



Device Manual

AS-i Gateway with EtherNet/IP device interface

AC1421

AC1422

Master profile: M4

Firmware: 4.3.1 or higher

English

Contents

1	Preliminary note	5
1.1	Legal and copyright information	5
1.2	Purpose of the document	5
1.3	Explanation of Symbols	6
1.4	Overview: User documentation for AC1421/22	7
1.5	Modification history	7
2	Safety instructions	8
2.1	General safety instructions	8
2.2	Required background knowledge	8
2.3	Tampering with the unit	8
3	System description	9
3.1	Intended use	10
3.1.1	Permitted use	10
3.1.2	Prohibited use	10
3.2	Information concerning the device	11
3.2.1	Overview	11
3.2.2	Operating elements	12
3.2.3	Display elements	12
3.2.4	CODESYS PLC	12
3.2.5	Interfaces	13
3.2.6	Required accessories	13
4	Operation	14
4.1	Control of the graphical user interface	14
4.1.1	Function keys	15
4.1.2	Arrow keys	15
4.2	Menu view	16
4.2.1	Menu navigation	16
4.2.2	Navigation aids	17
4.3	Page view	19
4.3.1	Navigate on a page	19
4.3.2	Use navigation aids	19
4.3.3	Description of the control elements	20
4.4	Remote access	32
4.4.1	General	32
4.4.2	Recommended browsers	32
4.4.3	Operating instructions	33
5	Menu	36
5.1	Start screen	36
5.2	Menu functions	37
5.2.1	Additional functions	37
5.3	Quick setup	38
5.3.1	Quick setup: Project AS-i networks	39
5.3.2	Quick setup: Configure the operating mode of the AS-i masters	40
5.3.3	Quick setup: Configure the output access	41
5.3.4	Quick setup: Access the device via QR code	41
5.3.5	Quick setup: Configure the EtherNet/IP interface	41
5.3.6	Quick setup: Set the configuration mode	43
5.3.7	Quick setup: Set the Configuration interface	44

5.3.8	Quick setup: Address the AS-i slaves connected to AS-i Master 1	46
5.3.9	Quick setup: Address the AS-i slaves connected to AS-i Master 2	47
5.4	AS-i 1 / AS-i 2	48
5.4.1	AS-i 1 / AS-i 2: Master setup	49
5.4.2	AS-i 1 / AS-i 2: Diagnosis	51
5.4.3	AS-i 1 / AS-i 2: AS-i slaves	53
5.5	System	59
5.5.1	System: Programmable Logic Controller (PLC)	60
5.5.2	System: Information	66
5.5.3	System: Setup	67
5.5.4	System: Diagnosis	80
5.6	Interfaces	81
5.6.1	Interfaces: Configuration interface	82
5.6.2	Interfaces: EtherNet/IP interface	85
5.7	ifm system solutions	97
5.7.1	Notes on ifm system solutions	98
5.7.2	Show information about installed ifm apps	99
5.7.3	Install single/basic app	100
5.7.4	Install multi app	101
5.7.5	Update ifm apps	102
5.7.6	Uninstall ifm apps	102
6	Setup	104
6.1	Connect the device to the periphery	104
6.1.1	EtherNet/IP interface	104
6.1.2	Configuration interface	104
6.2	Start screen 'Basic settings'	105
6.2.1	Change the basic settings of the device	105
6.3	Update the firmware of the device	107
6.3.1	Behaviour of the settings upon firmware update	107
6.3.2	Firmware update from SD card	108
6.3.3	Firmware update via the web interface	109
6.4	Connect and address AS-i slaves	111
6.5	Setup of EtherNet/IP	111
6.6	Setup of the configuration interface	112
6.7	Exchange AS-i slave	112
7	Troubleshooting	113
7.1	Status LED	113
7.1.1	Status LED: Basic device	113
7.1.2	Status LED: Fieldbus EtherNet/IP	113
7.2	Start screen: Status LEDs	114
7.2.1	Status of the web interface	114
7.2.2	Operating mode of the AS-i master	114
7.2.3	Control instance of the AS-i outputs	114
7.2.4	Fieldbus status	114
7.3	Online diagnosis function	115
7.3.1	Message types	115
7.3.2	Locate error sources	115
7.4	Online Support Center (OSC)	116
7.4.1	OSC: View current error messages	116
7.4.2	OSC: Show message history	117
7.5	Display diagnostic protocol	118
8	Appendix	119
8.1	Approval tests / certifications	119
8.2	Technical data	120
8.2.1	Housing	120
8.2.2	Display elements	120

8.2.3	Operation.....	120
8.2.4	Power supply connections.....	120
8.2.5	Interfaces.....	121
8.2.6	Programmable Logic Controller (PLC)	121
8.3	Address assignment in Ethernet networks	122
8.4	Configuration interface: connection concepts.....	123
8.4.1	Direct link.....	123
8.4.2	Connection via Ethernet network.....	124
8.5	AS-i master	125
8.5.1	Operating modes of the AS-i master	126
8.5.2	Master flags.....	128
8.6	AS-i slaves	129
8.6.1	Profiles of AS-i slaves.....	130
8.7	Fieldbus EtherNet/IP	140
8.7.1	Fieldbus objects	140
8.7.2	Fieldbus parameters.....	141
8.7.3	Device-specific parameters	142
8.7.4	Cyclic data.....	162
8.7.5	Acyclic data	186
8.7.6	EtherNet/IP projection software: Programmers' notes.....	193
8.8	OSC messages	198
8.8.1	OSC messages: System	198
8.8.2	OSC messages: AS-i 1 / AS-i 2.....	199

1 Preliminary note

Content

Legal and copyright information	5
Purpose of the document	5
Explanation of Symbols	6
Overview: User documentation for AC1421/22	7
Modification history	7

33203

1.1 Legal and copyright information

33117

© All rights reserved by ifm electronic gmbh. No part of this manual may be reproduced and used without the consent of ifm electronic gmbh.

All product names, pictures, companies or other brands used on our pages are the property of the respective rights owners:

- AS-i is the property of the AS-International Association, (→ www.as-interface.net)
- CAN is the property of the CiA (CAN in Automation e.V.), Germany (→ www.can-cia.org)
- CODESYS™ is the property of the 3S – Smart Software Solutions GmbH, Germany (→ www.codesys.com)
- DeviceNet™ is the property of the ODVA™ (Open DeviceNet Vendor Association), USA (→ www.odva.org)
- EtherNet/IP® is the property of the → ODVA™
- EtherCAT® is a registered trade mark and patented technology, licensed by Beckhoff Automation GmbH, Germany
- IO-Link® (→ www.io-link.com) is the property of the → PROFIBUS Nutzerorganisation e.V., Germany
- ISOBUS is the property of the AEF – Agricultural Industry Electronics Foundation e.V., Deutschland (→ www.aef-online.org)
- Microsoft® is the property of the Microsoft Corporation, USA (→ www.microsoft.com)
- PROFIBUS® is the property of the PROFIBUS Nutzerorganisation e.V., Germany (→ www.profibus.com)
- PROFINET® is the property of the → PROFIBUS Nutzerorganisation e.V., Germany
- Windows® is the property of the → Microsoft Corporation, USA

1.2 Purpose of the document

41760

This document applies to devices of the type "AS-i Gateway with EtherNet/IP device interface (art. no.: AC1421/22)

It is part of the device and contains information about the correct handling of the product.

- ▶ Read this document before using the device.
- ▶ Keep this document during the service life of the device.

1.3 Explanation of Symbols

34171



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 AC1421/22

41793

ifm electronic provides the following user documentation for the models of the device class "AS-i Gateway mit EtherNet/IP-Device Schnittstelle":

Document	Content / Description
Data sheet	Technical data of the device as a table
Operating instructions *	<ul style="list-style-type: none"> ▪ Notes on mounting and electrical installation of the device ▪ Set-up, description of the operating and display elements, maintenance information, scale drawing
Device manual	<ul style="list-style-type: none"> ▪ Notes on operation of the device via GUI and web interface ▪ Error elimination ▪ Description of the fieldbus data
Supplement device manual	<ul style="list-style-type: none"> ▪ Description of the acyclic data sets and the command interface
Programming manual	<ul style="list-style-type: none"> ▪ Creation of a project with the device using CODESYS ▪ Configuration of the device using CODESYS ▪ Programming of the PLC of the device ▪ Description of the device-specific CODESYS function libraries

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



The user can download all documents from the ifm 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	

2 Safety instructions

Content

General safety instructions	8
Required background knowledge	8
Tampering with the unit	8

28333

2.1 General safety instructions

41415

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

Intended use	10
Information concerning the device	11

28392

3.1 Intended use

Content

Permitted use	10
Prohibited use.....	10

36928

3.1.1 Permitted use

41798

The device is designed for operation in a control cabinet.

The device may only be used for the following purposes:

- as AS-i master in 1 or 2 AS-i networks to control the data exchange to the sensor/actuator level
- as gateway between the AS-i network and a higher-level controller (EtherNet/IP-Controller = Host; e.g. PLC) via the fieldbus interface
- as Programmable Logic Controller (PLC) for program-based parameter setting, control and regulation of the AS-i slaves connected to the device

3.1.2 Prohibited use

34228

The device may not be used beyond the limits of the technical data (→ **Technical data** (→ S. [120](#)))!

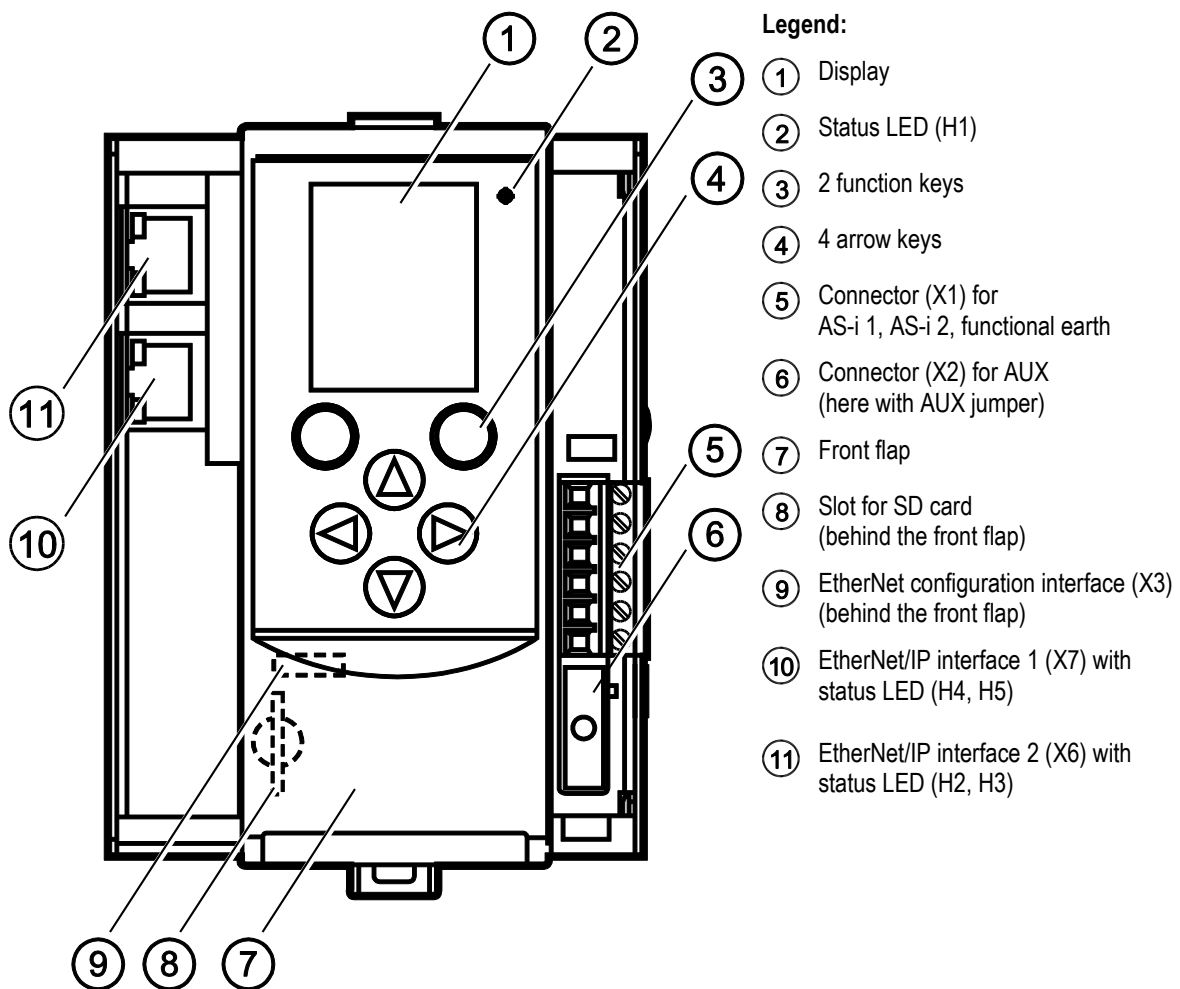
3.2 Information concerning the device

Content	
Overview.....	11
Operating elements.....	12
Display elements.....	12
CODESYS PLC.....	12
Interfaces.....	13
Required accessories.....	13

36905

3.2.1 Overview

41724



3.2.2 Operating elements

36790

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. [14](#))

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. [14](#))

Technical data: → **Technical data** (→ S. [120](#))

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. [113](#))

3.2.4 CODESYS PLC

36953

The device features a Programmable Logic Controller (PLC). The PLC can run the following application types:

- Applications that have been created with the IEC 61131-3 compliant programming software "CODESYS Development System" (from version V3.5 SP9 Patch 7 Hotfix 3)
- System solutions that have been provided by ifm electronic

Technical data: → **Programmable Logic Controller (PLC)** (→ S. [121](#))



For information about the programming of the device-internal PLC with CODESYS, please refer to the programming manual:

→ www.ifm.com > product page > [Downloads]

3.2.5 Interfaces

36927

The device provides the following interfaces:

Ethernet configuration interface

41495

The configuration interface (X3) is located behind the front flap of the device. It allows the user to access the following device functions:

- web interface for device configuration and diagnosis
- programming of the device-internal PLC
- Configuration as fieldbus interface

Possible network topologies: → **Configuration interface: connection concepts** (→ S. [123](#))

Technical data: → **Technical data** (→ S. [120](#))

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 interface: connection concepts** (→ S. [123](#))
- Technical data: → **Technical data** (→ S. [120](#))

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

Technical data: → **Technical data** (→ S. [120](#))

3.2.6 Required accessories

36764

To be able to operate the device in a sensible way you need the following accessories (not supplied with the device):

- Depending on the selected voltage supply (→ Operating instructions) you need:
 - a power supply for the 24 V power supply (e.g. art. no. DN3011)
 - for each AS-i master one AS-i power supply each (e.g. art. no. AC1236)
 - a data decoupling module AC1250 (accessory, optional)
- AS-i slaves.

4 Operation

Content

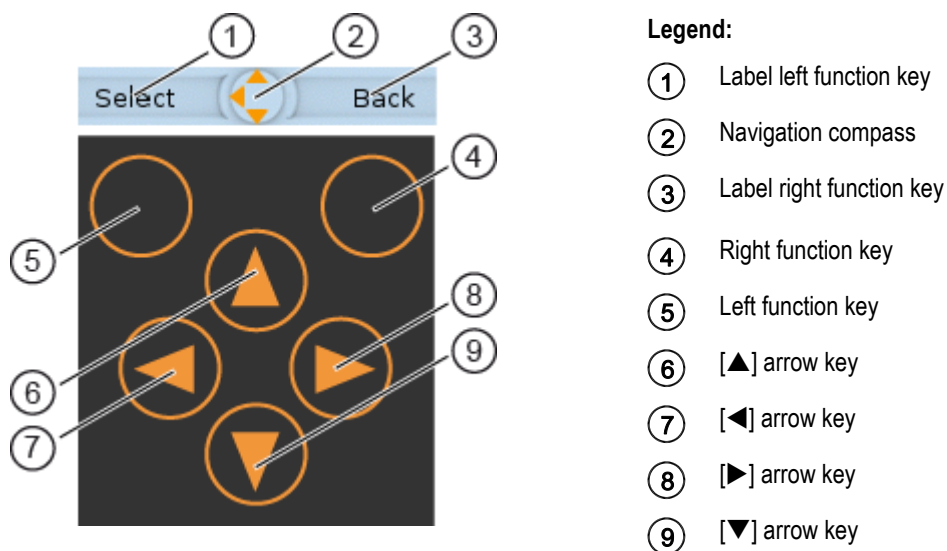
Control of the graphical user interface	14
Menu view.....	16
Page view	19
Remote access.....	32

41713

4.1 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.



4.1.1 Function keys

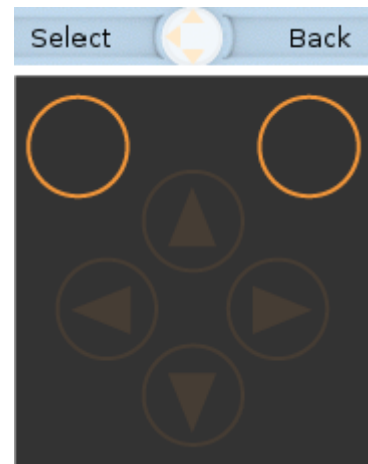
41476

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].



4.1.2 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.

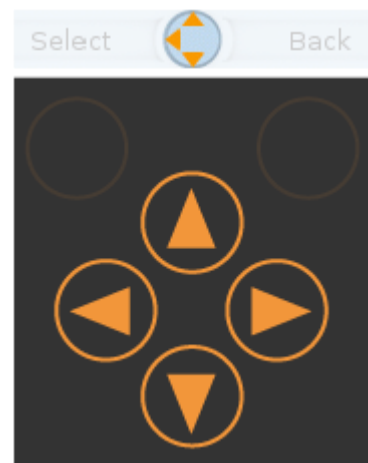
Examples:



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

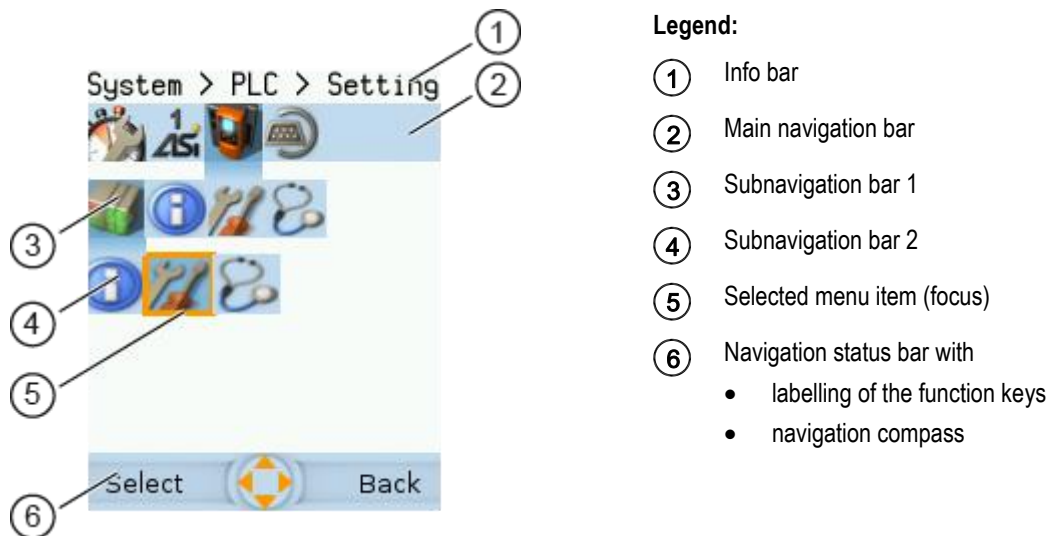


Only the arrow keys [▶] and [▼] are active and will trigger a device response when pressed.



4.2 Menu view

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.

4.2.1 Menu navigation

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. [19](#))).

In the main navigation bar:

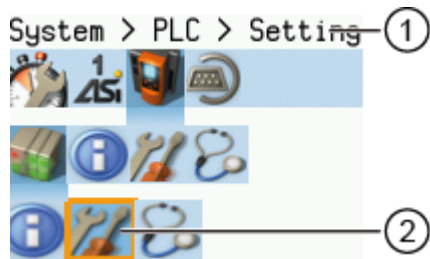
- ▶ Press [Back] function key to return to the start screen (→ **Start screen** (→ S. [36](#))).

4.2.2 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

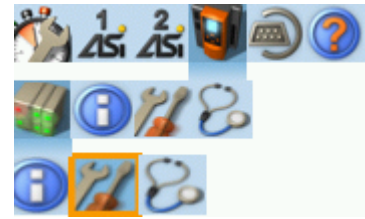
41499

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.



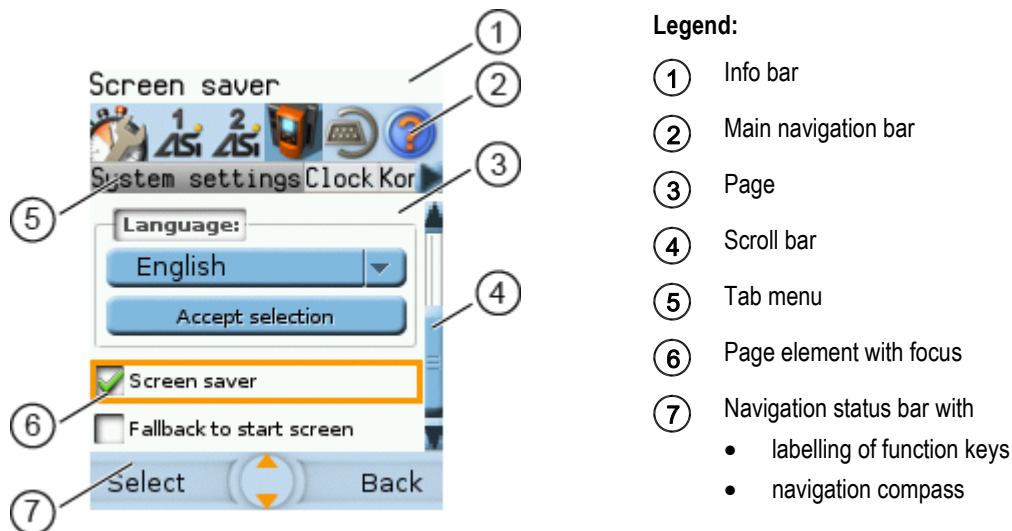
6.
 - ▶ Use [▶] to select the [Settings] menu symbol.
 - > The focus is on the [Settings] menu symbol.
 - ▶ Press the [Select] function key to go to the page view of the [Settings] menu item.
 - > The page shows the setting options for the device-internal PLC.



4.3 Page view

41786

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



4.3.1 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. [20](#))

4.3.2 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.

4.3.3 Description of the control elements

Content	
Tab menu/Tab	21
Button	22
Checkbox.....	22
List	23
Slave selector	24
Confirmation message.....	29
Numerical field	30
Binary field	31

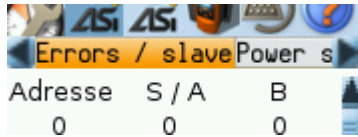
41586

A page consists of different control elements.

Tab menu/Tab

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

Example:



- > The focused tab has an orange background
- > The info bar displays the name of the active tab (in this example: 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.

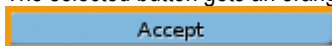
Example:



Use:

1 Select a button

- ▶ Use the arrow keys [▲] / [▼] to select a button.
- > The selected button gets an orange frame:



2 Activate the button

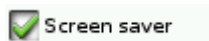
- ▶ Use [Select] function key to activate the selected button.
- > The function is executed.

Checkbox

41600

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

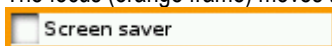
Example:



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

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

Examples:

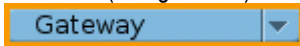
 = list without caption

Filter:  = list with caption

Use:

1 Select a list

- ▶ Use [▲] / [▼] arrow key to select the list.
- > The focus (orange frame) moves to the selected list.



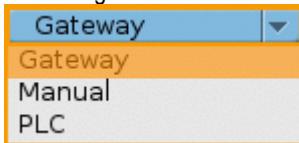
- > The list shows the active value: (in this example Gateway).

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. [\[Accept selection\]](#))!

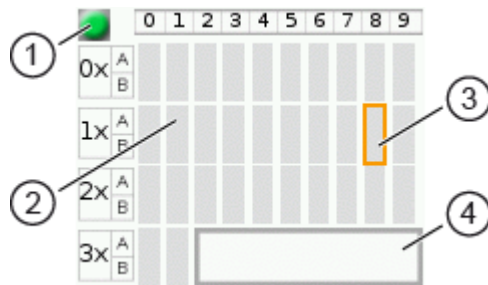
Slave selector

Content

Overview of slave states.....	25
Overview of free slave addresses	27

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

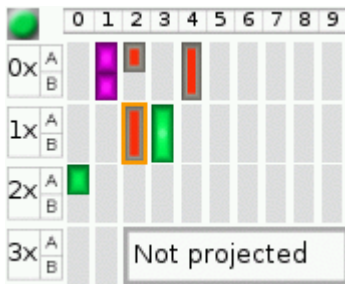
- row header: 1x (= tens digit of the AS-i address)
- column header: 8 (= units digit of the AS-i address)
- type of slave: single slave (= symbol fully occupies the address field)
- resulting AS-i address: 18

- > 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. [25](#)))
- Overview of free slave addresses (→ **Overview of free slave addresses** (→ S. [27](#)))

Overview of slave states



- > 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. 26)
- > 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: <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▪ 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

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. 28)
- > 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

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

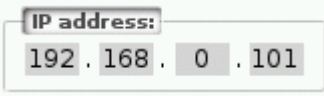
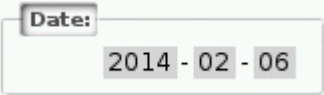



- ▶ Change the system settings.
- > The confirmation message appears.

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

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 <ul style="list-style-type: none"> w x y z = network segments (value range: 0... 255)
Date		Date entry in [yyyy-mm-ss] format <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> hh = hours (value range: 00 ... 12) mm = minutes (value range: 00 ... 59) ss = seconds (value range: 00 ... 59) <p> The numerical field for seconds (ss) cannot be edited!</p>
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).

4.4 Remote access

Content

General.....	32
Recommended browsers.....	32
Operating instructions.....	33

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.

4.4.1 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. [37](#))

4.4.2 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)

4.4.3 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 functions 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]

AS-i 1



AS-i 1 > Diagnostics




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:

 Status: logged in

User is logged in:

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

 Status: logged out

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. 33)).
- > At the top of the web interface, the status bar displays the following status message:
 -  Status: logged out
- ▶ Enter the fixed password in the [Password:] field.
- ▶ Click [Login] to log in to the web interface.
- > The status bar displays the changed status:
 -  Status: logged in
- > 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
- AC1421/22 is restarted

To prevent unauthorised access to the device settings:

- ▶ Manually log off before you leave the web interface! (→ **Disconnect from web interface** (→ S. 35))
- ▶ 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:
 - 🔒 Status: logged in
- ▶ Log out of the web interface by clicking [Logout]
- > Status bar shows changed status
 - 🔓 Status: logged out
- > 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 password memory function of the web browser is not deactivated: Delete all saved passwords in the browser settings!

5 Menu

Content

Start screen	36
Menu functions	37
Quick setup.....	38
AS-i 1 / AS-i 2	48
System.....	59
Interfaces.....	81
ifm system solutions	97

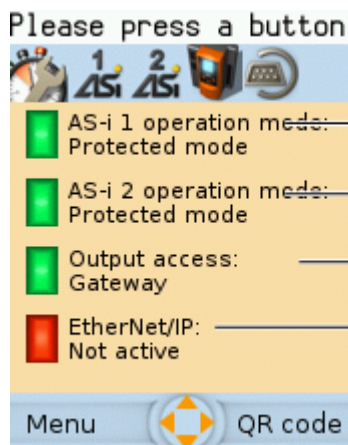
41740

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

5.1 Start screen

41690

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. [105](#))). The start screen displays the status information of important system components. Moreover, the graphical user interface is accessed and operated from the start screen.



- ① AS-i Master 1 operation mode
→ **Operating mode of the AS-i master** (→ S. [114](#))
- ② AS-i Master 2 operation mode
→ **Operating mode of the AS-i master** (→ S. [114](#))
only available for devices with 2 AS-i masters
- ③ Control instance of the AS-i slave outputs
→ **Control instance of the AS-i outputs** (→ S. [114](#))
- ④ Status of the EtherNet/IP connection
→ **Fieldbus status** (→ S. [114](#))

▶ Press [Menu] function key to go to the menu (→ **Menu functions** (→ S. [37](#)))








OR:

▶ Press [OSC] function key to go to the Online Support Center (→ **Online Support Center (OSC)** (→ S. [116](#)))

5.2 Menu functions

41739

The main navigation bar of the AC1421/22 provides access to the following menus:

Symbol	Description
	Access to the most important device functions → System (→ S. 59)
	Configuration and diagnostics of the AS-i 1 network (AS-i master, AS-i slaves) → AS-i 1 / AS-i 2 (→ S. 48)
	Configuration and diagnostics of the AS-i 2 network (AS-i master, AS-i slaves)* → AS-i 1 / AS-i 2 (→ S. 48)
	Configuration and diagnostics of the device, control of the device-internal PLC → System (→ S. 59)
	Configuration and diagnostics of the interfaces (EtherNet/IP, Configuration interface) → Interfaces (→ S. 81)
	Online Support Centre** → Online Support Center (OSC) (→ S. 116)
	Control and administration of the ifm system solutions (ifm apps)** → ifm system solutions (→ S. 97)

* ... only available for devices with 2 AS-i masters

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

5.2.1 Additional functions

41548


The web interface provides the following extra features compared to the user interface of the display:

- Download Electronic Data Sheet (EDS)
(→ **Download the device and I/O description** (→ S. [88](#)))
- Download description of inputs/outputs
(→ **Download the device and I/O description** (→ S. [88](#)))
- Adopt date and time settings of the PC/laptop
(→ **Adopt the system time of the PC** (→ S. [75](#)))
- Save diagnostics protocol
(→ **Store diagnostic protocol** (→ S. [79](#)))
- Use ifm system solutions
(→ **ifm system solutions** (→ S. [97](#)))
- Diagnostics indication
(→ **Start screen: Status LEDs** (→ S. [114](#)))

5.3 Quick setup

41409

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

Navigation path	Functions
	<ul style="list-style-type: none"> → Quick setup: Project AS-i networks (→ S. 39) → Quick setup: Configure the operating mode of the AS-i masters (→ S. 40) → Quick setup: Configure the output access (→ S. 41) → Quick setup: Access the device via QR code (→ S. 41) → Quick setup: Configure the EtherNet/IP interface (→ S. 41) → Quick setup: Set the configuration mode (→ S. 43) → Quick setup: Set the Configuration intertace (→ S. 44) → Quick setup: Address the AS-i slaves connected to AS-i Master 1 (→ S. 46) → Quick setup: Address the AS-i slaves connected to AS-i Master 2 (→ S. 47)

5.3.1 Quick setup: Project AS-i networks

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	<input type="checkbox"/>	Exclude AS-i Master 1 from projection adaptation
		<input checked="" type="checkbox"/>	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)	<input type="checkbox"/>	Exclude AS-i Master 2 from projection adaptation
		<input checked="" type="checkbox"/>	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".

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



Information regarding the operating modes of an AS-i master: → **Operating modes of the AS-i master** (→ S. [126](#))

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	<input type="checkbox"/> Projection mode inactive: AS-i network runs in protected mode (normal mode)
		<input checked="" type="checkbox"/> Projection mode active: AS-i network can be projected. (→ Quick setup: Address the AS-i slaves connected to AS-i Master 1 (→ S. 46) or → Quick setup: Address the AS-i slaves connected to AS-i Master 2 (→ S. 47))
[No slave reset]	Behaviour of the AS-i slaves when changing the operating mode	<input type="checkbox"/> 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).
		<input checked="" type="checkbox"/> 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].

5.3.3 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.

5.3.4 Quick setup: Access the device via QR code

41765

The QR code (Quick Response 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. 124))
- 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. 32)).

5.3.5 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.

5.3.6 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. [195](#))

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.

5.3.7 Quick setup: Set the Configuration interface

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

- 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	
[Obtain IP address autom.]	Active method for the configuration of the interface parameters	<input type="checkbox"/>	Manual assignment of the interface parameters through the operator
		<input checked="" type="checkbox"/>	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.
		[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	

- ▶ 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 [Obtain 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 [Obtain 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.

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

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. 25)
- ▶ Select the AS-i slave of which want to change the address.
- ▶ Use [Select] to activate the selected AS-i slave.

	0	1	2	3	4	5	6	7	8	9
0x	A	B	Green	Green	Green	Green	Green	Green	Green	Green
1x	A	B	Green	Green	Green	Green	Green	Green	Green	Green
2x	A	B	Green	Green	Green	Green	Green	Green	Green	Green
3x	A	B	Slave active	Slave active	Slave active	Slave active	Slave active	Slave active	Slave active	Slave active

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. 27)
- ▶ 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)

	0	1	2	3	4	5	6	7	8	9
0x	A	B	Free	Free	Free	Free	Free	Free	Free	Free
1x	A	B	Free	Free	Free	Free	Free	Free	Free	Free
2x	A	B	Free	Free	Free	Free	Free	Free	Free	Free
3x	A	B	Free	Free	Free	Free	Free	Free	Free	Free

	0	1	2	3	4	5	6	7	8	9
0x	A	B	Green	Green	Green	Green	Green	Green	Green	Green
1x	A	B	Red	Green	Green	Green	Green	Green	Green	Green
2x	A	B	Green	Green	Green	Green	Green	Green	Green	Green
3x	A	B	Not projected	Not projected	Not projected	Not projected	Not projected	Not projected	Not projected	Not projected

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. 39)).

5.3.9 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. [46](#))).

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.

5.4 AS-i 1 / AS-i 2

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



The [AS-i 2] menu is only available for devices with two AS-i masters!

Navigation path	Content
> >	AS-i master settings → Set the operating mode of the AS-i master (→ S. 49) → Carry out a projection adaptation (→ S. 50) → Set the monitoring functions of the AS-i master (→ S. 50)
> >	AS-i network diagnosis → Display and reset the error counters (→ S. 51) → Display the error statistics of the AS-i slaves (→ S. 51) → Display the voltage supply analysis (→ S. 52) → Display and reset performance data (→ S. 52)
> >	AS-i slave settings → Display the input/output data of the AS-i slave (→ S. 53) → Change the digital output values manually (→ S. 55) → Change the analogue output values manually (→ S. 55) → Show AS-i slave information (→ S. 56) → Change an AS-i slave address (→ S. 57) → Change an AS-i slave parameter output (→ S. 57) → Change the Extended ID1 of the AS-i slave (→ S. 58)

5.4.1 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

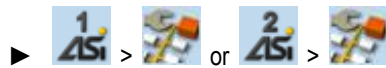
41640



More information on the operating modes of the AS-i master: → **Operating modes of the AS-i master** (→ S. [126](#))

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

1 Select the menu page



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	<input type="checkbox"/>	Projection mode inactive: AS-i network operates in protected mode (normal mode)
		<input checked="" type="checkbox"/>	Projection mode active: AS-i network can be projected.
[No slave reset]	Behaviour of the AS-i slaves when changing the operating mode	<input type="checkbox"/>	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).
		<input checked="" type="checkbox"/>	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.

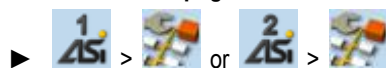


The projection adaptation can only be carried out in projection mode:

- ▶ [Projection mode] must be checked (→ **Set the operating mode of the AS-i master** (→ S. 49)).
- ▶ 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



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:

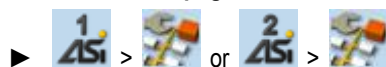
- > The Online Support Center displays an error message.
- ▶ Remove the error and repeat the process.

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



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. 126))	<input type="checkbox"/>	Automatic addressing disabled
		<input checked="" type="checkbox"/>	Automatic addressing enabled
[Earth fault detection]	Detection of earth faults	<input type="checkbox"/>	Do not detect earth faults in the AS-i system
		<input checked="" type="checkbox"/>	Detect earth faults in the AS-i system
[Double address detection]	Double address detection	<input type="checkbox"/>	Do not detect AS-i slaves with the same address
		<input checked="" type="checkbox"/>	Detect AS-i slaves with the same address

- > Selected values are applied.

5.4.2 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



- ▶ 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

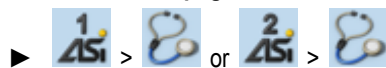
- ▶ Press [Reset] button.
- > All error counters are reset to 0.

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



- ▶ 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

To display the voltage supply analysis:





1 Select the menu page



▶ 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

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

1 Select the menu page



▶ 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.

5.4.3 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



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. 24)).
- ▶ 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)	
		<input type="checkbox"/> Data bit is switched off (0 / OFF)
		<input checked="" type="checkbox"/> Data bit is switched on (1 / ON)

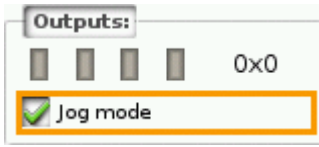
Analogue input

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.	<input type="checkbox"/> Invalid value <input checked="" type="checkbox"/> Valid value
▪ [Overflow]	The Overflow bit indicates whether the displayed value is within the value range.	<input type="checkbox"/> Value within valid value range <input checked="" type="checkbox"/> Valid value range exceeded

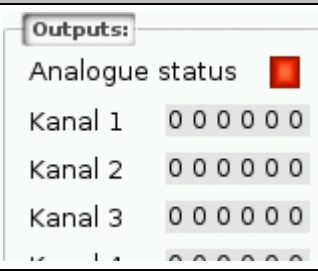
Digital output

41465

Designation	Description	Example / Possible values
[Outputs]	Current values of the digital outputs (binary and hexadecimal representation)	
		<input type="checkbox"/> Data bit is switched off (0 / OFF)
		<input checked="" type="checkbox"/> 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.	<input type="checkbox"/> Jog mode disabled ("switch mode") > The changes do not affect the output until you quit the editing mode.
		<input checked="" type="checkbox"/> 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	<input checked="" type="checkbox"/> Not O.K. <input checked="" type="checkbox"/> 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)	
		<input type="checkbox"/> Data bit is switched off (0 / OFF)
		<input checked="" type="checkbox"/> Data bit is switched on (1 / ON)

Change the digital output values manually



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 output 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 the output access** (→ S. 67)).

2 Select the menu page



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. 24)).
- ▶ 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. 54))
- ▶ Change the desired output value bit by bit.
- > Selected value is applied.

Change the analogue output values manually

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 the output access** (→ S. 67)).

2 Select the menu page



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. 24)).
- ▶ 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. 30)).
- > Selected value is applied.
- ▶ Optional: repeat step 3 to change further channels.

Show AS-i slave information

To display information about an AS-i slave:






1 Select the menu page



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. 24)).
- ▶ Select **Information** tab.

2 Display information about the AS-i slave

> Page shows the following information:

Name	Description	Possible values												
[AS-i slave address]	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	<div style="border: 1px solid grey; padding: 5px;"> <p>AS-i slave profile:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">IO</td> <td style="text-align: center;">ID</td> <td style="text-align: center;">ID2</td> <td style="text-align: center;">(ID1)</td> </tr> <tr> <td>Current:</td> <td>3</td> <td>f</td> <td>f (f)</td> </tr> <tr> <td>Preset:</td> <td>3</td> <td>f</td> <td>f (f)</td> </tr> </table> </div>	IO	ID	ID2	(ID1)	Current:	3	f	f (f)	Preset:	3	f	f (f)
IO	ID	ID2	(ID1)											
Current:	3	f	f (f)											
Preset:	3	f	f (f)											

- ▶ Use [▲]/[▼] for page navigation.

Change an AS-i slave address

To change the address of an AS-i slave:

1 Select the menu page



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. 24)).
- ▶ 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. 27)).
- ▶ 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. 25)).

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. 50)).

Change an AS-i slave parameter output

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

1 Enable manual access to the outputs

- ▶ Set [Output access] parameter = Manual (→ **Set the output access** (→ S. 67))

2 Select the menu page



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. 24)).
- ▶ 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

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

1 Select the menu page



- ▶ Select an AS-i slave (→ **Slave selector** (→ S. [24](#))).
- ▶ 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. [50](#))).

5.5 System




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

Navigation path	Functions
	Device-internal PLC → System: Programmable Logic Controller (PLC) (→ S. 60)
	System information → Show version information (→ S. 66)
	System settings → Set the output access (→ S. 67) → Enable/Disable the device-internal PLC (→ S. 68) → Set the device cycle (→ S. 69) → Switch the menu language (→ S. 70) → Set the behaviour of the display (→ S. 71) → Set the system time manually (→ S. 73) → Synchronise the system time with an NTP server (→ S. 74) → Adopt the system time of the PC (→ S. 75) → Export device configuration (→ S. 77) → Import device configuration (→ S. 78) → System reset (→ S. 79) → Store diagnostic protocol (→ S. 79)
	System diagnostics → Display diagnostic data (→ S. 80)

5.5.1 System: Programmable Logic Controller (PLC)

41671

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

Navigation path	Functions
	PLC information: → Display the status of the CODESYS PLC (→ S. 61) → Display information about PLC projects (→ S. 61)
	PLC settings → Control a single PLC application (→ S. 62) → Control PLC applications (→ S. 63) → Show target visualisation (→ S. 64)
	PLC diagnosis → Show memory used (→ S. 65)



For information about the programming of the device-internal 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 PLC status and project information.

Display the status of the CODESYS PLC

41467

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

1 Select the menu page



▶ Select [Status] tab.

2 Display the status of the CODESYS PLC

> Page shows the following information:

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

Display information about PLC projects

41440

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

1 Select the menu page



▶ Select [Project] tab.

2 Display information about 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

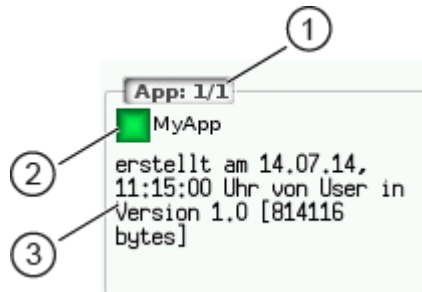
PLC: Settings

41801

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

Control a single PLC application

41576



- ① [App x/y]
 – x ... number of the app displayed
 – y ... total number of apps stored
- ② Status and name of the application
 ■ = application has been stopped
 ■ = application has been started
- ③ Information concerning the application
 – date and time of creation
 – author
 – version of application
 – size

To control a single 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 PLC application: continue with → step 3
 - Stop a single PLC application: continue with → step 4

3 Launch a single PLC application

- ▶ Press [Start] to launch the selected PLC application.
- > The confirmation prompt appears.
- ▶ Press [OK] to confirm the prompt.
- > The PLC application is started.
- ▶ Continue with → step 5

4 Stop a single 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 PLC application

- > The status display of the PLC application is updated

Control PLC applications

To control all PLC applications stored on the device:

1 Select the menu page



- ▶ Select **[All applications]** tab.

2 Display status information about the 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 PLC applications: continue with → step 3
 - Stop all PLC applications: continue with → step 4
 - Reset all PLC applications: continue with → step 5

3 Launch all PLC applications

- ▶ Press **[Starten]** button.
- > The confirmation prompt appears.
- ▶ Press [OK] to confirm the prompt.
- > All PLC applications are started.
- ▶ Continue with → step 6

4 Stop all PLC applications

- ▶ Press **[Stop]** button.
- > The confirmation prompt appears
- ▶ Press [OK] to confirm the prompt.
- > All PLC applications are stopped.
- ▶ Continue with → step 6

5 Reset all PLC applications

- ▶ Press **[Reset]** button.
- > The confirmation prompt appears.
- ▶ Press [OK] to confirm the prompt.
- > All PLC applications are reset and stopped.

6 Display the status of the PLC applications

- > The page shows updated information about the stored PLC applications.
- > The status of the **[Start]**, **[Stop]** and **[Reset]** buttons is updated.

Show target visualisation

Using the CODESYS programming system, the user can optionally program a target visualisation to create an application-specific user interface for the display of AC1421/22. 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 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.

5.5.2 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. AC1421/22
[SN]	Serial number of the device	e.g. 000000113034
[Build]	Version number of the installed firmware	e.g. 4.2.x
[HW version]	Version number of the device main board	e.g. AA

5.5.3 System: Setup

41670

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

Set the output access

41645

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

1 Select the menu page



- ▶ Select **[System settings]** tab.

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

- ▶ Set the following parameters as required:

Name	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.



If the value PLC is selected, the system will automatically enable the device-internal PLC (→ **Enable/Disable the device-internal PLC** (→ S. [68](#))).

Enable/Disable the device-internal PLC

NOTICE!

When disabling the device-internal PLC, all running PLC applications will be stopped. This could have undesirable effects on the controlled process if the PLC figures as the control unit for the AS-i slave outputs.

Risk of material damage to the machine/plant!

- ▶ The PLC application should be terminated in a controlled manner before disabling the device-internal PLC!
(→ **Control PLC applications** (→ S. [63](#)))

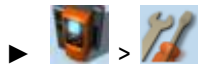
- ▶ Implement a safe state when programming the PLC applications!

When activating the device-internal PLC, PLC applications stored on the device are started automatically.

- ▶ Implement a safe start state when programming the PLC applications!

To set the internal Programmable Logic Controller (PLC):

1 Select the menu page



- ▶ Select **[System settings]** tab.

2 Enable/Disable the device-internal PLC

- > Set the following parameters as required:

Parameter	Description	Possible values	
[Use PLC]	State of the device-internal CODESYS PLC	<input type="checkbox"/>	Device-internal PLC is disabled.
		<input checked="" type="checkbox"/>	Device-internal PLC is enabled.

- > Selected value is applied.

Set the device cycle

NOTICE!

A device cycle that is too short can have undesirable effects on the correct transmission of the process and control data between the PLC and peripheral devices (higher-level PLC, AS-i slaves).

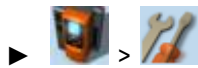
- > Risk of material damage to the machine/plant!
- ▶ Ensure a sufficiently long cycle time!



If the PLC is disabled, the device operates with a fixed cycle time of 0.7 ms.

To set the device cycle:

1 Select the menu page



- ▶ Select [System settings] tab.

2 Set the device cycle

- ▶ Set the following parameters as required:

Parameter	Description	Possible values	
[Device cycle]	Active → device cycle	[1.5 ms]	1.5 milliseconds
		[2.0 ms]	2.0 milliseconds
		[2.5 ms]	2.5 milliseconds
		[3.0 ms]	3.0 milliseconds

3 Save the changes

- ▶ Press [Accept selection] button.
- > Selected value is applied.

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

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	<input type="checkbox"/>	Screen saver is inactive: Display remains permanently switched on.
		<input checked="" type="checkbox"/>	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	<input type="checkbox"/>	The currently selected menu page stays on the screen.
		<input checked="" type="checkbox"/>	When the set time has elapsed, the display automatically changes to the start screen.

- > Selected values are applied.

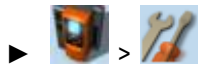
Set the system time

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	<input type="checkbox"/>	NTP client is deactivated: Device adopts the manually set values for [Time] and [Date].
		<input checked="" type="checkbox"/>	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. [73](#))
 - **Synchronise the system time with an NTP server** (→ S. [74](#))
 - **Adopt the system time of the PC** (→ S. [75](#))

Set the system time manually

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. [72](#))).
- ▶ 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. [30](#)))
- > 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

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. 72)).
- > 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

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. [32](#))).

Requirements:

- ▶ Connect the device with PC/laptop (→ **Configuration interface: connection concepts** (→ S. [123](#))).
- ▶ Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ S. [32](#))).



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. [72](#))).
- ▶ 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

41593



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 and import of the configuration file takes place via an SD card.

A device configuration consists of the following settings:

- System settings
- AS-i 1/AS-i 2 settings
- EtherNet/IP settings
- PLC applications (incl. 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. V3.2. is compatible with V3.2.2, but: V3.2.1 is incompatible with V3.3.1).
- Source and target device have the same article number.

Export device configuration

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 AC1421/22.

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

`ifm_DevID_XXXXXXXXXX_YYYYMMDDhhmmss.icnf`

- 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

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. [77](#))).
- ▶ 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.

System reset

41704

To reset the device:

1 Select the menu page



- ▶ Select **[Reset]** tab.

2 Carry out a system reset

- ▶ Press **[Restart]** button.
- > A safety query is displayed..
- ▶ Press [OK] to confirm the security prompt.
- > 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. [32](#))).

Requirements:

- ▶ Connect the device with PC/laptop (→ **Configuration interface: connection concepts** (→ S. [123](#))).
- ▶ Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ S. [32](#))).

1 Select menu page



- ▶ Select the [Diagnostic protocol] tab.

2 Store diagnostic protocol

- ▶ Press the [Generate diagnostic protocol] button.
- > AC1421/22 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.

5.5.4 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		
▪ [PLC]	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 Center (OSC)** (→ S. [116](#)). The warning only disappears when the device temperature is again in the normal range.

5.6 Interfaces

41482

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

Navigation path	Functions
	Configuration interface → Configure the IP parameters manually (→ S. 83) → Configure the IP parameters automatically (→ S. 84) → Show Ethernet information (→ S. 84)
	EtherNet/IP interface → Interfaces: EtherNet/IP interface (→ S. 85)

5.6.1 Interfaces: Configuration interface

41481

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

Notes on IP settings

41751

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

- 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	
[Obtain IP address autom.]	Active method for the configuration of the interface parameters	<input type="checkbox"/>	Manual assignment of interface parameters through operator
		<input checked="" type="checkbox"/>	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. [83](#))
 - **Configure the IP parameters automatically** (→ S. [84](#))

Configure the IP parameters manually

To configure the IP parameters of the configuration interface manually:

1 Select the menu page



- ▶ Select **[IP setup]** tab.

2 Deactivate the NTP client

- ▶ Uncheck [Obtain IP address autom.] (→**Notes on IP settings** (→ S. [82](#))).
- > 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. [82](#))):
 - [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



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. [82](#)))

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

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

5.6.2 Interfaces: EtherNet/IP interface

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. 86) → Display EtherNet/IP data → Display the module configuration (→ S. 88) → Download the device and I/O description (→ S. 88)
	EtherNet/IP settings → Configure the IP parameters manually (→ S. 90) → Configure the IP parameters automatically (→ S. 90) → Set the configuration mode (→ S. 91) → Set the device-specific parameters (→ S. 92) → Set the EtherNet/IP module configuration (→ S. 94)
	EtherNet/IP diagnosis → Display diagnostic data (→ S. 96)

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

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. 92)	
[Analog. channels/O-slave]	Number of analogue channels per output slave	→ Set the device-specific parameters (→ S. 92)	
[Failsafe state]	Behaviour of the AS-i outputs in case of an interrupted EtherNet/IP connection	→ Set the device-specific parameters (→ S. 92)	
[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!	<input type="checkbox"/>	Parameters are not downloaded, i.e. the AS-i slaves are activated using the parameters that are set in the device.
		<input checked="" type="checkbox"/>	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-volatily.
[Change byte order]	Byte order in a data word  The set parameter value applies to all attached tables.	→ Set the device-specific parameters (→ S. 92)	

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. [163](#))).

Download the device and I/O description

41500



This function is only available via the web-interface of the device (→ **Remote access** (→ S. [32](#))).

Requirements:

- ▶ Connect the device with PC/laptop (→ **Configuration interface: connection concepts** (→ S. [123](#))).
- ▶ Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ S. [32](#))).

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

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. 89)).
- > 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



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



More information: → **Configuration mode** (→ S. [195](#))

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



The parameters can only be changed if the configuration mode is set to Independent (→ **Set the configuration mode** (→ S. 91)).

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	<input type="checkbox"/>	Byte order remains unchanged.
		<input checked="" type="checkbox"/>	Byte order is inverted.

6 Save the changes

- ▶ Press **[Accept]** button.
- > Selected values are applied.

Set the EtherNet/IP module configuration

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. [91](#))).

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. 164)
[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. 164)
[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. 165)
[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. 165)
[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. 166)
[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. 166)
[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. 167)
[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. 167)

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. 170)
[EtherNet/IP: Slot 10]	Analogue inputs, area 2	→ Slot 10 – Analogue input data (→ S. 171)
[EtherNet/IP: Slot 11]	Analogue outputs, area 1	→ Slot 11 – Analogue output data (→ S. 172)
[EtherNet/IP: Slot 12]	Analogue outputs, area 2	→ Slot 12 – Analogue output data (→ S. 173)



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. [92](#))

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. 178)

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 PLC (→ S. 184)
[EtherNet/IP: Slot 15]	Scope of data transferred from the EtherNet/IP controller to the device-internal PLC.	→ Slot 15 – Outputs to PLC (→ S. 185)

6 Save the changes

- ▶ Press **[Accept]** button.
- > Selected values are applied.

EtherNet/IP: Diagnosis

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


5.7 ifm system solutions

41480



This menu is only available via the web interface of AC1421/22.
→ **Remote access** (→ S. [32](#))

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. 99) → Install single/basic app (→ S. 100) → Install multi app (→ S. 101) → Update ifm apps (→ S. 102) → Uninstall ifm apps (→ S. 102)

5.7.1 Notes on ifm system solutions

41753

With the AC1421/22, 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 PLC.



ifm system solutions and user-created Anwendungen must not be stored and run simultaneously on the AC1421/22!

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

ifm system solutions can only be installed and run if the device-internal PLC is activated.

- ▶ Activate the PLC of the AC1421/22 (→ **Enable/Disable the device-internal PLC** (→ S. 68))!



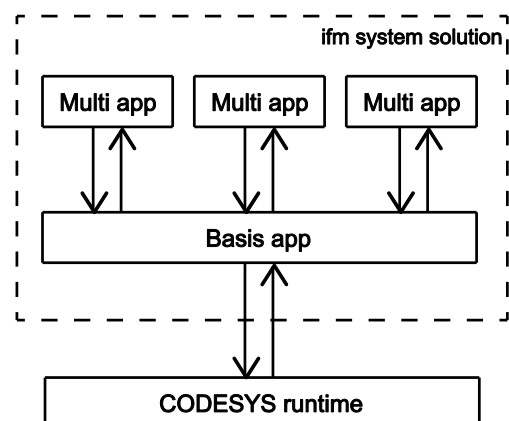
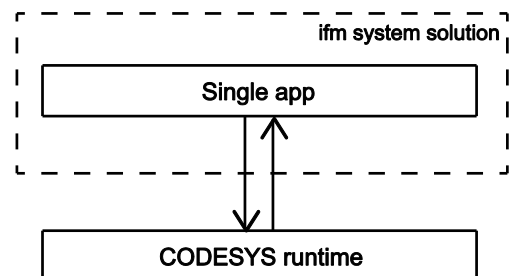
Users can download the available ifm system solutions from ifm's website.

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 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 AC1421/22 at the same time. They operate as a pure communication layer between the I/O mechanisms of the CODESYS PLC and the connected multi apps. Maximum 5 multi apps at a time can be stored and executed in parallel on the device.



5.7.2 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

5.7.3 Install single/basic app



Only one single app, basic app or CODESYS PLC application must be stored on the device. When installing a single/basic app, all ifm system solutions and CODESYS 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 PLC is stopped.
 - > All ifm system solutions and CODESYS 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 PLC is started.
 - > The installed single/basic app is automatically started (RUN state).

5.7.4 Install multi app



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. [100](#)))

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 PLC is stopped.
- > The selected multi app is installed.
- > The progress bar indicates the status of the installation process.
- > CODESYS PLC is started.
- > The installed multi app is automatically started (RUN state).
- ▶ Optional: Repeat steps 2 to 4 to install further multi apps.

5.7.5 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. [99](#))

1 Download new ifm app

- ▶ Download new version of the ifm system solution (→ **Notes on ifm system solutions** (→ S. [98](#))).

2 Update the installed ifm app

- ▶ Install the new ifm system solution
 - Single/basic app: → **Install single/basic app** (→ S. [100](#))
 - multi app: → **Install multi app** (→ S. [101](#))

5.7.6 Uninstall ifm apps

41683



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

Before uninstalling an ifm app, the CODESYS PLC of AC1421/22 is stopped. After successful uninstallation, the CODESYS 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. [99](#))

2 Uninstall ifm app

- ▶ In the section of the respective ifm app:
 - Activate the [Uninstall app] button.
- > CODESYS PLC is stopped.
- > The selected ifm app is uninstalled.
- > CODESYS PLC is started.

6 Setup

Content

Connect the device to the periphery.....	104
Start screen 'Basic settings'.....	105
Update the firmware of the device.....	107
Connect and address AS-i slaves	111
Setup of EtherNet/IP.....	111
Setup of the configuration interface	112
Exchange AS-i slave	112

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)

6.1 Connect the device to the periphery

41574

6.1.1 EtherNet/IP interface

41494

To connect the device to a EtherNet/IP network:

- ▶ Integrate the device into the EtherNet/IP network via the X6 and/or X7 EtherNet ports according to the requested topology.
Details → **Interfaces** (→ S. [13](#))

6.1.2 Configuration interface

41595

To access the device via the configuration interface (e.g. web interface, programming interface of the device-internal PLC):

- ▶ Select one of the connection concepts to connect the configuration interface (X3) to the programming PC/laptop.
Details: → **Configuration interface: connection concepts** (→ S. [123](#))

6.2 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. [19](#))).

6.2.1 Change the basic settings of the device

41597

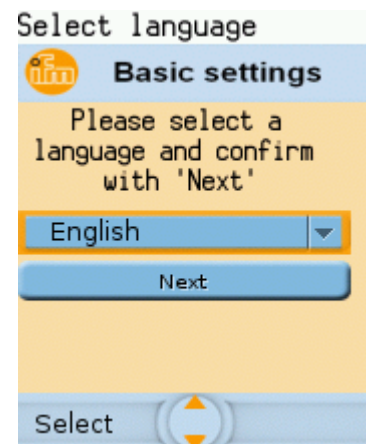
To change the basic settings of the device:

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

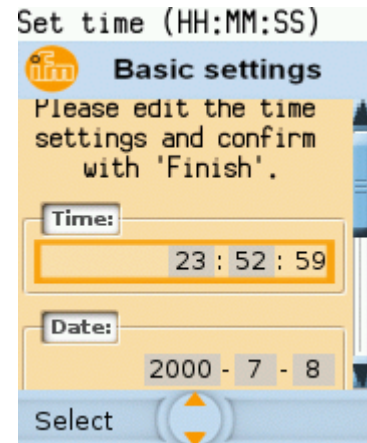
- ▶ List shows the active language.
- ▶ Use [▼] / [▲] to mark the list.
- > The focus (= orange frame) is on the marked list.
- ▶ Open the list with the left function key [Select].
- ▶ Use [▼] / [▲] to mark the desired language and press [Select] to activate it.
- > The GUI texts appear in the selected language.
- ▶ Go to the next page with **[Next]**.





3 Set the system time

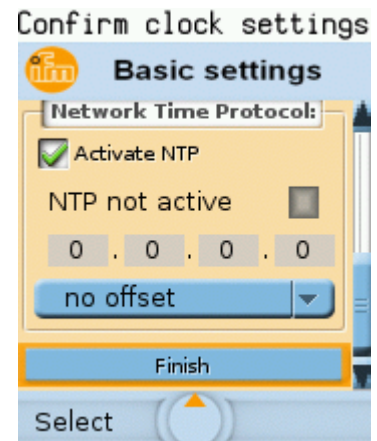
Option 1: Set the system time manually

- ▶ [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.



6.3 Update the firmware of the device

NOTICE!

Interrupting a firmware update leads to a loss of the current system and fieldbus settings.

- > Risk of data loss!
- ▶ Secure the device settings before carrying out a firmware update! (→ **Export device configuration** (→ S. [77](#)))
- ▶ Ensure an uninterrupted voltage supply during the firmware update!

To update the firmware of the device:

- ▶ Select one of the following options:
 - **Firmware update from SD card** (→ S. [108](#))
 - **Firmware update via the web interface** (→ S. [109](#))

6.3.1 Behaviour of the settings upon firmware update

The following settings/data records remain valid upon a firmware update:

Setting / data record	Path to the menu page
User language of the GUI	[System] > [Setup] > [System settings]
Display settings (screen saver, return)	[System] > [Setup] > [System settings]
System time (date/time)	[System] > [Setup] > [Clock]
NTP settings	[System] > [Setup] > [Clock]
Operating hours counter	[System] > [Diagnosis]
AS-i master settings and configuration data	[AS-i 1] / [AS-i 2] > [Master setup]
IP parameters of the configuration interface	[Interfaces] > [Configuration interface] > [IP-Setup]
Fieldbus settings	[Interfaces] > [EtherNet/IP] > [Setup]

The following settings/data records are reinitialised with their default values upon firmware update:

Setting / data record	Reset value	Path to the menu page
Control of the outputs	Gateway	[System] > [Setup] > [System settings]
Activate CODESYS PLC	deactivated	[System] > [Setup] > [System settings]
Device cycle	0.7 ms	[System] > [Setup] > [System settings]
OSC	Delete system messages	Start page > [OSC]
Retain variables	0x00	--

6.3.2 Firmware update from SD card



Pay attention to notes on memory behaviour (→ **Behaviour of the settings upon firmware update** (→ S. [107](#)))!

1 Preparations

- ▶ Download the new firmware file from the **ifm** website.
- ▶ Copy the firmware file into the root directory of an SD card.
- ▶ Insert the SD card containing the firmware file in the SD card slot (→ **SD card slot** (→ S. [13](#))).

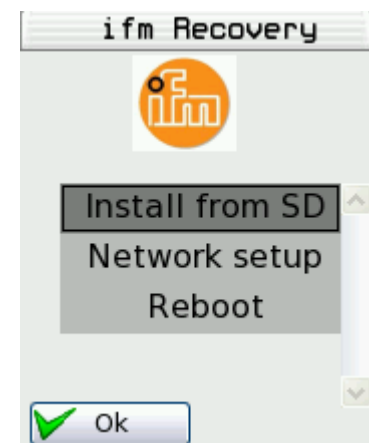
2 Start the recovery mode

- ▶ Separate the device from the circuit.
- ▶ Perform the following actions simultaneously:
 - Press the left function key and the arrow keys [**▲**] and [**▼**] simultaneously and keep them pressed (→ picture).
 - Connect the device to a circuit.
- ▶ Keep the keys pressed until the screen [ifm Recovery] appears (approx. 10 s).



3 Update the firmware

- ▶ Use the arrow keys [**▲**] / [**▼**] to select the menu item [Install from SD] (→ picture).
- ▶ Press [OK] using the left function key.
 - > The updating process starts.
 - > The display shows the progress of the firmware update.
 - > A status message appears once the firmware has been updated successfully.



4 Reboot the device

- ▶ Use the arrow keys [**▲**] / [**▼**] to select the [Reboot] button.
- ▶ Press [OK] to reboot the device.
 - > The device reboots with the current firmware.
 - > The start screen "Basic settings" appears (→ **Start screen 'Basic settings'** (→ S. [105](#))).

6.3.3 Firmware update via the web interface



Pay attention to notes on memory behaviour (→ **Behaviour of the settings upon firmware update** (→ S. [107](#)))!

1 Preparations

- ▶ Download the new firmware file from the **ifm** website.
- ▶ Connect the PC/laptop to the configuration interface (X3) of the device.
(→ **Configuration interface: connection concepts** (→ S. [123](#)))

2 Start the recovery mode

- ▶ Separate the device from the circuit.
- ▶ Perform the following actions simultaneously:
 - Press the left function key and the arrow keys [▲] and [▼] simultaneously and keep them pressed (→ picture).
 - Connect the device to a circuit.
- ▶ Keep the keys pressed until the screen [ifm Recovery] appears (approx. 10 s).

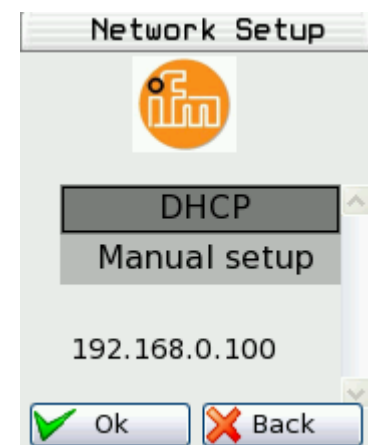


3 Optional: adjust the IP parameters

- ▶ Use the arrow keys [▲] / [▼] to select the menu item [Network Setup].
- ▶ Press [OK] to go to the network setup.
- > The display shows the page [Network Setup] (→ picture).
- > The page shows the current IP address of the device.

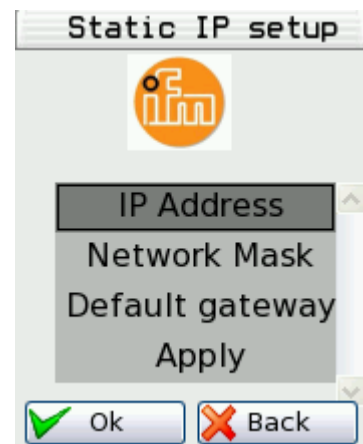
Option 1: obtain the IP parameters from a DHCP server

- ▶ Connect the configuration interface to the DHCP server.
- ▶ Use the arrow keys [▲] / [▼] to select the menu item [DHCP].
- ▶ Press [OK] to activate the DHCP client of the device.
- > The device obtains the IP parameters from the DHCP server.
- > If not successful, the device will create the IP parameters by means of the Zeroconf protocol.
- > The display shows the [Network Setup] page with the new IP address.
- ▶ Leave the network setup with [Back].
- > The display shows the [ifm Recovery] page.



Option 2: configure the IP parameters manually

- ▶ Use the arrow keys [▲] / [▼] to select the menu item [Manual Setup].
- ▶ Activate the manual setup with [OK].
- > The display shows the [Static IP setup] page (→ picture)
- ▶ Use the arrow keys [▲] / [▼] to select the following menu items one after the other and set them as required:
 - [IP Address]
 - [Network Mask]
 - [Default gateway]
- ▶ Press [Apply] to save the set values.
- > The display shows the [Network Setup] page with the new IP address.
- ▶ Leave the network setup with [Back].
- > The display shows the [ifm Recovery] page.

**4 Update the firmware**

- ▶ Access the web interface of the device.
- > The web interface of the recovery mode appears:



- ▶ Press the [Search ...] button.
- > The file explorer appears.
- ▶ Select the firmware file and press [Open].
- > The field [Select image to upload] shows the file path and name of the firmware file.
- ▶ Press [send] to start the updating process.
- > The display and web interface show the progress of the firmware update.
- > A status message appears once the firmware has been updated successfully.

5 Reboot the device

- ▶ Click on the tab [Reboot]
- > The device reboots with the current firmware.
- > The start screen "Basic settings" appears (→ **Start screen 'Basic settings'** (→ S. [105](#))).

6.4 Connect and address AS-i slaves

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. [46](#)) or → **Quick setup: Address the AS-i slaves connected to AS-i Master 2** (→ S. [47](#))).
- ▶ 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. [39](#))).
- > 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.

6.5 Setup of EtherNet/IP



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. [196](#))
 - Use the independent configuration mode: → **Configuration mode: Independent** (→ S. [197](#))




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. [111](#)))

6.6 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. [82](#))).

6.7 Exchange AS-i slave

41506

AC1421/22 makes it possible to replace an AS-i slave by a new AS-i slave in the operating mode "protected mode".

Requirements:

- > The new and the old AS-i slave have the same device profile (→ **Profiles of AS-i slaves** (→ S. [130](#))).
- > The new AS-i slave has the address 0.
- > Parameter [Automat. addressing] is activated (→ **Set the monitoring functions of the AS-i master** (→ S. [50](#))).

1 Remove old AS-i slave

- ▶ Disconnect the AS-i slave to be replaced from the AS-i network
- > AC1421/22 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.
- > AC1421/22 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 operational.

7 Troubleshooting

Content

Status LED	113
Start screen: Status LEDs	114
Online diagnosis function	115
Online Support Center (OSC)	116
Display diagnostic protocol.....	118

41667

This chapter offers information regarding fault detection and troubleshooting.

7.1 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. [11](#))

7.1.1 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.

7.1.2 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

7.2 Start screen: Status LEDs

41688

The start screen of the graphic user interface provides the following status information (→ **Start screen** (→ S. [36](#))):

7.2.1 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. [32](#))).

7.2.2 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

7.2.3 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

7.2.4 Fieldbus status

41417

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

7.3 Online diagnosis function




41719

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

7.3.1 Message types

41754

The online diagnostic function of AC1421/22 distinguishes 3 types of messages:

Symbol	Message type	Meaning
	Error	<ul style="list-style-type: none"> An error occurred; proper operation of the device is disturbed. User action absolutely required
	Warning	<ul style="list-style-type: none"> An irregularity has occurred User action required
	Event	<ul style="list-style-type: none"> An uncritical event has occurred No user action required

7.3.2 Locate error sources

41743

The online diagnosis function helps the operator to locate the source of occurring 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]



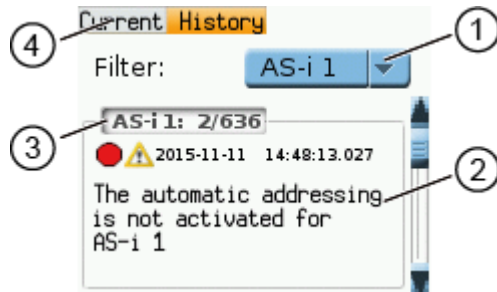
If a function unit of the device causes a warning and an error message at the same time, then the error symbol is displayed.

7.4 Online Support Center (OSC)

41718

The Online Support Center (OSC) displays detailed information about occurring events, failures and errors.

The OSC has the following appearance:



- ① List to select a filter and name of the selected filter
- ② Message
An message consists of error symbol, timestamp and detailed information about the errors
- ③ Number of the message displayed and total number of messages
- ④ Tabs to select a view
[Current]: → **OSC: View current error messages** (→ S. [116](#))
[History]: → **OSC: Show message history** (→ S. [117](#))

7.4.1 OSC: View current error messages

41726

The [Current] tab lists all current messages. The messages are in chronological order. All messages regarding warnings and errors are displayed.



- Information about the different types of messages: → **Message types** (→ S. [115](#))
- Overview of possible OSC messages of the device: → **OSC messages** (→ S. [198](#))

To view the error messages that are currently active:

- 1 **Select the menu page**
 - ▶ On the start screen: Select [OSC]
 - ▶ 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.

7.4.2 OSC: Show message history

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.

7.5 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. [79](#))

8 Appendix

Content

Approval tests / certifications	119
Technical data	120
Address assignment in Ethernet networks	122
Configuration interface: connection concepts	123
AS-i master	125
AS-i slaves	129
Fieldbus EtherNet/IP	140
OSC messages	198

33879

8.1 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



8.2 Technical data

Content

Housing.....	120
Display elements	120
Operation	120
Power supply connections.....	120
Interfaces	121
Programmable Logic Controller (PLC)	121

34188

8.2.1 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

8.2.2 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

8.2.3 Operation

41714

Membrane keys	
Function keys	2x
Navigation keys / arrow keys	4x

8.2.4 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

8.2.5 Interfaces

41483

EtherNet configuration interface	
Connection	2x RJ45
Transmission	10/100 Mbps/s
Protocol	HTTP, FTP, Telnet

41483

EtherNet fieldbus interface	
Connection	2x RJ45
Transmission rate	10/100 Mbps/s
Protocol	EtherNet/IP
Jitter	0.7 ms
Switch	integrated 2-port switch (iRT capable)

41483

SD card slot	
Media	SD memory cards (max. 32 Gbytes)
Format	SDHC format is supported
Supported file formats	FAT32

8.2.6 Programmable Logic Controller (PLC)

41770

Programmable Logic Controller (PLC)	
Type	CODESYS Control Runtime System (incl. CODESYS WebVisu)
Programming system	CODESYS Development System (version V3.5 SP9 Patch 7 Hotfix 3 or higher)
Programming languages	FBD, SFC, CFC, IL, LD, ST
Available memory for PLC applications / RETAIN variables	approx. 10 MB / 4072 bytes

8.3 Address assignment in Ethernet networks



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

8.4 Configuration interface: connection concepts

Content

Direct link	123
Connection via Ethernet network	124

41594

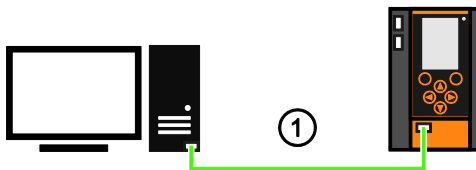
To be able to access the web interface and the programming interface of the device-internal PLC, the configuration interface (X3) must be connected to a computer. The device supports the following connection types:

- Direct connection (→ **Direct link** (→ S. [123](#)))
- Connection via an EtherNet network (→ **Connection via Ethernet network** (→ S. [124](#)))

8.4.1 Direct link

41458

To establish a direct connection to the device:



- ▶ Connect configuration interface X3 of the device with the Ethernet interface of the PC/laptop.
 - ▶ Setup the IP parameters of the configuration interface according to the requirements (→ **Address assignment in Ethernet networks** (→ S. [122](#))).
 - > User can access the web interface and/or programming interface of the device.

8.4.2 Connection via Ethernet network

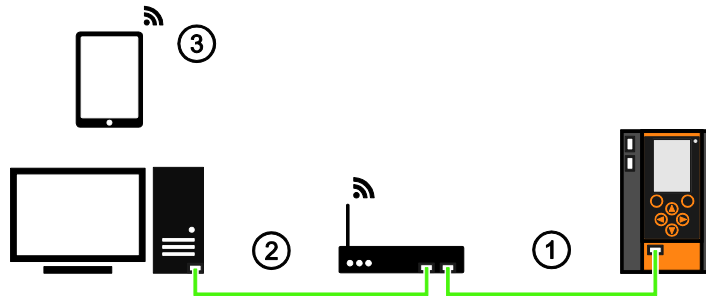
41573

To establish a connection via a Ethernet network, the device has to be connected with a coupling element (e.g. Ethernet switch / WiFi router).

Use one of the following options:

Option 1: Transmit fieldbus and web interface data via different networks

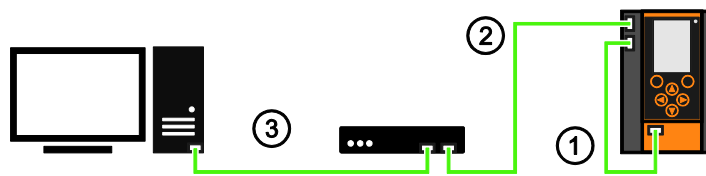
41716



- ① ▶ Connect configuration interface (X3) via Ethernet cable with the Ethernet switch / WiFi router (
 - ▶ Set IP parameter of the configuration interface (X3) and the switch / WiFi router according to the requirements (→ **Notes on IP settings** (→ S. 82)).
- ② ▶ Connect PC / laptop with the Ethernet switch.
 - > User can access the web interface and / or programming interface of the device.
 OR:
- ③ ▶ Connect PC / laptop / mobile device wireless with the WiFi router .
 - > User can access the web interface and / or programming interface of the device.

Option 2: transfer fieldbus and web interface data over the same network

41715



- ① ▶ Connect the configuration interface (X3) to the EtherNet/IP interface (X7) using an EtherNet cable.
 - ▶ Activate the DHCP function of the EtherNet switch for automatic assignment of IP addresses.
- ② ▶ Connect the EtherNet/IP interface (X6) to the EtherNet switch using an EtherNet cable.
 - ▶ The parameter [Obtain IP address autom.] must be activated (→ **Notes on IP settings** (→ S. 82)).
- ③ ▶ Connect the PC/laptop to the EtherNet switch using an EtherNet cable.
 - ▶ If necessary, activate the option [Optain IP address automatically] in the IP settings of the PC/laptop.
 - > The device and the PC/laptop/mobile device are connected over the IP network.

8.5 AS-i master

Content

Operating modes of the AS-i master	126
Master flags	128

41540

Master = Handles the complete organisation on the bus. The master decides on the bus access time and polls the →slaves cyclically.

8.5.1 Operating modes of the AS-i master

Content

Protected mode	126
Projection mode.....	126
Switch operating modes	127

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. [50](#))):

• 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: <ul style="list-style-type: none"> ▪ 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. [49](#)))
- 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.

8.5.2 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).

8.6 AS-i slaves

Content

Profiles of AS-i slaves.....	130
------------------------------	-----

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.

8.6.1 Profiles of AS-i slaves

Content

Configuration data (CDI) of the slaves (slave profiles).....	131
Slave profiles for slaves with combined transaction.....	138
Combined transaction – Use of analogue channels in the gateway depending on the slave profile ...	139

41771

Configuration data (CDI) of the slaves (slave profiles)

Content

Structure of the slave profile.....	131
Description of the IO code for digital slaves	132
Description of the ID code (selection)	132
Description of the extended ID code 1	133
Description of the extended ID code 2	133
Valid combinations IO code / ID code / extended ID code 2.....	135

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 <u>no</u> 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. 133))
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. 134))
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	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	-	only binary					-	only binary					-		
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
---------------	----------------	-----------------	------------------

8.7 Fieldbus EtherNet/IP

Content

Fieldbus objects.....	140
Fieldbus parameters.....	141
Device-specific parameters	142
Cyclic data	162
Acyclic data	186
EtherNet/IP projection software: Programmers' notes	193

12469



Information about EtherNet/IP: → www.odva.org (umbrella organisation)

8.7.1 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 AC1421/22 uses the following object classes:

- **Assembly instance objects** for the transmission of
 - device and EtherNet/IP parameters (→ **Parameter data** (→ S. [140](#)))
 - Cyclic process data, diagnostic data (→ **Cyclic data**)
- **Manufacturer-specific objects** for the transmission of acyclic data (→ **Acyclic data** (→ S. [141](#)))

Parameter data

41784

The parameter data is transferred 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 AC1421/22 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 AC1421/22 (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. [189](#)))

8.7.2 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

8.7.3 Device-specific parameters

Content


Parameters: Independent mode.....	142
Parameters: Top-down mode.....	143
Parameter setting via the configuration assembly object.....	145
EDS-file.....	161

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. [197](#))).

Parameters: Top-down mode

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.

Parameter	Description	Value range	
Change byte order	Change byte order in a word  Setting applies to all data of object class 4, instances 100 and 150	Disabled*	Byte order in a word remains unchanged.
		Enabled	Byte order in a word is inverted.
AS-i parameter download	Transmission of AS-i slave parameters from host to AC1421/22	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. [196](#))).

Parameter setting via the configuration assembly object

Content

Device-specific parameters	146
Parameters of the fieldbus slots	155
Derivation of parameter values for free slave assignment	161

41804

In → **Configuration mode: Top-Down** (→ S. [196](#)), the parameter data are set in the EtherNet/IP projection software (→ **Configuration mode: Top-Down** (→ S. [196](#))). 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** (→ S. [79](#)))
- 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. [155](#))
- **Device-specific parameters** (→ S. [146](#))

Device-specific parameters

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

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
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
C.15th analogue IN Slot 9 ²	n=79	41 ... 5F	4F	4F	AS-i 1 slave 1 ... 15 ... 31
		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

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
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
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

Data points in the configuration assembly		Possible setting values [hex]	Default values when using EDS file		Description
with EDS	without EDS		AC1421	AC1422	
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
C.14th analogue OUT slot 12 ³	n=124	41 ... 5F	9D	9D	AS-i 1 slave 1 ... 31
		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)

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 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)
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)

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 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
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

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 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)

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 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)
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

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 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
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

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)
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)
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)

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	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
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

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	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
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

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	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
			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

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	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	
			00	04	20	08			15: Outputs to AC142n-PLC, 4 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	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. [161](#)))

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 AC1421/22 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. [88](#))).

8.7.4 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. [197](#))) or in the EtherNet/IP projection software by means the configuration assembly object (→ **Configuration mode: Top-Down** (→ S. [196](#)), → **Parameter setting via the configuration assembly object** (→ S. [145](#))).

Overview: EtherNet/IP modules

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. 164)
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. 164)
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. 165)
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. 165)
5	Digital input data B slaves, AS-i master 1	→ Slot 5 – Digital input data B slaves, AS-i master 1 (→ S. 166)
6	Digital output data B slaves, AS-i master 1	→ Slot 6 – Digital output data B slaves, AS-i master 1 (→ S. 166)
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. 167)
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. 167)
9	Analogue input data of up to 31 slaves, range 1*	→ Slot 9 – Analogue input data (→ S. 170)
10	Analogue input data of up to 31 slaves, range 2*	→ Slot 10 – Analogue input data (→ S. 171)
11	Analogue output data of up to 31 slaves, range 1**	→ Slot 11 – Analogue output data (→ S. 172)
12	Analogue output data of up to 31 slaves, range 2**	→ Slot 12 – Analogue output data (→ S. 173)
13	Diagnostic data	→ Slot 13 – Diagnostic data (→ S. 178)
14	Data from the device-internal PLC to the EtherNet/IP PLC	→ Slot 14 – Inputs from PLC (→ S. 184)
15	Data from the EtherNet/IP PLC to the device-internal PLC	→ Slot 15 – Outputs to PLC (→ S. 185)

* ... Define the number of analogue channels and the slave number by means of the device parameters [analogue channels/I-slave] (→ **Device-specific parameters** (→ S. [142](#))).

** ... Define the number of analogue channels and the slave number by means of the device parameters [analogue channels/O-slave] (→ **Device-specific parameters** (→ S. [142](#))).

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. [168](#))

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. [168](#))

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. [168](#))

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. [168](#))

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. [168](#))

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. [168](#))

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. [168](#))

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. [168](#))

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. [169](#))).

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

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. 186)).	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. 174)).

Slot 10 – Analogue input data

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. 186)).	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. 174)).

Slot 11 – Analogue output data

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. [174](#))).

Slot 12 – Analogue output data

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. [174](#))).

Configuration of the analogue channels in slots 9 ... 12

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	<p>Variable slave assignment</p> <p>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</p> <p>The device-specific parameters (→ Device-specific parameters (→ S. 146)) 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. 177)). All available slave addresses of both AS-i masters can be selected.</p> <p>Preset, variable:</p> <ul style="list-style-type: none"> ▪ 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	<p>Fixed slave assignment</p> <p>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</p> <p>The slave assignment is fixed (→ Table: Fixed slave assignment for slots 9 ... 12 (→ S. 175)). A configuration of the slave order in the device-specific parameters is ineffective.</p>
1 channel	<p>Fixed slave assignment</p> <p>Of each transferring AS-i single and A address, the following analogue channels are transmitted: single slaves: channel 1 or: A slaves: channel 1</p> <p>The slave assignment is fixed (→ Table: Fixed slave assignment for slots 9 ... 12 (→ S. 175)). A configuration of the slave order in the device-specific parameters is ineffective.</p>
1 channel A/B-Slave	<p>Fixed slave assignment</p> <p>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</p> <p>The slave assignment is fixed (→ Table: Fixed slave assignment for slots 9 ... 12 (→ S. 175)). A configuration of the slave order in the device-specific parameters is ineffective.</p>

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
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
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

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. [174](#))).

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. 178))	25
		AC1422 (→ Module setting: AC1422 (→ S. 179))	50
		AC13x7 AS-i 1 (→ Module setting: AC13x7 AS-i 1 (→ S. 179))	13
		AC13x7 AS-i 1+2 (→ Module setting: AC13x7 AS-i 1+2 (→ S. 180))	26

Module setting: AC1421

41757

Word	Description	Details
1	System diagnosis	Diagnosis - System diagnosis (→ S. 180)
2...5	AS-i master 1: AS-i diagnosis	Diagnosis - AS-i diagnosis (→ S. 181)
6...9	AS-i master 1: list of missing slaves	Diagnosis - List of missing slaves (LCMES) (→ S. 182)
10...13	AS-i master 1: List of non-projected slaves	Diagnosis - List of non-projected slaves (LCAES) (→ S. 182)
14...17	AS-i master 1: List of slaves with wrong slave profile	Diagnosis - List of slaves with wrong slave profile (LCE) (→ S. 183)
18...21	AS-i master 1: list of peripheral faults	Diagnosis - List of peripheral faults (LPF) (→ S. 183)
22...25	AS-i master 1: list of multiple addressed slaves	Diagnosis - List of double addressed slaves (LDAS) (→ S. 183)

Module setting: AC1422

41750



Words 1 to 25 correspond to those of the module setting AC1421 (→ **Module setting: AC1421** (→ S. [178](#))).

Word	Description	Details
1	System diagnosis	Diagnosis - System diagnosis (→ S. 180)
2...5	AS-i master 1: AS-i diagnosis	Diagnosis - AS-i diagnosis (→ S. 181)
6...9	AS-i master 1: list of missing slaves	Diagnosis - List of missing slaves (LCMES) (→ S. 182)
10...13	AS-i master 1: List of non-projected slaves	Diagnosis - List of non-projected slaves (LCAES) (→ S. 182)
14...17	AS-i master 1: List of slaves with wrong slave profile	Diagnosis - List of slaves with wrong slave profile (LCE) (→ S. 183)
18...21	AS-i master 1: list of peripheral faults	Diagnosis - List of peripheral faults (LPF) (→ S. 183)
22...25	AS-i master 1: list of multiple addressed slaves	Diagnosis - List of double addressed slaves (LDAS) (→ S. 183)
26...29	AS-i master 2: AS-i diagnosis	Diagnosis - AS-i diagnosis (→ S. 181)
30...33	AS-i master 2: list of missing slaves	Diagnosis - List of missing slaves (LCMES) (→ S. 182)
34...37	AS-i master 2: List of non-projected slaves	Diagnosis - List of non-projected slaves (LCAES) (→ S. 182)
38...41	AS-i master 2: List of slaves with wrong slave profile	Diagnosis - List of slaves with wrong slave profile (LCE) (→ S. 183)
42...45	AS-i master 2: list of peripheral faults	Diagnosis - List of peripheral faults (LPF) (→ S. 183)
46...49	AS-i master 2: list of multiple addressed slaves	Diagnosis - List of double addressed slaves (LDAS) (→ S. 183)
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. 181)
2...5	AS-i master 1: list of detected slaves (LDS)	Diagnosis - List of detected slaves (LDS) (→ S. 182)
6...9	AS-i master 1: configuration error	Diagnosis - List of slaves with wrong slave profile (LCE) (→ S. 183)
10...13	AS-i master 1: peripheral fault (LPF)	Diagnosis - List of peripheral faults (LPF) (→ S. 183)

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. [179](#))).

Word	Description	Details
1	AS-i master 1: Master flags	Diagnosis - Master flags (→ S. 181)
2...5	AS-i master 1: list of detected slaves	Diagnosis - List of detected slaves (LDS) (→ S. 182)
6...9	AS-i master 1: configuration error	Diagnosis - List of slaves with wrong slave profile (LCE) (→ S. 183)
10...13	AS-i master 1: peripheral fault	Diagnosis - List of peripheral faults (LPF) (→ S. 183)
14	AS-i master 2: Master flags	Diagnosis - Master flags (→ S. 181)
15...18	AS-i master 2: list of detected slaves	Diagnosis - List of detected slaves (LDS) (→ S. 182)
19...22	AS-i master 1: configuration error	Diagnosis - List of slaves with wrong slave profile (LCE) (→ S. 183)
23...26	AS-i master 1: peripheral fault (LPF)	Diagnosis - List of peripheral faults (LPF) (→ S. 183)

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 Configuration_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. [181](#)))**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. [181](#)))

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. [181](#)))**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. [181](#)))**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. [181](#))).

Slot 14 – Inputs from PLC

41625

Slot	Description	Value range	Size [words]
14	Data from the device-internal PLC to the EtherNet/IP PLC	Empty module = module is deactivated	0
		004 words = 4 words AC1421/22 PLC >> fieldbus PLC	4
		008 words = 8 words AC1421/22 PLC >> fieldbus PLC	8
		012 words = 12 words AC1421/22 PLC >> fieldbus PLC	12
		016 words = 16 words AC1421/22 PLC >> fieldbus PLC	16
		020 words = 20 words AC1421/22 PLC >> fieldbus PLC	20
		024 words = 24 words AC1421/22 PLC >> fieldbus PLC	24
		028 words = 28 words AC1421/22 PLC >> fieldbus PLC	28
		032 words = 32 words AC1421/22 PLC >> fieldbus PLC	32
		036 words = 36 words AC1421/22 PLC >> fieldbus PLC	36
		040 words = 40 words AC1421/22 PLC >> fieldbus PLC	40
		044 words = 44 words AC1421/22 PLC >> fieldbus PLC	44
		048 words = 48 words AC1421/22 PLC >> fieldbus PLC	48
		052 words = 52 words AC1421/22 PLC >> fieldbus PLC	52
		056 words = 56 words AC1421/22 PLC >> fieldbus PLC	56
		060 words = 60 words AC1421/22 PLC >> fieldbus PLC	60
076 words = 76 words AC1421/22 PLC >> fieldbus PLC	76		
092 words = 92 words AC1421/22 PLC >> fieldbus PLC	92		
108 words = 108 words AC1421/22 PLC >> fieldbus PLC	108		
120 words = 120 words AC1421/22 PLC >> fieldbus PLC	120		

Slot 15 – Outputs to PLC

41618

Slot	Description	Value range	Size [words]
15	Data from the EtherNet/IP PLC to the device-internal PLC	Empty module = module is deactivated	0
		004 words = 4 words fieldbus PLC >> AC1421/22 PLC	4
		008 words = 8 words fieldbus PLC >> AC1421/22 PLC	8
		012 words = 12 words fieldbus PLC >> AC1421/22 PLC	12
		016 words = 16 words fieldbus PLC >> AC1421/22 PLC	16
		020 words = 20 words fieldbus PLC >> AC1421/22 PLC	20
		024 words = 24 words fieldbus PLC >> AC1421/22 PLC	24
		028 words = 28 words fieldbus PLC >> AC1421/22 PLC	28
		032 words = 32 words fieldbus PLC >> AC1421/22 PLC	32
		036 words = 36 words fieldbus PLC >> AC1421/22 PLC	36
		040 words = 40 words fieldbus PLC >> AC1421/22 PLC	40
		044 words = 44 words fieldbus PLC >> AC1421/22 PLC	44
		048 words = 48 words fieldbus PLC >> AC1421/22 PLC	48
		052 words = 52 words fieldbus PLC >> AC1421/22 PLC	52
		056 words = 56 words fieldbus PLC >> AC1421/22 PLC	56
		060 words = 60 words fieldbus PLC >> AC1421/22 PLC	60
		076 words = 76 words fieldbus PLC >> AC1421/22 PLC	76
092 words = 92 words fieldbus PLC >> AC1421/22 PLC	92		
108 words = 108 words fieldbus PLC >> AC1421/22 PLC	108		
120 words = 120 words fieldbus PLC >> AC1421/22 PLC	120		

8.7.5 Acyclic data

Content

Overview: acyclic data	187
Overview: acyclic data sets (DSx)	189
Overview: System commands	190
Overview: AS-i master commands	191
Programmers' notes: call up acyclic services	192

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
71	0	31	M2: slave lists LAS, LDS, LPF, LCE	DS9	r	16

Attribute [dec]	from byte no. [dec]	to byte no. [dec]	Content	DS	Access r = read w = write	Number of words
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. [189](#)))
M1 = AS-i Master 1
M2 = AS-i Master 2

Overview: acyclic data sets (DSx)

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	Digital 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 outputs 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 AS-i Gateway mit EtherNet/IP-Device Schnittstelle (→ **Overview: User documentation for AC1421/22** (→ S. [7](#))).

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 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 AS-i Gateway mit EtherNet/IP-Device Schnittstelle (→ **Overview: User documentation for AC1421/22** (→ S. [7](#))).

Overview: AS-i master commands

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!	ConfDataInp 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 *)

Comm. no. [hex]	Comm. no. [dec]	Description	Note
004A	74	CTT2 device group exchange: device group data exchange with an AS-i slave 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 *)
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. [139](#))



Detailed information about the acyclic data sets and the command interface is given in the supplement to the device manual of the AS-i Gateway mit EtherNet/IP-Device Schnittstelle (→ **Overview: User documentation for AC1421/22** (→ S. [7](#))).

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!

8.7.6 EtherNet/IP projection software: Programmers' notes

Content

Registration of the EDS file	193
Integrate the Device into the EtherNet/IP project.....	194
Configuration mode	195

41549

Registration of the EDS file

41776

ifm provides an EDS file to integrate the AC1421/22 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 AC1421/22 to the device catalogue of RSLogix 5000:

- ▶ Download and unpack the ESD file (→ **Download the device and I/O description** (→ S. [88](#))).
- ▶ Start RSLogix 5000.
- ▶ Select [Tools] > [EDS Hardware Installation Tool].
- > EDS Wizard appears.
- ▶ Register the downloaded EDS file of the AC1421/22 with the EDS Wizard.
- > EDS Wizard installs the EDS file and adds the AC1421/22 to the device catalogue.

Integrate the Device into the EtherNet/IP project

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. [91](#))).
- ▶ Register the EDS file (→ **Registration of the EDS file** (→ S. [193](#))).

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 AC1421/22 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 AC1421/22.

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 AC1421/22 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. [196](#))
- **Configuration mode: Independent** (→ S. [197](#))

Configuration mode: Top-Down

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. [194](#)))
- ▶ Activate the top-down configuration mode (→ **Set the configuration mode** (→ S. [91](#))).

1 Open controller tags

- ▶ In the Controller Organizer: double-click on [Controller Tags]
- > [Controller Tags] window appears.
- ▶ In the tree view: Click on [AC1421/22:C].
- > Controller tags for the configuration of the device appear.

2 Set parameter data

- ▶ Set device parameters (→ **Device-specific parameters** (→ S. [146](#))).
- ▶ <Configure fieldbus slots (→ **Parameters of the fieldbus slots** (→ S. [155](#))).

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.
- > AC1421/22: 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. [88](#))).
- ▶ 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 [AC1421/22:I] and output assembly [AC1421/22:O] show descriptions of the inputs and outputs.

Configuration mode: Independent

In the configuration mode "Independent", the parameter data is set via the GUI of the AC1421/22 (→ **Set the configuration mode** (→ S. [91](#)), → **Set the EtherNet/IP module configuration** (→ S. [94](#))). The assembly configuration defined in the projection software is not evaluated.

Prerequisites

- ▶ AC1421/22 has been added to the EtherNet/IP project (→ **Integrate the Device into the EtherNet/IP project** (→ S. [194](#)))
- ▶ Activate the "independent" configuration mode (→ **Set the configuration mode** (→ S. [91](#))).

1 Set parameter data

- ▶ Set device parameters (→ **Set the device-specific parameters** (→ S. [92](#)))
- ▶ Configure fieldbus slots (→ **Set the EtherNet/IP module configuration** (→ S. [94](#)))

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.
- > AC1421/22: the start screen shows the status of the EtherNet/IP connection:
 EtherNet/IP active

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. [88](#))).
- ▶ 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 [AC1421/22:I] and output assembly [AC1421/22:O] show descriptions of the inputs and outputs.

8.8 OSC messages

Content

OSC messages: System	198
OSC messages: AS-i 1 / AS-i 2.....	199

41730

This section contains information about the messages for events, warnings and faults of the AC1421/22.

8.8.1 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,PLC>	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

8.8.2 OSC messages: AS-i 1 / AS-i 2

41735

Message	Type	Corrective measures
System errors: AS-i master <1,2>	Error	<ul style="list-style-type: none"> ▶ Reboot the device If the error occurs again: ▶ Note the message and contact the ifm service center!
Earth fault: AS-i <1,2>	Error	<ul style="list-style-type: none"> ▶ Check for earth fault of AC1421/22
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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ Improve the transmission quality on the AS-i line
Double address detected: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Error	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ Improve the transmission quality on the AS-i line
Peripheral fault: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Warning	<ul style="list-style-type: none"> ▶ Check displayed AS-i slave
AS-i slave with address 0 cannot be automatically readdressed (wrong profile)	Warning	<ul style="list-style-type: none"> ▶ 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

9 Index

A

Acyclic data.....	141, 186
Additional functions.....	37
Address assignment in Ethernet networks.....	122
Adopt the system time of the PC.....	75
Analogue input.....	53
Analogue output.....	54
Appendix.....	119
Approval tests / certifications.....	119
Arrow and function keys.....	12
Arrow keys.....	15
AS-i 1 / AS-i 2.....	48
AS-i slaves.....	53
Diagnosis.....	51
Master setup.....	49
AS-i master.....	125
AS-i slaves.....	129

B

Behaviour of the settings upon firmware update.....	107
Binary field.....	31
Button.....	22

C

Carry out a projection adaptation.....	50
Change an AS-i slave address.....	57
Change an AS-i slave parameter output.....	57
Change the analogue output values manually.....	55
Change the basic settings of the device.....	105
Change the digital output values manually.....	55
Change the Extended ID1 of the AS-i slave.....	58
Checkbox.....	22
Clone device configuration.....	76
CODESYS PLC.....	12
Combined transaction – Use of analogue channels in the gateway depending on the slave profile.....	139
Configuration data (CDI) of the slaves (slave profiles).....	131
Configuration interface.....	104
connection concepts.....	123
Configuration mode.....	195
Independent.....	197
Top-Down.....	196
Configuration of the analogue channels in slots 9 ... 12.....	174
Configure the IP parameters automatically.....	84, 90
Configure the IP parameters manually.....	83, 90
Confirmation message.....	29
Connect and address AS-i slaves.....	111
Connect the device to the periphery.....	104
Connection via Ethernet network.....	124
Control a single PLC application.....	62
Control instance of the AS-i outputs.....	114
Control of the graphical user interface.....	14
Control PLC applications.....	63
Cyclic data.....	141, 162

D

Derivation of parameter values for free slave assignment.....	161
Description of the control elements.....	20

Description of the extended ID code 1.....	133
Description of the extended ID code 2.....	133
Description of the ID code (selection).....	132
Description of the IO code for digital slaves.....	132
Details of the diagnosis area.....	180
Device-specific parameters.....	142, 146
Diagnosis.....	182
Diagnosis - AS-i diagnosis.....	181
Diagnosis - List of double addressed slaves (LDAS).....	183
Diagnosis - List of missing slaves (LCMES).....	182
Diagnosis - List of non-projected slaves (LCAES).....	182
Diagnosis - List of peripheral faults (LPF).....	183
Diagnosis - List of slaves with wrong slave profile (LCE).....	183
Diagnosis - Master flags.....	181
Diagnosis - System diagnosis.....	180
Digital input.....	53
Digital output.....	54
Direct link.....	123
Disconnect from web interface.....	35
Display.....	12
Display and reset performance data.....	52
Display and reset the error counters.....	51
Display diagnostic data.....	80, 96
Display diagnostic protocol.....	118
Display elements.....	12, 120
Display EtherNet/IP data.....	87
Display information about PLC projects.....	61
Display the error statistics of the AS-i slaves.....	51
Display the input/output data of the AS-i slave.....	53
Display the module configuration.....	88
Display the status of the CODESYS PLC.....	61
Display the voltage supply analysis.....	52
Download the device and I/O description.....	88

E

EDS-file.....	161
Enable/Disable the device-internal PLC.....	68
Ethernet configuration interface.....	13
EtherNet/IP.....	
Diagnosis.....	96
Information.....	86
Setup.....	89
EtherNet/IP fieldbus interface.....	13
EtherNet/IP interface.....	104
EtherNet/IP projection software.....	
Programmers' notes.....	193
Example.....	17
structure of the digital input data.....	168
Examples.....	161
Exchange AS-i slave.....	112
Explanation of Symbols.....	6
Export device configuration.....	77
Extended ID code 2 for analogue slaves with profile 7.3.x.....	133
Extended ID code 2 for analogue slaves with profile 7.4.x.....	134

F

Fieldbus EtherNet/IP.....	140
Fieldbus objects.....	140
Fieldbus parameters.....	141
Fieldbus status.....	114
Firmware update from SD card.....	108

Firmware update via the web interface	109	Operation	14, 120
Free slave addresses		Option 1	
colour code + symbols	28	Transmit fieldbus and web interface data via different networks	124
Function keys.....	15	Option 2	
G		transfer fieldbus and web interface data over the same network	124
General	32	Optional	
General safety instructions	8	adjust the IP parameters	109
H		switch the language with a key combination	70
Housing.....	120	OSC	
I		Show message history	117
ifm system solutions	97	View current error messages	116
Import device configuration	78	OSC messages.....	198
Information concerning the device	11	AS-i 1 / AS-i 2	199
Install multi app.....	101	System.....	198
Install single/basic app	100	Overview	11
Integrate the Device into the EtherNet/IP project.....	194	acyclic data	187
Intended use	10	acyclic data sets (DSx).....	189
Interfaces	13, 81, 121	AS-i master commands	191
Configuration interface	82	EtherNet/IP modules	163
EtherNet/IP interface	85	System commands.....	190
L		User documentation for AC1421/22	7
Legal and copyright information	5	Overview of free slave addresses	27
List	23	Overview of slave states.....	25
Locate error sources.....	115	P	
M		Page view	19
Mapping of the digital input/output data	168	Parameter data	140
Master flags	128	Parameter input	54
Meaning of the colour combinations.....	28	Parameter setting via the configuration assembly object.....	145
Meaning of the colour combinations (example		Parameters	
configuration error type 2)	26	Independent mode	142
Menu	36	Top-down mode	143
Menu functions	37	Parameters of the fieldbus slots	155
Menu navigation	16	Permitted use.....	10
Menu view	16	PLC	
Message types.....	115	Diagnosis.....	65
Modification history	7	Information	61
Module setting		Settings.....	62
AC13x7 AS-i 1	179	Power supply connections.....	120
AC13x7 AS-i 1+2.....	180	Preliminary note	5
AC1421.....	178	Preparations	108, 109
AC1422.....	179	Profiles of AS-i slaves.....	130
N		Programmable Logic Controller (PLC)	121
Navigate on a page.....	19	Programmers' notes	
Navigation aids	17	call up acyclic services	192
Notes on ifm system solutions.....	98	Prohibited use	10
Notes on IP settings.....	82, 89	Projection mode	126
Numerical field	30	Protected mode	126
O		Purpose of the document	5
Online diagnosis function	115	Q	
Online Support Center (OSC).....	116	Quick setup	38
Operating elements	12	Access the device via QR code	41
Operating instructions.....	33	Address the AS-i slaves connected to AS-i Master 1.....	46
Operating mode of the AS-i master.....	114	Address the AS-i slaves connected to AS-i Master 2.....	47
Operating modes of the AS-i master.....	126	Configure the EtherNet/IP interface	41
		Configure the operating mode of the AS-i masters	40
		Configure the output access	41
		Project AS-i networks	39
		Set the Configuration interface	44
		Set the configuration mode	43

R

Reboot the device.....	108, 110
Recommended browsers.....	32
Registration of the EDS file.....	193
Remote access.....	32
Required accessories.....	13
Required background knowledge.....	8

S

Safety instructions.....	8
SD card slot.....	13
Set the behaviour of the display.....	71
Set the configuration mode.....	91
Set the device cycle.....	69
Set the device-specific parameters.....	92
Set the EtherNet/IP module configuration.....	94
Set the monitoring functions of the AS-i master.....	50
Set the operating mode of the AS-i master.....	49
Set the output access.....	67
Set the system time.....	72
Set the system time manually.....	73
Setup.....	104
Setup of EtherNet/IP.....	111
Setup of the configuration interface.....	112
Show AS-i slave information.....	56
Show Ethernet information.....	84
Show information.....	86
Show information about installed ifm apps.....	99
Show memory used.....	65
Show target visualisation.....	64
Show version information.....	66
Slave profiles for slaves with combined transaction.....	138
Slave selector.....	24
Slave status	
colour code + symbols.....	26
Slot 1 – Digital input data single or A slaves, AS-i master 1.....	164
Slot 10 – Analogue input data.....	171
Slot 11 – Analogue output data.....	172
Slot 12 – Analogue output data.....	173
Slot 13 – Diagnostic data.....	178
Slot 14 – Inputs from PLC.....	184
Slot 15 – Outputs to PLC.....	185
Slot 2 – Digital output data single or A slaves, AS-i master 1.....	164
Slot 3 – Digital input data single or A slaves, AS-i master 2.....	165
Slot 4 – Digital output data single or A slaves, AS-i master 2.....	165
Slot 5 – Digital input data B slaves, AS-i master 1.....	166
Slot 6 – Digital output data B slaves, AS-i master 1.....	166
Slot 7 – Digital input data B slaves, AS-i master 2.....	167
Slot 8 – Digital output data B slaves, AS-i master 2.....	167
Slot 9 – Analogue input data.....	170
Start screen.....	36
Status LEDs.....	114
Start screen 'Basic settings'.....	105
Start the recovery mode.....	108, 109
Status LED.....	113
Basic device.....	113
Fieldbus EtherNet/IP.....	113
Status LEDs.....	12
Status of the web interface.....	114
Store diagnostic protocol.....	79

Structure of the slave profile.....	131
Switch operating modes.....	127
Switch the menu language.....	70
Synchronise the system time with an NTP server.....	74
System.....	59
Diagnosis.....	80
Information.....	66
Programmable Logic Controller (PLC).....	60
Setup.....	67
System description.....	9
System reset.....	79

T

Tab menu/Tab.....	21
Table	
Fixed slave assignment for slots 9 ... 12.....	175
Master flags.....	169
variable slave assignment for slots 9 ... 12.....	177
Tampering with the unit.....	8
Technical data.....	120
Troubleshooting.....	113
Types of ifm system solutions.....	98

U

Uninstall ifm apps.....	102
Update ifm apps.....	102
Update the firmware.....	108, 110
Update the firmware of the device.....	107
Use navigation aids.....	19

V

Valid combinations IO code / ID code / extended ID code 2.....	135
--	-----

W

Web interface	
Access.....	33
Navigation.....	33
Password protection.....	34
Web interface login.....	34