search] button.

> A dialogue window appears.

► Select the requested single/basic app (*.ifmapp) and click [Open] to load it.

> The file name of the selected single/basic app is displayed.

3 Transfer the single/basic app to the device

► Click on [Transfer file] button to transfer the selected single/basic app to the device.

> The progress bar indicates the status of the process.

> After successful transfer: The window shows information about the copied single/basic app.

► Optional: Click on [Cancel] to stop the download process.

4 Install the single/basic app

► Activate the [Start installation] button.

> CODESYS Standard plc is stopped.

> All ifm system solutions and CODESYS Standard plc applications on the device are deleted.

> The selected single/basic app is installed.

> The progress bar indicates the status of the installation process.

> CODESYS Standard plc is started.

> The installed single/basic app is automatically started (RUN state).

7.8.4 Install multi app

41488

Maximum 5 multi apps must be stored on the device simultaneously.

To install a multi app on the device:

Requirements:

> The basic app is installed and started (RUN state) (→ **Install single/basic app** (→ S. 140))

1 Select menu page

► 

► Select the [Installation] tab.

2 Select multi app

► Activate the [Search] button.

> A dialogue window appears.

► Select the requested multi app (*.ifmapp) and click the [Open] button to load it.

> The file name of the selected multi app is displayed.

3 Transfer the multi app onto the device

► Click on [Transfer file] to transfer the selected multi app onto the device.

> The progress bar indicates the status of the process.

> After successful transfer: The window shows information about the copied multi app.

► Optional: Click on [Cancel] to stop the download process.

4 Install multi app

► Activate the [Start installation] button.

> CODESYS Standard plc is stopped.

> The selected multi app is installed.

> The progress bar indicates the status of the installation process.

> CODESYS Standard plc is started.

> The installed multi app is automatically started (RUN state).

► Optional: Repeat steps 2 to 4 to install further multi apps.

7.8.5 Update ifm apps

41682

The user can update an ifm system solution installed on the device by overwriting it with the new version of the ifm system solution.

Naming convention for ifm apps:

`AppName_x.y.z.ifmapp`

AppName =	name of the ifm app
x.y.z =	version number of the ifm app
ifmapp =	file extension of an ifm app

To update an ifm system solution:

Requirements:

> The name of the new ifm app and the installed ifm app must be identical.

> The version number of the ifm app must be greater than that of the installed ifm app.

To determine the version of the installed ifm app: → **Show information about installed ifm apps** (→ S. 139)

1 Download new ifm app

► Download new version of the ifm system solution (→ **Notes on ifm system solutions** (→ S. 138)).

2 Update the installed ifm app

► Install the new ifm system solution
– Single/basic app: → **Install single/basic app** (→ S. 140)
– multi app: → **Install multi app** (→ S. 141)

7.8.6 Uninstall ifm apps

41683

When a basic app is uninstalled, all dependent multi apps are uninstalled, too.

Before uninstalling an ifm app, the CODESYS Standard plc of AC422S is stopped. After successful uninstallation, the CODESYS Standard plc is started again.

To uninstall an ifm system solution installed on the device:

1 Display installed ifm apps

► **Show information about installed ifm apps** (→ S. 139)

2 Uninstall ifm app

► In the section of the respective ifm app:
Activate the [Uninstall app] button.

> CODESYS Standard plc is stopped.

> The selected ifm app is uninstalled.

> CODESYS Standard plc is started.

8 Setup

Content

41644

This section provides information for setting up the device following mounting, electrical installation and connection to AS-i network components.

Observe the notes on mounting and electrical connection of the device!
→ Operating instructions (supplied with the device)

8.1 Install device

42300

► Install AC422S correctly (→**Install device** (→ S. 28)).

8.2 Connect the device to the periphery

41574

8.2.1 EtherNet/IP interface

42243

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

► Connect the device to EtherNet/IP network via the EtherNet/IP interface (X6/X7).

8.2.2 Ethernet configuration interfaces

42952

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 the configuration interface 1 (X3) or 2 (X8) (→ **Configuration interfaces: Connection concepts** (→ S. 164)).

If AC422S is to be operated as EtherCAT master:

► Connect the device to the EtherCAT network via the configuration interface 1 (X3) or 2 (X8).

8.2.3 Install devices on the local I/O interface

42298

If non-safe and safe peripherals without AS-i interface are part of the system configuration, they have to be linked via the local I/O interface (X4) of AC422S.

- Installation instructions for the local I/O interface: →**Connect devices to local I/O interface** (→ S. 31)

The installation of the safe peripherals on the local I/O interface influences the obtainable characteristic safety figures (PL/SIL/cat.) of the entire system.

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

8.3 Connect the device

42202

► Ensure correct electrical connection of AC422S (→**Electrical connection** (→ S. 29)).

8.4 Start screen 'Basic settings'

41689

The 'Basic settings' start screen appears after the following actions/events:

- initial setup
- firmware update
- data loss due to battery failure

The basic settings provide access to the GUI texts, system time, etc.

The same operating notes as for the page view apply for the 'Basic settings' start screen (→ **Page view** (→ S. 49)).

8.4.1 Change the basic settings of the device

41597

To change the basic settings of the device:

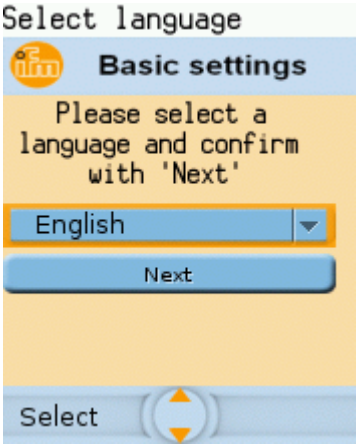
1 Start the device

► Connect the device to a circuit.

> The device starts.

> The display shows the start screen "Basic settings" (screenshot).

2 Set the language of the GUI texts



► List shows the active language.

► Use [▼] / [▲] to mark the list.

> The focus (= orange frame) is on the marked list.

► Open the list with the left function key [Select].

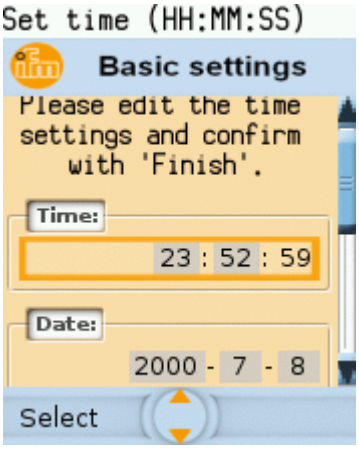
► Use [▼] / [▲] to mark the desired language and press [Select] to activate it.

> The GUI texts appear in the selected language.

► Go to the next page with [Next].

3 Set the system time

Option 1: Set the system time manually



► [Uhrzeit] and [Datum] indicate the current system time.

► Deactivate the checkbox [NT aktivieren].

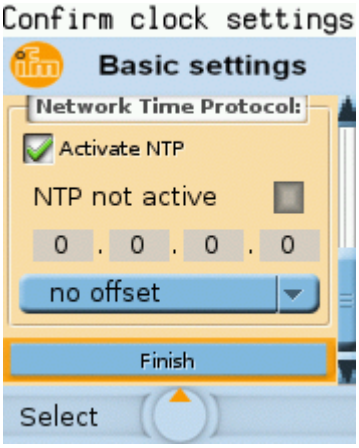
> Status LED = 

► In the group [Uhrzeit], set the desired clock time one position at a time.

► In the group [Datum], set the desired date one position at a time.

► Save the changes with [Finish] and go to the standard start screen.

Option 2. Synchronise the system time with an NTP server



► Activate the checkbox [NTP aktivieren].

> Status LED = 

► 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.

► Wait until status LED = 

> [Datum] and [Uhrzeit] show the synchronised values.

► Save the changes with [Finish] and go to the standard start screen.

8.5 ^.Notes on the firmware update

42293

An update of the firmware of AC422S must only be made by an authorised employee of ifm electronic gmbh.

► Contact your AS-i specialist for more information.

After a firmware update, the user must re-evaluate the existing, safety-relevant application and ensure that the defined safety function continues to be met correctly.

► Re-evaluate the safety-relevant application.

► Compile safety-relevant application again, load it to device and create boot application.

8.6 Connect and address AS-i slaves

41575

To integrate AS-i slaves into an AS-i network that is controlled by one of the AS-i masters of the device:

1 Connect and address the AS-i slave

► Connect ONE AS-i slave to be addressed to the requested AS-i network (AS-i 1 or AS-i 2) as described in the corresponding installation instructions.

► Assign the desired address to the AS-i slave
(→ **Quick setup: Address the AS-i slaves connected to AS-i Master 1** (→ S. 76) or → **Quick setup: Address the AS-i slaves connected to AS-i Master 2** (→ S. 77)).

► Optional: Repeat step 1 to connect and address further AS-i slaves.

2 Project the AS-i network

► Carry out a projection adaptation on the AS-i master with the newly addressed AS-i slaves
(→ **Quick setup: Project AS-i networks** (→ S. 69)).

> The AS-i master adds the detected slaves (LDS) to the list of the projected slaves (LPS).

> The AS-i slaves have a valid address and are integrated in the AS-i network.

8.7 Setup of EtherNet/IP

41407

Detailed information on how to configure the EtherNet/IP network: → operating instructions of the EtherNet/IP master

To connect the device to the EtherNet/IP network:

► Select one of the following options:

- Use the top-down configuration mode:→ **Configuration mode: Top-Down** (→ S. 233)
- Use the independent configuration mode: → **Configuration mode: Independent** (→ S. 234)

Before setting the EtherNet/IP parameters, all slaves must be connected to and addressed in the AS-i network.

► Project the AS-i slaves (→ **Connect and address AS-i slaves** (→ S. 147))

8.8 Setup of the configuration interface

41410

To set up the EtherNet configuration interface (X3):

►  > 

► Select [IP setup] tab.

► Set the interface parameters (→ **Notes on IP settings** (→ S. 110)).

8.9 Replace standard AS-i slave

42261

AC422S makes it possible to replace a standard AS-i slave by a new AS-i slave in the operating mode "protected mode".

Requirements:

> New and old AS-i slave have the same device profile (→ **Profiles of AS-i slaves** (→ S. 171)).

> The new AS-i slave has the address 0.

> Parameter [Automatic addressing] is activated (→ **Set the monitoring functions of the AS-i master** (→ S. 80)).

1 Remove old AS-i slave

► Disconnect the AS-i slave to be replaced from the AS-i network

> AC422S detects a configuration error and generates a corresponding OSC message.

2 Install new AS-i slave

► Connect the new AS-i slave to the AS-i network.

> AC422S detects the new AS-i slave and automatically assigns the address of the old AS-i slave.

> The OSC error message disappears.

> The new AS-i slave is ready for operation.

8.10 Replace safe AS-i slave

42260

AC422S makes it possible to replace an AS-i slave with a new safe AS-i slave in the operating mode "protected mode".

Requirements:

> New and old AS-i slave have the same AS-i profile (→ **Profiles of AS-i slaves** (→ S. 171)).

> New and old 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.

> Parameter [Automatic addressing] is activated (→ **Set the monitoring functions of the AS-i master** (→ S. 80)).

1 Remove old AS-i slave

► Disconnect the safe AS-i slave to be replaced from the AS-i network

> AC422S detects a configuration error and generates a corresponding OSC message.

2 Install new AS-i slave

► Connect the new AS-i slave to the AS-i network.

> AC422S detects the new AS-i slave and automatically assigns the address of the old AS-i slave.

> AC422S detects incorrect code sequence and requests testing of the new AS-i slave via OSC message.

► Carry out test (e.g. E-stop switch: lock ⇨ unlock).

> AC422S fills code table with code sequence of the new safe AS-i input slave.

> New safe AS-i input slave is ready for operation.

9 Troubleshooting

Content

41667

This chapter offers information regarding fault detection and troubleshooting.

9.1 Status LED

41692

The status LEDs of the device provide information about the current state of system components.

Position of the status LED on device: →**Overview** (→ S. 12)

9.1.1 Status LED: Basic device

41691

Status LED			Description
H1	green	on	Device has started, warnings or error messages.
	yellow	flashes 0.5 Hz	There is a warning but not an error message.
	red	flashes 2 Hz	There is an error message.

9.1.2 Status LED: Fieldbus EtherNet/IP

41708

Status LED			Description
H2	yellow	off	no data transmission
		flashes	Reception of data
H3	green	off	no physical connection
		on	Physical connection OK
H4	yellow	off	no data transmission
		flashes	Reception of data
H5	green	off	no physical connection
		on	Physical connection OK

9.1.3 Status LED: Configuration interface 2 (X8)

42115

Status LED			Description
H6	yellow	off	no data transmission
		flashes	Reception of data
H7	green	off	no physical connection
		on	Physical connection OK

9.2 Start screen: Status LEDs

41688

The start screen of the graphic user interface proves the following status information (→**Start screen** (→ S. 66)):

9.2.1 Status of the web interface

41707

Status LED			Description
Web interface status	red	on	offline
	green	on	online

This function is only available via the web interface of the device (→**Remote access** (→ S. 62)).

9.2.2 Operating mode of the AS-i master

41722

Status LED			Description
AS-i 1|2 operating mode	yellow	on	projection mode
	green	on	protected mode

9.2.3 Control instance of the AS-i outputs

41569

Status LED			Description
Output control	yellow	on	manually | manually via PLC
	green	on	gateway | gateway with PLC
	blue	on	PLC

9.2.4 Fieldbus status

41417

Status LED			Meaning
EtherNet/IP	red	on	EtherNet/IP inactive
	green	on	EtherNet/IP active

Status of the Safety PLC

42278

Status LED			Meaning
Safety PLC status	gray	ein	No safety configuration available
	green	ein	Safety configuration available

This function is only available via the web interface of the device (→**Remote access** (→ S. 62)).

9.3 Online diagnosis function

41719

The device offers an online diagnosis function. It helps the user to find and eliminate the source of occuring failures and errors.

9.3.1 Message types

41754

The online diagnostic function of AC422S distinguishes 3 types of messages:

Symbol	Message type	Meaning
	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

9.3.2 Locate error sources

41743

The online diagnosis function helps the operator to locate the source of ooccuring warning and error messages. The menu symbols of the navigation path leading to the menu page, which generates a message, are overlain by a warning / error symbol. Thus, the operator can easily locate the error source.

Example:

> The following menu symbols are overlain by an error symbol:
  - Main navigation bar: [AS-i 1]
  - Sub navigation bar: [Slaves]

> Error source on menu page [AS-i 1] > [Slaves]

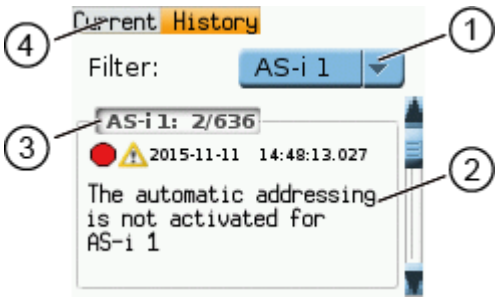
If a function unit of the device causes a warning and an error message at the same time, then the error symbol is displayed.

9.4 Online Support Centre (OSC)

42294

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

The OSC appears as follows:



- List to select the filter and the name of the selected filter
- Message
  A message consists of error symbol, time stamp and error details
- Cons. number of the error messages displayed and total number of messages
- (4) List to select the view
  [Current]: →**OSC: Display current messages** (→ S. 155)
  [History]: →**OSC: Show message history** (→ S. 156)

The following rules for the display of messages apply:

- system components of AC422S (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 deactivate the state messages of the safe function
- FBs of the SafetyPLCopen library:
  - Programmer can activate the transmission of the messages to the OSC

9.4.1 OSC: Display current messages

42311

The [Current] tab lists all current messages. The messages are in chronological order. Alle messages regarding warnings and errors are displayed.

Under [Current] only messages will be displayed, that are created in the non-safe part of the AC422S. Messages created in the safe part of the AC422S are only displayed in the message history (→**OSC: Show message history** (→ S. 156)).

Information about the different types of messages: →**Message types** (→ S. 153)
Overview of possible OSC messages of the device: →**OSC messages** (→ S. 235)

To view the error messages that are currently active:

1 Select the menu page

► On the start screen: Select [OSC] function key.

► Select [Current] tab.

2 Show current messages

> The page shows the error messages that are currently active.

► Press [▼] to select the message field.

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

► Use [▲]/[▼] to go through the error messages.

3 Optional: filter messages

► Set the following parameters as required:

Parameter	Description	Possible values	
[Filter]	System component the message was created in	[All]	Display all messages in chronological order of their occurrence (= preset).
		[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 (only selectable for devices with 2 AS-i masters).
		[System]	Display messages that were created in the system.

> Page shows filtered messages.

9.4.2 OSC: Show message history

41733

The [History] tab lists all messages which occurred during the operating time of the device. The messages are shown in chronological order. The device displays messages regarding events, warnings and errors.

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 symbols of the messages 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 again:

1 Select menu page

► On the start screen: Select [OSC].

► Select [History] tab.

2 Display all messages

> The page shows all previously generated error messages.

► Press [▼] to select the message field.

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

► Use [▲]/[▼] to go through the error messages.

3 Optional: Filter messages

► Set the following parameters as required:

Parameter	Description	Possible values	
[Filter]	System component the message was created in	[All]	Display all messages in chronological order of their occurrence (= preset).
		[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 (only selectable for devices with 2 AS-i masters).
		[System]	Display messages that were created in the system.

> Page shows filtered messages.

9.5 Availability of the fail-safe PLC

42215

The [Safety] menu symbol indicates the availability of the fail-safe PLC.

Symbol	Description
	▪ Fail-safe PLC of AC422S operating reliably. ▪ The operator has access to all sub-menus and functions of the [Safety] menu.
	▪ Fail-safe PLC of AC422S running internal hardware test (PBIT). ▪ The operator can access the sub-menus and functions of the [Safety] menu. ▪ The operator can access all other menus and their sub-menus and functions.
	▪ The fail-safe PLC of AC422S is not available due to a fatal error. ▪ The operator can access the sub-menus and functions of the [Safety] menu. ► To determine the error cause: →**Online Support Centre (OSC)** (→ S. 154)

If the menu symbol [Safety] remains greyed out for longer than 5 minutes and simultaneously the status LED lights yellow, the device has to be rebooted.

► To remove the error: Reboot the device (power reset)

9.6 Display diagnostic protocol

41439

To get an overview of the configuration and the current OSC messages, the operator can store the diagnostic protocol in the system

→ **Store diagnostic protocol** (→ S. 107)

10 Appendix

Content

33879

10.1 Approval tests / certifications

41524

Software-relevant certifications:

- AS-i master profile M4 according to AS-i specification 3.0
- Fieldbus certification: conform to EtherNet/IP specification

10.2 Technical data

Content

34188

10.2.1 Environmental conditions

42217

Environmental conditions	
Ambient temperature [°C]	0...50° for UL application: max. 45
Storage temperature [°C]	-20...70
Max. perm. relative air humidity [%]	95, non condensing
Height above sea level [m]	< 2000
Protection rating control cabinet	IP54

10.2.2 Safety classification

42264

Safety classification	
Standards	▪ SIL 3 (IEC 61508 : 2010) ▪ SIL cl 3 (IEC 62061: 2010) ▪ PL e / category 4 (EN ISO 13849-1 : 2008)
Mission time TM [h]	175200 (20 years)
PFH	1.21 x 10E-8
PFD_{avg}	1.04 x 10E-4

10.2.3 Power supply connections

41800

Power supply connections	
AS-i 1, AS-i 2, FE	plug-in, 6 poles, Combicon
24 V Power supply	plug-in, 2 poles, Combicon

10.2.4 Electrical data

42219

Electrical data	
Operating voltage [V]	18...32 DC (AUX)
Current consumption from 24 V DC and AS-i [mA]	< 750 (24 V) / < 10 from AS-i 1 / < 10 V from AS-i 2
Electrical separation	yes

10.2.5 Display elements

41442

Display	
Technology	LCD, colour
Size	35 x 28 mm (1.8“)
Resolution	220 x 176 pixels
Colour depth	18 bits (= 262 144 possible colours)

LED	
Possible colours	red, green, yellow

10.2.6 Housing

41477

Housing	
Degrees of protection	IP20
Material	Aluminium, steel sheet, Makrolon
Dimensions (W x H x D) [mm]	93 x 128,2 x 106,2

10.2.7 Interfaces

42305

Inputs (local I/O interface)	
Number	▪ 4 (two channels, safe) ▪ 8 (one channel, non safe)
Circuits	DC PNP (type 2 to IEC 61131-2)
Sensor supply	to SELV/PELV
Voltage range [V]	24 DC (18...32 DC)
Input current [mA]	7

Outputs (local I/O interface)	
Number	▪ 2 (two channels, safe) ▪ 4 (one channel, safe) ▪ 4 (one channel, non safe)
Circuits	Transistor PNP
Voltage range [V]	24 DC (18...32 DC)
External supply	to SELV/PELV
Max. current load per output [mA]	500
Max. inductance [mH]	400
Max. switching frequency [Hz]	25
Utilisation category	DC-13
Electrically isolated	yes
Short-circuit proof	yes

42305

EtherNet configuration interface	
Connection	2x RJ45
Transmission	10/100 Mbits/s
Protocol	HTTP, FTP, Telnet

42305

EtherNet fieldbus interface	
Connection	2x RJ45
Transmission rate	10/100 Mbits/s
Protocol	EtherNet/IP
Jitter	0.7 ms
Switch	integrated 2-port switch (iRT capable)

42305

SD card slot	
Media	SD memory cards (max. 32 Gbytes)
Format	SDHC format is supported
Supported file formats	FAT32

10.2.8 AS-interface

42241

AS-interface	
Number of AS-i master	2
AS-i version	3.0

AS-i profile	M4

10.2.9 Programmable Logic Controller (PLC)

42314

Standard plc	
Type	CODESYS Control Runtime System (incl. CODESYS WebVisu and TargetVisu)
Programming system	CODESYS Development System V3.5 SP9 Patch 7 Hotfix 3
Programming language	FBD, SFC, IL, CFC, LD, ST
Memory available for Standard plc applications / RETAIN variables	appr. 10 MB / 4072 Byte

Fail-safe PLC	
Type	CODESYS Control Safety Runtime System (certified)
Programming system	CODESYS Development System V3.5 SP9 Patch 7 Hotfix 3 with installed ifm AS-i package 1.5.2.10
Programming languages	FBD
Available memory for safe application / data	384 KBytes / 128 KBytes

10.3 Address assignment in Ethernet networks

39571

In the Ethernet network every IP address MUST be unique.

The following IP addresses are reserved for network-internal purposes and are therefore not allowed as an address for participants: nnn.nnn.nnn.0 | nnn.nnn.nnn.255.

Only network participants whose subnet mask is identical and whose IP addresses are identical with respect to the subnet mask can communicate with each other.

Rule:
If part of the subnet mask = 255, the corresponding IP address parts must be identical.
If part of the subnet mask = 0, the corresponding IP address parts must be different.

If the subnet mask = 255.255.255.0, 254 participants communicating with each other are possible in the network.
If the subnet mask = 255.255.0.0, 256x254 = 65 024 participants communicating with each other are possible in the network.

In the same physical network different subnet masks of the participants are allowed. They form different groups of participants which cannot communicate with groups of participants having other subnet masks.

In case of doubt or problems please contact your system administrator.

Examples:

Participant A IP address	**Participant A Subnet mask**	**Participant B IP address**	**Participant B Subnet mask**	**Communication of participants possible?**
192.168.82.247	255.255.255.0	192.168.82.10	255.255.255.0	Yes, 254 participants possible
192.168.82.**247**	255.255.255.0	192.168.82.**247**	255.255.255.0	No (same IP address)
192.168.82.247	255.255.**255**.0	192.168.82.10	255.255.**0**.0	No (different subnet mask)
192.168.**82**.247	255.255.255.0	192.168.**116**.10	255.255.255.0	No (different IP address range: 82 vs. 116)
192.168.222.213	255.255.0.0	192.168.222.123	255.255.0.0	Yes, 65 024 participants possible
192.168.111.213	255.255.0.0	192.168.222.123	255.255.0.0	Yes, 65 024 participants possible
192.168.82.247	255.255.255.0	192.168.82.**0**	255.255.255.0	No; the whole network is disturbed because the IP address xxx.xxx.xxx.0 is not allowed

10.4 Configuration interfaces: Connection concepts

Content

42146

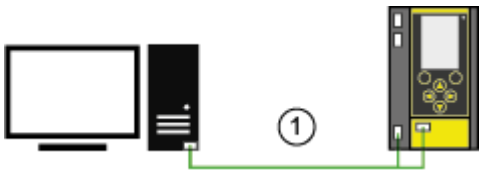
The device has 2 configuration interfaces X3 and X8 (→ **Ethernet configuration interfaces** (→ S. 13)).

To use the interface functions configuration interface X3 or X8 has to be connected to the necessary IT infrastructure. The device supports the following connection types:

- **Direct connection** (→ S. 164)
- **Connection via Ethernet network** (→ S. 165)

10.4.1 Direct connection

42925



► Connect either configuration interface 1 (X3) or 2 (X8) to the PC/laptop via Ethernet cable.

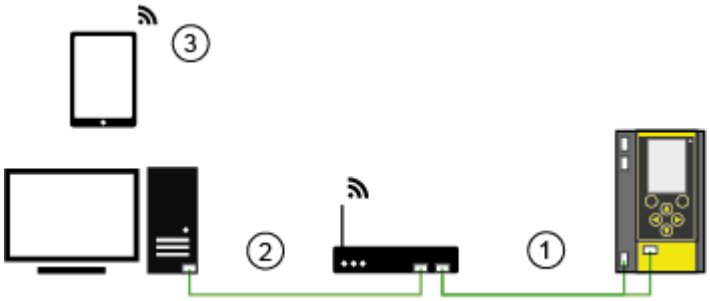
► Set the IP parameters of the configuration interface according to the requirements. (→ **Address assignment in Ethernet networks** (→ S. 163))

> User can access the web interface and/or programming interface of the device.

The selected configuration interface must not be used as EtherCAT master!

10.4.2 Connection via Ethernet network

42108



1 ► Connect either configuration interface 1 (X3) or 2 (X8) to switch / WiFi router via Ethernet cable.
► Set IP parameters of the configuration interface and the switch / WiFi router so that the data exchange between both devices is ensured. (→ **Address assignment in Ethernet networks** (→ S. 163))

2 ► Connect the PC/laptop to the switch using an Ethernet cable.
> User can access the web interface and/or programming interface of the device.

OR:

3 ► Establish wireless connection of PC/laptop/mobile device to the WiFi router.
> User can access the web interface and/or programming interface of the device.

The selected configuration interface must not be used as EtherCAT master!

10.5 AS-i master

Content

41540

Master = Handles the complete organisation on the bus. The master decides on the bus access time and polls the →slaves cyclically.

10.5.1 Operating modes of the AS-i master

Content

41721

The AS-i master can be operated in one of the following operating modes:

Protected mode

41761

In the operating mode "Protected mode" (= normal mode), the AS-i master only communicates with AS-i slaves that are entered in the list of projected slaves (LPS) and where current and target configuration match.

The AS-i master automatically detects the following actions and signals a configuration error:

- an AS-i slave is added to the AS-i network (error message: Slave not projected)
- an AS-i slave is removed from the AS-i network (error message: Slave not present)

Optionally, the operator can activate/deactivate the following monitoring functions (→ **Set the monitoring functions of the AS-i master** (→ S. 80)):

• Automatic addressing:	When a defective slave is replaced, the AS-i master controls the addressing. The new AS-i slave obtains the same address as the old AS-i slave if the following conditions are met: ▪ The new AS-i slave has the address `0`. ▪ Both AS-i slaves have the same device profile.
• Double address recognition:	The AS-i master recognises whether one or several AS-i slaves have the same address (error message: Double address error).
• Earth-fault detection:	The AS-i master detects any earth faults.

In the operating mode "Protected mode", the operator can control the PLC applications stored on the device (start, stop, reset).

Projection mode

41762

In the operating mode "Projection mode", the AS-i master communicates with all AS-i slaves that are connected to the AS-i line and do not have the address 0. Missing AS-i slaves are not detected by the AS-i master.

In projection mode a projection adaptation can be carried out. The AS-i master reads the configuration data of all detected AS-i slaves and saves it permanently.

Switch operating modes

41702

The operator / programmer can switch the operating modes of the AS-i master as follows:

- per GUI / web interface (→ **Set the operating mode of the AS-i master** (→ S. 79))
- per function block `Set_Mode` (→ programming manual: **Set_Mode**)

If an AS-i slave with the address 0 is connected, then the AS-i master cannot switch from "projection mode" into "protected mode" !

► Address the AS-i slave correctly.

► Switch the operating mode.

10.5.2 Master flags

41738

The master flags contain information about the status of the AS-i master and the fieldbus host.

The master flags are transmitted along with the input data of the digital AS-i slaves in the acyclic data set DS2 (→ Device Manual Supplement - Acyclic datasets and command interface).

10.6 AS-i slaves

Content

41533

Slave = Passive participant on the bus, only replies on request of the →master. Slaves have a clearly defined and unique →address in the bus.

10.6.1 Profiles of AS-i slaves

Content

41771

Configuration data (CDI) of the slaves (slave profiles)

Content

41591

The configuration data CDI (= **C**onfiguration **D**ata **I**mage) for single, A and B slaves is stored in a data word. The structure is shown below and is the same for all slaves.

Structure of the slave profile

41709

The slave profile has the following structure: S-[IO code].[ID code].[ext. ID code2]

Bits 15...12	Bits 11...8	Bits 7...4	Bits 3...0
XID2 extended ID code 2 3rd figure in the slave profile (AS-i slave v2.0 = 0xF *)	XID1 extended ID code 1 is no part of the slave profile can be changed by the user (AS-i slave v2.0 = 0xF *)	ID code ID code 2nd figure in the slave profile	IO code I/O configuration 1st figure in the slave profile
Example:	AC2255 4 digital inputs, 2 digital outputs AS-i profile = S-7.A.E This results in the following configuration data of the slave:		
0b1110 = 0xE	(e.g.) 0b0111 = 0x7	0b1010 = 0xA	0b0111 = 0x7
The corresponding CDI data word is: 11100111 10100111 = 0xE7A7			

*) AS-i slaves according to the AS-i specification 2.0 and older do not support the extended ID codes 1 and 2. In the master 0xF is stored for this configuration data.

Description of the IO code for digital slaves

41588

Structure slave profile = S-[IO-Code].x.x

IO code [hex]	**IO code** (bits 3…0)	**Function of the periphery bit**			
		D3	**D2**	**D1**	**D0**
0	0000	input	input	input	input
1	0001	output	input	input	input
2	0010	input / output	input	input	input
3	0011	output	output	input	input
4	0100	input / output	input / output	input	input
5	0101	output	output	output	input
6	0110	input / output	input / output	input / output	input
7	0111	input / output	input / output	input / output	input / output
8	1000	output	output	output	output
9	1001	input	output	output	output
A	1010	input / output	output	output	output
B	1011	input	input	output	output
C	1100	input / output	input / output	output	output
D	1101	input	input	input	output
E	1110	input / output	input / output	input / output	output
F	1111	not allowed			

Description of the ID code (selection)

41589

Structure slave profile = S-x.[ID-Code].x

ID code [hex]	**ID code** (Bits 3…0)	**Description**
0	0000	4 I/O connections for binary sensors and/or actuators with 1 signal each
1	0001	2 dual-signal I/O connections for binary sensors and/or actuators with 2 signals each
A	1010	slave operates in the extended addressing mode (B slave or A/B slave)
B	1011	slave corresponds to Safety-at-Work
F	1111	manufacturer-specific device (cannot be replaced with products from other manufacturers)

Description of the extended ID code 1

41585

Can be changed by the user, however not a part of the slave profile.

Default value:
0xF for single slaves
0x7 for A/B slaves

The value is evaluated and checked by the master. The user can make an additional distinction between slaves which do not differ in the AS-i system, e.g. slaves with different ranges for current, voltage or frequency. This prevents damage when replacing slaves with a wrong performance range.

Description of the extended ID code 2

41590

Extended ID code 2 for analogue slaves with profile 7.3.x

41514

The extended ID code 2 is used to specify complex slaves.
Structure slave profile = S-7.3.[ext.ID code2]

Bit 3	Bit 2	Bit 1	Bit 0	Description
		0	0	1-channel slave
		0	1	2-channel slave
		1	0	4-channel slave
		1	1	4-channel slave (if slave has no extended ID code)
	0			transparent data exchange = binary bits
	1			analogue value transmission
0				output slave
1				input slave

The ID code 2 results from a combination of the options stated above.

Extended ID code 2 for analogue slaves with profile 7.4.x

41513

The extended ID code 2 is used to specify complex slaves.
Structure slave profile = S-7.3.[ext. ID code2]

Bit 3	Bit 2	Bit 1	Bit 0	Description
		0	0	1-channel slave
		0	1	2-channel slave
		1	0	4-channel slave
		1	1	4-channel slave (if slave has no extended ID code)
0	0	0	0	4 binary inputs + 4 binary outputs
0				output slave
1				input slave

The ID code 2 results from a combination of the options stated above.

Valid combinations IO code / ID code / extended ID code 2

41677

Structure slave profile = S-[IO code].[ID code].[ext. ID code2]

IO code [hex]	**ID code** [hex]	**Ext. ID code 2** [hex]	**Meaning**
0…E not: 9, B, D	0	x	binary I/O connections for sensors and actuators
0, 3, 8	1	x	1 or 2 binary sensors or actuators with 2 signals each (dual-signal devices)
0	1	x	4 binary inputs for 2 dual-signal sensors
0…E not: 2A	A	x	slave operates in the "extended addressing mode" (B slave or A/B slave)
0	A	E	slave with extended address function: 4 binary inputs for 2 dual-signal sensors (e.g. I/O module AC2250)
0	B	x	slave corresponds to Safety-at-Work
0…E	F	x	manufacturer-specific device (cannot be replaced by other products)
1	1	x	single sensor with remote setting: 3 binary inputs + 1 binary output (e.g. sensor OC5226)
3	1	x	2 binary inputs for 1 dual-signal sensor AND 2 binary outputs for 1 dual-signal actuator
3	A	x	slave with extended address function
3	A	1	slave with extended address function: 2 binary inputs + 1 binary output
3	A	2	slave with extended address function: 4 binary inputs
6	0	x	quick combined transaction type 5 of 8, 12 or 16 data bits by using 2, 3 or 4 slave addresses in a slave
7	0	F	motor starter 2I + 2O (e.g. ZB0032)
7	0	E	4 binary inputs + 4 binary outputs (e.g. I/O module AC2251)
7	1	x	interface for the transmission of 6...18-bit signals; analogue profile for combined transaction type 1; was replaced by S-7.3
7	2	x	extended slave profile for the transmission of 6...18-bit signals; extended analogue profile for combined transaction type 1; was replaced by S-7.4
7	3	x	slave profile for 16-bit transmission with integrated support in the master; integrated analogue profile for combined transaction type 1 (→**Extended ID code 2 for analogue slaves with profile 7.3.x** (→ S. 174))
7	3	5	2 analogue outputs of 16 bits each (e.g. I/O module AC2618)
7	3	6	4 analogue outputs of 16 bits each (e.g. I/O module AC2518)
7	3	C	1 analogue input of 16 bits (e.g. sensor PPA020)
7	3	D	2 analogue inputs of 16 bits each (e.g. I/O module AC2616)
7	3	E	4 analogue inputs of 16 bits each (e.g. I/O module AC2516)
7	4	x	extended slave profile for 16-bit transmission with integrated support in the master; integrated extended analogue profile for combined transaction type 1 (→**Extended ID code 2 for analogue slaves with profile 7.4.x** (→ S. 174))
7	4	C	RFID identification system for writing and reading RFID tags 15-bit data + 1-bit messages (e.g. DTA100)
7	A	x	slave operates in the "extended addressing mode" (B slave or A/B slave)

IO code [hex]	**ID code** [hex]	**Ext. ID code 2** [hex]	**Meaning**
7	A	5	slave operates in the "extended addressing mode" (B slave or A/B slave) combined slave; supports combined transaction type 2
7	A	7	slave operates in the "extended addressing mode" (B slave or A/B slave) 4 binary inputs + 4 binary outputs
7	A	8	slave operates in the "extended addressing mode" (B slave or A/B slave) 1 channel for combined transaction type 4
7	A	9	slave operates in the "extended addressing mode" (B slave or A/B slave) dual channel for combined transaction type 4
7	A	A	slave operates in the "extended addressing mode" (B slave or A/B slave) 8 binary inputs + 8 binary outputs
7	A	E	slave operates in the "extended addressing mode" (B slave or A/B slave); dual sensor with actuator interface (e.g. sensor AC2317); 2 binary inputs + 2 binary outputs
7	B	x	safety slave with non-safe outputs
7	B	0	safety slave with non-safe outputs; 2 safe binary inputs (e.g. I/O module AC005S)
7	B	E	safety sensor with non-safe outputs; 2 safe binary inputs AND 2 safe binary outputs AND 2 non-safe (relay) outputs (e.g. I/O module AC009S)
7	D	x	device for motor control (electromechanical)
7	D	0	electromechanical motor control with open sub-profile
7	D	1	electromechanical direct starter
7	D	2	electromechanical reverser
7	D	3	electromechanical direct starter with brake
7	D	4	electromechanical reverser with brake
7	D	5	electromechanical direct starter with accessories
7	D	6	electromechanical reverser with accessories
7	E	x	device for motor control (electronic)
7	E	0	electronic motor control with open sub-profile
7	E	1	electronic direct starter
7	E	2	electronic reverser
7	E	3	electronic direct starter with brake
7	E	4	electronic reverser with brake
7	E	5	electronic direct starter with accessories
7	E	6	electronic reverser with accessories
8	1	x	4 binary outputs for 2 dual-signal actuators
B	1	x	dual-signal actuator with feedback: 2 binary outputs + 2 binary inputs
B	A	5	slave operates in the "extended addressing mode" (B slave or A/B slave); supports combined transaction type 2
B	A	E	slave operates in the "extended addressing mode" (B slave or A/B slave); 2 binary outputs + 2 binary inputs (e.g. AC2086 module)
D	1	x	single actuator with monitoring: 1 binary output + 3 binary inputs

x = any value (0...F)

Devices with M4 master profile enable connection of slaves with more than 4 digital inputs/outputs. The transmission is combined: Part of the data transmission is carried out via the digital bits D0...D3, another part via the "analogue" channels.

The more data is transmitted, the longer it takes until all data of a slave has been transmitted.

Cycle time single slave = 5 ms
Cycle time A/B slave (if address is only assigned to A or B slave) = 5 ms
Cycle time A/B slave (if address is assigned to A and B slave) = 10 ms
The cycle time for CTT transmission is a multiple of these values for individual data.

CTT = Combined Transaction Type

Slave profiles for slaves with combined transaction

41654

Structure slave profile = S-[IO-Code].[ID-Code].[ext.ID-Code2]

Slave profile	Master profile	Assignment analogue channels in the device		Bits D0…D3	Additional acyclic string data transaction	Combined transaction CTT
		Number of channels	Use analogue / digital			
S-6.0	M4	1 I **and** 1 O	2/3/4 x 4 binary inputs **and** 2/3/4 x 4 binary outputs	—	no	type 5
S-7.3	M3	1/2/4 I **or** 1/2/4 O	1/2/4 analogue inputs **or** 1/2/4 binary outputs	—	no	type 1
S-7.4	M3	1/2/4 I **or** 1/2/4 O	1/2/4 analogue inputs **or** 1/2/4 binary outputs	4 inputs **or** 4 outputs	yes	type 1
S-7.5.5	M4	0…4 I **and** 0…4 O	0…4 analogue inputs or < 65 binary inputs **and** 0…4 analogue outputs or < 65 binary outputs	2 inputs **and** 2 outputs	yes	type 2
S-7.A.5	M4	0…2 I **and** 0…2 O	0…2 analogue inputs or < 33 binary inputs **and** 0…2 analogue outputs or < 33 binary outputs	2 inputs **and** 1 output	yes	type 2
S-7.A.7	M4	—	—	4 inputs **and** 4 outputs	no	type 3
S-7.A.8	M4	1 I	1 analogue input **or** < 17 binary inputs	1 output	no	type 4
S-7.A.9	M4	2 I	2 analogue inputs **or** < 33 binary inputs	—	no	type 4
S-7.A.A	M4	1 I **and** 1 O	8 binary inputs **and** 8 binary outputs	—	no	type 3
S-B.A.5	M4	0…2 I **and** 0…2 O	0…2 analogue inputs or < 33 binary inputs **and** 0…2 analogue outputs or < 33 binary outputs	—	yes	type 2

Legend colour pattern:

binary inputs | binary outputs | analogue inputs | analogue outputs

Combined transaction – Use of analogue channels in the gateway depending on the slave profile

41592

Transaction	Slave profile	Slave type	Number channels	Analogue input channels					Analogue output channels				
				CH3	CH2	CH1	CH0	Trans.	CH3	CH2	CH1	CH0	Trans.
CTT5	6.0.x	S	1	–	–	–	b	–	–	–	–	b	–
CTT1	7.3.C	S	1	–	–	–	a	–	–	–	–	–	–
	7.3.D	S	2	–	–	a	a	–	–	–	–	–	–
	7.3.E	S	4	a	a	a	a	–	–	–	–	–	–
	7.3.4	S	1	–	–	–	–	–	–	–	–	a	–
	7.3.5	S	2	–	–	–	–	–	–	–	a	a	–
	7.3.6	S	4	–	–	–	–	–	a	a	a	a	–
	7.3.C	S	1	–	–	–	a	–	–	–	–	–	–
	7.3.D	S	2	–	–	a	a	–	–	–	–	–	–
	7.3.E	S	4	a	a	a	a	–	–	–	–	–	–
	7.3.4	S	1	–	–	–	–	–	–	–	–	a	–
	7.3.5	S	2	–	–	–	–	–	–	–	a	a	–
	7.3.6	S	4	–	–	–	–	–	a	a	a	a	–
CTT1	7.4.4	S	1	–	–	–	–	–	–	–	–	a	X
	7.4.5	S	2	–	–	–	–	–	–	–	a	a	X
	7.4.6	S	4	–	–	–	–	–	a	a	a	a	X
	7.4.C	S	1	–	–	–	a	X	–	–	–	–	–
	7.4.D	S	2	–	–	a	a	X	–	–	–	–	–
	7.4.E	S	4	a	a	a	a	X	–	–	–	–	–
CTT2	7.5.5	S	0…4	a b	a b	a b	a b	X	a b	a b	a b	a b	X
CTT2	7.A.5	A	0…2	–	–	a b	a b	X	–	–	a b	a b	X
	7.A.5	B	0…2	a b	a b	–	–	X	a b	a b	–	–	X
CTT3	7.A.7	A	–	only binary				–	only binary				–
		B	–					–					–
CTT4	7.A.8	A	1	–	–	–	a b	–	–	–	–	–	–
		B	1	–	a b	–	–	–	–	–	–	–	–
CTT4	7.A.9	A	2	–	–	a b	a b	–	–	–	–	–	–
		B	2	a b	a b	–	–	–	–	–	–	–	–
CTT3	7.A.A	A	1	–	–	–	b	–	–	–	–	b	–
		B	1	–	b	–	–	–	–	b	–	–	–
CTT2	B.A.5	A	0…2	–	–	a b	a b	X	–	–	a b	a b	X
	B.A.5	B	0…2	a b	a b	–	–	X	a b	a b	–	–	X

CHn = channel
Trans. = transparent mode

S = single slave
A = A slave
B = B slave

a = analogue inputs/outputs (word)
b = binary inputs/outputs (bits)
– = not used

X = additional acyclic transaction of strings for device, parameters, diagnosis

Legend colour pattern:

binary inputs

binary outputs

analogue inputs

analogue outputs

10.7 Fieldbus EtherNet/IP

Content

12469

Information about EtherNet/IP: → www.odva.org (umbrella organisation)

10.7.1 Fieldbus objects

41516

EtherNet/IP is based on the Common Industrial Protocol (CIP). CIP encloses services and applications in so-called object classes. Each object class has certain features (attributes) and defined interfaces which can be used to access the functions of the object instance.

The AC422S uses the following object classes:

- **Assembly instance objects** for the transmission of
  - device and EtherNet/IP parameters (→**Parameter data** (→ S. 180))
  - Cyclic process data, diagnostic data (→**Cyclic data**)
- **Manufacturer-specific objects** for the transmission of acyclic data (→**Acyclic data** (→ S. 180))

Parameter data

41784

The paramater data is transfered via the Configuration Assembly Object:

Object class [dec]	Instance [dec]	Attribute [dec]	Content	Access r = read w = write	max. no. of words
4	175	3	Parameter data (module configuration, device-specific parameters)	r/w	122

Cyclic data

41570

Cyclic data is transferred in dynamic assembly objects:

Object class [dec]	Instance [dec]	Attribute [dec]	Content	Access r = read w = write	max. no. of words
4	100	3	Cyclic data from AC422S to the I/O scanner (EtherNet/IP slots 1, 3, 5, 7, 9, 10, 13, 14)	r	max. 248
4	150	3	Cyclic data from the I/O scanner to AC422S (EtherNet/IP slots 2, 4, 6, 8, 11, 12, 15)	r/w	max. 248

Acyclic data

41543

Acyclic data is transferred in manufacturer-specific objects:

Object class [dec]	Instance [dec]	Attribute [dec]	Content	Access r = read w = write	max. no. of words
801	1	1, 21, 22	Acyclic data sets (system)	r	248
		32 ... 47	Acyclic data sets (AS-i Master 1)	r/w*	248
		64 ... 79	Acyclic data sets (AS-i Master 2)	r/w*	248
801	1	30	Command request channel, system	r/w	248
		31	Command reply channel, system	r	248
801	1	62	Command request channel, AS-i Master 1	r/w	248
		63	Command reply channel, AS-i Master 1	r	248
801	1	94	Command request channel, AS-i Master 2	r/w	248
		95	Command reply channel, AS-i Master 2	r	248

* ... depends on acyclic data set (→ **Overview: acyclic data sets (DSx)** (→ S. 227))

10.7.2 Fieldbus parameters

41508

The fieldbus parameters provide information for the integration of the device into the EtherNet/IP network. The fieldbus parameters are set directly on the device.

Parameter	Meaning	Value range
IP address	IP address (IPv4) of the device's EtherNet/IP interface	e.g.: 192.168.0.200
Subnet mask	Subnet mask of the EtherNet/IP network segment	e.g.: 255.255.255.0
Gateway address	IP address (IPv4) of the EtherNet/IP gateway	e.g.: 192.168.0.100

10.7.3 Device-specific parameters

Content

41583

The device-specific parameters allow you to make individual adjustments to the system. Depending on the selected configuration mode, the following parameters are available.

Parameters: Independent mode

41806

Parameter	Description	Value range	
Analogue channels per input slave	Number of analogue channels per input slave	4 channels*	4 channels (variable slave assignment)
		2 channels	2 channels (fixed slave assignment)
		1 channel	1 channel (fixed slave assignment)
		1 channel per A/B slave	1 channel per A/B slave (fixed slave assignment)
Analogue channels per output slave	Number of analogue channels per output slave	4 channels*	4 channels (variable slave assignment)
		2 channels	2 channels (fixed slave assignment)
		1 channel	1 channel (fixed slave assignment)
		1 channel per A/B slave	1 channel per A/B slave (fixed slave assignment)
Fail-safe state	Behaviour of the slave outputs if an interrupted fieldbus connection is detected	Reset outputs*	All AS-i outputs are switched off in case of an interrupted EtherNet/IP connection (value = 0).
		Hold outputs	The outputs are held in the last valid state that existed before the interrupted connection was detected.
Change byte order	Byte order in a word Setting applies to all data of object class 4, instances 100 and 150	Disabled*	Byte order in word remains unchanged.
		Enabled	Byte order in word is inverted.

* ... Default setting

In the 'Independent' configuration mode, the device-specific parameters are configured via the GUI of the device (→**Configuration mode: Independent** (→ S. 234)).

Parameters: Top-down mode

41805

Parameter	Description	Value range	
Analogue channels per input slave	Number of analogue channels per input slave	4 channels*	4 channels (variable slave assignment)
		2 channels	2 channels (fixed slave assignment)
		1 channel	1 channel (fixed slave assignment)
		1 channel per A/B slave	1 channel per A/B slave (fixed slave assignment)
Analogue channels per output slave	Number of analogue channels per output slave	4 channels*	4 channels (variable slave assignment)
		2 channels	2 channels (fixed slave assignment)
		1 channel	1 channel (fixed slave assignment)
		1 channel per A/B slave	1 channel per A/B slave (fixed slave assignment)
Modify slave order analogue IN	Order of analogue input slaves can be changed	Disabled*	The order of slaves remains unchanged (basic setting).
		Enabled	The order of slaves can be changed (parameters in the following row).
1st analogue IN slave (slot 9) ... 15th analogue IN slave (slot 9) 1st analogue IN slave (slot 10) ... 15th analogue IN slave (slot 10)	Assignment of analogue input slaves 1 to 15 of AS-i master 1/2 to AS-i slave addresses ! These settings are only effective if parameters `Analogue channels per input slave = 4 channels` and `Modify slave order analogue IN = Enabled`	Slave 1 AS-i master 1 Slave 2 AS-i master 1 ... Slave 31 AS-i master 1 Slave 1 AS-i master 2 Slave 2 AS-i master 2 ... Slave 31 AS-i master 2	
Modify slave order analogue OUT	Order of analogue output slaves can be changed	Disabled	The order of slaves remains unchanged (basic setting).
		Enabled	The order of slaves can be changed (parameters in the following row).
1st analogue OUT slave (slot 11) ... 15th analogue OUT slave (slot 11) 1st analogue OUT slave (slot 12) ... 15th analogue OUT slave (slot 12)	Assignment of analogue output slaves 1 to 15 of AS-i master 1/2 to AS-i slave addresses ! These parameters are only effective if parameters `Analogue channels per out slave = 4 channels` and `Modify slave order analogue OUT = Enabled`	Slave 1 AS-i master 1 Slave 2 AS-i master 1 ... Slave 31 AS-i master 1 Slave 1 AS-i master 2 Slave 2 AS-i master 2 ... Slave 31 AS-i master 2*	
Fail-safe state	Behaviour of the slave outputs if an interrupted fieldbus connection is detected	Reset outputs*	All AS-i outputs are switched off in case of an interrupted Profinet connection (value = 0).
		Hold outputs	The outputs are held in the last valid state that existed before the interrupted connection was detected.
Change byte order	Change byte order in a word	Disabled*	Byte order in a word remains unchanged.

Parameter	Description	Value range	
	Setting applies to all data of object class 4, instances 100 and 150	Enabled	Byte order in a word is inverted.
AS-i parameter download	Transmission of AS-i slave parameters from host to AC422S	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.
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	P3...P0 = 0x0 (= 0b0000) ... P3...P0 = 0xF (= 0b1111) for single slaves* P3...P0 = 0x7 (= 0b0111) for A/B slaves*	

* ... Default settings

In 'Top-down' configuration mode, the device-specific parameters are set via the fieldbus projection software (→**Configuration mode: Top-Down** (→ S. 233)).

Parameter setting via the configuration assembly object

Content

41804

In → **Configuration mode: Top-Down** (→ S. 233), the parameter data are set in the EtherNet/IP projection software (→ **Configuration mode: Top-Down** (→ S. 233)). By means of the configuration assembly object, the configuration is then transferred to the device and activated.

Only when a connection is established by the I/O scanner will the parameter data configured via the configuration assembly object be transferred to the device. Changes to the parameter data in the online mode of the controller will therefore only become effective after the next connection.

To trigger a new connection setup, perform one of the following actions:

- Reboot the device
- Perform a system reset (→ **System reset**)
- Briefly interrupt the EtherNet/IP connection between the I/O scanner and the device
- Transfer the project from the higher-level controller to the device (download)
- Restart the I/O scanner

The configuration in top-down mode includes the following parameters:

- **Parameters of the fieldbus slots** (→ S. 193)
- **Device-specific parameters** (→ S. 186)

Device-specific parameters

41582

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.Failsafe state	n=60	00	X	X	Reset AS-i outputs
		01			Hold AS-i outputs
C.Swap byteorder	n=61	00	X	X	deactivated
		01			activated
C.Analogue channels IN	n=62	01			1 channel
		02			2 channels
		04	X	X	4 channels
		0B			1 channel per A/B
C.Analogue channels OUT	n=63	01			1 channel
		02			2 channels
		04	X	X	4 channels
		0B			1 channel per A/B
C.Analogue IN order [1]	n=64	00	X	X	deactivated
		01			activated
C.1st analogue IN Slot 9 [2]	n=65	41 ... 5F	41	41	AS-i 1 slave **1**... 31
		81 ... 9F			AS-i 2 slave 1... 31
C.2nd analogue IN Slot 9 [2]	n=66	41 ... 5F	42	42	AS-i 1 slave 1, **2** ... 31
		81 ... 9F			AS-i 2 slave 1... 31
C.3rd analogue IN Slot 9 [2]	n=67	41 ... 5F	43	43	AS-i 1 slave 1 ... **3** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.4th analogue IN Slot 9 [2]	n=68	41 ... 5F	44	44	AS-i 1 slave 1 ... **4** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.5th analogue IN Slot 9 [2]	n=69	41 ... 5F	45	45	AS-i 1 slave 1 ... **5** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.6th analogue IN Slot 9 [2]	n=70	41 ... 5F	46	46	AS-i 1 slave 1 ... **6** ... 31
		81 ... 9F			AS-i 2 slave 1... 31
C.7th analogue IN Slot 9 [2]	n=71	41 ... 5F	47	47	AS-i 1 slave 1 ... **7** 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.8th analogue IN Slot 9 [2]	n=72	41 ... 5F	48	48	AS-i 1 slave 1 .. **8** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.9th analogue IN Slot 9 [2]	n=73	41 ... 5F	49	49	AS-i 1 slave 1 ... **9** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.10th analogue IN Slot 9 [2]	n=74	41 ... 5F	4A	4A	AS-i 1 slave 1 ... **10** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.11th analogue IN Slot 9 [2]	n=75	41 ... 5F	4B	4B	AS-i 1 slave 1 ... **11** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.12th analogue IN Slot 9 [2]	n=76	41 ... 5F	4C	4D	AS-i 1 slave 1 ... **12** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.13th analogue IN Slot 9 [2]	n=77	41 ... 5F	4D	4D	AS-i 1 slave 1 ... **13** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.14th analogue IN Slot 9 [2]	n=78	41 ... 5F	4E	4E	AS-i 1 slave 1 ... **14** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
	n=79	41 ... 5F	4F	4F	AS-i 1 slave 1 ... **15** ... 31

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.15th analogue IN Slot 9 [2]		81 ... 9F			AS-i 2 slave 1 ... 31
C.1st analogue IN Slot 10 [2]	n=80	41 ... 5F	81	81	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave **1** ... 31
C.2nd analogue IN Slot 10 [2]	n=81	41 ... 5F	82	82	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1, **2** ... 31
C.3rd analogue IN Slot 10 [2]	n=82	41 ... 5F	83	83	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **3** ... 31
C.4th analogue IN Slot 10 [2]	n=83	41 ... 5F	84	84	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **4** ... 31
C.5th analogue IN Slot 10 [2]	n=84	41 ... 5F	85	85	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **5** ... 31
C.6th analogue IN Slot 10 [2]	n=85	41 ... 5F	86	86	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **6** ... 31
C.7th analogue IN Slot 10 [2]	n=86	41 ... 5F	87	87	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **7** ... 31
C.8th analogue IN Slot 10 [2]	n=87	41 ... 5F	88	88	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **8** ... 31
C.9th analogue IN Slot 10 [2]	n=88	41 ... 5F	89	89	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **9** ... 31
C.10th analogue IN Slot 10 [2]	n=89	41 ... 5F	8A	8A	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **10** ... 31
C.11th analogue IN Slot 10 [2]	n=90	41 ... 5F	8B	8B	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **11** ... 31
C.12th analogue IN Slot 10 [2]	n=91	41 ... 5F	8C	8C	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **12** ... 31
C.13th analogue IN Slot 10 [2]	n=92	41 ... 5F	8D	8D	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **13** ... 31
C.14th analogue IN Slot 10 [2]	n=93	41 ... 5F	8E	8E	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **14** ... 31
C.15th analogue IN Slot 10 [2]	n=94	41 ... 5F	8F	8F	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **15** ... 31
C.Analogue OUT order [1]	n=95	00	X	X	deactivated
		01			activated
C.1st analogue OUT Slot 11 [3]	n=96	41 ... 5F	50	50	AS-i 1 slave 1 ... **16** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.2nd analogue OUT Slot 11 [3]	n=97	41 ... 5F	51	51	AS-i 1 slave 1 ... **17** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.3rd analogue OUT Slot 11 [3]	n=98	41 ... 5F	52	52	AS-i 1 slave 1 ... **18** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.4th analogue OUT Slot 11 [3]	n=99	41 ... 5F	53	53	AS-i 1 slave 1 ... **19** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.5th analogue OUT Slot 11 [3]	n=100	41 ... 5F	54	54	AS-i 1 slave 1 ... **20** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.6th analogue OUT Slot 11 [3]	n=101	41 ... 5F	55	55	AS-i 1 slave 1 ... **21** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.7th analogue OUT Slot 11 [3]	n=102	41 ... 5F	56	56	AS-i 1 slave 1 ... **22** ... 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.8th analogue OUT Slot 11 [3]	n=103	41 ... 5F	57	57	AS-i 1 slave 1 ... **23** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.9th analogue OUT Slot 11 [3]	n=104	41 ... 5F	58	58	AS-i 1 slave 1 ... **24** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.10th analogue OUT slot 11 [3]	n=105	41 ... 5F	59	59	AS-i 1 slave 1 ... **25** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.11th analogue OUT slot 11 [3]	n=106	41 ... 5F	5A	5A	AS-i 1 slave 1 ... **26** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.12th analogue OUT slot 11 [3]	n=107	41 ... 5F	5B	5B	AS-i 1 slave 1 ... **27** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.13th analogue OUT slot 11 [3]	n=108	41 ... 5F	5C	5C	AS-i 1 slave 1 ... **28** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.14th analogue OUT slot 11 [3]	n=109	41 ... 5F	5D	5D	AS-i 1 slave 1 ... **29** ...31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.15th analogue OUT slot 11 [3]	n=110	41 ... 5F	5E	5E	AS-i 1 slave 1 ... **30**, 31
		81 ... 9F			AS-i 2 slave 1 ... 31
C.1st analogue OUT Slot 12 [3]	n=111	41 ... 5F	91	91	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **16** ... 31
C.2nd analogue OUT Slot 12 [3]	n=112	41 ... 5F	92	92	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **17** ... 31
C.3rd analogue OUT Slot 12 [3]	n=113	41 ... 5F	93	93	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **18** ... 31
C.4th analogue OUT Slot 12 [3]	n=114	41 ... 5F	94	94	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **19** ... 31
C.5th analogue OUT slot 12 [3]	n=115	41 ... 5F	95	95	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **20** ... 31
C.6th analogue OUT slot 12 [3]	n=116	41 ... 5F	96	96	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **21** ... 31
C.7th analogue OUT slot 12 [3]	n=117	41 ... 5F	97	97	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **22** ... 31
C.8th analogue OUT slot 12 [3]	n=118	41 ... 5F	98	98	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **23** ... 31
C.9th analogue OUT slot 12 [3]	n=119	41 ... 5F	99	99	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **24** ... 31
C.10th analogue OUT slot 12 [3]	n=120	41 ... 5F	9A	9A	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **25** ... 31
C.11th analogue OUT slot 12 [3]	n=121	41 ... 5F	9B	9B	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **26** ... 31
C.12th analogue OUT slot 12 [3]	n=122	41 ... 5F	9B	9B	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **27** ... 31
C.13th analogue OUT slot 12 [3]	n=123	41 ... 5F	9C	9C	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **28** ... 31
	n=124	41 ... 5F	9D	9D	AS-i 1 slave 1 ... 31

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.14th analogue OUT slot 12 [3]		81 ... 9F			AS-i 2 slave 1 ... **29** ... 31
C.15th analogue OUT slot 12 [3]	n=125	41 ... 5F	9E	9E	AS-i 1 slave 1 ... 31
		81 ... 9F			AS-i 2 slave 1 ... **30**, 31
C.AS-i Parameter Download [1]	n=126	00	X	X	deactivated
		01			activated
C.Parameter slave 1(A) AS-i 1 [4]	n=127	00 ... 0F	0F	0F	Parameter for AS-i slave 1(A)
C.Parameter slave 2(A) AS-i 1 [4]	n=128	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 2(A)
C.Parameter slave 3(A) AS-i 1 [4]	n=129	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 3(A)
C.Parameter slave 4(A) AS-i 1 [4]	n=130	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 4(A)
C.Parameter slave 5(A) AS-i 1 [4]	n=131	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 5(A)
C.Parameter slave 6(A) AS-i 1 [4]	n=132	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 6(A)
C.Parameter slave 7(A) AS-i 1 [4]	n=133	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 7(A)
C.Parameter slave 8(A) AS-i 1 [4]	n=134	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 8(A)
C.Parameter slave 9(A) AS-i 1 [4]	n=135	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 9(A)
C.Parameter slave 10(A) AS-i 1 [4]	n=136	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 10(A)
C.Parameter slave 11(A) AS-i 1 [4]	n=137	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 11(A)
C.Parameter slave 12(A) AS-i 1 [4]	n=138	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 12(A)
C.Parameter slave 13(A) AS-i 1 [4]	n=139	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 13(A)
C.Parameter slave 14(A) AS-i 1 [4]	n=140	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 14(A)
C.Parameter slave 15(A) AS-i 1 [4]	n=141	00 ... 0F	0F	0F	Parameter for AS-i slave 15(A)
C.Parameter slave 16(A) AS-i 1 [4]	n=142	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 16(A)
C.Parameter slave 17(A) AS-i 1 [4]	n=143	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 17(A)
C.Parameter slave 18(A) AS-i 1 [4]	n=144	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 18(A)
C.Parameter slave 19(A) AS-i 1 [4]	n=145	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 19(A)
C.Parameter slave 20(A) AS-i 1 [4]	n=146	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 20(A)
C.Parameter slave 21(A) AS-i 1 [4]	n=147	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 21(A)
C.Parameter slave 22(A) AS-i 1 [4]	n=148	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 22(A)
C.Parameter slave 23(A) AS-i 1 [4]	n=149	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 23(A)
C.Parameter slave 24(A) AS-i 1 [4]	n=150	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 24(A)
C.Parameter slave 25(A) AS-i 1 [4]	n=151	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 25(A)

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.Parameter slave 26(A) AS-i 1 [4]	n=152	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 26(A)
C.Parameter slave 27(A) AS-i 1 [4]	n=153	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 27(A)
C.Parameter slave 28(A) AS-i 1 [4]	n=154	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 28(A)
C.Parameter slave 29(A) AS-i 1 [4]	n=155	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 29(A)
C.Parameter slave 30(A) AS-i 1 [4]	n=156	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 30(A)
C.Parameter slave 31(A) AS-i 1 [4]	n=157	00 ... 0F	0F	0F	Parameter for AS-i 1 slave 31(A)
C.Parameter slave 1B AS-i 1 [4]	n=158	00 ... 0F	07	07	Parameter for AS-i 1 slave 1B
C.Parameter slave 2B AS-i 1 [4]	n=159	00 ... 0F	07	07	Parameter for AS-i 1 slave 2B
C.Parameter slave 3B AS-i 1 [4]	n=160	00 ... 0F	07	07	Parameter for AS-i 1 slave 3B
C.Parameter slave 4B AS-i 1 [4]	n=161	00 ... 0F	07	07	Parameter for AS-i 1 slave 4B
C.Parameter slave 5B AS-i 1 [4]	n=162	00 ... 0F	07	07	Parameter for AS-i 1 slave 5B
C.Parameter slave 6B AS-i 1 [4]	n=163	00 ... 0F	07	7	Parameter for AS-i 1 slave 6B
C.Parameter slave 7B AS-i 1 [4]	n=1564	00 ... 0F	07	07	Parameter for AS-i 1 slave 7B
C.Parameter slave 8B AS-i 1 [4]	n=165	00 ... 0F	07	07	Parameter for AS-i 1 slave 8B
C.Parameter slave 9B AS-i 1 [4]	n=166	00 ... 0F	07	07	Parameter for AS-i 1 slave 9B
C.Parameter slave 10B AS-i 1 [4]	n=167	00 ... 0F	07	07	Parameter for AS-i 1 slave 10B
C.Parameter slave 11B AS-i 1 [4]	n=168	00 ... 0F	07	07	Parameter for AS-i 1 slave 11B
C.Parameter slave 12B AS-i 1 [4]	n=169	00 ... 0F	07	07	Parameter for AS-i 1 slave 12B
C.Parameter slave 13B AS-i 1 [4]	n=170	00 ... 0F	07	07	Parameter for AS-i 1 slave 13B
C.Parameter slave 14B AS-i 1 [4]	n=171	00 ... 0F	07	07	Parameter for AS-i 1 slave 14B
C.Parameter slave 15B AS-i 1 [4]	n=172	00 ... 0F	07	07	Parameter for AS-i 1 slave 15B
C.Parameter slave 16B AS-i 1 [4]	n=173	00 ... 0F	07	07	Parameter for AS-i 1 slave 16B
C.Parameter slave 17B AS-i 1 [4]	n=174	00 ... 0F	07	07	Parameter for AS-i 1 slave 17B
C.Parameter slave 18B AS-i 1 [4]	n=175	00 ... 0F	07	07	Parameter for AS-i 1 slave 18B
C.Parameter slave 19B AS-i 1 [4]	n=176	00 ... 0F	07	07	Parameter for AS-i 1 slave 19B
C.Parameter slave 20B AS-i 1 [4]	n=177	00 ... 0F	07	07	Parameter for AS-i 1 slave 20B
C.Parameter slave 21B AS-i 1 [4]	n=178	00 ... 0F	07	07	Parameter for AS-i 1 slave 21B
C.Parameter slave 22B AS-i 1 [4]	n=179	00 ... 0F	07	07	Parameter for AS-i 1 slave 22B

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.Parameter slave 23B AS-i 1 [4]	n=180	00 ... 0F	07	07	Parameter for AS-i 1 slave 23B
C.Parameter slave 24B AS-i 1 [4]	n=181	00 ... 0F	07	07	Parameter for AS-i 1 slave 24B
C.Parameter slave 25B AS-i 1 [4]	n=182	00 ... 0F	07	07	Parameter for AS-i 1 slave 25B
C.Parameter slave 26B AS-i 1 [4]	n=183	00 ... 0F	07	07	Parameter for AS-i 1 slave 26B
C.Parameter slave 27B AS-i 1 [4]	n=184	00 ... 0F	07	07	Parameter for AS-i 1 slave 27B
C.Parameter slave 28B AS-i 1 [4]	n=185	00 ... 0F	07	07	Parameter for AS-i 1 slave 28B
C.Parameter slave 29B AS-i 1 [4]	n=186	00 ... 0F	07	07	Parameter for AS-i 1 slave 29B
C.Parameter slave 30B AS-i 1 [4]	n=187	00 ... 0F	07	07	Parameter for AS-i 1 slave 30B
C.Parameter slave 31B AS-i 1 [4]	n=188	00 ... 0F	07	07	Parameter for AS-i 1 slave 31B
C.Parameter slave 1(A) AS-i 2 [4]	n=189	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 1(A)
C.Parameter slave 2(A) AS-i 2 [4]	n=190	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 2(A)
C.Parameter slave 3(A) AS-i 2 [4]	n=191	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 3(A)
C.Parameter slave 4(A) AS-i 2 [4]	n=192	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 4(A)
C.Parameter slave 5(A) AS-i 2 [4]	n=193	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 5(A)
C.Parameter slave 6(A) AS-i 2 [4]	n=194	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 6(A)
C.Parameter slave 7(A) AS-i 2 [4]	n=195	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 7(A)
C.Parameter slave 8(A) AS-i 2 [4]	n=196	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 8(A)
C.Parameter slave 9(A) AS-i 2 [4]	n=197	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 9(A)
C.Parameter slave 10(A) AS-i 2 [4]	n=198	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 10(A)
C.Parameter slave 11(A) AS-i 2 [4]	n=199	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 11(A)
C.Parameter slave 12(A) AS-i 2 [4]	n=200	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 12(A)
C.Parameter slave 13(A) AS-i 2 [4]	n=201	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 13(A)
C.Parameter slave 14(A) AS-i 2 [4]	n=202	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 14(A)
C.Parameter slave 15(A) AS-i 2 [4]	n=203	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 15(A)
C.Parameter slave 16(A) AS-i 2 [4]	n=204	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 16(A)
C.Parameter slave 17(A) AS-i 2 [4]	n=205	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 17(A)
C.Parameter slave 18(A) AS-i 2 [4]	n=206	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 18(A)
C.Parameter slave 19(A) AS-i 2 [4]	n=207	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 19(A)

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.Parameter slave 20(A) AS-i 2 [4]	n=208	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 20(A)
C.Parameter slave 21(A) AS-i 2 [4]	n=209	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 21(A)
C.Parameter slave 22(A) AS-i 2 [4]	n=210	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 22(A)
C.Parameter slave 23(A) AS-i 2 [4]	n=211	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 23(A)
C.Parameter slave 24(A) AS-i 2 [4]	n=212	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 24(A)
C.Parameter slave 25(A) AS-i 2 [4]	n=213	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 25(A)
C.Parameter slave 26(A) AS-i 2 [4]	n=214	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 26(A)
C.Parameter slave 27(A) AS-i 2 [4]	n=215	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 27(A)
C.Parameter slave 28(A) AS-i 2 [4]	n=216	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 28(A)
C.Parameter slave 29(A) AS-i 2 [4]	n=217	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 29(A)
C.Parameter slave 30(A) AS-i 2 [4]	n=218	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 30(A)
C.Parameter slave 31(A) AS-i 2 [4]	n=219	00 ... 0F	0F	0F	Parameter for AS-i 2 slave 31(A)
C.Parameter slave 1B AS-i 2 [4]	n=220	00 ... 0F	07	07	Parameter for AS-i 2 slave 1B
C.Parameter slave 2B AS-i 2 [4]	n=221	00 ... 0F	07	07	Parameter for AS-i 2 slave 2B
C.Parameter slave 3B AS-i 2 [4]	n=222	00 ... 0F	07	07	Parameter for AS-i 2 slave 3B
C.Parameter slave 4B AS-i 2 [4]	n=223	00 ... 0F	07	07	Parameter for AS-i 2 slave 4B
C.Parameter slave 5B AS-i 2 [4]	n=224	00 ... 0F	07	07	Parameter for AS-i 2 slave 5B
C.Parameter slave 6B AS-i 2 [4]	n=225	00 ... 0F	07	07	Parameter for AS-i 2 slave 6B
C.Parameter slave 7B AS-i 2 [4]	n=226	00 ... 0F	07	07	Parameter for AS-i 2 slave 7B
C.Parameter slave 8B AS-i 2 [4]	n=227	00 ... 0F	07	07	Parameter for AS-i 2 slave 8B
C.Parameter slave 9B AS-i 2 [4]	n=228	00 ... 0F	07	07	Parameter for AS-i 2 slave 9B
C.Parameter slave 10B AS-i 2 [4]	n=229	00 ... 0F	07	07	Parameter for AS-i 2 slave 10B
C.Parameter slave 11B AS-i 2 [4]	n=230	00 ... 0F	07	07	Parameter for AS-i 2 slave 11B
C.Parameter slave 12B AS-i 2 [4]	n=231	00 ... 0F	07	07	Parameter for AS-i 2 slave 12B
C.Parameter slave 13B AS-i 2 [4]	n=232	00 ... 0F	07	07	Parameter for AS-i 2 slave 13B
C.Parameter slave 14B AS-i 2 [4]	n=233	00 ... 0F	07	07	Parameter for AS-i 2 slave 14B
C.Parameter slave 15B AS-i 2 [4]	n=234	00 ... 0F	07	07	Parameter for AS-i 2 slave 15B
C.Parameter slave 16B AS-i 2 [4]	n=235	00 ... 0F	07	07	Parameter for AS-i 2 slave 16B

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
C.Parameter slave 17B AS-i 2 [4]	n=236	00 ... 0F	07	07	Parameter for AS-i 2 slave 17B
C.Parameter slave 18B AS-i 2 [4]	n=237	00 ... 0F	07	07	Parameter for AS-i 2 slave 18B
C.Parameter slave 19B AS-i 2 [4]	n=238	00 ... 0F	07	07	Parameter for AS-i 2 slave 19B
C.Parameter slave 20B AS-i 2 [4]	n=239	00 ... 0F	07	07	Parameter for AS-i 2 slave 20B
C.Parameter slave 21B AS-i 2 [4]	n=240	00 ... 0F	07	07	Parameter for AS-i 2 slave 21B
C.Parameter slave 22B AS-i 2 [4]	n=241	00 ... 0F	07	07	Parameter for AS-i 2 slave 22B
C.Parameter slave 23B AS-i 2 [4]	n=242	00 ... 0F	07	07	Parameter for AS-i 2 slave 23B
C.Parameter slave 24B AS-i 2 [4]	n=243	00 ... 0F	07	07	Parameter for AS-i 2 slave 24B
C.Parameter slave 25B AS-i 2 [4]	n=244	00 ... 0F	07	07	Parameter for AS-i 2 slave 25B
C.Parameter slave 26B AS-i 2 [4]	n=245	00 ... 0F	07	07	Parameter for AS-i 2 slave 26B
C.Parameter slave 27B AS-i 2 [4]	n=246	00 ... 0F	07	07	Parameter for AS-i 2 slave 27B
C.Parameter slave 28B AS-i 2 [4]	n=247	00 ... 0F	07	07	Parameter for AS-i 2 slave 28B
C.Parameter slave 29B AS-i 2 [4]	n=248	00 ... 0F	07	07	Parameter for AS-i 2 slave 29B
C.Parameter slave 30B AS-i 2 [4]	n=249	00 ... 0F	07	07	Parameter for AS-i 2 slave 30B
C.Parameter slave 31B AS-i 2 [4]	n=250	00 ... 0F	07	07	Parameter for AS-i 2 slave 31B

Legend:
1 = Free slave assignment only possible in top-down mode.
2 = Parameter can only be set if [C.analogue IN order] = 01 and [C.Analogue channels IN] = 4 channels
3 = Parameter can only be set if [C.analogue OUT order] = 01 and [C.Analogue channels OUT] = 4 channels
4 = Parameter can only be set if [C.AS-i param. download] = 01

Parameters of the fieldbus slots

41803

NOTICE!

For the transmission of cyclic process data between the device and the EtherNet/IP PLC, a limited number of data words is available for each direction of transmission:

- Input data (= modules 1, 3, 5, 7, 9, 10, 13, 14): 248 words
- Output data (= modules 2, 4, 6, 8, 11, 12, 15): 248 words

If the EtherNet/IP modules have been parameterised in such a way 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.

► Parameterise the EtherNet/IP modules in a way to ensure that the input and output data do not exceed the maximum number of words to be transmitted.

Slot [dec]	Data points in the configuration assembly		Possible setting values [hex]				Default values when using EDS file		Description
	with EDS	without EDS	n+3	n+2	n+1	n	AC1421	AC1422	
1	C.Slot1	n=0	00	00	00	00			Empty module
			00	00	10	02			1: digital IN AS-i 1, Slaves 01(A) ... 03(A)
			00	00	10	04			1: digital IN AS-i 1, Slaves 01(A) ... 07(A)
			00	00	10	06			1: digital IN AS-i 1, Slaves 01(A) ... 11(A)
			00	00	10	08			1: digital IN AS-i 1, Slaves 01(A) ... 15(A)
			00	00	10	0A			1: digital IN AS-i 1, Slaves 01(A) ... 19(A)
			00	00	10	0C			1: digital IN AS-i 1, Slaves 01(A) ... 23(A)
			00	00	10	0E			1: digital IN AS-i 1, Slaves 01(A) ... 27(A)
			00	00	10	10	X	X	1: digital IN AS-i 1, Slaves 01(A) ... 31(A)
2	C.Slot2	n=4	00	00	00	00			Empty module
			00	00	20	02			2: digital OUT AS-i 1, Slaves 01(A) ... 03(A)
			00	00	20	04			2: digital OUT AS-i 1, Slaves 01(A) ... 07(A)
			00	00	20	06			2: digital OUT AS-i 1, Slaves 01(A) ... 11(A)
			00	00	20	08			2: digital OUT AS-i 1, Slaves 01(A) ... 15(A)
			00	00	20	0A			2: digital OUT AS-i 1, Slaves 01(A) ... 19(A)
			00	00	20	0C			2: digital OUT AS-i 1, Slaves 01(A) ... 23(A)
			00	00	20	0E			2: digital OUT AS-i 1, Slaves 01(A) ... 27(A)
			00	00	20	10	X	X	2: digital OUT AS-i 1, Slaves 01(A) ... 31(A)
3	C.Slot3	n=8	00	00	00	00	X		Empty module
			00	02	10	02			3: digital IN AS-i 2, Slaves 01(A) ... 03(A)
			00	02	10	04			3: digital IN AS-i 2, Slaves 01(A) ... 07(A)
			00	02	10	06			3: digital IN AS-i 2, Slaves 01(A) ... 11(A)
			00	02	10	08			3: digital IN AS-i 2, Slaves 01(A) ... 15(A)
			00	02	10	0A			3: digital IN AS-i 2, Slaves 01(A) ... 19(A)
			00	02	10	0C			3: digital IN AS-i 2, Slaves 01(A) ... 23(A)
			00	02	10	0E			3: digital IN AS-i 2, Slaves 01(A) ... 27(A)
			00	02	10	10		X	3: digital IN AS-i 2, Slaves 01(A) ... 31(A)
4	C.Slot4	n=12	00	00	00	00	X		Empty module
			00	02	20	02			4: digital OUT AS-i 2, Slaves 01(A) ... 03(A)
			00	02	20	04			4: digital OUT AS-i 2, Slaves 01(A) ... 07(A)
			00	02	20	06			4: digital OUT AS-i 2, Slaves 01(A) ... 11(A)
			00	02	20	08			4: digital OUT AS-i 2, Slaves 01(A) ... 15(A)
			00	02	20	0A			4: digital OUT AS-i 2, Slaves 01(A) ... 19(A)
			00	02	20	0C			4: digital OUT AS-i 2, Slaves 01(A) ... 23(A)
			00	02	20	0E			4: digital OUT AS-i 2, Slaves 01(A) ... 27(A)
			00	02	20	10		X	4: digital OUT AS-i 2, Slaves 01(A) ... 31(A)
5	C.Slot5	n=16	00	00	00	00			Empty module
			00	01	10	02			5: digital IN AS-i 1, Slaves 01B ... 03B
			00	01	10	04			5: digital IN AS-i 1, Slaves 01B ... 07B
			00	01	10	06			5: digital IN AS-i 1, Slaves 01B ... 11B
			00	01	10	08			5: digital IN AS-i 1, Slaves 01B ... 15B
			00	01	10	0A			5: digital IN AS-i 1, Slaves 01B ... 19B
			00	01	10	0C			5: digital IN AS-i 1, Slaves 01B ... 23B
			00	01	10	0E			5: digital IN AS-i 1, Slaves 01B ... 27B
			00	01	10	10	X	X	5: digital IN AS-i 1, Slaves 01B ... 31B

Slot [dec]	Data points in the configuration assembly		Possible setting values [hex]				Default values when using EDS file		Description
	with EDS	without EDS	n+3	n+2	n+1	n	AC1421	AC1422	
6	C.Slot6	n=20	00	00	00	00			Empty module
			00	01	20	02			6: digital OUT AS-i 1, Slaves 01B ... 03B
			00	01	20	04			6: digital OUT AS-i 1, Slaves 01B ... 07B
			00	01	20	06			6: digital OUT AS-i 1, Slaves 01B ... 11B
			00	01	20	08			6: digital OUT AS-i 1, Slaves 01B ... 15B
			00	01	20	0A			6: digital OUT AS-i 1, Slaves 01B ... 19B
			00	01	20	0C			6: digital OUT AS-i 1, Slaves 01B ... 23B
			00	01	20	0E			6: digital OUT AS-i 1, Slaves 01B ... 27B
			00	01	20	10	X	X	6: digital OUT AS-i 1, Slaves 01B ... 31B
7	C.Slot7	n=24	00	00	00	00	X		Empty module
			00	03	10	02			7: digital IN AS-i 2, Slaves 01B ... 03B
			00	03	10	04			7: digital IN AS-i 2, Slaves 01B ... 07B
			00	03	10	06			7: digital IN AS-i 2, Slaves 01B ... 11B
			00	03	10	08			7: digital IN AS-i 2, Slaves 01B ... 15B
			00	03	10	0A			7: digital IN AS-i 2, Slaves 01B ... 19B
			00	03	10	0C			7: digital IN AS-i 2, Slaves 01B ... 23B
			00	03	10	0E			7: digital IN AS-i 2, Slaves 01B ... 27B
			00	03	10	10		X	7: digital IN AS-i 2, Slaves 01B ... 31B
8	C.Slot8	n=28	00	00	00	00	X		Empty module
			00	03	20	02			8: digital OUT AS-i 2, Slaves 01B ... 03B
			00	03	20	04			8: digital OUT AS-i 2, Slaves 01B ... 07B
			00	03	20	06			8: digital OUT AS-i 2, Slaves 01B ... 11B
			00	03	20	08			8: digital OUT AS-i 2, Slaves 01B ... 15B
			00	03	20	0A			8: digital OUT AS-i 2, Slaves 01B ... 19B
			00	03	20	0C			8: digital OUT AS-i 2, Slaves 01B ... 23B
			00	03	20	0E			8: digital OUT AS-i 2, Slaves 01B ... 27B
			00	03	20	10		X	8: digital OUT AS-i 2, Slaves 01B ... 31B
9	C.Slot9	n=32	00	00	00	00			Empty module
			00	00	50	08			9: analog IN range 1, 04 words
			00	00	50	10			9: analog IN range 1, 08 words
			00	00	50	18			9: analog IN range 1, 12 words
			00	00	50	20			9: analog IN range 1, 16 words
			00	00	50	28			9: analog IN range 1, 20 words
			00	00	50	30			9: analog IN range 1, 24 words
			00	00	50	38			9: analog IN range 1, 28 words
			00	00	50	40			9: analog IN range 1, 32 words
			00	00	50	48			9: analog IN range 1, 36 words
			00	00	50	50			9: analog IN range 1, 40 words
			00	00	50	58			9: analog IN range 1, 44 words
			00	00	50	60			9: analog IN range 1, 48 words
			00	00	50	68			9: analog IN range 1, 52 words
			00	00	50	70			9: analog IN range 1, 56 words
			00	00	50	78	X	X	9: analog IN range 1, 60 words

Slot [dec]	Data points in the configuration assembly		Possible setting values [hex]				Default values when using EDS file		Description
	with EDS	without EDS	n+3	n+2	n+1	n	AC1421	AC1422	
10	C.Slot10	n=36	00	00	00	00	X		Empty module
			00	00	50	08			10: analog IN range 2, 04 words
			00	00	50	10			10: analog IN range 2, 08 words
			00	00	50	18			10: analog IN range 2, 12 words
			00	00	50	20			10: analog IN range 2, 16 words
			00	00	50	28			10: analog IN range 2, 20 words
			00	00	50	30			10: analog IN range 2, 24 words
			00	00	50	38			10: analog IN range 2, 28 words
			00	00	50	40			10: analog IN range 2, 32 words
			00	00	50	48			10: analog IN range 2, 36 words
			00	00	50	50			10: analog IN range 2, 40 words
			00	00	50	58			10: analog IN range 2, 44 words
			00	00	50	60			10: analog IN range 2, 48 words
			00	00	50	68			10: analog IN range 2, 52 words
			00	00	50	70			10: analog IN range 2, 56 words
			00	00	50	78		X	10: analog IN range 2, 60 words
11	C.Slot11	n=40	00	00	00	00			Empty module
			00	00	60	08			11: analog OUT range 1, 04 words
			00	00	60	10			11: analog OUT range 1, 08 words
			00	00	60	18			11: analog OUT range 1, 12 words
			00	00	60	20			11: analog OUT range 1, 16 words
			00	00	60	28			11: analog OUT range 1, 20 words
			00	00	60	30			11: analog OUT range 1, 24 words
			00	00	60	38			11: analog OUT range 1, 28 words
			00	00	60	40			11: analog OUT range 1, 32 words
			00	00	60	48			11: analog OUT range 1, 36 words
			00	00	60	50			11: analog OUT range 1, 40 words
			00	00	60	58			11: analog OUT range 1, 44 words
			00	00	60	60			11: analog OUT range 1, 48 words
			00	00	60	68			11: analog OUT range 1, 52 words
			00	00	60	70			11: analog OUT range 1, 56 words
			00	00	60	78	X	X	11: analog OUT range 1, 60 words
12	C.Slot12	n=44	00	00	00	00	X		Empty module
			00	00	60	08			12: analog OUT range 2, 04 words
			00	00	60	10			12: analog OUT range 2, 08 words
			00	00	60	18			12: analog OUT range 2, 12 words
			00	00	60	20			12: analog OUT range 2, 16 words
			00	00	60	28			12: analog OUT range 2, 20 words
			00	00	60	30			12: analog OUT range 2, 24 words
			00	00	60	38			12: analog OUT range 2, 28 words
			00	00	60	40			12: analog OUT range 2, 32 words
			00	00	60	48			12: analog OUT range 2, 36 words

Slot [dec]	Data points in the configuration assembly		Possible setting values [hex]				Default values when using EDS file		Description
	with EDS	without EDS	n+3	n+2	n+1	n	AC1421	AC1422	
			00	00	60	50			12: analog OUT range 2, 40 words
			00	00	60	58			12: analog OUT range 2, 44 words
			00	00	60	60			12: analog OUT range 2, 48 words
			00	00	60	68			12: analog OUT range 2, 52 words
			00	00	60	70			12: analog OUT range 2, 56 words
			00	00	60	78		X	12: analog OUT range 2, 60 words
13	C.Slot13	n=48	00	00	00	00			Empty module
			00	00	D0	32	X		13: AC1421 (25 words)
			00	02	D0	64		X	13: AC1422 (50 words)
			00	00	D0	1A			13: AC13x7 AS-i 1 (13 words)
			00	02	D0	34			13: AC13x7 AS-i 1+2 (26 words)
14	C.Slot14	n=52	00	00	00	00	X	X	Empty module
			00	04	10	08			14: Inputs from AC142n-PLC, 4 words
			00	04	10	10			14: Inputs from AC142n-PLC, 8 words
			00	04	10	18			14: Inputs from AC142n-PLC, 12 words
			00	04	10	20			14: Inputs from AC142n-PLC, 16 words
			00	04	10	28			14: Inputs from AC142n-PLC, 20 words
			00	04	10	30			14: Inputs from AC142n-PLC, 24 words
			00	04	10	38			14: Inputs from AC142n-PLC, 28 words
			00	04	10	40			14: Inputs from AC142n-PLC, 32 words
			00	04	10	48			14: Inputs from AC142n-PLC, 36 words
			00	04	10	50			14: Inputs from AC142n-PLC, 40 words
			00	04	10	58			14: Inputs from AC142n-PLC, 44 words
			00	04	10	60			14: Inputs from AC142n-PLC, 48 words
			00	04	10	68			14: Inputs from AC142n-PLC, 52 words
			00	04	10	70			14: Inputs from AC142n-PLC, 56 words
			00	04	10	78			14: Inputs from AC142n-PLC, 60 words
			00	04	10	98			14: Inputs from AC142n-PLC, 76 words
			00	04	10	B8			14: Inputs from AC142n-PLC, 92 words
			00	04	10	D8			14: Inputs from AC142n-PLC, 108 words
			00	04	10	F0			14: Inputs from AC142n-PLC, 120 words
15	C.Slot15	n=56	00	00	00	00	X	X	Empty module

Slot [dec]	Data points in the configuration assembly		Possible setting values [hex]				Default values when using EDS file		Description
	with EDS	without EDS	n+3	n+2	n+1	n	AC1421	AC1422	
			00	04	20	08			15: Outputs to AC142n-PLC, 4 words
			00	04	20	10			15: Outputs to AC142n-PLC, 8 words
			00	04	20	18			15: Outputs to AC142n-PLC, 12 words
			00	04	20	20			15: Outputs to AC142n-PLC, 16 words
			00	04	20	28			15: Outputs to AC142n-PLC, 20 words
			00	04	20	30			15: Outputs to AC142n-PLC, 24 words
			00	04	20	38			15: Outputs to AC142n-PLC, 28 words
			00	04	20	40			15: Outputs to AC142n-PLC, 32 words
			00	04	20	48			15: Outputs to AC142n-PLC, 36 words
			00	04	20	50			15: Outputs to AC142n-PLC, 40 words
			00	04	20	58			15: Outputs to AC142n-PLC, 44 words
			00	04	20	60			15: Outputs to AC142n-PLC, 48 words
			00	04	20	68			15: Outputs to AC142n-PLC, 52 words
			00	04	20	70			15: Outputs to AC142n-PLC, 56 words
			00	04	20	78			15: Outputs to AC142n-PLC, 60 words
			00	04	20	98			15: Outputs to AC142n-PLC, 76 words
			00	04	20	B8			15: Outputs to AC142n-PLC, 92 words
			00	04	20	D8			15: Outputs to AC142n-PLC, 108 words
			00	04	20	F0			15: Outputs to AC142n-PLC, 120 words

Derivation of parameter values for free slave assignment

41587

The following table shows the derivation of parameter values for a free assignment of slaves within the analogue areas.

A free assignment of analogue slaves in slots 9...12 can only be applied if the parameters [C.Analogue channels IN] and [C.Analogue channels OUT] are set to the value `4 channels`!

Byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
AS-i 2	AS-i 1	Reserved	Slave address (1...31)				

Legend:

Master:
- AS-i Master 1 = 0x40
- AS-i Master 2 = 0x80

Slave:
- Slave 1 = 0x01
- ...
- Slave 31 = 0x1F

Derivation: byte value = master + slave (→ **Examples** (→ S. 199))

Examples

41497

Byte							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
1	0	0	0x02				

= 0x82 = AS-i master 2, slave 2

0	1	0	0x1F				

= 0x5F = AS-i master 1, slave 31

EDS-file

41503

The EDS file (**E**lectronic **D**ata **S**heet)is used to easily integrate the AC422S in a fieldbus projecting software. The EDS supplies a profile of the fieldbus device in form of an ASCII file. It describes all features of the device such as communication parameters and objects.

The EDS file is saved in the device. It can be downloaded directly to the configuration PC via the web interface (→**Download the device and I/O description** (→ S. 116)).

10.7.4 Cyclic data

41571

The cyclic process data are updated through the fieldbus mechanisms at regular intervals. They belong to the category of implicit messaging (→ **Implicit Messaging**) and are therefore real-time capable.

Slots combine the process data of several AS-i slaves. The following tables show the available EtherNet/IP modules.

The user must set the content and length of the cyclically transmitted data either at the device (→ **Configuration mode: Independent** (→ S. 234)) or in the EtherNet/IP projection software by means the configuration assembly object (→ **Configuration mode: Top-Down** (→ S. 233), → **Parameter setting via the configuration assembly object** (→ S. 185)).

Overview: EtherNet/IP modules

41727

NOTICE!

For the transmission of cyclic process data between the device and the EtherNet/IP PLC, a limited number of data words is available for each direction of transmission:

- Input data (= modules 1, 3, 5, 7, 9, 10, 13, 14): 248 words
- Output data (= modules 2, 4, 6, 8, 11, 12, 15): 248 words

If the EtherNet/IP modules have been parameterised in such a way 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.

► Parameterise the EtherNet/IP modules in a way to ensure that the input and output data do not exceed the maximum number of words to be transmitted.

Slot	Description	Further information
1	Digital input data single or A slaves, AS-i master 1	→ **Slot 1 – Digital input data single or A slaves, AS-i master 1** (→ S. 202)
2	Digital output data single or A slaves, AS-i master 1	→ **Slot 2 – Digital output data single or A slaves, AS-i master 1** (→ S. 202)
3	Digital input data single or A slaves, AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 3 – Digital input data single or A slaves, AS-i master 2** (→ S. 203)
4	Digital output data single or A slaves, AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 4 – Digital output data single or A slaves, AS-i master 2** (→ S. 203)
5	Digital input data B slaves, AS-i master 1	→ **Slot 5 – Digital input data B slaves, AS-i master 1** (→ S. 204)
6	Digital output data B slaves, AS-i master 1	→ **Slot 6 – Digital output data B slaves, AS-i master 1** (→ S. 204)
7	Digital input data B slaves, AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 7 – Digital input data B slaves, AS-i master 2** (→ S. 205)
8	Digital output data B slaves, AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 8 – Digital output data B slaves, AS-i master 2** (→ S. 205)
9	Analogue input data of up to 31 slaves, range 1*	→ **Slot 9 – Analogue input data** (→ S. 208)
10	Analogue input data of up to 31 slaves, range 2*	→ **Slot 10 – Analogue input data** (→ S. 209)
11	Analogue output data of up to 31 slaves, range 1**	→ **Slot 11 – Analogue output data** (→ S. 210)
12	Analogue output data of up to 31 slaves, range 2**	→ **Slot 12 – Analogue output data** (→ S. 211)
13	Diagnostic data	→ **Slot 13 – Diagnostic data** (→ S. 216)
14	Data from the device-internal Standard plc to the EtherNet/IP PLC	→ **Slot 14 – Inputs from Standard plc** (→ S. 223)
15	Data from the EtherNet/IP PLC to the device-internal Standard plc	→ **Slot 15 – Outputs to Standard plc** (→ S. 224)

* ... Define the number of analogue channels and the slave number by means of the device parameters [analogue channels/I-slave] (→ **Device-specific parameters** (→ S. 182)).

** ... Define the number of analogue channels and the slave number by means of the device parameters [analogue channels/O-slave] (→ **Device-specific parameters** (→ S. 182)).

Slot 1 – Digital input data single or A slaves, AS-i master 1

41657

Slot	Description	Value range	Length [words]
1	Digital input data of single or A slaves, connected to AS-i master 1	Empty module = Module is disabled	0
		01 ... 03 = Module is active with slaves 1(A) ... 3(A), AS-i Master 1	1
		01 ... 07 = Module is active with slaves 1(A) ... 7(A), AS-i Master 1	2
		01 ... 11 = Module is active with slaves 1(A) ... 11(A), AS-i Master 1	3
		01 ... 15 = Module is active with slaves 1(A) ... 15(A), AS-i Master 1	4
		01 ... 19 = Module is active with slaves 1(A) ... 19(A), AS-i Master 1	5
		01 ... 23 = Module is active with slaves 1(A) ... 23(A), AS-i Master 1	6
		01 ... 27 = Module is active with slaves 1(A) ...27(A), AS-i Master 1	7
		01 ... 31 = Module is active with slaves 1(A) ... 31(A), AS-i Master 1	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 2 – Digital output data single or A slaves, AS-i master 1

41621

Slot	Description	Value range	Length [words]
2	Digital output data of single or A slaves, connected to AS-i master 1	Empty module = Module is disabled	0
		01 ... 03 = Module is active with slaves 1(A) ... 3(A), AS-i Master 1	1
		01 ... 07 = Module is active with slaves 1(A) ... 7(A), AS-i Master 1	2
		01 ... 11 = Module is active with slaves 1(A) ... 11(A), AS-i Master 1	3
		01 ... 15 = Module is active with slaves 1(A) ... 15(A), AS-i Master 1	4
		01 ... 19 = Module is active with slaves 1(A) ... 19(A), AS-i Master 1	5
		01 ... 23 = Module is active with slaves 1(A) ... 23(A), AS-i Master 1	6
		01 ... 27 = Module is active with slaves 1(A) ...27(A), AS-i Master 1	7
		01 ... 31 = Module is active with slaves 1(A) ... 31(A), AS-i Master 1	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 3 – Digital input data single or A slaves, AS-i master 2

41620

Slot	Description	Value range	Length [words]
3	Digital input data of single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	Empty module = Module is disabled	0
		01 ... 03 = Module is active with slaves 1(A) ... 3(A), AS-i Master 2	1
		01 ... 07 = Module is active with slaves 1(A) ... 7(A), AS-i Master 2	2
		01 ... 11 = Module is active with slaves 1(A) ... 11(A), AS-i Master 2	3
		01 ... 15 = Module is active with slaves 1(A) ... 15(A), AS-i Master 2	4
		01 ... 19 = Module is active with slaves 1(A) ... 19(A), AS-i Master 2	5
		01 ... 23 = Module is active with slaves 1(A) ... 23(A), AS-i Master 2	6
		01 ... 27 = Module is active with slaves 1(A) ...27(A), AS-i Master 2	7
		01 ... 31 = Module is active with slaves 1(A) ... 31(A), AS-i Master 2	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 4 – Digital output data single or A slaves, AS-i master 2

41635

Slot	Description	Value range	Length [words]
4	Digital output data of single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	Empty module = Module is disabled	0
		01 ... 03 = Module is active with slaves 1(A) ... 3(A), AS-i Master 2	1
		01 ... 07 = Module is active with slaves 1(A) ... 7(A), AS-i Master 2	2
		01 ... 11 = Module is active with slaves 1(A) ... 11(A), AS-i Master 2	3
		01 ... 15 = Module is active with slaves 1(A) ... 15(A), AS-i Master 2	4
		01 ... 19 = Module is active with slaves 1(A) ... 19(A), AS-i Master 2	5
		01 ... 23 = Module is active with slaves 1(A) ... 23(A), AS-i Master 2	6
		01 ... 27 = Module is active with slaves 1(A) ...27(A), AS-i Master 2	7
		01 ... 31 = Module is active with slaves 1(A) ... 31(A), AS-i Master 2	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 5 – Digital input data B slaves, AS-i master 1

41638

Slot	Description	Value range	Length [words]
5	Digital input data of B slaves, connected to AS-i master 1	Empty module = Module is disabled	0
		01B ... 03B = Module is active with slaves 1B ... 3B, AS-i Master 1	1
		01B ... 07B = Module is active with slaves 1B ... 7B, AS-i Master 1	2
		01B ... 11B = Module is active with slaves 1B ... 11B, AS-i Master 1	3
		01B ... 15B = Module is active with slaves 1B ... 15B, AS-i Master 1	4
		01B ... 19B = Module is active with slaves 1B ... 19B, AS-i Master 1	5
		01B ... 23B = Module is active with slaves 1B ... 23B, AS-i Master 1	6
		01B ... 27B = Module is active with slaves 1B ... 27B, AS-i Master 1	7
		01B ... 31B = Module is active with slaves 1B ... 31B, AS-i Master 1	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 6 – Digital output data B slaves, AS-i master 1

41629

Slot	Description	Value range	Length [words]
6	Digital output data of B slaves, connected to AS-i master 1	Empty module = Module is disabled	0
		01B ... 03B = Module is active with slaves 1B ... 3B, AS-i Master 1	1
		01B ... 07B = Module is active with slaves 1B ... 7B, AS-i Master 1	2
		01B ... 11B = Module is active with slaves 1B ... 11B, AS-i Master 1	3
		01B ... 15B = Module is active with slaves 1B ... 15B, AS-i Master 1	4
		01B ... 19B = Module is active with slaves 1B ... 19B, AS-i Master 1	5
		01B ... 23B = Module is active with slaves 1B ... 23B, AS-i Master 1	6
		01B ... 27B = Module is active with slaves 1B ... 27B, AS-i Master 1	7
		01B ... 31B = Module is active with slaves 1B ... 31B, AS-i Master 1	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 7 – Digital input data B slaves, AS-i master 2

41633

Slot	Description	Value range	Length [words]
7	Digital input data of B slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	Empty module = Module is disabled	0
		01B ... 03B = Module is active with slaves 1B ... 3B, AS-i Master 2	1
		01B ... 07B = Module is active with slaves 1B ... 7B, AS-i Master 2	2
		01B ... 11B = Module is active with slaves 1B ... 11B, AS-i Master 2	3
		01B ... 15B = Module is active with slaves 1B ... 15B, AS-i Master 2	4
		01B ... 19B = Module is active with slaves 1B ... 19B, AS-i Master 2	5
		01B ... 23B = Module is active with slaves 1B ... 23B, AS-i Master 2	6
		01B ... 27B = Module is active with slaves 1B ... 27B, AS-i Master 2	7
		01B ... 31B = Module is active with slaves 1B ... 31B, AS-i Master 2	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Slot 8 – Digital output data B slaves, AS-i master 2

41696

Slot	Description	Value range	Length [words]
8	Digital output data of B slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	Empty module = Module is disabled	0
		01B ... 03B = Module is active with slaves 1B ... 3B, AS-i Master 2	1
		01B ... 07B = Module is active with slaves 1B ... 7B, AS-i Master 2	2
		01B ... 11B = Module is active with slaves 1B ... 11B, AS-i Master 2	3
		01B ... 15B = Module is active with slaves 1B ... 15B, AS-i Master 2	4
		01B ... 19B = Module is active with slaves 1B ... 19B, AS-i Master 2	5
		01B ... 23B = Module is active with slaves 1B ... 23B, AS-i Master 2	6
		01B ... 27B = Module is active with slaves 1B ... 27B, AS-i Master 2	7
		01B ... 31B = Module is active with slaves 1B ... 31B, AS-i Master 2	8

Mapping of the digital input/output data: → **Mapping of the digital input/output data** (→ S. 206)

Mapping of the digital input/output data

41745

This table illustrates the mapping of digital input/output data of the individual slaves to the bytes of the transmitted words:

Word	AS-i slave addresses			
	Bits 15...12	Bits 11...8	Bits 7...4	Bits 3...0
1	M flags*	1(A) / 1B	2(A) / 2B	3(A) / 3B
2	4(A) / 4B	5(A) / 5B	6(A) / 6B	7(A) / 7B
3	8(A) / 8B	9(A) / 9B	10(A) / 10B	11(A) / 11B
4	12(A) / 12B	13(A) / 13B	14(A) / 14B	15(A) / 15B
5	16(A) / 16B	17(A) / 17B	18(A) / 18B	19(A) / 19B
6	20(A) / 20B	21(A) / 21B	22(A) / 22B	23(A) / 23B
7	24(A) / 24B	25(A) / 25B	26(A) / 26B	27(A) / 27B
8	28(A) / 28B	29(A) / 29B	30(A) / 30B	31(A) / 31B

Legend:

* ... The master flags (M flags) are only transmitted in the digital input data (→ **Table: Master flags** (→ S. 207)).

Example: structure of the digital input data

41498

Task:
The digital input data of slaves 1A, 3 and 6A of AS-i master 1 are to be transmitted.

Solution:
Slot: 1
Module configuration: `01 ... 07`
Data length: 2 words

The following table shows in which positions of the two word sized data block the digital input data of the slaves are transmitted:

Data block (2 words)							
Bits 31...28	**Bits 27...24**	**Bits 23...20**	**Bits 19...16**	**Bits 15...12**	**Bits 11...8**	**Bits 7...4**	**Bits 3...0**
	1A		3			6A	

Table: Master flags

41665

Bits 12...15 of the first word of the digital input data contain the master flags. They provide information on the operating state of the AS-i master. The following table shows the meaning of each bit:

Bit 15	Bit 14	Bit 13	Bit 12
AS-i power fail (19 V)	Configuration error in the AS-i circuit	AS-i master is offline (AS-i data is invalid)	Periphery fault in the AS-i circuit

Possible values per bit:
0 = no error
1 = error

In the digital output data, bits 12...15 have no relevance and are not evaluated!

Slot 9 – Analogue input data

41699

Slot	Description	Value range	Length [words]
9	Data area with a maximum length of 60 words for cyclic transmission of analogue input information Default setting: analogue inputs of AS-i slaves 01 ... 15, connected to AS-i master 1 The `valid` and `overflow` flags that each analogue AS-i input slave provides for each channel are NOT represented here. If required, they can be read out via the acyclic services. (→ **Acyclic data** (→ S. 225)).	Empty module = Module is deactivated	0
		004 words = Module is activated with 4 words	4
		008 words = Module is activated with 8 words	8
		012 words = Module is activated with 12words	12
		016 words = Module is activated with 16 words	16
		020 words = Module is activated with 20 words	20
		024 words = Module is activated with 24 words	24
		028 words = Module is activated with 28 words	28
		032 words = Module is activated with 32 words	32
		036 words = Module is activated with 36 words	36
		040 words = Module is activated with 40 words	40
		044 words = Module is activated with 44 words	44
		048 words = Module is activated with 48 words	48
		052 words = Module is activated with 52 words	52
		056 words = Module is activated with 56 words	56
		060 words = Module is activated with 60 words	60

The exact mapping of analogue input data within this area depends on the parameter setting [Analog. channels/I-slave] (→**Configuration of the analogue channels in slots 9 ... 12** (→ S. 212)).

Slot 10 – Analogue input data

41655

Slot	Description	Value range	Length [words]
10	Data area with a maximum length of 60 words for cyclic transmission of analogue input information Default setting: analogue inputs of AS-i slaves 01.. 15, connected to AS-i master 2 (only available for devices with 2 AS-i masters) The `valid` and `overflow` flags that each analogue AS-i input slave provides for each channel are NOT represented here. If required, they can be read out via the acyclic services (Explicit Messaging) (→ **Acyclic data** (→ S. 225)).	Empty module = Module is deactivated	0
		004 words = Module is activated with 4 words	4
		008 words = Module is activated with 8 words	8
		012 words = Module is activated with 12 words	12
		016 words = Module is activated with 16 words	16
		020 words = Module is activated with 20 words	20
		024 words = Module is activated with 24 words	24
		028 words = Module is activated with 28 words	28
		032 words = Module is activated with 32 words	32
		036 words = Module is activated with 36 words	36
		040 words =Module is activated with 40 words	40
		044 words = Module is activated with 44 words	44
		048 words = Module is activated with 48 words	48
		052 words = Module is activated with 52 words	52
		056 words = Module is activated with 56 words	56
		060 words = Module is activated with 60 words	60

The exact mapping of analogue input data within this area depends on the parameter setting [Analog. channels/I-slave] (→**Configuration of the analogue channels in slots 9 ... 12** (→ S. 212)).

Slot 11 – Analogue output data

41623

Slot	Description	Value range	Length [words]
11	Data area with a maximum length of 60 words for cyclic transmission of analogue output information. Default setting: analogue outputs of AS-i slaves 16...30, connected to AS-i master 1	Empty module = Module is deactivated	0
		004 words = Module is activated with 4 words	4
		008 words = Module is activated with 8 words	8
		012 words = Module is activated with 12 words	12
		016 words = Module is activated with 16 words	16
		020 words = Module is activated with 20 words	20
		024 words = Module is activated with 24 words	24
		028 words = Module is activated with 28 words	28
		032 words = Module is activated with 32 words	32
		036 words = Module is activated with 36 words	36
		040 words = Module is activated with 40 words	40
		044 words = Module is activated with 44 words	44
		048 words = Module is activated with 48 words	48
		052 words = Module is activated with 52 words	52
		056 words = Module is activated with 56 words	56
		060 words = Module is activated with 60 words	60

The exact mapping of analogue output data within this area depends on the parameter setting [Analog. channels/O-slave] (→**Configuration of the analogue channels in slots 9 ... 12** (→ S. 212)).

Slot 12 – Analogue output data

41627

Slot	Description	Value range	Length [words]
12	Data area with a maximum length of 60 words for cyclic transmission of analogue output information. Default setting: analogue outputs of AS-i slaves 16...30, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	Empty module = Module is deactivated	0
		004 words = Module is activated with 4 words	4
		008 words = Module is activated with 8 words	8
		012 words = Module is activated with 12 words	12
		016 words = Module is activated with 16 words	16
		020 words = Module is activated with 20 words	20
		024 words = Module is activated with 24 words	24
		028 words = Module is activated with 28 words	28
		032 words = Module is activated with 32 words	32
		036 words = Module is activated with 36 words	36
		040 words = Module is activated with 40 words	40
		044 words = Module is activated with 44 words	44
		048 words = Module is activated with 48 words	48
		052 words = Module is activated with 52 words	52
		056 words = Module is activated with 56 words	56
		060 words = Module is activated with 60 words	60

The exact mapping of analogue output data within this area depends on the parameter setting [Analog. channels/O-slave] (→**Configuration of the analogue channels in slots 9 ... 12** (→ S. 212)).

Configuration of the analogue channels in slots 9 ... 12

41613

The configuration of the EtherNet/IP device parameters [Analog. channels/I-slave] and [Analog. channels/O-slave] determines which analogue channels of the AS-i slaves are transmitted. The following table shows the meaning of the adjustable parameter values:

Parameter values	Description
4 channels	**Variable slave assignment** The analogue channels of max. 30 slave addresses are transferred: single slaves: channels 1...4 or: A slaves: channels 1+2 and B slaves: channels 1+2 The device-specific parameters (→ **Device-specific parameters** (→ S. 186)) of the device allow you to individually define the order of 15 of the analogue slaves to be transferred, respectively (→ **Table: variable slave assignment for slots 9 ... 12** (→ S. 215)). All available slave addresses of both AS-i masters can be selected. Preset, variable: ▪ for slot 9: AS-i master 1: single slaves 1 ... 15 or: slave 1A ... 15A, 1B ... 15B ▪ for slot 10: AS-i master 2: single slaves 1 ... 15 or: slave 1A ... 15A, 1B ... 15B ▪ for slot 11: AS-i master 1: single slaves 16 ... 30 or: slave 16A .... 30A, 15B ... 30B ▪ for slot 12: AS-i master 2: single slaves 16 ... 30 or: slave 16A .... 30A, 15B ... 30B
2 channels	**Fixed slave assignment** Of each transferring AS-i single and A address, the following analogue channels are transmitted: of single slaves: channels 1+2 or: of A slaves: channels 1+2 The slave assignment is fixed (→ **Table: Fixed slave assignment for slots 9 ... 12** (→ S. 213)). A configuration of the slave order in the device-specific parameters is ineffective.
1 channel	**Fixed slave assignment** Of each transferring AS-i single and A address, the following analogue channels are transmitted: single slaves: channel 1 or: A slaves: channel 1 The slave assignment is fixed (→ **Table: Fixed slave assignment for slots 9 ... 12** (→ S. 213)). A configuration of the slave order in the device-specific parameters is ineffective.
1 channel A/B-Slave	**Fixed slave assignment** Of each transferring slave address, the following analogue channels are transmitted: single slaves: channels 1+3 or: A slaves: channel 1 and B slaves: channel 1 The slave assignment is fixed (→ **Table: Fixed slave assignment for slots 9 ... 12** (→ S. 213)). A configuration of the slave order in the device-specific parameters is ineffective.

Table: Fixed slave assignment for slots 9 ... 12

41673

Word	Word content for the following number of analogue channels per input/output slave		
	2 channels	1 channel	1 channel A/B-Slave
1	Mx / slave 1(A) / Channel 1	Mx / slave 1(A) / Channel 1	Mx / slave 1(A) / Channel 1
2	Mx / slave 1(A) / Channel 2	Mx / slave 2(A) / Channel 1	Mx / slave 1B / Channel 1 = Mx / slave 1 / Channel 3
3	Mx / slave 2(A) / Channel 1	Mx / slave 3(A) / Channel 1	Mx / slave 2(A) / Channel 1
4	Mx / slave 2(A) / Channel 2	Mx / slave 4(A) / Channel 1	Mx / slave 2B / Channel 1 = Mx / slave 2 / Channel 3
5	Mx / slave 3(A) / Channel 1	Mx / slave 5(A) / Channel 1	Mx / slave 3(A) / Channel 1
6	Mx / slave 3(A) / Channel 2	Mx / slave 6(A) / Channel 1	Mx / slave 3B / Channel 1 = Mx / slave 3 / Channel 3
7	Mx / slave 4(A) / Channel 1	Mx / slave 7(A) / Channel 1	Mx / slave 4(A) / Channel 1 1
8	Mx / slave 4(A) / Channel 2	Mx / slave 8(A) / Channel 1	Mx / slave 4B / Channel 1 = Mx / slave 4 / Channel 3
9	Mx / slave 5(A) / Channel 1	Mx / slave 9(A) / Channel 1	Mx / slave 5(A) / Channel 1
10	Mx / slave 5(A) / Channel 2	Mx / slave 10(A) / Channel 1	Mx / slave 5B /Channel 1 = Mx / slave 5 / Channel 3
11	Mx / slave 6(A) / Channel 1	Mx / slave 11(A) / Channel 1	Mx / slave 6(A) / Channel 1
12	Mx / slave 6(A) / Channel 2	Mx / slave 12(A) / Channel 1	Mx / slave 6B / Channel 1 = Mx / slave 6 / Channel 3
13	Mx / slave 7(A) / Channel 1	Mx / slave 13(A) / Channel 1	Mx / slave 7(A) / Channel 1
14	Mx / slave 7(A) / Channel 2	Mx / slave 14(A) / Channel 1	Mx / slave 7B / Channel 1 = Mx / slave 7 / Channel 3
15	Mx / slave 8(A) / Channel 1	Mx / slave 15(A) / Channel 1	Mx / slave 8(A) / Channel 1
16	Mx / slave 8(A) / Channel 2	Mx / slave 16(A) / Channel 1	Mx / slave 8B / Channel 1 = Mx / slave 8 / Channel 3
17	Mx / slave 9(A) / Channel 1	Mx / slave 17(A) / Channel 1	Mx / slave 9(A) / Channel 1
18	Mx / slave 9(A) / Channel 2	Mx / slave 18(A) / Channel 1	Mx / slave 9B / Channel 1 = Mx / slave 9 / Channel 3
19	Mx / slave 10(A) / Channel 1	Mx / slave 19(A) / Channel 1	Mx / slave 10(A) / Channel 1
20	Mx / slave 10(A) / Channel 2	Mx / slave 20(A) / Channel 1	Mx / slave 10B / Channel 1 = Mx / slave 10 / Channel 3
21	Mx / slave 11(A) / Channel 1	Mx / slave 21(A) / Channel 1	Mx / slave 11(A) / Channel 1
22	Mx / slave 11(A) / Channel 2	Mx / slave 22(A) / Channel 1	Mx / slave 11B / Channel 1 = Mx / slave 11 / Channel 3
23	Mx / slave 12(A) / Channel 1	Mx / slave 23(A) / Channel 1	Mx / slave 12(A) / Channel 1
24	Mx / slave 12(A) / Channel 2	Mx / slave 24(A) / Channel 1	Mx / slave 12B / Channel 1 = Mx / slave 12 / Channel 3
25	Mx / slave 13(A) / Channel 1	Mx / slave 25(A) / Channel 1	Mx / slave 13(A) / Channel 1
26	Mx / slave 13(A) / Channel 2	Mx / slave 26(A) / Channel 1	Mx / slave 13B / Channel 1 = Mx / slave 13 / Channel 3
27	Mx / slave 14(A) / Channel 1	Mx / slave 27(A) / Channel 1	Mx / slave 14(A) / Channel 1
28	Mx / slave 14(A) / Channel 2	Mx / slave 28(A) / Channel 1	Mx / slave 14B / Channel 1 = Mx / slave 14 / Channel 3
29	Mx / slave 15(A) / Channel 1	Mx / slave 29(A) / Channel 1	Mx / slave 15(A) / Channel 1
30	Mx / slave 15(A) / Channel 2	Mx / slave 30(A) / Channel 1	Mx / slave 15B / Channel 1= Mx / slave 15 / Channel 3
31	Mx / slave 16(A) /Channel 1	Mx / slave 31(A) / Channel 1	Mx / slave 16(A) / Channel 1
32	Mx / slave 16(A) / Channel 2		Mx / slave 16B / Channel 1 = Mx / slave 16 / Channel 3
33	Mx / slave 17(A) / Channel 1		Mx / slave 17(A) / Channel 1
34	Mx / slave 17(A) / Channel 2		Mx / slave 17B / Channel 1= Mx / slave 17 / Channel 3
35	Mx / slave 18(A) / Channel 1		Mx / slave 18(A) / Channel 1
36	Mx / slave 18(A) / Channel 2		Mx / slave 18B / Channel 1 = Mx / slave 18 / Channel 3
37	Mx / slave 19(A) / Channel 1		Mx / slave 19(A) / Channel 1
38	Mx / slave 19(A) / Channel 2		Mx / slave 19B / Channel 1 = Mx / slave 19 / Channel 3
39	Mx / slave 20(A) / Channel 1		Mx / slave 20(A) / Channel 1

Word	Word content for the following number of analogue channels per input/output slave		
	2 channels	1 channel	1 channel A/B-Slave
40	Mx / slave 20(A) / Channel 2		Mx / slave 20B / Channel 1 = Mx / slave 20 / Channel 3
41	Mx / slave 21(A) / Channel 1		Mx / slave 21(A) / Channel 1
42	Mx / slave 21(A) / Channel 2		Mx / slave 21B / Channel 1 = Mx / slave 21 / Channel 3
43	Mx / slave 22(A) /Channel 1		Mx / slave 22(A) / Channel 1
44	Mx / slave 22(A) / Channel 2		Mx / slave 22B / Channel 1 = Mx / slave 22 / Channel 3
45	Mx / slave 23(A) / Channel 1		Mx / slave 23(A) / Channel 1
46	Mx / slave 23(A) / Channel 2		Mx / slave 23B / Channel 1 = Mx / slave 23 / Channel 3
47	Mx / slave 24(A) / Channel 1		Mx / slave 24(A) / Channel 1
48	Mx / slave 24(A) / Channel 2		Mx / slave 24B / Channel 1 = Mx / slave 24 / Channel 3
49	Mx / slave 25(A) / Channel 1		Mx / slave 25(A) / Channel 1
50	Mx / slave 25(A) / Channel 2		Mx / slave 25B / Channel 1 = Mx / slave 25 / Channel 3
51	Mx / slave 26(A) / Channel 1		Mx / slave 26(A) / Channel 1
52	Mx / slave 26(A) / Channel 2		Mx / slave 26B / Channel 1 = Mx / slave 26 / Channel 3
53	Mx / slave 27(A) / Channel 1		Mx / slave 27(A) / Channel 1
54	Mx / slave 27(A) / Channel 2		Mx / slave 27B / Channel 1 = Mx / slave 27 / Channel 3
55	Mx / slave 28(A) / Channel 1		Mx / slave 28(A) / Channel 1
56	Mx / slave 28(A) / Channel 2		Mx / slave 28B / Channel 1 = Mx / slave 28 / Channel 3
57	Mx / slave 29(A) / Channel 1		Mx / slave 29(A) / Channel 1
58	Mx / slave 29(A) / Channel 2		Mx / slave 29B / Channel 1 = Mx / slave 29 / Channel 3
59	Mx / slave 30(A) / Channel 1		Mx / slave 30(A) /Channel 1
60	Mx / slave 30(A) / Channel 2		Mx / slave 30B / Channel 1 = Mx / slave 30 / Channel 3

Legend:

x ... - slot 9 + 11: x=1 (M1 = AS-i master 1)
- slot 10 + 12: x=2 (M2 = AS-i master 2)

Table: variable slave assignment for slots 9 ... 12

41668

Word offset no.	Content of transmitted word for parameter value 4 channels
n	Mx / slave m(A) / channel 1
n+1	Mx / slave m(A) / channel 2
n+2	Mx / slave m(A) / channel 1 = Mx / slave mB / channel 1
n+3	Mx / slave m(A) / channel 2 = Mx / slave mB / channel 2

Legend:

n ... number of 4-word blocks
1 = if 4 words are set
...
15 = if 60 words are set

x ... 1 = AS-i Master 1
2 = AS-i Master 2

m ... numerical part of the selected AS-i slave address

Variable AS-i slave assignment is only possible in top-down mode. In the EtherNet/IP projection software, each word can be assigned the data of an AS-i slave via the configuration assembly object. Otherwise, the preset values apply (→ **Configuration of the analogue channels in slots 9 ... 12** (→ S. 212)).

To assign a specific AS-i slave address to the transferring channels:

► Open the project in the EtherNet/IP projection software.

► Make the following settings in the configuration assembly object:

- Activate the data point `C.Analogue IN order` (= 0x01).
- Assign the desired slave addresses to the input channels in the data points `C.1st analogue IN Slot 9` to `C.15th analogue IN Slot 10`.
- Activate the data point `C. Analogue OUT order` (= 0x01).
- Assign the desired slave addresses to the output channels in the data points `C.1st analogue OUT Slot 11` ... `C.15th analogue OUT Slot 12` .

► Save the set values and transfer the project to the device (download).

Slot 13 – Diagnostic data

41626

Slot	Description	Value range	Data length [words]
13	Diagnostic data sent to the I/O scanner Contents of diagnostic data: → following tables	Empty module	0
		AC1421 (→ **Module setting: AC1421** (→ S. 216))	25
		AC1422 (→ **Module setting: AC1422** (→ S. 217))	50
		AC13x7 AS-i 1 (→ **Module setting: AC13x7 AS-i 1** (→ S. 218))	13
		AC13x7 AS-i 1+2 (→ **Module setting: AC13x7 AS-i 1+2** (→ S. 218))	26

Module setting: AC1421

41757

Word	Description	Details
1	System diagnosis	**Diagnosis - System diagnosis** (→ S. 219)
2...5	AS-i master 1: AS-i diagnosis	**Diagnosis - AS-i diagnosis** (→ S. 219)
6...9	AS-i master 1: list of missing slaves	**Diagnosis - List of missing slaves (LCMES)** (→ S. 220)
10...13	AS-i master 1: List of non-projected slaves	**Diagnosis - List of non-projected slaves (LCAES)** (→ S. 221)
14...17	AS-i master 1: List of slaves with wrong slave profile	**Diagnosis - List of slaves with wrong slave profile (LCE)** (→ S. 221)
18...21	AS-i master 1: list of peripheral faults	**Diagnosis - List of peripheral faults (LPF)** (→ S. 222)
22...25	AS-i master 1: list of multiple addressed slaves	**Diagnosis - List of double addressed slaves (LDAS)** (→ S. 222)

Module setting: AC1422

41750

Words 1 to 25 correspond to those of the module setting AC1421 (→ **Module setting: AC1421** (→ S. 216)).

Word	Description	Details
1	System diagnosis	**Diagnosis - System diagnosis** (→ S. 219)
2...5	AS-i master 1: AS-i diagnosis	**Diagnosis - AS-i diagnosis** (→ S. 219)
6...9	AS-i master 1: list of missing slaves	**Diagnosis - List of missing slaves (LCMES)** (→ S. 220)
10...13	AS-i master 1: List of non-projected slaves	**Diagnosis - List of non-projected slaves (LCAES)** (→ S. 221)
14...17	AS-i master 1: List of slaves with wrong slave profile	**Diagnosis - List of slaves with wrong slave profile (LCE)** (→ S. 221)
18...21	AS-i master 1: list of peripheral faults	**Diagnosis - List of peripheral faults (LPF)** (→ S. 222)
22...25	AS-i master 1: list of multiple addressed slaves	**Diagnosis - List of double addressed slaves (LDAS)** (→ S. 222)
26...29	AS-i master 2: AS-i diagnosis	**Diagnosis - AS-i diagnosis** (→ S. 219)
30...33	AS-i master 2: list of missing slaves	**Diagnosis - List of missing slaves (LCMES)** (→ S. 220)
34...37	AS-i master 2: List of non-projected slaves	**Diagnosis - List of non-projected slaves (LCAES)** (→ S. 221)
38...41	AS-i master 2: List of slaves with wrong slave profile	**Diagnosis - List of slaves with wrong slave profile (LCE)** (→ S. 221)
42...45	AS-i master 2: list of peripheral faults	**Diagnosis - List of peripheral faults (LPF)** (→ S. 222)
46...49	AS-i master 2: list of multiple addressed slaves	**Diagnosis - List of double addressed slaves (LDAS)** (→ S. 222)
50	reserved	

Module setting: AC13x7 AS-i 1

41759

The content of the module setting is compatible with the diagnosis data of the predecessor model AC1327.

Word	Description	Details
1	AS-i master 1: Master flags	**Diagnosis - Master flags** (→ S. 219)
2...5	AS-i master 1: list of detected slaves (LDS)	**Diagnosis - List of detected slaves (LDS)** (→ S. 220)
6...9	AS-i master 1: configuration error	**Diagnosis - List of slaves with wrong slave profile (LCE)** (→ S. 221)
10...13	AS-i master 1: peripheral fault (LPF)	**Diagnosis - List of peripheral faults (LPF)** (→ S. 222)

Module setting: AC13x7 AS-i 1+2

41758

The content of the module setting is compatible with the diagnostic data of the predecessor model AC1337.

Words 1 to 13 correspond to those of the module setting `AC13x7 AS-i 1` (→ **Module setting: AC13x7 AS-i 1** (→ S. 218)).

Word	Description	Details
1	AS-i master 1: Master flags	**Diagnosis - Master flags** (→ S. 219)
2...5	AS-i master 1: list of detected slaves	**Diagnosis - List of detected slaves (LDS)** (→ S. 220)
6...9	AS-i master 1: configuration error	**Diagnosis - List of slaves with wrong slave profile (LCE)** (→ S. 221)
10...13	AS-i master 1: peripheral fault	**Diagnosis - List of peripheral faults (LPF)** (→ S. 222)
14	AS-i master 2: Master flags	**Diagnosis - Master flags** (→ S. 219)
15...18	AS-i master 2: list of detected slaves	**Diagnosis - List of detected slaves (LDS)** (→ S. 220)
19...22	AS-i master 1: configuration error	**Diagnosis - List of slaves with wrong slave profile (LCE)** (→ S. 221)
23...26	AS-i master 1: peripheral fault (LPF)	**Diagnosis - List of peripheral faults (LPF)** (→ S. 222)

Details of the diagnosis area

41581

Diagnosis - System diagnosis

41448

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	-	-	-	-	-	-	-	-	-	-	-	-	PS	GI	OT	ISE

Legend:

Flag	Description
ISE	Internal System Error Interner Systemfehler
OT	over temperature: temperature inside the device has exceeded the permissible max. temperature value
GI	gateway inactive: the gateway mode was deactivated
PS	PLC stop: The controller was stopped

Diagnosis - AS-i diagnosis

41466

Offset Word no.	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	CEAS	CEMS
n+1	Voltage AS-i+ to AS-i- in mV															
n+2	Voltage FE to AS-i- in mV															
n+3	Symmetry in % (-100% ... +100%)															

Legend:

Flag	Description
IME	internal master error: Internal system error of an AS-i master
PM	projection mode: AS-i master was set to the projection mode.
S0	slave 0 detected: New slave 0 was detected.
EF	earth fault: Earth fault was detected
PF22.5	22.5V AS-i Power-Fail (classic AS-i Power) was detected.
PF19	19 AS-i Power-Fail (Power24) was detected.
CEMS	Configuration Error – Missing Slave: AS-i configuration error, one or several slaves are projected, but not available.
CEAS	Configuration Error – Additional Slave: AS-i configuration error, one or several slaves are available, but not projected.
CEIP	Configuration Error – Invalid Profile: AS-i configuration error, the slave profiles of one or several slaves differ from the projected slave profiles.
PE	periphery error: One or several AS-i slaves have a periphery error.
DAE	duplicate address error: One or several multiple-addressing faults occurred.

Diagnosis - Master flags

41446

Offset Word no.	bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	-	-	-	-	-	-	-	-	-	CNOT	-	PNOT	PF	LDS0	CACT	-

Legend:

Flag	Description
CACT	Configuration Active: AS-i master is in the projection mode.
LDS0	LDS.0: A single slave with the address 0 was detected
PF	AS-i_Power_Fail: AS-i voltage too low
PNOT	NOT Periphery_OK: periphery fault
CNOT	NOT Configuartion_OK: configuration error
-	reserved

Diagnosis - List of detected slaves (LDS)

41452

Offset Word no.	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	n.a.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Possible value of slave fields:

0 ... no slave detected
1.... slave detected

Diagnosis - List of missing slaves (LCMES)

41453

Offset Word no.	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	n.a.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Possible values of slave fields:

0 ... no error
1.... slave is projected, but is missing

If at least 1 bit is set in this list, the bit for CEMS is also set.
(→**Diagnosis - AS-i diagnosis** (→ S. 219))

Diagnosis - List of non-projected slaves (LCAES)

41455

Offset Word no.	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	n.a.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Possible values of slave fields:

0 ... no error
1.... slave is detected, but not yet projected

If at least 1 bit is set in this list, the bit for CEAS is also set.
(→**Diagnosis - AS-i diagnosis** (→ S. 219))

Diagnosis - List of slaves with wrong slave profile (LCE)

41447

Offset Word no.	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	n.a.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Possible values of slave fields:

0 ... no error
1.... Slave is detected, but has wrong profile

If at least 1 bit is set in this list, the bit for CEIP is also set.
(→**Diagnosis - AS-i diagnosis** (→ S. 219))

Diagnosis - List of peripheral faults (LPF)

41454

Offset Word no.	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	n.a.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Possible values of slave fields:

0 ... no error
1.... peripheral fault at the slave

If at least 1 bit is set in this list, the bit for PE is also set.
(→**Diagnosis - AS-i diagnosis** (→ S. 219))

Diagnosis - List of double addressed slaves (LDAS)

41451

Offset Word no.	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	n.a.
n+3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Possible values of slave fields:

0 ... no error
1.... Double address error detected

If at least 1 bit is set in this list, the bit for DAE is also set.
(→**Diagnosis - AS-i diagnosis** (→ S. 219)).

Slot 14 – Inputs from Standard plc

41625

Slot	Description	Value range	Size [words]
14	Data from the device-internal Standard plc to the EtherNet/IP PLC	Empty module = module is deactivated	0
		004 words = 4 words AC422S Standard plc >> fieldbus PLC	4
		008 words = 8 words AC422S Standard plc >> fieldbus PLC	8
		012 words = 12 words AC422S Standard plc >> fieldbus PLC	12
		016 words = 16 words AC422S Standard plc >> fieldbus PLC	16
		020 words = 20 words AC422S Standard plc >> fieldbus PLC	20
		024 words = 24 words AC422S Standard plc >> fieldbus PLC	24
		028 words = 28 words AC422S Standard plc >> fieldbus PLC	28
		032 words = 32 words AC422S Standard plc >> fieldbus PLC	32
		036 words = 36 words AC422S Standard plc >> fieldbus PLC	36
		040 words = 40 words AC422S Standard plc >> fieldbus PLC	40
		044 words = 44 words AC422S Standard plc >> fieldbus PLC	44
		048 words = 48 words AC422S Standard plc >> fieldbus PLC	48
		052 words = 52 words AC422S Standard plc >> fieldbus PLC	52
		056 words = 56 words AC422S Standard plc >> fieldbus PLC	56
		060 words = 60 words AC422S Standard plc >> fieldbus PLC	60
		076 words = 76 words AC422S Standard plc >> fieldbus PLC	76
		092 words = 92 words AC422S Standard plc >> fieldbus PLC	92
		108 words = 108 words AC422S Standard plc >> fieldbus PLC	108
		120 words = 120 words AC422S Standard plc >> fieldbus PLC	120

Slot 15 – Outputs to Standard plc

41618

Slot	Description	Value range	Size [words]
15	Data from the EtherNet/IP PLC to the device-internal Standard plc	Empty module = module is deactivated	0
		004 words = 4 words fieldbus PLC >> AC422S Standard plc	4
		008 words = 8 words fieldbus PLC >> AC422S Standard plc	8
		012 words = 12 words fieldbus PLC >> AC422S Standard plc	12
		016 words = 16 words fieldbus PLC >> AC422S Standard plc	16
		020 words = 20 words fieldbus PLC >> AC422S Standard plc	20
		024 words = 24 words fieldbus PLC >> AC422S Standard plc	24
		028 words = 28 words fieldbus PLC >> AC422S Standard plc	28
		032 words = 32 words fieldbus PLC >> AC422S Standard plc	32
		036 words = 36 words fieldbus PLC >> AC422S Standard plc	36
		040 words = 40 words fieldbus PLC >> AC422S Standard plc	40
		044 words = 44 words fieldbus PLC >> AC422S Standard plc	44
		048 words = 48 words fieldbus PLC >> AC422S Standard plc	48
		052 words = 52 words fieldbus PLC >> AC422S Standard plc	52
		056 words = 56 words fieldbus PLC >> AC422S Standard plc	56
		060 words = 60 words fieldbus PLC >> AC422S Standard plc	60
		076 words = 76 words fieldbus PLC >> AC422S Standard plc	76
		092 words = 92 words fieldbus PLC >> AC422S Standard plc	92
		108 words = 108 words fieldbus PLC >> AC422S Standard plc	108
		120 words = 120 words fieldbus PLC >> AC422S Standard plc	120

10.7.5 Acyclic data

Content

41545

Overview: acyclic data

41792

The attributes in object class 801, instance 1, are preset as follows:

Attribute [dec]	from byte no. [dec]	to byte no. [dec]	Content	DS	Access r = read w = write	Number of words
0	--	--	reserved for system start-up	--	--	--
1	0	51	Read system information	DS1	r	26
30	0	239	System command request channel	--	r/w	120
31	0	239	System command reply channel	--	r	120
32	0	69	M1: digital slave inputs 1(A)…31(A) and 1B…31B (1 byte per slave) + M1 master flags (status AS-i master and exec.-ctl. flags and host flags)	DS2	r	35
33	0	149	M1: analogue slave inputs 1(A)…15(B)	DS3	r	75
34	0	159	M1: analogue slave inputs 16(A)…31(B)	DS4	r	80
35	0	63	M1: digital slave outputs 1(A)…31(A) and 1B…31B (1 byte per slave)	DS5	r/w	32
36	0	119	M1: analogue slave outputs 1(A)…15(B)	DS6	r/w	60
37	0	127	M1: analogue slave outputs 16(A)…31(B)	DS7	r/w	64
38	0	63	M1: status flags analogue outputs 1(A)…31(A) and 1B…31B	DS8	r	32
39	0	31	M1: slave lists LAS, LDS, LPF, LCE	DS9	r	16
40	0	7	M1: slave list LPS	DS10	r	4
41	0	127	M1: current configuration data CDI	DS11	r	64
42	0	127	M1: projected configuration data PCD	DS12	r	64
43	0	63	M1: input parameter image	DS13	r	32
44	0	63	M1: output parameter image	DS14	r/w	32
46	0	143	M1: slave error counter, configuration error counter, AS-i cycle counter	DS15	r	72
47	0	23	M1: LCEMS, LCEAS, LDAE	DS17	r	12
48	0	740	M1: Error distribution frame errors	DS20	r	370
62	0	239	M1: command request channel	--	r/w	120
63	0	239	M1: command reply channel	--	r	120
64	0	69	M2: digital slave inputs 1(A)…31(A) and 1B…31B (1 byte per slave) + M2 master flags (status AS-i master and exec.-ctl. flags and host flags)	DS2	r	35
65	0	149	M2: analogue slave inputs 1(A)…15(B)	DS3	r	75
66	0	159	M2: analogue slave inputs 16(A)…31(B)	DS4	r	80
67	0	63	M2: digital slave outputs 1(A)…31(A) and 1B…31B (1 byte per slave)	DS5	r/w	32
68	0	119	M2: analogue slave outputs 1(A)…15(B)	DS6	r/w	60
69	0	127	M2: analogue slave outputs 16(A)…31(B)	DS7	r/w	64
70	0	63	M2: status flags analogue outputs 1(A)…31(A) and 1B…31B	DS8	r	32

Attribute [dec]	from byte no. [dec]	to byte no. [dec]	Content	DS	Access r = read w = write	Number of words
71	0	31	M2: slave lists LAS, LDS, LPF, LCE	DS9	r	16
72	0	7	M2: slave list LPS	DS10	r	4
73	0	127	M2: current configuration data CDI	DS11	r	64
74	0	127	M2: projected configuration data PCD	DS12	r	64
75	0	63	M2: input parameter image	DS13	r	32
76	0	63	M2: output parameter image	DS14	r/w	32
78	0	143	M2: slave error counter, configuration error counter, AS-i cycle counter	DS15	r	72
79	0	23	M2: LCEMS, LCEAS, LDAE	DS17	r	12
80	0	37	Read M2: Error distribution frame errors	DS20	r	370
94	0	239	M2: command request channel	--	r/w	120
95	0	239	M2: command reply channel	--	r	120

Legend:

DS = data set (→ **Overview: acyclic data sets (DSx)** (→ S. 227))
M1 = AS-i Master 1
M2 = AS-i Master 2

Overview: acyclic data sets (DSx)

41791

Data record	Content	Access r = read w = write	Words
DS1	System information	r	26
DS2	Digital inputs of slaves 1(A)…31(A) and 1B…31B and master flags (Status AS-i master and exec.-ctl. flags and host flags)	r	36
DS3	Analogue inputs of slaves 1(A)…15(B)	r	75
DS4	Analogue inputs of slaves 16(A)…31(B)	r	80
DS5	Digitale outputs of slaves 1(A)…31(A) and 1B...31B	r/w	32
DS6	Analogue outputs of slaves 1(A)…15(B)	r/w	60
DS7	Analogue otputs of slaves 16(A)…31(B)	r/w	64
DS8	Statusflags of analogue output data of slaves 1(A)…31(A) and 1B…31B	r	32
DS9	Slave lists LAS, LDS, LPF, LCE	r	16
DS10	Slave list LPS	r	4
DS11	Actual Configuration data (CDI)	r	64
DS12	Projected Configuration data (PCD)	r	64
DS13	Image of input parameter	r	32
DS14	Image of output parameter	r/w	32
DS15	Slave error counter, configuration error counter, AS-i cycle counter	r	72
DS16	n.a.	–	–
DS17	AS-i master: Error lists LCEMS, LCEAS, LDAE	r	12
DS18	Fieldbus information (only available via CODESYS)	r	19
DS19	n.a.	–	–
DS20	n.a.	–	–

Detailed information about the acyclic data sets and the command interface is given in the supplement to the device manual of the SmartSPS SafeLine mit EtherNet/IP-Device-Schnittstelle (→ **Overview: User documentation for AC4S** (→ S. 8)).

Overview: System commands

41794

Comm. no. [hex]	Comm. no. [dec]	Description
0101	257	Quick setup AS-i Master 1/2
0103	259	Change the user language
0104	260	Change the display settings
0105	261	Set output control
0106	262	Set the Standard plc operating mode
0109	265	Set the date / time
010A	266	Configure the NTP server settings
010B	267	Read date / time / NTP settings
010C	268	Reboot the system
010D	269	Read fieldbus information (can only be executed in CODESYS!)
010F	271	Read text of an OSC entry
0110	272	Display target visualisation

Detailed information about the acyclic data sets and the command interface is given in the supplement to the device manual of the SmartSPS SafeLine mit EtherNet/IP-Device-Schnittstelle (→ **Overview: User documentation for AC4S** (→ S. 8)).

Overview: AS-i master commands

41795

Comm. no. [hex]	Comm. no. [dec]	Description	Note
0001	1	Write parameters to a connected AS-i slave	
0003	3	Adopt and save currently connected AS-i slaves in the configuration (!) With this command the fieldbus connection is reset. The device must be rebooted!	ConfDataInput Slave → Projected Configuration Data and LDS → LPS
0004	4	Change the list of projected AS-i slaves (LPS)	
0005	5	set the operating mode of the AS-i master	
0006	6	readdress a connected AS-i slave	
0007	7	set the auto addressing mode of the AS-i master	
0009	9	change the extended ID code 1 in the connected AS-i slave	
000A	10	change PCD	
000D	13	AS-i master supply voltage, symmetry, earth fault	
0015	21	read ID string of an AS-i slave with profile S-7.4	slave profile S-7.4
001A	26	read AS-i master info	
001C	28	deactivation of the slave reset when changing to the protected mode	
0021	33	read diagnostic string of an AS-i slave with profile S-7.4	slave profile S-7.4
0022	34	read parameter string of an AS-i slave with profile S-7.4	slave profile S-7.4
0023	35	write parameter string of an AS-i slave with profile S-7.4	slave profile S-7.4
0024	36	CTT2 standard read: acyclic standard read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0025	37	CTT2 standard write: acyclic standard write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0026	38	CTT2 vendor specific read: acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0027	39	CTT2 vendor specific write: acyclic manufacturer-specific write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0040	64	CTT2 device group read: acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0041	65	CTT2 device group write: acyclic device group write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0042	66	CTT2 vendor specific selective read from buffer: selective standard read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0043	67	CTT2 vendor specific selective write from buffer: selective standard write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0044	68	CTT2 vendor specific selective read: selective manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0045	69	CTT2 vendor specific selective write: selective manufacturer-specific write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0046	70	CTT2 device group selective read: selective device group read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0047	71	CTT2 device group selective write: selective device group write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0049	73	CTT2 vendor specific exchange: manufacturer-specific data exchange with an AS-i slave with CTT2 profile	CTT2 slave profile *)
004A	74	CTT2 device group exchange: device group data exchange with an AS-i salve with CTT2 profile	CTT2 slave profile *)
004B	75	CTT2 device group selective read from buffer: manufacturer-specific read / write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)

Comm. no. [hex]	Comm. no. [dec]	Description	Note
004C	76	CTT2 device group selective write from buffer: device group read / write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0050	80	set AS-i master settings	
0051	81	Reset the error counters	

Legend:
*) ... CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5
CTT → **Combined transaction – Use of analogue channels in the gateway depending on the slave profile** (→ S. 179)

Detailed information about the acyclic data sets and the command interface is given in the supplement to the device manual of the SmartSPS SafeLine mit EtherNet/IP-Device-Schnittstelle (→ **Overview: User documentation for AC4S** (→ S. 8)).

Programmers' notes: call up acyclic services

41769

EtherNet/IP controllers use the `Message (MSG)` command to send data/commands asynchronously to another network participant and receive its response.

For detailed information about the `Message (MSG)` command: → operating instructions of the EtherNet/IP controller used!

10.7.6 EtherNet/IP projection software: Programmers' notes

Content

41549

Registration of the EDS file

41776

ifm provides an EDS file to integrate the AC422S in a EtherNet/IP projection software. The EDS file is stored on the device. In the EDS file, all parameters, process data, and their valid value ranges are defined.

To add the AC422S to the device catalogue of RSLogix 5000:

► Download and unpack the ESD file (→ **Download the device and I/O description** (→ S. 116)).

► Start RSLogix 5000.

► Select [Tools] > [EDS Hardware Installation Tool].

> EDS Wizard appears.

► Register the downloaded EDS file of the AC422S with the EDS Wizard.

> EDS Wizard installs the EDS file and adds the AC422S to the device catalogue.

Integrate the Device into the EtherNet/IP project

41492

Preparations

- ► Connect the device via the field bus interface (X6/X7) with the I/O scanner
- ► Activate the top-down configuration mode (→ **Set the configuration mode** (→ S. 119)).
- ► Register the EDS file (→ **Registration of the EDS file** (→ S. 231)).

1 Open / create EtherNet/IP project

- ► Start RSLogix 5000.
- ► Open an existing EtherNet/IP project.
  OR
  Create a new EtherNet/IP project with EtherNet/IP controller and IO scanner.

2 Add AC422S to the project

- ► In the Controller Organizer: Right mouse click on IO scanners
- > Context menu appears.
- ► In the context menu: Select [New Module].
- > The window [Select Module Type] appears.
- ► Select the device and click on [Create].
- > The [New Module] window appears.
- ► Enter name and IP address of the AC422S.

3 Configure module definition

- ► In the window [New Module]: Click on [Change ...]
- > The [Module Definition] window appears.
- ► Select the value [Compatible Module] in the [Electronic Keying] list.
- ► In the [Name] column: Select [Exclusive Owner].
- ► Click on [OK] to adopt the entered values.
- ► Click on [OK] to add the device to the project.
- > RSLogix 5000 adds the device as a sub-element of the IO scanner to the project.

Configuration mode

41611

To properly set the AC422S for permanent operation in the EtherNet/IP network, type and scope of the data to be transmitted as well as the parameters of the EtherNet/IP interface need to be defined. The following configuration modes are available:

- **Configuration mode: Top-Down** (→ S. 233)
- **Configuration mode: Independent** (→ S. 234)

Configuration mode: Top-Down

41609

In the configuration mode "top-down", the parameter data is set in the EtherNet/IP projection software. The configuration created in this way is then transferred to the device (download).

Qualifications

► The device has been added to the EtherNet/IP project (→ **Integrate the Device into the EtherNet/IP project** (→ S. 232))

► Activate the top-down configuration mode (→ **Set the configuration mode** (→ S. 119)).

1 Open controller tags

► In the Controller Organizer: double-click on [Controller Tags]

> [Controller Tags] window appears.

► In the tree view: Click on [AC422S:C].

> Controller tags for the configuration of the device appear.

2 Set parameter data

► Set device parameters (→ **Device-specific parameters** (→ S. 186)).

► <Configure fieldbus slots (→ **Parameters of the fieldbus slots** (→ S. 193)).

NOTICE!

For the transmission of cyclic process data between the device and the EtherNet/IP PLC, a limited number of data words is available for each direction of transmission:

- Input data (= modules 1, 3, 5, 7, 9, 10, 13, 14): 248 words
- Output data (= modules 2, 4, 6, 8, 11, 12, 15): 248 words

If the EtherNet/IP modules have been parameterised in such a way 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.

► Parameterise the EtherNet/IP modules in a way to ensure that the input and output data do not exceed the maximum number of words to be transmitted.

► Save the project.

3 Transfer configuration to the device

► Set the communication path to the device (→ operating instructions RSLogix 5000).

► Transfer the project to the EtherNet/IP controller and start it.

> The EtherNet/IP controller transfers the configuration to the device.

> AC422S: the start screen shows the status of the EtherNet/IP connection:


EtherNet/IP active

4 Optional: import the description of the inputs and outputs into the project

► Download the I/O description file (→**Download the device and I/O description** (→ S. 116)).

► In RSLogix 5000: Select [Tools] > [Import] > [Tags and Logic Comments ...].

> The [Import] dialogue box appears.
► Select the downloaded I/O description file and click on [Import].
> RSLogix 5000 imports the I/O description into the [Controller Tags].
► In [Controller Organizer]: double-click on [Controller Tags]
> The detailed view of the controller tags appears.
> Input assembly [AC422S:I) and output assembly [AC422S:O] show descriptions of the inputs and outputs.

Configuration mode: Independent

41610

In the configuration mode "Independent", the parameter data is set via the GUI of the AC422S (→ **Set the configuration mode** (→ S. 119), → **Set the EtherNet/IP module configuration** (→ S. 122)). The assembly configuration defined in the projection software is not evaluated.

Prerequisites

► AC422S has been added to the EtherNet/IP project (→ **Integrate the Device into the EtherNet/IP project** (→ S. 232))
► Activate the "independent" configuration mode (→ **Set the configuration mode** (→ S. 119)).

1 Set parameter data

► Set device parameters (→ **Set the device-specific parameters** (→ S. 120))
► Configure fieldbus slots (→ **Set the EtherNet/IP module configuration** (→ S. 122))

NOTICE!

For the transmission of cyclic process data between the device and the EtherNet/IP PLC, a limited number of data words is available for each direction of transmission:

- Input data (= modules 1, 3, 5, 7, 9, 10, 13, 14): 248 words
- Output data (= modules 2, 4, 6, 8, 11, 12, 15): 248 words

If the EtherNet/IP modules have been parameterised in such a way 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.
► Parameterise the EtherNet/IP modules in a way to ensure that the input and output data do not exceed the maximum number of words to be transmitted.

Set the communication path to the device (→ operating instructions RSLogix 2).

► Transfer the project to the EtherNet/IP controller and start it.
> AC422S: the start screen shows the status of the EtherNet/IP connection:

3 Optional: import the description of the inputs and outputs into the project

► Download the I/O description file (→**Download the device and I/O description** (→ S. 116)).
► In RSLogix 5000: Select [Tools] > [Import] > [Tags and Logic Comments ...].
> The [Import] dialogue box appears.
► Select the downloaded I/O description file and click on [Import].
> RSLogix 5000 imports the I/O description into the [Controller Tags].
► In [Controller Organizer]: double-click on [Controller Tags]
> The detailed view of the controller tags appears.
> Input assembly [AC422S:I) and output assembly [AC422S:O] show descriptions of the inputs and outputs.

10.8 OSC messages

Content

41730

This section contains information about the messages for events, warnings and faults of the AC422S.

10.8.1 OSC messages: System

41734

Message	Type	Corrective measures
An internal device error was detected <Fehlernummer>	Error	► Note the message and contact the ifm service center
Permitted temperature limit value inside the device was exceeded (<xxx.x> °C)	Warning	► Check thermal conditions of the system environment
First operation after delivery	Event	not necessary
The output control was set to <Gateway,manuell,SPS>	Event	not necessary
System power-up completed, <SW-Version>	Event	not necessary
A system reset was requested manually	Event	not necessary
The user-specific message history was deleted.	Event	not necessary
The device was reset to factory settings via <HMI, Feldbus>.	Event	not necessary
PLC used for more than 10 hours.	Event	not necessary
The project <Name> was loaded.	Event	not necessary
The PLC was set to the operating mode <Projektierungsmodus, geschützter Betrieb>.	Event	not necessary
The firmware was updated from <FW-Version> to version <FW-Version>.	Event	not necessary
The settings of the fieldbus interface were modified	Event	not necessary
The fieldbus connection was established	Event	not necessary
The fieldbus connection was aborted	Event	not necessary
The IP settings of the configuration interface were changed	Event	not necessary

10.8.2 OSC messages: AS-i 1 / AS-i 2

41735

Message	Type	Corrective measures
System errors: AS-i master <1,2>	Error	► Reboot the device If the error occurs again: ► Note the message and contact the ifm service center!
Earth fault: AS-i <1,2>	Error	► Check for earth fault of AC422S
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 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 connections of the AS-i slave ► Reconnect 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 the remaining AS-i slave ► Reconnect removed AS-i slave to the AS-i network
The automatic addressing is not activated for AS-i <1,2>.	Warning	► Activate automatic addressing ([AS-i1]/[AS-i2] > [Master setup])
A voltage drop of 19.0 V was detected on AS-i master <1,2>	Warning	► Check voltage supply of the device and replace if necessary
A voltage drop of 22.5 V was detected on AS-i master <1,2>	Warning	► Check voltage supply of the device and replace if necessary
Increased message 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 displayed AS-i slave
AS-i slave with address 0 cannot be automatically readdressed (wrong profile)	Warning	► Activate automatic addressing ([AS-i1]/[AS-i2] > [Master setup]
Manual output change: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>, value: <0..F, 0..32768>	Event	not necessary
Manual parameter change: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>, value: <0..F, 0..32768>	Event	not necessary
AS-i master <1,2> was switched to the <geschützten Betrieb,Projektierungsmodus>	Event	not necessary
AS-i projection process was carried out.	Event	not necessary
AS-i slave with the address 0 was detected	Event	not necessary

10.8.3 OSC messages: Safety module

42325

Message	Type	Corrective measures
An internal fault in the safety board was detected <Fehlernummer1>, <Fehlernummer2>	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 slave with slave with unambiguous 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 adaptation ([Quick-Setup] > [Alles projektieren])
Cross-networking participant <Name> missing	Error	► Check cross networking
The safety board was switched to the operating mode <Operate, Maintenance>	Event	not necessary
The safety configuration "<Name>" was loaded	Event	not necessary
The safety configuration "<Name>" was deleted	Event	not necessary
The safety configuration is not readable	Event	not necessary
The safety configuration "<Name>" was enabled by <Kurzzeichen>	Event	not necessary

OSC messages: AS-i 1 / AS-i 2 (safety)

42320

Message	Type	Corrective measures
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	► Replace one of the slaves with slave with unambiguous 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 unambiguous code sequence
Error in code sequence during the teach process (0x5827): currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	► Check configuration of the AS-i network
Error in code sequence during the teach process (0x5820): currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	► Replace slave with slave with unambiguous code sequence
Safe AS-i input slave of type positively guided waiting for testing: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	► Carry out testing for safe AS-i slave
ASi_SYS_ERROR_CFG_CANTADDSLAVE_e; currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	► Maximum number of the control slaves reached; check logical interfaces of the project

OSC messages: CODESYS (safety)

42318

Message	Type	Corrective measures
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

OSC messages: System (safety)

42324

Message	Type	Corrective measures
Overvoltage on the internal supply detected: tmn=%s; ln=%s; p1=%s; p2=%s	Warning	► Check voltage supply of the device and replace, if necessary
Undervoltage detected on the internal supply: tmn=%s; ln=%s; p1=%s; p2=%s	Warning	► Check voltage supply of the device and replace, if necessary
The internal device temperature has exceeded the warning threshold of 78°C: tmn=%s; ln=%s; p1=%s; p2=%s	Warning	► Check thermal conditions of the system environment
The internal device temperature has exceeded the error threshold of 85°C: tmn=%s; ln=%s; p1=%s; p2=%s	Warning	► Check thermal conditions of the system environment
The internal device temperature has fallen below the error threshold of -5°C: tmn=%s; ln=%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; ln=%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; ln=%s; p1=%s; p2=%s	Error	► Note the message and contact the ifm service centre.
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	► 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 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 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.

Message	Type	Corrective measures
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	Warning	► 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_FRMSYNC_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.
System warning: BIT_ASI_WRONG_FRMPARI_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.

Message	Type	Corrective measures
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.
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.

Message	Type	Corrective measures
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; p2=%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.

Message	Type	Corrective measures
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.
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=%s	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.

Message	Type	Corrective measures
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 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.
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=%s	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.

Message	Type	Corrective measures
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=%s	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.
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_EMPTY_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.

Message	Type	Corrective measures
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.
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_OVERFLOW_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.

Message	Type	Corrective measures
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_PRESENT_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.
System error: BIT_OS_TASK_TOLESSTIMETICKS_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.

Message	Type	Corrective measures
System error: BIT_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_SAFESTORAGE_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_SAFESTORAGE_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_RELEASED_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.
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_SYSLUT_VERS_MISM_WARN_1; tmn=%s; ln=%s; p1=%s; p2=%s	Warning	► Note the message and contact the ifm service centre.

Message	Type	Corrective measures
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_ACCEPT_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_ACCEPT_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.
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.

OSC messages: Logical devices (safety)

42327

Message	Type	Corrective measures
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
ERROR: (%s), DC=%s, DC-1=%s, P1=%s, P2=%s	Error	Logical device of the safe AS-i slaves or the safe local inputs/outputs 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
INIT: (%s), DC=%s, DC-1=%s, P1=%s, P2=%s	Note	Logical device of the safe AS-i slave or 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
OFF: (%s), DC=%s, DC-1=%s, P1=%s, P2=%s	Note	Logical device of the safe AS-i slave or the safe local input/output 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
ON: (%s), DC=%s, DC-1=%s, P1=%s, P2=%s	Note	Logical device of the safe AS-i slave or 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 safe local inputs/outputs requests testing
TEST: (%s), DC=%s, DC-1=%s, P1=%s, P2=%s	Note	Logical device of the safe AS-i slave or the safe local input/output requests testing

OSC messages: Local inputs/outputs (safety)

42326

Message	Type	Corrective measures
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 "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 parameter "Channel A" an 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 safe and non-safe information: currDev=%s; currDiagState=%s; prevDiagState=%s; addr1=%s; addr2=%s	Error	► Check channel use in the configuration.
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.

OSC messages: FSoE (Safety)

42319

Message	Type	Corrective measures
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

10.8.4 OSC messages: Safety PLCopen function blocks

42323

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	Possible values	
Message #LogID	ID of the source of the message	0x8001 =	CODESYS_LOG_ID
currDevice	ID of the safety-PLCopen function block the diagnostic code of which is displayed; corresponds to the value defined by the programmer for "FB_Type"	→**Ctrl_SetDiagInfo**, input parameters	
hwid	Instanz-ID des FB	→**Ctrl_SetDiagInfo**, input parameters	
CurrDiagState	current state of the StateMachine of the safety PLCopen FB	→ operating instructions safety PLCopen library in CODESYS	
PrevDiagState	State of the StateMachine of the safety PLCopen FB in the previous PLC cycle	→ operating instructions 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 parameters	
Addr2	Reserved	0x0	constant

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