Device Manual
AS-i Gateway
with PROFIBUS slave interface

AC1411
AC1412

Master Profile: M4
Firmware: 4.2.x

English

7391195/00 12/2017

Contents

1 Preliminary note

Contents

14801

1.1 Legal and copyright information

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1.2 Purpose of the document

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This document applies to devices of the type "AS-i gateway with Profibus slave interface (art. no.: AC1411/12)

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 Symbols and styles used

13839

► ... Instructions

> ... Reaction, result

→ ... Cross-reference or internet link

123 Decimal number
0x123 Hexadecimal number
0b010 Binary number

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

1.4 Overview: User documentation for AC1411/12

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ifm electronic provides the following user documentation for the models of the device class "AS-i gateway with Profibus slave interface":

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

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Version	Topic	Date
00	New creation of document	12/2017

2 Safety instructions

Contents

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2.1 General safety instructions

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

Only use the product for its intended purpose.

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

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

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

► Observe these operating instructions.

► Adhere to the warning notes on the product.

2.2 Required background knowledge

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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

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⚠ WARNING

Tampering with the units can affect the safety of operators and machinery!

Tampering with the units is not allowed.
In case of non-compliance our liability and warranty expire.

- ► Do not open the devices!
- ► Do not insert any objects into the devices!
- ► Prevent metal foreign bodies from penetrating!

2.4 Warnings used

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⚠ WARNING

Death or serious irreversible injuries may result.

⚠ CAUTION

Slight reversible injuries may result.

NOTICE

Property damage is to be expected or may result.

Important note
Non-compliance may result in malfunction or interference.

Information
Supplementary note.

3 System description

Contents

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3.1 Intended use

Contents

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3.1.1 Permitted use

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The device is designed for operation in a control cabinet.

The device may only be used for the following purposes:

- as AS-i master in1 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 (PROFIBUS-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

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The device may not be used beyond the limits of the technical data (→ **Technical data** (→ p. 115))!

3.2 Information concerning the device

Contents

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3.2.1 Overview

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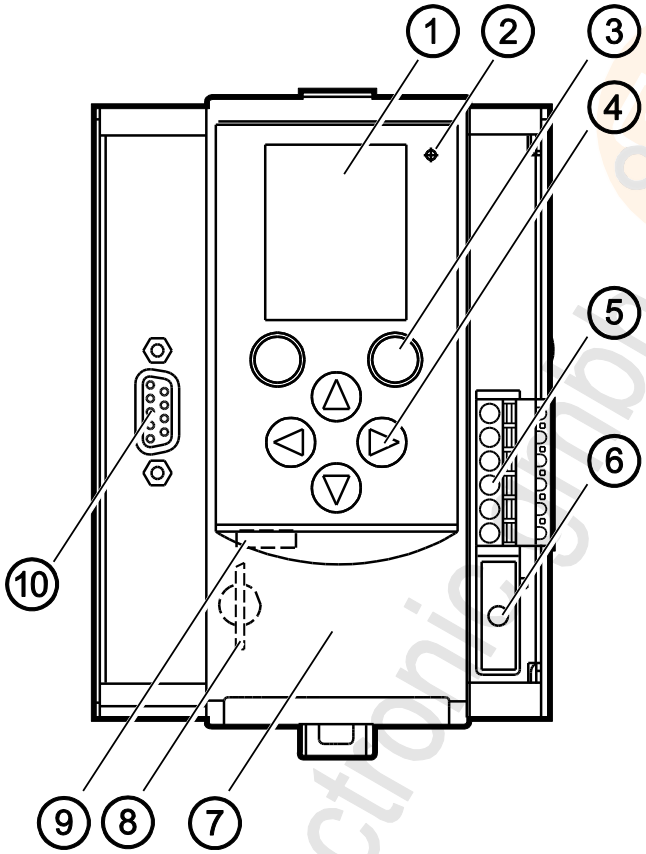

Legend:

1. Display
2. Status LED (H1)
3. 2 function keys
4. 4 arrow keys
5. Connector (X1) for AS-i 1, AS-i 2, functional earth
6. Connector (X2) for AUX (here with AUX jumper)
7. Front flap
8. Slot for SD card (behind the front flap)
9. Ethernet configuration interface (X3) (behind the front flap)
10. PROFIBUS interface (X6)

3.2.2 Operating elements

15840

The device provides the following operating elements.

Arrow and function keys

15867

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** (→ p. 15)

3.2.3 Display elements

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The device provides the following display elements:

Display

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The display is used to display the Graphical User Interface (GUI) of the device.

Operating notes: → **Operation** (→ p. 15)

Technical data: → **Technical data** (→ p. 115)

Status LEDs

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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** (→ p. 108)

3.2.4 CODESYS PLC

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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)** (→ p. 116)

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

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The device provides the following interfaces:

Ethernet configuration interface

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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** (→ p. 118)
Technical data: → **Technical data** (→ p. 115)

PROFIBUS fieldbus interface

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The device communicates with the higher-level control instance of the PROFIBUS network via the PROFIBUS interface (X6).

- Notes regarding connetion concepts: → **Configuration interface: connection concepts** (→ p. 118)
- Technical data: → **Technical data** (→ p. 115)

SD card slot

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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** (→ p. 115)

3.2.6 Required accessories

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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

Contents

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4.1 Control of the graphical user interface

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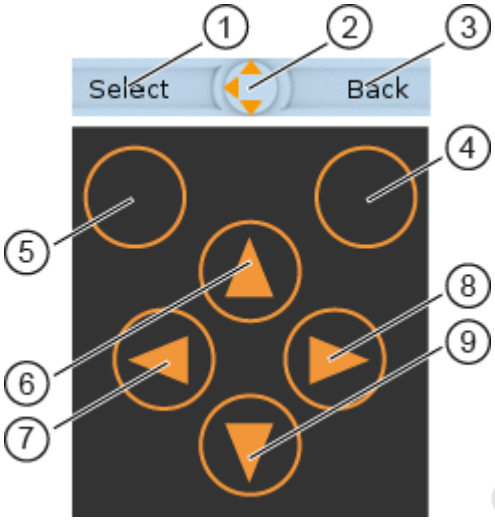
Below the display is the key panel with six membrane keys. The operator controls the graphical user interface of the device with these keys. The key panel is closely linked to the navigation status bar.



Legend:

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

4.1.1 Function keys

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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

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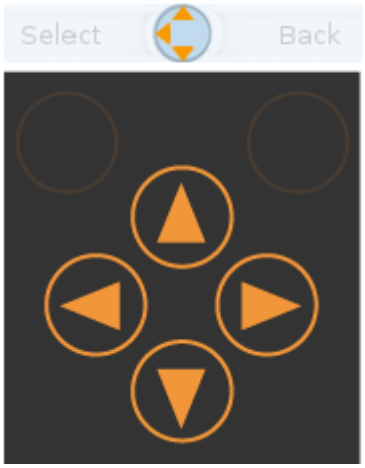

The four**arrow keys** [▲], [▶], [▼] and [◀] can be used for navigation and selection.

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

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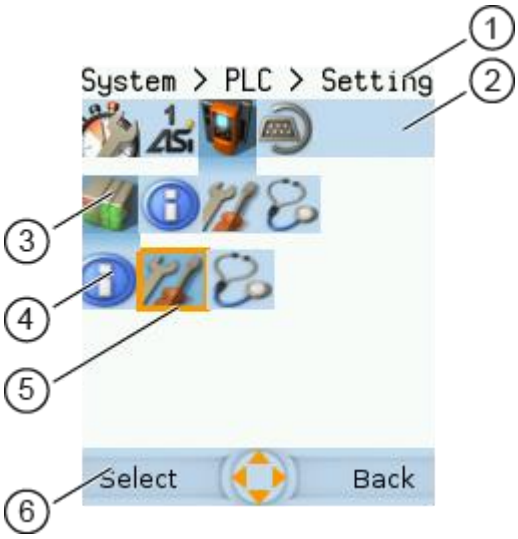
The menu view allows the user to select the menu page with the required control or display function.



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

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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** (→ p. 20)).

In the main navigation bar:

► Press [Back] function key to return to the start screen (→ **Start screen** (→ p. 37)).

4.2.2 Navigation aids

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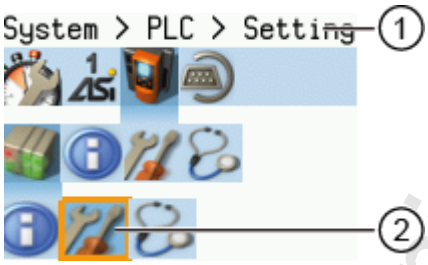
The following screen elements help you navigate through the menu:

> 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.

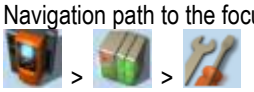


Legend:

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:


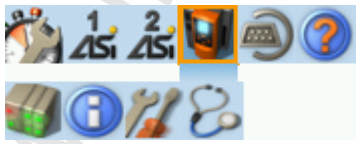
Example

11770

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

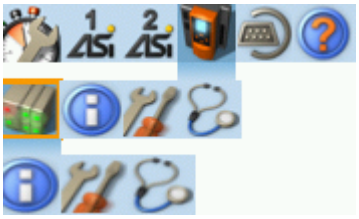
1. > Initial position when accessing the menu screen

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

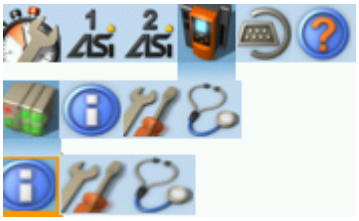


3. ► Use [▼] to change to the first subnavigation barh.
   > The focus is on the [Diagnosis] menu symbol.

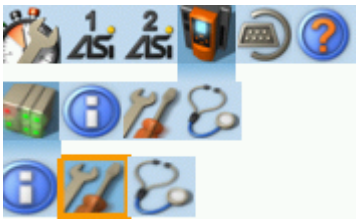
4. ► Use [◀] to select the [PLC] menu symbol.
   > The focus is on the [PLC] menu symbol.
   > The second subnavigation bar appears.



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

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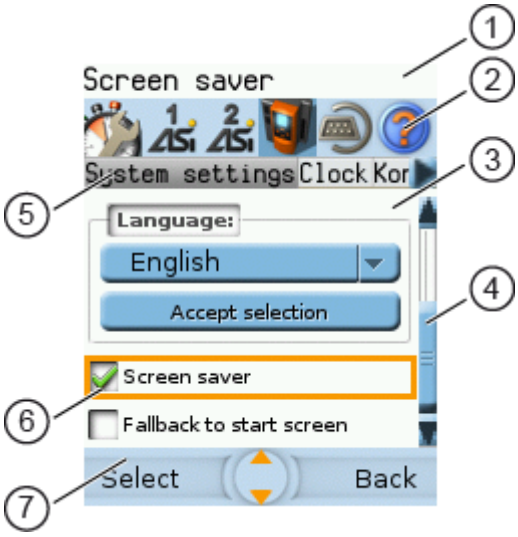
The page view allows the user to select and execute a requested function.



Legend:

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

4.3.1 Navigate on a page

15831

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** (→ p. 21)

4.3.2 Use navigation aids

14838

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

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A page consists of different control elements.

Tab menu/Tab

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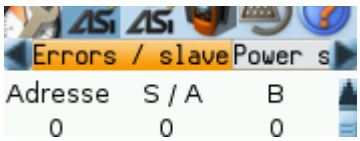
A tab menu groups together the different functions of a menu page. A tab menu consists of at least two tabs. A tab combines related functions.

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

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

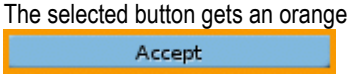
Example:

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

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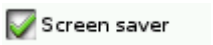
A checkbox permits the user to activate/deactivate a parameter. A checkbox control element consists of a checkbox and a caption.

Example:

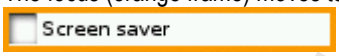


Use:

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

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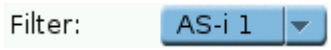
A list provides a set of defined values. The operator can select precisely one value from this set (= 1 of n selection).

Examples:

= list without caption



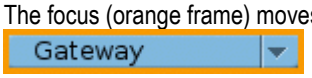
= list with caption

Use:

1 Select a list

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

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



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

2 Activate the list

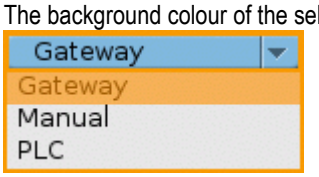
► Use [Select] function key to open the list.

> The opened list shows the selectable values.

3 Select a value

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

> The background colour of the selected value turns orange.



4 Apply the selected value

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

> The list shows the selected value.

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

Slave selector

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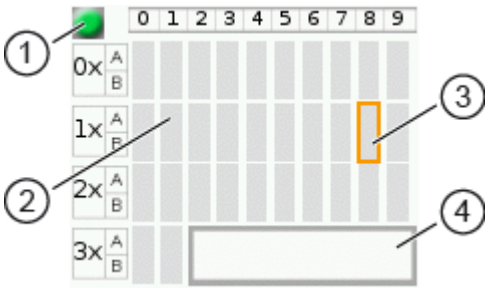
The slave selector is used to select an AS-i slave or an AS-i address.



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** (→ p. 26))
- Overview of free slave addresses (→ **Overview of free slave addresses** (→ p. 28))

Overview of slave states

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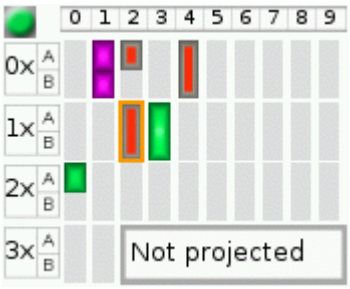


> The slave selector shows an overview of the slaves in the selected AS-i network.

> The symbol colour signals the slave status. Meaning of symbols and colours:
→ **Slave status: colour code + symbols** (→ p. 27)

> 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

11236

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

Meaning of the colour combinations (example: configuration error type 2)

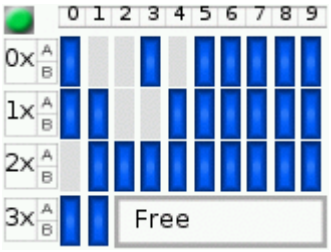
11237

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

Overview of free slave addresses

6993

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** (→ p. 29)

> 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

11239

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

11240

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

7033

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

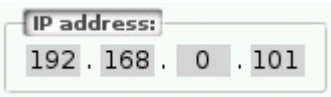
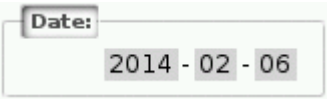
► Press [Select] function key to confirm the changes and apply the new value.
OR:
Press [Back] function key to reject the changes and continue to use the old value.

> The page displays the valid settings.

Numerical field

7046

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

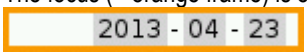
Control element	Example	Meaning
IP address		Entry of an IP address (IPv4) in [w.x.y.z] format ▪ w | x | y | z = network segments (value range: 0... 255)
Date		Date entry in [yyyy-mm-ss] format ▪ yyyy = year (value range: 0000 ... 9999) ▪ mm = month (value range: 01 ... 12) ▪ dd = day (value range: 01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

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

1 Select a numerical field

► Use [▲] / [▼] arrow key to select the date control element.

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



> The date control element displays the current date

2 Activate the editing mode

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

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

3 Set the desired value

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

> The segment displays the new value.

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

4 Select the next segment

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

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

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

5 Adopt the set values

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

> The date control element displays the valid date

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

Binary field

7047

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

Contents

7068

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

7069

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** (→ p. 38)

4.4.2 Recommended browsers

7070

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

Web interface: Access

10283

► 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

14193

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

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

Example:

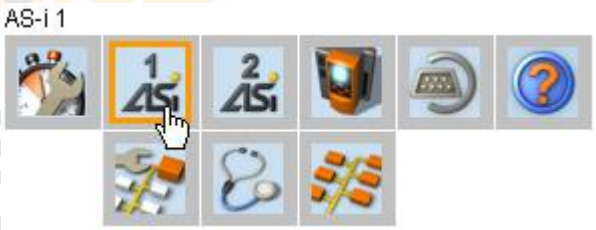
To select  >  :

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

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

> Subnavigation bar appears.

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



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

> symbol [Diagnosis] has the focus.

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

► Click on symbol [Diagnosis]

> Web browser shows menu page [Diagnosis]

Web interface: Password protection

14187

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

14221

► Go to the web interface (→ **Operating instructions** (→ p. 34)).
> 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
- AC1411/12 is restarted

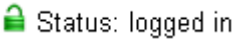
To prevent unauthorised access to the device settings:
► Manually log off before you leave the web interface! (→ **Disconnect from web interface** (→ p. 36))
► Remember to turn off the "Save password" function of your web browser before accessing the web interface!
► If the "Save password" function of your web browser is not turned off: delete the stored passwords in your browser settings!

Disconnect from web interface

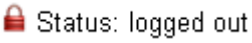
14276

To log out of the web interface:

► Start web interface

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


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

> Status bar shows changed status


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

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

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

To prevent unauthorised access to the device settings:

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

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

5 Menu

Contents

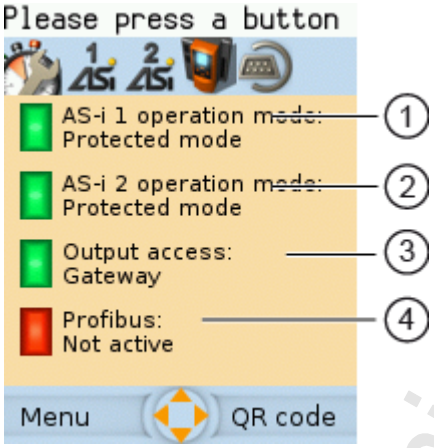
18788

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

5.1 Start screen

14439

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'** (→ p. 99)). 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** (→ p. 109)
2. AS-i master 2 operation mode
   → **Operating mode of the AS-i master** (→ p. 109)
   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** (→ p. 109)
4. Status of the PROFIBUS connection
   → **Fieldbus status** (→ p. 109)

► Press [Menu] function key to go to the menu (→ **Menu functions** (→ p. 38))

OR:

► Press [OSC] function key to go to the Online Support Center (→ **Online Support Center (OSC)** (→ p. 111))

5.2 Menu functions

1977

The main navigation bar of the AC1411/12 provides access to the following menus:

Symbol	Description
	Access to the most important device functions → **System** (→ p. 59)
	Configuration and diagnostics of the AS-i 1 network (AS-i master, AS-i slaves) → **AS-i 1 / AS-i 2** (→ p. 48)
	Configuration and diagnostics of the AS-i 2 network (AS-i master, AS-i slaves)* → **AS-i 1 / AS-i 2** (→ p. 48)
	Configuration and diagnostics of the device, control of the device-internal PLC → **System** (→ p. 59)
	Configuration and diagnostics of the interfaces (PROFIBUS, Configuration interface) → **Interfaces** (→ p. 82)
	Online Support Centre** → **Online Support Center (OSC)** (→ p. 111)
	Control and administration of the ifm system solutions (ifm apps)** → **ifm system solutions** (→ p. 92)

* ... only available for devices with 2 AS-i masters
** ... only available via the web interface of the device

5.2.1 Additional functions

14446

As compared to the user interface of the display, the web interface provides the following additional functions:

- Download device description file (GSD file)
  (→ **Download GSD file** (→ p. 89))
- Adopt date and time settings of the PC/laptop
  (→ **Adopt the system time of the PC** (→ p. 75))
- Save diagnostics protocol
  (→ **Store diagnostic protocol** (→ p. 80))
- Use ifm system solutions
  (→ **ifm system solutions** (→ p. 92))
- Diagnostics indicators
  (→ **Start screen: Status LEDs** (→ p. 109))

5.3 Quick setup

14880

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

Navigation path	Functions
	→ **Quick setup: Project AS-i networks** (→ p. 40) → **Quick setup: Configure the operating mode of the AS-i masters** (→ p. 41) → **Quick setup: Configure the output access** (→ p. 42) → **Quick setup: Access the device via QR code** (→ p. 42) → **Quick setup: Configure the PROFIBUS interface** (→ p. 43) → **Quick setup: Set the Configuration interface** (→ p. 44) → **Quick setup: Address the AS-i slaves connected to AS-i master 1** (→ p. 46) → **Quick setup: Address the AS-i slaves connected to AS-i master 2** (→ p. 47)

5.3.1 Quick setup: Project AS-i networks

8973

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

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

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

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

1 Select menu page

► 

► Select tab [Project all].

2 Select the AS-i master for projection adaptation

► Set the following parameters as required:

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

3 Start the projection adaptation

► Activate the button [Start projection process].

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

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

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

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

8974

Information regarding the operating modes of an AS-i master:→ **Operating modes of the AS-i master** (→ p. 121)

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	Meaning	Possible values	
[Projection mode]	Active operating mode of the AS-i master	☐	Projection mode inactive: AS-i network runs in protected mode (normal mode)
		☑	Projection mode active: AS-i network can be projected. (→ **Quick setup: Address the AS-i slaves connected to AS-i master 1** (→ p. 46) or → **Quick setup: Address the AS-i slaves connected to AS-i master 2** (→ p. 47))
[No slave reset]	Behaviour of the AS-i slaves when changing the operating mode	☐	Slave is reset when changing the operating mode: When changing the operating mode, the AS-i slaves will be reset for a short moment (reset or offline phase).
		☑	Slave is not reset when changing the operating mode: When changing the operating mode, the AS-i slaves continue to operate without interruption.

> Selected values are applied.

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

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

5.3.3 Quick setup: Configure the output access

17867

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	Meaning	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

11764

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

Requirements:

- The AS-i device must be connected to a wireless LAN router with switch functionality. (→ **Connection via Ethernet network** (→ p. 119))
- 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** (→ p. 33)).

5.3.5 Quick setup: Configure the PROFIBUS interface

10917

To configure the PROFIBUS interface:

1 Select the menu page

► 

► Select [Profibus] tab.

2 Set the Profibus address

► In group [Profibus address], set the following parameters as required:

Parameter	Description	Possible values	
[Profibus address]	PROFIBUS address of the device	3 ... 126	Profibus address 3 ... Profibus address 126

3 Save the changes

► Select [Accept] to activate the changes.

> The PROFIBUS interface is accessible at the configured address.

5.3.6 Quick setup: Set the Configuration interface

8991

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	Meaning	Possible values	
[Optain IP address autom.]	Active method for the configuration of the interface parameters	☐	Manual assignment of the interface parameters through the operator
		☑	Automatic assignment of the interface parameters
[IP status]	Configuration protocol used	[Static]	The operator sets the IP parameters manually.
		[DHCP]	The IP parameters are set by a DHCP server.
		[Zeroconfig]	The IP parameters are set automatically with the Zeroconf protocol.
[IP address]	IP address of the interface	e.g. `192.168.0.100`	
[Subnet mask]	Network mask of the network segment	e.g. `255.255.255.0`	
[Gateway address]	IP address of the network gateway	e.g. `192.168.0.1`	

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

3 Configure the IP parameters manually

► Uncheck [Optain IP address autom].

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

► Press [Accept] to save the changes.

► Continue with → step 5

4 Configure the IP parameters automatically

► Check [Optain IP address autom].

► Press [Accept] to save the changes.

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

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

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

5 Show the current settings

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

5.3.7 Quick setup: Address the AS-i slaves connected to AS-i master 1

8992

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

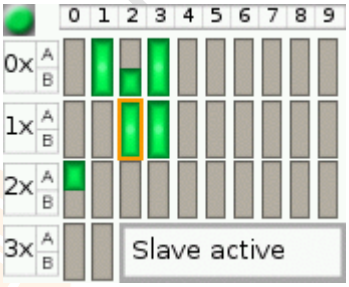
1 Select the menu page

► 

► 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** (→ p. 26)

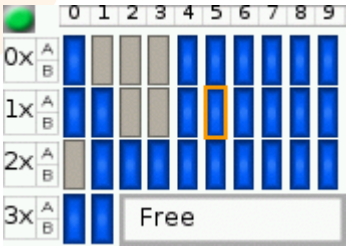


► Select the AS-i slave of which want to change the address.

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

3 Select a new AS-i address

> The page provides an overview of the free AS-i addresses (→ figure)
Notes on colour codes: → **Overview of free slave addresses** (→ p. 28)



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

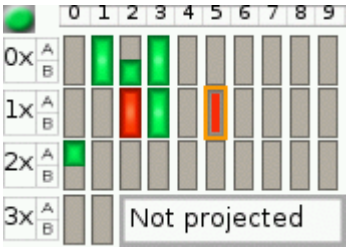
► Assign the selected address with [Select].

> The confirmation prompt appears.

► Confirm the message with [OK].

> The AS-i slave has new address.

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



4 Address additional AS-i slaves (optional)

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

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

> The slave status indicates a configuration error.

To eliminate the configuration error:

► Start a projection adaptation (→ **Quick setup: Project AS-i networks** (→ p. 40)).

5.3.8 Quick setup: Address the AS-i slaves connected to AS-i master 2

11671

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** (→ p. 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

14197

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
1 >  2 > 	AS-i master settings → **Set the operating mode of the AS-i master** (→ p. 49) → **Carry out a projection adaptation** (→ p. 50) → **Set the monitoring functions of the AS-i master** (→ p. 50)
1 >  2 > 	AS-i network diagnosis → **Display and reset the error counters** (→ p. 51) → **Display the error statistics of the AS-i slaves** (→ p. 51) → **Display the voltage supply analysis** (→ p. 52) → **Display and reset performance data** (→ p. 52)
1 >  2 > 	AS-i slave settings → **Display the input/output data of the AS-i slave** (→ p. 53) → **Change the digital output values manually** (→ p. 55) → **Change the analogue output values manually** (→ p. 56) → **Show AS-i slave information** (→ p. 56) → **Change an AS-i slave address** (→ p. 57) → **Change an AS-i slave parameter output** (→ p. 57) → **Change the Extended ID1 of the AS-i slave** (→ p. 58)

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

8996

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

15877

More information on the operating modes of the AS-i master: → **Operating modes of the AS-i master** (→ p. 121)

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

1 Select the menu page

▶  >  or  > 

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

> Set the following parameters as required:

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

> Selected values are applied.

Carry out a projection adaptation

8938

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** (→ p. 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

►  >  or  > 

2 Carry out a projection adaptation

► Press [Start projection process] button.

> The projection adaptation is carried out.

If successful:

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

If not successful:

> The Online Support Center displays an error message.

► Remove the error and repeat the process.

Set the monitoring functions of the AS-i master

11728

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

1 Select the menu page

►  >  or  > 

2 Set the monitoring functions of the AS-i master

► Set the following parameters as required:

Parameter	Description	Possible values	
[Automatic addressing]	Behaviour if AS-i slave is replaced (→ **Protected mode** (→ p. 121))	☐	Automatic addressing disabled
		☑	Automatic addressing enabled
[Earth fault detection]	Detection of earth faults	☐	Do not detect earth faults in the AS-i system
		☑	Detect earth faults in the AS-i system
[Double address detection]	Double address detection	☐	Do not detect AS-i slaves with the same address
		☑	Detect AS-i slaves with the same address

> Selected values are applied.

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

9039

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

Display and reset the error counters

9042

To display and reset the AS-i error counters:

1 Select the menu page

►  >  or  > 

► Select [Error counters] tab.

2 Display the error counters

> Page shows the following information:

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

3 Optional: reset the error counters

► Press [Reset] button.

> All error counters are reset to 0.

Display the error statistics of the AS-i slaves

9087

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

1 Select the menu page

►  >  or  > 

► Select [Errors / slave] tab.

2 Display the error statistics of the AS-i slaves

> Page shows the following information:

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

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

Display the voltage supply analysis

9088

To display the voltage supply analysis:

1 Select the menu page

►  >  or  > 

► Select [Power supply] tab.

2 Display the voltage supply analysis

> Page shows the following information:

Name	Description	Possible values	
[Power supply]	Method of voltage supply	[Aux]	Voltage is supplied separately by the AS-i network and AUX 24 V.
		[AS-i]	Voltage is only supplied by the AS-i network.
		[Power24]	Voltage is supplied by data decoupling module.
[AS-i voltage]	AS-i voltage measured (in [V])	e.g. 30.3 V	
[DC earth fault]	Evaluation of the network symmetry		AS-i network is symmetrical
			AS-i network is asymmetrical
			AS-i network has earth fault
		Graphical representation of the network symmetry: 	

Display and reset performance data

9089

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

1 Select the menu page

►  >  or  > 

► Select [Performance] tab.

2 Display performance data

> Page shows the following information:

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

3 Optional: reset the performance data

► Press [Reset] button.

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

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

9037

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

10934

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

1 Select the menu page

►  >  or  > 

► Select an AS-i slave (→ **Slave selector** (→ p. 25)).

► Select [Data] tab.

2 Display input/output data

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

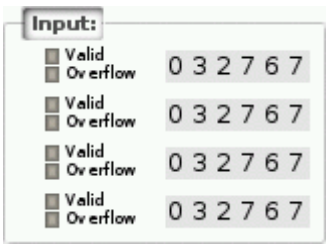
Digital input

15972

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

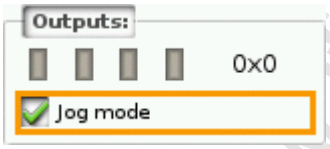
Analogue input

15973

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

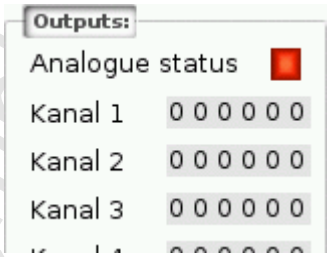
Digital output

15974

Designation	Description	Example / Possible values
[Outputs]	Current values of the digital outputs (binary and hexadecimal representation)	
		Data bit is switched off (0 / OFF)
		Data bit is switched on (1 / ON)
▪ [Jog mode]	The parameter controls the behaviour of the outputs in the event of a changed output value.	Jog mode disabled ("switch mode") > The changes do not affect the output until you quit the editing mode.
		Jog mode enabled ("momentary switch mode") > The changes immediately affect the output.

Analogue output

15975

Name	Description	Example / Possible values
[Outputs]	Current values of the analogue output channels and information about their status	
▪ [Analogue status]	Current status of the analogue outputs	Not O.K.
		O.K.
▪ [Channel x]	Current value of the analogue output channel x (x = 1...n; n = number of channels per AS-i slave)	per digit: `0 ... 9`

Parameter input

15843

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

Change the digital output values manually

10939

⚠ WARNING

Risk of personal injury! Risk of material damage to the machine/plant!

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

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

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

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

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

1 Enable manual access to the outputs

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

2 Select the menu page

- ►  >  or  > 
- ► Select an AS-i slave (→ **Slave selector** (→ p. 25)).
- ► 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** (→ p. 54))
- ► Change the desired output value bit by bit.
- > Selected value is applied.

Change the analogue output values manually

10940

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** (→ p. 67)).

2 Select the menu page

►  >  or  > 

► Select an AS-i slave (→ **Slave selector** (→ p. 25)).

► 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** (→ p. 31)).

> Selected value is applied.

► Optional: repeat step 3 to change further channels.

Show AS-i slave information

10935

To display information about an AS-i slave:

1 Select the menu page

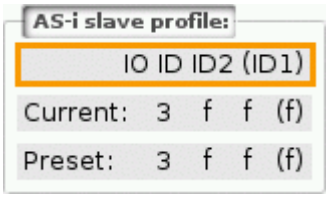
►  >  or  > 

► Select an AS-i slave (→ **Slave selector** (→ p. 25)).

► Select [Information] tab.

2 Display information about the AS-i slave

> Page shows the following information:

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

► Use [▲] / [▼] for page navigation.

Change an AS-i slave address

10944

To change the address of an AS-i slave:

1 Select the menu page

►  >  or  > 

► Select an AS-i slave (→ **Slave selector** (→ p. 25)).

► 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** (→ p. 28)).

► 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** (→ p. 26)).

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** (→ p. 50)).

Change an AS-i slave parameter output

10945

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** (→ p. 67))

2 Select the menu page

►  >  or  > 

► Select an AS-i slave (→ **Slave selector** (→ p. 25)).

► 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

10952

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

1 Select the menu page

►  >  or  > 

► Select an AS-i slave (→ **Slave selector** (→ p. 25)).

► 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:

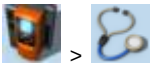
> An error message appears (configuration error).

► Start a projection adaptation (→ **Carry out a projection adaptation** (→ p. 50)).

5.5 System

18028

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)** (→ p. 60)
	System information → **Show version information** (→ p. 66)
	System settings → **Set the output access** (→ p. 67) → **Enable/Disable the device-internal PLC** (→ p. 68) → ***Set the device cycle*** (→ p. 69) → **Switch the menu language** (→ p. 70) → **Set the behaviour of the display** (→ p. 71) → **Set the system time manually** (→ p. 73) → **Synchronise the system time with an NTP server** (→ p. 74) → **Adopt the system time of the PC** (→ p. 75) → **Export device configuration** (→ p. 77) → **Import device configuration** (→ p. 78) → **Set compatibility mode** (→ p. 79) → **System reset** (→ p. 80) → **Store diagnostic protocol** (→ p. 80)
	System diagnostics → **Display diagnostic data** (→ p. 81)

5.5.1 System: Programmable Logic Controller (PLC)

8955

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

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

11778

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

Display the status of the CODESYS PLC

14841

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.	

Display information about PLC projects

14842

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

16217

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

Control a single PLC application

14846

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

14847

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

9055

Using the CODESYS programming system, the user can optionally program a target visualisation to create an application-specific user interface for the display of AC1411/12. 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

10936

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

Show memory used

14845

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

7281

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

Show version information

11774

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. AC1411/12
[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

7274

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

Set the output access

9100

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** (→ p. 68)).

Enable/Disable the device-internal PLC

15841

NOTICE

Risk of material damage to the machine/plant!

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.

► The PLC application should be terminated in a controlled manner before disabling the device-internal PLC!
(→ **Control PLC applications** (→ p. 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	Meaning	Possible values	
[Use PLC]	State of the device-internal CODESYS PLC	☐	Device-internal PLC is disabled.
		☑	Device-internal PLC is enabled.

> Selected value is applied.

Set the device cycle

11780

NOTICE

Risk of material damage to the machine/plant!

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).

► 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

7088

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

15834

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

9107

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

1 Select the menu page

►  > 

► Select [System settings] tab.

2 Set the behaviour of the display

► Set the following parameters as required:

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

> Selected values are applied.

Set the system time

10954

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

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

To set the system time:

1 Select the menu page

►  > 

► Select [Clock] tab.

2 Display the current system time settings

> The following parameters display the current system time settings:

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

3 Select the configuration method

► Select one of the following:

– **Set the system time manually** (→ p. 73)
– **Synchronise the system time with an NTP server** (→ p. 74)
– **Adopt the system time of the PC** (→ p. 75)

Set the system time manually

10963

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** (→ p. 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** (→ p. 31))

> 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

10969

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** (→ p. 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

15756

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

This function is only available via the web-interface of the device (→ **Remote access** (→ p. 33)).

Requirements:

- ► Connect the device with PC/laptop (→ **Configuration interface: connection concepts** (→ p. 118)).
- ► Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ p. 33)).

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** (→ p. 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

7087

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
- PROFIBUS 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. V**3.2.** is compatible with V**3.2.**2, but: V**3.2.**1 is incompatible with V**3.3.**1).
- Source and target device have the same article number.

Export device configuration

16199

NOTICE

Risk of undesired system behaviour

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

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

NOTICE

Risk of data loss

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

► 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 AC1411/12.

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

`ifm_DevID_xxxxxxxxxxx_YYYYMMDDhhmmss.iconf`

- DevID — Article number of the device
- xxxxxxxxxxx — 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

16200

NOTICE

Risk of undesired system behaviour

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

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

NOTICE

Risk of data loss

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

► 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** (→ p. 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 Select menu page

►  > 

► Select [Configuration] tab.

2 Restore the device configuration

► Insert an SD card with the stored device configuration in the SD card slot.

► 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.

Set compatibility mode

18520

To ensure downward compatibility with devices of the ControllerE product family, AC1411/12 can be operated in different compatibility modes. The set compatibility mode decides which PROFIBUS modules, device-specific parameters and diagnostic data are used by AC1411/12.

To set the compatibility mode.

1 Deactivate PROFIBUS connection

► Disable the PROFIBUS connection of the device.

2 Select menu page

►  > 

► Select the [Compatibility] tab.

3 Select compatibility mode

► Select one of the following values from the list:

Value	Description	References
[AC14]	Native mode for Smart PLC models AC1411 and AC1412	Parameter data: → **Parameter data: compatibility mode AC14** (→ p. 135) PROFIBUS modules: → **PROFIBUS modules: compatibility mode AC14** (→ p. 139) Alarms/diagnostics: → **DP/V1 alarms** (→ p. 177)
[AC1305/06/26]	Compatibility mode for controller e models C1305, AC1306 and AC1326	Parameter data: → **Parameter data: compatibility mode AC1305/06/26** (→ p. 137) PROFIBUS modules: → **PROFIBUS modules: compatibility mode AC1305/06/26** (→ p. 156) Alarms/diagnostics: → **DP/V0 diagnosis** (→ p. 174)

► Use [Accect selection] to apply the selected value.

> The parameter data and PROFIBUS modules of the selected module are active.

4 Activate PROFIBUS connection

► Enable the PROFIBUS connection of the device.

> The device transmits the data written in the selected compatibility mode.

System reset

8977

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

7040

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
- PROFIBUS configuration
- System settings
- CODESYS information
- OSC history

This function is only available via the web-interface of the device (→ **Remote access** (→ p. 33)).

Requirements:

► Connect the device with PC/laptop (→ **Configuration interface: connection concepts** (→ p. 118)).

► Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ p. 33)).

1 Select menu page

►  > 

► Select the [Diagnostic protocol] tab.

2 Store diagnostic protocol

► Press the [Generate diagnostic protocol] button.

> AC1411/12 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

15827

To display the diagnostic data of the device:

1 Select menu page

▶  > 

2 Display diagnostic data

> Page shows the following information:

Name	Description	Possible values	
[Betriebszeit [JJ-TTT SS:MM]]	Operating time of system and components	All times indicated in [JJ-TTT-SS-MM] format: YY = years DD = days hh = hours mm = minutes	
▪ [gesamt]	Operating time of device		
▪ [aktuell]	Operating time of device since last system start		
▪ [LCD]	Operating time of LCD		
▪ [SPS]	Operating time of controller		
[Temperatur]	Current device temperature	Indications in [°C] (→ Note)	
[Versorgt durch]	Voltage supply of device	[Aux]	Voltage is supplied separately by AS-i network and AUX 24 V.
		[AS-i]	Voltage is only supplied by the AS-i network.
		[Power Modul]	Voltage is supplied by data decoupling module.

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

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

If the system temperature reaches the critical zone, a warning is displayed in the → **Online Support Center (OSC)** (→ p. 111). The warning only disappears when the device temperature is again in the normal range.

5.6 Interfaces

15143

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

Navigation path	Functions
 > 	Configuration interface → **Configure the IP parameters manually** (→ p. 84) → **Configure the IP parameters automatically** (→ p. 84) → **Show Ethernet information** (→ p. 85)
 > 	PROFIBUS interface → **Interfaces: PROFIBUS interface** (→ p. 86)

5.6.1 Interfaces: Configuration interface

7279

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

Notes on IP settings

14856

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	
[Optain IP address autom.]	Active method for the configuration of the interface parameters	☐	Manual assignment of interface parameters through operator
		☑	Automatic assignment of interface parameters
[IP status]	Configuration protocol used	[Static]	The operator sets the IP parameters manually.
		[DHCP]	The IP parameters are set by a DHCP server.
		[Zeroconf]	The IP parameters are set automatically with the Zeroconf protocol.
[IP address]	IP address of the interface	e.g. `192.168.0.100`	
[Subnet mask]	Network mask of the network segment	e.g. `255.255.255.0`	
[Gateway address]	IP address of the network gateway	e.g. `192.168.0.1`	

► Select one of the following options:
– **Configure the IP parameters manually** (→ p. 84)
– **Configure the IP parameters automatically** (→ p. 84)

Configure the IP parameters manually

14860

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** (→ p. 83)).

> 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** (→ p. 83)):
– [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

14859

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** (→ p. 83))

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

14857

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: PROFIBUS interface

7097

The [PROFIBUS] menu provides access to information, settings and diagnostic data regarding the PROFIBUS interface.

Navigation path	Functions
	PROFIBUS information → **Display I&M information** (→ p. 87) → **Display PROFIBUS data** (→ p. 88) → **Display the module configuration** (→ p. 89) → **Download GSD file** (→ p. 89)
	PROFIBUS settings → **Configure the PROFIBUS interface** (→ p. 90)
	PROFIBUS diagnosis → **Display diagnostic data** (→ p. 91)

PROFIBUS: Information

11781

The menu item [Information] provides access to information regarding the PROFIBUS interface.

Display I&M information

10985

To display the I&M information (I&M = Identification & Maintenance):

1 Select the menu page

►  >  > 

► Select [I&M information] tab.

2 Display I&M information

> Page shows the following information:

Name	Description
[Manufacturer ID]	Displays the manufacturer ID
[Order number]	Displays the article number of the device
[SN]	Displays the serial number
[HW version]	Displays the hardware version
[SW version]	Displays the software version
[Revision no.]	Displays the revision number
[Profile ID]	Displays the profile ID
[Profile type]	Displays the profile type
[I&M version]	Displays the I&M version

Display PROFIBUS data

10995

To display the PROFIBUS data:

1 Select the menu page

►  >  > 

► Select [Profibus data] tab.

2 Display PROFIBUS data

> Page shows the following information:

Designation	Description	Possible values	
[Profibus address]	Displays the Profibus address	3 ... 126	
[Profibus baud rate]	Displays the transmission rate of the PROFIBUS interface	[Unknown]	Device is not connected to the PROFIBUS master
		[9.6 Kbits/s] ... [12 Mbits/s]	Baud rate
[Analog. channels/I-slave]	Number of analogue channels per projected input slave	[Unknown]	Device is not connected to the PROFIBUS master
		[1 channel per A/B]	1 channel per A/B slave OR: channels 1 + 3 per single slave
		[1 channel]	1 channel per single slave OR: 1 channel per A slave
		[2 channels]	2 channels per single slave OR: 2 channels per A slave
		[4 channels]	4 channels per single slave OR: 2 channels per A/B slave
[Analog. channels/O-slave]	Number of analogue channels per projected output slave	→ [Analog. channels/I-slave]	
[Failsafe state]	Behaviour of the AS-i outputs in case of an interrupted PROFIBUS connection	[Clear output]	switch off AS-i outputs
		[Hold output]	hold AS-i outputs on the last value
[Parameter download]	Transmission of the parameter data of the AS-i slaves to the device	☐	Parameters are not downloaded, i.e. AS-i slaves are activated with the parameters set in the device.
		☑	Each time the PROFIBUS connection is established the AS-i slave parameters are loaded onto the device from the PROFIBUS controller, activated in the slaves and stored non-volatilely.
[Profivbus alarms]	Transmission of Profibus alarms to the PROFIBUS controller	☐	No PROFIBUS alarms are sent.
		☑	PROFIBUS alarms are triggered in the PROFIBUS master if there is a fault on the device.
[Swap IO]	Swap of the nibbles in the byte (only applies to digital data in slots 1...4)	☐	No swap of assignment of the slave nibbles in the byte.
		☑	Swap of assignment of the slave nibbles in the byte.

Display the module configuration

11009

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 module configuration of the PROFIBUS slots. (→ **PROFIBUS modules: compatibility mode AC14** (→ p. 139))

The fieldbus slots can only be configured in the PROFIBUS projection software.

Download GSD file

14453

This function is only available via the web-interface of the device (→ **Remote access** (→ p. 33)).
This function is only available if the compatibility mode 'AC14' is enabled (→ **Set compatibility mode** (→ p. 79)).

Requirements:

► Connect the device with PC/laptop (→ **Configuration interface: connection concepts** (→ p. 118)).

► Start the web browser and open the web interface of the device (→ **Recommended browsers** (→ p. 33)).

1 **Select the menu page**

►  >  > 

► Select [GSD file] tab.

> The [GSD file] menu screen appears.

2 **Download GSD file**

► Click on [Download GSD file] to download the device description.

PROFIBUS: Setup

16196

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

Configure the PROFIBUS interface

11013

We recommend setting up the fieldbus on the PROFIBUS controller and adopting the configuration on the device.

To configure the PROFIBUS interface:

1 Select the menu page

►  >  > 

2 Set the PROFIBUS address of the device

► Set the following parameters as required:

Parameter	Meaning	Possible values	
[Profibus address]	Address of the PROFIBUS interface	3 ... 126	= Profibus address 3 ... = Profibus address 126

3 Save the changes

► Press [Accept] button.

> Selected value is applied.

PROFIBUS: Diagnosis

9126

The menu item [Diagnosis] provides access to the diagnostic data of the PROFIBUS interface:

Display diagnostic data

11019

To display the diagnostic PROFIBUS data:

1 Select the menu page

▶  >  > 

2 Display diagnostic data

> Page shows the following information:

Designation	Meaning	Possible values	
[PROFIBUS connection status]	Displays the connection status of the PROFIBUS interfaces		
▪ [Status Port X6]	Connection status of port X6		No connection to fieldbus controller
			Connection to fieldbus controller established

5.7 ifm system solutions

7065

This menu is only available via the web interface of AC1411/12.
→ **Remote access** (→ p. 33)

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** (→ p. 94) → **Install single/basic app** (→ p. 95) → **Install multi app** (→ p. 96) → **Update ifm apps** (→ p. 97) → **Uninstall ifm apps** (→ p. 97)

5.7.1 Notes on ifm system solutions

12229

With the AC1411/12, 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 applications must not be stored and run simultaneously on the AC1411/12!

► 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 AC1411/12 (→ **Enable/Disable the device-internal PLC** (→ p. 68))!

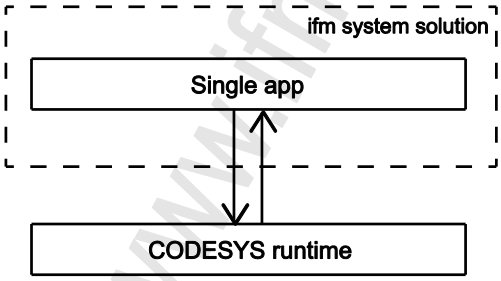
Users can download the available ifm system solutions from ifm's website.
→ www.ifm.com > Service > Download > Industrial communication

Types of ifm system solutions

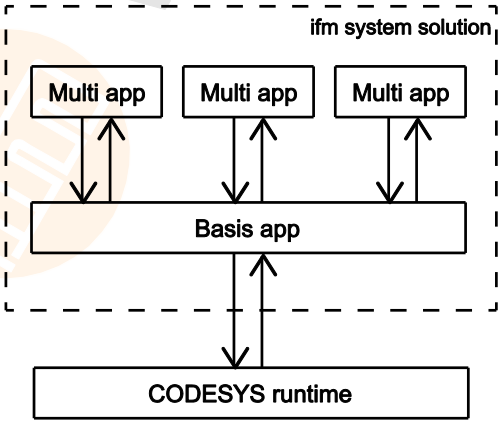
8682

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 AC1411/12 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

9041

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

7092

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

6954

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** (→ p. 95))

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

6925

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** (→ p. 94)

1 Download new ifm app

► Download new version of the ifm system solution (→ **Notes on ifm system solutions** (→ p. 92)).

2 Update the installed ifm app

► Install the new ifm system solution
– Single/basic app: → **Install single/basic app** (→ p. 95)
– multi app: → **Install multi app** (→ p. 96)

5.7.6 Uninstall ifm apps

7014

When a basic app is uninstalled, all dependent multi apps are uninstalled, too.
Before uninstalling an ifm app, the CODESYS PLC of AC1411/12 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** (→ p. 94)

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

Contents

15844

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

9000

6.1.1 PROFIBUS interface

10907

To connect the device to a PROFIBUS network:

► Connect the device to the topology of the PROFIBUS network via the PROFIBUS port (X6).
Details: → **Interfaces** (→ p. 13)

6.1.2 Configuration interface

10909

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

► connect the configuration interface (X3) of the device to the programming PC/laptop directly or via an Ethernet network.
Details: → **Configuration interface: connection concepts** (→ p. 118)

6.2 Start screen 'Basic settings'

11226

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** (→ p. 20)).

6.2.1 Change the basic settings of the device

18511

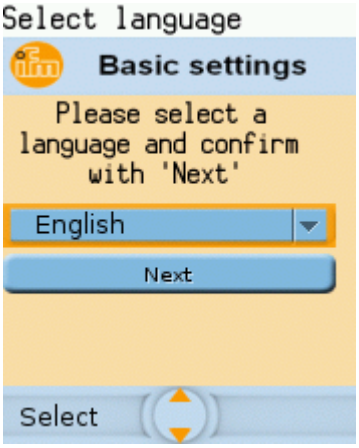
To change the basic settings of the device:

1 Start the device

► Connect the device to a circuit.
> The device starts.
> The display shows the start screen "Basic settings" (screenshot).

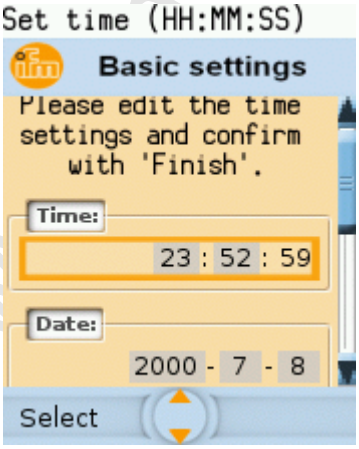
2 Set the language of the GUI texts

► 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].



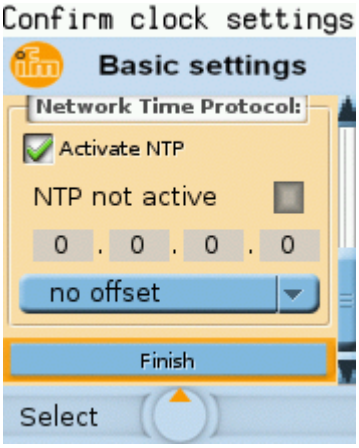
3 Set the system time

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 [Fertigstellen] 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 [Fertigstellen] and go to the standard start screen.

6.3 Update the firmware of the device

18399

NOTICE

Risk of data loss!

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

► Secure the device settings before carrying out a firmware update! (→ **Export device configuration** (→ p. 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** (→ p. 102)
- **Firmware update via the web interface** (→ p. 103)

6.3.1 Behaviour of the settings upon firmware update

17058

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] > [PROFIBUS] > [Setup]

The following settings/data records are reinitalised 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

18400

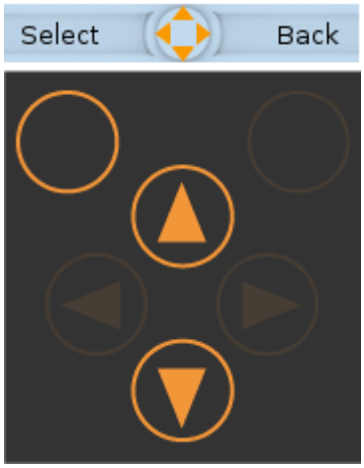
Pay attention to notes on memory behaviour (→ **Behaviour of the settings upon firmware update** (→ p. 101))!

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** (→ p. 13)).

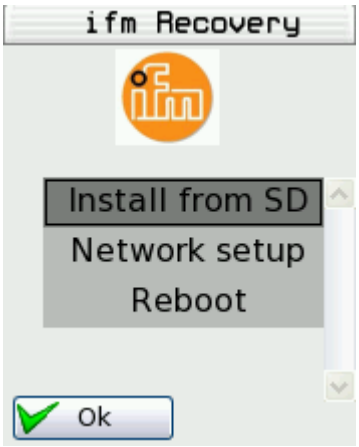
2 Start the recovery mode

- ► 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'** (→ p. 99)).

6.3.3 Firmware update via the web interface

18401

Pay attention to notes on memory behaviour (→ **Behaviour of the settings upon firmware update** (→ p. 101))!

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** (→ p. 118))

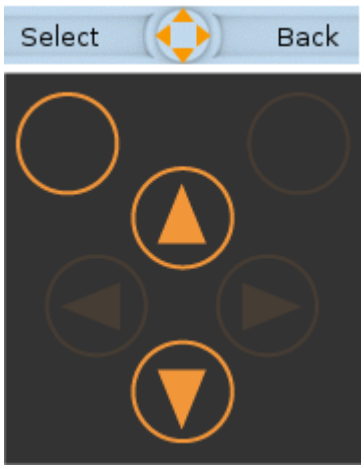
2 Start the recovery mode

► 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.

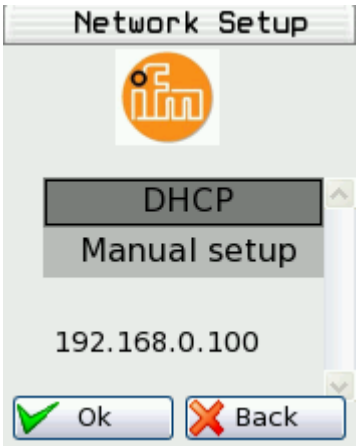
> The device obtains the IP parameters from the DHCP server.

> 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.

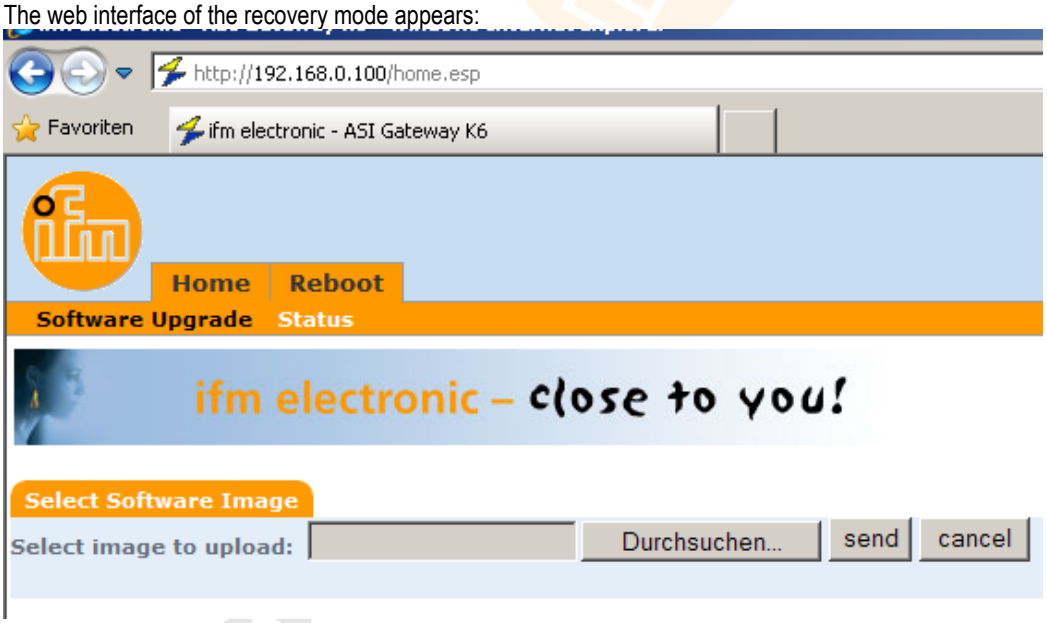


Option 2: configure the IP parameters manually

► 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'** (→ p. 99)).

6.4 Connect and address AS-i slaves

9004

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** (→ p. 46) or → **Quick setup: Address the AS-i slaves connected to AS-i master 2** (→ p. 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** (→ p. 40)).
- > 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 Set the Profibus interface

10910

Detailed information on how to configure the PROFIBUS network: → operating instructions of the PROFIBUS master

To integrate the device into a PROFIBUS network:

1 Set the interface parameters

►  >  > 

► Set the interface parameters (→ **Configure the PROFIBUS interface** (→ p. 90)).

2 Integrate device into PROFIBUS project using the GSD file

► Copy the GSD file of the device to the PC/laptop with the PROFIBUS configuration software (→ **Download GSD file** (→ p. 89)).

► Load the device into the device library of the PROFIBUS configuration software by means of the GSD file (→ operating instructions of the PROFIBUS configuration software).

► Integrate the device into the PROFIBUS project.

3 Set the device parameters, fieldbus modules and system behaviour

► Set the following parameters in the PROFIBUS configuration software:
– Device-specific parameters (→ **Device-specific parameters** (→ p. 135))
– PROFIBUS modules (→ **PROFIBUS modules: compatibility mode AC14** (→ p. 139))

► Set the system behaviour in the PROFIBUS configuration software (e.g. watchdog)

4 Activate configuration

► Save and load the configuration to PROFIBUS controller (download).

► Start the PROFIBUS controller.

> The device has been integrated into PROFIBUS network (→ Status LED of the PROFIBUS interface).

5 Display the set configuration on device

►  >  > 

► Select [Profibus data] tab.

> The page shows the saved configuration.

6.6 Setup of the configuration interface

9006

To set up the EtherNet configuration interface (X3):

►  > 

► Select [IP setup] tab.

► Set the interface parameters (→ **Notes on IP settings** (→ p. 83)).

6.7 Exchange AS-i slave

10249

AC1411/12 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** (→ p. 125)).

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

> Parameter [Automat. adressing] is activated (→ **Set the monitoring functions of the AS-i master** (→ p. 50)).

1 Remove old AS-i slave

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

> AC1411/12 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.

> AC1411/12 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

Contents

7288

This chapter offers information regarding fault detection and troubleshooting.

7.1 Status LED

7094

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

Position of the status LED on device: → **Overview** (→ p. 11)

7.1.1 Status LED: Basic device

6950

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.

7.2 Start screen: Status LEDs

7777

The start screen of the graphic user interface proves the following status information (→ **Start screen** (→ p. 37)):

7.2.1 Status of the web interface

20766

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** (→ p. 33)).

7.2.2 Operating mode of the AS-i master

7780

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

7783

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

11816

Status LED			Meaning
PROFIBUS	red	on	PROFIBUS inactive
	green	on	PROFIBUS active

7.3 Online diagnosis function

7055

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

7.3.1 Message types

18986

The online diagnostic function of AC1411/12 distinguishes 3 types of messages:

Symbol	Message type	Meaning
	Error	▪ An error occurred; proper operation of the device is disturbed. ▪ User action absolutely required
	Warning	▪ An irregularity has occurred ▪ User action required
	Event	▪ An uncritical event has occurred ▪ No user action required

7.3.2 Locate error sources

7063

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

Example:

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

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

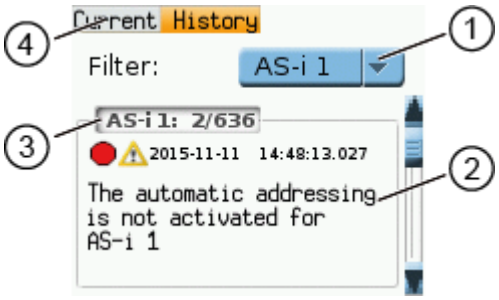
If a function unit of the device causes a warning and an error message at the same time, then the error symbol is displayed.

7.4 Online Support Center (OSC)

7058

The Online Support Center (OSC) displays detailed information about occuring 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** (→ p. 112)
   [History]: → **OSC: Show message history** (→ p. 113)

7.4.1 OSC: View current error messages

15842

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

Information about the different types of messages: → **Message types** (→ p. 110)
Overview of possible OSC messages of the device: → **OSC messages** (→ p. 183)

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

11775

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.

8 Appendix

Contents

7156

8.1 Approval tests / certifications

11068

Software-relevant certifications:

- AS-i master profile M4 according to AS-i specification 3.0
- Fieldbus certification: Profibus

8.2 Technical data

Contents

9011

8.2.1 Housing

9044

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

9045

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

9046

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

8.2.4 Power supply connections

9047

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

11070

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

11073

Profibus fieldbus interface	
Connection	Sub-D socket, 9-pole
Transmission rate	9.6 kbaud ... 12 Mbaud
Profibus frame length	IN = 244 Bytes OUT = 244 Bytes
Protocol	Profibus DP (DPV0 + DPV1), EN50170
Services and data	▪ Acyclic Profibus services including AS-i command channel ▪ Profibus I&M data (Identification and Maintenance) ▪ GSD file

11072

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)

14849

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

14436

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

Contents

7071

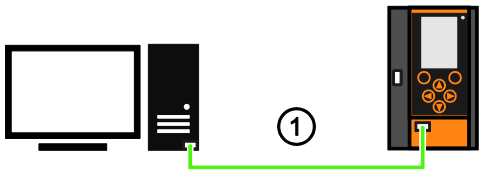
To be able to access the web interface and the programming interface of the device-internal PLC, the configuration interface (X3) must be connected to a computer. The device supports the following connection types:

- Direct connection (→ **Direct link** (→ p. 118))
- Connection via an EtherNet network (→ **Connection via Ethernet network** (→ p. 119))

8.4.1 Direct link

12551

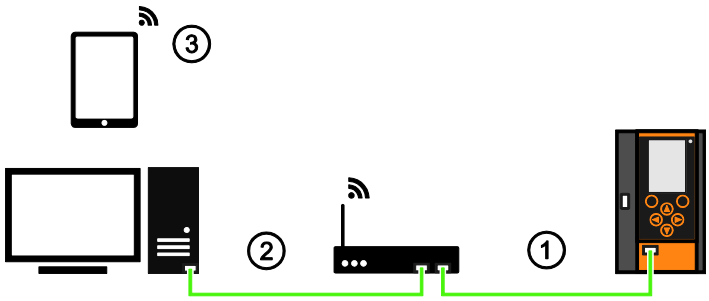
To establish a direct connection to the device:



1 ► 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** (→ p. 117)).
> User can access the web interface and/or programming interface of the device.

8.4.2 Connection via Ethernet network

12553



(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** (→ p. 83)).

(2) ► Connect PC / laptop with the Ethernet switch.
> User can accress the web interface and / or programming interface of the device.

OR:

(3) ► Connect PC / laptop / mobile device wireless with the WiFi router .
> User can accress the web interface and / or programming interface of the device.

8.5 AS-i master

Contents

8900

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

Contents

8934

The AS-i master can be operated in one of the following operating modes:

Protected mode

14833

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** (→ p. 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: ▪ 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

14848

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

5487

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** (→ p. 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

16936

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

Contents

8893

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

Contents

8902

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

Contents

5346

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

5347

The slave profile has the following structure: S-[IO code].[ID code].[ext. ID code2]

Bits 15...12	Bits 11...8	Bits 7...4	Bits 3...0
XID2 extended ID code 2 3rd figure in the slave profile (AS-i slave v2.0 = 0xF *)	XID1 extended ID code 1 is no part of the slave profile can be changed by the user (AS-i slave v2.0 = 0xF *)	ID code ID code 2nd figure in the slave profile	IO code I/O configuration 1st figure in the slave profile
Example:	AC2255 4 digital inputs, 2 digital outputs AS-i profile = S-7.A.E This results in the following configuration data of the slave:		
0b1110 = 0xE	(e.g.) 0b0111 = 0x7	0b1010 = 0xA	0b0111 = 0x7
The corresponding CDI data word is: 11100111 10100111 = 0xE7A7			

*) AS-i slaves according to the AS-i specification 2.0 and older do not support the extended ID codes 1 and 2. In the master 0xF is stored for this configuration data.

Description of the IO code for digital slaves

5349

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)

5351

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

5353

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

5355

Extended ID code 2 for analogue slaves with profile 7.3.x

5357

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

5358

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

5359

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** (→ p. 128))
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** (→ p. 128))
7	4	C	RFID identification system for writing and reading RFID tags 15-bit data + 1-bit messages (e.g. DTA100)

IO code [hex]	ID code [hex]	Ext. ID code 2 [hex]	Meaning
7	A	x	slave operates in the "extended addressing mode" (B slave or A/B slave)
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)

IO code [hex]	**ID code** [hex]	**Ext. ID code 2** [hex]	**Meaning**
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

5362

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

5366

Transaction	Slave profile	Slave type	Number channels	Analogue input channels					Analogue output channels				
				CH3	CH2	CH1	CH0	Trans.	CH3	CH2	CH1	CH0	Trans.
CTT5	6.0.x	S	1	–	–	–	b	–	–	–	–	b	–
CTT1	7.3.C	S	1	–	–	–	a	–	–	–	–	–	–
	7.3.D	S	2	–	–	a	a	–	–	–	–	–	–
	7.3.E	S	4	a	a	a	a	–	–	–	–	–	–
	7.3.4	S	1	–	–	–	–	–	–	–	–	a	–
	7.3.5	S	2	–	–	–	–	–	–	–	a	a	–
	7.3.6	S	4	–	–	–	–	–	a	a	a	a	–
	7.3.C	S	1	–	–	–	a	–	–	–	–	–	–
	7.3.D	S	2	–	–	a	a	–	–	–	–	–	–
	7.3.E	S	4	a	a	a	a	–	–	–	–	–	–
	7.3.4	S	1	–	–	–	–	–	–	–	–	a	–
	7.3.5	S	2	–	–	–	–	–	–	–	a	a	–
	7.3.6	S	4	–	–	–	–	–	a	a	a	a	–
CTT1	7.4.4	S	1	–	–	–	–	–	–	–	–	a	X
	7.4.5	S	2	–	–	–	–	–	–	–	a	a	X
	7.4.6	S	4	–	–	–	–	–	a	a	a	a	X
	7.4.C	S	1	–	–	–	a	X	–	–	–	–	–
	7.4.D	S	2	–	–	a	a	X	–	–	–	–	–
	7.4.E	S	4	a	a	a	a	X	–	–	–	–	–
CTT2	7.5.5	S	0…4	a b	a b	a b	a b	X	a b	a b	a b	a b	X
CTT2	7.A.5	A	0…2	–	–	a b	a b	X	–	–	a b	a b	X
	7.A.5	B	0…2	a b	a b	–	–	X	a b	a b	–	–	X
CTT3	7.A.7	A	–	only binary				–	only binary				–
		B	–					–					–
CTT4	7.A.8	A	1	–	–	–	a b	–	–	–	–	–	–
		B	1	–	a b	–	–	–	–	–	–	–	–
CTT4	7.A.9	A	2	–	–	a b	a b	–	–	–	–	–	–
		B	2	a b	a b	–	–	–	–	–	–	–	–
CTT3	7.A.A	A	1	–	–	–	b	–	–	–	–	b	–
		B	1	–	b	–	–	–	–	b	–	–	–
CTT2	B.A.5	A	0…2	–	–	a b	a b	X	–	–	a b	a b	X
	B.A.5	B	0…2	a b	a b	–	–	X	a b	a b	–	–	X

CHn = channel
Trans. = transparent mode

S = single slave
A = A slave
B = B slave

a = analogue inputs/outputs (word)
b = binary inputs/outputs (bits)
– = not used

X = additional acyclic transaction of strings for device, parameters, diagnosis

Legend colour pattern:

binary inputs | binary outputs | analogue inputs | analogue outputs

8.7 Fieldbus Profibus

11075

PROFIBUS (**Pro**cess **Fi**eld **Bus**) is a standard for →fieldbus communication in automation technology. There are two versions of PROFIBUS, DP being the one most widely used.

- PROFIBUS-DP (decentralised periphery) for the control of sensors and actuators by a central controller in manufacturing engineering and for networking of several controllers among each other. Data rates up to 12 Mbits/s on twisted two-wire cables and/or fibre optics are possible.
- PROFIBUS-PA (process automation) is used for the control of measurement devices by a process control system in process technology and is suited for hazardous areas (zones 0 and 1). Only a limited current flows on the bus cables in an intrinsically safe circuit so that even in case of a problem no explosive sparks can occur. A disadvantage of PROFIBUS-PA is the relatively slow data transfer rate of 31.25 Kbits/s.

→ www.profibus.com (umbrella organisation)

8.7.1 Fieldbus parameters

11057

The fieldbus parameters provide information for the integration of the device into the PROFIBUS network.

Parameter	Meaning	Value range
PROFIBUS address	Address of the device in the PROFIBUS network	3* ... 126
PROFIBUS baud rate	Data rate of the <Profibus> network	Auto detect* 9.6 Kbits/s ... 12 Mbit/s

* ... Preset values

If the Profibus address is set to 126, a corresponding DP V2 master can readdress the address via the acyclic service "Set Slave Address".

8.7.2 Device-specific parameters

11063

The device-specific parameters serve to configure the device for process operation.
Depending on the active compatibility mode the user can access the following parameter data:

- **Parameter data: compatibility mode AC14** (→ p. 135)
- **Parameter data: compatibility mode AC1305/06/26** (→ p. 137)

To access the device-specific parameters:

► Launch PROFIBUS projection software.
► Double-click on the AC1411/12 device symbol
► Click on the [Parameter] tab.

Parameter data: compatibility mode AC14

11233

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)
1st analogue input slave … 30th analogue input slave	Assignment of the AS-i slave address to a position in the analogue input data image. Prerequisite: Parameter [Analogue channels per input slave] = 4 channels For each AS-i analogue slave 4 words of data are reserved.	Slave 1 AS-i master 1* … Slave 15 AS-i master 1* Slave 16 AS-i master 1 … Slave 31 AS-i master 1 Slave 1 AS-i master 2 … Slave 31 AS-i master 2	
1st analogue output slave … 30th analogue output slave	Assignment of the AS-i slave address to a position in the analogue output data image. Prerequisite: Parameter [Analogue channels per output slave] = 4 channels For each AS-i analogue slave 4 words of data are reserved.	Slave 1 AS-i master 1* … Slave 15 AS-i master 1* Slave 16 AS-i master 1 … Slave 31 AS-i master 1 Slave 1 AS-i master 2 … Slave 31 AS-i master 2	
Failsafe state	Behaviour of the slave outputs if an interrupted fieldbus connection is detected	Clear outputs* =	All AS-i outputs are switched off in case of an interrupted PROFIBUS connection (value = 0).

Parameter	Description	Value range	
		Hold outputs =	The outputs are held in the last valid state that existed before the interrupted connection was detected.
PROFIBUS alarms	Transmission of the PROFIBUS alarms	Disable =	The PROFIBUSalarm data is NOT written to the AS-i system.
		Enable* =	The PROFIBUS alarm data is written to the AS-i system.
Swap IO mapping slot 1...4	Slave assignment in the bytes of the digital data	yes* =	Slave n+1 / slave n
		no =	Slave n / slave n+1
AS-i param. download	Transmission of the slave parameters when downloading a configuration from the PROFIBUS projection software.	Disable* =	The following slave parameter data are NOT downloaded to the device. The parameters set in the device apply.
		Enable =	Each time the PROFIBUS connection is established, the following slave parameter data are downloaded to the device, activated in the AS-i slaves, and stored non-volatilely.
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	Parameter data of the AS-i slaves. The set values are only activated when the parameter "AS-i param. download" is set to the value "Enable".	P3..P0 = P3..P0 = … P3..P0** = … P3..P0* =	2#0000 / 16#0 2#0001 / 16#1 ... 2#0111 / 16#7 ... 2#1111 / 16#F

* ... Default setting for single slaves
** ... Default setting for A/B slaves

Parameter data: compatibility mode AC1305/06/26

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Parameter	Description	Value range	
1. analog input slave … 15. analog input slave	Assignment of the AS-i slave address to a position in the analogue input data image. For each AS-i analogue slave 4 words of data are reserved.	Slave 1 AS-i master 1* … Slave 15 AS-i master 1* Slave 16 AS-i master 1 … Slave 31 AS-i master 1 Slave 1 AS-i master 2 … Slave 31 AS-i master 2	
1. analog output slave … 15. analog output slave	Assignment of the AS-i slave address to a position in the analogue output data image. For each AS-i analogue slave 4 words of data are reserved.	Slave 1 AS-i master 1* … Slave 15 AS-i master 1* Slave 16 AS-i master 1 … Slave 31 AS-i master 1 Slave 1 AS-i master 2 … Slave 31 AS-i master 2	
AS-i param. download	Transfer of the slave parameters when downloading a configuration from the PROFIBUS projection software.	Disable* =	The following slave parameter data are NOT downloaded to the device. The parameters set in the device apply.
		Enable =	Each time the PROFIBUS connection is established, the following slave parameter data are downloaded to the device, activated in the AS-i slaves, and stored non-volatilely.
Param. slave 1(A) AS-i master 1 … Param. slave 31(A) AS-i master 1	Parameter data of the AS-i slaves. The set values are only activated when the parameter "AS-i param. download" is set to the value "Enable".	P3...P0 =	0x0 ... 0xF
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			
Extended PROFIBUS Diagnosis	Transfer of extended device-specific diagnosis data	Disable =	Only standard DP/V0 diagnosis data is transfered
		Enable =	Extended, device-specific DP/V0 diagnosis data is transfered

GSD file

11052

A GSD file is provided for mapping of AC1411/12 in a fieldbus projection software (e.g. Siemens Step7). In the GSD file, all parameters, process data, and their valid value ranges are defined.

- The GSD file for the compatibility mode "AC14" is stored in the device. It can be downloaded to the PC with the PROFIBUS projection software via the web interface:
  → **Download GSD file** (→ p. 89)).
- The GSD file for the compatibility mode "AC1305/06/26" can be downloaded from the ifm web page:
  → www.ifm.com > Service > Download > Industrial communication > GSD: AC1305/06, AC1326 | Profibus DP

Siemens Step7 Object Manager:

The Object Manager is part of the hardware configuration of Siemens Step7. As a device catalogue, it contains all the devices that are available for the PROFIBUS projection. All non Siemens devices are listed in "Profibus – Further field devices". New devices can be imported with the help of a GSD file.

8.7.3 Cyclic data

9005

The cyclic process data is, as the name suggests, cyclically updated via the fieldbus mechanisms.

For this, it must be defined in the fieldbus configuration which data with which lengths in which address areas of the host controller are to be used.

So-called slots contain each the process data of several AS-i slaves.

Number and content of the fieldbus modules used by the AC1411/12 depend on the active compatibility mode (→ **Set compatibility mode** (→ p. 79)).

PROFIBUS modules: compatibility mode AC14

11192

Slot	Description	Detailed information
1	Binary inputs and outputs of single or A slaves, connected to AS-i master 1	→ **Slot 1 – Digital inputs/outputs of single/A slaves, AS-i master 1** (→ p. 140)
2	Binary inputs and outputs of single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 2 – Digital inputs/outputs of single/A slaves, AS-i master 2** (→ p. 140)
3	Binary inputs/outputs of B slaves, connected to AS-i master 1	→ **Slot 3 – Digital inputs/outputs of B slaves, AS-i master 1** (→ p. 141)
4	Binary inputs/outputs of B slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 4 – Digital inputs/outputs of B slaves, AS-i master 2** (→ p. 141)
5	Analogue inputs of up to 31 single or A slaves, connected to AS-i master 1	→ **Slot 5 – Analogue inputs on AS-i master 1** (→ p. 144)
6	Analogue inputs of up to 31 single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 6 – Analogue inputs on AS-i master 2** (→ p. 145)
7	Analogue outputs of up to 31 single or A slaves, connected to AS-i master 1	→ **Slot 7 – Analogue outputs on AS-i master 1** (→ p. 146)
8	Analogue outputs of up to 31 single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 8 – Analogue outputs on AS-i master 2** (→ p. 147)
9	Data from the device-internal PLC to the higher-level fieldbus controller	→ **Slot 9 – Inputs from AC1411/12 PLC** (→ p. 152)
10	Data from the device-internal PLC to the higher-level fieldbus controller	→ **Slot 10 – Inputs from AC1411/12 PLC** (→ p. 153)
11	Data from the higher-level fieldbus controller to the device-internal PLC	→ **Slot 11 – Outputs to AC1411/12 PLC** (→ p. 154)>
12	Data from the higher-level fieldbus controller to the device-internal PLC	→ **Slot 12 – Outputs to AC1411/12 PLC** (→ p. 155)

Slot 1 – Digital inputs/outputs of single/A slaves, AS-i master 1

8743

Slot	Description	Value range	Length [bytes]
1	Digital inputs/outputs of single or A slaves, connected to AS-i master 1	S/A slaves 01…07 AS-i 1 = S/A slaves 1 to 7 of AS-i master 1	4
		S/A slaves 01…15 AS-i 1 = S/A slaves 1 to 15 of AS-i master 1	8
		S/A slaves 01…23 AS-i 1 = S/A slaves 1 to 23 of AS-i master 1	12
		all S/A slaves AS-i 1 = all S/A slaves of AS-i master 1	16

In each 4-byte data block, the data of 8 AS-i slaves is transmitted (→ **Mapping of the digital input/output data** (→ p. 142)).

Slot 2 – Digital inputs/outputs of single/A slaves, AS-i master 2

8745

Slot	Description	Value range	Length [bytes]
2	Digital inputs/outputs of single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	S/A slaves 01…07 AS-i 2 = S/A slaves 1 to 7 of AS-i master 2	4
		S/A slaves 01…15 AS-i 2 = S/A slaves 1 to 15 of AS-i master 2	8
		S/A slaves 01…23 AS-i 2 = S/A slaves 1 to 23 of AS-i master 2	12
		all S/A slaves AS-i 2 = all S/A slaves of AS-i master 2	16

In each 4-byte data block, the data of 8 AS-i slaves is transmitted (→ **Mapping of the digital input/output data** (→ p. 142)).

Slot 3 – Digital inputs/outputs of B slaves, AS-i master 1

8748

Slot	Description	Value range	Length [bytes]
3	Digital inputs/outputs of B slaves, connected to AS-i master 1	B-slaves 01…07 AS-i 1 = B slaves 1 to 7 of AS-i master 1	4
		B-slaves 01…15 AS-i 1 = B slaves 1 to 15 of AS-i master 1	8
		B-slaves 01…23 AS-i 1 = B slaves 1 to 23 of AS-i master 1	12
		all B slaves AS-i 1 = all B slaves of AS-i master 1	16

In each 4-byte data block, the data of 8 AS-i slaves is transmitted (→ **Mapping of the digital input/output data** (→ p. 142)).

Slot 4 – Digital inputs/outputs of B slaves, AS-i master 2

8749

Slot	Description	Value range	Length [bytes]
4	Digital inputs/outputs of B slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	B-slaves 01…07 AS-i 2 = B slaves 1 to 7 of AS-i master 2	4
		B-slaves 01…15 AS-i 2 = B slaves 1 to 15 of AS-i master 2	8
		B-slaves 01…23 AS-i 2 = B slaves 1 to 23 of AS-i master 2	12
		all B slaves AS-i 2 = all B slaves of AS-i master 2	16

In each 4-byte data block, the data of 8 AS-i slaves is transmitted (→ **Mapping of the digital input/output data** (→ p. 142)).

Mapping of the digital input/output data

8747

The following table shows in which area of a byte the input/output data of each slave are transmitted.

Byte no.	Bits 4...7	Bits 0...3	Content			
			S/A slaves 01...07 B slaves 01...07	S/A slaves 01...15 B slaves 01...15	S/A slaves 01...23 B slaves 01...23	all S/A slaves all B slaves
1	Master flags[1] Master flags	Slave 1(A) Slave 1B	X	X	X	X
2	Slave 2(A) Slave 2B	Slave 3(A) Slave 3B	X	X	X	X
3	Slave 4(A) Slave 4B	Slave 5(A) Slave 5B	X	X	X	X
4	Slave 6(A) Slave 6B	Slave 7(A) Slave 7B	X	X	X	X
5	Slave 8(A) Slave 8B	Slave 9(A) Slave 9B		X	X	X
6	Slave 10(A) Slave 10B	Slave 11(A) Slave 11B		X	X	X
7	Slave 12(A) Slave 12B	Slave 13(A) Slave 13B		X	X	X
8	Slave 14(A) Slave 14B	Slave 15(A) Slave 15B		X	X	X
9	Slave 16(A) Slave 16B	Slave 17(A) Slave 17B			X	X
10	Slave 18(A) Slave 18B	Slave 19(A) Slave 19B			X	X
11	Slave 20(A) Slave 20B	Slave 21(A) Slave 21B			X	X
12	Slave 22(A) Slave 22B	Slave 23(A) Slave 23B			X	X
13	Slave 24(A) Slave 24B	Slave 25(A) Slave 25B				X
14	Slave 26(A) Slave 26B	Slave 27(A) Slave 27B				X
15	Slave 28(A) Slave 28 B	Slave 29(A) Slave 29B				X
16	Slave 30(A) Slave 30B	Slave 31(A) Slave 31B				X

Legend:

[1] ... The master flags (M flags) are only transmitted in the digital input data (→ **Table: Master flags** (→ p. 143)).

Table: Master flags

8744

Bits 4...7 of the first byte of the digital input data contain the master flags. They provide information on the operating state of the AS-i master.

Bit 7	Bit 6	Bit 5	Bit 4
AS-i power fail (19 V)	Configuration error in the AS-i system	AS-i master is offline	Periphery fault

In the digital output data, bits 4...7 have no relevance and are not evaluated!

Slot 5 – Analogue inputs on AS-i master 1

11173

Slot	Description	Value range	Length [words]
5	Analogue inputs of up to 31 single or A slaves, connected to AS-i master 1 1 / 2 / 4 words per AS-i slave or 1 word per A/B slave (→ **Configuration of the analogue channels in slots 5 ... 8** (→ p. 148)) Define the number of analogue channels and the slave number by means of the device parameters. Analogue input data is transferred via the modules in slot 5. Each input value is transmitted as a 16-bit value. The "valid" and "overflow" flags that each analogue AS-i input slave provides for each channel are NOT represented here.	No analogue IN = module is deactivated	0
		004 words = 4 words analogue inputs	4
		008 words = 8 words analogue inputs	8
		012 words = 12 words analogue inputs	12
		016 words = 16 words analogue inputs	16
		020 words = 20 words analogue inputs	20
		024 words = 24 words analogue inputs	24
		028 words = 28 words analogue inputs	28
		032 words = 32 words analogue inputs	32
		036 words = 36 words analogue inputs	36
		040 words = 40 words analogue inputs	40
		044 words = 44 words analogue inputs	44
		048 words = 48 words analogue inputs	48
		052 words = 52 words analogue inputs	52
		056 words = 56 words analogue inputs	56
		060 words = 60 words analogue inputs	60

The **Table: Fixed slave assignment for slots 5...8** (→ p. 149) shows the data image for setting the parameter.

Slot 6 – Analogue inputs on AS-i master 2

11174

Slot	Description	Value range	Length [words]
6	Analogue inputs of up to 31 single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters) 1 / 2 / 4 words per AS-i slave or 1 word per A/B slave (→ **Configuration of the analogue channels in slots 5 ... 8** (→ p. 148)) Define the number of analogue channels and the slave number by means of the device parameters. Analogue input data is transferred via the modules in slot 6. Each input value is transmitted as a 16-bit value. The "valid" and "overflow" flags that each analogue AS-i input slave provides for each channel are NOT represented here.	No analogue IN	0
		004 words = 4 words analogue inputs	4
		008 words = 8 words analogue inputs	8
		012 words = 12 words analogue inputs	12
		016 words = 16 words analogue inputs	16
		020 words = 20 words analogue inputs	20
		024 words = 24 words analogue inputs	24
		028 words = 28 words analogue inputs	28
		032 words = 32 words analogue inputs	32
		036 words = 36 words analogue inputs	36
		040 words = 40 words analogue inputs	40
		044 words = 44 words analogue inputs	44
		048 words = 48 words analogue inputs	48
		052 words = 52 words analogue inputs	52
		056 words = 56 words analogue inputs	56
		060 words = 60 words analogue inputs	60

The **Table: Fixed slave assignment for slots 5...8** (→ p. 149) shows the data image for setting the parameter.

Slot 7 – Analogue outputs on AS-i master 1

11175

Slot	Description	Value range	Length [words]
7	Analogue outputs of up to 31 single or A slaves, connected to AS-i master 1 1 / 2 / 4 words per AS-i slave or 1 word per A/B slave (→ **Configuration of the analogue channels in slots 5 ... 8** (→ p. 148)) Define the number of analogue channels and the slave number by means of the device parameters. Analogue output data is transferred via the modules in slot 7. Each output value is transmitted as a 16-bit value.	No analogue outputs = module is deactivated	0
		004 words = 4 words analogue outputs	4
		008 words = 8 words analogue outputs	8
		012 words = 12 words analogue outputs	12
		016 words = 16 words analogue outputs	16
		020 words = 20 words analogue outputs	20
		024 words = 24 words analogue outputs	24
		028 words = 28 words analogue outputs	28
		032 words = 32 words analogue outputs	32
		036 words = 36 words analogue outputs	36
		040 words = 40 words analogue outputs	40
		044 words = 44 words analogue outputs	44
		048 words = 48 words analogue outputs	48
		052 words = 52 words analogue outputs	52
		056 words = 56 words analogue outputs	56
		060 words = 60 words analogue outputs	60

The **Table: Fixed slave assignment for slots 5...8** (→ p. 149) shows the data image for setting the parameter.

Slot 8 – Analogue outputs on AS-i master 2

11176

Slot	Description	Value range	Length [words]
8	Analogue outputs of up to 31 single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters) 1 / 2 / 4 words per AS-i slave or 1 word per A/B slave (→ **Configuration of the analogue channels in slots 5 ... 8** (→ p. 148)) Define the number of analogue channels and the slave number by means of the device parameters. Analogue output data is transferred via the modules in slot 8. Each output value is transmitted as a 16-bit value.	No analogue outputs = module is deactivated	0
		004 words = 4 words analogue outputs	4
		008 words = 8 words analogue outputs	8
		012 words = 12 words analogue outputs	12
		016 words = 16 words analogue outputs	16
		020 words = 20 words analogue outputs	20
		024 words = 24 words analogue outputs	24
		028 words = 28 words analogue outputs	28
		032 words = 32 words analogue outputs	32
		036 words = 36 words analogue outputs	36
		040 words = 40 words analogue outputs	40
		044 words = 44 words analogue outputs	44
		048 words = 48 words analogue outputs	48
		052 words = 52 words analogue outputs	52
		056 words = 56 words analogue outputs	56
		060 words = 60 words analogue outputs	60

The **Table: Fixed slave assignment for slots 5...8** (→ p. 149) shows the data image for setting the parameter.

Configuration of the analogue channels in slots 5 ... 8

11178

Depending on the setting of the device-specific parameters [Analogue channels per input slave] and [Analogue channels per output slave], the following analogue channels are transmitted per AS-i slave:

Parameter value	Description
`4 channels`	**Variable slave assignment** The analogue channels of max. 30 slave addresses are transmitted: of single slaves: channels 1...4 or: of A slaves: channels 1+2 and of B slaves: channels 1+2 The device-specific parameters of the device allow you to individually define the order of 15 of the analogue slaves to be transferred, respectively. All available slave addresses of both AS-i masters can be selected (→ **Table: Variable slave assignment for slots 5 ... 8** (→ p. 151)). Preset, variable: - for slots 5...8 respectively: 15 slaves on AS-i master 1
`2 channels`	**Fixed slave assignment** The following analogue channels of each transferring AS-i single and A address are transmitted: of single slaves: channels 1+2 or: of A slaves: channels 1+2 The slave assignment is fixed (→ **Table: Fixed slave assignment for slots 5...8** (→ p. 149)). A configuration of the slave order in the device-specific parameters is ineffective.
`1 channel`	**Fixed slave assignment** Channel 1 of each AS-i single and A address is transferred: of single slaves: channel 1 or: of A slaves: channel 1 The slave assignment is fixed (→ **Table: Fixed slave assignment for slots 5...8** (→ p. 149)). A configuration of the slave order in the device-specific parameters is ineffective.
`1 channel A/B-Slave`	**Fixed slave assignment** The following analogue channels of each transferring slave address are transmitted: of single slaves: channels 1+3 or: of A slaves: channel 1 and of B slaves: channel 1 The slave assignment is fixed (→ **Table: Fixed slave assignment for slots 5...8** (→ p. 149)). A configuration of the slave order in the device-specific parameters is ineffective.

Table: Fixed slave assignment for slots 5...8

11177

Word	Setting in the PROFIBUS device parameters for the following slave addresses			
	2 channels	1 channel	1 channel per A/B slave	
1	slave 1(A) / channel 1	slave 1(A) / channel 1	slave 1 / channel 1	slave 1A / channel 1
2	slave 1(A) / channel 2	slave 2(A) / channel 1	slave 1 / channel 3	slave 1B / channel 1
3	slave 2(A) / channel 1	slave 3(A) / channel 1	slave 2 / channel 1	slave 2A / channel 1
4	slave 2(A) / channel 2	slave 4(A) / channel 1	slave 2 / channel 3	slave 2B / channel 1
5	slave 3(A) / channel 1	slave 5(A) / channel 1	slave 3 / channel 1	slave 3A / channel 1
6	slave 3(A) / channel 2	slave 6(A) / channel 1	slave 3 / channel 3	slave 3B / channel 1
7	slave 4(A) / channel 1	slave 7(A) / channel 1	slave 4 / channel 1	slave 4A / channel 1
8	slave 4(A) / channel 2	slave 8(A) / channel 1	slave 4 / channel 3	slave 4B / channel 1
9	slave 5(A) / channel 1	slave 9(A) / channel 1	slave 5 / channel 1	slave 5A / channel 1
10	slave 5(A) / channel 2	slave 10(A) / channel 1	slave 5 / channel 3	slave 5B / channel 1
11	slave 6(A) / channel 1	slave 11(A) / channel 1	slave 6 / channel 1	slave 6A / channel 1
12	slave 6(A) / channel 2	slave 12(A) / channel 1	slave 6 / channel 3	slave 6B / channel 1
13	slave 7(A) / channel 1	slave 13(A) / channel 1	slave 7/ channel 1	slave 7A / channel 1
14	slave 7(A) / channel 2	slave 14(A) / channel 1	slave 7 / channel 3	slave 7B / channel 1
15	slave 8(A) / channel 1	slave 15(A) / channel 1	slave 8 / channel 1	slave 8A / channel 1
16	slave 8(A) / channel 2	slave 16(A) / channel 1	slave 8 / channel 3	slave 8B / channel 1
17	slave 9(A) / channel 1	slave 17(A) / channel 1	slave 9 / channel 1	slave 9A / channel 1
18	slave 9(A) / channel 2	slave 18(A) / channel 1	slave 9 / channel 3	slave 9B / channel 1
19	slave 10(A) / channel 1	slave 19(A) / channel 1	slave 10 / channel 1	slave 10A / channel 1
20	slave 10(A) / channel 2	slave 20(A) / channel 1	slave 10 / channel 3	slave 10B / channel 1
21	slave 11(A) / channel 1	slave 21(A) / channel 1	slave 11 / channel 1	slave 11A / channel 1
22	slave 11(A) / channel 2	slave 22(A) / channel 1	slave 11 / channel 3	slave 11B / channel 1
23	slave 12(A) / channel 1	slave 23(A) / channel 1	slave 12 / channel 1	slave 12A / channel 1
24	slave 12(A) / channel 2	slave 24(A) / channel 1	slave 12 / channel 3	slave 12B / channel 1
25	slave 13(A) / channel 1	slave 25(A) / channel 1	slave 13 / channel 1	slave 13A / channel 1
26	slave 13(A) / channel 2	slave 26(A) / channel 1	slave 13 / channel 3	slave 13B / channel 1
27	slave 14(A) / channel 1	slave 27(A) / channel 1	slave 14 / channel 1	slave 14A / channel 1
28	slave 14(A) / channel 2	slave 28(A) / channel 1	slave 14 / channel 3	slave 14B / channel 1
29	slave 15(A) / channel 1	slave 29(A) / channel 1	slave 15 / channel 1	slave 15A / channel 1
30	slave 15(A) / channel 2	slave 30(A) / channel 1	slave 15 / channel 3	slave 15B / channel 1
31	slave 16(A) / channel 1	slave 31(A) / channel 1	slave 16 / channel 1	slave 16A / channel 1
32	slave 16(A) / channel 2	0	slave 16 / channel 3	slave 16B / channel 1
33	slave 17(A) / channel 1	0	slave 17 / channel 1	slave 17A / channel 1
34	slave 17(A) / channel 2	0	slave 17 / channel 3	slave 17B / channel 1
35	slave 18(A) / channel 1	0	slave 18 / channel 1	slave 18A / channel 1
36	slave 18(A) / channel 2	0	slave 18 / channel 3	slave 18B / channel 1
37	slave 19(A) / channel 1	0	slave 19 / channel 1	slave 19A / channel 1

Word	Setting in the PROFIBUS device parameters for the following slave addresses			
	2 channels	1 channel	1 channel per A/B slave	
38	slave 19(A) / channel 2	0	slave 18 / channel 3	slave 19B / channel 1
39	slave 20(A) / channel 1	0	slave 20 / channel 1	slave 20A / channel 1
40	slave 20(A) / channel 2	0	slave 20 / channel 3	slave 20B / channel 1
41	slave 21(A) / channel 1	0	slave 21 / channel 1	slave 21A / channel 1
42	slave 21(A) / channel 2	0	slave 21 / channel 3	slave 21B / channel 1
43	slave 22(A) / channel 1	0	slave 22 / channel 1	slave 22A / channel 1
44	slave 22(A) / channel 2	0	slave 22 / channel 3	slave 22B / channel 1
45	slave 23(A) / channel 1	0	slave 23 / channel 1	slave 23A / channel 1
46	slave 23(A) / channel 2	0	slave 23 / channel 3	slave 23B / channel 1
47	slave 24(A) / channel 1	0	slave 24 / channel 1	slave 24A / channel 1
48	slave 24(A) / channel 2	0	slave 24 / channel 3	slave 24B / channel 1
49	slave 25(A) / channel 1	0	slave 25 / channel 1	slave 25A / channel 1
50	slave 25(A) / channel 2	0	slave 25 / channel 3	slave 25B / channel 1
51	slave 26(A) / channel 1	0	slave 26 / channel 1	slave 26A / channel 1
52	slave 26(A) / channel 2	0	slave 26 / channel 3	slave 26B / channel 1
53	slave 27(A) / channel 1	0	slave 27 / channel 1	slave 27A / channel 1
54	slave 27(A) / channel 2	0	slave 27 / channel 3	slave 27B / channel 1
55	slave 28(A) / channel 1	0	slave 28 / channel 1	slave 28A / channel 1
56	slave 28(A) / channel 2	0	slave 28 / channel 3	slave 28B / channel 1
57	slave 29(A) / channel 1	0	slave 29 / channel 1	slave 29A / channel 1
58	slave 29(A) / channel 2	0	slave 29 / channel 3	slave 29B / channel 1
59	slave 30(A) / channel 1	0	slave 30 / channel 1	slave 30A / channel 1
60	slave 30(A) / channel 2	0	slave 30 / channel 3	slave 30B / channel 1

Table: Variable slave assignment for slots 5 ... 8

8765

The following table shows the structure of the data image to set the parameter:

- `Analogue channels per input slave = 4`
- `Analogue channels per output slave = 4`

Word Offset-Nr.	Content of the transferred word for parameter setting = `4 channels`
n	Mx / slave m(A) / channel
n+1	Mx / slave m(A) / channel
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 = for setting 4 words ... 15 = for setting 60 words
x ...	1 = AS-i master 1 2 = AS-i master 2
m ...	Numeric part of the selected AS-i slave address

Slot 9 – Inputs from AC1411/12 PLC

10251

Slot	Description	Value range	Length [words]
9	Data from the device-internal PLC to the PROFIBUS PLC	Empty module = module is deactivated	0
		004 words = 4 words AC1411/12 PLC >> fieldbus PLC	4
		008 words = 8 words AC1411/12 PLC >> fieldbus PLC	8
		012 words = 12 words AC1411/12 PLC >> fieldbus PLC	12
		016 words = 16 words AC1411/12 PLC >> fieldbus PLC	16
		020 words = 20 words AC1411/12 PLC >> fieldbus PLC	20
		024 words = 24 words AC1411/12 PLC >> fieldbus PLC	24
		028 words = 28 words AC1411/12 PLC >> fieldbus PLC	28
		032 words = 32 words AC1411/12 PLC >> fieldbus PLC	32
		036 words = 36 words AC1411/12 PLC >> fieldbus PLC	36
		040 words = 40 words AC1411/12 PLC >> fieldbus PLC	40
		044 words = 44 words AC1411/12 PLC >> fieldbus PLC	44
		048 words = 48 words AC1411/12 PLC >> fieldbus PLC	48
		052 words = 52 words AC1411/12 PLC >> fieldbus PLC	52
		056 words = 56 words AC1411/12 PLC >> fieldbus PLC	56
		060 words = 60 words AC1411/12 PLC >> fieldbus PLC	60

Slot 10 – Inputs from AC1411/12 PLC

10254

Slot	Description	Value range	Length [words]
10	Data from the device-internal PLC to the PROFIBUS PLC	Empty module = module is deactivated	0
		004 words = 4 words AC1411/12 PLC >> fieldbus PLC	4
		008 words = 8 words AC1411/12 PLC >> fieldbus PLC	8
		012 words = 12 words AC1411/12 PLC >> fieldbus PLC	12
		016 words = 16 words AC1411/12 PLC >> fieldbus PLC	16
		020 words = 20 words AC1411/12 PLC >> fieldbus PLC	20
		024 words = 24 words AC1411/12 PLC >> fieldbus PLC	24
		028 words = 28 words AC1411/12 PLC >> fieldbus PLC	28
		032 words = 32 words AC1411/12 PLC >> fieldbus PLC	32
		036 words = 36 words AC1411/12 PLC >> fieldbus PLC	36
		040 words = 40 words AC1411/12 PLC >> fieldbus PLC	40
		044 words = 44 words AC1411/12 PLC >> fieldbus PLC	44
		048 words = 48 words AC1411/12 PLC >> fieldbus PLC	48
		052 words = 52 words AC1411/12 PLC >> fieldbus PLC	52
		056 words = 56 words AC1411/12 PLC >> fieldbus PLC	56
		060 words = 60 words AC1411/12 PLC >> fieldbus PLC	60

Slot 11 – Outputs to AC1411/12 PLC

15757

Slot	Description	Value range	Length [words]
11	Data from the PROFIBUS PLC to the device-internal PLC	Empty module = module is deactivated	0
		004 words = 4 words fieldbus PLC >> AC1411/12 PLC	4
		008 words = 8 words fieldbus PLC >> AC1411/12 PLC	8
		012 words = 12 words fieldbus PLC >> AC1411/12 PLC	12
		016 words = 16 words fieldbus PLC >> AC1411/12 PLC	16
		020 words = 20 words fieldbus PLC >> AC1411/12 PLC	20
		024 words = 24 words fieldbus PLC >> AC1411/12 PLC	24
		028 words = 28 words fieldbus PLC >> AC1411/12 PLC	28
		032 words = 32 words fieldbus PLC >> AC1411/12 PLC	32
		036 words = 36 words fieldbus PLC >> AC1411/12 PLC	36
		040 words = 40 words fieldbus PLC >> AC1411/12 PLC	40
		044 words = 44 words fieldbus PLC >> AC1411/12 PLC	44
		048 words = 48 words fieldbus PLC >> AC1411/12 PLC	48
		052 words = 52 words fieldbus PLC >> AC1411/12 PLC	52
		056 words = 56 words fieldbus PLC >> AC1411/12 PLC	56
		060 words = 60 words fieldbus PLC >> AC1411/12 PLC	60

Slot 12 – Outputs to AC1411/12 PLC

17244

Slot	Description	Value range	Length [words]
12	Data from the PROFIBUS PLC to the device-internal PLC	Empty module = module is deactivated	0
		004 words = 4 words fieldbus PLC >> AC1411/12 PLC	4
		008 words = 8 words fieldbus PLC >> AC1411/12 PLC	8
		012 words = 12 words fieldbus PLC >> AC1411/12 PLC	12
		016 words = 16 words fieldbus PLC >> AC1411/12 PLC	16
		020 words = 20 words fieldbus PLC >> AC1411/12 PLC	20
		024 words = 24 words fieldbus PLC >> AC1411/12 PLC	24
		028 words = 28 words fieldbus PLC >> AC1411/12 PLC	28
		032 words = 32 words fieldbus PLC >> AC1411/12 PLC	32
		036 words = 36 words fieldbus PLC >> AC1411/12 PLC	36
		040 words = 40 words fieldbus PLC >> AC1411/12 PLC	40
		044 words = 44 words fieldbus PLC >> AC1411/12 PLC	44
		048 words = 48 words fieldbus PLC >> AC1411/12 PLC	48
		052 words = 52 words fieldbus PLC >> AC1411/12 PLC	52
		056 words = 56 words fieldbus PLC >> AC1411/12 PLC	56
		060 words = 60 words fieldbus PLC >> AC1411/12 PLC	60

PROFIBUS modules: compatibility mode AC1305/06/26

7266

Slot	Description	Detailed information
1	Digital inputs and outputs of single or A slaves, connected to AS-i master 1	→ **Slots 1...4 – Digital inputs/outputs on AS-i master 1/2** (→ p. 157)
2	Digital inputs and outputs of single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slots 1...4 – Digital inputs/outputs on AS-i master 1/2** (→ p. 157)
3	Digital inputs/outputs of B slaves, connected to AS-i master 1	→ **Slots 1...4 – Digital inputs/outputs on AS-i master 1/2** (→ p. 157)
4	Digital inputs/outputs of B slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slots 1...4 – Digital inputs/outputs on AS-i master 1/2** (→ p. 157)
5	Multiplexed analogue inputs of AS-i master 1/2	→ Note
6	Multiplexed analogue outputs of AS-i master 1/2	→ Note
7	Command channel (fieldbus)	→ Note
8	Data from the device-internal PLC to the higher-level fieldbus controller	→ **Slot 8 – Inputs from PLC** (→ p. 160)
9	Data of the higher-level fieldbus controller to the device-internal PLC	→ **Slot 9 – Outputs to AC14 PLC** (→ p. 161)
10	Analogue inputs of up to 15 AS-i slaves on AS-i master 1/2	→ **Slot 10 – Analogue inputs on AS-i master 1/2** (→ p. 162)
11	Analogue outputs of up to 15 AS-i slaves on AS-i master 1/2	→ **Slot 11 – Analogue outputs on AS-i master 1/2** (→ p. 163)
12	Command channel (host)	→ Note

The slots 5, 6, 7 and12 are not evaluated by AC1411/12.

- Data to the higher-level PROFIBUS PLC are set to "0".
- Data directed to AC1411/12 are rejected.

Slots 1...4 – Digital inputs/outputs on AS-i master 1/2

7248

The modules available and the mapping of the digital input data/output data to the slots 1 to 4 are equal to the modules and the mapping in compatibility mode "AC14".

Slot	Description	Detailed information
1	Digital inputs/outputs of single or A slaves, connected to AS-i master 1	→ **Slot 1 – Digital inputs/outputs of single/A slaves, AS-i master 1** (→ p. 140)
2	Digital inputs/outputs of single or A slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 2 – Digital inputs/outputs of single/A slaves, AS-i master 2** (→ p. 140)
3	Digital inputs/outputs of B slaves, connected to AS-i master 1	→ **Slot 3 – Digital inputs/outputs of B slaves, AS-i master 1** (→ p. 141)
4	Digital inputs/outputs of B slaves, connected to AS-i master 2 (only available for devices with 2 AS-i masters)	→ **Slot 4 – Digital inputs/outputs of B slaves, AS-i master 2** (→ p. 141)

The content of the master flags is different from the content of the masterflags in the compatibility mode "AC14" (→ **Table: Master flags** (→ p. 159))!

Mapping of the digital input/output data

7175

The following table shows in which area of a byte the input/output data of each slave are transmitted.

Byte no.	Bits 4...7	Bits 0...3	Content			
			S/A slaves 01...07 B slaves 01...07	S/A slaves 01...15 B slaves 01...15	S/A slaves 01...23 B slaves 01...23	all S/A slaves all B slaves
1	Master flags[1] Master flags	Slave 1(A) Slave 1B	X	X	X	X
2	Slave 2(A) Slave 2B	Slave 3(A) Slave 3B	X	X	X	X
3	Slave 4(A) Slave 4B	Slave 5(A) Slave 5B	X	X	X	X
4	Slave 6(A) Slave 6B	Slave 7(A) Slave 7B	X	X	X	X
5	Slave 8(A) Slave 8B	Slave 9(A) Slave 9B		X	X	X
6	Slave 10(A) Slave 10B	Slave 11(A) Slave 11B		X	X	X
7	Slave 12(A) Slave 12B	Slave 13(A) Slave 13B		X	X	X
8	Slave 14(A) Slave 14B	Slave 15(A) Slave 15B		X	X	X
9	Slave 16(A) Slave 16B	Slave 17(A) Slave 17B			X	X
10	Slave 18(A) Slave 18B	Slave 19(A) Slave 19B			X	X
11	Slave 20(A) Slave 20B	Slave 21(A) Slave 21B			X	X
12	Slave 22(A) Slave 22B	Slave 23(A) Slave 23B			X	X
13	Slave 24(A) Slave 24B	Slave 25(A) Slave 25B				X
14	Slave 26(A) Slave 26B	Slave 27(A) Slave 27B				X
15	Slave 28(A) Slave 28 B	Slave 29(A) Slave 29B				X
16	Slave 30(A) Slave 30B	Slave 31(A) Slave 31B				X

Legend:

[1] ... The master flags (M flags) are only transmitted in the digital input data (→ **Table: Master flags** (→ p. 159)).

Table: Master flags

18764

Bits 4...7 of the first byte of the digital input data contain the master flags. They provide information on the operating state of the AS-i master.

Bit 7	Bit 6	Bit 5	Bit 4
CODESYS-PLC has started and at least one application is active	Configuration error in the AS-i system	No AS-i slave detected	Peripheral fault

The bits 4...7 of the 1st byte of the digital output data contain control information for the diagnostic data:

Bit 7	Bit 6	Bit 5	Bit 4
reserved	reserved	Reset stored diagnostic data	Activate transfer of the stored diagnostic data

Slot 8 – Inputs from PLC

12476

Slot	Description	Value range	Length [words]
8	Data from the device-internal PLC to the PROFIBUS PLC	Empty module = Module is disabled	0
		001 byte = 1 byte from AC14 PLC to fieldbus PLC	0,5
		001 word = 1 word from AC14 PLC to fieldbus PLC	1
		002 words = 2 words AC1411/12 PLC >> fieldbus PLC	2
		004 words = 4 words AC1411/12 PLC >> fieldbus PLC	4
		008 words = 8 words AC1411/12 PLC >> fieldbus PLC	8
		016 words = 16 words AC1411/12 PLC >> fieldbus PLC	16
		032 words = 32 words AC1411/12 PLC >> fieldbus PLC	32
		064 words = 64 words AC1411/12 PLC >> fieldbus PLC	64

Slot 9 – Outputs to AC14 PLC

18706

Steck-platz	Beschreibung	Wertebereich	Länge [Worte]
9	Data from the PROFIBUS PLC to the device-internal PLC	Empty module = Module is disabled	0
		001 byte = 1 byte from fieldbus PLC to AC14 PLC	0,5
		001 word = 1 word from fieldbus PLC to AC14 PLC	1
		002 words = 2 words fieldbus PLC >> AC1411/12 PLC	2
		004 words = 4 words fieldbus PLC >> AC1411/12 PLC	4
		008 words = 8 words fieldbus PLC >> AC1411/12 PLC	8
		016 words = 16 words fieldbus PLC >> AC1411/12 PLC	16
		032 words = 32 words fieldbus PLC >> AC1411/12 PLC	32
		064 words = 64 words fieldbus PLC >> AC1411/12 PLC	64

Slot 10 – Analogue inputs on AS-i master 1/2

18742

Slot	Description	Value range	Length [words]
10	Analogue inputs of up to 15 AS-i slaves, connected to AS-i master 1 und AS-i master 2 4 words per AS-i slave; define slave numbers by means of the device parameters (→ **Configuration of the analogue channels in the slots 10...11** (→ p. 163)) Each input value is transmitted as a 16-bit value. The "valid" and "overflow" flags that each analogue AS-i input slave provides for each channel are NOT represented here.	No analogue IN = Module is disabled	0
		004 words = 4 words analogue inputs	4
		008 words = 8 words analogue inputs	8
		012 words = 12 words analogue inputs	12
		016 words = 16 words analogue inputs	16
		020 words = 20 words analogue inputs	20
		024 words = 24 words analogue inputs	24
		028 words = 28 words analogue inputs	28
		032 words = 32 words analogue inputs	32
		036 words = 36 words analogue inputs	36
		040 words = 40 words analogue inputs	40
		044 words = 44 words analogue inputs	44
		048 words = 48 words analogue inputs	48
		052 words = 52 words analogue inputs	52
		056 words = 56 words analogue inputs	56
		060 words = 60 words analogue inputs	60

Slot 11 – Analogue outputs on AS-i master 1/2

20319

Slot	Description	Value range	Length [words]
11	Analogue outputs of up to 15 AS-i slaves, connected to AS-i master 1and AS-i master 2 4 words per AS-i Slave; Define slave numbers by means of the device parameters. (→ **Configuration of the analogue channels in the slots 10...11** (→ p. 163)) Each output value is transmitted as a 16-bit value.	No analogue outputs = Module is disabled	0
		004 words = 4 words analogue outputs	4
		008 words = 8 words analogue outputs	8
		012 words = 12 words analogue outputs	12
		016 words = 16 words analogue outputs	16
		020 words = 20 words analogue outputs	20
		024 words = 24 words analogue outputs	24
		028 words = 28 words analogue outputs	28
		032 words = 32 words analogue outputs	32
		036 words = 36 words analogue outputs	36
		040 words = 40 words analogue outputs	40
		044 words = 44 words analogue outputs	44
		048 words = 48 words analogue outputs	48
		052 words = 52 words analogue outputs	52
		056 words = 56 words analogue outputs	56
		060 words = 60 words analogue outputs	60

Configuration of the analogue channels in the slots 10...11

8742

The device-specific parameters of the device allow you to individually define the order of 15 of the analogue slaves to be transferred, respectively. All available slave addresses of both AS-i masters can be selected (→ **Parameter data: compatibility mode AC1305/06/26** (→ p. 137)).

8.7.4 Acyclic data

9070

Acyclic data are transmitted via slot 0, subslot 1 (→ **Overview: Acyclic process data** (→ p. 164)).
The indices use the data structures of the following components:

- Acyclic data set (DS):
  → **Overview: acyclic data sets (DSx)** (→ p. 166)
- Fieldbus command channel:
  → **Overview: System commands** (→ p. 167)
  → **Overview: AS-i master commands** (→ p. 168)

Overview: Acyclic process data

8752

The indices on slot 0, subslot 1, are used as follows:

Index [dec]	From byte no. [dec]	To byte no. [dec]	Contents	DS	Access r = read w = write	Number of words
0	–	–	reserved for system start	–	–	–
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 LAS, LDS, LPF, LCE	DS9	r	16
40	0	7	M1 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 (1 byte per slave)	DS13	r	32
44	0	63	M1 output parameter image (1 byte per slave)	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
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

Index [dec]	**From byte no.** [dec]	**To byte no.** [dec]	**Contents**	**DS**	**Access** r = read w = write	**Number of words**
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 LAS, LDS, LPF, LCE	DS9	r	16
72	0	7	M2 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 (1 byte per slave)	DS13	r	32
76	0	63	M2 output parameter image (1 byte per slave)	DS14	r/w	32
78	0	131	M2 slave error counter, configuration error counter, AS-i cycle counter	DS15	r	66
79	0	23	M2 LCEMS, LCEAS, LDAE	DS17	r	12
94	0	239	M2 command request channel	–	r/w	120
95	0	239	M2 command reply channel	–	r	120

Legend:

DS = Acyclic data set (→ **Overview: acyclic data sets (DSx)** (→ p. 166))
M1 = AS-i master 1
M2 = AS-i master 2

Overview: acyclic data sets (DSx)

17035

Data record	Content	Access r = read w = write	Words
DS1	System information	r	26
DS2	Digital inputs of slaves 1(A)…31(A) and 1B…31B and master flags (Status AS-i master and exec.-ctl. flags and host flags)	r	36
DS3	Analogue inputs of slaves 1(A)…15(B)	r	75
DS4	Analogue inputs of slaves 16(A)…31(B)	r	80
DS5	Digitale outputs of slaves 1(A)…31(A) and 1B...31B	r/w	32
DS6	Analogue outputs of slaves 1(A)…15(B)	r/w	60
DS7	Analogue otputs of slaves 16(A)…31(B)	r/w	64
DS8	Statusflags of analogue output data of slaves 1(A)…31(A) and 1B…31B	r	32
DS9	Slave lists LAS, LDS, LPF, LCE	r	16
DS10	Slave list LPS	r	4
DS11	Actual Configuration data (CDI)	r	64
DS12	Projected Configuration data (PCD)	r	64
DS13	Image of input parameter	r	32
DS14	Image of output parameter	r/w	32
DS15	Slave error counter, configuration error counter, AS-i cycle counter	r	72
DS16	n.a.	–	–
DS17	AS-i master: Error lists LCEMS, LCEAS, LDAE	r	12
DS18	Fieldbus information (only available via CODESYS)	r	19
DS19	n.a.	–	–
DS20	n.a.	–	–

Detailed information about the acyclic data sets and the command interface is given in the supplement to the device manual of the AS-i gateway with Profibus slave interface (→ **Overview: User documentation for AC1411/12** (→ p. 6)).

Overview: System commands

11078

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 with Profibus slave interface (→ **Overview: User documentation for AC1411/12** (→ p. 6)).

Overview: AS-i master commands

7250

Comm. no. [hex]	Comm. no. [dec]	Description	Note
0001	1	Write parameters to a connected AS-i slave	
0003	3	Adopt and save currently connected AS-i slaves in the configuration (!) With this command the fieldbus connection is reset. The device must be rebooted!	ConfDataInput Slave → Projected Configuration Data and LDS → LPS
0004	4	Change the list of projected AS-i slaves (LPS)	
0005	5	set the operating mode of the AS-i master	
0006	6	readdress a connected AS-i slave	
0007	7	set the auto addressing mode of the AS-i master	
0009	9	change the extended ID code 1 in the connected AS-i slave	
000A	10	change PCD	
000D	13	AS-i master supply voltage, symmetry, earth fault	
0015	21	read ID string of an AS-i slave with profile S-7.4	slave profile S-7.4
001A	26	read AS-i master info	
001C	28	deactivation of the slave reset when changing to the protected mode	
0021	33	read diagnostic string of an AS-i slave with profile S-7.4	slave profile S-7.4
0022	34	read parameter string of an AS-i slave with profile S-7.4	slave profile S-7.4
0023	35	write parameter string of an AS-i slave with profile S-7.4	slave profile S-7.4
0024	36	CTT2 standard read: acyclic standard read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0025	37	CTT2 standard write: acyclic standard write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0026	38	CTT2 vendor specific read: acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0027	39	CTT2 vendor specific write: acyclic manufacturer-specific write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0040	64	CTT2 device group read: acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0041	65	CTT2 device group write: acyclic device group write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0042	66	CTT2 vendor specific selective read from buffer: selective standard read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0043	67	CTT2 vendor specific selective write from buffer: selective standard write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0044	68	CTT2 vendor specific selective read: selective manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0045	69	CTT2 vendor specific selective write: selective manufacturer-specific write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0046	70	CTT2 device group selective read: selective device group read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0047	71	CTT2 device group selective write: selective device group write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)

Comm. no. [hex]	Comm. no. [dec]	Description	Note
0049	73	CTT2 vendor specific exchange: manufacturer-specific data exchange with an AS-i slave with CTT2 profile	CTT2 slave profile *)
004A	74	CTT2 device group exchange: device group data exchange with an AS-i salve with CTT2 profile	CTT2 slave profile *)
004B	75	CTT2 device group selective read from buffer: manufacturer-specific read / write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
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** (→ p. 133)

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 with Profibus slave interface (→ **Overview: User documentation for AC1411/12** (→ p. 6)).

Step7 programmer's notes: call acyclic services

9215

In the projection software, standard function blocks are used for the acyclic data exchange between a PROFIBUS IO controller and the AC1411/12.

Siemens S7 controllers provide two standard function blocks:

- SFB52 RDREC for reading acyclic data
- SFB53 WRREC for writing acyclic data

For detailed information regarding SFB52 and SFB53: → operating instructions of the Siemens S7 controller!

Error codes of the acyclic services

16656

SFB52 and SFB53 provide a 32-bit value at their "Status" output which informs about any problems during processing. The error message is structured as follows:

Bits 31...24	Bits 23...16	Bits 15...8	Bits 7...0
Error code	Error decode	Error code 1	Error code 2

The following error messages for acyclic services have been implemented in the ifm device:

Error number [hex]	**Error name**	**Description**
8180 A200	PNIO_RW_APP_MODUL_FAILURE	Error when executing the command
8180 B100	PNIO_RW_WRITE_LENGTH_ERROR	Too many bytes to be written to the resource
8180 B600	PNIO_RW_ACCESS_DENIED	The access to a resource was blocked (e.g. outputs if not in the gateway mode)
8180 B700	PNIO_RW_ACCESS_INVALID_LENGTH	More bytes are to be read than are provided by the resource
8180 C300	PNIO_RW_RESOURCE_UNAVAILABLE	The resource does not provide any data
DE80 A900	IORDRES_RW_APP_FEATURE_UNSUPPORTED	The selected resource is not supported
DF80 B100	IOWRRES_RW_WRITE_LENGTH_ERROR	The number of bytes to be written is too high
DF80 B200	IOWRRES_RW_ACCESS_INVALID_SLOT	The selected slot is invalid

8.7.5 I&M data

Contents

8868

Data structures (= data records) have been defined for identification and maintenance (I&M) in this fieldbus. I&M0 is absolutely necessary for the certification.

I&M data is only supported by the following compatibility mode: AC14

I&M data addressing

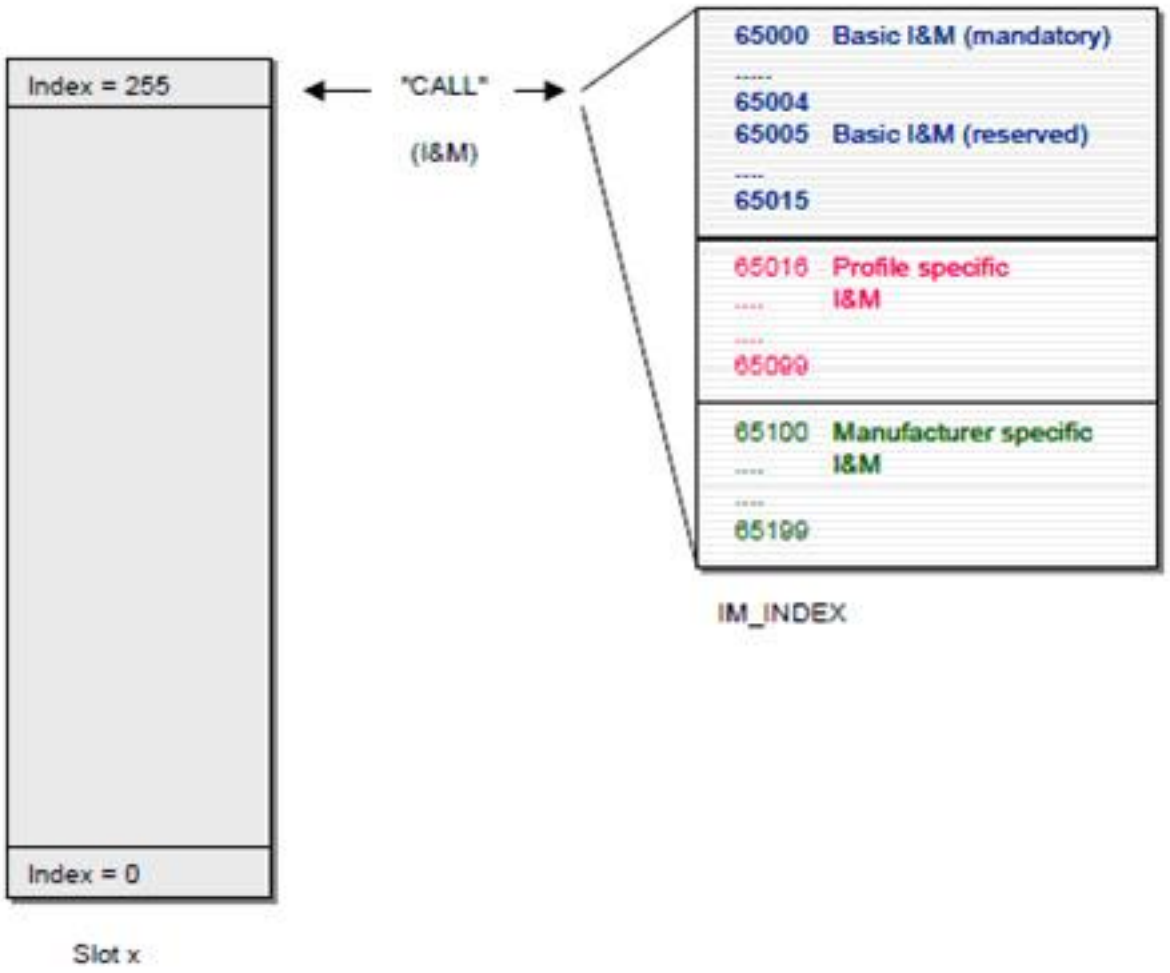
11202

Revision: 2011-11-16

The I&M data can be read from the device with the following addressing:

I&M	Slot / module	Sub-slot	IM_index [hex]	Length [bytes]	Read	Write	Absolutely necessary
I&M 0			FDE8	64	X	--	X

On index 255 another address window opens, the so-called FI index zone. In this zone the I&M data are between the FI indexes $FDE8_{16}$ and $FDEA_{16}$ (= 65 000...65 002_{10}). This area is called IM_index.



Graphic: Identification and Maintenance Functions, from: PNO, Profile Guidelines Part 1

I&M0 data

18524

I&M0 provide the user with device-specific basic information. This ensures reliable identification of the device, the device's hardware and software components, and the manufacturer.

Date	Bytes	Content	Description
Profibus block header	4	-	Profibus block header: 0x0800 = diagnosis channel 0xFDE8 = index I&M0
I&M0 header: manufacturer-specific	10		Not supported, filled with blanks (0x20)
MANUFACTURER_ID	2	310	Manufacturer ID of ifm
ORDER_ID	20	e.g. AC14xx	Device order number (ASCII characters) Unneeded characters are filled with 0x20 (blank)
SERIAL_NUMBER	16		12-character serial number of the device (ASCII) Unneeded characters are filled with 0x20 (blank)
HARDWARE_REVISION	2	e.g. AA	Device version (2 ASCII characters)
SOFTWARE_REVISION	4	e.g. V3.0.8	e.g. V3.0.8 Byte 0 = software type (char): V (= official release) Byte 1 = major version (uint8): 3 Byte 2 = major version (uint8): 0 Byte 3 = build version (uint8): 8
REVISION_COUNTER	2	0x0001...0xFFFF	Revision counter of the device. If changes are made to the device data, the revision counter is incremented. Changes to the device data are for example the installation of a new firmware or changed device parameters.
PROFILE_ID	2	0xF600	ID for generic device
PROFILE_SPECIFIC_TYPE	2	0x0003	Profile specific type „IO module“
IM_VERSION	2	1.0	The current version of the I&M data Byte 0 = major version (uint8): 1 Byte 1 = major version (uint8): 1
IM_SUPPORTED	2	0	Supported I&M data: I&M0

8.7.6 Fieldbus alarms

Contents

8871

Depending on the compatibility mode currently active the AC1411/12 supports the following diagnosis / alarm options.

DP/V0 diagnosis

7174

DP/V0 diagnosis is only supported by the following compatibility modes: AC1305/06/26
For information regarding the compatibility mode of the AC1411/12: → **Set compatibility mode** (→ p. 79)

Diagnostic structure

7173

In the compatibility mode AC1305/06/26, the AC1411/12 has the following diagnostic structure:

Byte	Content	Meaning
0	Station status 1	Standard diagnostics (→ Note)
1	Station status 2	
2	Station status 3	
3	Station number DP master	
4	Manufacturer ID (high byte) 0x04	
5	Manufacturer ID (low byte) 0xD8	
6	Length of the extended diagnostics (0x3A)	Header of the extended diagnostics
7	Status type: Status manufacturer-specific	
8	Slot number (0x04)	
9	0	
10, 11	Master flags	Diagnostics AS-i master 1 S/A and B slaves → **Master flags** (→ p. 176) → **Mapping of the AS-i slave addresses** (→ p. 176)
12...19	LDS: list of detected slaves	
20...27	LCE: list of configuration errors	
28...35	LPF: list of peripheral faults	
36, 37	Master flags	Diagnostics AS-i master 2 S/A and B slaves → **Master flags** (→ p. 176) → **Mapping of the AS-i slave addresses** (→ p. 176)
38...45	LDS: list of detected slaves	
46...53	LCE: list of configuration errors	
54...61	LPF: list of peripheral faults	
62...67	reserved	reserved

Via the device parameter "Extended PROFIBUS Diag." the user can set whether only the standard diagnostics (bytes 0...5) or the extended diagnostics (bytes 0...67) are used.

For information regarding the device parameters: → **Parameter data: compatibility mode AC1305/06/26** (→ p. 137)

Master flags

20579

The master flags are transmitted in the bytes 10 and 36.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
CTRL	Cerr	Offl	PF	APF	Sl0	ProjM	WdRS232

Legend:

CTRL .. PLC of AC1411/12 is in the RUN mode
Cerr ... AS-i configuration error
Offl ... AS-i master offline (no AS-i slave detected)
PF ... AS-i peripheral fault
APF ... AS-i voltage error
Sl0 ... AS-i slave with address 0 detected
ProjM ... AS-i master in projection mode
WdRS232 ... is not supported (=0)

Mapping of the AS-i slave addresses

20580

The AS-i slave addresses are mapped as follows in the lists LDS, LCE and LPF:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
(n+1)	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)
(n+2)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
(n+3)	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)
(n+4)	7B	6B	5B	4B	3B	2B	1B	--
(n+5)	15B	14B	13B	12B	11B	10B	9B	8B
(n+6)	23B	22B	21B	20B	19B	18B	17B	16B
(n+7)	31B	30B	29B	28B	27B	26B	25B	24B

Legend:

n = 12 (= LDS, AS-i master 1)
20 (= LCE, AS-i master 1)
28 (= LPF, AS-i master 1)
38 (= LDS, AS-i master 2)
46 (= LCE, AS-i master 2)
54 (= LPF, AS-i master 2)

DP/V1 alarms

11213

DP/V1 alarms are only supported by the following compatibility mode: AC14
For information regarding the compatibility mode of the AC1411/12: → **Set compatibility mode** (→ p. 79)

Alarm types

11214

Profibus DP/V1 knows 6 alarm types:

- diagnosis alarms
- process alarms
- pull-plug alarms
- status alarms
- update alarms
- manufacturer-specific alarms

The AC1411/12 device only supports the diagnosis alarms.

Diagnosis alarms

11216

The data block of a diagnosis alarm consists of the standard diagnosis and the extended diagnosis.
The standard diagnosis is automatically generated by netX and its size is always 6 bytes.
The extended diagnosis always contains one diagnosis alarm block of a size of max. 60 bytes according to the specification. The structure of the diagnosis alarm block is described below:

Diagnosis alarm block

11217

The diagnosis alarm block consists of:

- the 4-byte header and
- the diagnosis data

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	Block length					
2	0	Alarm type = diagnosis alarm = 000 0001_2						
3	Slot number = 00_{16}							
4	Sequence number = 0 0000_2					Add ack = 0	Alarm specifier	
5…60	Alarm data							

Header of the diagnosis alarm block

11218

Element	No. of bits	Contents [bin]	Description
Block length	6		Number of bytes of the diagnosis alarm block including the header (= alarm data + 4 bytes)
Alarm type	7	000 0001	Alarm type = diagnosis alarm
Slot number	8	0000 0000	Alarms are always transferred on the first slot.
Sequence number	5	0 0000	The sequencing mode is not used.
Add ack	1	0	Additional acknowledge = 0: The user does not have to acknowledge the fault.
Alarm specifier	2	01	Coming error: Device has one or several upcoming errors. This alarm can be sent several times if other errors are added or disappear but there still is at least one upcoming error.
		10	Leaving error: There is no longer any error in the device.

Notes on the comparison with Profinet:

- With Profinet the device diagnosis alarms are transferred to slot 0 which corresponds to the host.
- With Profibus the slots are indicated in the range from 0...254 which, however, corresponds to slots 1...255. Therefore the device diagnosis alarms are transferred to slot 1 in Profibus!
- In Profibus, only the slot numbers in the alarms are transferred. In Profibus there are no subslots and channels as in Profinet.

Alarm data in the diagnosis alarm block

11219

Device diagnosis (alarm data byte 5)

11220

Byte no.	Bit							
	7	6	5	4	3	2	1	0
5	--	--	--	--	PS	A	OT	ISE

Legend:

Alarm	Description	
MA	manual mode active	manual mode for output access is active
ISE	internal system error	internal device system error
OT	over temperature	temperature inside the device has exceeded the permissible max. temperature value
PS	PLC stop	the PLC was stopped (available only for devices with PLC)

AS-i diagnosis (alarm data bytes 6...9)

11221

Byte no.	Bit							
	7	6	5	4	3	2	1	0
6			M1-PF19	M1-PF22.5	M1-EF	M1-S0	M1-PM	M1-IME
7			-	M1-DAE	M1-PE	M1-CEIP	M1-CEAS	M1-CEMS
8			M2-PF19	M2-PF22.5	M2-EF	M2-S0	M2-PM	M2-IME
9			-	M2-DAE	M2-PE	M2-CEIP	M2-CEAS	M2-CEMS

Legend:
M1 ... AS-i master 1
M2 ... AS-i master 2

Alarm	Description	
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.
CEMS	configuration error – missing slave	AS-i configuration error: One or several slaves are projected but not available.
DAE	duplicate address error	One or several multiple-addressing faults occurred.
EF	earth fault	Earth fault was detected.
IME	internal master error	Internal system error of an AS-i master
PE	periphery error	One or several AS-i slaves have a periphery error.
PF19	19 V AS-i power fail	Failure of the Power24 supply was detected.
PF22.5	22.5 V AS-i power fail	Failure of the classic ASi power was detected.
PM	projection mode	AS-i master was set to the projection mode.
S0	slave 0 detected	New slave 0 was detected.

List of missing slaves (alarm data bytes 10...25)

11222

List of missing slaves causing a configuration error.
If at least 1 bit is set in this list, CEMS is also set.

Byte no.	Bit							
	7	6	5	4	3	2	1	0
10	M1-S7(A)	M1-S6(A)	M1-S5(A)	M1-S4(A)	M1-S3(A)	M1-S2(A)	M1-S1(A)	M1-S0
11	M1-S15(A)	M1-S14(A)	M1-S13(A)	M1-S12(A)	M1-S11(A)	M1-S10(A)	M1-S9(A)	M1-S8(A)
12	M1-S23(A)	M1-S22(A)	M1-S21(A)	M1-S20(A)	M1-S19(A)	M1-S18(A)	M1-S17(A)	M1-S16(A)
13	M1-S31(A)	M1-S30(A)	M1-S29(A)	M1-S28(A)	M1-S27(A)	M1-S26(A)	M1-S25(A)	M1-S24(A)
14	M1-S7B	M1-S6B	M1-S5B	M1-S4B	M1-S3B	M1-S2B	M1-S1B	---
15	M1-S15B	M1-S14B	M1-S13B	M1-S12B	M1-S11B	M1-S10B	M1-S9B	M1-S8B
16	M1-S23B	M1-S22B	M1-S21B	M1-S20B	M1-S19B	M1-S18B	M1-S17B	M1-S16B
17	M1-S31B	M1-S30B	M1-S29B	M1-S28B	M1-S27B	M1-S26B	M1-S25B	M1-S24B
18	M2-S7(A)	M2-S6(A)	M2-S5(A)	M2-S4(A)	M2-S3(A)	M2-S2(A)	M2-S1(A)	M2-S0
19	M2-S15(A)	M2-S14(A)	M2-S13(A)	M2-S12(A)	M2-S11(A)	M2-S10(A)	M2-S9(A)	M2-S8(A)
20	M2-S23(A)	M2-S22(A)	M2-S21(A)	M2-S20(A)	M2-S19(A)	M2-S18(A)	M2-S17(A)	M2-S16(A)
21	M2-S31(A)	M2-S30(A)	M2-S29(A)	M2-S28(A)	M2-S27(A)	M2-S26(A)	M2-S25(A)	M2-S24(A)
22	M2-S7B	M2-S6B	M2-S5B	M2-S4B	M2-S3B	M2-S2B	M2-S1B	---
23	M2-S15B	M2-S14B	M2-S13B	M2-S12B	M2-S11B	M2-S10B	M2-S9B	M2-S8B
24	M2-S23B	M2-S22B	M2-S21B	M2-S20B	M2-S19B	M2-S18B	M2-S17B	M2-S16B
25	M2-S31B	M2-S30B	M2-S29B	M2-S28B	M2-S27B	M2-S26B	M2-S25B	M2-S24B

Legend:

M1 ... AS-i master 1
M2 ... AS-i master 2

List of faulty slaves (alarm data bytes 26...41)

11223

List of the slaves or slave addresses causing an error:
- config. error (too many slaves),
- config. error (wrong profile),
- periphery fault,
- double addressing fault

Byte no.	Bit							
	7	6	5	4	3	2	1	0
26	M1-S7(A)	M1-S6(A)	M1-S5(A)	M1-S4(A)	M1-S3(A)	M1-S2(A)	M1-S1(A)	M1-S0
27	M1-S15(A)	M1-S14(A)	M1-S13(A)	M1-S12(A)	M1-S11(A)	M1-S10(A)	M1-S9(A)	M1-S8(A)
28	M1-S23(A)	M1-S22(A)	M1-S21(A)	M1-S20(A)	M1-S19(A)	M1-S18(A)	M1-S17(A)	M1-S16(A)
29	M1-S31(A)	M1-S30(A)	M1-S29(A)	M1-S28(A)	M1-S27(A)	M1-S26(A)	M1-S25(A)	M1-S24(A)
30	M1-S7B	M1-S6B	M1-S5B	M1-S4B	M1-S3B	M1-S2B	M1-S1B	---
31	M1-S15B	M1-S14B	M1-S13B	M1-S12B	M1-S11B	M1-S10B	M1-S9B	M1-S8B
32	M1-S23B	M1-S22B	M1-S21B	M1-S20B	M1-S19B	M1-S18B	M1-S17B	M1-S16B
33	M1-S31B	M1-S30B	M1-S29B	M1-S28B	M1-S27B	M1-S26B	M1-S25B	M1-S24B
34	M2-S7(A)	M2-S6(A)	M2-S5(A)	M2-S4(A)	M2-S3(A)	M2-S2(A)	M2-S1(A)	M2-S0
35	M2-S15(A)	M2-S14(A)	M2-S13(A)	M2-S12(A)	M2-S11(A)	M2-S10(A)	M2-S9(A)	M2-S8(A)
36	M2-S23(A)	M2-S22(A)	M2-S21(A)	M2-S20(A)	M2-S19(A)	M2-S18(A)	M2-S17(A)	M2-S16(A)
37	M2-S31(A)	M2-S30(A)	M2-S29(A)	M2-S28(A)	M2-S27(A)	M2-S26(A)	M2-S25(A)	M2-S24(A)
38	M2-S7B	M2-S6B	M2-S5B	M2-S4B	M2-S3B	M2-S2B	M2-S1B	---
39	M2-S15B	M2-S14B	M2-S13B	M2-S12B	M2-S11B	M2-S10B	M2-S9B	M2-S8B
40	M2-S23B	M2-S22B	M2-S21B	M2-S20B	M2-S19B	M2-S18B	M2-S17B	M2-S16B
41	M2-S31B	M2-S30B	M2-S29B	M2-S28B	M2-S27B	M2-S26B	M2-S25B	M2-S24B

Legend:

M1 ... AS-i master 1
M2 ... AS-i master 2

Safety messages (alarm data bytes 42...60)

11224

Byte no.	Bit							
	7	6	5	4	3	2	1	0
42...60	reserved							

Step7 programmer's notes

8888

Diagnostics alarm procedure:

1. As soon as a device has detected a diagnostics alarm, the alarm is automatically forwarded to the fieldbus controller.
2. When a diagnostics alarm arrives in the fieldbus controller, an interrupt of the cyclic program (OB1) processing is automatically generated.
3. In this case the Simatic operating system calls the OB82 (diagnostics alarm OB) which allows specific alarm processing.

The incoming and outgoing diagnostics alarms are signalled via OB82.

► Create OB82 (can be empty).

> If OB82 does not exist, the S7 goes into the STOP state at each alarm.

► The LED [SF] on the S7 starts to light at the first incoming alarm and goes out with the last outgoing alarm.

8.8 OSC messages

Contents

18959

This section contains information about the messages for events, warnings and faults of the AC1411/12.

8.8.1 OSC messages: System

14284

Message	Type	Corrective measures
An internal device error was detected <Fehlernummer>	Error	► Note the message and contact the ifm service center
Permitted temperature limit value inside the device was exceeded (<xxx.x> °C)	Warning	► Check thermal conditions of the system environment
First operation after delivery	Event	not necessary
The output control was set to <Gateway,manuell,SPS>	Event	not necessary
System power-up completed, <SW-Version>	Event	not necessary
A system reset was requested manually	Event	not necessary
The user-specific message history was deleted.	Event	not necessary
The device was reset to factory settings via <HMI, Feldbus>.	Event	not necessary
PLC used for more than 10 hours.	Event	not necessary
The project <Name> was loaded.	Event	not necessary
The PLC was set to the operating mode <Projektierungsmodus, geschützter Betrieb>.	Event	not necessary
The firmware was updated from <FW-Version> to version <FW-Version>.	Event	not necessary
The settings of the fieldbus interface were modified	Event	not necessary
The fieldbus connection was established	Event	not necessary
The fieldbus connection was aborted	Event	not necessary
The IP settings of the configuration interface were changed	Event	not necessary

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

16029

Message	Type	Corrective measures
System errors: AS-i master <1,2>	Error	► Reboot the device If the error occurs again: ► Note the message and contact the ifm service center!
Earth fault: AS-i <1,2>	Error	► Check for earth fault of AC1411/12
Incorrect profile: AS-i <1,2>, slave <1(A)..31(A), 1B..31B> with profile <S-x.x.x> expected, but <S-y.y.y> found.	Error	► Check profile of the AS-i slave
Config error: AS-i <1,2>, slave <1(A)..31(A), 1B..31B> with the profile <S-x.x.x> missing	Error	► Check connections of the AS-i slave ► Reconnect AS-i slave
Config error: AS-i <1,2>, slave <1(A)..31(A), 1B..31B> with the profile <S-x.x.x> is available but not projected	Error	► Carry out projection process ([Quick setup] > [Project all])
Protocol error: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B> no data transmission	Error	► Improve the transmission quality on the AS-i line
Double address detected: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Error	► Remove an AS-i slave with a double address from the AS-i network ► Readdress the remaining AS-i slave ► Reconnect removed AS-i slave to the AS-i network
The automatic addressing is not activated for AS-i <1,2>.	Warning	► Activate automatic addressing ([AS-i1]/[AS-i2] > [Master setup])
A voltage drop of 19.0 V was detected on AS-i master <1,2>	Warning	► Check voltage supply of the device and replace if necessary
A voltage drop of 22.5 V was detected on AS-i master <1,2>	Warning	► Check voltage supply of the device and replace if necessary
Increased message error rate: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Warning	► Improve the transmission quality on the AS-i line
Peripheral fault: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>	Warning	► Check displayed AS-i slave
AS-i slave with address 0 cannot be automatically readdressed (wrong profile)	Warning	► Activate automatic addressing ([AS-i1]/[AS-i2] > [Master setup]
Manual output change: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>, value: <0..F, 0..32768>	Event	not necessary
Manual parameter change: AS-i <1, 2>, slave <1(A)..31(A), 1B..31B>, value: <0..F, 0..32768>	Event	not necessary
AS-i master <1,2> was switched to the <geschützten Betrieb,Projektierungsmodus>	Event	not necessary
AS-i projection process was carried out.	Event	not necessary
AS-i slave with the address 0 was detected	Event	not necessary

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