

ifm electronic



Operating instructions
AS-i controller_e

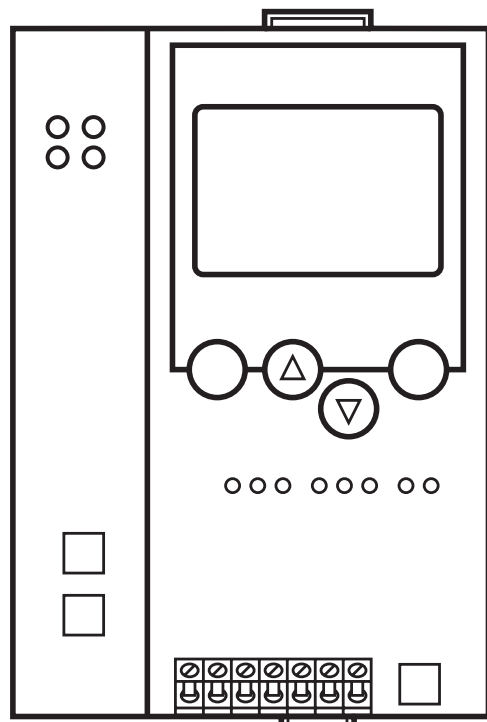
ecomat300[®]

AC1391

AC1392

UK

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1 Preliminary note



1.1 Notes on this document

This document applies to devices of the type "AS-i controller_e" (art. no.: AC1391 / AC1392). It is part of the device and contains information about the correct handling of the product.

This document is intended for qualified electricians. These specialists are people who are qualified by their training and their experience to see and to avoid possible hazards that may be caused during operation of the device.

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

1.2 Symbols used

- ▶ Instructions
- > Reaction, result
- [...] Designation of pushbuttons, buttons or indications
- Cross-reference
-  Important note
Non-compliance can result in malfunction or interference.
-  Information
Supplementary note

2 Safety instructions

2.1 General

- ▶ Observe these operating instructions.
- ▶ Adhere to the warning notes on the product.

Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or incorrect handling can affect the safety of operators and machinery.

2.2 Installation and connection

The device must only be installed, connected and put into operation by a qualified electrician as the safe function of the device and machinery is only guaranteed when installation is correctly carried out. The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the device.

2.3 Tampering with the device

Tampering with the device is not allowed and will lead to an exclusion of liability and warranty. Tampering with the device can affect the safety of operators and machinery.

- ▶ Do not open the device.
- ▶ Do not insert any objects into the device.
- ▶ Prevent metal foreign bodies from penetrating.

3 Functions and features

- The controller_e integrates one or two AS-i masters (AC1391 / AC1392, both in accordance with the AS-i version 3.0), a mini controller and two EtherCAT interface ports.
- It controls the exchange of data to the sensor / actuator level.
- It processes the peripheral data in the integrated processor (signal preprocessing).
- It works as stand-alone controller with exchange of data to the PC (visualisation).
- It communicates with the superior control level (EtherCAT).

3.1 Programming interface RS232C

- Baud rate 4800 to 115,200 baud
- Max. distance between controller_e and PC: 20 m
- Potential separation from the controller_e power supply
- Programming cable E70320 for connection to PC required

3.2 Ethernet Programming Interface

- EtherCAT
- RJ45, twisted pair

4 Installation

Fix the controller_e onto a 35 mm DIN rail which has an electrically safe ground connection. The protection rating of the unit is IP 20, therefore it should be mounted in a protected location (e.g. control cabinet).



Ensure a condensation-free environment. Avoid excessive dust, vibration and shock. The air circulation through the vents must not be impeded.

Avoid installation in direct vicinity of frequency inverters.

5 Electrical connection



Disconnect the installation from power. Connect the unit as indicated on the terminals.

Never connect the minus potentials to each other or the minus potentials to the FE connection.

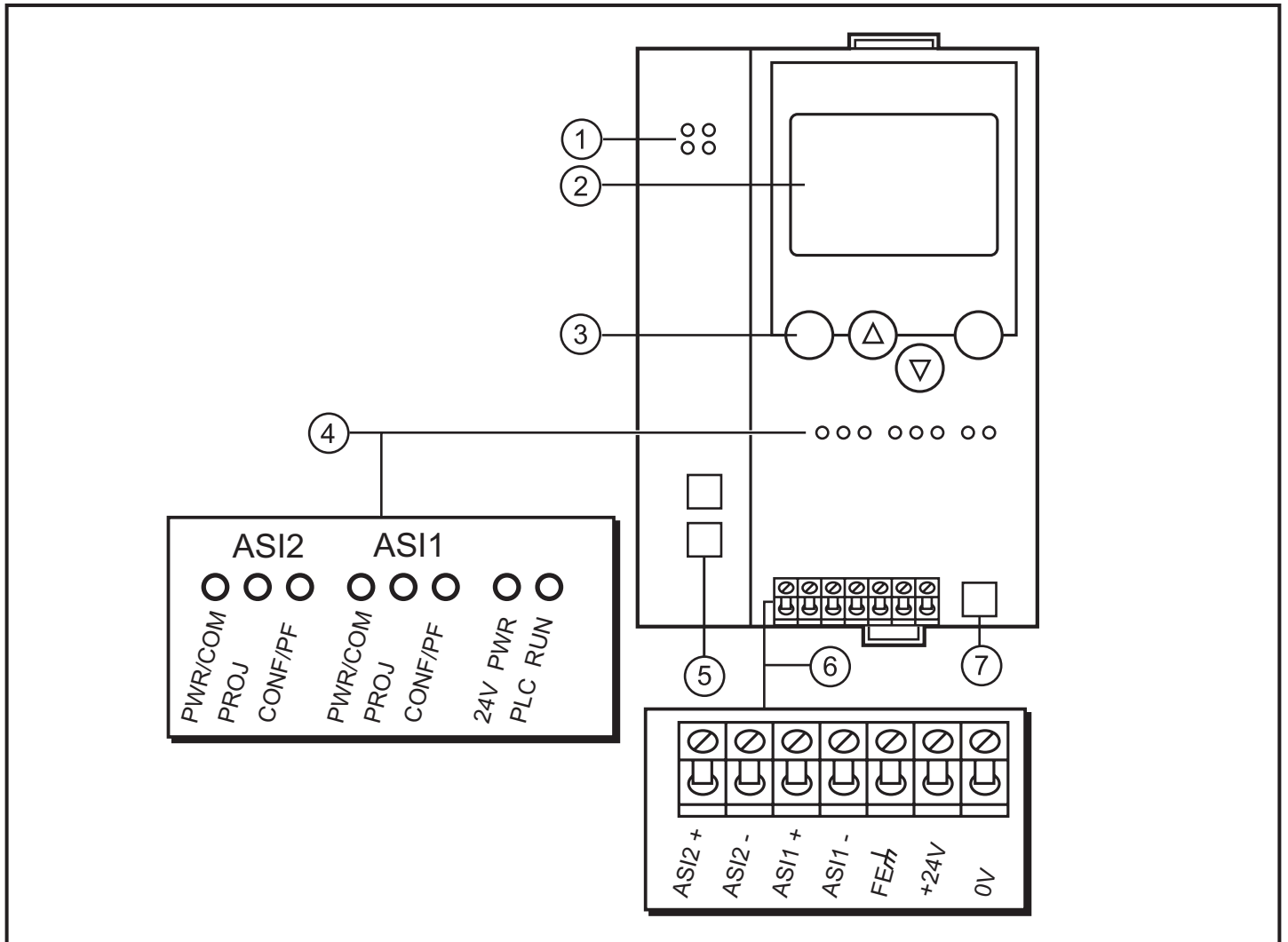
Ensure an electrically safe ground connection between AS-i controller_e (terminal FE) and ground of the unit.

Supply the controller_e with a 24 V DC voltage (20...30V PELV), e.g. from the 24 V power supply DN3011 from ifm electronic.

The connection is made to the terminals +24 V and 0 V.

6 Operating and display elements

6.1 LED indicators and pin connection



- 1: Status LEDs on the network connection
- 2: Display
- 3: Setting buttons
- 4: LEDs (ASI2 only with AC1392)
- 5: EtherCAT interfaces
- 6: Wiring
- 7: RS232C interface

6.1.1 LEDs

LED 24 V PWR green	
off	no 24 V voltage supply available
lights	24 V voltage supply available
LED PLC RUN yellow	
off	PLC in the operating mode "stop"
lights	PLC in the operating mode "run"

Information concerning the state of the master (AC1391) / masters (AC1392) and the connected system is given via three diagnostic LEDs on the controller_e.

6.1.2 Diagnostic LEDs

LED PWR/COM lights	AS-i voltage present, at least one slave was detected.
LED PWR/COM flashes	AS-i voltage present, but no slave was detected correctly.
LED PROJ lights	Projection mode active, the configuration monitoring is deactivated.
LED PROJ flashes	Projection mode active, changeover to protected mode not possible as a slave with the address 0 is connected.
LED CONF/PF lights	Projected and current configuration do not match.
LED CONF/PF flashes	Peripheral fault on at least one connected slave.

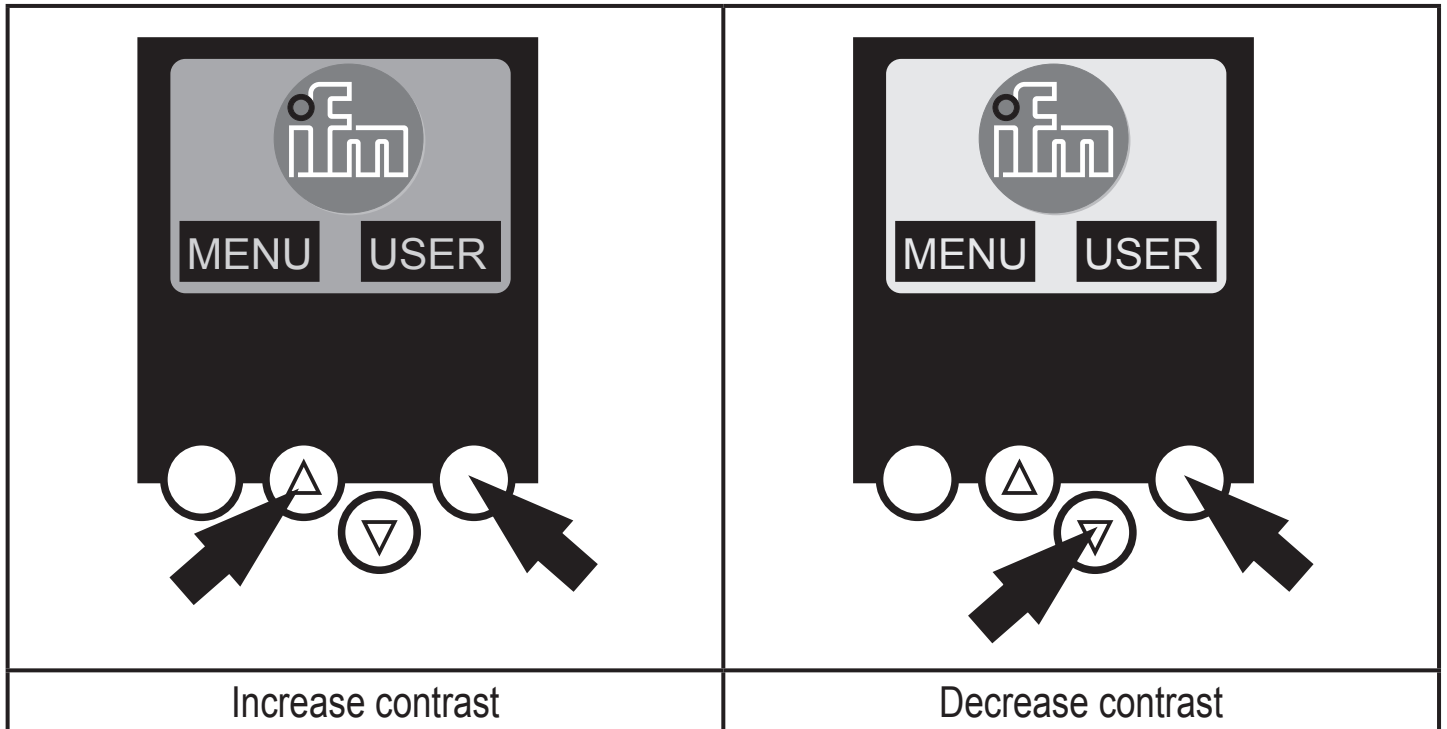
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6.1.3 Status LEDs on the network connection

LED RUN green	
off	Module in the Init state
flashes	Module in the pre-operational state
flashes 1x, pause	Module in the safe-operational state
lights	Module in the operational state
LED ERR red	
off	EtherCAT communication active
flashes	General configuration error
flashes 1x, pause	The application has changed the EtherCat operating status automatically
flashes 2x, pause	SYNC manager timeout
lights	Application watchdog timeout, e.g. PLC not in the operating mode "run"
Link / activity x green (x=1 or X=2)	
off	No Ethernet connection detected on port x
lights	Ethernet connection detected on port x
flashes irregularly	Exchange of Ethernet packages on port x

6.2 Contrast setting

The contrast can be directly changed by simultaneously pressing the right button and the Δ -button (too bright) or the ∇ -button (too dark).



7 Operation

To operate an AS-i system a special AS-i power supply is required (e.g. AC1216). The AS-i power supply supplies the yellow AS-i cable with energy and implements a data decoupling to the voltage regulator of the power supply. Standard switched-mode power supplies would consider the AS-i data signals as interference signals and suppress them.



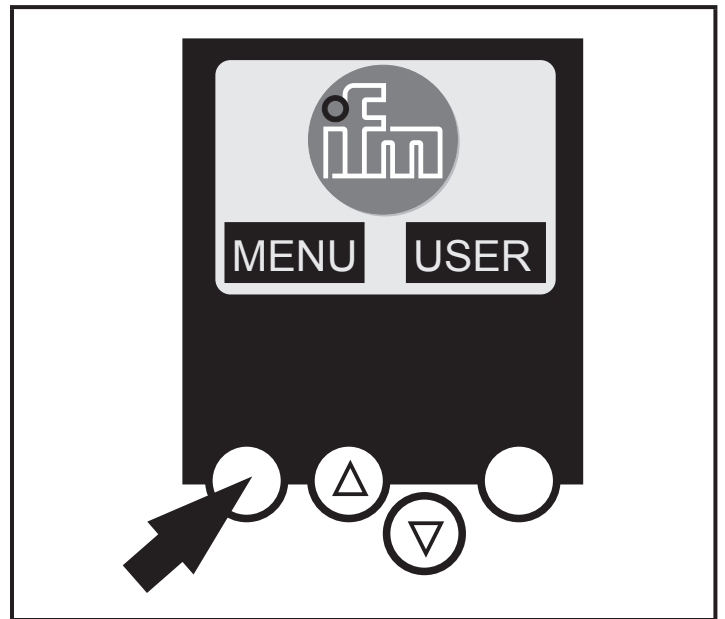
Disconnect the power supply before connecting the controller_e.

The AS-i system is operated ungrounded. AS-i + and AS-i - are to be symmetrical to the ground potential of the installation.

Ensure a low-resistance connection of the symmetry point of the AS-i power supply (terminal "shield") to the ground of the installation.

8 Menu overview

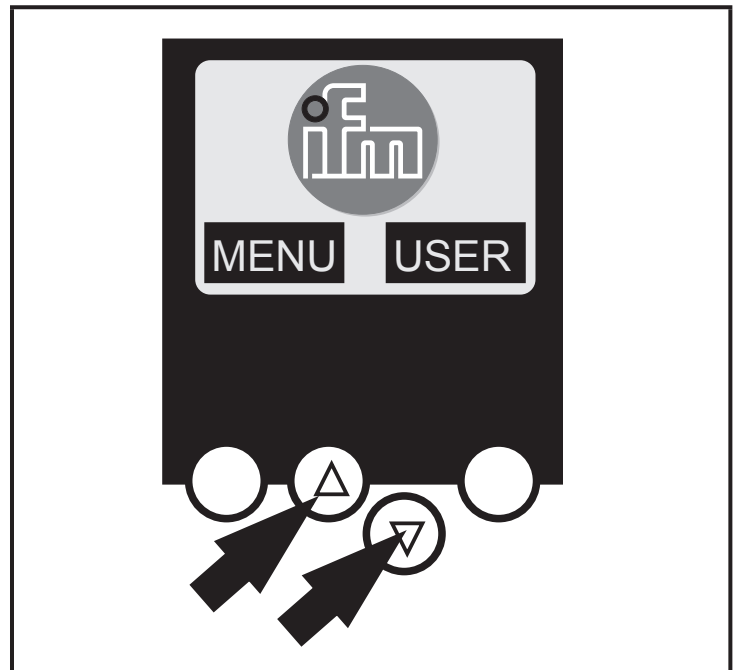
Open the main menu by pressing the left button "MENU" in the start display.



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To navigate within a menu item press the button Δ or ∇ .

Press the buttons simultaneously to switch between the German and English menu.



8.1 Password

In the menu "System Setup", menu item "Password" the handling can be restricted or enabled.

When delivered, the device is in the user mode. By entering an invalid password (e.g. 1000) all menu items which can change settings are blocked. By entering the password "CE01" the user mode is enabled again. The password is stored non-volatilely by the "System Setup", "Store System" menu item.

8.2 Menu navigation

By pressing the left button in the start display (AS-i error diagnostics) the main menu is opened. The two buttons in the middle allow scrolling through the menu.

- Quick setup (Summary of the menu items for a basic configuration)
 - ▽ "Teach in" of the current AS-i configuration (project all)
 - ▽ Settings of the fieldbus interface (option)

- PLC setup
 - ▽ Start and stop the PLC in the controller_e (if used)

- PLC info (Display of the user program name, author, date)

- Slave lists (Checking of the addresses of the connected AS-i slaves)
 - ▽ Indication of the list of detected slaves (LDS)
 - ▽ Indication of the list of projected slaves (LPS)
 - ▽ Indication of the list of activated slaves (LAS)
 - ▽ Indication of the list of periphery faults in AS-i slaves (LPF)

- Slave addresses (Programming of the addresses of the connected AS-i slaves)
 - ▽ Readdressing of an AS-i slave connected to the controller_e
 - ▽ Automatic addressing of new AS-i slaves to the next free address (easy start-up)

○ Diagnosis (diagnosis of the connected AS-i networks)

- ▽ Counting the AS-i voltage dips since power on of the controller_e
- ▽ Counting the AS-i configuration errors since power on of the controller_e
- ▽ Verify the fault rate of the AS-i messages of the connected AS-i system
- ▽ Indication of the number of connected AS-i slaves and the cycles per second
- ▽ List of the AS-i slaves with faulty messages since power on of the controller_e
- ▽ Reset of the error counter
- ▽ Indication of the maximum system cycle time
- ▽ Reading the diagnostic information of Safety-at-Work monitors

○ Master setup

(Information about the AS-i master system)

- ▽ Teach in of the current AS-i configuration (project all)
- ▽ Changeover to the projection mode: configuration of the AS-i system
- ▽ Changeover to the protected mode: normal operation (master monitors configuration)
- ▽ Enable the automatic AS-i slave addressing in the protected mode
- ▽ Deactivation of the AS-i reset during the change to the protected mode
- ▽ Display of the config error counter of the connected AS-i system
- ▽ Reset of the config error counter
- ▽ Display of the fault rate percentage of the connected AS-i system

- Slave info (Details about the connected AS-i slaves)
 - ▽ Indication of the digital or analogue inputs/outputs of the connected AS-i slaves
 - ▽ Indication of the parameters of the connected AS-i slaves
 - ▽ Indication of the ID and I/O codes of the connected AS-i slaves
 - ▽ Indication of the transmission errors to the connected AS-i slaves

- Slave setup (Settings of the connected AS-i slaves)
 - ▽ Digital or analogue inputs / outputs of the connected AS-i slaves
 - ▽ Current and projected parameters of the connected AS-i slaves
 - ▽ Current and projected I/O and ID codes of the connected AS-i slaves
 - ▽ Message errors in the communication to the connected AS-i slaves

- System setup (Device settings of the controller_e)
 - ▽ Store the current system settings
 - ▽ Setting of the baud rate of the serial programming interface
 - ▽ Setting of the parameters of the Ethernet programming interface (option)
 - ▽ Enter the new password to disable or enable the menu functions
 - ▽ Update the controller_e operating system (special software required!)
 - ▽ Reset to the factory settings of the controller_e
 - ▽ IP address of the Ethernet programming interface (optional)

- System info (Device information)
 - ▽ Hardware and operating system version numbers of this device
 - ▽ Serial number of this device
 - ▽ Current / maximum PLC cycle time
- Fieldbus setup (The different fieldbus interfaces are optional)
 - ▽ Input of the module lengths

Module 1 digital inputs master 1A	Module 11 command channel
Module 2 digital outputs master 1A	Module 12 PLC inputs
Module 3 digital inputs master 2A	Module 13 PLC outputs
Module 4 digital outputs master 2A	Module 14 analogue input master 1
Module 5 digital inputs master 1B	Module 15 analogue output master 1
Module 6 digital outputs master 1B	Module 16 analogue input master 2
Module 7 digital inputs master 2B	Module 17 analogue output master 2
Module 8 digital outputs master 2B	Module 18 diagnosis
Module 9 analogue multiplexed input	Module 19 host command channel
Module 10 analogue multiplexed output	

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9 Technical data

9.1 Data sheets



Data sheets can be found at: www.ifm.com → data sheet search → AC1391/ AC1392

9.2 Programming manual



The programming manual can be found at: www.ifm.com → data sheet search → AC1391/ AC1392 → Operating instructions

10 Maintenance, repair and disposal

- ▶ Dispose of the device in accordance with the national environmental regulations.

11 Approvals/standards



The EC declaration of conformity and approvals can be found at:
www.ifm.com → data sheet search → AC1391/ AC1392 → Approvals

12 Scale drawing

