ifm electronic

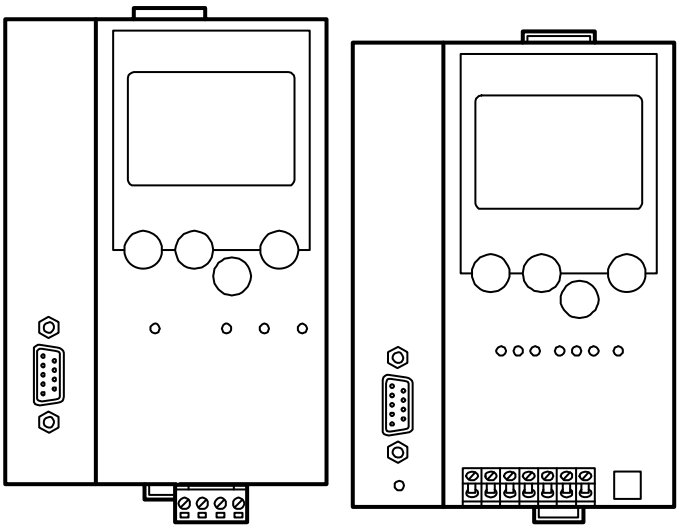
Device Manual
AS-i Gateway Profibus-DPV1

ecomat300

1 AS-i Master	2 AS-i Master
AC1375	**AC1376**
Smart Link DP	AS-i DP Gateway
Firmware from Version RTS 1.4x	Firmware from Version RTS 2.3x

Master profile: M4

English



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Contents

1 On this manual

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In the additional "Programming Manual for CoDeSys V2.3" you will obtain more details about the use of the programming system "CoDeSys for Automation Alliance". This manual can be downloaded free of charge from **ifm's** website:
→ www.ifm.com > select your country > [Service] > [Download] > [Bus system AS-Interface]

Nobody is perfect. Send us your suggestions for improvements to this manual and you will receive a little gift from us to thank you.

1.1 What do the symbols and formats mean?

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The following symbols or pictograms depict different kinds of remarks in our manuals:

⚠ WARNING

Death or serious irreversible injuries are possible.

⚠ CAUTION

Slight reversible injuries are possible.

NOTICE

Property damage is to be expected or possible.

NOTE

Important notes on faults and errors.

Info

Further hints.

► ...	Required action
> ...	Response, effect
→ ...	"see"
abc	Cross references (links)
[...]	Designations of keys, buttons or display

1.2 What devices are described in this manual?

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This manual describes the AS-i gateway family from **ifm electronic gmbh** for the connection to Profibus DPV1:

- AC1375 + AC1376
- with master profile M4
- with AS-i version 3.0 master
- with a firmware
  - from version RTS 1.4x for AC1375
  - from version RTS 2.3x for AC1376

1.3 How is this documentation structured?

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This documentation is a combination of different types of manuals. It is for beginners and also a reference for advanced users.

How to use this documentation:

- Refer to the table of contents to select a specific subject.
- The print version of the manual contains a search index in the annex.
- At the beginning of a chapter we will give you a brief overview of its contents.
- Abbreviations and technical terms are listed in the glossary.

In case of malfunctions or uncertainties please contact the manufacturer at:
→ www.ifm.com > select your country > [Contact].

We want to become even better! Each separate section has an identification number in the top right corner. If you want to inform us about any inconsistencies, please indicate this number with the title and the language of this documentation. Thank you for your support.

We reserve the right to make alterations which can result in a change of contents of the documentation. You can find the current version on **ifm's** website at:
→ www.ifm.com > select your country > [Service] > [Download] > [Bus system AS-Interface]

2 Safety instructions

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2.1 Important!

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No characteristics are warranted with the information, notes and examples provided in this manual. The drawings, representations and examples imply no responsibility for the system and no application-specific particularities.

The manufacturer of the machine/equipment is responsible for the safety of the machine/equipment.

⚠ WARNING

Property damage or bodily injury are possible when the notes in this manual are not adhered to!
ifm electronic gmbh does not assume any liability in this regard.

- ► The acting person must have read and understood the safety instructions and the corresponding chapters of this manual before performing any work on or with this device.
- ► The acting person must be authorised to work on the machine/equipment.
- ► Adhere to the technical data of the devices!
  You can find the current data sheet on **ifm's** homepage at:
  → www.ifm.com > select your country > [Data sheet search] > (Article no.) > [Technical data in PDF format]
- ► Note the installation and wiring information as well as the functions and features of the devices!
  → supplied installation instructions or on **ifm's** homepage:
  → www.ifm.com > select your country > [Data sheet search] > (Article no.) > [Operating instructions]

NOTICE

The driver module of the serial interface can be damaged!

Disconnecting the serial interface while live can cause undefined states which damage the driver module.

- ► Do not disconnect the serial interface while live.

Start-up behaviour of the controller

The manufacturer of the machine/equipment must ensure with his application program that when the controller starts or restarts no dangerous movements can be triggered.

A restart can, for example, be caused by:

- voltage restoration after power failure
- reset after watchdog response because of too long a cycle time

2.2 What previous knowledge is required?

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This document is intended for people with knowledge of control technology and PLC programming with IEC 61131-3.

If this device contains a PLC, in addition these persons should know the CoDeSys® software.

The document is intended for specialists. These specialists are people who are qualified by their training and their experience to see risks and to avoid possible hazards that may be caused during operation or maintenance of a product. The document contains information about the correct handling of the product.

Read this document before use to familiarise yourself with operating conditions, installation and operation. Keep the document during the entire duration of use of the device.

Adhere to the safety instructions.

3 System description

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3.1 Information concerning the device

Contents

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→ What devices are described in this manual? (→ page 10)

3.1.1 Overview: Where is what for AC1375?

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Legend:

1. unlocking key for detaching the device from a DIN rail
2. metal housing IP20
3. text/graphics display
4. 4 pushbuttons
5. status LEDs
6. connection terminals for the AS-i interface and FE
7. fieldbus interface
8. status LED of the fieldbus interface

Figure: Overview gateway AC1375

3.1.2 Overview: Where is what for AC1376?

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Legend:

1. unlocking key for detaching the device from a DIN rail
2. metal housing IP20
3. text/graphics display
4. 4 pushbuttons
5. status LEDs
6. 6-pin RJ11 socket of RS-232C for firmware update
7. connection terminals for the 24V voltage supply, AS-i interfaces and FE
8. status LED of the fieldbus interface
9. fieldbus interface

Figure: Overview gateway AC1376

3.1.3 Required accessories

5316

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

- (Only AC1376:) a power supply for the 24 V power supply (e.g. art. no. DN3011)
  (AC1375 is supplied via AS-i)
- for each AS-i master one power supply each (e.g. art. no. AC1236)
- as well as AS-i slaves.

3.2 Intended use

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NOTE

Danger when device is overloaded or incorrectly used.

The device and / or the associated machine / plant may be damaged or destroyed or may malfunction if the limits of the "Technical data" for this device are exceeded or if the device is used outside the specified "Intended use".

► Use the device only within the limits of the Technical data (→ page 477) (→ data sheet).

► Use the device only in accordance with the "Intended use".

3.2.1 Permitted use

5319

You may use the device for the following purposes (= Intended use):

- as fieldbus gateway between the actuator-sensor-interface network and a higher-level controller (fieldbus master = host; e.g. PLC) via the fieldbus connection Profibus DPV1.

3.2.2 Prohibited use

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In the following areas you must NOT use the device:

- outdoors,
- in wet environments,
- beyond the limits of the Technical data (→ page 477) (→ data sheet).

Tampering with the device can seriously affect the safety of operators and machinery. This is not permitted and leads to an exclusion of liability and warranty.

4 Function

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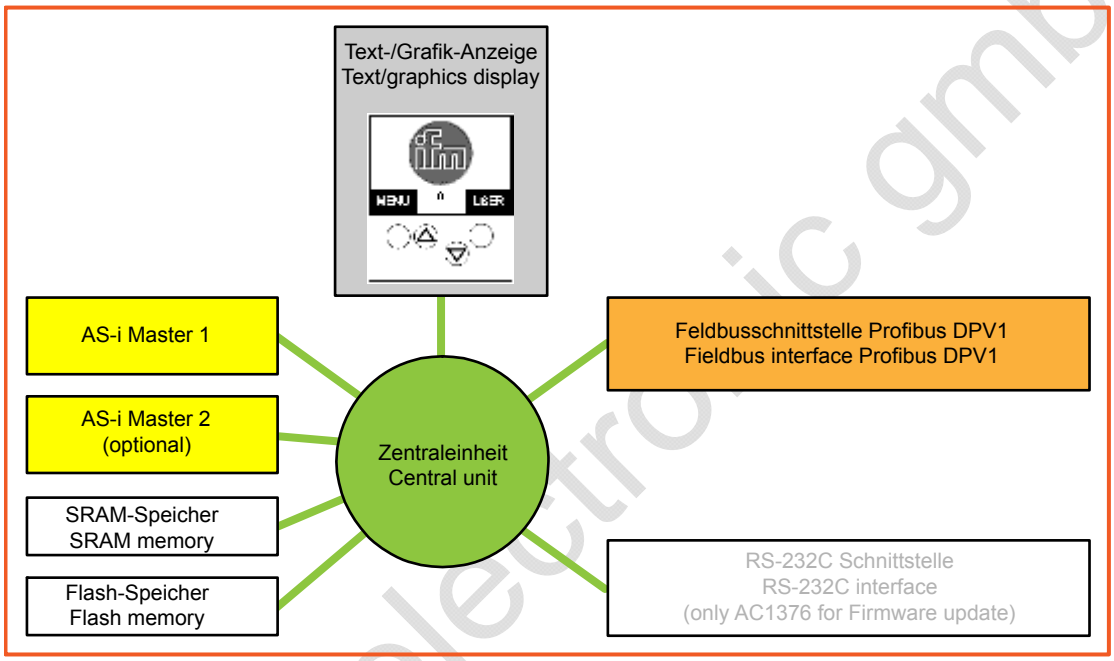
4.1 Data management

5323

The device consists of different units:



- The central processing unit (CPU) ensures the data transfer between the subsystems. It manages the remanent flash memory and the volatile RAM memory.
- The flash memory (1 Mbyte) stores non-volatilely...
  - the system configuration including the AS-i configurations,
  - the runtime system (RTS),
  - the remanent data.
- After power-on of the device the operating system runs in the SRAM memory (1 Mbyte).
- The AS-i masters of AC1376 have one separate microcontroller each.
- The AS-i master communicates with the connected slave modules on the AS-i bus according to the AS-i specification.

- Using the text/graphics display on the device enables a more detailed system diagnosis. With the four keys the device is easy to use.
  → chapter Operating and display elements (→ page 92)
  - The bilingual structure of the menus and messages simplifies worldwide use of this device family. → chapter Text/graphics display: Switch language (→ page 96)
  - An intelligent message management generates priority-based diagnostic and error messages and supports the user considerably during set-up and removal of failures. → chapter Troubleshooting (→ page 479)
- The **fieldbus interface** operates independently and exchanges data with the central system via a "dual port RAM" interface.

4.2 Introduction AS-i data

Contents

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The AS-i master and the AS-i slaves make a large amount of data available to the user. The user can retrieve information, such as the status of the master and the configuration data of the slaves. This data is combined in several data fields.

These data structures and their contents will be described in the following sections.

4.2.1 Field definitions for direct data access

Contents

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strMasterFlags – fields with master status information

5329

Word no.	Bit	Bit = TRUE means:
0	0	"no slave reset" When executing the function "Config all" (via the menu or command channel of the device) the slaves are NOT reset, as described in the AS-i specification.
	1...15	reserved
1	0	"Config OK“ There is no configuration error. The configuration of all AS-i slaves in the network complies with the projection data.
	1	"LDS.0" One slave with the AS-i address 0 was detected on the master.
	2	reserved
	3	reserved
	4	"Configuration_Active" The device is in the projection mode
	5	"Normal_Operation_Active" The AS-i master is in normal operation: it communicates with at least one slave.
	6	"AS-i_Power_Fail" The AS-i voltage is too low.
	7	reserved
	8	"Periphery_OK" None of the active AS-i slaves signals a peripheral fault.
	9	"Auto_Address_Enable" The mode "automatic addressing of the slaves" on this master is activated.
	10...15	reserved

strSlaveCyc – fields with digital I//O data

5332

Word no.	Bit 12...15	Bit 8...11	Bit 4...7	Bit 0...3
0	reserved	slave 2(A)	reserved	slave 1(A)
1	reserved	slave 4(A)	reserved	slave 3(A)
2	reserved	slave 6(A)	reserved	slave 5(A)
3	reserved	slave 8(A)	reserved	slave 7(A)
4	reserved	slave 10(A)	reserved	slave 9(A)
5	reserved	slave 12(A)	reserved	slave 11(A)
6	reserved	slave 14(A)	reserved	slave 13(A)
7	reserved	slave 16(A)	reserved	slave 15(A)
8	reserved	slave 18(A)	reserved	slave 17(A)
9	reserved	slave 20(A)	reserved	slave 19(A)
10	reserved	slave 22(A)	reserved	slave 21(A)
11	reserved	slave 24(A)	reserved	slave 23(A)
12	reserved	slave 26(A)	reserved	slave 25(A)
13	reserved	slave 28(A)	reserved	slave 27(A)
14	reserved	slave 30(A)	reserved	slave 29(A)
15	reserved	reserved	reserved	slave 31(A)
16	reserved	slave 2B	reserved	slave 1B
17	reserved	slave 4B	reserved	slave 3B
18	reserved	slave 6B	reserved	slave 5B
19	reserved	slave 8B	reserved	slave 7B
20	reserved	slave 10B	reserved	slave 9B
21	reserved	slave 12B	reserved	slave 11B
22	reserved	slave 14B	reserved	slave 13B
23	reserved	slave 16B	reserved	slave 15B
24	reserved	slave 18B	reserved	slave 17B
25	reserved	slave 20B	reserved	slave 19B
26	reserved	slave 22B	reserved	slave 21B
27	reserved	slave 24B	reserved	slave 23B
28	reserved	slave 26B	reserved	slave 25B
29	reserved	slave 28B	reserved	slave 27B
30	reserved	slave 30B	reserved	slave 29B
31	reserved	reserved	reserved	slave 31B

strFbusInCyc / strFbusOutCyc – fields with fieldbus I/O data

5333

Word no.	Bit 12...15	Bit 8...11	Bit 4...7	Bit 0...3
0	slave 2(A)	slave 3(A)	DP status	slave 1(A)
1	slave 6(A)	slave 7(A)	slave 4(A)	slave 5(A)
2	slave 10(A)	slave 11(A)	slave 8(A)	slave 9(A)
3	slave 14(A)	slave 15(A)	slave 12(A)	slave 13(A)
4	slave 18(A)	slave 19(A)	slave 16(A)	slave 17(A)
5	slave 22(A)	slave 23(A)	slave 20(A)	slave 21(A)
6	slave 26(A)	slave 27(A)	slave 24(A)	slave 25(A)
7	slave 30(A)	slave 31(A)	slave 28(A)	slave 29(A)
8	slave 2B	slave 3B	reserved	slave 1B
9	slave 6B	slave 7B	slave 4B	slave 5B
10	slave 10B	slave 11B	slave 8B	slave 9B
11	slave 14B	slave 15B	slave 12B	slave 13B
12	slave 18B	slave 19B	slave 16B	slave 17B
13	slave 22B	slave 23B	slave 20B	slave 21B
14	slave 26B	slave 27B	slave 24B	slave 25B
15	slave 30B	slave 31B	slave 28B	slave 29B

strSlavePara – fields with current / projected / reflected parameter data

5334

Word no.	Bit 12...15	Bit 8...11	Bit 4...7	Bit 0...3
0	slave 4(A)	slave 3(A)	slave 2(A)	slave 1(A)
1	slave 8(A)	slave 7(A)	slave 6(A)	slave 5(A)
2	slave 12(A)	slave 11(A)	slave 10(A)	slave 9(A)
3	slave 16(A)	slave 15(A)	slave 14(A)	slave 13(A)
4	slave 20(A)	slave 19(A)	slave 18(A)	slave 17(A)
5	slave 24(A)	slave 23(A)	slave 22(A)	slave 21(A)
6	slave 28(A)	slave 27(A)	slave 26(A)	slave 25(A)
7	slave 1B	slave 31(A)	slave 30(A)	slave 29(A)
8	slave 5B	slave 4B	slave 3B	slave 2B
9	slave 9B	slave 8B	slave 7B	slave 6B
10	slave 13B	slave 12B	slave 11B	slave 10B
11	slave 17B	slave 16B	slave 15B	slave 14B
12	slave 21B	slave 20B	slave 19B	slave 18B
13	slave 25B	slave 24B	slave 23B	slave 22B
14	slave 29B	slave 28B	slave 27B	slave 26B
15	reserved	reserved	slave 31B	slave 30B

strSlaveCDI / strSlavePrj – fields with current and projected configuration data (CDI)

5335

Word no.	Bit 12...15 XID2 code	Bit 8...11 XID1 code	Bit 4...7 ID code	Bit 0...3 IO code
0	slave 0 *)	slave 0 *)	slave 0 *)	slave 0 *)
1	slave 1	slave 1	slave 1	slave 1
2	slave 2	slave 2	slave 2	slave 2
3	slave 3	slave 3	slave 3	slave 3
4	slave 4	slave 4	slave 4	slave 4
5	slave 5	slave 5	slave 5	slave 5
6	slave 6	slave 6	slave 6	slave 6
7	slave 7	slave 7	slave 7	slave 7
8	slave 8	slave 8	slave 8	slave 8
9	slave 9	slave 9	slave 9	slave 9
10	slave 10	slave 10	slave 10	slave 10
11	slave 11	slave 11	slave 11	slave 11
12	slave 12	slave 12	slave 12	slave 12
13	slave 13	slave 13	slave 13	slave 13
14	slave 14	slave 14	slave 14	slave 14
15	slave 15	slave 15	slave 15	slave 15
16	slave 16	slave 16	slave 16	slave 16
17	slave 17	slave 17	slave 17	slave 17
18	slave 18	slave 18	slave 18	slave 18
19	slave 19	slave 19	slave 19	slave 19
20	slave 20	slave 20	slave 20	slave 20
21	slave 21	slave 21	slave 21	slave 21
22	slave 22	slave 22	slave 22	slave 22
23	slave 23	slave 23	slave 23	slave 23
24	slave 24	slave 24	slave 24	slave 24
25	slave 25	slave 25	slave 25	slave 25
26	slave 26	slave 26	slave 26	slave 26
27	slave 27	slave 27	slave 27	slave 27
28	slave 28	slave 28	slave 28	slave 28
29	slave 29	slave 29	slave 29	slave 29
30	slave 30	slave 30	slave 30	slave 30
31	slave 31	slave 31	slave 31	slave 31

*) For the slave address 0B (not allowed) the default setting for these values is "0".

Notes:

Single, A and B slaves use the same structure for profiles: S-[IO code].[ID code].[XID2 code]	
IO code	I/O configuration, first digit in the slave profile
ID code	ID code, second digit in the slave profile
XID1 code	extended ID code 1, can be changed by the user, no part of the slave profile (for AS-i slave version < 2.0 = F_h)
XID2 code	extended ID code 2, third digit in the slave profile (for AS-i slave version 2.0 = F_{hex})

Details → chapter Configuration data (CDI) of the slaves (slave profiles) (→ page 32)

strSlaveList– fields with slave lists

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Word no.	Bit / slave address															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0 *)
1	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
2	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
3	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

*) There is no slave 0 in the LAS and LPS lists, therefore the master sets the field to "0"!

strSlaveErrCtr – fields with slave telegram error counters

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Word no.	Telegram error counter of ...
0	slave 1(A)
1	slave 2(A)
2	slave 3(A)
3	slave 4(A)
4	slave 5(A)
5	slave 6(A)
6	slave 7(A)
7	slave 8(A)
8	slave 9(A)
9	slave 10(A)
10	slave 11(A)
11	slave 12(A)
12	slave 13(A)
13	slave 14(A)
14	slave 15(A)
15	slave 16(A)
16	slave 17(A)
17	slave 18(A)
18	slave 19(A)
19	slave 20(A)
20	slave 21(A)
21	slave 22(A)
22	slave 23(A)
23	slave 24(A)
24	slave 25(A)
25	slave 26(A)
26	slave 27(A)
27	slave 28(A)
28	slave 29(A)
29	slave 30(A)
30	slave 31(A)

Word no.	Telegram error counter of ...
31	slave 1B
32	slave 2B
33	slave 3B
34	slave 4B
35	slave 5B
36	slave 6B
37	slave 7B
38	slave 8B
39	slave 9B
40	slave 10B
41	slave 11B
42	slave 12B
43	slave 13B
44	slave 14B
45	slave 15B
46	slave 16B
47	slave 17B
48	slave 18B
49	slave 19B
50	slave 20B
51	slave 21B
52	slave 22B
53	slave 23B
54	slave 24B
55	slave 25B
56	slave 26B
57	slave 27B
58	slave 28B
59	slave 29B
60	slave 30B
61	slave 31B

strAnalogSlave – fields with analogue I/O data

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Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	analogue data channel 0 from/to slave 1 or: analogue data channel 0 from/to slave 1A															
1	analogue data channel 1 from/to slave 1 or: analogue data channel 1 from/to slave 1A															
2	analogue data channel 2 from/to slave 1 or: analogue data channel 0 from/to slave 1B															
3	analogue data channel 3 from/to slave 1 or: analogue data channel 1 from/to slave 1B															
4	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
...	→ table Details of the slave assignment (→ page 26)															
150	analogue data channel 0 from/to slave 31 or: analogue data channel 0 from/to slave 31A															
151	analogue data channel 1 from/to slave 31 or: analogue data channel 1 from/to slave 31A															
152	analogue data channel 2 from/to slave 31 or: analogue data channel 0 from/to slave 31B															
153	analogue data channel 3 from/to slave 31 or: analogue data channel 1 from/to slave 31B															
154	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0

Legend:

Vn	valid bit	1 bit	0 = values in channel n are invalid 1 = values in channel n are valid Output data must be valid (Vn = 1) to be enabled in the AS-i slave!
On	overflow bit	1 bit	0 = data is in the valid range 1 = data is in the invalid range (especially in case of input modules when the measuring range is not reached or exceeded)
OVx	output valid	1 bit	channel-independent bit "output data valid" from the slave: CTT1: 0 = more than 3.5 s have elapsed since the last update of the output values 1 = slave requests new output data within the next 3 s CTT2…CTT5: 0 = slave receives no new output data 1 = slave receives new output data **NOTE:** only valid for analogue **out**put slaves. For **in**put slaves set OVx = "0"!
TVx	transfer valid	1 bit	channel-independent bit "transfer valid" from the slave: 0 = error during transfer or: timeout 1 = transfer of analogue input/output data OK
TIx	transfer to the slave (transfer Input)	1 bit	from master profile M4 onwards: 0 = slave transmits input data as a value (15 bits long, plus sign) 1 = slave transmits input data as a bit pattern (16 bits long, no sign)
TOx	transfer from the slave (transfer output)	1 bit	from master profile M4 onwards: 0 = slave receives output data as a value (15 bits long, plus sign) 1 = slave receives output data as a bit pattern (16 bits long, no sign)

Details of the slave assignment

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Word no.	Single slave		A slave		B slave	
	channel	slave addr.	channel	slave addr.	channel	slave addr.
0	0	1	0	1A		
1	1		1			
2	2				0	1B
3	3				1	
4	status information					
5	0	2	0	2A		
6	1		1			
7	2				0	2B
8	3				1	
9	status information					
10	0	3	0	3A		
11	1		1			
12	2				0	3B
13	3				1	
14	status information					
15	0	4	0	4A		
16	1		1			
17	2				0	4B
18	3				1	
19	status information					
20	0	5	0	5A		
21	1		1			
22	2				0	5B
23	3				1	
24	status information					
25	0	6	0	6A		
26	1		1			
27	2				0	6B
28	3				1	
29	status information					
30	0	7	0	7A		
31	1		1			
32	2				0	7B
33	3				1	
34	status information					

Word no.	Single slave		A slave		B slave	
	channel	slave addr.	channel	slave addr.	channel	slave addr.
35	0	8	0	8A		
36	1		1			
37	2				0	8B
38	3				1	
39	status information					
40	0	9	0	9A		
41	1		1			
42	2				0	9B
43	3				1	
44	status information					
45	0	10	0	10A		
46	1	10	1	10A		
47	2				0	10B
48	3				1	
49	status information					
50	0	11	0	11A		
51	1		1			
52	2				0	11B
53	3				1	
54	status information					
55	0	12	0	12A		
56	1		1			
57	2				0	12B
58	3				1	
59	status information					
60	0	13	0	13A		
61	1		1			
62	2				0	13B
63	3				1	
64	status information					
65	0	14	0	14A		
66	1		1			
67	2				0	14B
68	3				1	
69	status information					

Word no.	Single slave		A slave		B slave	
	channel	slave addr.	channel	slave addr.	channel	slave addr.
70	0	15	0	15A		
71	1		1			
72	2				0	15B
73	3				1	
74	status information					
75	0	16	0	16A		
76	1		1			
77	2				0	16B
78	3				1	
79	status information					
80	0	17	0	17A		
81	1		1			
82	2				0	17B
83	3				1	
84	status information					
85	0	18	0	18A		
86	1		1			
87	2				0	18B
88	3				1	
89	status information					
90	0	19	0	19A		
91	1		1			
92	2				0	19B
93	3				1	
94	status information					
95	0	20	0	20A		
96	1		1			
97	2				0	20B
98	3				1	
99	status information					
100	0	21	0	21A		
101	1		1			
102	2				0	21B
103	3				1	
104	status information					

Word no.	Single slave		A slave		B slave	
	channel	slave addr.	channel	slave addr.	channel	slave addr.
105	0	22	0	22A		
106	1		1			
107	2				0	22B
108	3				1	
109	status information					
110	0	23	0	23A		
111	1		1			
112	2				0	23B
113	3				1	
114	status information					
115	0	24	0	24A		
116	1		1			
117	2				0	24B
118	3				1	
119	status information					
120	0	25	0	25A		
121	1		1			
122	2				0	25B
123	3				1	
124	status information					
125	0	26	0	26A		
126	1		1			
127	2				0	26B
128	3				1	
129	status information					
130	0	27	0	27A		
131	1		1			
132	2				0	27B
133	3				1	
134	status information					
135	0	28	0	28A		
136	1		1			
137	2				0	28B
138	3				1	
139	status information					

Word no.	Single slave		A slave		B slave	
	channel	slave addr.	channel	slave addr.	channel	slave addr.
140	0	29	0	29A		
141	1		1			
142	2				0	29B
143	3				1	
144	status information					
145	0	30	0	30A		
146	1		1			
147	2				0	30B
148	3				1	
149	status information					
150	0	31	0	31A		
151	1		1			
152	2				0	31B
153	3				1	
154	status information					

strSafetyList – fields with safety slave contacts

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Word no.	Bit / safety slave address, contact															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	7C2	7C1	6C2	6C1	5C2	5C1	4C2	4C1	3C2	3C1	2C2	2C1	1C2	1C1	res	res
1	15C2	15C1	14C2	14C1	13C2	13C1	12C2	12C1	11C2	11C1	10C2	10C1	9C2	9C1	8C2	8C1
2	23C2	23C1	22C2	22C1	21C2	21C1	20C2	20C1	19C2	19C1	18C2	18C1	17C2	17C1	16C2	16C1
3	31C2	31C1	30C2	30C1	29C2	29C1	28C2	28C1	27C2	27C1	26C2	26C1	25C2	25C1	24C2	24C1

Examples:

1C1_= safety slave 1, contact 1 open
1C2_= safety slave 1, contact 2 open

31C1_= safety slave 31, contact 1 open
31C2_= safety slave 31, contact 2 open

4.2.2 Profiles of AS-i slaves

Contents

8902

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

Contents

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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 = F_{hex} *)	XID1 extended ID code 1 is no part of the slave profile can be changed by the user (AS-i slave v2.0 = F_{hex} *)	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:		
$1110_{bin} = E_{hex}$	(e.g.) $0111_{bin} = 7_{hex}$	$1010_{bin} = A_{hex}$	$0111_{bin} = 7_{hex}$
The corresponding CDI data word is: 11100111 $10100111_{bin} = E7A7_{hex}$			

*) 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 "F_{hex}" 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:
F_h for single slaves
7_h 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 (8_{hex})	Bit 2 (4_{hex})	Bit 1 (2_{hex})	Bit 0 (1_{hex})	Meaning
		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 (8_{hex})	Bit 2 (4_{hex})	Bit 1 (2_{hex})	Bit 0 (1_{hex})	Meaning
		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

IO code (hex)	ID code (hex)	ext. ID code 2 (hex)	Meaning
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 (→ page 34))
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 (→ page 35))
7	4	C	RFID identification system for writing and reading RFID tags 15-bit data + 1-bit messages (e.g. DTA100)
7	A	x	slave operates in the "extended addressing mode" (B slave or A/B slave)
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

IO code (hex)	ID code (hex)	ext. ID code 2 (hex)	Meaning
7	E	2	electronic reverser
7	E	3	electronic direct starter with brake
7	E	4	electronic reverser with brake
7	E	5	electronic direct starter with accessories
7	E	6	electronic reverser with accessories
8	1	x	4 binary outputs for 2 dual-signal actuators
B	1	x	dual-signal actuator with feedback: 2 binary outputs + 2 binary inputs
B	A	5	slave operates in the "extended addressing mode" (B slave or A/B slave); supports combined transaction type 2
B	A	E	slave operates in the "extended addressing mode" (B slave or A/B slave); 2 binary outputs + 2 binary inputs (e.g. AC2086 module)
D	1	x	single actuator with monitoring: 1 binary output + 3 binary inputs

x = any value (0...F)

Devices with M4 master profile enable connection of slaves with more than 4 digital inputs/outputs. The transmission is combined: Part of the data transmission is carried out via the digital bits D0...D3, another part via the "analogue" channels.

Info

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		Binary bits D0...D3	Additional acyclic string data transaction	Combined transaction CTT
		Number of channels	Use analogue / binary			
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		analogue inputs
	binary outputs		analogue outputs

Info

Further slave profiles are continuously developed and approved by the technical commission of "AS-International Association". The AS-i controller can only communicate with slaves whose profiles are defined in the controller operating system.

► Ask your AS-i sales specialist.

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	–	–	–

Transaction	Slave profile	Slave type	Number channels	Analogue input channels					Analogue output channels				
				CH3	CH2	CH1	CH0	Trans.	CH3	CH2	CH1	CH0	Trans.
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		analogue inputs
	binary outputs		analogue outputs

4.2.3 Data distribution of slaves in the M4 gateway (depending on the profile)

Contents

5368

Data distribution of the single slave with profile S-0.1 in the M4 gateway

5369

Slave:	• 4 binary inputs for 2 dual-signal sensors
Gateway	• 4 binary inputs

M4 gateway Example for master 1			**Single slave** **Profile S-0.1** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2	binary IN D2	←	binary IN D2
A binary IN D3	binary IN D3	←	binary IN D3
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the A slave with profile S-0.A.E in the M4 gateway

5371

Slave:	• 4 binary inputs for 2 dual-signal sensors
Gateway:	• 4 binary inputs

M4 gateway Example for master 1			**A slave Profile S-0.A.E** Example slave addr. 3A
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2	binary IN D2	←	binary IN D2
A binary IN D3	binary IN D3	←	binary IN D3
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the B slave with profile S-0.A.E in the M4 gateway

5373

Slave:	• 4 binary inputs for 2 dual-signal sensors
Gateway:	• 4 binary inputs

M4 gateway Example for master 1			**B slave profile S-0.A.E** Example slave addr. 3B
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0		←	binary IN D0
A binary IN D1		←	binary IN D1
A binary IN D2		←	binary IN D2
A binary IN D3		←	binary IN D3
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0	binary IN D0	←	
B binary IN D1	binary IN D1	←	
B binary IN D2	binary IN D2	←	
B binary IN D3	binary IN D3	←	
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-1.1 in the M4 gateway

5374

Slave:	• 3 binary inputs • 1 binary output
Gateway:	• 3 binary inputs • 1 binary output

M4 gateway Example for master 1			**Single slave** **Profile S-1.1** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2	binary IN D2	←	binary IN D2
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3	binary OUT D3	→	binary OUT D3
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-3.1 in the M4 gateway

5376

Slave:	• 2 binary inputs for 1 dual-signal sensor • 2 binary outputs for 1 dual-signal actuator
Gateway:	• 2 binary inputs + 2 binary outputs

M4 gateway Example for master 1			**Single slave** **Profile S-3.1** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3	binary OUT D3	→	binary OUT D3
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the A slave with profile S-3.A in the M4 gateway

5378

Slave:	• 2 binary inputs • 1 binary output
Gateway:	• 2 binary inputs + 1 binary output

M4 gateway Example for master 1			**A slave** **Profile S-3.A** Example slave addr. 3A
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

For slaves with extended addressing mode (ID code = A) the master uses the binary output bit D3 to distinguish between A and B slaves. D3 cannot be used.

Data distribution of the B slave with profile S-3.A in the M4 gateway

5380

Slave:	• 2 binary inputs • 1 binary output
Gateway:	• 2 binary inputs + 1 binary output

M4 gateway Example for master 1				**B slave Profile S-3.A** Example slave addr. 3B
analogue IN 1				
analogue IN 2				
analogue IN 3				
analogue IN 4				
analogue OUT 1				
analogue OUT 2				
analogue OUT 3				
analogue OUT 4				
A binary IN D0			←	binary IN D0
A binary IN D1			←	binary IN D1
A binary IN D2				
A binary IN D3				
A binary OUT D0				
A binary OUT D1				
A binary OUT D2			→	binary OUT D2
A binary OUT D3				
B binary IN D0	binary IN D0	←		
B binary IN D1	binary IN D1	←		
B binary IN D2				
B binary IN D3				
B binary OUT D0				
B binary OUT D1				
B binary OUT D2	binary OUT D2	→		
B binary OUT D3				

For slaves with extended addressing mode (ID code = A) the master uses the binary output bit D3 to distinguish between A and B slaves. D3 cannot be used.

Data distribution of the single slave with profile S-6.0.x in the M4 gateway (transparent mode)

5381

The slave module contains 2...4 successive slave addresses with digital data.

Number slave addresses	Data length bit stream	Slave profile for ...			
		1st Slave	2nd Slave	3rd Slave	4th Slave
2	8 bits	S-6.0.2	S-6.0.5	—	—
3	12 bits	S-6.0.3	S-6.0.6	S-6.0.5	—
4	16 bits	S-6.0.4	S-6.0.7	S-6.0.6	S-6.0.5

Gateway:	• 1 input channel + 1 output channel (if less than 4 slave addresses only partly used and always filled from left (D15) to right (D0))

Example: First slave address = 3 and data length = 16 bits

M4 gateway						Single slave profile S-6.0.x
analogue IN 1	15...12	11...8	7...4	3...0		Slave profile S-6.0.4 (addr.= 3)
analogue IN 2					← analogue IN 1: 0	binary IN D0
analogue IN 3					← analogue IN 1: 1	binary IN D1
analogue IN 4					← analogue IN 1: 2	binary IN D2
analogue OUT 1	15…12	11…8	7…4	3…0	← analogue IN 1: 3	binary IN D3
analogue OUT 2					analogue OUT 1: 0 →	binary OUT D0
analogue OUT 3					analogue OUT 1: 1 →	binary OUT D1
analogue OUT 4					analogue OUT 1: 2 →	binary OUT D2
A binary IN D0					analogue OUT 1: 3 →	binary OUT D3
A binary IN D1						Slave profile S-6.0.7 (addr.= 4)
A binary IN D2					← analogue IN 1: 4	binary IN D0
A binary IN D3					← analogue IN 1: 5	binary IN D1
A binary OUT D0					← analogue IN 1: 6	binary IN D2
A binary OUT D1					← analogue IN 1: 7	binary IN D3
A binary OUT D2					analogue OUT 1: 4 →	binary OUT D0
A binary OUT D3					analogue OUT 1: 5 →	binary OUT D1
B binary IN D0					analogue OUT 1: 6 →	binary OUT D2
B binary IN D1					analogue OUT 1: 7 →	binary OUT D3
B binary IN D2						Slave profile S-6.0.6 (addr.= 5)
B binary IN D3					← analogue IN 1: 8	binary IN D0
B binary OUT D0					← analogue IN 1: 9	binary IN D1
B binary OUT D1					← analogue IN 1: 10	binary IN D2
B binary OUT D2					← analogue IN 1: 11	binary IN D3
B binary OUT D3					analogue OUT 1: 8 →	binary OUT D0
					analogue OUT 1: 9 →	binary OUT D1
					analogue OUT 1: 10 →	binary OUT D2
					analogue OUT 1: 11 →	binary OUT D3

		Slave profile S-6.0.5 (addr.= 6)
←	analogue IN 1: 12	binary IN D0
←	analogue IN 1: 13	binary IN D1
←	analogue IN 1: 14	binary IN D2
←	analogue IN 1: 15	binary IN D3
analogue OUT 1: 12	→	binary OUT D0
analogue OUT 1: 13	→	binary OUT D1
analogue OUT 1: 14	→	binary OUT D2
analogue OUT 1: 15	→	binary OUT D3

Data distribution of the single slave with profile S-6.0.x in the M4 gateway (analogue mode)

5383

The slave module contains 2...4 successive slave addresses with binary data which together represent an analogue value.

Number slave addresses	Data length bit stream	Slave profile for ...			
		1st slave	2nd slave	3rd slave	4th slave
2	8 bits	S-6.0.A	S-6.0.5	—	—
3	12 bits	S-6.0.B	S-6.0.6	S-6.0.5	—
4	16 bits	S-6.0.C	S-6.0.7	S-6.0.6	S-6.0.5

Gateway:	• 1 input channel + 1 output channel (if less than 4 slave addresses only partly used and always filled from left (D15) to right (D0))

Example: First slave address = 3 and data length = 12 bits

M4 gateway							Single slave profile S-6.0.x
analogue IN 1 *)	15...12	11...8	7...4	3...0			Slave profile S-6.0.B (addr.= 3)
analogue IN 2					←	analogue IN 1: 4	binary IN D0
analogue IN 3					←	analogue IN 1: 5	binary IN D1
analogue IN 4					←	analogue IN 1: 6	binary IN D2
analogue OUT 1 *)	15…12	11…8	7…4	3…0	←	analogue IN 1: 7	binary IN D3
analogue OUT 2					analogue OUT 1: 4	→	binary OUT D0
analogue OUT 3					analogue OUT 1: 5	→	binary OUT D1
analogue OUT 4					analogue OUT 1: 6	→	binary OUT D2
A binary IN D0					analogue OUT 1: 7	→	binary OUT D3
A binary IN D1							Slave profile S-6.0.7 (addr.= 4)
A binary IN D2					←	analogue IN 1: 8	binary IN D0
A binary IN D3					←	analogue IN 1: 9	binary IN D1
A binary OUT D0					←	analogue IN 1: 10	binary IN D2
A binary OUT D1					←	analogue IN 1: 11	binary IN D3
A binary OUT D2					analogue OUT 1: 8	→	binary OUT D0
A binary OUT D3					analogue OUT 1: 9	→	binary OUT D1
B binary IN D0					analogue OUT 1: 10	→	binary OUT D2
B binary IN D1					analogue OUT 1: 11	→	binary OUT D3
B binary IN D2							Slave profile S-6.0.6 (addr.= 5)
B binary IN D3					←	analogue IN 1: 12	binary IN D0
B binary OUT D0					←	analogue IN 1: 13	binary IN D1
B binary OUT D1					←	analogue IN 1: 14	binary IN D2
B binary OUT D2					←	analogue IN 1: 15	binary IN D3
B binary OUT D3					analogue OUT 1: 12	→	binary OUT D0
					analogue OUT 1: 13	→	binary OUT D1
					analogue OUT 1: 14	→	binary OUT D2

	analogue OUT 1: 15	→	binary OUT D3

* Data bit D15 = bit with sign ⇒ therefore the highest slave number always provides the sign of the analogue value and the 3 most significant bits of the analogue value.

*) Data bits D3...0: Data not used is right-padded with zero!

Data distribution of the single slave with profile S-7.3.4 in the M4 gateway

5384

Slave:	• 1-channel analogue output
Gateway:	• 1 output channel

M4 gateway Example for master 1			**Single slave** **Profile S-7.3.4** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.3.5 in the M4 gateway

5386

Slave:	• 2-channel analogue outputs
Gateway:	• 2 output channels

M4 gateway Example for master 1			**Single slave Profile S-7.3.5** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.3.6 in the M4 gateway

5388

Slave:	• 4-channel analogue outputs
Gateway:	• 4 output channels

M4 gateway Example for master 1			**Single slave Profile S-7.3.6** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3	analogue OUT 3	→	analogue OUT 3
analogue OUT 4	analogue OUT 4	→	analogue OUT 4
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.3.C in the M4 gateway

5390

Slave:	• 1-channel analogue input
Gateway:	• 1 input channel

M4 gateway Example for master 1			**Single slave Profile S-7.3.C** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.3.D in the M4 gateway

5392

Slave:	• 2-channel analogue inputs
Gateway:	• 2 input channels

M4 gateway Example for master 1			**Single slave Profile S-7.3.D** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.3.E in the M4 gateway

5394

Slave:	• 4-channel analogue inputs
Gateway:	• 4 input channels

M4 gateway Example for master 1			**Single slave** **Profile S-7.3.E** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3	analogue IN 3	←	analogue IN 3
analogue IN 4	analogue IN 4	←	analogue IN 4
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.0 in the M4 gateway

5396

Slave: E type field in the ID string of the slave = 3	• 4 binary inputs + 4 binary outputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 4 binary inputs + 4 binary outputs

M4 gateway Example for master 1			**Single slave Profile S-7.4.0** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2	binary IN D2	←	binary IN D2
A binary IN D3	binary IN D3	←	binary IN D3
A binary OUT D0	binary OUT D0	→	binary OUT D0
A binary OUT D1	binary OUT D1	→	binary OUT D1
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3	binary OUT D3	→	binary OUT D3
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.4 in the M4 gateway

5398

Slave: E type field in the ID string of the slave = 1	• 1-channel analogue output • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 1 output channel

M4 gateway Example for master 1			**Single slave Profile S-7.4.4** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.5 in the M4 gateway

5400

Slave: E type field in the ID string of the slave = 3	• 2-channel analogue outputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 2 output channels

M4 gateway Example for master 1			**Single slave Profile S-7.4.5** Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.6 in the M4 gateway

5404

Slave: E type field in the ID string of the slave = 3	• 4-channel analogue outputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 4 output channels

M4 gateway Example for master 1			**Single slave Profile S-7.4.**6 Example slave addr. 3
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3	analogue OUT 3	→	analogue OUT 3
analogue OUT 4	analogue OUT 4	→	analogue OUT 4
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.C in the M4 gateway

5406

Slave: E type field in the ID string of the slave = 3	• 1-channel analogue input • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 1 input channel

M4 gateway Example for master 1			**Single slave Profile S-7.4.C** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.D in the M4 gateway

5408

Slave: E type field in the ID string of the slave = 3	• 2-channel analogue inputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 2 input channels

M4 gateway Example for master 1			**Single slave Profile S-7.4.D** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.4.E in the M4 gateway

5410

Slave: E type field in the ID string of the slave = 3	• 4-channel analogue inputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 4 input channels

M4 gateway Example for master 1			**Single slave Profile S-7.4.E** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3	analogue IN 3	←	analogue IN 3
analogue IN 4	analogue IN 4	←	analogue IN 4
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the single slave with profile S-7.5.5 in the M4 gateway

5412

Slave:	• 0…4-channel analogue inputs OR < 64-bit binary inputs • 0…4-channel analogue outputs OR < 64-bit binary outputs • 2 binary inputs + 2 binary outputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 0…4 input channels • 0…4 output channels • 2 binary inputs + 2 binary outputs

Graphics: diagram for analogue signals

M4 gateway Example for master 1			**Single slave** **Profile S-7.5.5** Example slave addr. 3
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3	analogue IN 3	←	analogue IN 3
analogue IN 4	analogue IN 4	←	analogue IN 4
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3	analogue OUT 3	→	analogue OUT 3
analogue OUT 4	analogue OUT 4	→	analogue OUT 4
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3	binary OUT D3	→	binary OUT D3
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Graphics: diagram for binary signals

M4 gateway Example for master 1			**Single slave** **Profile S-7.5.5** Example slave addr. 3
analogue IN 1	< 16-bit binary IN 1	←	< 16-bit binary IN 1
analogue IN 2	< 16-bit binary IN 2	←	< 16-bit binary IN 2
analogue IN 3	< 16-bit binary IN 3	←	< 16-bit binary IN 3
analogue IN 4	< 16-bit binary IN 4	←	< 16-bit binary IN 4
analogue OUT 1	< 16-bit binary OUT 1	→	< 16-bit binary OUT 1
analogue OUT 2	< 16-bit binary OUT 2	→	< 16-bit binary OUT 2
analogue OUT 3	< 16-bit binary OUT 3	→	< 16-bit binary OUT 3
analogue OUT 4	< 16-bit binary OUT 4	→	< 16-bit binary OUT 4
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3	binary OUT D3	→	binary OUT D3
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the A slave with profile S-7.A.5 in the M4 gateway

5414

Slave:	• 0…2 channels analogue inputs OR < 32-bit binary inputs • 0…2 channels analogue outputs OR < 32-bit binary outputs • 2 binary inputs + 1 binary output • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 0…2 input channels • 0…2 output channels • 2 binary inputs + 1 binary output

Graphics: diagram for analogue signals

M4 gateway Example for master 1			**A slave Profile S-A.5** Example slave addr. 3A
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Graphics: diagram for binary signals

M4 gateway Example for master 1			**A slave** **Profile S-7.A.5** Example slave addr. 3A
analogue IN 1	< 16-bit binary IN 1	←	< 16-bit binary IN 1
analogue IN 2	< 16-bit binary IN 2	←	< 16-bit binary IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1	< 16-bit binary OUT 1	→	< 16-bit binary OUT 1
analogue OUT 2	< 16-bit binary OUT 2	→	< 16-bit binary OUT 2
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the B slave with profile S-7.A.5 in the M4 gateway

5416

Slave:	• 0…2 channels analogue inputs OR < 32-bit binary inputs • 0…2 channels analogue outputs OR < 32-bit binary outputs • 2 binary inputs + 1 binary output • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 0…2 input channels • 0…2 output channels • 2 binary inputs + 1 binary output

Graphics: diagram for analogue signals

M4 gateway Example for master 1				**B slave** **Profile S-7.A.5** Example slave addr. 3B
analogue IN 1			←	analogue IN 1
analogue IN 2			←	analogue IN 2
analogue IN 3	analogue IN 1	←		
analogue IN 4	analogue IN 2	←		
analogue OUT 1			→	analogue OUT 1
analogue OUT 2			→	analogue OUT 2
analogue OUT 3	analogue OUT 1	→		
analogue OUT 4	analogue OUT 2	→		
A binary IN D0			←	binary IN D0
A binary IN D1			←	binary IN D1
A binary IN D2				
A binary IN D3				
A binary OUT D0				
A binary OUT D1				
A binary OUT D2			→	binary OUT D2
A binary OUT D3				
B binary IN D0	binary IN D0	←		
B binary IN D1	binary IN D1	←		
B binary IN D2				
B binary IN D3				
B binary OUT D0				
B binary OUT D1				
B binary OUT D2	binary OUT D2	→		
B binary OUT D3				

Graphics: diagram for binary signals

M4 gateway Example for master 1				**B slave Profile S-7.A.5** Example slave addr. 3B
analogue IN 1			←	< 16-bit binary IN 1
analogue IN 2			←	< 16-bit binary IN 2
analogue IN 3	< 16-bit binary IN 1	←		
analogue IN 4	< 16-bit binary IN 2	←		
analogue OUT 1			→	< 16-bit binary OUT 1
analogue OUT 2			→	< 16-bit binary OUT 2
analogue OUT 3	< 16-bit binary OUT 1	→		
analogue OUT 4	< 16-bit binary OUT 2	→		
A binary IN D0			←	binary IN D0
A binary IN D1			←	binary IN D1
A binary IN D2				
A binary IN D3				
A binary OUT D0				
A binary OUT D1				
A binary OUT D2			→	binary OUT D2
A binary OUT D3				
B binary IN D0	binary IN D0	←		
B binary IN D1	binary IN D1	←		
B binary IN D2				
B binary IN D3				
B binary OUT D0				
B binary OUT D1				
B binary OUT D2	binary OUT D2	→		
B binary OUT D3				

Data distribution of the A slave with profile S-7.A.7 in the M4 gateway

5417

Slave:	• 4 binary inputs + 4 binary outputs • 16-bit integer OR bit stream
Gateway:	• 4 binary inputs + 4 binary outputs

M4 gateway Example for master 1			**A slave** **Profile S-7.A.7** Example slave addr. 3A
analogue IN 1			
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0	binary IN D0	←	binary IN D0
A binary IN D1	binary IN D1	←	binary IN D1
A binary IN D2	binary IN D2	←	binary IN D2
A binary IN D3	binary IN D3	←	binary IN D3
A binary OUT D0	binary OUT D0	→	binary OUT D0
A binary OUT D1	binary OUT D1	→	binary OUT D1
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3	binary OUT D3	→	binary OUT D3
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the B slave with profile S-7.A.7 in the M4 gateway

5419

Slave:	• 4 binary inputs + 4 binary outputs • 16-bit integer OR bit stream
Gateway:	• 4 binary inputs + 4 binary outputs

M4 gateway Example for master 1				**B slave** **Profile S-7.A.7** Example slave addr. 3B
analogue IN 1				
analogue IN 2				
analogue IN 3				
analogue IN 4				
analogue OUT 1				
analogue OUT 2				
analogue OUT 3				
analogue OUT 4				
A binary IN D0			←	binary IN D0
A binary IN D1			←	binary IN D1
A binary IN D2			←	binary IN D2
A binary IN D3			←	binary IN D3
A binary OUT D0			→	binary OUT D0
A binary OUT D1			→	binary OUT D1
A binary OUT D2			→	binary OUT D2
A binary OUT D3			→	binary OUT D3
B binary IN D0	binary IN D0	←		
B binary IN D1	binary IN D1	←		
B binary IN D2	binary IN D2	←		
B binary IN D3	binary IN D3	←		
B binary OUT D0	binary OUT D0	→		
B binary OUT D1	binary OUT D1	→		
B binary OUT D2	binary OUT D2	→		
B binary OUT D3	binary OUT D3	→		

Data distribution of the A slave with profile S-7.A.8 in the M4 gateway

5420

Slave:	• 1-channel analogue input OR < 16-bit binary inputs • 1 binary output • 14/16-bit integer OR 8/12/16-bit bit stream
Gateway:	• 1 input channel • 1 binary output

Graphics: diagram for analogue signals:

M4 gateway Example for master 1			**A slave Profile S-7.A.8** Example slave addr. 3A
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Graphics: diagram for binary signals:

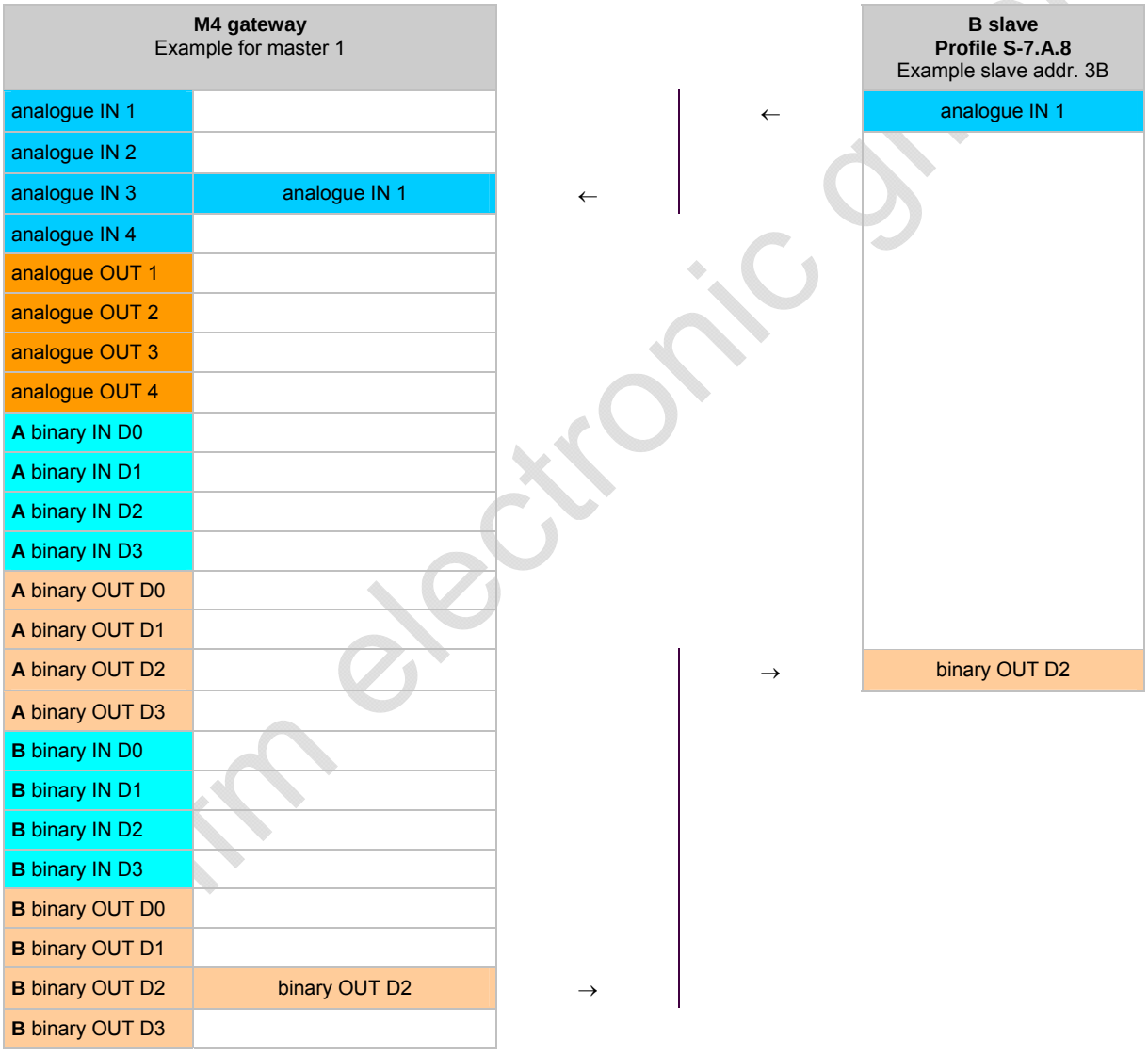
M4 gateway Example for master 1			**A slave** **Profile S-7.A.8** Example slave addr. 3A
analogue IN 1	< 16-bit binary IN 1	←	< 16-bit binary IN 1
analogue IN 2			
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2	binary OUT D2	→	binary OUT D2
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the B slave with profile S-7.A.8 in the M4 gateway

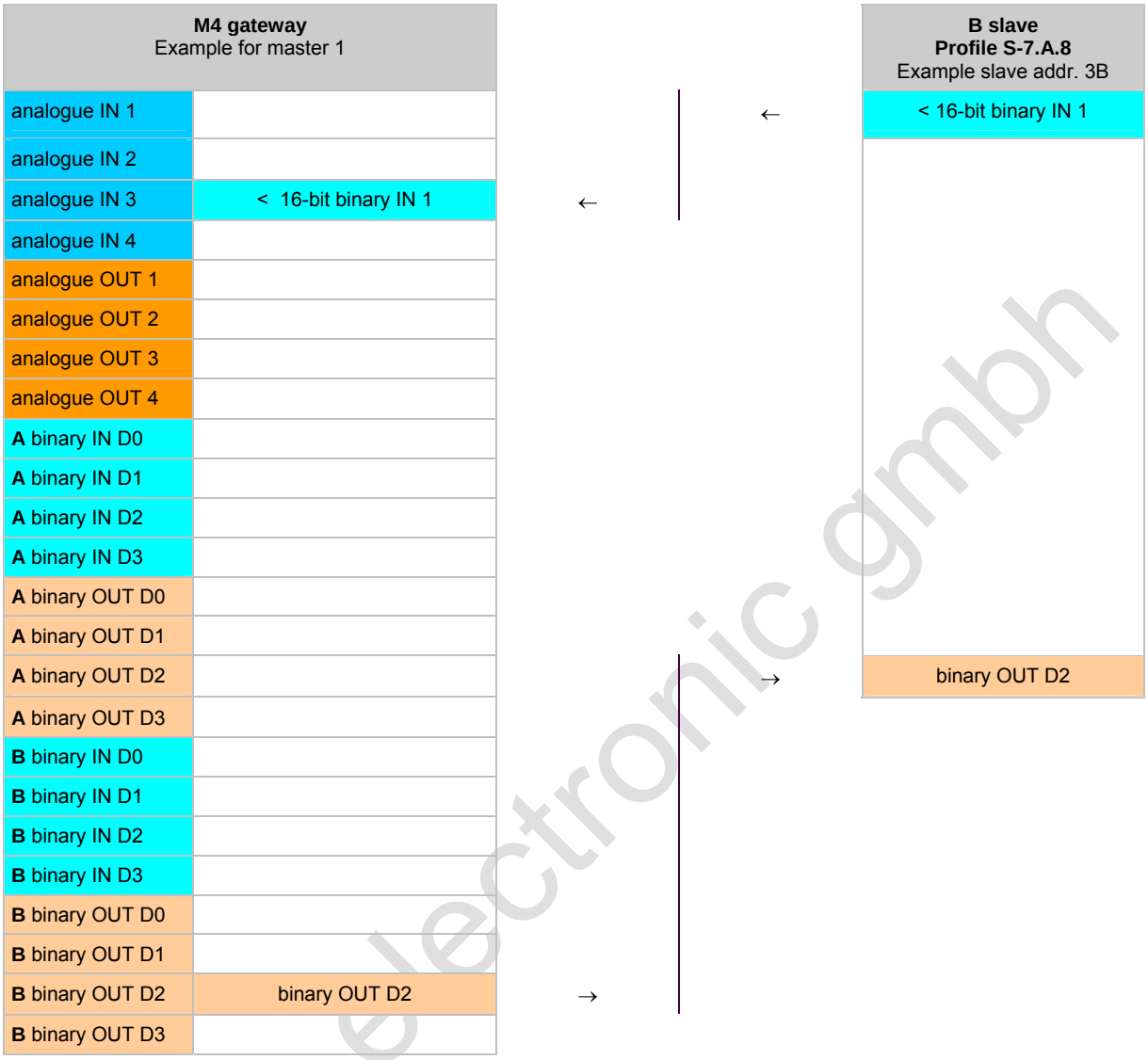
5422

Slave:	• 1-channel analogue input OR < 16-bit binary inputs • 1 binary output • 14/16-bit integer OR 8/12/16-bit bit stream
Gateway:	• 1 input channel • 1 binary output

Graphics: diagram for analogue signals:



Graphics: diagram for binary signals:



Data distribution of the A slave with profile S-7.A.9 in the M4 gateway

5423

Slave:	• 2-channel analogue inputs OR < 32-bit binary inputs • 12/14-bit integer
Gateway:	• 2 input channels

Graphics: diagram for analogue signals:

M4 gateway Example for master 1			**A slave** **Profile S-7.A.9** Example slave addr. 3A
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Graphics: diagram for binary signals:

M4 gateway Example for master 1			**A slave** **Profile S-7.A.9** Example slave addr. 3A
analogue IN 1	< 16-bit binary IN 1	←	< 16-bit binary IN 1
analogue IN 2	< 16-bit binary IN 2	←	< 16-bit binary IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1			
analogue OUT 2			
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the B slave with profile S-7.A.9 in the M4 gateway

5425

Slave:	• 2-channel analogue inputs OR < 32-bit binary inputs • 12/14-bit integer
Gateway:	• 2 input channels

Graphics: diagram for analogue signals:

M4 gateway Example for master 1				**B slave** **Profile S-7.A.9** Example slave addr. 3B
analogue IN 1			←	analogue IN 1
analogue IN 2			←	analogue IN 2
analogue IN 3	analogue IN 1	←		
analogue IN 4	analogue IN 2	←		
analogue OUT 1				
analogue OUT 2				
analogue OUT 3				
analogue OUT 4				
A binary IN D0				
A binary IN D1				
A binary IN D2				
A binary IN D3				
A binary OUT D0				
A binary OUT D1				
A binary OUT D2				
A binary OUT D3				
B binary IN D0				
B binary IN D1				
B binary IN D2				
B binary IN D3				
B binary OUT D0				
B binary OUT D1				
B binary OUT D2				
B binary OUT D3				

Graphics: diagram for binary signals:

M4 gateway Example for master 1				**B slave Profile S-7.A.9** Example slave addr. 3B
analogue IN 1			←	< 16-bit binary IN 1
analogue IN 2			←	< 16-bit binary IN 2
analogue IN 3	< 16-bit binary IN 1	←		
analogue IN 4	< 16-bit binary IN 2	←		
analogue OUT 1				
analogue OUT 2				
analogue OUT 3				
analogue OUT 4				
A binary IN D0				
A binary IN D1				
A binary IN D2				
A binary IN D3				
A binary OUT D0				
A binary OUT D1				
A binary OUT D2				
A binary OUT D3				
B binary IN D0				
B binary IN D1				
B binary IN D2				
B binary IN D3				
B binary OUT D0				
B binary OUT D1				
B binary OUT D2				
B binary OUT D3				

Data distribution of the A slave with profile S-7.A.A in the M4 gateway

5426

Slave:	• 8 binary inputs + 8 binary outputs
Gateway:	• 1 input channel • 1 output channel

M4 gateway Example for master 1					**A slave Profile S-7.A.A** Example slave addr. 3A
analogue IN 1	15...8	—	←	analogue IN 1: 8	binary IN D0
analogue IN 2			←	analogue IN 1: 9	binary IN D1
analogue IN 3			←	analogue IN 1: 10	binary IN D2
analogue IN 4			←	analogue IN 1: 11	binary IN D3
analogue OUT 1	15...8	—	←	analogue IN 1: 12	binary IN D4
analogue OUT 2			←	analogue IN 1: 13	binary IN D5
analogue OUT 3			←	analogue IN 1: 14	binary IN D6
analogue OUT 4			←	analogue IN 1: 15	binary IN D7
A binary IN D0			analogue OUT 1: 8	→	binary OUT D0
A binary IN D1			analogue OUT 1: 9	→	binary OUT D1
A binary IN D2			analogue OUT 1: 10	→	binary OUT D2
A binary IN D3			analogue OUT 1: 11	→	binary OUT D3
A binary OUT D0			analogue OUT 1: 12	→	binary OUT D4
A binary OUT D1			analogue OUT 1: 13	→	binary OUT D5
A binary OUT D2			analogue OUT 1: 14	→	binary OUT D6
A binary OUT D3			analogue OUT 1: 15	→	binary OUT D7
B binary IN D0					
B binary IN D1					
B binary IN D2					
B binary IN D3					
B binary OUT D0					
B binary OUT D1					
B binary OUT D2					
B binary OUT D3					

Data distribution of the B slave with profile S-7.A.A in the M4 gateway

5428

Slave:	• 8 binary inputs + 8 binary outputs
Gateway:	• 1 input channel • 1 output channel

M4 gateway Example for master 1					**B slave Profile S-7.A.A** Example slave addr. 3B
analogue IN 1			←	analogue IN 3: 8	binary IN D0
analogue IN 2			←	analogue IN 3: 9	binary IN D1
analogue IN 3	15...8	—	←	analogue IN 3: 10	binary IN D2
analogue IN 4			←	analogue IN 3: 11	binary IN D3
analogue OUT 1			←	analogue IN 3: 12	binary IN D4
analogue OUT 2			←	analogue IN 3: 13	binary IN D5
analogue OUT 3	15...8	—	←	analogue IN 3: 14	binary IN D6
analogue OUT 4			←	analogue IN 3: 15	binary IN D7
A binary IN D0			analogue OUT 3: 8	→	binary OUT D0
A binary IN D1			analogue OUT 3: 9	→	binary OUT D1
A binary IN D2			analogue OUT 3: 10	→	binary OUT D2
A binary IN D3			analogue OUT 3: 11	→	binary OUT D3
A binary OUT D0			analogue OUT 3: 12	→	binary OUT D4
A binary OUT D1			analogue OUT 3: 13	→	binary OUT D5
A binary OUT D2			analogue OUT 3: 14	→	binary OUT D6
A binary OUT D3			analogue OUT 3: 15	→	binary OUT D7
B binary IN D0					
B binary IN D1					
B binary IN D2					
B binary IN D3					
B binary OUT D0					
B binary OUT D1					
B binary OUT D2					
B binary OUT D3					

Data distribution of the A slave with profile S-B.A.5 in the M4 gateway

5429

Slave:	• 0…2 channels analogue inputs OR < 32-bit binary inputs • 0…2 channels analogue outputs OR < 32-bit binary outputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 2 input channels • 2 output channels

Graphics: diagram for analogue signals

M4 gateway Example for master 1			**A slave** **Profile S-B.A.5** Example slave addr. 3A
analogue IN 1	analogue IN 1	←	analogue IN 1
analogue IN 2	analogue IN 2	←	analogue IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1	analogue OUT 1	→	analogue OUT 1
analogue OUT 2	analogue OUT 2	→	analogue OUT 2
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Graphics: diagram for binary signals

M4 gateway Example for master 1			**A slave** **Profile S-B.A.5** Example slave addr. 3A
analogue IN 1	< 16-bit binary IN 1	←	< 16-bit binary IN 1
analogue IN 2	< 16-bit binary IN 2	←	< 16-bit binary IN 2
analogue IN 3			
analogue IN 4			
analogue OUT 1	< 16-bit binary OUT 1	→	< 16-bit binary OUT 1
analogue OUT 2	< 16-bit binary OUT 2	→	< 16-bit binary OUT 2
analogue OUT 3			
analogue OUT 4			
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Data distribution of the B slave with profile S-B.A.5 in the M4 gateway

5431

Slave:	• 0…2 channels analogue inputs OR < 32-bit binary inputs • 0…2 channels analogue outputs OR < 32-bit binary outputs • 16-bit integer OR bit stream • device string • parameter string • diagnostic string
Gateway:	• 2 input channels • 2 output channels

Graphics: diagram for analogue signals

M4 gateway Example for master 1			**B slave Profile S-B.A.5** Example slave addr. 3B
analogue IN 1		←	analogue IN 1
analogue IN 2		←	analogue IN 2
analogue IN 3	analogue IN 1	←	
analogue IN 4	analogue IN 2	←	
analogue OUT 1		→	analogue OUT 1
analogue OUT 2		→	analogue OUT 2
analogue OUT 3	analogue OUT 1	→	
analogue OUT 4	analogue OUT 2	→	
A binary IN D0			
A binary IN D1			
A binary IN D2			
A binary IN D3			
A binary OUT D0			
A binary OUT D1			
A binary OUT D2			
A binary OUT D3			
B binary IN D0			
B binary IN D1			
B binary IN D2			
B binary IN D3			
B binary OUT D0			
B binary OUT D1			
B binary OUT D2			
B binary OUT D3			

Graphics: diagram for binary signals

M4 gateway Example for master 1				**B slave** **Profile S-B.A.5** Example slave addr. 3B
analogue IN 1			←	< 16-bit binary IN 1
analogue IN 2			←	< 16-bit binary IN 2
analogue IN 3	< 16-bit binary IN 1	←		
analogue IN 4	< 16-bit binary IN 2	←		
analogue OUT 1			→	< 16-bit binary OUT 1
analogue OUT 2			→	< 16-bit binary OUT 2
analogue OUT 3	< 16-bit binary OUT 1	→		
analogue OUT 4	< 16-bit binary OUT 2	→		
A binary IN D0				
A binary IN D1				
A binary IN D2				
A binary IN D3				
A binary OUT D0				
A binary OUT D1				
A binary OUT D2				
A binary OUT D3				
B binary IN D0				
B binary IN D1				
B binary IN D2				
B binary IN D3				
B binary OUT D0				
B binary OUT D1				
B binary OUT D2				
B binary OUT D3				

5 Electrical connection

Contents

^^5433

→ data sheet
→ Mounting Instructions

5.1 Suggested wiring

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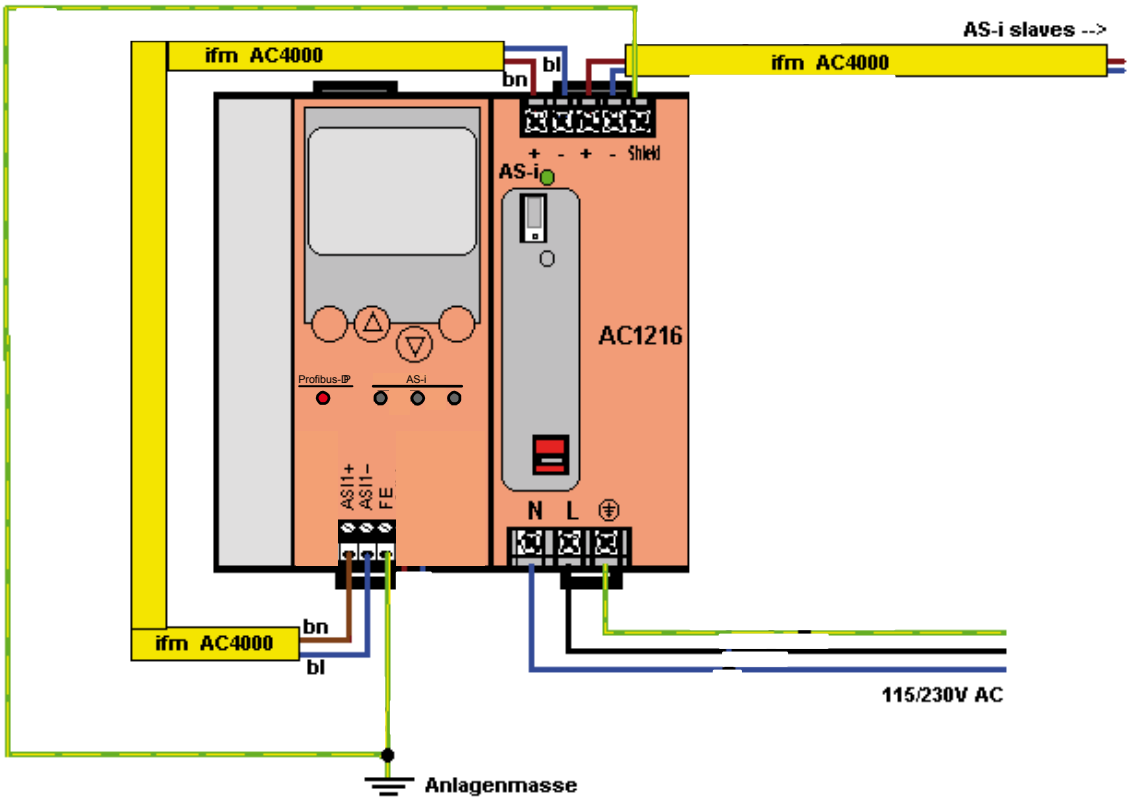
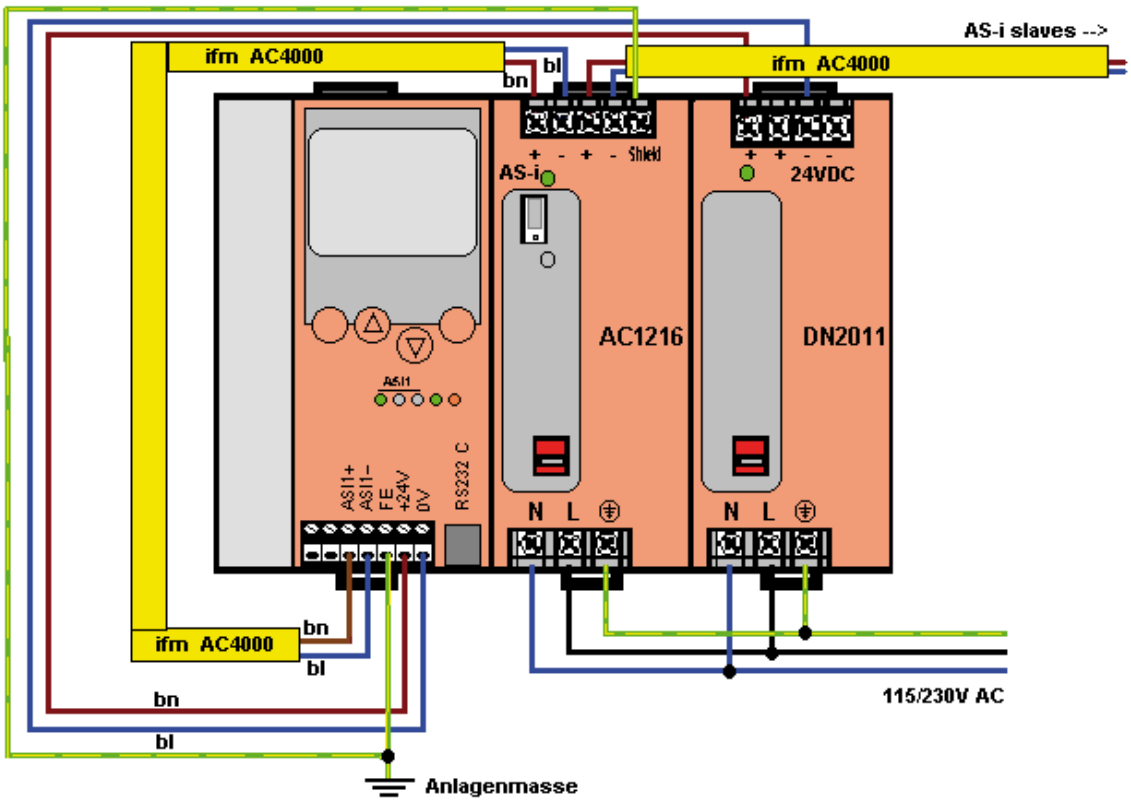


Graphics: Suggested wiring of gateway AC1375



Graphics: Suggested wiring of gateway AC1376

5.2 The AS-i power supply

5437

To operate an AS-i system a special AS-i power supply is required, e.g. AC1236 from **ifm electronic**. The AS-i power supply supplies the connected slaves with energy via the yellow AS-i cable and at the same time implements data decoupling from the voltage regulator of the power supply. Standard switched-mode power supplies do not feature data decoupling and are therefore not suited for use as AS-i current supply.

In the **ifm** AS-i power supplies the two terminals AS-i+ and AS-i- are designed redundantly, so that they can additionally be connected to the terminals ASI 1+ and ASI 1- of the gateway without additional terminals. The same applies to ASI 2+ and ASI 2- for the second AS-i master circuit.

For the operation of the optional second AS-i master a second AS-i power supply is required, because the two master circuits must be electrically isolated.

NOTE

Overcurrent in case of short circuit!
Risk of damage to devices. In case of short circuits, the AS-i power supply provides the maximum current.

► Disconnect the power supply before the device is connected.

NOTE

Interference or corruption of the AS-i signals possible.
When the AS-i power supply is grounded, the signals AS-i+ and AS-i- are no longer symmetrical to the mass potential of the machine/plant.

► Do NOT ground the AS-i network.

► Connect the "Shield" terminal on the AS-i power supply to the machine ground (GND potential) so that it is well conductive.

5.3 Wiring and set-up of the slaves

5438

In general, the AS-i devices are short-circuit proof and reverse-polarity protected. Control cabinet modules, however, should be wired while disconnected.

NOTE

Malfunction of the machine/plant in which the device is installed!
Possible damage or destruction of the devices by a short circuit when working while live.

- ► Electrical installation tasks must be carried out by a qualified electrician.
- ► Disconnect the power supply before connecting the device in order to avoid short circuits during installation.
- ► Only install the gateway and the slaves while disconnected!

- ► Disconnect the gateway and its supply.
- ► Connect the AS-i field modules.
- ► Connect the AS-i control cabinet modules.
- ► Address the AS-i slaves:
  a) before installation via the addressing device or
  b) after installation via the menu [Slave addresses] > [Addressing].
- ► Activate the gateway and its supply again.

> The green LED [PWR/COM] flashes or is lit.
The red LED [PROJ] flashes because projection does not yet correspond to the connected periphery.

- ► In a next step address the slaves: → chapter Configuration of the slaves (→ page 119).

6 Operating and display elements

Contents

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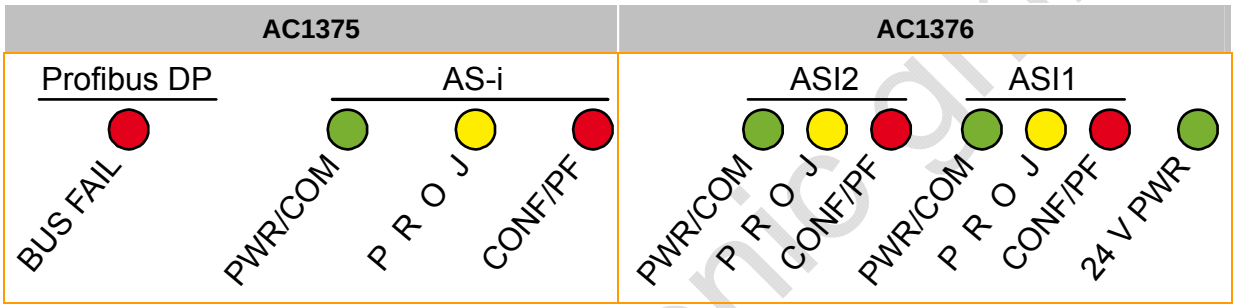
6.1 Diagnostic LEDs

5441

The three diagnostic LEDs on the device inform about the status of the AS-i master and the connected systems:



Graphics: diagnostic LEDs on the gateway

Two designations for one LED separated by a slash "/" mean:

- The first designation describes the state when the LED is permanently lit (mostly: normal case) and
- the second designation describes the state when the LED is flashing (mostly: normal case).

Table: LED functions

Diagnostic LEDs	LED colour	LED off	LED lit	LED flashes
ASI1 [PWR/COM] AS-i bus 1: Power Communication	green	no supply for AS-i bus 1	AS-i supply is available; at least 1 slave on the bus was recognised	AS-i supply is available; no slave on the bus was recognised
ASI1 [PROJ] AS-i bus 1: Projection	yellow	operating mode is active	projection mode is active; configuration monitoring is deactivated	projection mode active; changeover to protected mode not possible because a slave with the address 0 is connected
ASI1 [CONF/PF] AS-i bus 1: Configuration Peripheral Fault	red	configuration and periphery ok	projected and current configuration do not match	periphery fault detected
ASI2 [PWR/COM] AS-i bus 2: Power Communication	green	no supply for AS-i bus 2	AS-i supply is available; at least 1 slave on the bus was recognised	AS-i supply is available; no slave on the bus was recognised
ASI2 [PROJ] AS-i bus 2: Projection	yellow	operating mode is active	projection mode is active; configuration monitoring is deactivated	projection mode active; changeover to protected mode not possible because a slave with the address 0 is connected
ASI2 [CONF/PF] AS-i bus 2: Configuration Peripheral Fault	red	configuration and periphery ok	projected and current configuration do not match	periphery fault detected
[24V PWR]	green	no 24 V operating voltage	24 V operating voltage available	---
[BUS FAIL]	red	when response monitoring (watchdog) active: Profibus connection ok OR: master switched off OR: response monitoring (watchdog) deactivated	when response monitoring (watchdog) active: no Profibus connection	device error → message text in text/graphics display

6.2 Display (presentation, language, contrast/brightness)

Contents

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Using the text/graphics display on the device enables a more detailed system diagnosis. With the four keys the device is easy to use. The bilingual structure of the menus and messages simplifies worldwide use of this device family. An intelligent message management generates priority-based diagnostic and error messages and supports the user during set-up.

The respective function of the keys is displayed dynamically above the keys.

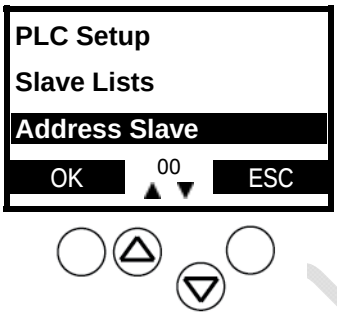
After power-on of the gateway the device displays either a start screen with the ifm logo (AC1376) or with the headline "AS-i DP Gateway" (AC1375) or – if available – a list of the errors in the connected AS-i systems. In any case, the system menu can be accessed by pressing the left [MENU] button.

6.2.1 What is what in the text/graphics display?

5449

Menu screen

5450



> Usually the menu shows 3 to 5 lines similar to those on the left.

> One menu line is inverted:
This shows the active or selected entry. By pressing on [OK] the device changes to the respective menu screen.

> 00:
Number of the menu screen.

> Triangles [▲] or [▼]:
note which arrow keys can be used to scroll in the menus (or: to move the line marking).

► Press [▲] or [▼] to scroll through the menu or the values:
[▲] = scroll through the menu points or increment the value,
[▼] = scroll through the menu points or decrement the value.

► Press [OK] to select marked menu item.

► Press [ESC] to quit this menu to go to the previous menu level.

Info

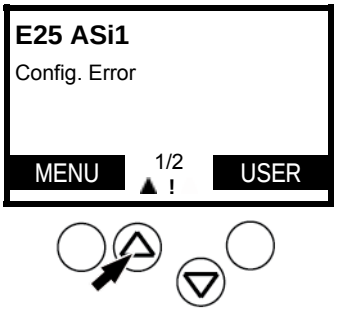
In this documentation we show the menu version for the device AC1376 (2 AS-i master).

Some menus are slightly different and / or have other menu screen numbers for the device AC1375 (1 AS-i master). We indicate the deviations.

Error screen

5452

In case of a configuration error or failure the start screen of the text/graphics display will provide information as shown in the following screen:



Display of an error when the start screen was active:

> E25 = error number, → chapter Troubleshooting (→ page 479).

> ASi1 = concerned AS-i master channel number.

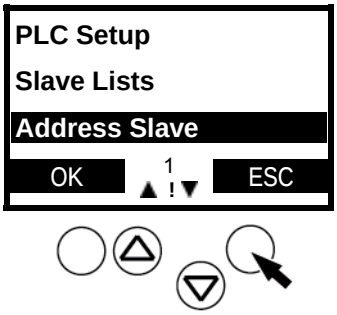
> Config. Error:
There is a configuration error.

> 1/2:
First page of 2 with troubleshooting.

> Flashing "**!**":
There is an error message.

> LED [CONF/PF] lights.

> Triangles [▲] / [▼]
note which arrow keys can be used to scroll.



Display of an error when any menu screen is active:

> Flashing "**!**":
There is an error message.

> LED [CONF/PF] lights.

> Triangles [▲] / [▼]
note which arrow keys can be used to scroll.

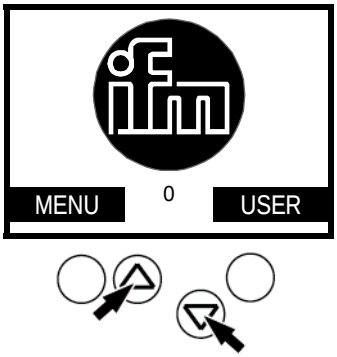
► Return to the start screen with [ESC].

> An error screen as described above appears.

6.2.2 Text/graphics display: Switch language

5454

There are 2 languages stored for the text/graphics display in the device. You can change between the languages at any time.

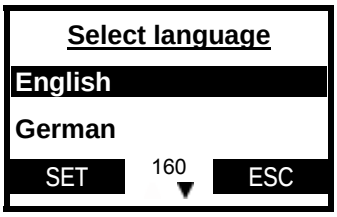


Step 1:

> **Example:** current language = English.

► [▲] and [▼] pressed simultaneously for about 2 seconds.

simultaneously!

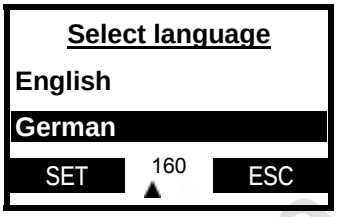


Step 2:

> Text/graphics display is reinitialised.

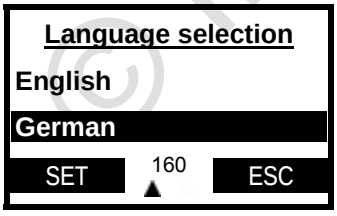
> Indication of the current language (here: English).

► Move to the requested language with [▲] or [▼].



Step 3:

► Select the requested language with [SET].



Step 4:

> Display changes to the requested language.

► Quit language selection with [ESC].

> That's it!

English is always available and is set as default language on delivery. The other language depends on the device version (→ AS-i catalogue). Therefore, the menus shown in this manual are only in English.

6.2.3 Text/graphics display: Set contrast/brightness

5456

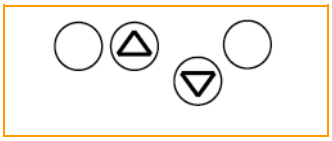
If the text/graphics display is difficult to read, the contrast can be set:

> **The display is too bright / too pale:**	
 **simultaneously!**	► Press these buttons simultaneously. > Contrast is increased / screen becomes darker.
> **The display is too dark:**	
 **simultaneously!**	► Press these buttons simultaneously. > Contrast is decreased / screen becomes brighter.
> **The text/graphics display indicates nothing any more (only background illumination active). All other functions of the device are not affected.**	
 **simultaneously!**	► [▲] and [▼] pressed simultaneously for about 2 seconds. > Text/graphics display is reinitialised. > Language selection is active. ► Quit language selection with [ESC].

The device automatically stores the last setting.

6.3 Key functions

5460



The four keys on the device enable quick and easy handling of the menu:

The [▲] und [▼] keys are used for selecting the menu or for changing the displayed values. Menus with more than three options are adapted automatically. If it is possible to move upwards and downwards in the menu, this is indicated by means of small arrows in the middle of the lowest line of the display (→ Menu screen (→ page 94)).

The two outer keys are function keys. Their function depends on the menu screen and is indicated in the lowest row of the display by means of inverted texts.

Example:

- Here the left key is used for the function [OK], i.e. to confirm the selected menu item.
- The right key is used for the function [ESC], i.e. to return to the previous menu level.

7 Menu

Contents

5464

Info

All menu texts in this manual are in English.

Switch language → chapter Text/graphics display: Switch language (→ page 96).

7.1 Menu overview

5466

With [Menu] the main menus indicated below can be opened:

Main menu	Explanation
Main menu [Quick Setup] (→ page 100)	quick setting of AS-i and fieldbus parameters
Main menu [Slave Lists] (→ page 101)	display of status information of the slaves in lists
Main menu [Address Slave] (→ page 102)	individual addressing of slaves
Main menu [Diagnostics] (→ page 103)	display of status information of the masters and reset of the error counter
Main menu [Master Setup] (→ page 105)	set operating modes master
Main menu [Fieldbus Setup] (→ page 107)	set fieldbus parameters
Main menu [Slave Info] (→ page 109)	displaying status information of individual active slaves
Main menu [Slave Setup] (→ page 110)	displaying or changing output data or parameters of individual slaves
Main menu [System Setup] (→ page 112)	set parameters for programming interfaces, update firmware, set access password, etc.
Main menu [System Info] (→ page 115)	display of all system parameters

7.2 Main menu [Quick Setup]

5467

Menu tree	Explanation
Quick Setup -- Config. all	► Quick configuration of all → chapter Finish configuration (→ page 128). > The device changes to the projection mode, if it has not done so already. > The device checks all connected slaves (on both masters) and enters them in its table as "projected". > The device changes to the protected mode.
Quick Setup -- Fieldbus Setup	► Quick configuration of the fieldbus. > Display of the current fieldbus address. ► Change the fieldbus address using the keys [▲] or [▼]. ► After pressing [OK]: > Display of the baud rate set in the Profibus master. ► Always after pressing [OK]: > Display of the data saved in the fieldbus master via the data packages for communication with the AS-i master: ▪ Digital inputs in the fieldbus master from single or A slaves on AS-i master 1 ▪ Digital outputs in the fieldbus master to single or A slaves on AS-i master 1 ▪ Digital inputs in the fieldbus master from single or A slaves on AS-i master 2 ▪ Digital outputs in the fieldbus master to single or A slaves on AS-i master 2 ▪ Digital inputs in the fieldbus master of B slaves on AS-i master 1 ▪ Digital outputs in the fieldbus master to B slaves on AS-i master 1 ▪ Digital inputs in the fieldbus master from B slaves on AS-i master 2 ▪ Digital outputs in the fieldbus master to B slaves on AS-i master 2 ▪ Analogue multiplex inputs in the fieldbus master ▪ Analogue multiplex outputs in the fieldbus master ▪ Fieldbus data command channel ▪ Fieldbus data PLC inputs in the fieldbus master ▪ Fieldbus PLC outputs in the fieldbus master ▪ Analogue inputs in the fieldbus master from AS-i master 1 ▪ Analogue outputs in the fieldbus master to AS-i master 1

Menu tree	Explanation
	▪ Analogue inputs in the fieldbus master from AS-i master 2 ▪ Analogue outputs in the fieldbus master to AS-i master 2 ▪ Fieldbus data diagnosis ▪ Fieldbus master command channel ▪ Digital inputs in the fieldbus master from single or A slaves on AS-i master 1 (cycle starts again). ► Abort with [ESC].

7.3 Main menu [Slave Lists]

5469

Display of status information of the slaves in lists.

Menu tree	Explanation
Slave Lists -- AS-i Master 1	
Slave Lists -- AS-i Master 1 -- -- Detected Slaves AS-I 1	Detected slaves on AS-i master 1: (→ chapter Display of the list of detected slaves (LDS) (→ page 413)) > Indication at which slave address the device has detected a slave (or several slaves) type A, B or S (standard) on the bus irrespective of whether the slave is active on the bus.
Slave Lists -- AS-i Master 1 -- -- Projected Slaves AS-I 1	Projected slaves on AS-i master 1: (→ chapter Display of the list of projected slaves (LPS) (→ page 416)) > Indication at which slave address a slave (or several slaves) type A, B or S (standard) is projected on the bus.
Slave Lists -- AS-i Master 1 -- -- Activated Slaves AS-I 1	Activated slaves on AS-i master 1: (→ chapter Display list of activated slaves (LAS) (→ page 419)) > Indication at which slave address the device has detected an activated slave type A, B or S (standard) on the bus. Only detected and projected slaves can be activated. The slave configuration is ok when all projected slaves on the bus have been detected and activated.
Slave Lists -- AS-i Master 1 -- -- Peripherie Fault AS-i 1	Peripheral fault on AS-i master 1: (→ chapter Display of the list of slaves with peripheral fault (LPF) (→ page 422)) > Indication at which slave address the device has detected one slave (or several slaves) type A, B or S (standard) with a wiring fault on the bus.
Slave Lists -- AS-i Master 2	See AS-i master 1

7.4 Main menu [Address Slave]

5471

Address slaves individually (password level 1 required).

Menu tree	Explanation
Address Slave -- Change Address	Address slaves (→ chapter Manual slave addressing (→ page 124))
Address Slave -- Change Address -- -- AS-i Master 1	> Display of the detected slave with the lowest address on the bus. ► Scroll through the addresses of the detected slaves with the buttons [▲] or [▼]. ► After pressing [OK]: change the current address using the buttons [▲] or [▼]. ► Adopt the new address with [OK]. Alternatively: ► Abort addressing with [ESC] and keep the old address.
Address Slave -- Change Address -- -- AS-i Master 2	see slave addressing AS-i master 1
Address Slave -- Easy Startup	Easy startup (→ chapter Automatic individual addressing of slaves (→ page 121))
Address Slave -- Easy Startup -- -- AS-i Master 1	> Message: "Master 1 waiting for slave 0". Display of slave address assigned last. Display of the next free slave address. ► Integration of a new slave (with the address 0) by simply connecting the slave to the bus: > The device automatically assigns the next available slave address previously displayed. > (cycle starts again) ► Abort addressing with [ESC].
Address Slave -- Easy Startup -- -- AS-i Master 2	See Easy Startup of the AS-i master 1

7.5 Main menu [Diagnostics]

5473

Display of status information of the masters and reset of the error counter.

Menu tree	Explanation
Diagnostics -- AS-i Master 1	
Diagnostics -- AS-i Master 1 -- -- Voltage Disturbance	Voltage failure: (→ chapter Number of AS-i voltage failures on the AS-i master (→ page 427)) > Display of the number of cases of undervoltage on the AS-i bus.
Diagnostics -- AS-i Master 1 -- -- Configuration Error	Configuration errors: > Display of the number of detected configuration errors since the last reset.
Diagnostics -- AS-i Master 1 -- -- Telegram Error	Telegram errors: (→ chapter AS-i telegram errors on the master (→ page 431)) > Display of faulty AS-i telegrams in percent of the sent telegrams. ► After [MORE]: > Display of the number of active slaves. > Display of the number of AS-i cycles per second.
Diagnostics -- AS-i Master 1 -- -- Noisy Slaves	Noisy Slaves: (→ chapter Number of disturbed telegrams on the master (by noisy slaves) (→ page 434)) > Display of the number of disturbed telegrams of each active slave. ► After [SORT]: > New sorting of the table according to the number of disturbed telegrams.
Diagnostics -- AS-i Master 1 -- -- Reset Error Counter	Resetting the error counter (password level 1 required): (→ chapter Reset error counter (→ page 437)) ► After [OK]: > Error Counter reset to 0.
Diagnostics -- AS-i Master 1 -- -- Cycle time	Cycle time: (→ chapter Display of the longest cycle time (→ page 439)) > Display of the longest AS-i cycle time after last reset: "System response in [ms]". ► After [CLEAR]: > Resetting the previous test series and starting a new test series.
Diagnostics -- AS-i Master 2	See AS-i master 1
Diagnostics -- Safety Master 1	Diagnosis of safety monitor on master 1

Menu tree	Explanation
Diagnostics -- Safety Master 1 -- -- Read Monitor	Reading the states of the safety monitors (→ chapter Read states of the safety monitor (→ page 441)) > Status information of the OSSD (Output Signal Switching Device)
Diagnostics -- Safety Master 1 -- -- Trigg. Slave	Reading the states of the safety slaves (→ chapter Read states of safety slaves (→ page 445)) > Status information of the input bits (code sequence)
Diagnostics -- Safety Master 1 -- -- Enable Monitor	Enabling an AS-i slave as safety monitor. Only now can the device exchange the safety-related data with the safety monitor (special protocol). (→ chapter Set AS-i address of the safety monitor (→ page 449))
Diagnostics -- Safety Master 1 -- -- Disable Monitor	Disable an AS-i slave as safety monitor. (→ chapter Reset AS-i address of the safety monitor (→ page 452))
Diagnostics -- Safety Master 1 -- -- Setup Monitor	Setting the diagnosis to enable circuits or all safety devices (→ chapter Set the diagnostic characteristics of the safety monitor (→ page 455))
Diagnostics -- Safety Master 1 -- -- Reset all	Resetting all set diagnostic states of the safety devices (→ chapter Reset diagnostic states of safety devices (→ page 458))
Diagnostics -- Safety Master 2	see Safety Master 1

7.6 Main menu [Master Setup]

5475

Set operating modes master.

Menu tree	Explanation
Master Setup -- AS-i Master 1	Master setup AS-i master 1.
Master setup -- AS-i Master 1 -- -- Config all	AS-i master 1: Config. all (password level 1 required). Prerequisites: - master operating mode = project, - no slave with the address 0 on the bus. > Safety query: "Are you sure?" ► After [OK]: > The device checks all connected slaves (only on this master) and enters them as "projected" in its table. > The master operating mode remains on "Config.".
Master Setup -- AS-i Master 1 -- -- Operation Mode	AS-i Master 1: Operating mode (password level 1 required) (→ chapter How to switch the operating modes for the AS-i master. (→ page 117)). > Display of the current setting. ► Press [▲] or [▼] to scroll between the operating modes... - protected, - project.
Master Setup -- AS-i Master 1 Operation Mode -- -- -- Protect. Mode	Operating mode "protected": > LED [PROJ] goes out. > Changes to the slaves are detected (LED [CONF/PF] lights). Slaves with a different projected profile are not activated.
Master Setup -- AS-i Master 1 -- -- Operation Mode -- -- -- Config. Mode	Operating mode "Config.": > LED [PROJ] lights. > Changes to the slaves are detected (LED [CONF/PF] lights). All connected slaves are active.
Master Setup -- AS-i Master 1 -- -- Autoaddr. Mode	AS-i Master 1: Mode "automatic addressing" (password level 1 required): > Display of the current setting. ► Press [▲] or [▼] to scroll between ON and OFF. ► Adopt with [OK]. • Automatic addressing ON: Permits the replaced slave to be assigned the address of the old slave in the protected mode (default). • Automatic addressing OFF: The replaced slave must be manually set to the right address.

Menu tree	Explanation
Master Setup -- AS-i Master 1 -- -- Slave Reset	AS-i Master 1: resetting the slave (password level 1 required) > Display of the current setting. ► Scroll between ON and OFF with [▲] or [▼]. ► Adopt with [OK]. • Slave reset ON: After switching the master to the protected mode the device briefly sets all slave outputs to "0" (default). • Slave reset OFF: The status of the slave outputs remains unchanged when switching to another operating mode.
Master Setup -- AS-i Master 2	See AS-i master 1.

7.7 Main menu [Fieldbus Setup]

5477

Set fieldbus parameters (password level 1 required).

Menu tree	Explanation

Menu tree	Explanation
Fieldbus Setup	► Project fieldbus quickly. > Display of the current fieldbus address. ► Change the fieldbus address using the keys [▲] or [▼]. ► After pressing [OK]: > Display of the baud rate set in the Profibus master. ► Always after pressing [OK]: > Display of the data saved in the fieldbus master via the data packages for communication with the AS-i master: ▪ Digital inputs in the fieldbus master from single or A slaves on AS-i master 1 ▪ Digital outputs in the fieldbus master to single or A slaves on AS-i master 1 ▪ Digital inputs in the fieldbus master from single or A slaves on AS-i master 2 ▪ Digital outputs in the fieldbus master to single or A slaves on AS-i master 2 ▪ Digital inputs in the fieldbus master from B slaves on AS-i master 1 ▪ Digital outputs in the fieldbus master to B slaves on AS-i master 1 ▪ Digital inputs in the fieldbus master from B slaves on AS-i master 2 ▪ Digital outputs in the fieldbus master to B slaves on AS-i master 2 ▪ Analogue multiplex inputs in the fieldbus master ▪ Analogue multiplex outputs in the fieldbus master ▪ Fieldbus data command channel ▪ Fieldbus data PLC inputs in the fieldbus master ▪ Fieldbus PLC outputs in the fieldbus master ▪ Analogue inputs in the fieldbus master from AS-i master 1 ▪ Analogue outputs in the fieldbus master to AS-i master 1 ▪ Analogue inputs in the fieldbus master from AS-i master 2 ▪ Analogue outputs in the fieldbus master to AS-i master 2 ▪ Fieldbus data diagnosis ▪ Fieldbus master command channel ▪ Digital inputs in the fieldbus master from single or A slaves on AS-i master 1 (cycle starts again). ► Abort with [ESC].

7.8 Main menu [Slave Info]

5479

Displaying status information of individual active slaves
(→ chapter Display slave data (→ page 461))

Menu tree	Explanation
Slave Info _AS-i Master 1	> Display of the lowest address of the slaves detected on the bus. ► Scroll through the addresses of the detected slaves with [▲] or [▼] ► After [OK]: ► Display of current data of the selected slave (depending on the type of slave): ▪ Data of the digital inputs and outputs (binary + hexadecimal) ▪ Data of the analogue channels (decimal) ▪ Entries in the lists of active / detected / projected slaves / slaves with peripheral fault ▪ Slave profile configuration ▪ Slave parameters ▪ Number of telegram errors ▪ (cycle starts again) ► Continue to the next data with [MORE]. ► Cancel with [ESC]. > Display of the currently selected slave address. ► Scroll through the addresses of the detected slaves with [▲] or [▼] to display the same data of other slaves (s.a.). ► Cancel with [ESC].
Slave Info _AS-i Master 2	See AS-i master 1

7.9 Main menu [Slave Setup]

5481

Display or change the output data or parameters of individual slaves (password level 2 required).

⚠ WARNING

Risk of personal injury! Risk of material damage to the machine/plant!
After changing the slave outputs the output values remain unchanged.

The output values only change in the following cases:

- Manual new setting of the outputs via Slave Setup,
- when changing from projection mode to protected mode, unless the "slave reset" function was deactivated via the menu,
- host processes the outputs,
- deactivate and restart the gateway.

► Secure the concerned area.

► Only trained personnel is allowed to set outputs manually.

► Deactivate the outputs again immediately after the end of the test!

Menu tree	Explanation
Slave Setup -- AS-i Master 1	> Display of the detected slave with the lowest address on the bus. ► Scroll through the addresses of the detected slaves with [▲] or [▼]. ► Select slave address with [OK].
Slave Setup -- AS-i Master 1 -- -- Digital output	> Display of current data of the selected slave (→ chapter Set output values (→ page 465)). ► Change value of the output signal with [▲] or [▼] and then [SET]. > The line "Current" adopts the setup value and the change is transferred to the outputs as long as the host does not process these outputs. ► Cancel with [ESC].
Slave Setup -- AS-i Master 1 -- -- Parameter value	> Display of current parameter data of the selected slave (→ chapter Change slave parameter data (→ page 133)). ► Change the value of the parameter in the "Setup“ line with [▲] or [▼] and transmit it to the slave with [SET]. > If the value or change is not permissible: "Slave data invalid" message. ► Cancel with [ESC].
Slave Setup -- AS-i Master 1 -- -- Analogue value	> Display of current data of the selected slave (depending on the type of slave): analogue values (→ chapter Set output values (→ page 465)). ► After [OK]:

Menu tree	Explanation
Slave Setup -- AS-i Master 1 -- -- Analogue value -- -- -- Analogue channel 1 -- -- -- Analogue channel 2 -- -- -- Analogue channel 3 -- -- -- Analogue channel 4	► Scroll through the numbers of the analogue channel with [▲] or [▼]. ► After [OK]: > Display of current data of the selected channel. ► Change value of the analogue channel with [▲] or [▼] and then [SET]. > The line "Current" adopts the setup value and the change is transferred to the outputs as long as the host does not process these outputs. ► Cancel with [ESC].
Slave Setup -- AS-i Master 2	See AS-i master 1.

7.10 Main menu [System Setup]

5483

Set parameters for programming interfaces, update firmware, set access password, etc.

Menu tree	Explanation
System Setup -- Serial Port Baudrate	Only AC1376: (only for firmware update). ► Scroll between the possible baud rates of the serial interface with [▲] or [▼]. ► Confirm the selection with [OK]. Or: Cancel with [ESC].
System Setup -- Ethernet Setup	(no function)
System Setup -- Modbus Setup	(no function)
System Setup -- Firmware Update	Only AC1376: Update of the firmware (RTS Runtime System Software) (password level 3 required): (→ chapter Update firmware (→ page 142)). Requirement: PC/notebook with special software connected to serial interface.
System Setup -- Firmware Update -- -- Runtime System	Only AC1376: Update of the run time system. > Display: "RTS firmware: Connect to PC – Start now?" ⇒ "The PC must be connected to update the RTS firmware. Start transmission now?" ► Confirm the selection with [OK]. > Gateway waiting for new RTS firmware. ► Start transmission on the PC. > Transmission from PC to gateway in process. ► Restart gateway (supply off - on).
System Setup -- Firmware Update -- -- AS-i Master 1	Only AC1376: Update AS-i master 1 ► Confirm the selection with [OK]. > Display: "AS-i 1 firmware: Connect to System – Start now?" → "The PC must be connected to update the firmware on the AS-i master 1. Start transmission now?" ► Confirm the selection with [OK]. > Gateway waiting for new AS-i master firmware. ► Start transmission on PC. > Transmission from PC to gateway in process. ► Restart gateway (supply off - on).
System Setup -- Firmware Update -- -- AS-i Master 2	Only AC1376: See update of the AS-i master 1

Menu tree	Explanation
System Setup -- Password	The 4-digit password prevents unauthorised changes on the device. Passwords and respective releases (→ chapter Password protection (→ page 136)). > Display: "Password – 0000". An arrow () below shows the digit to be edited. ► Go to the next digit with [➔]. ► Change the digit with [▲] or [▼]. ► After the last digit once again [➔]. > Display of the new password. ► Adopt with [OK], Abort with [ESC]. > Return to the previous menu level. If the password has been entered correctly, the corresponding parameter changes are possible; if the password is wrong they are blocked.
System Setup -- Factory default	► Start reset to factory setting with [OK] (password level 3 required) (→ chapter Reset to factory preset (→ page 140)). > Safety query "Are you sure?" ► Confirm the selection with [OK]. > Reset of the device to the factory setting. Some changes will not become effective before the next power-on. > The password is reset to level 1.
System Setup -- System Errors	System setup errors (→ chapter Troubleshooting (→ page 479)). > History memory of the last system errors which had to be acknowledged.
System Setup -- System Specials	System particularities (password level 2 required):
System Setup -- System Specials -- -- Fall Back	Switch between - FALL BACK VNC ON and - FALL BACK VNC OFF. The menu entered by the user is automatically left after a defined time if the device is not operated.
System Setup -- System Specials -- -- RTS Error	Switch between - RTS ERROR ON and - RTS ERROR OFF. The display of the Rxx system messages can be disabled by means of this setting.
System Setup -- System Specials -- -- Bitmap Manual	> Display of stored background images. ► Scrolling with the buttons [▲] or [▼]. ► Abort with the right key.

Menu tree	Explanation
System Setup -- System Specials -- -- Bitmap Cont.	> Alternating display of stored background images. ► Abort with the right key.
System Setup -- System Specials -- -- Power-ON time	> Display of the current operating time (days, hours, minutes, seconds) since the last power-on. ► Abort with [ESC].

7.11 Main menu [System Info]

5485

Display all system parameters.

Menu tree	Explanation
AC1375: System info	> Display of all system parameters: (→ chapter Display system parameters (→ page 474)). ▪ Hardware version RTS firmware version RTS checksum Fieldbus system version ▪ Device serial number From here the display is only accessible in the administrator mode (protected by password level 3): ▪ Designers Developers Programmers ▪ Admin Info (permanently updated): RTS cycles 100 ms each max. RTS response time [ms] ► Delete cycle time values with [CLEAR] ► Scroll through the list of parameters with [MORE] ► Return to start menu with [MENU] or [ESC]
AC1376: System info	> Display see AC1375, however: ▪ Hardware version RTS runtime system firmware version AS-i Master 1 firmware version AS-i Master 2 firmware version Fieldbus system version ▪ RTS checksum Consistency checksum Linux kernel version Linux RAM disk version ▪ Device serial number From here the display is only accessible in the administrator mode (protected by password level 3): ▪ Designers Developers Programmers ▪ Admin Info (permanently updated): RTS cycles 100 ms each max. RTS response time [ms] ► Delete cycle time values with [CLEAR] ► Scroll through the list of parameters with [MORE] ► Return to start menu with [MENU] or [ESC]

8 Switch operating modes

Contents

5487

8.1 Which operating modes are available for the AS-i master?

5489

The master of the device can be used in the following operating modes:

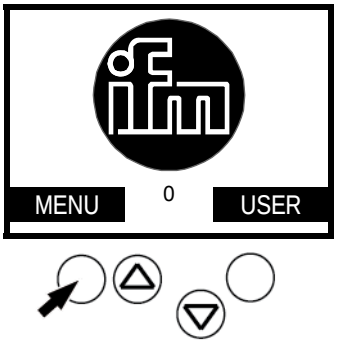
Operating mode	Meaning	Use
Operation Mode	Protected operation > LED [PROJ] is off. > New slaves are only activated if they have been correctly projected before.	If the removal or adding of slaves is not supposed to affect the AS-i system. Changes to the projected constellation of slaves are indicated as an error message. > "Slave missing" or "Slave not projected" If a faulty slave is replaced by a slave of the same type (with the address 0), the system detects the replacement, adopts the new slave and assigns it the address of the faulty slave.
Config. Mode	Configure > LED [PROJ] lights: > New slaves are immediately activated.	Only makes sense in case of planned changes to the AS-i system.

In principle, changes to the slaves which are connected to the master via AS-i are immediately detected. The [CONF/PF] LED lights as soon as there is a change compared to the projected state.

8.2 How to switch the operating modes for the AS-i master.

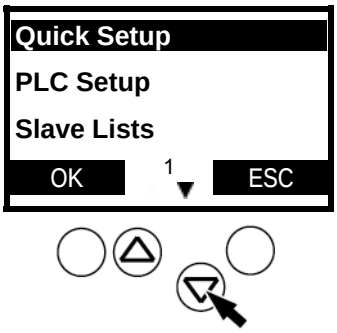
5792

[MENU] > [Master Setup] > select master > [Operation Mode] > select mode > [OK]



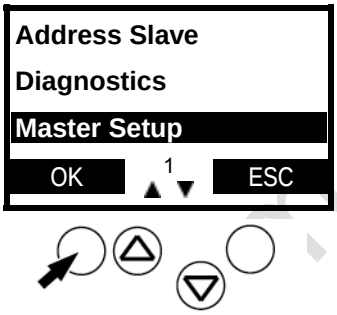
Step 1:

► Press [Menu].



Step 2:

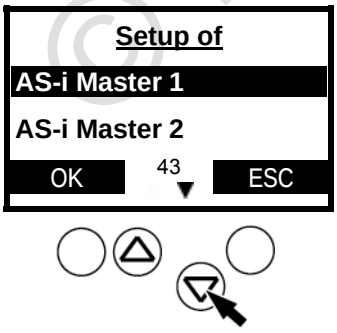
► Press [▼] to scroll to [Master Setup].



Step 3:

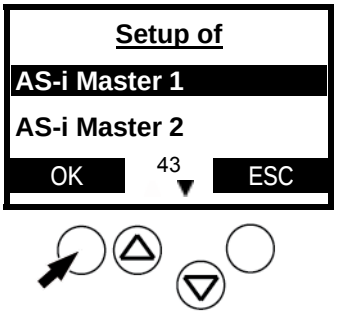
► Press [OK] to select [Master Setup].

AC1375: continue with step 6.



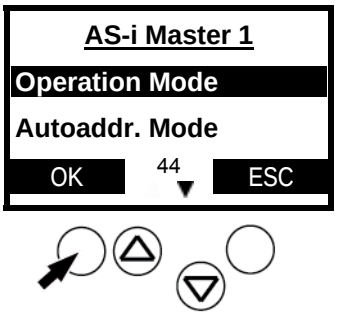
Step 4:

► If necessary, press [▼] to scroll to [Master 2].



Step 5:

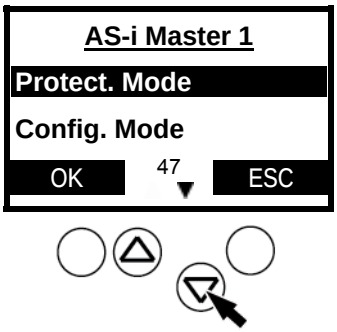
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 22.

► Select [Operation Mode] with [OK].

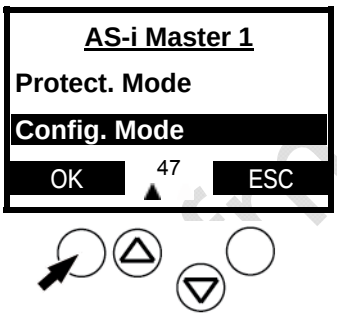


Step 7:

AC1375: Menu screen number = 25.

> The marking shows the current operating mode.

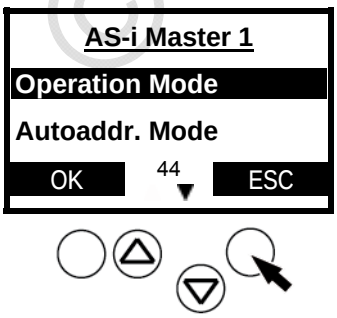
► Press [▲] / [▼] to scroll to the requested operating mode.



Step 8:

AC1375: Menu screen number = 25.

► Activate the selected operating mode with [OK].



Step 9:

AC1375: Menu screen number = 22.

> LED [PROJ] lights when the "Config." mode is active.

> LED [PROJ] is off when the "protected mode" is active.

► Press [ESC] several times to return to the start screen.

> That's it!

9 Set-up

Contents

5495

This chapter shows you how to get the device started quickly.

After power-on the display (→ What is what in the text/graphics display? (→ page 94)) shows a start screen and possibly an error message of the connected AS-i system.

9.1 Configuration of the slaves

Contents

5197

In this chapter you will learn about the methods how to address slaves using this device.

NOTE

Every address is allowed in the system only once so that the AS-i master can communicate with every slave individually.

Slaves with the address 0 do not operate on the bus.

The manufacturers of AS-i slaves always deliver their devices with the address 0.

> If address is wrong or has been assigned twice:
The device displays an error message and does not process the slaves.

9.1.1 Permissible slave addresses

5499

Single Slaves	(0), 1...31
A/B slaves	(0A), 1A...31A, 1B...31B *)

*) The address 0B is not permissible.

- If an address was assigned to a single slave, this address must not be assigned as an A or B address. Addresses assigned to A/B slaves must not be assigned to single slaves.
  Example of a forbidden combination: 17, 17A.
- If an address was assigned to an A slave, this address must not be assigned as B address as well. A/B slaves share one address number.
  Example of a permissible combination: 17A, 17B

Info

The device addresses A/B slaves which are connected as pairs (i.e. with the same address) only in alternate cycles.

Example: slave 17A is processed in the first cycle, slave 17B in the second cycle.

- Maximalausbau je Master: 31 Single-Slaves oder 62 A-/B slaves

9.1.2 Automatic individual addressing of slaves

5501

Now address the slaves. This is possible by means of the buttons and the text/graphics display on the device. In the "Easy Startup" mode the device can address the slaves automatically in rising order if the slaves are connected one after the other on the bus.

NOTE

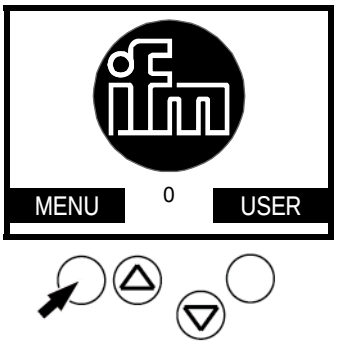
However, this automatic process only works without problems if the slave to be connected has the address 0!

If the slave has already been used in another system, it probably already has another address than 0. In such a case, the device does not react to the connection of the new slave. This slave is not automatically addressed.

Then → chapter Manual slave addressing (→ page 124).

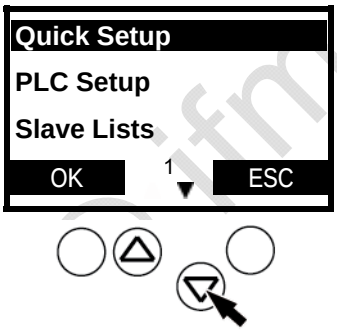
Password level 1 required: → chapter Password setting (→ page 138).

[MENU] > [Slave Addresses] > [Easy Startup] > select master > connect slave > [ESC]



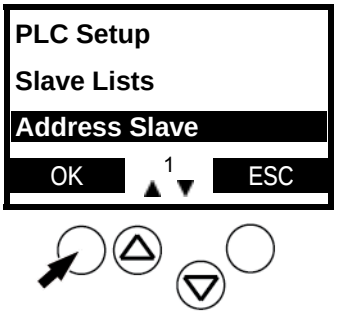
Step 1:

► Press [Menu].



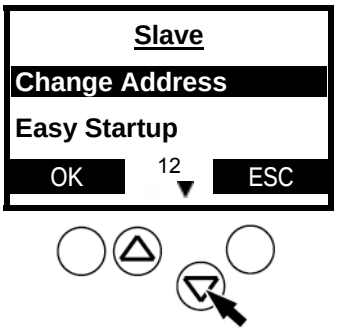
Step 2:

► Press [▼] to scroll to [Slave Addresses].



Step 3:

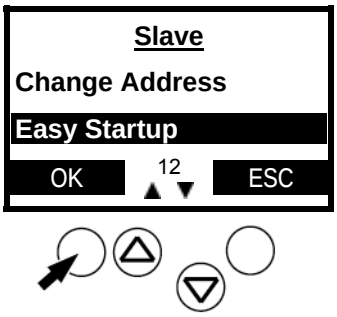
► Select [Slave Addresses] with [OK].



Step 4:

AC1375: Menu screen number = 6

► Press [▼] to scroll to [Easy Startup].

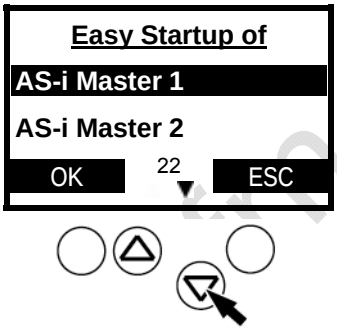


Step 5:

AC1375: Menu screen number = 6

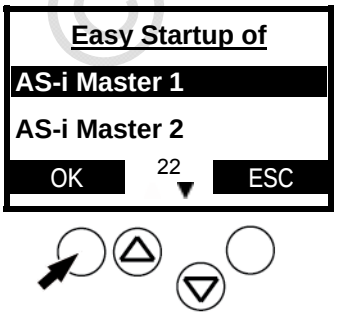
► Select [Easy Startup] with [OK].

AC1375: continue with step 8.



Step 6:

► If necessary, press [▼] to scroll to [Master 2].



Step 7:

► Select AS-i master with [OK].

Step 8:

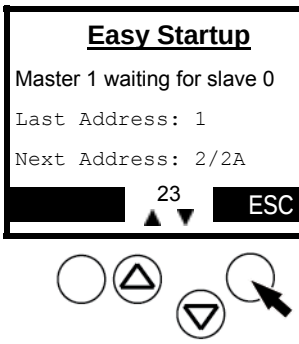
AC1375: Menu screen number = 11

> The device is waiting for a slave with the address 0 to be activated on or connected to master 1.

> Display of the slave address assigned last (or blank field).

> Display of the next free slave address.

► Take one slave which still has the address 0 and connect it to the AS-i bus or activate it.



Step 9:

AC1375: Menu screen number = 11

> The device automatically assigns the next available slave address (previously displayed) to this new slave.

> The device displays the address assigned to the new slave and, below, the next available slave address.

> LED [PWR/COM] no longer flashes, but lights: At least one active slave is now correctly detected.

> LED [CONF/PF] lights: There is (at least) one new slave on the bus which is not yet in its projection list.

When all slaves have been addressed:

► Return to the start screen with [ESC].

NOTE

► Only connect one new slave at a time in the "Easy Startup" mode!

> When the device has completed the integration of the new slave, the display "Waiting for Slave 0" reappears.

► Note down the address assigned under "Last address" for this slave.

► Then you can connect the next slave with the address 0.

► Finally "Config. all" to add the new slaves to the list of projected slaves, → chapter Enter detected slaves in the configuration list (→ page 131).

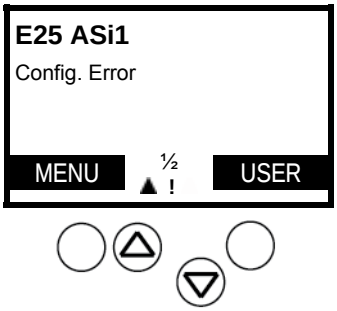
9.1.3 Manual slave addressing

5503

The old slave address is not 0? The automatic procedure described above (→ chapterAutomatic individual addressing of slaves (→ page 121)) however only works without problems if the slaves to be connected have the address 0! If the slaves have already been used in another system, the slaves probably already have another address. In such a case, the device does not react to the connection of the new slave.

► Remove these slaves again from the system.

In this section we will show you how to change the addresses of the devices.



► Exit automatic addressing:
Press [ESC] several times to return to the start screen (→ Graphics).

You want to integrate a slave in the AS-i bus which has already been programmed with an address but which now needs a new address?

Prerequisites:

- Neither the "old" nor the new address of the slave must already be assigned on the bus.
- Connecting a slave with the address 0 to the AS-i bus is not allowed.

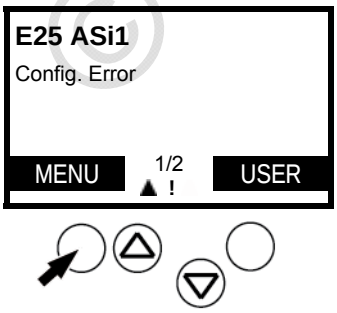
► If necessary, temporarily remove the already existing slave with the correct "old" address from the bus.

► Install or activate the new slave on the bus.

Info

Password level 1 required: → chapter Password setting (→ page 138).

[MENU] > [Slave Addresses] > [Change Address] > select master > select old slave address > [OK] > select new slave address > [OK] > [MORE] or [ESC]

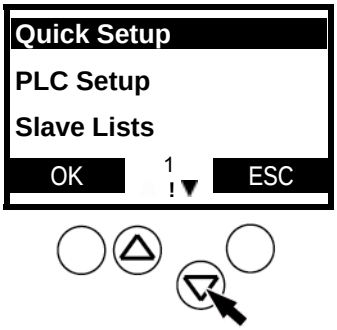


Step 1:

> The display on the left appears instead of the ifm start screen: "Configuration error", → chapter Error screen (→ page 95).

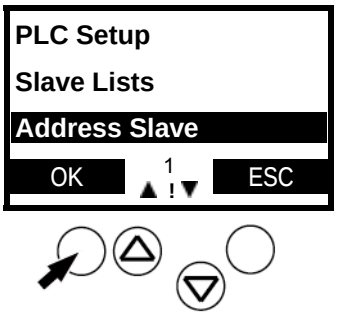
> LED [CONF/PF] lights.

> Press [Menu].



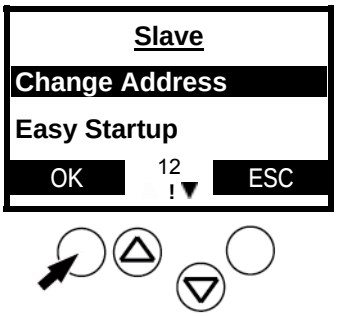
Step 2:

► Press [▼] to scroll to [Slave Addresses].



Step 3:

► Select [Slave Addresses] with [OK].

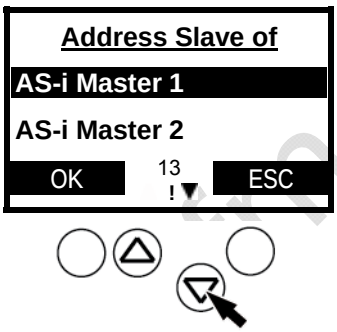


Step 4:

AC1375: Menu screen number = 6

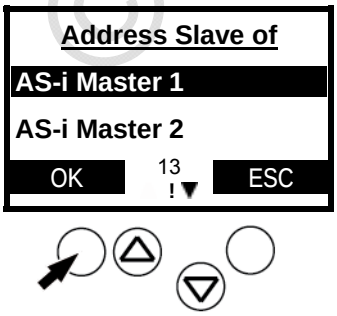
► Select [Change Address] with [OK].

AC1375: continue with step 7.



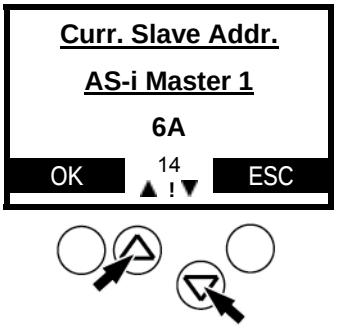
Step 5:

► If necessary, press [▼] to scroll to [Master 2].



Step 6:

► Select AS-i master with [OK].

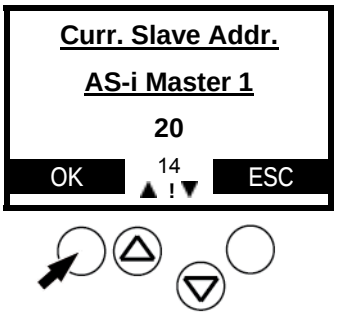


Step 7:

AC1375: Menu screen number = 7

> Display of the lowest found valid slave address.

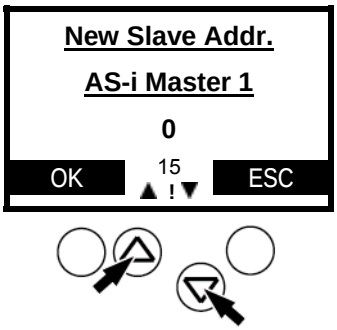
► Press [▲] / [▼] to scroll to the slave whose address is to be changed.



Step 8:

AC1375: Menu screen number = 7

► Select requested slave with [OK].

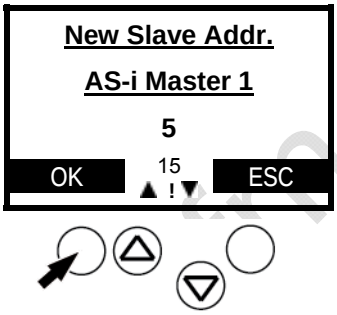


Step 9:

AC1375: Menu screen number = 8

> Display of the neutral slave address 0.

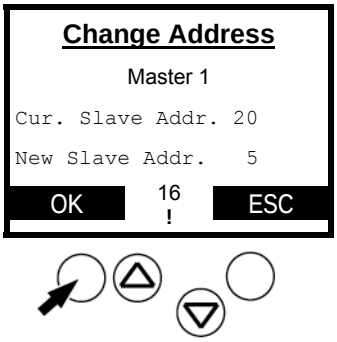
► Press [▲] / [▼] to scroll to the requested slave address.



Step 10:

AC1375: Menu screen number = 8

► Select the new slave address with [OK].

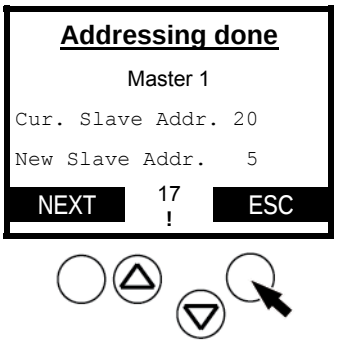


Step 11:

AC1375: Menu screen number = 9

> Display of the old and the new slave address.

► Confirm the new slave address with [OK].



Step 12:

AC1375: Menu screen number = 10

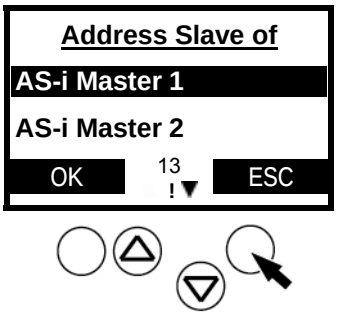
> Display of the message "WAIT" while saving.

> Display of the change made (→ graphics).

> LED [CONF/PF] lights. Configuration errors.

► Press [MORE] to repeat steps 7 to 12 for another slave whose address is to be changed.

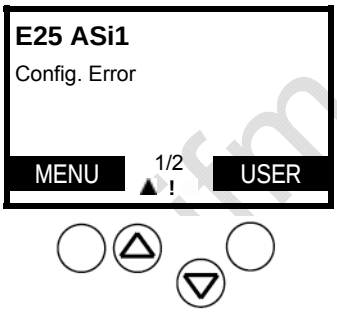
► Press [ESC] to terminate slave addressing.



Step 13:

AC1375: Menu screen number = 7

► Return to the start screen with [ESC].



Step 14:

> The display on the left appears instead of the ifm start screen: "Configuration error", → chapter Error screen (→ page 95).

> LED CONF/PF lights.

In the next section we will show you how to complete the configurationFinish configuration (→ page 128).

9.1.4 Finish configuration

5511

Now all slaves are present on the bus with the correct address.

But the error message (the symbol "**!**") keeps on flashing and the LED [CONF/PF] lights?

Cause: The device has detected all slaves on the bus but the slaves - at least not all of them - are not yet in the "List of projected slaves" LPS.

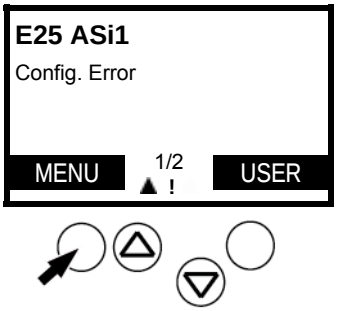
This means: The error message "configuration error" is displayed as long as there is a difference between the detected and configured slaves.

Remedy: In the mode "Quick Setup" enter all detected slaves in the configuration list by pressing a key.

Info

Password level 1 required: → chapter Password setting (→ page 138).

[MENU] > [Slave Lists] > select master > [Detected Slaves]

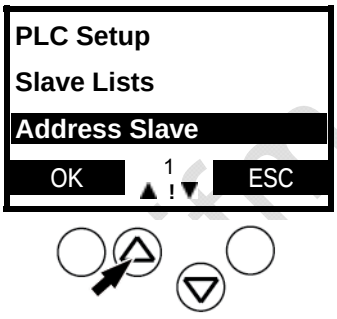


Step 1:

> The display on the left appears instead of the ifm start screen: "Configuration error", → chapter Error screen (→ page 95).

> LED [CONF/PF] lights.

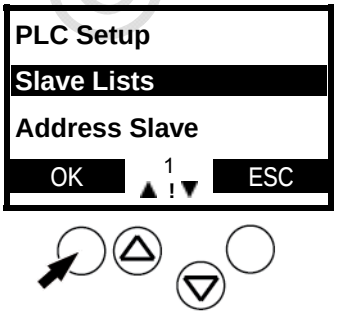
► Press the key [MENU].



Step 2:

> Device displays the menu item used last.

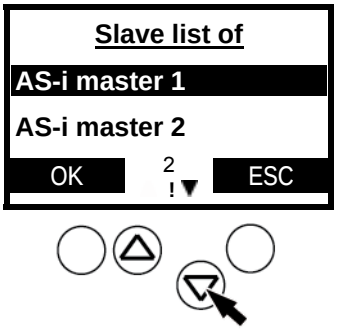
► Press [▲] to scroll to [Slave Lists].
Reason: Check the configuration made so far in the list of detected slaves LDS.



Step 3:

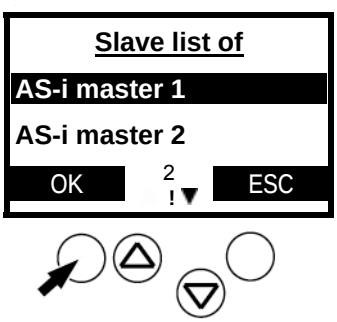
► Select [Slave Lists] with [OK].

AC1375: continue with step 6.



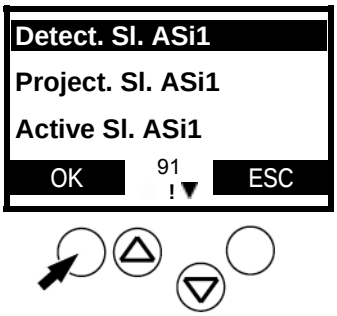
Step 4:

► If necessary, press [▼] to scroll to [Master 2].



Step 5:

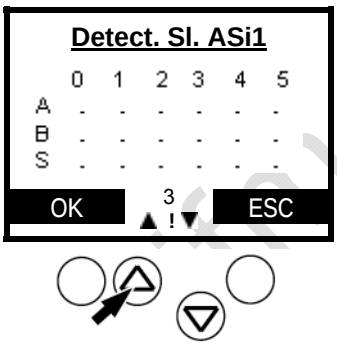
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 47

► Select [Detected Slaves] with [OK].

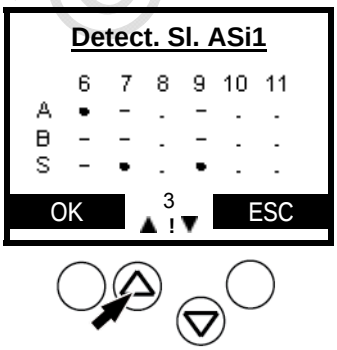


Step 7:

AC1375: Menu screen number = 2

> A table of detected slaves is displayed.
Here: no slaves have been detected on master 1 with the addresses 0 to 5.

► If necessary press [▲] to scroll to the next address block.



Step 8:

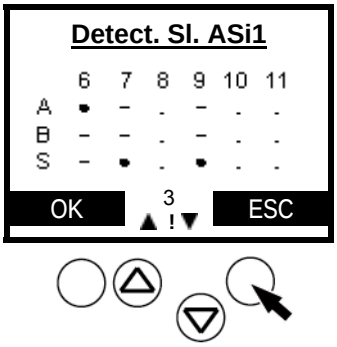
AC1375: Menu screen number = 2

► A table of detected slaves is displayed.
Here an **example**:

- an A/B slave has been detected as A slave at the address 6,
- a single slave each has been detected at the addresses 7 and 9.

► Check found slave addresses and compare them to the plan.

► If necessary press [▲] to scroll to the next address block.



Step 9:

AC1375: Menu screen number = 2

(a) If all detected slaves are to be entered in the configuration list:

► Press [ESC] to return to the menu [Slave Lists].

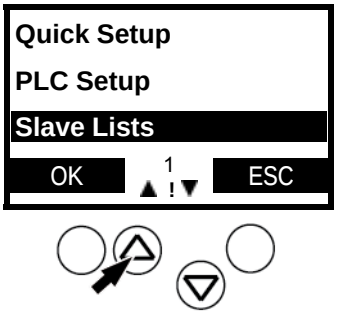
► Continue: → chapter Enter detected slaves in the configuration list (→ page 131).

(b) If incorrect slave addresses are to be reassigned:
→ chapter Manual slave addressing (→ page 124).

9.1.5 Enter detected slaves in the configuration list

5515

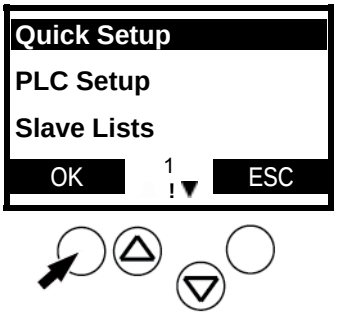
[Quick Setup] > [Config. all] > [OK]



Step 10:

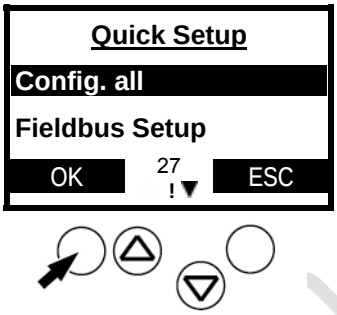
> Device displays the menu item used last.

► Press [▲to scroll to [Quick Setup].
Purpose: Enter all detected slaves in the configuration list at the push of a button.



Step 11:

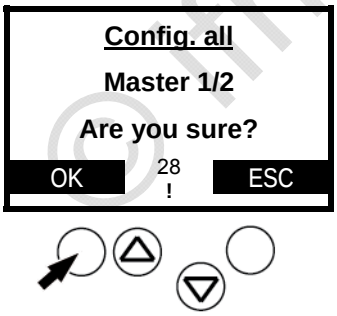
► Select [Quick Setup] with [OK].



Step 12:

AC1375: Menu screen number = 12

► Select [Conf. all] with [OK].

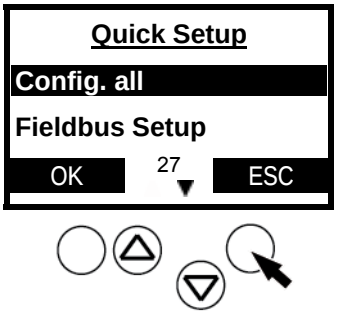


Step 13:

AC1375: Menu screen number = 13

> Display of safety query:
"Do you want to project all slaves on AS-i master 1 and 2?
Are you sure?"

► Acknowledge with [OK].



Step 14:

> Display of the message "WAIT" while saving.

> Error message "**!**" stops.

> The display on the left appears.
(AC1375: Menu screen number = 12

> Red LED [CONF/PF] goes out.

> Yellow LED [PROJ] goes out because the device now automatically activates the "protected mode".

► Return to the start screen with [ESC].

> That's it!

9.2 Change slave parameter data

5518

The parameter value "0Fh" is preset for the slaves.

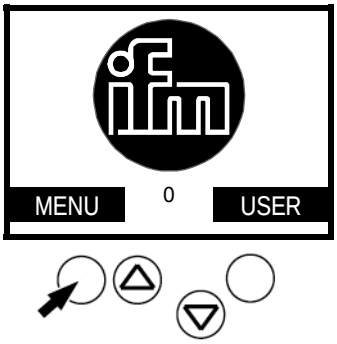
Example for a useful parameter change: Not connected analogue input channels generate a peripheral fault of the module. By changing parameters you can block unused channels so that the module does not trigger a peripheral fault.

Please note the corresponding remarks in the instructions of the modules.

Info

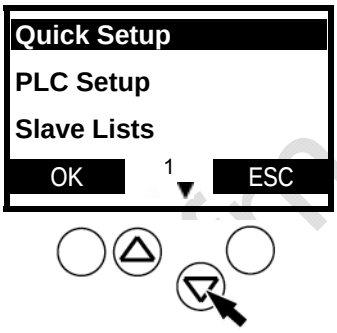
Password level 2 required: → chapter Password setting (→ page 138).
Changed values are not adopted in case of a wrong password level.

[MENU] > [Slave Setup] > select master > select slave > [Parameter Value] > change parameter data > [SET]



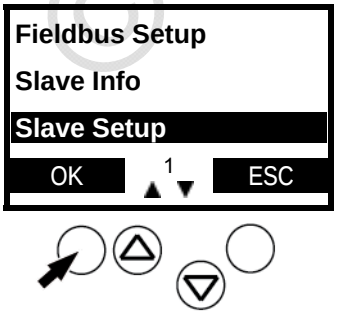
Step 1:

► Press [Menu].



Step 2:

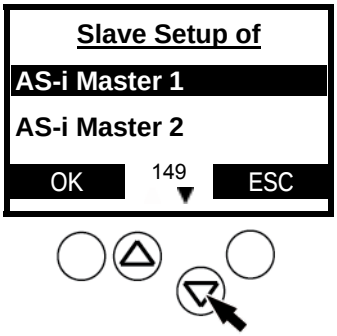
► Press [▼] to scroll to [Slave Setup].



Step 3:

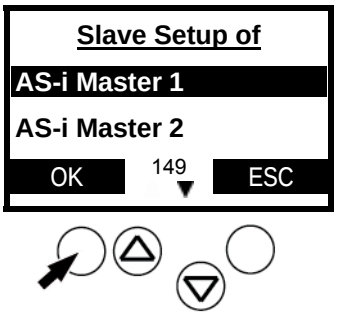
► Select [Slave Setup] with [OK].

AC1375: continue with step 6.



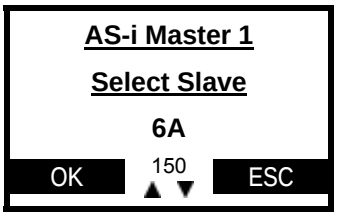
Step 4:

► If necessary, press [▼] to scroll to [Master 2].



Step 5:

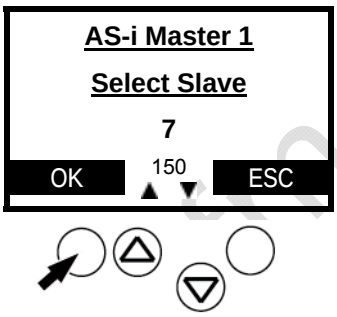
► Select AS-i master with [OK].



Step 6:

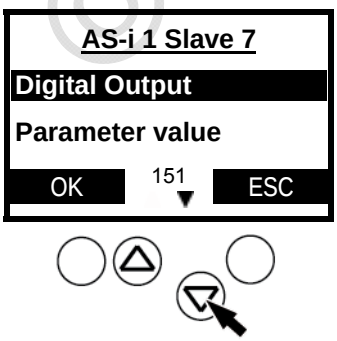
> Display of the lowest found valid slave address.

► If necessary, press [▲] / [▼] to scroll to another slave.



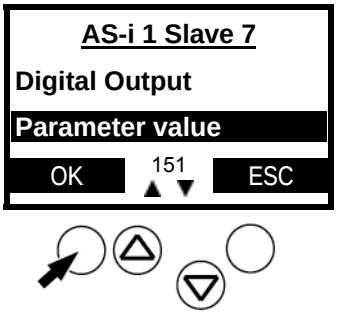
Step 7:

► Select requested slave with [OK].



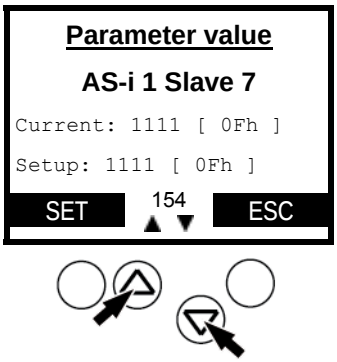
Step 8:

► If necessary, press [▼] to scroll to [Parameter Value].



Step 9:

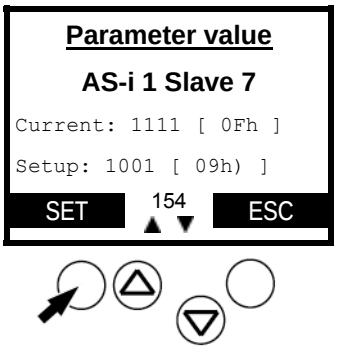
► Select [Parameter value] with [OK].



Step 10:

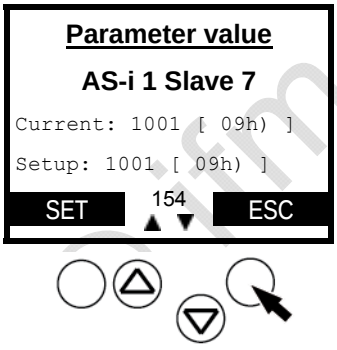
> Display of current and setup parameter values as binary value and hex value.

► Press [▲] / [▼] setup value to set parameter data.



Step 11:

► Press [SET] to save new parameter data on the slave.
Keep the key [SET] pressed until the change has been made!



Step 12:

(If the setup value of the parameter data for this slave is not permitted:

> Display error message: "Slave data invalid“.

► Repeat steps 10...12 with corrected values.)

> Setup parameter data is copied to the current parameter data.

► Return to the start screen with [ESC].

> That's it!

9.3 Password protection

Contents

5522

9.3.1 General

5523

In the menu [System Setup], menu item [Password], the handling can be restricted or enabled. On delivery, the device is in the user mode (= password level 1). By entering an arbitrary invalid password (e.g. 1000) all menu items that allow settings to be changed will be blocked. This blocking is the password level 0 (end user mode).

⚠ WARNING

Risk for persons and plant/machine by access of unauthorised users to special menus of the device.

► Change the password to the level 0 again as soon as the work in a higher password level has been completed. → chapter Password setting (→ page 138).

9.3.2 Password levels

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Password level	Operating mode	Password	Note
0	end user mode	as required	
1	user mode	CE01	factory setting
2	service mode	E02C	

Main menu	2nd menu level	Required password level
Quick Setup	all	1
PLC Setup	all	1
Slave addresses	all	1
Diagnosis	reset error counter	1
Master Setup	config. all	1
Master Setup	operating mode	1
Master Setup	autoaddr. mode	1
Master Setup	slave reset	1
Fieldbus Setup	all	1
System Setup	modbus setup	1
System Setup	firmware update	3 *)
System Setup	factory setting	3 *)
System Setup	special system	2
System Info	admin info	3 *)
Slave Setup	all	2
All other menus	all	0

*) Please contact your AS-i sales specialist if you want to work with the password level 3.

The set password is immediately valid when entered and remains effective until the setting is changed.

9.3.3 Password setting

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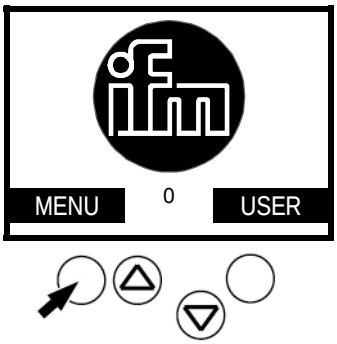
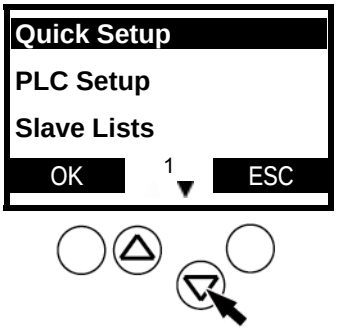
[MENU] > [System-Setup] > [Password] > Change Password > [OK]



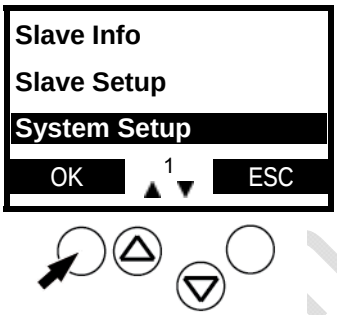
Step 1:

► Press [Menu].



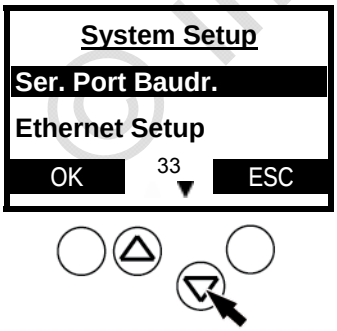
Step 2:

► Press [▼] to scroll to [System Setup].



Step 3:

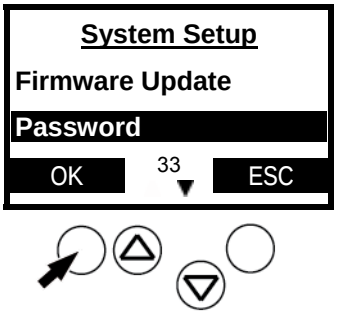
► Select [System Setup] with [OK]



Step 4:

AC1375: Menu screen number = 16

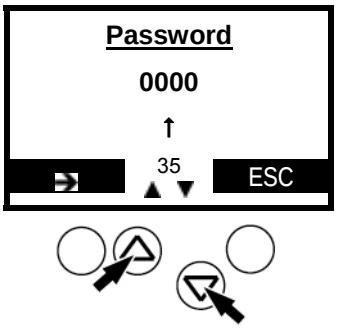
► Press [▼] to scroll to [Password].



Step 5:

AC1375: Menu screen number = 16

► Select [Password] with [OK].



Step 6:

AC1375: Menu screen number = 18

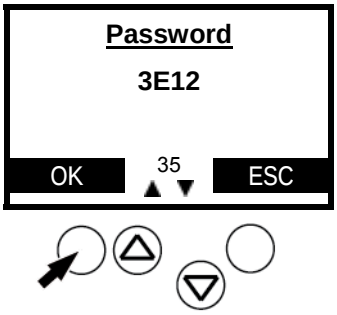
> Display password "0000".
The arrow ↑ points to the digit which can be changed.

► Press [▲] / [▼] to change the digit in the range 0...F.

► Press [➔] to go to the next digit.

► Repeat steps 6...7 for all digits.

After the last digit:



Step 6:

AC1375: Menu screen number = 18

► Set new password with [OK].

NOTE:
The set password is immediately valid when entered and remains effective until the setting is changed.

9.4 Reset to factory preset

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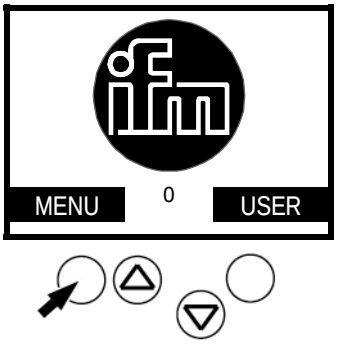
You work with a used device (e.g. from a test project). You want to restore the factory settings of the device to prepare it for the new project?

Info

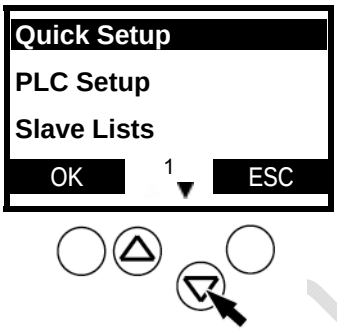
Password level 3 required: → chapter Password setting (→ page 138).
For the administrator mode please contact your AS-i sales specialist.

[MENU] > [System Setup] > [Factory default] > 2x[OK]



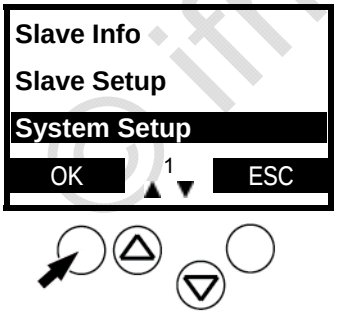
Step 1:

► Press [Menu].



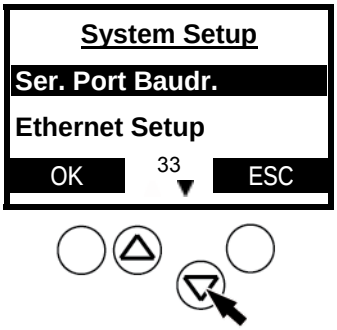
Step 2:

► Press [▼] to scroll to [System Setup].



Step 3:

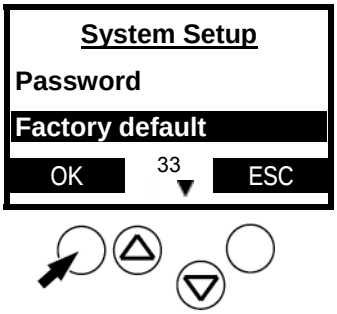
► Press [OK] to select [System Setup].



Step 4:

AC1375: Menu screen number = 16

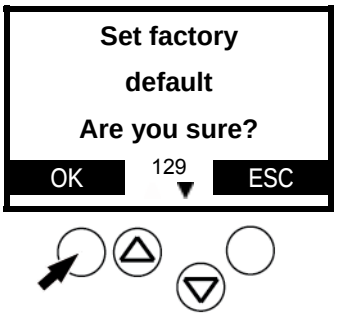
► Press [▼ to scroll to [Factory default].



Step 5:

AC1375: Menu screen number = 16

► Select [Factory default] with [OK].

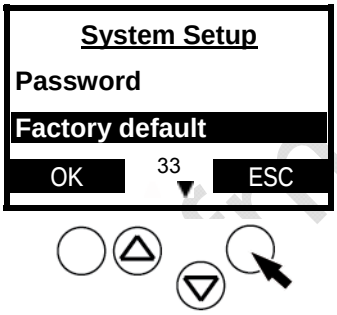


Step 6:

AC1375: Menu screen number = ##

> Display of safety query
"Reset to factory settings. Are you sure?"

► Acknowledge with [OK].



Step 7:

> Reset of the device to the settings on delivery. Some changes will not become effective before the next power-on.

> The password is reset to level 1.

> Return to → screen.
AC1375: Menu screen number = 16

► Return to the start screen with [ESC].

► Switch the device off and on again.

> The language of the device is reset to English.

> The baud rate of the serial interface is reset to 115 200 baud.

> That's it!

9.5 Update firmware

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Info

To update the operating system of the device you need a special software which is not generally available for security reasons.

► If needed, please contact our AS-i sales specialist.

9.6 Character sets

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The device has 3 different sets of characters used in the menu:

- 16 pixels high proportional font,
- 8 pixels high proportional font,
- 8 pixels high, 6 pixels wide font for tables.

Table of characters:

0		32	space	64	@	96	`	128	Ç	160	á	192	└	224	
1		33	!	65	A	97	a	129	ü	161	í	193	┴	225	β
2		34	"	66	B	98	b	130	é	162	ó	194	┬	226	
3		35	#	67	C	99	c	131	â	163	ú	195	├	227	
4		36	$	68	D	100	d	132	ä	164	ñ	196	─	228	
5		37	%	69	E	101	e	133	à	165	Ñ	197	┼	229	
6		38	&	70	F	102	f	134	å	166	ª	198		230	µ
7		39	'	71	G	103	g	135	ç	167	º	199		231	
8		40	(	72	H	104	h	136	ê	168	¿	200	╚	232	
9		41	)	73	I	105	i	137	ë	169	⌐	201	╔	233	
10		42	*	74	J	106	j	138	è	170	¬	202	╩	234	
11		43	+	75	K	107	k	139	ï	171	½	203	╦	235	
12		44	,	76	L	108	l	140	î	172	¼	204	╠	236	
13		45	-	77	M	109	m	141	ì	173	¡	205	═	237	
14		46	.	78	N	110	n	142	Ä	174	«	206	╬	238	
15		47	/	79	O	111	o	143	Å	175	»	207		239	
16	►	48	0	80	P	112	p	144	É	176	░	208		240	
17	◄	49	1	81	Q	113	q	145	æ	177	▒	209		241	±
18	↕	50	2	82	R	114	r	146	Æ	178	▓	210		242	
19	‼	51	3	83	S	115	s	147	ô	179	│	211		243	
20	¶	52	4	84	T	116	t	148	ö	180	┤	212		244	
21	§	53	5	85	U	117	u	149	ò	181		213		245	
22	▬	54	6	86	V	118	v	150	û	182		214		246	
23	↨	55	7	87	W	119	w	151	ù	183		215		247	
24	↑	56	8	88	X	120	x	152	ÿ	184		216		248	
25	↓	57	9	89	Y	121	y	153	Ö	185	╣	217	┘	249	
26	→	58	:	90	Z	122	z	154	Ü	186	║	218	┌	250	
27	←	59	;	91	[	123	{	155	ø	187	╗	219	█	251	
28	∟	60	<	92	\	124	¦	156	£	188	╝	220	▄	252	
29	↔	61	=	93	]	125	}	157	¥	189		221		253	²
30	▲	62	>	94	^	126	~	158	Pt	190		222		254	■
31	▼	63	?	95	_	127	⌂	159	ƒ	191	┐	223	▀	255	

9.7 Set the parameters of the fieldbus interface in the device

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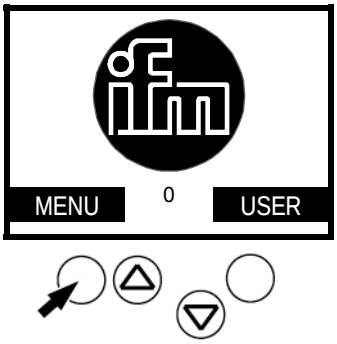
NOTE

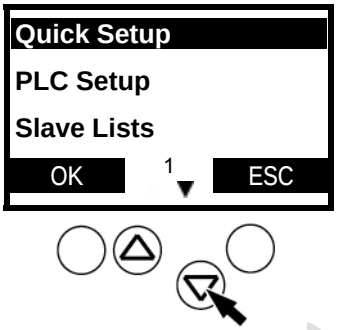
Automatic alignment of the fieldbus interface with the host is only possible if connected. On the other hand, a unit with a wrong fieldbus address can lead to interference in the active Profibus system.

[Menu] > [Fieldbus Setup] > Choose address > [OK]



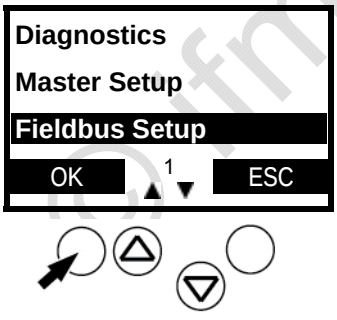
Step 1:

► Press [Menu].



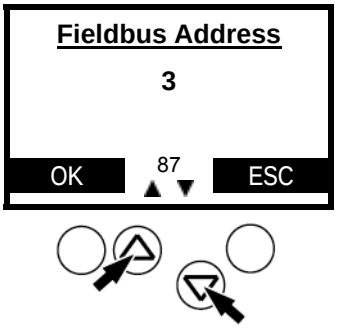
Step 2:

► Press [▼] to scroll to [Fieldbus Setup].



Step 3:

► Press [OK] to select [Fieldbus Setup].



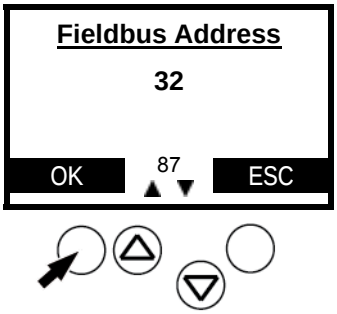
Step 4:

AC1375: Menu screen number = 43

> Display of the current fieldbus address.

► Press [▲] / [▼] to scroll to the requested address.

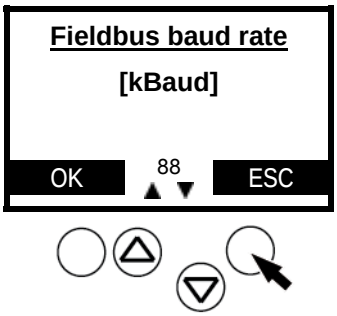
NOTE:
The address must match the indication in the fieldbus master.



Step 5:

AC1375: Menu screen number = 43

► Save the fieldbus address with [OK].



Step 6:

AC1375: Menu screen number = 44

> If there is communication with the fieldbus master:
Display of the baud rate set in the master.

► Acknowledge with [OK].

> If there is no communication with the fieldbus master:
Display value not defined.

► Cancel with [ESC].

► Connect gateway to the Profibus host: Connect the Profibus cable to the device.

9.8 Parameter setting of the Profibus host

Contents

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NOTE

Refer to the description of the Profibus interface on the host
(host = fieldbus master = in most cases higher-level PLC).

9.8.1 Introduction

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GSD file

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(GSD = **G**eneral **S**tation **D**escription)

The GSD file contains different possible definitions (indications of length) for each of the 12 modules.

You can find the current version of the GSD file on the **ifm** homepage:
→ www.ifm.com > select your country > [Service] > [Download] > [Bus system AS-Interface]
e.g. for AC1375:
→ GSD file for SmartLink AC1375
→ download the file `ifm...07E5.gsd` (... = version)

The GSD file is also provided on the **ifm** CD, e.g. for AC1375:

`cd:\ServicePack\ProgramFiles\ifm_ControllerE\Fieldbus\Profibus\AC1375\ifm…07E5.gsd`

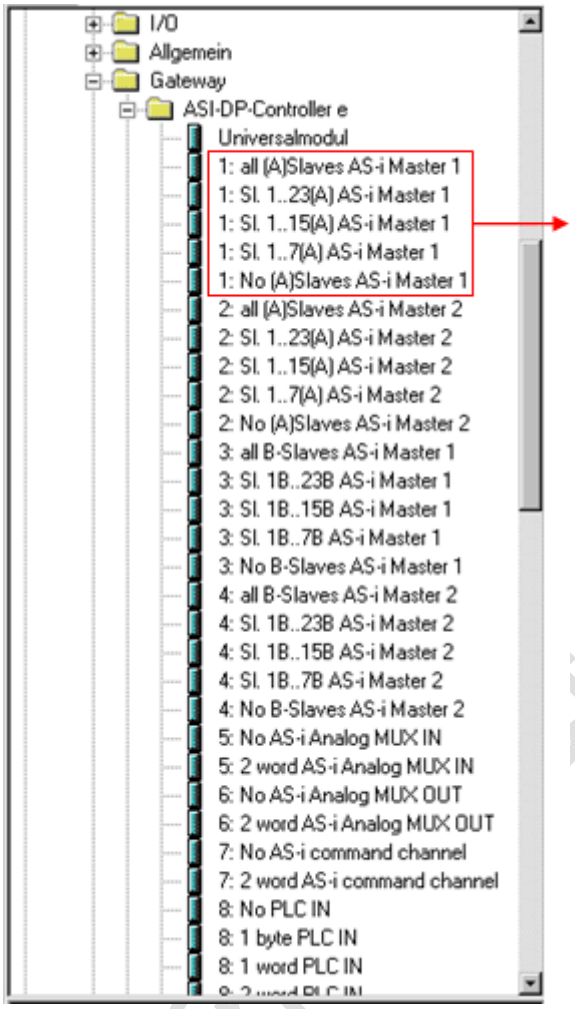
► Copy this file to the suitable directory of the corresponding fieldbus configuration program (→ its description).

Programming software

5543

The data of the device and the connected AS-i systems to be transferred can be defined (by indicating the length of up to 12 modules) in the programming software for the Profibus DP master system (host).

You can select from these definitions for parameter setting in the host:



Profibus modules; example for module 1:

There is a choice of 5 entries:

- all single and A slaves on AS-i master 1 (length = 16 bytes)
- single and A slaves with the addresses 1(A)...23(A) on AS-i master 1 (length = 12 bytes)
- single and A slaves with the addresses 1(A)...15(A) on AS-i master 1 (length = 8 bytes)
- single and A slaves with the addresses 1(A)...7(A) on AS-i master 1 (length = 4 bytes)
- no single or A slaves on AS-i master 1 (length = 0 byte)

If the parameters for a smaller number of slaves than indicated in the selection point are to be set, you have created free reserve in the host.

Example:

5 single and/or A slaves are connected to the AS-i master 1.

You have selected on the host:
"single and A slaves with the addresses 1(A)...7(A) on AS-i master 1"

You have then created an address area reserve of 1 byte in the host which is not used for the time being. The first 3 bytes of the reserved address area are used to exchange data.

9.8.2 Assigning the addresses of the inputs/outputs to the host "locations"

Contents

5545

For Profibus DP, virtual locations in the host are assigned to the inputs/outputs addressed via AS-i.

Addressing of CTT2 and CTT3 slaves:
→ chapter Combined transaction – Use of analogue channels in the gateway depending on the slave profile (→ page 39),
→ chapter Data distribution of slaves in the M4 gateway (depending on the profile) (→ page 41).

Digital inputs / outputs

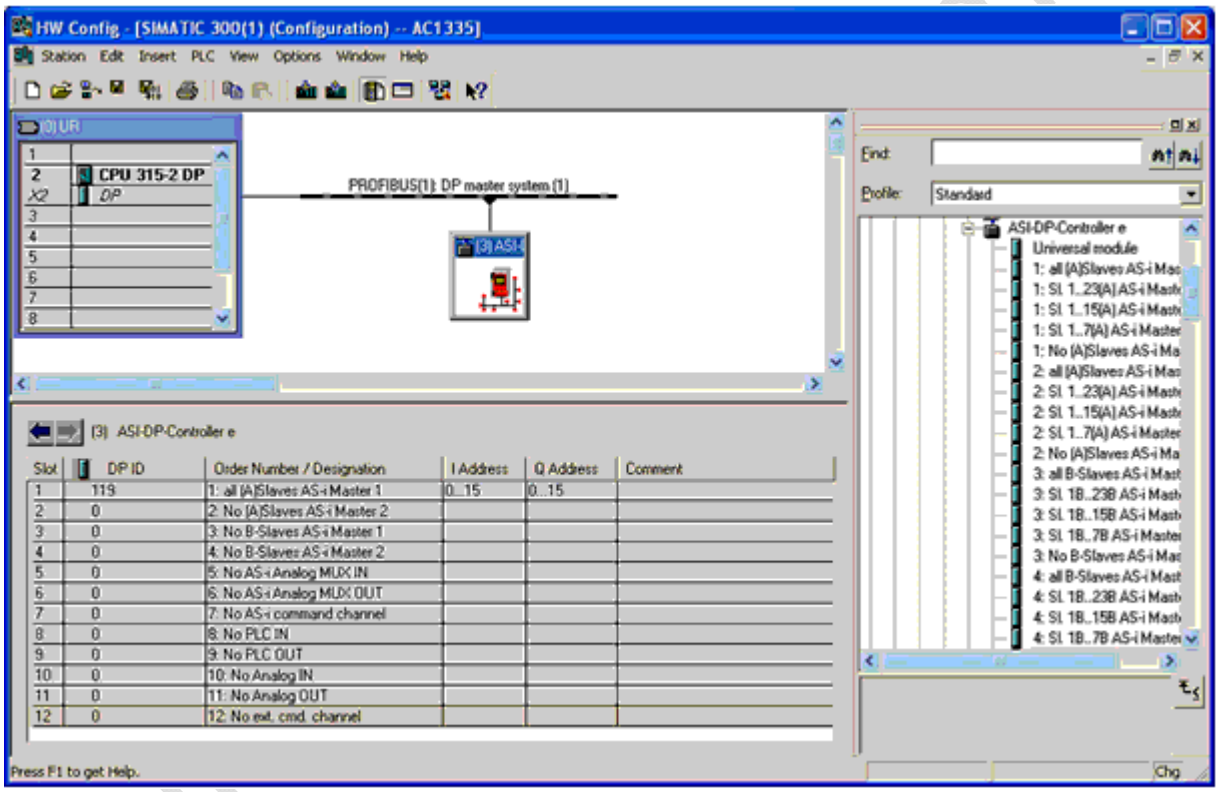
Contents

5547

1st example

5551

Siemens S7 with AS-i gateway. The digital inputs/outputs on the AS-i master are assigned to the host as bytes 0...15.



In this constellation, how are the IEC addresses distributed to the inputs and outputs of the slaves?

Digital inputs and outputs of the slaves at start address 0

5549

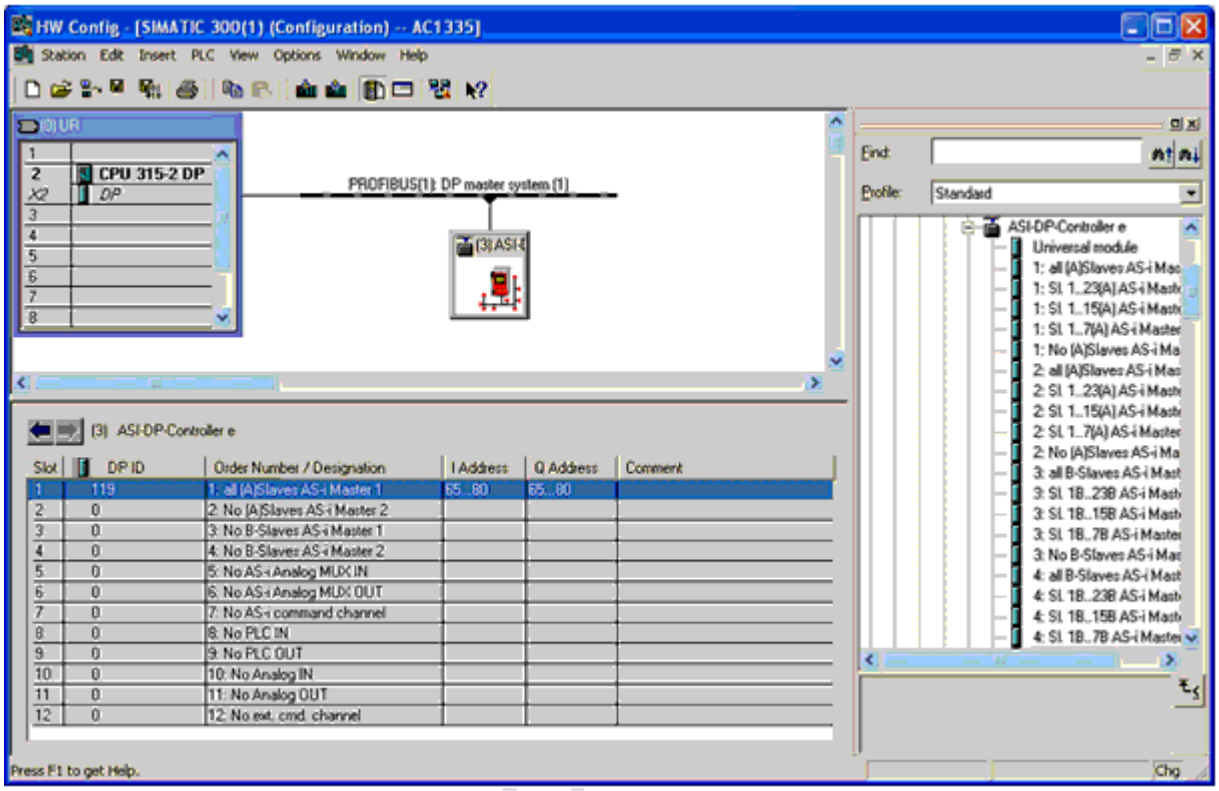
Start address	Bits 7...4				Bits 3...0			
0	(slave 0) reserved for master flags				slave 1			
	reserve	Conf.Err.	No slave	PF.Err	D3	D2	D1	D0
	0 .7	0 .6	0 .5	0 .4	0 .3	0 .2	0 .1	0 .0
1	slave 2				slave 3			
	D3	D2	D1	D0	D3	D2	D1	D0
	1 .7	1 .6	1 .5	1 .4	1 .3	1 .2	1 .1	1 .0
2	slave 4				slave 5			
	D3	D2	D1	D0	D3	D2	D1	D0
	2 .7	2 .6	2 .5	2 .4	2 .3	2 .2	2 .1	2 .0
3	slave 6				slave 7			
	D3	D2	D1	D0	D3	D2	D1	D0
	3 .7	3 .6	3 .5	3 .4	3 .3	3 .2	3 .1	3 .0
4	slave 8				slave 9			
	D3	D2	D1	D0	D3	D2	D1	D0
	4 .7	4 .6	4 .5	4 .4	4 .3	4 .2	4 .1	4 .0
5	slave 10				slave 11			
	D3	D2	D1	D0	D3	D2	D1	D0
	5 .7	5 .6	5 .5	5 .4	5 .3	5 .2	5 .1	5 .0
6	slave 12				slave 13			
	D3	D2	D1	D0	D3	D2	D1	D0
	6 .7	6 .6	6 .5	6 .4	6 .3	6 .2	6 .1	6 .0
7	slave 14				slave 15			
	D3	D2	D1	D0	D3	D2	D1	D0
	7 .7	7 .6	7 .5	7 .4	7 .3	7 .2	7 .1	7 .0
8	slave 16				slave 17			
	D3	D2	D1	D0	D3	D2	D1	D0
	8 .7	8 .6	8 .5	8 .4	8 .3	8 .2	8 .1	8 .0
9	slave 18				slave 19			
	D3	D2	D1	D0	D3	D2	D1	D0
	9 .7	9 .6	9 .5	9 .4	9 .3	9 .2	9 .1	9 .0
10	slave 20				slave 21			
	D3	D2	D1	D0	D3	D2	D1	D0
	10 .7	10 .6	10 .5	10 .4	10 .3	10 .2	10 .1	10 .0
11	slave 22				slave 23			
	D3	D2	D1	D0	D3	D2	D1	D0
	11 .7	11 .6	11 .5	11 .4	11 .3	11 .2	11 .1	11 .0

Start address	Bits 7...4				Bits 3...0			
12	slave 24				slave 25			
	D3	D2	D1	D0	D3	D2	D1	D0
	12 .7	12 .6	12 .5	12 .4	12 .3	12 .2	12 .1	12 .0
13	slave 26				slave 27			
	D3	D2	D1	D0	D3	D2	D1	D0
	13 .7	13 .6	13 .5	13 .4	13 .3	13 .2	13 .1	13 .0
14	slave 28				slave 29			
	D3	D2	D1	D0	D3	D2	D1	D0
	14 .7	14 .6	14 .5	14 .4	14 .3	14 .2	14 .1	14 .0
15	slave 30				slave 31			
	D3	D2	D1	D0	D3	D2	D1	D0
	15 .7	15 .6	15 .5	15 .4	15 .3	15 .2	15 .1	15 .0

2nd example

5550

Siemens S7 with AS-i gateway. The digital inputs/outputs on the AS-i master are assigned to the host as bytes 65..80.



In this constellation, how are the IEC addresses distributed to the inputs and outputs of the slaves?

Digital inputs and outputs of the slaves at start address 65

5553

Start address	Bits 7...4				Bits 3...0			
65	(slave 0) reserved for master flags				slave 1			
	reserve	Conf.Err.	Noslave	PF.Err	D3	D2	D1	D0
	65 .7	65 .6	65 .5	65 .4	65 .3	65 .2	65 .1	65 .0
66	slave 2				slave 3			
	D3	D2	D1	D0	D3	D2	D1	D0
	66 .7	66 .6	66 .5	66 .4	66 .3	66 .2	66 .1	66 .0
67	slave 4				slave 5			
	D3	D2	D1	D0	D3	D2	D1	D0
	67 .7	67 .6	67 .5	67 .4	67 .3	67 .2	67 .1	67 .0
68	slave 6				slave 7			
	D3	D2	D1	D0	D3	D2	D1	D0
	68 .7	68 .6	68 .5	68 .4	68 .3	68 .2	68 .1	68 .0

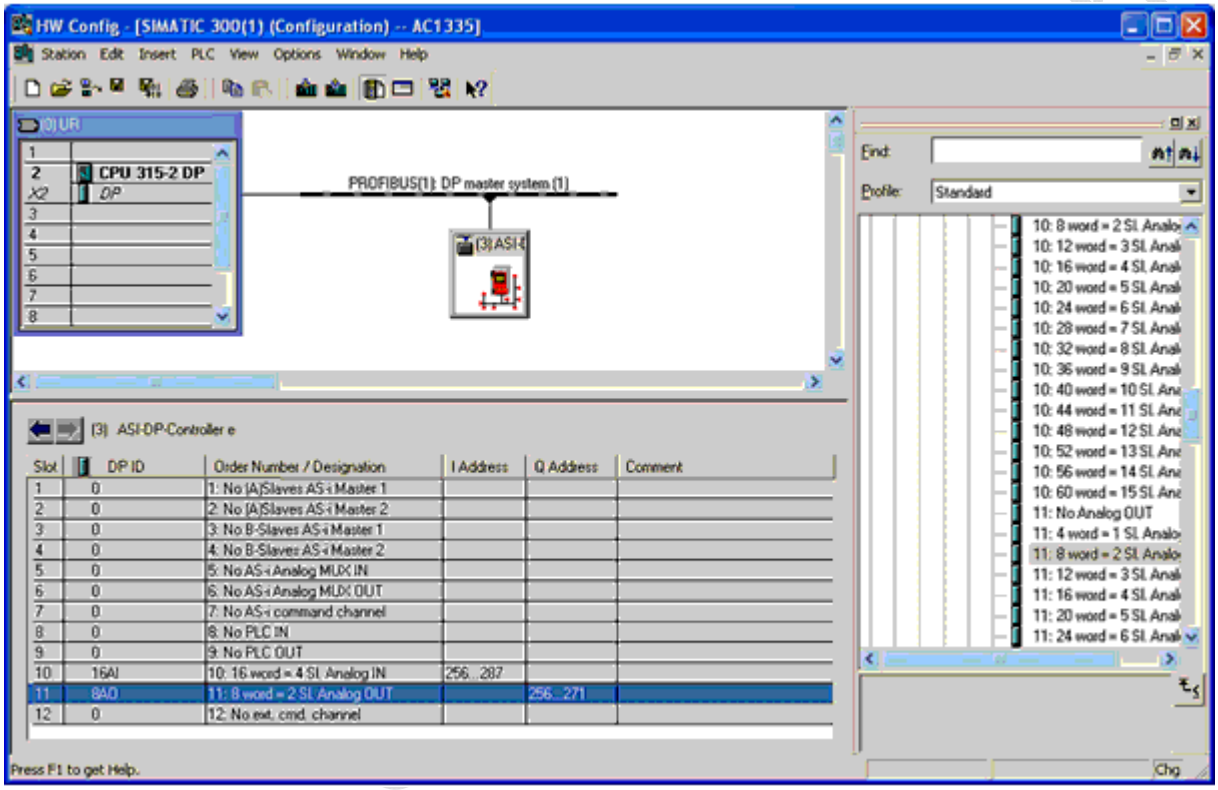
Start address	Bits 7...4				Bits 3...0			
69	slave 8				slave 9			
	D3	D2	D1	D0	D3	D2	D1	D0
	69 .7	69 .6	69 .5	69 .4	69 .3	69 .2	69 .1	69 .0
70	slave 10				slave 11			
	D3	D2	D1	D0	D3	D2	D1	D0
	70 .7	70 .6	70 .5	70 .4	70 .3	70 .2	70 .1	70 .0
71	slave 12				slave 13			
	D3	D2	D1	D0	D3	D2	D1	D0
	71 .7	71 .6	71 .5	71 .4	71 .3	71 .2	71 .1	71 .0
72	slave 14				slave 15			
	D3	D2	D1	D0	D3	D2	D1	D0
	72 .7	72 .6	72 .5	72 .4	72 .3	72 .2	72 .1	72 .0
73	slave 16				slave 17			
	D3	D2	D1	D0	D3	D2	D1	D0
	73 .7	73 .6	73 .5	73 .4	73 .3	73 .2	73 .1	73 .0
74	slave 18				slave 19			
	D3	D2	D1	D0	D3	D2	D1	D0
	74 .7	74 .6	74 .5	74 .4	74 .3	74 .2	74 .1	74 .0
75	slave 20				slave 21			
	D3	D2	D1	D0	D3	D2	D1	D0
	75 .7	75 .6	75 .5	75 .4	75 .3	75 .2	75 .1	75 .0
76	slave 22				slave 23			
	D3	D2	D1	D0	D3	D2	D1	D0
	76 .7	76 .6	76 .5	76 .4	76 .3	76 .2	76 .1	76 .0
77	slave 24				slave 25			
	D3	D2	D1	D0	D3	D2	D1	D0
	77 .7	77 .6	77 .5	77 .4	77 .3	77 .2	77 .1	77 .0
78	slave 26				slave 27			
	D3	D2	D1	D0	D3	D2	D1	D0
	78 .7	78 .6	78 .5	78 .4	78 .3	78 .2	78 .1	78 .0
79	slave 28				slave 29			
	D3	D2	D1	D0	D3	D2	D1	D0
	79 .7	79 .6	79 .5	79 .4	79 .3	79 .2	79 .1	79 .0
80	slave 30				slave 31			
	D3	D2	D1	D0	D3	D2	D1	D0
	80 .7	80 .6	80 .5	80 .4	80 .3	80 .2	80 .1	80 .0

Analogue inputs/outputs

Contents

5554

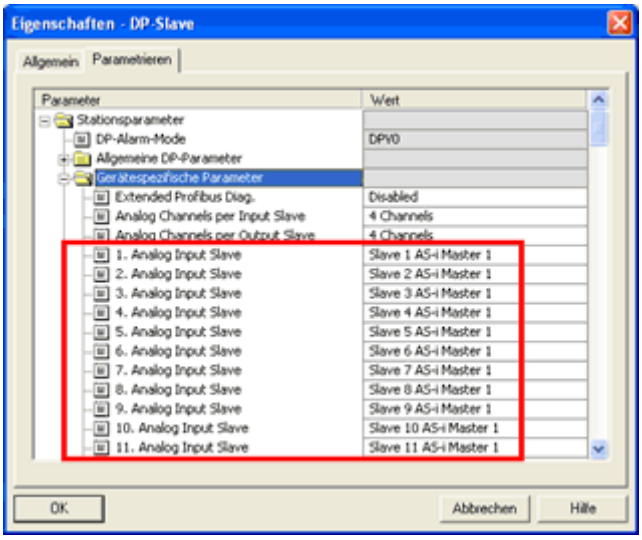
Example: Siemens S7 with AS-i gateway:
The analogue inputs on the AS-i gateway are assigned to the host as bytes 256...287 (32 bytes = 16 words). The analogue inputs on the AS-i master are assigned to the host as bytes 256...271 (16 bytes = 8 words).



The order of the shown analogue slaves can be explicitly defined via parameters in the Profibus configuration.

► To adapt the parameters, double-click on the gateway symbol.

► Change to the tab [Parameter Setting] in the window which appears.
→ figure below:



In this constellation, how are the IEC addresses distributed to the inputs and outputs of the slaves? The following tables show the correlation between start address and AS-i slave address (parameter preset).

Analogue inputs

5557

Start address [byte]	Slave address *)	Channel number
256	1	1
258		2
260		3
262		4
264	2	1
266		2
268		3
270		4
272	3	1
274		2
276		3
278		4
280	4	1
282		2
284		3
286		4

*) The slave address can be freely assigned via the Profibus parameter data!

Analogue outputs

5558

Start address [byte]	Slave address *)	Channel number
256	1	1
258		2
260		3
262		4
264	2	1
266		2
268		3
270		4

*) The slave address can be freely assigned via the Profibus parameter data!

9.8.3 Define Profibus DP modules

Contents

5559

The text of the different options of the modules always starts with the module number (→ photo in section Programming software (→ page 146)). So all options in the module list of the hardware catalogue starting with "1:" are options of the first module in the device definition.

The first module for example defines the number of binary I/O data bytes of single or A slaves of AS-i master 1 which are to be transferred to the Profibus master via Profibus DP.

NOTE

The maximum data length of all 12 modules must not exceed 152 input bytes and 152 output bytes.

Example: Siemens S7 with AS-i gateway AC1376

(3) ASI-DP-Controller e

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	119	1: all (A)Slaves AS-i Master 1	256...271	256...271	
2	0	2: No (A)Slaves AS-i Master 2			
3	113	3: Sl. 1B..7B AS-i Master 1	272...275	272...275	
4	0	4: No B-Slaves AS-i Master 2			
5	2AX	5: 2 word AS-i Analog MUX IN	276...279	276...279	
6	2AX	6: 2 word AS-i Analog MUX OUT	280...283	280...283	
7	179	7: 4 byte AS-i command channel	284...287	284...287	
8	2AI	8: 2 word PLC IN	288...291		
9	4AO	9: 4 word PLC OUT		288...295	
10	8AI	10: 8 word = 2 Sl. Analog IN	292...307		
11	12AO	11: 12 word = 3 Sl. Analog OUT		296...319	
12	Ext. Command channel				

For the advanced Profibus DP user it is also possible to use length codes other than those indicated as long as the maximum lengths of the modules are not exceeded.

Module 1 – Binary inputs/outputs of single/A slaves of AS-i master 1

5563

Module	1
Contents	Binary inputs and outputs of single or A slaves of AS-i master 1
Length	0...16 bytes I/O (if not used: length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	flags master 1	slave 1(A)
2	slave 2(A)	slave 3(A)
3	slave 4(A)	slave 5(A)
4	slave 6(A)	slave 7(A)
5	slave 8(A)	slave 9(A)
6	slave 10(A)	slave 11(A)
7	slave 12(A)	slave 13(A)
8	slave 14(A)	slave 14(A)
9	slave 16(A)	slave 15(A)
10	slave 18(A)	slave 19(A)
11	slave 20(A)	slave 21(A)
12	slave 22(A)	slave 23(A)
13	slave 24(A)	slave 25(A)
14	slave 26(A)	slave 27(A)
15	slave 28(A)	slave 29(A)
16	slave 30(A)	slave 31(A)

The flags in the first input byte contain status information of the AS-i 1:

Bit 7	Bit 6	Bit 5	Bit 4
reserved	configuration error in the AS-i system	AS-i master offline	peripheral fault

The flags in the first output byte contain control information of the AS-i master 1:

Bit 7	Bit 6	Bit 5	Bit 4
reserved	reserved	reset of the stored diagnostic data	activate transfer of the stored diagnostic data

If bit 4 of the control information is TRUE, the AS-i master transmits the stored peripheral faults and configuration errors in the device-specific diagnosis. The flags remain TRUE even if the fault is no longer present. Bit 5 in the control information resets this information.

Module 2 – Binary inputs/outputs of single/A slaves of AS-i master 2

5566

Module	2 (only for AC1376)
Contents	Binary inputs and outputs of single or A slaves of AS-i master 2
Length	0...16 bytes I/O (if not used): length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	flags master 1	slave 1(A)
2	slave 2(A)	slave 3(A)
3	slave 4(A)	slave 5(A)
4	slave 6(A)	slave 7(A)
5	slave 8(A)	slave 9(A)
6	slave 10(A)	slave 11(A)
7	slave 12(A)	slave 13(A)
8	slave 14(A)	slave 14(A)
9	slave 16(A)	slave 15(A)
10	slave 18(A)	slave 19(A)
11	slave 20(A)	slave 21(A)
12	slave 22(A)	slave 23(A)
13	slave 24(A)	slave 25(A)
14	slave 26(A)	slave 27(A)
15	slave 28(A)	slave 29(A)
16	slave 30(A)	slave 31(A)

The flags in the first input byte contain status information of the AS-i master 2:

Bit 7	Bit 6	Bit 5	Bit 4
reserved	configuration error in the AS-i system	AS-i master offline	peripheral fault

The flags in the first output byte contain control information of the AS-i master 2:

Bit 7	Bit 6	Bit 5	Bit 4
reserved	reserved	reset of the stored diagnostic data	activate transfer of the stored diagnostic data

If bit 4 of the control information is TRUE, the AS-i master transmits the stored peripheral faults and configuration errors in the device-specific diagnosis. The flags remain TRUE even if the fault is no longer present. Bit 5 in the control information resets this information.

Module 3 – Binary inputs/outputs of B slaves of AS-i master 1

5567

Module	3
Contents	Binary inputs and outputs of B slaves of AS-i master 1
Length	0...16 bytes I/O (if not used: length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	reserved	slave 1B
2	slave 2B	slave 3B
3	slave 4B	slave 5B
4	slave 6B	slave 7B
5	slave 8B	slave 9B
6	slave 10B	slave 11B
7	slave 12B	slave 13B
8	slave 14B	slave 14B
9	slave 16B	slave 15B
10	slave 18B	slave 19B
11	slave 20B	slave 21B
12	slave 22B	slave 23B
13	slave 24B	slave 25B
14	slave 26B	slave 27B
15	slave 28B	slave 29B
16	slave 30B	slave 31B

Module 4 – Binary inputs/outputs of B slaves of AS-i master 2

5568

Module	3 (only AC1376)
Contents	binary inputs/outputs of B slaves of AS-i master 2
Length	0...16 bytes I/O (if not used length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	reserved	slave 1B
2	slave 2B	slave 3B
3	slave 4B	slave 5B
4	slave 6B	slave 7B
5	slave 8B	slave 9B
6	slave 10B	slave 11B
7	slave 12B	slave 13B
8	slave 14B	slave 14B
9	slave 16B	slave 15B
10	slave 18B	slave 19B
11	slave 20B	slave 21B
12	slave 22B	slave 23B
13	slave 24B	slave 25B
14	slave 26B	slave 27B
15	slave 28B	slave 29B
16	slave 30B	slave 31B

Module 5 – Multiplexed analogue inputs of AS-i masters 1/2

5569

Module	5
Contents	multiplexed analogue inputs of AS-i masters 1 and 2
Length	2 words consistent I/O (if not used: length = 0)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	MM		ST	SLA					reserved = 0						C	

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$
C	channel no.	2 bits	$0...3_{hex} = 0...3_{dec}$

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	copy of the request								E4	E3	E2	E1	res. = 0		C	
2	analogue value, INTEGER															

Legend:

E1	error no. 1 of the response	1 bit	0 = no error detected 1 = error: value invalid
E2	error no. 2 of the response	1 bit	0 = no error detected 1 = error: overflow
E3	error no. 3 of the response	1 bit	0 = no error detected 1 = error: no analogue slave found
E4	error no. 4 of the response	1 bit	0 = no error detected 1 = error: protocol error
C	channel no.	2 bits	$0...3_{hex} = 0...3_{dec}$

Module 6 – Multiplexed analogue outputs of AS-i masters 1/2

5581

Module	6
Contents	multiplexed analogue outputs of AS-i masters 1 and 2
Length	2 words consistent I/O (if not used: length = 0)

NOTE

If analogue outputs are also triggered in module 11, the value written in module 6 is overwritten with the data of module 11.

Request from DP master to AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	MM		ST	SLA					reserved = 0			V	res. = 0		C	
2	analogue value, INTEGER															

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$
V	switch off the channel	1 bit	0 = channel is valid 1 = switch off channel, master transmits "invalid"
C	channel no.	2 bits	$0...3_{hex} = 0...3_{dec}$

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	copy of the request								E4	E3	E2	E1	res. = 0		C	
2	analogue value, INTEGER															

Legend:

E1	error no. 1 of the response	1 bit	0 = no error detected 1 = error: value invalid
E2	error no. 2 of the response	1 bit	0 = no error detected 1 = error: overflow
E3	error no. 3 of the response	1 bit	0 = no error detected 1 = error: no analogue slave found
E4	error no. 4 of the response	1 bit	0 = no error detected 1 = error: protocol error
C	channel no.	2 bits	$0...3_{hex} = 0...3_{dec}$

Module 7 – Command channel

5585

Module	7
Contents	command channel, → chapter DP module 7 – command channel (→ page 172).
Length	4 words consistent I/O (if not used: length = 0)

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	res. = 0		command number					
2	MM		ST	SLA				
3	*)							
4	*)							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	01_{bin} = 1_{dec} = master 1 10_{bin} = 2_{dec} = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$

*) → Overview of the commands in the DP module 7 (→ page 164)

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	E	B	reflected command number					
2	reflected command data							
3	*)							
4	*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used

*) → Overview of the commands in the DP module 7 (→ page 164)

The commands are only executed if the command number (the first byte) changes. If the same command is to be executed with different data several times (e.g. read slave lists), the operating mode "continuous command" must first be selected for the data transmission. This is done with the Module 7, command 62 (3Ehex) – [Continuous Command] operating mode (→ page 204).

Overview of the commands in the DP module 7

5589

command no.			Contents of ...		
dec	hex	Description	Byte 2	Byte 3	Byte 4
01	01	► read master flags	MM000000	0	—
		response:	MM000000	Master flags in module 7 (→ page 173)	
02	02	► change operating mode	MM000000	AS-i master preset operating mode	—
		response:	MM000000	AS-i master current operating mode	—
03	03	► read current slave configuration	MMXSSSSS	—	—
		response:	MMXSSSSS	slave configuration data	
04	04	► read projected slave configuration	MMXSSSSS	—	—
		response:	MMXSSSSS	slave configuration data	
05	05	► change projected slave configuration	MMXSSSSS	slave configuration data	
		response:	MMXSSSSS	slave configuration data	
06	06	► read slave parameters	MMXSSSSS	—	—
		response:	MMXSSSSS	projected parameters	current parameters
07	07	► change projected slave parameters (default parameters)	MMXSSSSS	projected parameters	—
		response:	MMXSSSSS	projected parameters	—
08	08	► read LAS	MMXSSSSS	—	—
		response:	MMXSSSSS	slave addresses from address group	
09	09	► read LDS	MMXSSSSS	—	—
		response:	MMXSSSSS	slave addresses from address group	
10	0A	► read LPF	MMXSSSSS	—	—
		response:	MMXSSSSS	slave addresses from address group	
11	0B	► read LPS	MMXSSSSS	—	—
		response:	MMXSSSSS	slave addresses from address group	
12	0C	reserved	—	—	
13	0D	► read telegram error counter	MMXSSSSS	—	—
		response:	MMXSSSSS	error counter	
14	0E	► read configuration error counter	MM000000	—	—
		► response:	MM000000	error counter	
15	0F	► read AS-i cycle counter	MM000000	—	—
		► response:	MM000000	current count value of the cycle counter	
16	10	► change current slave parameters	MMXSSSSS	parameters	—
		response:	MMXSSSSS	reflected parameters	—
17 18	11 12	reserved	—	—	—

command no.			Contents of ...		
dec	hex	Description	Byte 2	Byte 3	Byte 4
19	13	► Config. all	MM000000	—	—
		response:	MM000000	status	—
20	14	reserved	—	—	—
21	15	► save configuration in flash	MM000000	—	—
		response:	MM000000	—	—
22	16	► reset telegram error counter	MMXSSSSS	—	—
		response:	MMXSSSSS	—	—
23	17	► address slave	MMXSSSSS	00XSSSSS	—
		response:	MMXSSSSS	—	—
62	3E	► operating mode "continuous command“	0	preset command mode	0 = deactivate 1 = activate
		response:	0	current command mode	0 = deactivated 1 = activated
63	3F	► no operation command without function	—	—	—
		response:	—	—	—

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
X	slave type	1 bit	0 = single slave or A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SSSSS	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Module 8 – Data transmission between Profibus DP master and PLC in the ControllerE

5591

Module	8 (no function in the gateway)
Contents	field for the data transmission between the Profibus DP master system and the PLC functions in the ControllerE
Length	0...64 words inputs (if not used: length = 0)
Addresses	%IW0.0...%IW0.63

Module 9 – Data transmission between PLC in the ControllerE and the Profibus DP master

5592

Module	9 (no function in the gateway)
Contents	field for the data transmission between the PLC functions in the ControllerE and the Profibus DP master system
Length	0...64 words outputs (if not used: length = 0)
Addresses	%QW0.0...%QW0.63

Module 10 – Parallel analogue inputs

5593

Module	10	
Contents	Parallel analogue inputs of up to 30 AS-i slaves, 1/2/4 words per AS-i slave; the slave number and the number of analogue channels are defined by Profibus DP parameters.	
	data length = 4 words	(default) All 4 channels of a total of up to 15 slaves on masters 1 and 2 are transmitted. Selection of the slaves to be transmitted via Profibus DP device parameters (→ chapter Device-specific Profibus DP parameters (→ page 169)).
	data length = 2 words	From slave 1 onwards (of up to 30 slaves) on master 1, the channels 1 and 2 are transmitted.
	data length = 1 word	From slave 1 onwards (of up to 30 slaves) on masters 1 and 2, channel 1 each is transmitted.
Length	0...60 words inputs (if not used: length = 0)	

Module 11 – Parallel analogue outputs

5594

Module	11	
Contents	Parallel analogue outputs of up to 30 AS-i slaves, 1/2/4 words per AS-i slave; the slave number and the number of analogue channels are defined by Profibus DP parameters.	
	data length = 4 words	(default) All 4 channels of a total of up to 15 slaves on masters 1 and 2 are transmitted. Selection of the slaves to be transmitted via Profibus DP device parameters (→ chapter Device-specific Profibus DP parameters (→ page 169)).
	data length = 2 words	On slave 1 (up to 30 slaves) on master 1, the channels 1 and 2 are transmitted.
	data length = 1 word	On slave 1 (up to 30 slaves) on masters 1 and 2, channel 1 is transmitted.
Length	0...60 words outputs (if not used: length = 0)	

NOTE

If analogue outputs are also triggered in module 6, the value written in module 6 is overwritten with the data of module 11.

Module 12 – Extended command channel

5595

Module	12
Contents	DP module 12: extended command channel (→ page 207)
Length	2...18 words consistent inputs/outputs (if not used: length = 0)

NOTE

In some controllers larger consistent data fields cannot be processed in the direct I/O address area; special function calls are then required.

9.8.4 Device-specific Profibus DP parameters

Contents

5596

With up to 100 bytes of the device-specific Profibus parameters the addresses of the analogue input slaves and analogue output slaves to be transferred in parallel can be defined and the parameters of the connected AS-i slaves can be set.

Device-specific Profibus DP parameters (example)

5597

Byte	Parameter [hex]	Description
1	80	fixed device parameters
2	00	
3	00	
4	00	
5	AE	fixed value: start of the analogue input addresses
6…20	42…A9	slaves 2, 4, 6, 8,...30 of master 1
21	AA	fixed value: start of the analogue output addresses
22…36	41…2E	slaves 1, 3, 5, 7,...29 of master 1
37	2F	bit 5 = TRUE activates the extended diagnosis of the AS-i system via Profibus DP
	1F	bit 4 = TRUE activates the AS-i parameter download
37…100	1F…FF	predefined parameters of the AS-i slaves

Slave addresses in the Profibus parameter bytes 6...20 and 22...36:

Bit	7	6	5	4	3	2	1	0
Contents	MM		ST	SLA				

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

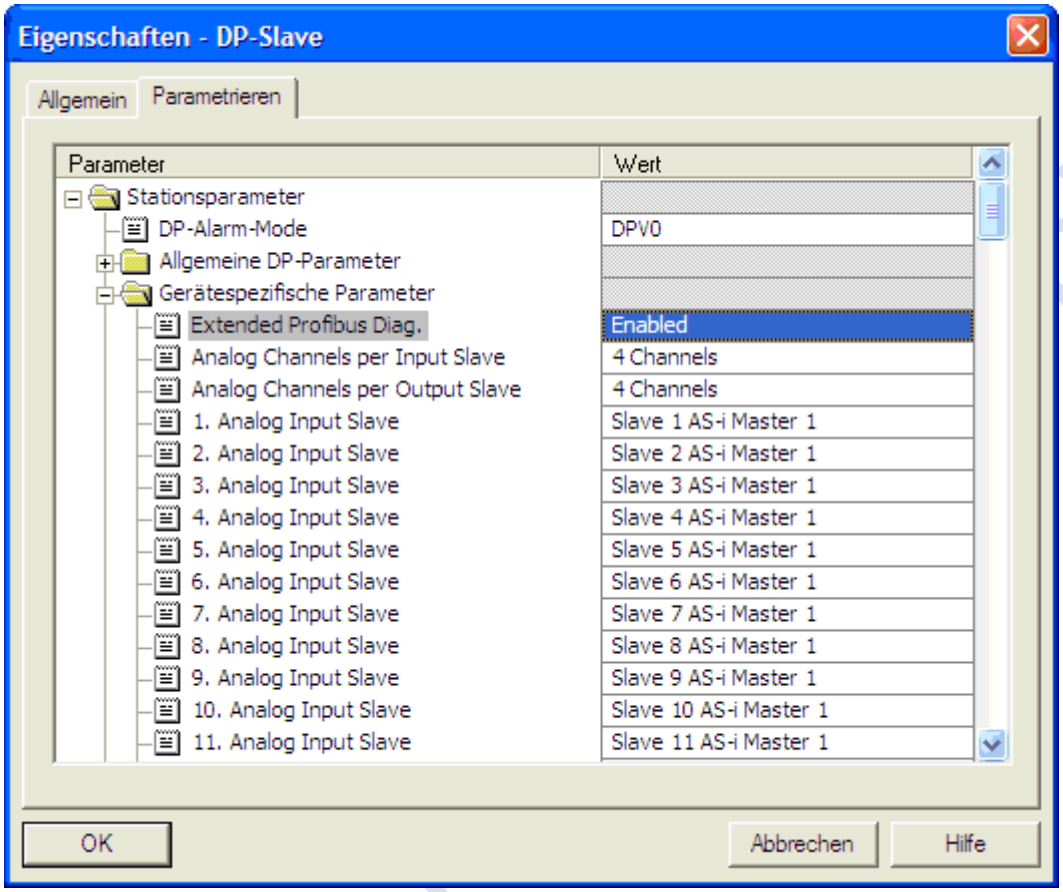
Examples:

master 1	slave 3(A)	1*64 + 3	= 67_{dec}	= 43_{hex}
master 2	slave 5(A)	2*64 + 5	= 133_{dec}	= 85_{hex}
master 1	slave 1 B	1*64 + 1 + 32	= 97_{dec}	= 61_{hex}
master 1	slave 28(A)	1*64 + 28	= 92_{dec}	= $5C_{hex}$

Definition in the GSD file

5598

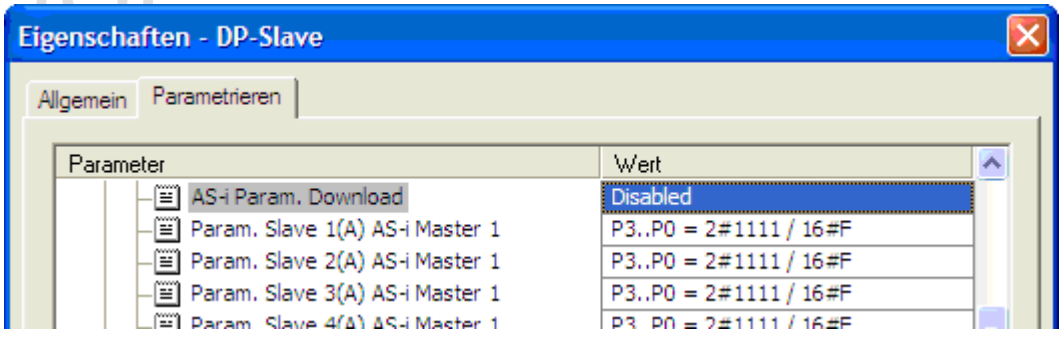
The definitions in the GSD file (GSD = **G**eneral **S**tation **D**escription) enable easy access to the device parameters if this is supported by the configuration tool of the Profibus DP master:



Example Siemens step 7: Byte 37, bit 5 = TRUE

If the parameter "Extended Profibus Diag." is set to "Enabled", the AS-i master transmits the extended diagnostic data described in the next section. This data generates a DP request for a diagnosis in case of an error state in the AS-i master. Therefore a Siemens PLC OB82 must be programmed to react to this state, otherwise the PLC stops.

For "Disabled" (default) the AS-i master only transmits the standard diagnosis. An AS-i error state has no direct effect on the Profibus DP but must then be monitored otherwise by the PLC (using the bits 4...7 in the first byte or via the command channel).



Example Siemens step 7: Byte 37, bit 4 = TRUE

9.8.5 Finish set-up

5601

System behaviour

► Define the system behaviour in the fieldbus configuration program, e.g. response monitoring (watchdog) etc.

Save

► Save the configuration.

► Transfer the configuration to the DP master.

Start

► Start the DP master.

If there is communication on the fieldbus:

> The menu [Fieldbus Setup] in the gateway successively shows the settings configured in the DP master.

When response monitoring (watchdog) activated:

> LED [Bus Failure] goes out.

10 DP module 7 – command channel

Contents

5603

→ Table Overview of the commands in the DP module 7 (→ page 164)

10.1 Commands in DP module 7

Contents

5607

10.1.1 Module 7, command 01 – Read master flags

5608

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$01_{dec} = 01_{hex}$					
2	MM		0					
3	not used							
4	not used							

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	E	B	reflected command number					
2	copy of the request							
3	→ table Master flags in module 7 (→ page 173)							
4	→ table Master flags in module 7 (→ page 173)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used

Master flags in module 7

5611

Byte	Bit	If bit D6 = TRUE, then:
3	0	periphery of all connected slaves is ok (no peripheral fault)
	1	automatic addressing is enabled
	2	exchange of data with the slaves is active
	3...7	reserved
4	0	AS-i configuration is ok
	1	a slave 0 is detected
	2	automatic addressing is enabled
	3	automatic addressing is active
	4	configuration mode is active
	5	normal mode is active
	6	AS-i voltage fault has occurred
	7	offline phase completed

10.1.2 Module 7, command 02 – Change operating mode

5613

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$02_{dec} = 02_{hex}$					
2	MM		0					
3	MOD							
4	not used							

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
MOD	opperating mode	1 byte	00 = set master to the normal mode (protected mode) 01 = set master to the projection mode

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	E	B	reflected command number					
2	copy of the request							
3	copy of the request							
4	not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

10.1.3 Module 7, command 03 – Read current slave configuration

5616

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$03_{dec} = 03_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	extended ID code 2				extended ID code 1			
4	ID code				IO configuration			

Example: Read current slave configuration of slave 7B on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	03	03 = command number 3
2	67	(slave no. **7**) + (master no. **1 * 64**) + (**32**, if B slave) = 103_{dec} = 67_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	03	command processed, no error occurred reflected command number
2	67	copy of the request
3	EF	E = extended ID code 2 F = extended ID code 1
4	03	0 = ID code 3 = IO configuration

Corresponds to slave profile S 3.0.E = 2I/2O module with peripheral fault detection.

10.1.4 Module 7, command 04 – Read projected slave configuration

5620

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$04_{dec} = 04_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	extended ID code 2				extended ID code 1			
4	ID code				IO configuration			

Example: Read projected slave configuration of slave 16(A) on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	04	04 = command number 4
2	50	(slave no. **16**) + (master no. **1 * 64**) + (32, if B slave) = 80_{dec} = 50_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	04	command processed, no error occurred reflected command number
2	50	copy of the request
3	EF	E = extended ID code 2 F = extended ID code 1
4	37	3 = ID code 7 = IO configuration

Corresponds to slave profile S 7.3.E = analogue input module with 4 inputs.

10.1.5 Module 7, command 05 – Change projected slave configuration

5623

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$05_{dec} = 05_{hex}$					
2	MM		ST	SLA				
3	extended ID code 2				extended ID code 1			
4	ID code				IO configuration			

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	copy of the request							
4	copy of the request							

Example: Change projected slave configuration of slave 1(A) on master 2

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	05	05 = command number 5
2	81	(slave no. **1**) + (master no. **2 * 64**) + (32, if B slave) = 129_{dec} = 81_{hex}
3	6F	6 = extended ID code 2 F = extended ID code 1
4	37	3 = ID code 7= IO configuration

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	05	command processed, no error occurred reflected command number
2	81	copy of the request
3	67	copy of the request
4	37	copy of the request

10.1.6 Module 7, command 06 – Read slave parameters

5626

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$06_{dec} = 06_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	projected parameter							
4	current parameter							

Example: Read slave parameter of slave 2(A) on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	06	06 = command number 6
2	42	(slave no. **2**) + (master no. **1 * 64**) + (32, if B slave) = $66_{dec} = 42_{hex}$
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	06	command processed, no error occurred reflected command number
2	42	copy of the request
3	03	projected parameter
4	0F	current parameter

10.1.7 Module 7, command 07 – Change projected slave parameters

5629

With this command the following elements are saved non-volatilely in the flash memory:
- all slave parameters,
- the slave configuration,
- the Profibus parameters.

Requirement: Device is in the projection mode.
→ Module 7, command 02 – Change operating mode (→ page 174).

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$07_{dec} = 07_{hex}$					
2	MM		ST	SLA				
3	projected parameter							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	copy of the request							
4	not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: Change projected slave parameters of slave 7B on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	07	07 = command number 7
2	87	(slave no. **7**) + (master no. **1 * 64**) + (**32**, if B slave) = 135_{dec} = 87_{hex}
3	0F	projected parameter
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	07	command processed, no error occurred reflected command number
2	87	copy of the request
3	0F	copy of the request
4	xx	not changed

10.1.8 Module 7, command 08 – Read LAS (list of active slaves)

5632

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$08_{dec} = 08_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	→ table Slave group in module 7 (→ page 185)							
4	→ table Slave group in module 7 (→ page 185)							

Example: Read LAS (list of active slaves) of slave group 1 on master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	08	08 = command number 8
2	42	(slave no. **2**) → group 1 + (master no. **1 * 64**) + (32, if B slave) = 66_{dec} = 42_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	08	command processed, no error occurred reflected command number
2	42	copy of the request
3	03_{hex} = 00000011_{bin}	→ table Slave group in module 7 (→ page 185), group 1: slave 8(A) is active slave 9(A) is active
4	FE_{hex} = 11111110_{bin}	→ table Slave group in module 7 (→ page 185), group 1: slaves 1(A) to 7(A) are active

Slave group in module 7

5635

The 2 feedback bytes can only give information about max. 16 slaves. Therefore the slaves are divided in 4 groups (→ following table).

When querying the slave lists any slave number from the requested slave group is to be indicated.

Slave group	Byte 3								Byte 4							
	Bit / AS-i slave address															
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
1	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0 *)
2	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
3	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
4	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

*) LAS and LPS have no slave 0, therefore this bit is set to 0!

10.1.9 Module 7, command 09 – Read LDS (list of detected slaves)

5637

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$09_{dec} = 09_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	→ table Slave group in module 7 (→ page 185)							
4	→ table Slave group in module 7 (→ page 185)							

Example: Read LDS (list of detected slaves) of slave group 3 on AS-i master 2

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	09	09 = command number 9
2	A5	(slave no. **5**) → group 3 + (master no. **2 * 64**) + (**32**, if B slave) = 165_{dec} = $A5_{hex}$
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	09	command processed, no error occurred reflected command number
2	A5	copy of the request
3	03_{hex} = 00000011_{bin}	→ table Slave group in module 7 (→ page 185), group 3: slaves 8B and 9B were detected
4	FE_{hex} = 11111110_{bin}	→ table Slave group in module 7 (→ page 185), group 3: slaves 1B to 7B were detected

10.1.10 Module 7, Command 10 (0Ahex) – Read LPF (list of slaves with peripheral fault)

5640

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$10_{dec} = 0A_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	→ table Slave group in module 7 (→ page 185)							
4	→ table Slave group in module 7 (→ page 185)							

Example: Read LPF (list of slaves with peripheral fault) of slave group 2 on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	0A	0A = command number 10
2	54	(slave no. **20**) → group 2 + (master no. **1 * 64**) + (32, if B slave) = 84_{dec} = 54_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	0A	command processed, no error occurred reflected command number
2	54	copy of the request
3	02_{hex} = 00000010_{bin}	→ table Slave group in module 7 (→ page 185), group 2: slave 26(A) indicates peripheral fault
4	20_{hex} = 00100000_{bin}	→ table Slave group in module 7 (→ page 185), group 2: slave 21(A) indicates peripheral fault

10.1.11 Module 7, command 11 (0Bhex) – Read LPS (list of projected slaves)

5643

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$11_{dec} = 0B_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	→ table Slave group in module 7 (→ page 185)							
4	→ table Slave group in module 7 (→ page 185)							

Example: Read LPS (list of projected slaves) of slave group 2 on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	0B	0B = command number 11
2	54	(slave no. **20**) → group 2 + (master no. **1 * 64**) + (32, if B slave) = 84_{dec} = 54_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	0B	command processed, no error occurred reflected command number
2	54	copy of the request
3	02_{hex} = 00000010_{bin}	→ table Slave group in module 7 (→ page 185), group 2: slave 26(A) is projected
4	FE_{hex} = 11111110_{bin}	→ table Slave group in module 7 (→ page 185), group 2: slaves 17(A) to 23(A) are projected

10.1.12 Module 7, command 13 (0Dhex) – Read telegram error counter

5646

Provides the number of errors during the exchange of data between the slave and the master since power on or reset.

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$13_{dec} = 0D_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	error counter high byte							
4	error counter low byte							

Example: Read telegram error counter of slave 1 on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	0D	0D = command number 13
2	41	(slave no. **1**) + (master no. **1 * 64**) + (32, if B slave) = 65_{dec} = 41_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0D	command processed, no error occurred reflected command number
2	54	copy of the request
3	00	error counter = 0020_{hex} = 0032_{dec} ⇒ Since the last power on of the device or reset of the counter 32 incorrect telegrams have occurred during the exchange of data.
4	20	

10.1.13 Module 7, command 14 (0Ehex) – Read configuration error counter

5649

Provides the number of the configuration errors of the master since power on or reset.

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$14_{dec} = 0E_{hex}$					
2	MM		0					
3	not used							
4	not used							

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	error counter high byte							
4	error counter low byte							

Example: Read configuration error counter on AS-i master 2

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	0E	0E = command number 14
2	80	(master no. **2 * 64**) = $128_{dec} = 80_{hex}$
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0E	command processed, no error occurred reflected command number
2	80	copy of the request
3	00	error counter = $0003_{hex} = 0003_{dec}$ ⇒ Since the last power on of the device or reset of the counter 3 configuration errors have occurred.
4	03	

10.1.14 Module 7, command 15 (0Fhex) – Read AS-i cycle counter

5652

Provides the number of the AS-i cycles of the master since power on. By carrying out several measurements the number of cycles per time unit can be measured.

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$15_{dec} = 0F_{hex}$					
2	MM		0					
3	not used							
4	not used							

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	cycle counter high byte							
4	cycle counter low byte							

Example: Read AS-i cycle counter of AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	0F	0F = command number 15
2	40	(master no. **1 * 64**) $= 64_{dec} = 40_{hex}$
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0F	command processed, no error occurred reflected command number
2	40	copy of the request
3	04	cycle counter = $04CA_{hex} = 1226_{dec}$ since the last power on of the device ⇒ 1226 cycles have been performed in the AS-i master 1.
4	CA	

10.1.15 Module 7, command 16 (10hex) – Change current slave parameters

5653

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$16_{dec} = 10_{hex}$					
2	MM		ST	SLA				
3	preset value parameter							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	feedback value parameter							
4	not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: Change slave parameter of slave 7 on AS-i master 1 to the value "F"

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	10	10 = command number 16
2	47	(slave no. **7**) + (master no. **1 * 64**) + (32, if B slave) = 71_{dec} = 47_{hex}
3	0F	projected parameter
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	10	command processed, no error occurred reflected command number
2	47	copy of the request
3	0F	feedback value can be different from preset value
4	xx	not changed

10.1.16 Module 7, command 19 (13hex) – Project all

5656

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$19_{dec} = 13_{hex}$					
2	MM		0					
3	not used							
4	not used							

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	status							
4	not changed*)							

Legend:

status	status	1 byte	80_{hex} = process completed 00 = in all other cases

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: Project all on AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	13	13 = command number 19
2	40	+ (master no. **1 * 64**) = $64_{dec} = 40_{hex}$
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	13	command processed, no error occurred reflected command number
2	40	copy of the request
3	80	status
4	xx	not changed

10.1.17 Module 7, command 21 (15hex) – Save configuration in flash memory

5659

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$21_{dec} = 15_{hex}$					
2	MM		0					
3	not used							
4	not used							

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	not changed*)							
4	not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: Save AS-i configuration in flash for AS-i master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	13	13 = command number 19
2	40	+ (master no. **1 * 64**) = $64_{dec} = 40_{hex}$
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	13	command processed, no error occurred reflected command number
2	40	copy of the request
3	xx	not changed
4	xx	not changed

10.1.18 Module 7, command 22 (16hex) – Reset telegram error counter of a slave

5662

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$22_{dec} = 16_{hex}$					
2	MM		ST	SLA				
3	not used							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	not changed*)							
4	not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: Reset telegram error counter of slave 7(A) on AS-i master 2

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	16	16 = command number 22
2	87	(slave no. **7**) + (master no. **2 * 64**) + (32, if B slave) = 135_{dec} = 87_{hex}
3	xx	not used
4	xx	not used

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	16	command processed, no error occurred reflected command number
2	87	copy of the request
3	xx	not changed
4	xx	not changed

10.1.19 Module 7, command 23 (17hex) – Address slave

5665

Requirement: Device is in the projection mode.
→ Module 7, command 02 – Change operating mode (→ page 174).

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$23_{dec} = 17_{hex}$					
2	MM		ST	SLA				
3	new slave address							
4	not used							

Calculation of the byte "slave address" = (slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Legend:

MM	master no.	2 bits	$01_{bin} = 1_{dec}$ = master 1 $10_{bin} = 2_{dec}$ = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	reflected command number					
2	copy of the request							
3	copy of the request							
4	error message (→ General error codes (→ page 209))							

Example: Address slave 2B on AS-i master 1 to 7B

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	17	17 = command number 23
2	62	(slave no. **2**) + (master no. **1 * 64**) + (**32**, if B slave) = 98_{dec} = 62_{hex}
3	07	new slave address 7B
4	xx	not used

Response from device to fieldbus master in case of a fault

Byte no.	Value [hex]	Meaning
1	17	command processed, no error occurred reflected command number
2	62	copy of the request
3	07	copy of the request
4	14	→ chapter General error codes (→ page 209) here: Error: Master in the wrong operating mode.

10.1.20 Module 7, command 62 (3Ehex) – [Continuous Command] operating mode

5670

In the continuous mode the current command is transmitted in each cycle.

NOTE

The continuous mode influences the performance of the device.

► Use only for reading commands!

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$62_{dec} = 3E_{hex}$					
2	reserved = 0							
3	Mod/Stat							
4	Com-Mod							

Legend:

Mod/Stat	mode / status	1 byte	00 = reads the current status 01 = changes the mode
Com-Mod	command mode	1 byte	00 = [single command] = commands are only executed when the command number is changed 01 = [continuous command] = commands are executed cyclically

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	E	B	reflected command number					
2	copy of the request							
3	copy of the request							
4	copy of the request							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used

Example: Read LAS (list of active slaves) of slave group 1 on master 1

Request from fieldbus master to device

Byte no.	Value [hex]	Meaning
1	08	08 = command number 8
2	00	reserved
3	01	changes the mode
4	01	commands are carried out cyclically

Response from device to fieldbus master

Byte no.	Value [hex]	Meaning
1	08	command processed, no error occurred reflected command number
2	00	copy of the request
3	01	copy of the request
4	01	copy of the request

10.1.21 Module 7, command 63 (3Fhex) – No-operation command without function

5675

Request from fieldbus master to device

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	0	0	$63_{dec} = 3F_{hex}$					
2	not used							
3	not used							
4	not used							

Response from device to fieldbus master

Byte no.	Bit							
	7	6	5	4	3	2	1	0
1	E	B	reflected command number					
2	not changed*)							
3	not changed*)							
4	not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

11 DP module 12: extended command channel

Contents

5679

The extended command channel is used to exchange data between the AS-i master and the Profibus host (PLC).

Info

In some controllers larger consistent data fields cannot be processed in the direct I/O address area. Special function calls are then required.

11.1 Syntax of the extended command channel

5680

Length	2...18-word consistent inputs/outputs (if not used: length = 0) the word 2 is reserved for 7.4 commands (if not used: word = 0)

NOTE

- ► If a command is to be executed, the user ID must be changed!
  Changing the command number alone does not start the execution.
- ► If a command is to be executed several times, the user ID must be changed accordingly, e.g. by counting up.
- ► Do not count up the user ID until the preceding command has been completed
  (to do so, check the bits E + B in the 1st word).

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number							
2 *)	res. = 0		ST	SLA					res. = 0		number of data bytes to be transmitted					
3...18	parameter data of the command to be executed															

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…1F$_{hex}$ = 0…31$_{dec}$ (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20$_{hex}$ or 32$_{dec}$ to the slave address)
SLA	slave address	5 bits	00…1F$_{hex}$ = 0…31$_{dec}$

*) 2nd word: reserved for 7.4 commands

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2 *)	0	ST	reflected slave address					F	res. = 0		number of data bytes received					
3...18	command data															

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20$_{hex}$ or 32$_{dec}$ to the slave address)
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) 2nd word: reserved for 7.4 commands

11.2 Error codes in the module 12

5681

11.2.1 General error codes

5682

Revision: 2010-0-25

Value [hex]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
02	no slave with the old address found
03	slave with address 0 connected
04	slave with the new address already exists
05	error when deleting the old address
06	error when reading the IO configuration
07	error when writing the new address or extended ID code 1
08	new address could only be saved temporarily
09	extended ID code 1 could only be saved temporarily
0A	the slave is not in the LAS
0B	parameter or address invalid
0C	faulty S-7.4 protocol sequence
0D	S-7.4 protocol aborted (timeout)
0E	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0F	AS-i slave has completed the S-7.4 string
10	AS-i S-7.4 no longer connected (no longer in LAS)
11	another S-7.4 transfer to the addressed AS-i slave is already active
12	the previous segmented S-7.4 transfer was not yet completed
13	invalid S-7.4 data length
14	master is in the wrong operating mode *)
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
18	master is not in the protected mode
19	master is not in the normal mode
20	command could not be processed within the specified time
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

11.2.2 CTT2 error codes

5686

Revision: 2010-05-19

Value [hex]	Meaning
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; the command could not be completed in the specified time
05	command was not acknowledged
06	invalid sub-index
07	command 'Selective Read Request' is missing

11.3 Commands in the extended command channel

Contents

5700

11.3.1 Module 12, extended command 00 = execute no command

5702

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 00_{dec} = 00_{hex}							
2...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: execute no command

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0300	M = 0: AS-i master 1 UID = 03: user ID changes e.g. to 3 00 = command number 0
2...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0300	copy of the request command processed, no error occurred
2...18	xxxx	not changed

11.3.2 Module 12, extended command 01 – change slave parameters

5706

Requirement: The addressed AS-i master must be in the Protected mode.
→ Module 12, extended command 05 – change the operating mode of the AS-i master (→ page 222)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 01_{dec} = 01_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								res. = 0		ST	SLA				
4	reserved = 0								parameter value to be written							
5...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								read back parameter value							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
0A	the slave is not in the LAS
0B	parameter or address invalid
14	master is in the wrong operating mode *)

*) here: master is not in the protected mode

Example: change parameter of slave 4B on AS-i master 1 to the value 03

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0901	M=0: AS-i master 1 UID=09: user ID changes e.g. to 9 01 = command number 1
2	0000	reserved
3	0024	(Slave no. **4**) + (**32**, if B slave) = 36_{dec} = 24_{hex}
4	0003	parameter value to be written
5...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0901	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	0003	read back parameter value; may differ from the value to be written (so-called reflected parameters)
4...18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8901	E=1: error when executing the command reflected command data
2	0000	reserved
3	000A	error code 0A = slave is not in LAS
4...18	xxxx	not changed

11.3.3 Module 12, extended command 03 – adopt and save connected AS-i slaves in the configuration

5708

(= config all)

Requirement: The addressed AS-i master must be in the projection mode.
→ Module 12, extended command 05 – change the operating mode of the AS-i master (→ page 222)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 03_{dec} = 03_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
14	master is in the wrong operating mode *)

*) here: master is not in the projection mode

Example: adopt and save currently connected AS-i slaves in the configuration

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0C03	M=0: AS-i master 1 UID=0C: user ID changes e.g. to 12 03 = command number 3
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0C03	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8C03	E=1: error when executing the command reflected command data
2	0000	reserved
3	0014	error code 14 = master is not in the projection mode
4...18	xxxx	not changed

11.3.4 Module 12, extended command 04 – change the list of projected AS-i slaves (LPS)

5709

Requirement: The addressed AS-i master must be in the projection mode.
→ Module 12, extended command 05 – change the operating mode of the AS-i master (→ page 222)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 04_{dec} = 04_{hex}							
2	reserved = 0								reserved = 0							
3	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0 *)
4	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
6	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

► Set the bit corresponding to the slave address to TRUE in the words 3...6 for each slave to be projected.

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
14	master is in the wrong operating mode *)

*) here: master is not in the projection mode

Example: slaves 1A to 5A, 31A, 1B and 16B are to be projected

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0204	M=0: AS-i master 1 UID=02: user ID changes e.g. to 2 04 = command number 4
2	0000	reserved
3	003E	$003E_{hex}$ = 0000 0000 0011 1110_{bin}: slaves 1(A) to 5(A) are to be projected
4	8000	8000_{hex} = 1000 0000 0000 0000_{bin}: slave 31(A) is to be projected
5	0002	0002_{hex} = 0000 0000 0000 0010_{bin}: slave 1B is to be projected
6	0001	0001_{hex} = 0000 0000 0000 0001_{bin}: slave 16B is to be projected
7...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0204	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8204	E=1: error when executing the command reflected command data
2	0000	reserved
3	0014	error code 14 = master is not in the projection mode
4...18	xxxx	not changed

11.3.5 Module 12, extended command 05 – change the operating mode of the AS-i master

5712

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 05_{dec} = 05_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								MOD							
4...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)
MOD	opperating mode	1 byte	00 = set master to the normal mode (protected mode) 01 = set master to the projection mode

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
03	slave with address 0 connected

Example: set AS-i master 1 to projection mode

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0105	M=0: AS-i master 1 UID=01: user ID changes e.g. to 1 05 = command number 5
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0105	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8105	E=1: error when executing the command reflected command data
2	0000	reserved
3	0003	error code 03 = slave with the address 0 is connected
4...18	xxxx	not changed

11.3.6 Module 12, extended command 06 – change the AS-i slave address

5714

Requirement: The addressed AS-i master must be in the Protected mode.
→ Module 12, extended command 05 – change the operating mode of the AS-i master (→ page 222)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 06_{dec} = 06_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								res. = 0		ST	old SLA				
4	reserved = 0								res. = 0		ST	new SLA				
5...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
02	no slave with the old address found
03	slave with address 0 connected
04	slave with the new address already exists
05	error when deleting the old address
06	error when reading the IO configuration
07	error when writing the new address or extended ID code 1
08	new address could only be saved temporarily
09	extended ID code 1 could only be saved temporarily
0B	parameter or address invalid
14	master is in the wrong operating mode *)

*) here: master is not in the Protected mode

Example: readdress AS-i slave 9B to 11A

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0806	M=0: AS-i master 1 UID=08: user ID changes e.g. to 8 06 = command number 6
2	0000	reserved
3	0029	29_{hex} = 20_{hex} (for B slaves) + 9_{hex} = old slave address 9B
4	000B	B_{hex} = 11_{dec} = new slave address 11A
5...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0806	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8806	E=1: error when executing the command reflected command data
2	0000	reserved
3	0003	error code 03 = a slave with the address 0 is connected
4...18	xxxx	not changed

11.3.7 Module 12, extended command 07 – set the autoaddress mode of the AS-i master

5716

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 07_{dec} = 07_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								AutoAd							
4...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
AutoAd	automatic addressing	1 byte	00 = deactivate automatic addressing 01 = activate automatic addressing

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: allow automatic addressing for AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0407	M=0: AS-i master 1 UID=04: user ID changes e.g. to 4 07 = command number 7
2	0000	reserved
3	0001	1 = automatic addressing possible
4...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0407	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

11.3.8 Module 12, extended command 09 – Change [extended ID code 1] in the connected AS-i slave

5719

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 09_{dec} = 09_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								res. = 0		ST	SLA				
4	reserved = 0								new "extended ID code 1"							
5...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
02	no slave with the old address found
03	slave with address 0 connected
07	error when writing the new address or extended ID code 1
09	extended ID code 1 could only be saved temporarily
0B	parameter or address invalid

Example: change "extended ID code 1" in AS-i slave 17(A) to "8"

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0F09	M=0: AS-i master 1 UID=0F: user ID changes e.g. to 15 09 = command number 9
2	0000	reserved
3	0011	$11_{hex} = 17_{dec}$ = slave address 17(A)
4	0008	new "extended ID code 1" is 8
5...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0F09	E=0: command processed, no error occurred 09 = reflected command data
2	0000	reserved
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8F09	E=1: error when executing the command 09 = reflected command data
2	0000	reserved
3	0007	error code 07 = slave does not support extended ID code
4...18	xxxx	not changed

11.3.9 Module 12, extended command 10...20 (0A...14hex) – force analogue data transmission directly to / from 3 AS-i slaves each

5721

With these commands the analogue input or output data of 3 slaves can be overwritten. The commands are assigned to 3 slave addresses each:

Slave groups

Command number		Slave addresses		
Decimal	Hexadecimal	n:	(n+1)	(n+2)
10	0A	1	2	3
11	0B	4	5	6
12	0C	7	8	9
13	0D	10	11	12
14	0E	13	14	15
15	0F	16	17	18
16	10	19	20	21
17	11	22	23	24
18	12	25	26	27
19	13	28	29	30
20	14	31	—	—

Table: assignment command number - slave addresses

Example: In the command 14_{dec} ($0E_{hex}$) the data of the slave addresses 13, 14 and 15 is transmitted.

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 10…20$_{dec}$ = 0A…14$_{hex}$							
2	reserved = 0								reserved = 0							
3	output data of AS-i single slave (n), channel 0 **OR** of AS-i A slave (n), channel 0															
4	output data of AS-i single slave (n), channel 1 **OR** of AS-i A slave (n), channel 1															
5	output data of AS-i single slave (n), channel 2 **OR** of AS-i A slave (n), channel 2															
6	output data of AS-i single slave (n), channel 3 **OR** of AS-i A slave (n), channel 3															
7	reserved = 0								-	V3	-	V2	-	V1	-	V0
8	output data of AS-i single slave (n+1), channel 0 **OR** of AS-i A slave (n+1), channel 0															
9	output data of AS-i single slave (n+1), channel 1 **OR** of AS-i A slave (n+1), channel 1															
10	output data of AS-i single slave (n+1), channel 2 **OR** of AS-i A slave (n+1), channel 2															
11	output data of AS-i single slave (n+1), channel 3 **OR** of AS-i A slave (n+1), channel 3															
12	reserved = 0								-	V3	-	V2	-	V1	-	V0
13	output data of AS-i single slave (n+2), channel 0 **OR** of AS-i A slave (n+2), channel 0															
14	output data of AS-i single slave (n+2), channel 1 **OR** of AS-i A slave (n+2), channel 1															
15	output data of AS-i single slave (n+2), channel 2 **OR** of AS-i A slave (n+2), channel 2															
16	output data of AS-i single slave (n+2), channel 3 **OR** of AS-i A slave (n+2), channel 3															
17	reserved = 0								-	V3	-	V2	-	V1	-	V0
18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…1F$_{hex}$ = 0…31$_{dec}$ (a change to the user ID starts the command call)
Vn	valid bit	1 bit	0 = values in channel n are invalid 1 = values in channel n are valid Output data must be valid (Vn = 1) to be enabled in the AS-i slave!

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	Input data or reflected output data of AS-i single slave (n), channel 0 **OR** of AS-i A slave (n), channel 0															
4	Input data or reflected output data of AS-i single slave (n), channel 1 **OR** of AS-i A slave (n), channel 1															
5	Input data or reflected output data of AS-i single slave (n), channel 2 **OR** of AS-i A slave (n), channel 2															
6	Input data or reflected output data of AS-i single slave (n), channel 3 **OR** of AS-i A slave (n), channel 3															
7	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
8	Input data or reflected output data of AS-i single slave (n+1), channel 0 **OR** of AS-i A slave (n+1), channel 0															
9	Input data or reflected output data of AS-i single slave (n+1), channel 1 **OR** of AS-i A slave (n+1), channel 1															
10	Input data or reflected output data of AS-i single slave (n+1), channel 2 **OR** of AS-i A slave (n+1), channel 2															
11	Input data or reflected output data of AS-i single slave (n+1), channel 3 **OR** of AS-i A slave (n+1), channel 3															
12	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
13	Input data or reflected output data of AS-i single slave (n+2), channel 0 **OR** of AS-i A slave (n+2), channel 0															
14	Input data or reflected output data of AS-i single slave (n+2), channel 1 **OR** of AS-i A slave (n+2), channel 1															
15	Input data or reflected output data of AS-i single slave (n+2), channel 2 **OR** of AS-i A slave (n+2), channel 2															
16	Input data or reflected output data of AS-i single slave (n+2), channel 3 **OR** of AS-i A slave (n+2), channel 3															
17	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
Vn	valid bit	1 bit	0 = values in channel n are invalid 1 = values in channel n are valid Output data must be valid (Vn = 1) to be enabled in the AS-i slave!
On	overflow bit	1 bit	0 = data is in the valid range 1 = data is in the invalid range (especially in case of input modules when the measuring range is not reached or exceeded)

OVx	output valid	1 bit	channel-independent bit "output data valid" from the slave: CTT1: 0 = more than 3.5 s have elapsed since the last update of the output values 1 = slave requests new output data within the next 3 s CTT2…CTT5: 0 = slave receives no new output data 1 = slave receives new output data **NOTE:** only valid for analogue **out**put slaves. For **in**put slaves set OVx = "0"!
TVx	transfer valid	1 bit	channel-independent bit "transfer valid" from the slave: 0 = error during transfer or: timeout 1 = transfer of analogue input/output data OK
TIx	transfer to the slave (transfer Input)	1 bit	from master profile M4 onwards: 0 = slave transmits input data as a value (15 bits long, plus sign) 1 = slave transmits input data as a bit pattern (16 bits long, no sign)
TOx	transfer from the slave (transfer output)	1 bit	from master profile M4 onwards: 0 = slave receives output data as a value (15 bits long, plus sign) 1 = slave receives output data as a bit pattern (16 bits long, no sign)

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: force analogue data (4 channels) to slave 1 on master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	009A	M=0: AS-i master 1 UID=09: user ID changes e.g. to 9 0A command number 10
2	0000	reserved
3	0169	output data AS-i slave 1, channel 0
4	0202	output data AS-i slave 1, channel 1
5	0395	output data AS-i slave 1, channel 2
6	1033	output data AS-i slave 1, channel 3
7	0055	overflow and valid bits for AS-i slave 1: 55_{hex} = 0101 0101_{bin} ⇒ O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2009	output data AS-i slave 2, channel 0
9	2202	output data AS-i slave 2, channel 1
10	0195	output data AS-i slave 2, channel 2
11	1022	output data AS-i slave 2, channel 3
12	0055	overflow and valid bits for AS-i slave 2: 55_{hex} = 0101 0101_{bin} ⇒ O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
13	3339	output data AS-i slave 3, channel 0
14	1102	output data AS-i slave 3, channel 1
15	1953	output data AS-i slave 3, channel 2
16	1234	output data AS-i slave 3, channel 3
17	0055	overflow and valid bits for AS-i slave 3: 55_{hex} = 0101 0101_{bin} ⇒ O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	090A	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	3169	(slave 1 is a 4-channel input slave) input data AS-i slave 1, channel 0
4	2202	input data AS-i slave 1, channel 1
5	1395	input data AS-i slave 1, channel 2
6	0033	input data AS-i slave 1, channel 3
7	0255	overflow and valid bits for AS-i slave 1: 0255_{hex} = 0000 0010 0101 0101_{bin} ⇒ TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2229	(slave 2 is a 2-channel input slave) input data AS-i slave 2, channel 0
9	2332	input data AS-i slave 2, channel 1
10	7FFF	channel 2 no valid value for AS-i slave 2
11	7FFF	channel 3 no valid value for AS-i slave 2
12	0205	overflow and valid bits for AS-i slave 2: 0205_{hex} = 0000 0010 0000 0101_{bin} ⇒ TVA = 1, OVA = 0, O3 = 0, V3 = 0, O2 = 0, V2 = 0, O1 = 0, V1 = 1, O0 = 0, V0 = 1.
13	3339	(slave 3 is a 4-channel output slave) reflected output data AS-i slave 3, channel 0
14	1102	reflected output data AS-i slave 3, channel 1
15	1953	reflected output data AS-i slave 3, channel 2
16	1234	reflected output data AS-i slave 3, channel 3
17	0255	overflow and valid bits for AS-i slave 3: 0255_{hex} = 0000 0010 0101 0101_{bin} ⇒ TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
18	xxxx	not changed

11.3.10 Module 12, extended command 21 (15hex) – read 7.4 ID string of an AS-i slave

5722

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 21_{dec} = 15_{hex}							
2	res. = 0		ST	SLA					res. = 0			DL				
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	res.	reflected slave address					F=0	res. = 0			reflected command data				
3	I/O	2D	DT-Start			DT-Count			Mux field			E type				
4	number of parameter bytes to be read								EDT read			res. = 0		Diag	res. = 0	
5	EDT write		reserved = 0						number of parameter bytes to be written							
6	device-specific information								manufacturer identification							
7...16	device-specific information								device-specific information							
17	reserved = 0								number of bytes received							
18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command
I/O	direction of data	1 bit	direction of data for the devices with E type ≠ 3 0 = input 1 = output
2D	double data transfer	1 bit	double data transfer (redundancy) possible 0 = simple data transfer 1 = double data transfer
DT-Start	start triple	3 bits	(information for the driver in the master)
DT-Count	number of data triples	3 bits	(information for the driver in the master)
Mux field	number of multiplexed data words	3 bits	0…3 number = value in "Mux field" +1
E type	slave function + data structure	5 bits	characterises the slave as regards functionality and data structure 00 = reserved 01 = transmitted values are measured values 02 = transmitted values are 16 digital bit values 03 = normal operation in 4-bit mode (4I/4O) 04...$1F_{hex}$ = 04...31_{dec} = reserved
	number of parameter bytes to be read	1 byte	number of bytes which can be read as parameter string 00 = no parameter string readable 01...DB_{hex} = 01...219_{dec} = number of bytes
Diag	slave supports the 7.4 diagnosis string	1 bit	0 = diagnosis string is not supported 1 = diagnosis string is supported
EDT read	reserved	3 bits	reserved for later profiles
EDT write	reserved	3 bits	reserved for later profiles
	number of parameter bytes to be written	1 byte	number of bytes which can be written as parameter string 00 = no parameter string readable 01...DB_{hex} = 01...219_{dec} = number of bytes

	manufacturer identification	1 byte	defined manufacturer number assigned by AS-International
	device-specific information	1 byte	as an option more bytes for the manufacturer-specific device description

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	S	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
0C	faulty S-7.4 protocol sequence
0D	S-7.4 protocol aborted (timeout)
0E	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0F	AS-i slave has completed the S-7.4 string
10	AS-i S-7.4 no longer connected (no longer in LAS)
11	another S-7.4 transfer to the addressed AS-i slave is already active
12	the previous segmented S-7.4 transfer was not yet completed
13	invalid S-7.4 data length
14	invalid S-7.4 command

Example: read ID string of AS-i slave 3(A) on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0215	M=0: AS-i master 1 UID=02: user ID changes e.g. to 2 15 = command number 21
2	0300	$03_{hex} = 03_{dec}$ = slave address 3(A)
3...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0215	E=0: command processed, no error occurred reflected command data
2	0608 8608	0xxx/8xxx = the toggle bit TG changes after each execution x6xx = slave address 3(A) shifted 1 bit to the left xx08 = ID strings of 8 data bytes have been received
3	2D01	1st word of the ID string of slave 3: $2D01_{hex}$ = 0 0 101 101 000 00001_{bin}
4	0203	2nd word of the ID string of slave 3: 0203_{hex} = 00000010 000 00 0 11_{bin}
...	...	etc.
17	0008	08 = device transmits an ID string of 8 bytes length
18	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	8215	E=1: error when executing the command reflected command data
2	0000	reserved
3	0014	error code14 = invalid S-7.4 command
4...18	xxxx	not changed

11.3.11 Module 12, extended command 25 (19hex) – set AS-i master test mode

5726

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 25_{dec} = 19_{hex}							
2	reserved = 0								reserved = 0							
3	SZ								MOD							
4	loops															
5...17	PS	—	ST	SLA					reserved = 0				Data			
18	not used								DLen							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
SZ	sequence size	1 byte	size of the request sequence permitted values = 1...121_{dez} (01...79_{hex})
MOD	test mode	1 byte	00 = test mode 0: master passes the offline phase and returns to the normal operating mode. 01 = test mode 1: only available after power ON: if CPTE input = 0, the master permanently transmits "write parameter" to slave 15 02 = test mode 2: as in normal operation, however, slaves which have not responded 6 successive times are not deleted from the LDS 03 = test mode 3: master changes to the management phase, remains in this phase and accepts all known commands of the host system **IMPORTANT:** only call this command once, not cyclically! 04 = test mode 4: master transmits the defined data cyclically **IMPORTANT:** no AS-i error check possible!
loops	master sequence loops	1 word	quantity how often a master request sequence is repeated permitted values = 0001_{16}… $FFFF_{16}$ $FFFF_{16}$ = unlimited repetition
PS	parameter request	1 bit	send command as data exchange / write parameter 0 = Data_Exchange Request (I4=0) 1 = Write_Parameter Request (I4=1)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
Data	slave data	4 bits	only for test mode 4: slave output data
DLen	data length	1 byte	01_{hex}

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: set AS-i master test mode 2

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	1419	M=0: AS-i master 1 UID=14: user ID changes e.g. to 20 19 = command number 25
2	0000	reserved
3	0002	0002 = test mode 2: as in normal operation, however, slaves which have not responded 6 successive times are not deleted from the LDS.
4...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	1419	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

11.3.12 Module 12, extended command 26 (1Ahex) – read AS-i master version

5735

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number 26_{dec} = $1A_{hex}$							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	M12								MOD							
4	master version **), places before the decimal point															
5	master version **), places after the decimal point															
6...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
M12	number of AS-i masters	1 byte	00 = device has 1 AS-i master 01 = device has 2 AS-i masters
MOD	test mode	1 byte	00 = test mode 0: master passes the offline phase and returns to the normal operating mode. 01 = test mode 1: only available after power ON: if CPTE input = 0, the master permanently transmits "write parameter" to slave 15 02 = test mode 2: as in normal operation, however, slaves which have not responded 6 successive times are not deleted from the LDS 03 = test mode 3: master changes to the management phase, remains in this phase and accepts all known commands of the host system **IMPORTANT:** only call this command once, not cyclically! 04 = test mode 4: master transmits the defined data cyclically **IMPORTANT:** no AS-i error check possible!

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

**) data only valid if MOD = 0 (test mode = 0)

Example: read AS-i master version

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	131A	M=0: AS-i master 1 UID=13: user ID changes e.g. to 19 1A = command number 26
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	131A	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	0100	01 = device with 1 master 00 = test mode 0 → Module 12, extended command 25 (19hex) – set AS-i master test mode (→ page 242)
4	0000	places before the decimal point of version 0.237A
5	237A	places after the decimal point of version 0.237A
6...18	xxxx	not changed

11.3.13 Module 12, extended command 28 (1Chex) – no slave reset when changing to the protected mode

5739

When changing from the projection mode to the protected mode, all slaves are normally briefly reset (reset or offline phase). This may lead to problems when the system is running. In such cases the "deactivation of the slave reset" prevents the short deactivation of the slave outputs during changing of the operating mode.

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 28_{dec} = $1C_{hex}$							
2	reserved = 0								reserved = 0							
3	reserved = 0								OLP							
4...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)
OLP	offline phase = slave reset	1 byte	00 = offline phase when changing over to the protected mode 01 = no offline phase when changing over to the protected mode

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: AS-i master 1 – no slave reset when changing to the protected mode

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	041C	M=0: AS-i master 1 UID=04: user ID changes e.g. to 4 1C = command number 28
2	0000	reserved
3	0001	01 = no offline phase when changing to the protected mode
4...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	041C	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

11.3.14 Module 12, extended command 31 (1Fhex) – execute the extended safety monitor protocol in the Safety-at-Work monitor once

5740

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = $1F_{hex}$ = 31_{dec}							
2	reserved = 0								reserved = 0							
3	sub command								res. = 0		ST	SLA				
4...16	not used								not used							
17	field number								data length							
18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
	sub command	1 byte	00_{hex} = executing the "extended safety monitor protocol" once in the "Safety at Work" monitor with the slave address 30_{dec} ($1E_{hex}$)
	field number	1 byte	???
	data length	1 byte	???

Response from device to host in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reflected sub command								reflected slave address							
4	LEDs OSSD 1				LEDs OSSD 2				data call 1				data call 0			
5	OSSD2 not green								OSSD1 not green							
6	1st colour output circuit 1								1st module address output circuit 1							
7	2nd colour output circuit 1								2nd module address output circuit 1							
8	3rd colour output circuit 1								3rd module address output circuit 1							
9	4th colour output circuit 1								4th module address output circuit 1							
10	5th colour output circuit 1								5th module address output circuit 1							
11	6th colour output circuit 1								6th module address output circuit 1							
12	1st colour output circuit 2								1st module address output circuit 2							
13	2nd colour output circuit 2								2nd module address output circuit 2							
14	3rd colour output circuit 2								3rd module address output circuit 2							
15	4th colour output circuit 2								4th module address output circuit 2							
16	5th colour output circuit 2								5th module address output circuit 2							
17	6th colour output circuit 2								6th module address output circuit 2							
18	field number = 0/1								reserved = 0							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

More description → following tables.

Description of the different fields in word no. 4 for [LEDs OSSD 1/2]

Value [hex.]	Value [bin.]	Meaning
0	0000	green = contacts of the output circuits closed
1	0001	yellow = startup / restart disable active
2	0010	yellow flashing or red: = contacts of the output circuits open
3	0011	red flashing = error on the level of the monitored AS-i components
> 4	> 0100	reserved

Description of the different fields in word no. 4 for [data call 1/2]

data call 1		data call 0		Meaning
Value [hex.]	Value [bin.]	Value [hex.]	Value [bin.]	
8	1000	0	0000	protective operation, everything ok (also not available, not configured or depending output circuits are displayed as "ok")
9	1001	1	0001	protective operation, output circuit 1 off
A	1010	2	0010	protective operation, output circuit 2 off
B	1011	3	0011	protective operation, both output circuits off
C	1100	4	0100	configuration operation: power on
D	1101	5	0101	configuration operation
E	1110	6	0110	reserved / not defined
F	1111	7	0111	configuration operation: fatal device error, RESET or device exchange required
-	-	> 8	1xxx	no current diagnosis information available, please wait

Description of the different fields in word no. 5 for [OSSD1/2 not green]

Value [hex.]	Value [bin.]	Meaning
0	0000	no module, responses of the data calls in the words 6...17 are not relevant
1	0001	the number of POUs in the output circuit is 1
…	…	…
6	0110	the number of POUs in the output circuit is 6
7	0111	the number of POUs in the output circuit is > 6
> 8	1xxx	reserved / not defined

Description of the different fields in word no. 6...17 for [colour output circuit]

Module address 1...6 in output circuit 1/2: Indicates the index of the module of the configuration. The module address which was defined in the program ASIMON is indicated.

Value [hex.]	Value [bin.]	Meaning
0	0000	green, continuous
1	0001	green, flashing
2	0010	yellow, continuous
3	0011	yellow, flashing
4	0100	red, continuous
5	0101	red, flashing
6	0110	grey, off

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed								not changed							

Possible error codes:

Value [hex.]	Meaning
00…02	general errors during command processing
0A…0C	internal protocol error
10	sub command invalid
11	no slave with the profile S-7.F.F on the slave address
16	the monitor with the address was changed in the protocol mode
20	command could not be processed within the specified time
EE	fatal error during command execution

Example: one-time execution of the extended safety monitor protocol on address 30

Request of host to device

Word no.	Value [hex.]	Meaning
1	071F	M=0: AS-i master 1 UID=07: user ID changes to 7 1F = command 31
2	0000	reserved
3	001E	00 = sub command 0 = one-time execution of the extended safety monitor protocol $1E_{hex} = 30_{dec}$ = Safety-at-Work monitor with the slave address 30
4…18	xxxx	not used

Response from device to host in the normal case : Safety-at-Work monitor has not triggered

Word no.	Value [hex.]	Meaning
1	071F	copy of the request command processed, no error occurred
2	0000	reserved
3	001E	reflected command data
4	0000	green: contacts of the output circuits closed
5	0000	both output circuits green
6…17	xxxx	not relevant, because 5th word = 0000
18	xxxx	not changed

Response from device to host in the normal case : Safety-at-Work monitor has triggered

Word no.	Value [hex.]	Meaning
1	071F	copy of the request command processed, no error occurred
2	0000	reserved
3	001E	reflected command data
4	2211	2x = output circuit 1 red; x2 = invalid, → word 5; 11 = protective operation, output circuit 1 off
5	0003	00 = OSSD2 green 03 = OSSD1 not green, provides 3 modules which are not green
6	0421	04 = red permanently lit 21 = module 33
7	0422	04 = red permanently lit 22 = module 34
8	0423	04 = red permanently lit 23 = module 35
9…11	xxxx	not relevant, because low byte of 5th word = 03 ⇒ 3 modules relevant
12…17	xxxx	not relevant, because high byte of 5th word = 00 ⇒ green, no module relevant
18	0100	01 = field nubmer 1

Response from device to host in case of a fault

Word no.	Value [hex.]	Meaning
1	871F	copy of the request E=1: error when executing the command
2	0000	reserved
3	0011	error code=11: no slave with the profile S-7.F.F on the slave address
4…18	xxxx	not changed

11.3.15 Module 12, extended command 33 (21hex) – read 7.4 diagnostic string of an AS-i slave

5746

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 33_{dec} = 21_{hex}							
2	res. = 0		ST	SLA					res. = 0			DL				
3...18	not used								not used							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	res.	reflected slave address					F=0	res. = 0			reflected command data				
3	diagnostic byte 1								diagnostic byte 0							
4...16	diagnostic bytes 2...27															
17	diagnostic byte 29								diagnostic byte 28							
18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

INFO: The control bytes defined in profile 7.4 with follow and valid bits are filtered out by the system.

Example: read diagnostic string of AS-i slave 3(A) on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0721	S=0: sequence here always 0 M=0: AS-i master 1 UID=07: user ID changes e.g. to 7 21 = command number 33
2	0300	$03_{hex} = 03_{dec}$ = slave address 3(A)
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0721	E=0: command processed, no error occurred S=0: last sequence 07 = reflected user ID 21 = reflected command number
2	0608 8608	0xxx/8xxx = the toggle bit TG changes after each execution x6xx = slave address 3(A) shifted 1 bit to the left xx08 = ID strings of 8 data bytes have been received
3	2D01	01 = diagnostic byte 0 of slave 3 2D = diagnostic byte 1 of slave 3
4	0203	03 = diagnostic byte 2 of slave 3 02 = diagnostic byte 3 of slave 3
5	1122	22 = diagnostic byte 4 of slave 3 11 = diagnostic byte 5 of slave 3
6	3344	44 = diagnostic byte 6 of slave 3 33 = diagnostic byte 7 of slave 3
7...18	xxxx	not changed

11.3.16 Module 12, extended command 34 (22hex) – read 7.4 parameter string of an AS-i slave

5749

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 34_{dec} = 22_{hex}							
2	res. = 0		ST	SLA					res. = 0			DL				
3...18	not used								not used							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	res.	reflected slave address					F=0	res. = 0			reflected command data				
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

INFO: The control bytes defined in profile 7.4 with follow and valid bits are filtered out by the system.

Example: read parameter string of AS-i slave 3(A) on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0822	S=0: sequence here always 0 M=0: AS-i master 1 UID=08: user ID changes e.g. to 8 22 = command number 34
2	0300	03_{hex} = 03_{dec} = slave address 3(A)
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0822	E=0: command processed, no error occurred S=0: last sequence 08 = reflected command data 22 = reflected command number
2	0608 8608	0xxx/8xxx = the toggle bit TG changes after each execution x6xx = slave address 3(A) shifted 1 bit to the left xx08 = ID strings of 8 data bytes have been received
3	1234	34 = parameter byte 0 of slave 3 12 = parameter byte 1 of slave 3
4	5678	78 = parameter byte 2 of slave 3 56 = parameter byte 3 of slave 3
5	1234	34 = parameter byte 4 of slave 3 12 = parameter byte 5 of slave 3
6	5678	78 = parameter byte 6 of slave 3 56 = parameter byte 7 of slave 3
7...18	xxxx	not changed

11.3.17 Module 12, extended command 35 (23hex) – write 7.4 parameter string of an AS-i slave

5752

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 35_{dec} = 23_{hex}							
2	res. = 0		ST	SLA					res. = 0			DL				
3	parameter byte 1								parameter byte 0							
4...11	parameter bytes 2...17															
12	parameter byte 19								parameter byte 18							
13...18	not used								not used							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	5 bits	00…$1F_{hex}$ = 0…31_{dec}

NOTE

The number of the bytes to be sent must be divisible by 2 since the system always can transmit only multiples of 2 bytes in the S7.4 protocol.

The control bytes defined in profile 7.4 with follow bit and valid bit are automatically added by the system. Therefore, without segmentation, this command is limited to 20 bytes of parameter data. Larger data volumes must be divided into several segments.

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	res.	reflected slave address					F=0	res. = 0			reflected command data				
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: write parameter string in AS-i slave 3(A) on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0923	S=0: sequence here always 0 M=0: AS-i master 1 UID=09: user ID changes e.g. to 9 23 = command number 35
2	0304	$03_{hex} = 03_{dec}$ = slave address 3(A) 04 ⇒ transmit 4 parameter bytes
3	2DF4	F4 = parameter byte 0 for slave 3 2D = parameter byte 1 for slave 3
4	5BB8	B8 = parameter byte 2 for slave 3 5B = parameter byte 3 for slave 3
5...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0923	E=0: command processed, no error occurred S=0: last sequence 09 = reflected command data 23 = reflected command number
2	0604 8604	0xxx/8xxx = the toggle bit TG changes after each execution x6xx = slave address 3(A) shifted 1 bit to the left copy of the request
3...18	xxxx	not changed

11.3.18 Module 12, acyclic command 36 (24hex) – standard read call to an AS-i slave with CTT2 profile

5755

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 36_{dec} = 24_{hex}							
2	res. = 0		ST	SLA					reserved = 0							
3	res. = 0		DL						IX							
4...18	not used								not used							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	6 bits	number of bytes to be transferred permitted values: 01…20_{hex} = 01…32_{dec} (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	L32	reflected slave address					F=0	res. = 0			reflected command data				
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 **or** number of bytes read								parameter byte 30							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
L32	32 parameter bytes	1 bit	0 = number of bytes read is < 32_{dec} ⇒ high byte in word 18 contains the number of read bytes 1 = number of read bytes is = 32_{dec} ⇒ high byte in word 18 contains parameter byte 31
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	TG	reserved = 0						F=1	reserved = 0							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: standard read call to slave 3A on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0424	S=0: sequence here always 0 M=0: AS-i master 1 04 = user ID changes e.g. to 4 24 = command number 36
2	0300	03 = slave address 3A
3	0409	in index 9, 4 bytes of parameter data are to be read
4...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0424	E=0: command processed, no error occurred S=0: last sequence 04 = reflected user ID 24 = reflected command number
2	0600 8600	0xxx/8xxx = the toggle bit TG changes after each execution L32=0 ⇒ number of read bytes < 32 x6xx = slave address 3A shifted 1 bit to the left reflected command data
3	1234	1st and 2nd parameter bytes of index 9 in slave 3A
4	5678	3rd and 4th parameter bytes of index 9 in slave 3A
5...17	xxxx	invalid / not changed
18	0400	04 = 4 bytes of parameter data were read

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	8424	E=1: error when executing the command reflected command data
2	0000	reserved
3	0016	error code 16_{hex} = timeout during command processing
4...18	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	8424	E=1: error when executing the command reflected command data
2	0100 8100	the toggle bit TG changes after each execution F=1: error when executing the command
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave error codeE1 = error detected by AS-i slave; CTT2 error
4...18	xxxx	not changed

11.3.19 Module 12, acyclic command 37 (25hex) – standard write call to an AS-i slave with CTT2 profile

5762

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 37_{dec} = 25_{hex}							
2	res. = 0		ST	SLA					reserved = 0							
3	res. = 0		DL						IX							
4	parameter byte 1								parameter byte 0							
5...17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	6 bits	number of bytes to be transferred permitted values: 01…20_{hex} = 01…32_{dec} (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be written permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	L32	reflected slave address					F=0	res. = 0			reflected command data				
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
L32	32 parameter bytes	1 bit	0 = number of bytes read is < 32_{dec} ⇒ high byte in word 18 contains the number of read bytes 1 = number of read bytes is = 32_{dec} ⇒ high byte in word 18 contains parameter byte 31
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	TG	reserved = 0						F=1	reserved = 0							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: standard write call to slave 3A on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0525	S=0: sequence here always 0 M=0: AS-i master 1 05 = user ID changes e.g. to 05 25 = command number 37
2	0300	03 = slave address 3A
3	0207	in index 7, 2 bytes of parameter data are to be written
4	1AF4	these two parameter bytes are for slave 3(A)
5...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0525	E=0: command processed, no error occurred S=0: last sequence reflected command data
2	0000 8000	the toggle bit TG changes after each execution F=0: command processed, no error occurred
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	8525	E=1: error when executing the command reflected command data
2	0000	reserved
3	0016	error code 16_{hex} = timeout during command processing
4...18	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	8525	E=1: error when executing the command reflected command data
2	0100 8100	the toggle bit TG changes after each execution F=1: eerror when executing the command
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave eerror code E1 = error detected by AS-i slave; CTT2 error
4...18	xxxx	not changed

11.3.20 Module 12, acyclic command 38 (26hex) – manufacturer-specific read call to an AS-i slave with CTT2 profile

5768

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 38_{dec} = 26_{hex}							
2	res. = 0		ST	SLA					reserved = 0							
3	res. = 0		DL						IX							
4...18	not used								not used							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	6 bits	number of bytes to be transferred permitted values: 01…20_{hex} = 01…32_{dec} (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	L32	reflected slave address					F=0	res. = 0			reflected command data				
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 **or** number of bytes read								parameter byte 30							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
L32	32 parameter bytes	1 bit	0 = number of bytes read is < 32_{dec} ⇒ high byte in word 18 contains the number of read bytes 1 = number of read bytes is = 32_{dec} ⇒ high byte in word 18 contains parameter byte 31
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	TG	reserved = 0						F=1	reserved = 0							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: manufacturer-specific read call to slave 3A on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0626	S=0: sequence here always 0 M=0: AS-i master 1 06 = user ID changes e.g. to 6 26 = command number 38
2	0300	03 = slave address 3A
3	0409	in index 9, 4 bytes of parameter data are to be read
4...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0626	E=0: command processed, no error occurred S=0: last sequence reflected command data
2	0600 8600	0xxx/8xxx = the toggle bit TG changes after each execution L32=0 ⇒ number of read bytes < 32 x6xx = slave address 3A shifted 1 bit to the left reflected command data
3	1234	1st and 2nd parameter bytes of index 9 in slave 3A
4	5678	3rd and 4th parameter bytes of index 9 in slave 3A
5...17	xxxx	invalid / not changed
18	0400	04 = 4 bytes of parameter data were read

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	8626	E=1: error when executing the command reflected command data
2	0000	reserved
3	0016	error code 16_{hex} = timeout during command processing
4...18	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	8626	E=1: error when executing the command reflected command data
2	0100 8100	the toggle bit TG changes after each execution F=1: error when executing the command
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave error codeE1 = error detected by AS-i slave; CTT2 error
4...18	xxxx	not changed

11.3.21 Module 12, acyclic command 39 (27hex) – manufacturer-specific write call to an AS-i slave with CTT2 profile

5771

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res.	S	M	UID					command number = 39_{dec} = 27_{hex}							
2	res. = 0		ST	SLA					reserved = 0							
3	res. = 0		DL						IX							
4	parameter byte 1								parameter byte 0							
5...17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							

Legend:

S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	6 bits	number of bytes to be transferred permitted values: 01…20_{hex} = 01…32_{dec} (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be written permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S	M	reflected user ID					reflected command number							
2	TG	L32	reflected slave address					F=0	res. = 0			reflected command data				
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
L32	32 parameter bytes	1 bit	0 = number of bytes read is < 32_{dec} ⇒ high byte in word 18 contains the number of read bytes 1 = number of read bytes is = 32_{dec} ⇒ high byte in word 18 contains parameter byte 31
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								error code							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	M	reflected user ID					reflected command number							
2	TG	reserved = 0						F=1	reserved = 0							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2
TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: manufacturer-specific write call to slave 3A on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0727	S=0: sequence here always 0 M=0: AS-i master 1 07 = user ID changes e.g. to 7 27 = command number 39
2	0300	03 = slave address 3A
3	0207	in index 7, 2 bytes of parameter data are to be written
4	1AF4	these two parameter bytes are for slave 3(A)
5...18	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0727	E=0: command processed, no error occurred S=0: last sequence reflected command data
2	0000 8000	the toggle bit TG changes after each execution F=0: command processed, no error occurred
3...18	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	8727	E=1: error when executing the command reflected command data
2	0000	reserved
3	0016	error code 16_{hex} = timeout during command processing
4...18	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	8727	E=1: error when executing the command copy of the request
2	0100 8100	the toggle bit TG changes after each execution F=1: error when executing the command
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave error codeE1 = error detected by AS-i slave; CTT2 error
4...18	xxxx	not changed

11.3.22 Module 12, extended command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A)

5774

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 50_{dec} = 32_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 0(A), ID2								slave 0(A), ID1				slave 0(A), ID code			slave 0(A), IO config.
4	slave 1(A), ID2								slave 1(A), ID1				slave 1(A), ID code			slave 1(A), IO config.
5	slave 2(A), ID2								slave 2(A), ID1				slave 2(A), ID code			slave 2(A), IO config.
6	slave 3(A), ID2								slave 3(A), ID1				slave 3(A), ID code			slave 3(A), IO config.
7	slave 4(A), ID2								slave 4(A), ID1				slave 4(A), ID code			slave 4(A), IO config.
8	slave 5(A), ID2								slave 5(A), ID1				slave 5(A), ID code			slave 5(A), IO config.
9	slave 6(A), ID2								slave 6(A), ID1				slave 6(A), ID code			slave 6(A), IO config.
10	slave 7(A), ID2								slave 7(A), ID1				slave 7(A), ID code			slave 7(A), IO config.
11	slave 8(A), ID2								slave 8(A), ID1				slave 8(A), ID code			slave 8(A), IO config.
12	slave 9(A), ID2								slave 9(A), ID1				slave 9(A), ID code			slave 9(A), IO config.
13	slave 10(A), ID2								slave 10(A), ID1				slave 10(A), ID code			slave 10(A), IO config.
14	slave 11(A), ID2								slave 11(A), ID1				slave 11(A), ID code			slave 11(A), IO config.
15	slave 12(A), ID2								slave 12(A), ID1				slave 12(A), ID code			slave 12(A), IO config.
16	slave 13(A), ID2								slave 13(A), ID1				slave 13(A), ID code			slave 13(A), IO config.
17	slave 14(A), ID2								slave 14(A), ID1				slave 14(A), ID code			slave 14(A), IO config.
18	slave 15(A), ID2								slave 15(A), ID1				slave 15(A), ID code			slave 15(A), IO config.

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: read current configuration of AS-i slaves 0(A)...15(A) on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0232	M=0: AS-i master 1 UID=02: user ID changes e.g. to 2 32 = command number 50
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0232	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	FFFF	current configuration slave 0: ID2 =F, ID1=F, ID=F and IO=F
4	EF03	current configuration slave 1(A): ID2 =E, ID1=F, ID=0 and IO=3
...	...	...
18	EF37	current configuration slave 15(A): ID2 =E, ID1=F, ID=3 and IO=7

11.3.23 Module 12, extended command 51 (33hex) – read current configuration of AS-i slaves 16(A)...31(A)

5776

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 51_{dec} = 33_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 16(A), ID2								slave 16(A), ID1				slave 16(A), ID code			slave 16(A), IO config.
4	slave 17(A), ID2								slave 17(A), ID1				slave 17(A), ID code			slave 17(A), IO config.
5	slave 18(A), ID2								slave 18(A), ID1				slave 18(A), ID code			slave 18(A), IO config.
6	slave 19(A), ID2								slave 19(A), ID1				slave 19(A), ID code			slave 19(A), IO config.
7	slave 20(A), ID2								slave 20(A), ID1				slave 20(A), ID code			slave 20(A), IO config.
8	slave 21(A), ID2								slave 21(A), ID1				slave 21(A), ID code			slave 21(A), IO config.
9	slave 22(A), ID2								slave 22(A), ID1				slave 22(A), ID code			slave 22(A), IO config.
10	slave 23(A), ID2								slave 23(A), ID1				slave 23(A), ID code			slave 23(A), IO config.
11	slave 24(A), ID2								slave 24(A), ID1				slave 24(A), ID code			slave 24(A), IO config.
12	slave 25(A), ID2								slave 25(A), ID1				slave 25(A), ID code			slave 25(A), IO config.
13	slave 26(A), ID2								slave 26(A), ID1				slave 26(A), ID code			slave 26(A), IO config.
14	slave 27(A), ID2								slave 27(A), ID1				slave 27(A), ID code			slave 27(A), IO config.
15	slave 28(A), ID2								slave 28(A), ID1				slave 28(A), ID code			slave 28(A), IO config.
16	slave 29(A), ID2								slave 29(A), ID1				slave 29(A), ID code			slave 29(A), IO config.
17	slave 30(A), ID2								slave 30(A), ID1				slave 30(A), ID code			slave 30(A), IO config.
18	slave 31(A), ID2								slave 31(A), ID1				slave 31(A), ID code			slave 31(A), IO config.

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: → Module 12, extended command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A) (→ page 279)

11.3.24 Module 12, extended command 52 (34hex) – read current configuration of AS-i slaves 1B...15B

5778

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 52_{dec} = 34_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 0B, ID2								slave 0B, ID1				slave 0B, ID code			slave 0B, IO config.
4	slave 1B, ID2								slave 1B, ID1				slave 1B, ID code			slave 1B, IO config.
5	slave 2B, ID2								slave 2B, ID1				slave 2B, ID code			slave 2B, IO config.
6	slave 3B, ID2								slave 3B, ID1				slave 3B, ID code			slave 3B, IO config.
7	slave 4B, ID2								slave 4B, ID1				slave 4B, ID code			slave 4B, IO config.
8	slave 5B, ID2								slave 5B, ID1				slave 5B, ID code			slave 5B, IO config.
9	slave 6B, ID2								slave 6B, ID1				slave 6B, ID code			slave 6B, IO config.
10	slave 7B, ID2								slave 7B, ID1				slave 7B, ID code			slave 7B, IO config.
11	slave 8B, ID2								slave 8B, ID1				slave 8B, ID code			slave 8B, IO config.
12	slave 9B, ID2								slave 9B, ID1				slave 9B, ID code			slave 9B, IO config.
13	slave 10B, ID2								slave 10B, ID1				slave 10B, ID code			slave 10B, IO config.
14	slave 11B, ID2								slave 11B, ID1				slave 11B, ID code			slave 11B, IO config.
15	slave 12B, ID2								slave 12B, ID1				slave 12B, ID code			slave 12B, IO config.
16	slave 13B, ID2								slave 13B, ID1				slave 13B, ID code			slave 13B, IO config.
17	slave 14B, ID2								slave 14B, ID1				slave 14B, ID code			slave 14B, IO config.
18	slave 15B, ID2								slave 15B, ID1				slave 15B, ID code			slave 15B, IO config.

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: → Module 12, extended command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A) (→ page 279)

11.3.25 Module 12, extended command 53 (35hex) – read current configuration of AS-i slaves 16B...31B

5780

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 53_{dec} = 35_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 16B, ID2								slave 16B, ID1				slave 16B, ID code			slave 16B, IO config.
4	slave 17B, ID2								slave 17B, ID1				slave 17B, ID code			slave 17B, IO config.
5	slave 18B, ID2								slave 18B, ID1				slave 18B, ID code			slave 18B, IO config.
6	slave 19B, ID2								slave 19B, ID1				slave 19B, ID code			slave 19B, IO config.
7	slave 20B, ID2								slave 20B, ID1				slave 20B, ID code			slave 20B, IO config.
8	slave 21B, ID2								slave 21B, ID1				slave 21B, ID code			slave 21B, IO config.
9	slave 22B, ID2								slave 22B, ID1				slave 22B, ID code			slave 22B, IO config.
10	slave 23B, ID2								slave 23B, ID1				slave 23B, ID code			slave 23B, IO config.
11	slave 24B, ID2								slave 24B, ID1				slave 24B, ID code			slave 24B, IO config.
12	slave 25B, ID2								slave 25B, ID1				slave 25B, ID code			slave 25B, IO config.
13	slave 26B, ID2								slave 26B, ID1				slave 26B, ID code			slave 26B, IO config.
14	slave 27B, ID2								slave 27B, ID1				slave 27B, ID code			slave 27B, IO config.
15	slave 28B, ID2								slave 28B, ID1				slave 28B, ID code			slave 28B, IO config.
16	slave 29B, ID2								slave 29B, ID1				slave 29B, ID code			slave 29B, IO config.
17	slave 30B, ID2								slave 30B, ID1				slave 30B, ID code			slave 30B, IO config.
18	slave 31B, ID2								slave 31B, ID1				slave 31B, ID code			slave 31B, IO config.

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: → Module 12, extended command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A) (→ page 279)

11.3.26 Module 12, extended command 54 (36hex) – read current parameters of the AS-i slaves

5782

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 54_{dec} = 36_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	parameters slave 4(A)				parameters slave 3(A)				parameters slave 2(A)				parameters slave 1(A)			
4	parameters slave 8(A)				parameters slave 7(A)				parameters slave 6(A)				parameters slave 5(A)			
5	parameters slave 12(A)				parameters slave 11(A)				parameters slave 10(A)				parameters slave 9(A)			
6	parameters slave 16(A)				parameters slave 15(A)				parameters slave 14(A)				parameters slave 13(A)			
7	parameters slave 20(A)				parameters slave 19(A)				parameters slave 18(A)				parameters slave 17(A)			
8	parameters slave 24(A)				parameters slave 23(A)				parameters slave 22(A)				parameters slave 21(A)			
9	parameters slave 28(A)				parameters slave 27(A)				parameters slave 26(A)				parameters slave 25(A)			
10	parameters slave 1B				parameters slave 31(A)				parameters slave 30(A)				parameters slave 29(A)			
11	parameters slave 5B				parameters slave 4B				parameters slave 3B				parameters slave 2B			
12	parameters slave 9B				parameters slave 8B				parameters slave 7B				parameters slave 6B			
13	parameters slave 13B				parameters slave 12B				parameters slave 11B				parameters slave 10B			
14	parameters slave 17B				parameters slave 16B				parameters slave 15B				parameters slave 14B			
15	parameters slave 21B				parameters slave 20B				parameters slave 19B				parameters slave 18B			
16	parameters slave 25B				parameters slave 24B				parameters slave 23B				parameters slave 22B			
17	parameters slave 29B				parameters slave 28B				parameters slave 27B				parameters slave 26B			
18	not changed*)								parameters slave 31B				parameters slave 30B			

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: read current parameters of the AS-i slaves on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0636	M=0: AS-i master 1 UID=06: user ID changes e.g. to 6 36 = command number 54
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0636	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	4321	1 = parameter of slave 1(A) 2 = parameter of slave 2(A) 3 = parameter of slave 3(A) 4 = parameter of slave 4(A)
4	8765	5 = parameter of slave 5(A) 6 = parameter of slave 6(A) 7 = parameter of slave 7(A) 8 = parameter of slave 8(A)
...	...	...
18	xx98	8 = parameter of slave 30(A) 9 = parameter of slave 31(A)

11.3.27 Module 12, extended command 55 (37hex) – read current AS-i slave lists

5784

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 55_{dec} = 37_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)

Response from device to fieldbus master

Word no.	Bit / AS-i slave address																
	–	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	–	E	B	M	reflected user ID					reflected command number							
2	–	reserved = 0								reserved = 0							
3	LAS	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
4		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
6		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7	LDS	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
8		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
9		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
10		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
11	LPF	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
12		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
13		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
14		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
15	LPS	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
16		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
17		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
18		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: read current AS-i slave lists

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0737	M=0: AS-i master 1 UID=07: user ID changes e.g. to 7 37 = command number 55
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0737	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	0102	0102_{hex} = 0000 0001 0000 0010_{bin} LAS of slaves (0) to 15(A): slaves 1(A) and 8(A) are active
4	8001	8001_{hex} = 1000 0000 0000 0001_{bin} LAS of slaves 16(A) to 31(A): slaves 16(A) and 31(A) are active
...	...	...
18	8001	8001_{hex} = 1000 0000 0000 0001_{bin} LPS of slaves 16B to 31B: slaves 16B and 31B are projected

11.3.28 Module 12, extended command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A)

5786

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 56_{dec} = 38_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 0(A), ID2				slave 0(A), ID1				slave 0(A), ID code				slave 0(A), IO config.			
4	slave 1(A), ID2				slave 1(A), ID1				slave 1(A), ID code				slave 1(A), IO config.			
5	slave 2(A), ID2				slave 2(A), ID1				slave 2(A), ID code				slave 2(A), IO config.			
6	slave 3(A), ID2				slave 3(A), ID1				slave 3(A), ID code				slave 3(A), IO config.			
7	slave 4(A), ID2				slave 4(A), ID1				slave 4(A), ID code				slave 4(A), IO config.			
8	slave 5(A), ID2				slave 5(A), ID1				slave 5(A), ID code				slave 5(A), IO config.			
9	slave 6(A), ID2				slave 6(A), ID1				slave 6(A), ID code				slave 6(A), IO config.			
10	slave 7(A), ID2				slave 7(A), ID1				slave 7(A), ID code				slave 7(A), IO config.			
11	slave 8(A), ID2				slave 8(A), ID1				slave 8(A), ID code				slave 8(A), IO config.			
12	slave 9(A), ID2				slave 9(A), ID1				slave 9(A), ID code				slave 9(A), IO config.			
13	slave 10(A), ID2				slave 10(A), ID1				slave 10(A), ID code				slave 10(A), IO config.			
14	slave 11(A), ID2				slave 11(A), ID1				slave 11(A), ID code				slave 11(A), IO config.			
15	slave 12(A), ID2				slave 12(A), ID1				slave 12(A), ID code				slave 12(A), IO config.			
16	slave 13(A), ID2				slave 13(A), ID1				slave 13(A), ID code				slave 13(A), IO config.			
17	slave 14(A), ID2				slave 14(A), ID1				slave 14(A), ID code				slave 14(A), IO config.			
18	slave 15(A), ID2				slave 15(A), ID1				slave 15(A), ID code				slave 15(A), IO config.			

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: read projected configuration of AS-i slaves 0(A)...15(A) on AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0238	M=0: AS-i master 1 UID=02: user ID changes e.g. to 2 38 = command number 56
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0238	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	FFFF	here not used since slave 0 cannot be projected
4	EF03	current configuration slave 1(A): ID2 =E, ID1=F, ID=0 and IO=3
...	...	...
18	EF37	current configuration slave 15(A): ID2 =E, ID1=F, ID=3 and IO=7

11.3.29 Module 12, extended command 57 (39hex) – read projected configuration of AS-i slaves 16(A)...31(A)

5789

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 57_{dec} = 39_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 16(A), ID2				slave 16(A), ID1				slave 16(A), ID code				slave 16(A), IO config.			
4	slave 17(A), ID2				slave 17(A), ID1				slave 17(A), ID code				slave 17(A), IO config.			
5	slave 18(A), ID2				slave 18(A), ID1				slave 18(A), ID code				slave 18(A), IO config.			
6	slave 19(A), ID2				slave 19(A), ID1				slave 19(A), ID code				slave 19(A), IO config.			
7	slave 20(A), ID2				slave 20(A), ID1				slave 20(A), ID code				slave 20(A), IO config.			
8	slave 21(A), ID2				slave 21(A), ID1				slave 21(A), ID code				slave 21(A), IO config.			
9	slave 22(A), ID2				slave 22(A), ID1				slave 22(A), ID code				slave 22(A), IO config.			
10	slave 23(A), ID2				slave 23(A), ID1				slave 23(A), ID code				slave 23(A), IO config.			
11	slave 24(A), ID2				slave 24(A), ID1				slave 24(A), ID code				slave 24(A), IO config.			
12	slave 25(A), ID2				slave 25(A), ID1				slave 25(A), ID code				slave 25(A), IO config.			
13	slave 26(A), ID2				slave 26(A), ID1				slave 26(A), ID code				slave 26(A), IO config.			
14	slave 27(A), ID2				slave 27(A), ID1				slave 27(A), ID code				slave 27(A), IO config.			
15	slave 28(A), ID2				slave 28(A), ID1				slave 28(A), ID code				slave 28(A), IO config.			
16	slave 29(A), ID2				slave 29(A), ID1				slave 29(A), ID code				slave 29(A), IO config.			
17	slave 30(A), ID2				slave 30(A), ID1				slave 30(A), ID code				slave 30(A), IO config.			
18	slave 31(A), ID2				slave 31(A), ID1				slave 31(A), ID code				slave 31(A), IO config.			

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: → Module 12, extended command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A) (→ page 293)

11.3.30 Module 12, extended command 58 (3Ahex) – read projected configuration of AS-i slaves 1B...15B

5791

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number $58_{dec} = 3A_{hex}$							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex} = 0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 0B, ID2								slave 0B, ID1				slave 0B, ID code			slave 0B, IO config.
4	slave 1B, ID2								slave 1B, ID1				slave 1B, ID code			slave 1B, IO config.
5	slave 2B, ID2								slave 2B, ID1				slave 2B, ID code			slave 2B, IO config.
6	slave 3B, ID2								slave 3B, ID1				slave 3B, ID code			slave 3B, IO config.
7	slave 4B, ID2								slave 4B, ID1				slave 4B, ID code			slave 4B, IO config.
8	slave 5B, ID2								slave 5B, ID1				slave 5B, ID code			slave 5B, IO config.
9	slave 6B, ID2								slave 6B, ID1				slave 6B, ID code			slave 6B, IO config.
10	slave 7B, ID2								slave 7B, ID1				slave 7B, ID code			slave 7B, IO config.
11	slave 8B, ID2								slave 8B, ID1				slave 8B, ID code			slave 8B, IO config.
12	slave 9B, ID2								slave 9B, ID1				slave 9B, ID code			slave 9B, IO config.
13	slave 10B, ID2								slave 10B, ID1				slave 10B, ID code			slave 10B, IO config.
14	slave 11B, ID2								slave 11B, ID1				slave 11B, ID code			slave 11B, IO config.
15	slave 12B, ID2								slave 12B, ID1				slave 12B, ID code			slave 12B, IO config.
16	slave 13B, ID2								slave 13B, ID1				slave 13B, ID code			slave 13B, IO config.
17	slave 14B, ID2								slave 14B, ID1				slave 14B, ID code			slave 14B, IO config.
18	slave 15B, ID2								slave 15B, ID1				slave 15B, ID code			slave 15B, IO config.

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: → Module 12, extended command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A) (→ page 293)

11.3.31 Module 12, extended command 59 (3Bhex) – read projected configuration of AS-i slaves 16B...31B

5793

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number $59_{dec} = 3B_{hex}$							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex} = 0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	slave 16B, ID2								slave 16B, ID1				slave 16B, ID code			slave 16B, IO config.
4	slave 17B, ID2								slave 17B, ID1				slave 17B, ID code			slave 17B, IO config.
5	slave 18B, ID2								slave 18B, ID1				slave 18B, ID code			slave 18B, IO config.
6	slave 19B, ID2								slave 19B, ID1				slave 19B, ID code			slave 19B, IO config.
7	slave 20B, ID2								slave 20B, ID1				slave 20B, ID code			slave 20B, IO config.
8	slave 21B, ID2								slave 21B, ID1				slave 21B, ID code			slave 21B, IO config.
9	slave 22B, ID2								slave 22B, ID1				slave 22B, ID code			slave 22B, IO config.
10	slave 23B, ID2								slave 23B, ID1				slave 23B, ID code			slave 23B, IO config.
11	slave 24B, ID2								slave 24B, ID1				slave 24B, ID code			slave 24B, IO config.
12	slave 25B, ID2								slave 25B, ID1				slave 25B, ID code			slave 25B, IO config.
13	slave 26B, ID2								slave 26B, ID1				slave 26B, ID code			slave 26B, IO config.
14	slave 27B, ID2								slave 27B, ID1				slave 27B, ID code			slave 27B, IO config.
15	slave 28B, ID2								slave 28B, ID1				slave 28B, ID code			slave 28B, IO config.
16	slave 29B, ID2								slave 29B, ID1				slave 29B, ID code			slave 29B, IO config.
17	slave 30B, ID2								slave 30B, ID1				slave 30B, ID code			slave 30B, IO config.
18	slave 31B, ID2								slave 31B, ID1				slave 31B, ID code			slave 31B, IO config.

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

Example: → Module 12, extended command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A) (→ page 293)

11.3.32 Module 12, extended command 96 (60hex) – save data in the non volatile flash memory of the device

5795

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 96_{dec} = 60_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								Area number							
4...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
	area number	1 byte	02 = saves the configuration of the AS-i master 1 03 = saves the configuration of the AS-i master 2

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	reserved = 0								reflected command data							
4...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: save configuration of AS-i master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0960	M=0: AS-i master 1 UID=09: user ID changes e.g. to 9 60 = command number 96
2	0000	reserved
3	0002	02 = saves the configuration of the AS-i master 1 in a non volatile manner
4...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0960	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	0002	reflected command data
4...18	xxxx	not changed

11.3.33 Module 12, extended command 97 (61hex) – make settings in the AS-i master

5799

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 97_{dec} = 61_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								command number							
4	parameter (depending on command number)															
5...18	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)
	command number	1 byte	10_{hex} = changes the operating mode of the PLC (without function in the gateway), (according parameters → word 4) 12_{hex} = reset all slave error counters 13_{hex} = reset configuration error counter 14_{hex} = reset AS-i cycle error counter
	parameter for command number	1 word	parameters; here for command number 10: 0000 = activates the gateway mode 0001 = stops the PLC 0002 = sets the operating mode of the PLC to RUN

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
M	master no.	1 bit	0 = master 1 1 = master 2

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: reset all slave error counters

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0961	M=0: AS-i master 1 UID=09: user ID changes e.g. to 9 60 = command number 96
2	0000	reserved
3	0012	command number = 12 ⇒ reset all slave error counters
4...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0961	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3...18	xxxx	not changed

11.3.34 Module 12, extended command 102 (66hex) – user menu

5801

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	res. = 0		M	UID					command number = 102_{dec} = 66_{hex}							
2	reserved = 0								reserved = 0							
3	reserved = 0								command number							
4...18	parameter (depending on the command number) or: not used															

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	5 bits	00…$1F_{hex}$ = 0…31_{dec} (a change to the user ID starts the command call)
	command number	1 byte	01 = reads the current menu status 02 = jumps to the start menu screen no. 0 03 = jumps to the user menu screen no. 161 04 = deletes the → empty screen, only for user menus 05 = writes a defined string to a defined position in the display, only for user menus: parameter 1 = X position (1…128 pixels) parameter 2 = Y position(1…8 lines per 8 pixels) parameter 3 = character set and representation (values can be combined): 00x1 = "Small" 00x2 = "Big" 00x3 = "Fix" 00x4 = "Bitmap" 00x5 = "Big underlined" 001x = delete line invertedly (→ black bar) 002x = do not delete points 1 to X 004x = do not delete from string end to point 128 008x = shows the string invertedly parameter 4…5 = pointer towards string (string with "0000" completed) 06 = writes a defined "byte matrix" at a defined position in the display, only for user menus: parameter 1 = X1 position upper left (1…128 pixels) parameter 2 = Y1 position upper left (1…8 lines 8 pixels each) parameter 3 = X2 position bottom right (1…128 pixels) parameter 4 = Y2 position bottom right (1…8 lines 8 pixels each) parameter 5…6 = pointer towards byte matrix (1 byte corresponds to a vertical field of 8 pixels height, bit 0 = top … Bit 7 = bottom) 07 = shows a defined arrow in the display next to the image number, only for user menus: parameter = 0001 → ▲ parameter = 0002 → ▼ parameter = 0003 → ▲ + ▼ -- continued on the following page --

<table>
<tr>
<td></td>
<td>command number</td>
<td>1 byte</td>
<td>-- continued --

08 = defines the texts allocated to the outer keys, only for user menus:
parameter 1 = key index (0…13)
parameter 2 = definition of the key index, e.g.:
<table>
<tr><th>Index</th><th>left key</th><th>right key</th></tr>
<tr><td>0000</td><td>OK</td><td>ESC</td></tr>
<tr><td>0001</td><td>==></td><td>ESC</td></tr>
<tr><td>0002</td><td>MORE</td><td>ESC</td></tr>
<tr><td>0003</td><td>NEXT</td><td>ESC</td></tr>
<tr><td>0004</td><td>OK</td><td></td></tr>
<tr><td>0005</td><td></td><td>ESC</td></tr>
<tr><td>0006</td><td>MORE</td><td>MENU</td></tr>
<tr><td>0007</td><td>OK</td><td>MENU</td></tr>
<tr><td>0008</td><td>MENU</td><td>USER</td></tr>
<tr><td>0009</td><td><==</td><td>ESC</td></tr>
<tr><td>000A</td><td>INFO</td><td>ESC</td></tr>
<tr><td>000B</td><td>CLEAR</td><td>ESC</td></tr>
<tr><td>000C</td><td></td><td></td></tr>
<tr><td>000D</td><td>-WAIT-</td><td>-WAIT-</td></tr>
</table>
</td>
</tr>
</table>

Response from device to fieldbus master (command number = 01)

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	res.	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	keys pressed															
4	activated menu area															
5	process error occurred															
6	currently displayed menu window															
7	activated system language															
8...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command	
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used	
M	master no.	1 bit	0 = master 1 1 = master 2	
	keys pressed	1 word	0001 = bit 0: left key 0002 = bit 1: key [▲] 0004 = bit 2: key [▼] 0008 = bit 3: right key	combinations possible by adding the values
	activated menu area	1 word	00A0 = system menu active 00A1 = user menu active 00AE = process error display active (E10...E30) 00AF = system error display active (acknowledgement required)	
	process error occurred	1 word	0000 = no process errors given 0001 = one or more process errors given	
	currently displayed menu window	1 word	number of the menu screen	
	activated system language	1 word	0000 = menu display in English 0001 = menu display in the second system language	

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master (command number = 02)

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	res.	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Response from device to fieldbus master in the normal case (command number = 04…08)

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B	res.	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3...18	not changed*)								not changed*)							

Response from device to fieldbus master in case of a fault (command number = 04…08)

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B	res.	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	not changed*)								error code							
4...18	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
AD	Access denied. The user menu must be active!
E0	parameter invalid

Example: read the status of the display

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0766	M=0: AS-i master 1 UID=07: user ID changes e.g. to 7 66 = command number 102
2	0000	reserved
3	0001	01 = command number: reads the current menu status
4...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0766	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	0008	0008_{hex} = 0000 0000 0000 0100_{bin} ⇒ right key is pressed
4	00A0	00A0 = system menu active
5	0001	0001 = one or more process errors occurred
6	001B	$001B_{hex}$ = 0027_{dec} ⇒ menu screen "Quick Setup" is currently displayed
7	0000	0000 = the English menus are displayed
8...18	xxxx	not changed

11.3.35 Module 12, extended command 105 (69hex) – read device features

5805

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reserved = 0			UID					command number = 105_{dec} = 69_{hex}							
2	reserved = 0								reserved = 0							
3...18	not used								not used							

Legend:

UID	user ID	5 bits	$00…1F_{hex}$ = $0…31_{dec}$ (a change to the user ID starts the command call)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	res.	reflected user ID					reflected command number							
2	reserved = 0								reserved = 0							
3	2M	DP	EN	reserved = 0					Mod **)							
4	reserved = 0								AT							
5	reserved = 0								flash memory type							
6	hardware version															
7	RTS firmware version number															
8	RTS firmware release number															
9	AS-i master 1 firmware version number															
10	AS-i master 1 firmware release number															
11	AS-i master 2 firmware version number															
12	AS-i master 2 firmware release number															
13	Linux kernel version															
14	Linux ramdisk version															
15...18	not changed*)								not changed*)							

Legend:

E	error bit	1 bit	0 = no error detected 1 = error when executing the command
B	busy	1 bit	0 = command processed, buffer response valid 1 = command in process, channel used
2M	2 AS-i master	1 bit	0 = unit has 1 AS-i master 1 = unit has 2 AS-i masters
DP	Profibus DP	1 bit	0 = fieldbus interface Profibus DP not available 1 = fieldbus interface Profibus DP available
EN	Ethernet	1 bit	0 = Ethernet programming interface not available 1 = Ethernet programming interface available
Mod	PLC mode	1 byte	$0000\ 0001_{bin} = 01_{dec}$ = PLC in RUN $0000\ 0010_{bin} = 02_{dec}$ = PLC in STOP $0000\ 0100_{bin} = 04_{dec}$ = PLC stops at the breakpoint $0000\ 1000_{bin} = 08_{dec}$ = gateway mode
AT	Anybus type	1 byte	01 = Anybus Profibus DP 04 = Anybus CANopen 05 = Anybus DeviceNet 09 = Anybus Ethernet IT 0A = Anybus Ethernet/IP 0B = ifm Profibus DP 0C = no fieldbus module detected

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

**) parameter in the gateway (AC1375/76) without function = "0"

Example: read device features

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0669	M=0: AS-i master 1 UID=06: user ID changes e.g. to 6 69 = command number 105
2	0000	reserved
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	0669	E=0: command processed, no error occurred reflected command data
2	0000	reserved
3	0008	0008_{hex} = 0000 0000 0000 1000_{bin} ⇒ 2M=0: device has 1 AS-i master DP=0: fieldbus interface Profibus DP not available EN=0: Ethernet programming interface not available PLC mode = 08 ⇒ gateway mode
4	000B	Anybus type = 000B ⇒ ifm Profibus DP
5	0002	flash memory type
6	1000	hardware version
7	0002	1st part of the RTS firmware version (here: 02.218B) ⇒ version number 02.xxxx
8	218B	2nd part of the RTS firmware version (here: 02.218B) ⇒ release number xx.218B
9	0000	1st part of the AS-i master 1 firmware version (here: 0.238A) ⇒ version number 0.xxxx
10	238A	2nd part of the AS-i master 1 firmware version (here: 0.238A) ⇒ version number x.238A
11	0000	1st part of the AS-i master 2 firmware version (here: 0.238A) ⇒ version number 0.xxxx
12	238A	2nd part of the AS-i master 2 firmware version (here: 0.238A) ⇒ version number x.238A
13	0196	Linux kernel version: 406
14	0A6E	Linux ramdisk version: 10.110
15...18	xxxx	not changed

12 Acyclic services for Profibus DPV1

Contents

5808

12.1 Description

5810

A main focus of the Profibus power stage DPV1 is the additionally available acyclic data transfer. Field devices can be assigned parameters and calibrated during operation, and acknowledged alarm messages are made possible. The transfer of the acyclic data is carried out in parallel to the cyclic data transfer, but with a low priority.

There is read or write access via virtual slots and indexes. Via slots and indexes, access to data blocks of up to 244 bytes is possible. With Siemens Step7, slot 0 is always assigned to the device itself and can always be addressed.

The device supports acyclic data transmission to DPM1 and DPM2 masters.

The access to parts of the data block in slot 0 is only possible by reducing the length. The offset of the data is always 0 bytes for all data fields when access is made via slot 0 and index.

In case of a data length of 0, the entire length of the slot is returned. An error code is not returned in case of length 0.

So, the M1 master flags can only be read in conjunction with the M1 digital inputs.

In case of access via slot 0, index 10, the projected parameters (PP) can only be written in conjunction with the projected configuration data (PCD).

Given that the Profibus FDT scheme (FDT = **F**ield **D**evice **T**ool) only allows access without length indication, the device shortens the data blocks always to the maximum data length intended for the slot/index. If the requested data length exceeds 160 bytes (= max. intended length in the device), it is also reduced to the length of the requested data block.

12.2 Services for acyclic data transfer between DPM1 master and slave

5811

The connection-oriented data transfer is carried out via an MS1 connection. This is established in DPM1 and is very closely linked to the connection for the cyclic data transfer. It can only be used by the master which has set and also configured the corresponding slave.

Service	Meaning
READ	the master reads a data block of the slave
WRITE	the slave writes a data block to the master

12.3 Services for acyclic data transfer between DPM2 master and slave

5812

The connection-oriented data transfer is carried out via an MS2 connection. This is established by DPM2 prior to start of the acyclic data transfer by means of the service `INITIATE`. Then the connection can be used for the services `READ` and `WRITE`. Termination of the connection is carried out accordingly. A slave can maintain several active MS2 connections at the same time, only limited by the resources available in the slave.

Service	Meaning
INITIATE / ABORT	establishment or termination of a connection for acyclic data transfer between DPM2 and the slave
READ	the master reads a data block of the slave
WRITE	the slave writes a data block to the master

12.4 DPV1 addresses in slot 0 for access via PLC

5813

DPV1 addresses in slot 0			Contents [1]	Access [2] r = read w = write	Size [Words]
Index	Byte no. of	Byte no. to			
0	0	63	M1 digital slave inputs	r	32
	64	67	M1 master flags	r	2
1	0	149	M1 analogue slave inputs	r	75
2	0	159	M1 analogue slave inputs	r	80
3	0	127	M1 current configuration data	r	64
4	0	31	M1 current parameters	r	16
	32	39	M1 LAS	r	4
	40	47	M1 LDS	r	4
	48	55	M1 LPF	r	4
	56	63	M1 LPS	r	4
5	0	127	M1 projected configuration data	r	64
6	0	31	M1 reflected parameters	r	16
	32	155	M1 slave error counter	r	62
	156	157	M1 configuration error counter	r	1
	158	159	M1 AS-i cycle counter	r	1
7	0	63	M1 digital slave outputs	r/w	32
	64	67	M1 reserved		2
8	0	149	M1 analogue slave outputs	r/w	75
9	0	159	M1 analogue slave outputs	r/w	80
10	0	127	M1 projected configuration data	r/w	64
	128	159	M1 projected parameters	r/w	16
11	0	37	M1 command channel request	r/w	19
12	0	37	M1 command channel response	r	19
16	0	63	M2 digital slave inputs	r	32
	64	67	M2 master flags	r	2
17	0	149	M2 analogue slave inputs	r	75
18	0	159	M2 analogue slave inputs	r	80
19	0	127	M2 current configuration data	r	64
20	0	31	M2 current parameters	r	16
	32	39	M2 LAS	r	4
	40	47	M2 LDS	r	4
	48	55	M2 LPF	r	4
	56	63	M2 LPS	r	4
21	0	127	M2 projected configuration data	r	64

DPV1 addresses in slot 0			Contents [1]	Access [2] r = read w = write	Size [Words]
Index	Byte no. of	Byte no. to			
22	0	31	M2 reflected parameters	r	16
	32	155	M2 slave error counter	r	62
	156	157	M2 configuration error counter	r	1
	158	159	M2 AS-i cycle counter	r	1
23	0	63	M2 digital slave outputs	r/w	32
	64	67	M2 reserved		2
24	0	149	M2 analogue slave outputs	r/w	75
25	0	159	M2 analogue slave outputs	r/w	80
26	0	127	M2 projected configuration data	r/w	64
	128	159	M2 projected parameters	r/w	16
27	0	37	M2 command channel request	r/w	19
28	0	37	M2 command channel response	r	19
32	0	127	input data of the fieldbus	r/w	64
33	0	127	output data to the fieldbus	r	64

[1]) M1 = master 1 / M2 = master 2 [2]) access always as from byte 0

NOTE

In the DPV1 address space a command channelCommand channelModbus command channel with a length of 19 words is defined for each AS-i master (→ following table):

DPV1 addresses			Master	Command channel	Access r = read w = write	Size [Words]
Start dec.	Start hex.	End dec.				
4794	12BA	4812	1	request	r / w	19
4813	12CD	4831	1	response	r	19
8890	22BA	8908	2	request	r / w	19
8909	22CD	8927	2	response	r	19

A DP master operates as host system. The commands are always triggered by the DP master by a corresponding entry in its output data range. The AS-i master responds then in the input data area of the host system.

12.5 Examples

5814

12.5.1 Examples DPV1 reading

5815

DPV1 master request			Data received by DP master	
Slot	**Index**	**Length**	**Data field**	**Data length [bytes]**
0	0	0	M1 digital slave inputs of slaves 1...31	64
0	0	2	M1 digital slave inputs of slaves 1 and 2	2
0	0	60	M1 digital slave inputs %IB1.1…%IB11.27	60
0	3	0	M1 current configuration data of all slaves	128
0	3	6	M1 current configuration of slaves 0...2	6

12.5.2 Examples DPV1 writing

5816

DPV1 master request			Data received by DP slave	
Slot	**Index**	**Length**	**Data field**	**Data length [bytes]**
0	7	2	M1 digital slave outputs of slaves 1 and 2	2
0	8	10	M1 analogue slave outputs of slave 1	10
0	11	12	M1 command channel request	12

12.6 DPV1 error messages

Contents

5817

12.6.1 DPV1 error codes: application

5818

Error byte 1

Value [hex]	Meaning
A0	read error
A1	write error
A2	module failure
A8	version conflict
A9	feature not supported
AA	user specific

12.6.2 DPV1 error codes: data access

5825

Error byte 1

Value [hex]	Meaning
B0	invalid index
B1	write length error
B2	invalid slot
B3	type conflict
B4	invalid area
B5	state conflict
B6	access denied
B7	invalid range
B8	invalid parameter
B9	invalid type
BA...BF	user specific

12.6.3 DPV1 error codes: device

5837

Error byte 1

Value [hex]	Meaning
C0	read constrain conflict
C1	write constrain conflict
C2	resource busy
C3	resource unavailable
C8	user specific

12.6.4 DPV1 error codes: application-specific

5843

Error byte 2

Value [hex]	Meaning
00	reserved
01	reserved
02	reserved
03	reserved

12.6.5 DPV1 function 58 'Reason codes'

5844

Value [hex]	Meaning
10	—
11	sequence error
12	invalid request PDU received
13	timeout of the connection
14	invalid response PDU received
15	invalid service from USER
16	Send_Timeout requested was too small
17	invalid additional address information
18	waiting for FDL_DATA_REPLY

12.7 Syntax of the acyclic services in the DPV1 command channel

5853

NOTE

- ► If a command is to be executed, the value 65_{hex} must be entered in the command request! Changing the command number does not start the execution.
- ► If a command is to be executed several times, the user ID must be changed accordingly, e.g. by counting up.
- ► Do not start the command until the preceding command has been completed. (To do so, check the bits E + B in the 1st word.)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved for string transfers								command number							
3...18	command parameters															
19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex} = 0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322)							
2	reserved for string transfers								reflected command number							
3...18	command data															
19	not changed								not changed							

12.7.1 Command status

5856

The command status indicates the status of the command channel:

Value [hex]	Meaning
65	command request by the host
6A	command is being processed
6B	command aborted due to an error
6C	abort after timeout during command processing
6D	command completed, but response data not yet consistent
6E	unknown command
6F	command completed, response buffer is valid

12.8 Acyclic command in the DPV1 command channel

Contents

5858

12.8.1 Acyclic command 00 – execute no command

5859

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 00_{dec} = 00_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: execute no command

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0365	03 = user ID changes e.g. to 3 65 = command request
2	0000	00 = command number 0
3...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	036F	03 = reflected user ID 6F = command status is "done" (no error)
2	0000	reflected command number
3...19	xxxx	not changed

12.8.2 Acyclic command 01 – change slave parameters

5863

Requirement: the addressed AS-i master must be in the Protected mode.
→ Acyclic command 05 – set the operating mode of the AS-i master (→ page 331)

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 01_{dec} = 01_{hex}							
3	reserved = 0								res. = 0		ST	SLA				
4	reserved = 0								reserved = 0				parameter value to be written			
5...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								reserved = 0				read back parameter value			
4...19	not changed*)								not changed*)							

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
0A	the slave is not in the LAS
0B	parameter or address invalid
14	master is in the wrong operating mode *)

*) master is not in the Protected mode.

Example: write parameter "3" to AS-i slave 4B

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0001	01 = command number 1
3	0024	(slave no. **4**) + (**32**, if B slave) = 36_{dec} = 24_{hex}
4	0003	parameter value to be written
5...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	096F	09 = reflected user ID 6F = command status is "done" (no error)
2	0001	reflected command number
3	0003	read back parameter value; might differ from the value to be written (so-called reflected parameters)
4...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	096B	09 = reflected user ID 6B = error during command execution
2	0001	reflected command number
3	000A	error code 0A = slave is not in LAS.
4...19	xxxx	not changed

12.8.3 Acyclic command 03 – adopt and save connected AS-i slaves in configuration

5865

(= project all)

Requirement: the addressed AS-i master must be in the projection mode.
→ Acyclic command 05 – set the operating mode of the AS-i master (→ page 331)

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 03_{dec} = 03_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
14	master is in the wrong operating mode *)

*) master is not in the projection mode.

Example: adopt and save currently connected AS-i slaves in the configuration

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0C65	0C = user ID changes e.g. to 12 65 = command request
2	0003	03 = command number 3
3...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0C6F	0C = reflected user ID 6F = command status is "done" (no error)
2	0003	reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	0C6B	0C = reflected user ID 6B = error during command execution
2	0003	reflected command number
3	0014	error code 14 = master is not in the projection mode.
4...19	xxxx	not changed

12.8.4 Acyclic command 04 – change the list of projected AS-i slaves (LPS)

5886

Requirement: the addressed AS-i master must be in the projection mode.
→ Acyclic command 05 – set the operating mode of the AS-i master (→ page 331)

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 04_{dec} = 04_{hex}							
3	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0 *)
4	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
6	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

► Set the bit corresponding to the slave address to TRUE in the words 3...6 for each slave to be projected.

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
14	master is in the wrong operating mode *)

*) master is not in the projection mode.

Example: slaves 1A to 5A, 31A, 1B and 16B are to be projected

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0C65	0C = user ID changes e.g. to 12 65 = command request
2	0004	04 = command number 4
3	003E	$003E_{hex}$ = 0000 0000 0011 1110_{bin}: slaves 1(A) to 5(A) are to be projected.
4	8000	8000_{hex} = 1000 0000 0000 0000_{bin}: slave 31(A) is to be projected.
5	0002	0002_{hex} = 0000 0000 0000 0010_{bin}: slave 1B is to be projected.
6	0001	0001_{hex} = 0000 0000 0000 0001_{bin}: slave 16B is to be projected.
7...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0C6F	0C = reflected user ID 6F = command status is "done" (no error)
2	0004	reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	0C6B	0C = reflected user ID 6B = error during command execution
2	0004	reflected command number
3	0014	error code 14 = master is not in the projection mode.
4...19	xxxx	not changed

12.8.5 Acyclic command 05 – set the operating mode of the AS-i master

5867

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 05_{dec} = 05_{hex}							
3	reserved = 0								MOD							
4...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
MOD	opperating mode	1 byte	00 = set master to the normal mode (protected mode) 01 = set master to the projection mode

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Possible error codes:

Value [hex.]	Meaning
03	slave with address 0 connected

Example: set AS-i master to projection mode

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0005	05 = command number 5
3	0001	01 = set master to the projection mode.
4...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	096F	09 = reflected user ID 6F = command status is "done" (no error)
2	0005	reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	096B	09 = reflected user ID 6B = error during command execution
2	0005	reflected command number
3	0003	error code 03 = slave with address 0 connected.
4...19	xxxx	not changed

12.8.6 Acyclic command 06 – change the AS-i slave address

5869

Requirement: the addressed AS-i master must be in the Protected mode.
→ Acyclic command 05 – set the operating mode of the AS-i master (→ page 331)

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 06_{dec} = 06_{hex}							
3	reserved = 0								res. = 0		ST	old SLA				
4	reserved = 0								res. = 0		ST	new SLA				
5...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Possible error codes:

Value [hex.]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
02	no slave with the old address found
03	slave with address 0 connected
04	slave with the new address already exists
05	error when deleting the old address
06	error when reading the IO configuration
07	error when writing the new address or extended ID code 1
08	new address could only be saved temporarily
09	extended ID code 1 could only be saved temporarily
0B	parameter or address invalid
14	master is in the wrong operating mode *)

*) master is not in the Protected mode

Example: change AS-i slave address 9B to 11A

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0865	08 = user ID changes e.g. to 8 65 = command request
2	0006	06 = command number 6
3	0029	(slave no. **9**) + (**32**, if B slave) = 41_{dec} = 29_{hex}
4	000B	(slave no. **11**) + (32, if B slave) = 11_{dec} = $0B_{hex}$
5...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	086F	08 = reflected user ID 6F = command status is "done" (no error)
2	0006	reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	086B	08 = reflected user ID 6B = error during command execution
2	0006	reflected command number
3	0003	error code 03 = slave with address 0 connected.
4...19	xxxx	not changed

12.8.7 Acyclic command 07 – set the autoaddress mode of the AS-i master

5870

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 07_{dec} = 07_{hex}							
3	reserved = 0								AutoAd							
4...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
AutoAd	automatic addressing	1 byte	00 = deactivate automatic addressing 01 = activate automatic addressing

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: activate automatic addressing of the AS-i master

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	0007	07 = command number 7
3	0001	01 = activate automatic addressing
4...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	046F	04 = reflected user ID 6F = command status is "done" (no error)
2	0007	reflected command number
3...19	xxxx	not changed

12.8.8 Acyclic command 09 – change extended ID code 1 in the AS-i slave

5871

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 09_{dec} = 09_{hex}							
3	reserved = 0								res. = 0		ST	SLA				
4	reserved = 0								new "extended ID Code 1"							
5...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Possible error codes:

Value [hex.]	Meaning
01	no slave response OR: master is in the offline mode when requesting the command
02	no slave with the old address found
03	slave with address 0 connected
07	error when writing the new address or extended ID code 1
09	extended ID code 1 could only be saved temporarily
0B	parameter or address invalid

Example: change extended ID code 1 of AS-i slave 17(A) to "8"

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0F65	0F = user ID changes e.g. to 15 65 = command request
2	0009	09 = command number 9
3	0011	(slave no. **17**) + (32, if B slave) = 17_{dec} = 11_{hex}
4	0008	08 = new "extended ID Code 1"
5...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	0F6F	0F = reflected user ID 6F = command status is "done" (no error)
2	0009	reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	0F6B	0F = res. = 0 6B = error during command execution
2	0009	reflected command number
3	0007	error code07 = slave does not support extended ID code.
4...19	xxxx	not changed

12.8.9 Acyclic command 10...20 (0A...14hex) – force analogue data transmission directly to / from 3 AS-i slaves each

5872

With these commands the analogue input or output data of 3 slaves can be overwritten. The commands are assigned to 3 slave addresses each:

Slave groups

Command number		Slave addresses		
Decimal	Hexadecimal	n:	(n+1)	(n+2)
10	0A	1	2	3
11	0B	4	5	6
12	0C	7	8	9
13	0D	10	11	12
14	0E	13	14	15
15	0F	16	17	18
16	10	19	20	21
17	11	22	23	24
18	12	25	26	27
19	13	28	29	30
20	14	31	—	—

Table: assignment command number - slave addresses

Example: In the command 14_{dec} ($0E_{hex}$) the data of the slave addresses 13, 14 and 15 is transmitted.

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = $10…20_{dec}$ = $0A…14_{hex}$							
3	output data of AS-i single slave (n), channel 0 **OR** of AS-i A slave (n), channel 0															
4	output data of AS-i single slave (n), channel 1 **OR** of AS-i A slave (n), channel 1															
5	output data of AS-i single slave (n), channel 2 **OR** of AS-i A slave (n), channel 2															
6	output data of AS-i single slave (n), channel 3 **OR** of AS-i A slave (n), channel 3															
7	reserved = 0								-	V3	-	V2	-	V1	-	V0
8	output data of AS-i single slave (n+1), channel 0 **OR** of AS-i A slave (n+a), channel 0															
9	output data of AS-i single slave (n+1), channel 1 **OR** of AS-i A slave (n+1), channel 1															
10	output data of AS-i single slave (n+1), channel 2 **OR** of AS-i A slave (n+1), channel 2															
11	output data of AS-i single slave (n+1), channel 3 **OR** of AS-i A slave (n+1), channel 3															
12	reserved = 0								-	V3	-	V2	-	V1	-	V0
13	output data of AS-i single slave (n+2), channel 0 **OR** of AS-i A slave (n+2), channel 0															
14	output data of AS-i single slave (n+2), channel 1 **OR** of AS-i A slave (n+2), channel 1															
15	output data of AS-i single slave (n+2), channel 2 **OR** of AS-i A slave (n+2), channel 2															
16	output data of AS-i single slave (n+2), channel 3 **OR** of AS-i A slave (n+2), channel 3															
17	reserved = 0								-	V3	-	V2	-	V1	-	V0
18...19	not used								not used							

Legend:

M	master no.	1 bit	0 = master 1 1 = master 2
UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
Vn	valid bit	1 bit	0 = values in channel n are invalid 1 = values in channel n are valid Output data must be valid (Vn = 1) to be enabled in the AS-i slave!

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	input data or reflected output data of AS-i single slave (n), channel 0 **OR** of AS-i A slave (n), channel 0															
4	input data or reflected output data of AS-i single slave (n), channel 1 **OR** of AS-i A slave (n), channel 1															
5	input data or reflected output data of AS-i single slave (n), channel 2 **OR** of AS-i A slave (n), channel 2															
6	input data or reflected output data of AS-i single slave (n), channel 3 **OR** of AS-i A slave (n), channel 3															
7	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
8	input data or reflected output data of AS-i single slave (n+1), channel 0 **OR** of AS-i A slave (n+1), channel 0															
9	input data or reflected output data of AS-i single slave (n+1), channel 1 **OR** of AS-i A slave (n+1), channel 1															
10	input data or reflected output data of AS-i single slave (n+1), channel 2 **OR** of AS-i A slave (n+1), channel 2															
11	input data or reflected output data of AS-i single slave (n+1), channel 3 **OR** of AS-i A slave (n+1), channel 3															
12	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
13	input data or reflected output data of AS-i single slave (n+2), channel 0 **OR** of AS-i A slave (n+2), channel 0															
14	input data or reflected output data of AS-i single slave (n+2), channel 1 **OR** of AS-i A slave (n+2), channel 1															
15	input data or reflected output data of AS-i single slave (n+2), channel 2 **OR** of AS-i A slave (n+2), channel 2															
16	input data or reflected output data of AS-i single slave (n+2), channel 3 **OR** of AS-i A slave (n+2), channel 3															
17	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
18...19	not changed*)								not changed*)							

Legend:

Vn	valid bit	1 bit	0 = values in channel n are invalid 1 = values in channel n are valid Output data must be valid (Vn = 1) to be enabled in the AS-i slave!
On	overflow bit	1 bit	0 = data is in the valid range 1 = data is in the invalid range (especially in case of input modules when the measuring range is not reached or exceeded)
OVx	output valid	1 bit	channel-independent bit "output data valid" from the slave: CTT1: 0 = more than 3.5 s have elapsed since the last update of the output values 1 = slave requests new output data within the next 3 s CTT2…CTT5: 0 = slave receives no new output data 1 = slave receives new output data **NOTE:** only valid for analogue **out**put slaves. For **in**put slaves set OVx = "0"!

TVx	transfer valid	1 bit	channel-independent bit "transfer valid" from the slave: 0 = error during transfer or: timeout 1 = transfer of analogue input/output data OK
TIx	transfer to the slave (transfer Input)	1 bit	from master profile M4 onwards: 0 = slave transmits input data as a value (15 bits long, plus sign) 1 = slave transmits input data as a bit pattern (16 bits long, no sign)
TOx	transfer from the slave (transfer output)	1 bit	from master profile M4 onwards: 0 = slave receives output data as a value (15 bits long, plus sign) 1 = slave receives output data as a bit pattern (16 bits long, no sign)

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: force analogue data (4 channels) to slave 1...3 on master 1

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0165	01 = user ID changes e.g. to 1 65 = command request
2	000A	0A = command number 10
3	0169	output data AS-i slave 1, channel 0
4	0202	output data AS-i slave 1, channel 1
5	0395	output data AS-i slave 1, channel 2
6	1033	output data AS-i slave 1, channel 3
7	0055	overflow and valid bits for AS-i slave 1: 55_{hex} = 0101 0101_{bin} ⇒ O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2009	output data AS-i slave 2, channel 0
9	2202	output data AS-i slave 2, channel 1
10	0195	output data AS-i slave 2, channel 2
11	1022	output data AS-i slave 2, channel 3
12	0055	overflow and valid bits for AS-i slave 2: 55_{hex} = 0101 0101_{bin} ⇒ O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
13	3339	output data AS-i slave 3, channel 0
14	1102	output data AS-i slave 3, channel 1
15	1953	output data AS-i slave 3, channel 2
16	1234	output data AS-i slave 3, channel 3
17	0055	overflow and valid bits for AS-i slave 3: 55_{hex} = 0101 0101_{bin} ⇒ O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
18...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	016F	01 = reflected user ID 6F = command status is "done" (no error)
2	000A	reflected command number
3	3169	(slave 1 is a 4-channel input slave) input data AS-i slave 1, channel 0
4	2202	input data AS-i slave 1, channel 1
5	1395	input data AS-i slave 1, channel 2
6	0033	input data AS-i slave 1, channel 3
7	0255	overflow and valid bits for AS-i slave 1: 0255_{hex} = 0000 0010 0101 0101_{bin} ⇒ TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2229	(slave 2 is a 2-channel input slave) input data AS-i slave 2, channel 0
9	2332	input data AS-i slave 2, channel 1
10	7FFF	channel 2 no valid value for AS-i slave 2
11	7FFF	channel 2 no valid value for AS-i slave 3
12	0205	overflow and valid bits for AS-i slave 2: 0205_{hex} = 0000 0010 0000 0101_{bin} ⇒ TVA = 1, OVA = 0, O3 = 0, V3 = 0, O2 = 0, V2 = 0, O1 = 0, V1 = 1, O0 = 0, V0 = 1.
13	3339	(slave 3 is a 4-channel output slave) reflected output data AS-i slave 3, channel 0
14	1102	reflected output data AS-i slave 3, channel 1
15	1953	reflected output data AS-i slave 3, channel 2
16	1234	reflected output data AS-i slave 3, channel 3
17	0255	overflow and valid bits for AS-i slave 3: 0255_{hex} = 0000 0010 0101 0101_{bin} ⇒ TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
18...19	xxxx	not changed

12.8.10 Acyclic command 21 (15hex) – read 7.4 ID of an AS-i slave

5874

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res. = 0		ST	SLA					command number = 21_{dec} = 15_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	S	reflected slave address					F=0	reflected command number							
3	I/O	2D	DT-Start			DT-Count			Mux field			E type				
4	number of parameter bytes to be read								EDT read			res. = 0		Diag	res. = 0	
5	EDT write			reserved = 0					number of parameter bytes to be written							
6	device-specific information								manufacturer identification							
7...16	device-specific information								device-specific information							
17	reserved = 0								number of bytes received							
18...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
F	error bit	1 bit	0 = no error detected 1 = error when executing the command
I/O	direction of data	1 bit	direction of data for the devices with E type ≠ 3 0 = input 1 = output
2D	double data transfer	1 bit	double data transfer (redundancy) possible 0 = simple data transfer 1 = double data transfer
DT-Start	start triple	3 bits	(information for the driver in the master)
DT-Count	number of data triples	3 bits	(information for the driver in the master)
Mux field	number of multiplexed data words	3 bits	0…3 number = value in "Mux field" +1

E type	slave function + data structure	5 bits	characterises the slave as regards functionality and data structure 00 = reserved 01 = transmitted values are measured values 02 = transmitted values are 16 digital bit values 03 = normal operation in 4-bit mode (4I/4O) 04...1F$_{hex}$ = 04...31$_{dec}$ = reserved
	number of parameter bytes to be read	1 byte	number of bytes which can be read as parameter string 00 = no parameter string readable 01...DB$_{hex}$ = 01...219$_{dec}$ = number of bytes
Diag	slave supports the 7.4 diagnosis string	1 bit	0 = diagnosis string is not supported 1 = diagnosis string is supported
EDT read	reserved	3 bits	reserved for later profiles
EDT write	reserved	3 bits	reserved for later profiles
	number of parameter bytes to be written	1 byte	number of bytes which can be written as parameter string 00 = no parameter string readable 01...DB$_{hex}$ = 01...219$_{dec}$ = number of bytes
	manufacturer identification	1 byte	defined manufacturer number assigned by AS-International
	device-specific information	1 byte	as an option more bytes for the manufacturer-specific device description

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = 6B$_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Possible error codes:

Value [hex.]	Meaning
0C	faulty S-7.4 protocol sequence
0D	S-7.4 protocol aborted (timeout)
0E	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0F	AS-i slave has completed the S-7.4 string
10	AS-i S-7.4 no longer connected (no longer in LAS)
11	another S-7.4 transfer to the addressed AS-i slave is already active
12	the previous segmented S-7.4 transfer was not yet completed
13	invalid S-7.4 data length
14	invalid S-7.4 command

Example: read 7.4 ID string of AS-i slave 3(A)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0315	(slave no. **3**) + (32, if B slave) = 03_{dec} = 03_{hex} 15 = command number 21
3...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	026F	02 = reflected user ID 6F = command status is "done" (no error)
2	0615 8615	0xxx/8xxx = the toggle bit TG changes after each execution S=0: last sequence x6 = slave address 3(A), shifted 1 bit to the left 15 = reflected command number 21
3	2D01	1st word of the ID string of slave 3: $2D01_{hex}$ = 0 0 101 101 000 00001_{bin}
4	0203	2nd word of the ID string of slave 3: 0203_{hex} = 00000010 000 00 0 11_{bin}
...	...	etc.
17	0008	08 = slave sends an ID string with 8 bytes length
18...19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	026B	02 = reflected user ID 6B = error during command execution
2	0015	reflected command number
3	0014	error code 14 = invalid S-7.4 command.
4...19	xxxx	not changed

12.8.11 Acyclic command 25 (19hex) – set AS-i master test mode

5876

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 25_{dec} = 19_{hex}							
3	SZ								MOD							
4	loops															
5...17	PS	—	ST	SLA					reserved = 0				Data			
18	not used								DLen							
19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
SZ	sequence size	1 byte	size of the request sequence permitted values = $1...121_{dez}$ ($01...79_{hex}$)
MOD	test mode	1 byte	00 = test mode 0: master passes the offline phase and returns to the normal operating mode. 01 = test mode 1: only available after power ON: if CPTE input = 0, the master permanently transmits "write parameter" to slave 15 02 = test mode 2: as in normal operation, however, slaves which have not responded 6 successive times are not deleted from the LDS 03 = test mode 3: master changes to the management phase, remains in this phase and accepts all known commands of the host system **IMPORTANT:** only call this command once, not cyclically! 04 = test mode 4: master transmits the defined data cyclically **IMPORTANT:** no AS-i error check possible!
loops	master sequence loops	1 word	quantity how often a master request sequence is repeated permitted values = 0001_{16}… $FFFF_{16}$ $FFFF_{16}$ = unlimited repetition
PS	parameter request	1 bit	send command as data exchange / write parameter 0 = Data_Exchange Request (I4=0) 1 = Write_Parameter Request (I4=1)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$
Data	slave data	4 bits	only for test mode 4: slave output data
DLen	data length	1 byte	01_{hex}

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: set AS-i master to test mode 2

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0019	19 = command number 25
3	0002	0002 = test mode 2: as in normal operation, however, slaves which have not responded 6 successive times are not deleted from the LDS.
4...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	0019	reflected command number
3...19	xxxx	not changed

12.8.12 Acyclic command 26 (1Ahex) – read AS-i master version

5877

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 26_{dec} = $1A_{hex}$							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	M12								MOD							
4	master version **), places before the decimal point															
5	master version **), places after the decimal point															
6...19	not changed*)								not changed*)							

Legend:

M12	number of AS-i masters	1 byte	00 = device has 1 AS-i master 01 = device has 2 AS-i masters
MOD	test mode	1 byte	00 = test mode 0: master passes the offline phase and returns to the normal operating mode. 01 = test mode 1: only available after power ON: if CPTE input = 0, the master permanently transmits "write parameter" to slave 15 02 = test mode 2: as in normal operation, however, slaves which have not responded 6 successive times are not deleted from the LDS 03 = test mode 3: master changes to the management phase, remains in this phase and accepts all known commands of the host system **IMPORTANT:** only call this command once, not cyclically! 04 = test mode 4: master transmits the defined data cyclically **IMPORTANT:** no AS-i error check possible!

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

**) data only valid if MOD = 0 (test mode = 0)

Example: read AS-i master version

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	001A	1A = command number 26
3...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	046F	04 = reflected user ID 6F = command status is "done" (no error)
2	001A	reflected command number
3	0100	01 = device with 1 master 00 = test mode 0 → Acyclic command 25 (19hex) – set AS-i master test mode (→ page 347)
4	0000	places before the decimal point of version 0.237A
5	237A	places after the decimal point of version 0.237A
6...19	xxxx	not changed

12.8.13 Acyclic command 28 (1Chex) – no slave reset when changing to the protected mode

5879

When changing from the projection mode to the protected mode, all slaves are normally briefly reset (reset or offline phase). This may lead to problems when the system is running. In such cases the "deactivation of the slave reset" prevents the short-term deactivation of the slave outputs during changing of the operating mode.

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 28_{dec} = $1C_{hex}$							
3	reserved = 0								OLP							
4...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
OLP	offline phase = slave reset	1 byte	00 = offline phase when changing over to the protected mode 01 = no offline phase when changing over to the protected mode

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								6F = command status is "done" (no error)							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: AS-i master 1 - no slave reset when changing to the protected mode

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	001C	1C = command number 28
3	0001	01 = no offline phase when changing to the protected mode
4...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	046F	04 = reflected user ID 6F = command status is "done" (no error)
2	001C	reflected command number
3...19	xxxx	not changed

12.8.14 Acyclic command 31 (1Fhex) – execute the extended safety monitor protocol in the Safety-at-Work monitor once

5880

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = $1F_{hex} = 31_{dec}$							
3	sub command								res. = 0		ST	SLA				
4...17	sub command data								sub command data							
18	field number								data length							
19	not used								not used							

Legend:

UID	user ID	5 bits	$00…1F_{hex} = 0…31_{dec}$ (a change to the user ID starts the command call)
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$
	sub command	1 byte	00_{hex} = executing the "extended safety monitor protocol" once in the "Safety at Work" monitor with the slave address 30_{dec} ($1E_{hex}$)
	field number	1 byte	???
	data length	1 byte	???

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	reflected sub command								reflected slave address							
4	LEDs OSSD 1				LEDs OSSD 2				data call 1				data call 0			
5	OSSD2 not green								OSSD1 not green							
6	1st colour output circuit 1								1st module address output circuit 1							
7	2nd colour output circuit 1								2nd module address output circuit 1							
8	3rd colour output circuit 1								3rd module address output circuit 1							
9	4th colour output circuit 1								4th module address output circuit 1							
10	5th colour output circuit 1								5th module address output circuit 1							
11	6th colour output circuit 1								6th module address output circuit 1							
12	1st colour output circuit 2								1st module address output circuit 2							
13	2nd colour output circuit 2								2nd module address output circuit 2							
14	3rd colour output circuit 2								3rd module address output circuit 2							
15	4th colour output circuit 2								4th module address output circuit 2							
16	5th colour output circuit 2								5th module address output circuit 2							
17	6th colour output circuit 2								6th module address output circuit 2							
18	field number = 0/1								reserved = 0							
19	not changed *)								not changed *)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Description of the different fields in word no. 4 for [LEDs OSSD 1/2]

Value [hex.]	Value [bin.]	Meaning
0	0000	green = contacts of the output circuits closed
1	0001	yellow = startup / restart disable active
2	0010	yellow flashing or red: = contacts of the output circuits open
3	0011	red flashing = error on the level of the monitored AS-i components
> 4	> 0100	reserved

Description of the different fields in word no. 4 for [data call 1/2]

data call 1		data call 0		Meaning
Value [hex.]	Value [bin.]	Value [hex.]	Value [bin.]	
8	1000	0	0000	protective operation, everything ok (also not available, not configured or depending output circuits are displayed as "ok")
9	1001	1	0001	protective operation, output circuit 1 off
A	1010	2	0010	protective operation, output circuit 2 off
B	1011	3	0011	protective operation, both output circuits off
C	1100	4	0100	configuration operation: power on
D	1101	5	0101	configuration operation
E	1110	6	0110	reserved / not defined
F	1111	7	0111	configuration operation: fatal device error, RESET or device exchange required
-	-	> 8	1xxx	no current diagnosis information available, please wait

Description of the different fields in word no. 5 for [OSSD1/2 not green]

Value [hex.]	Value [bin.]	Meaning
0	0000	no module, responses of the data calls in the words 6...17 are not relevant
1	0001	the number of POUs in the output circuit is 1
…	…	…
6	0110	the number of POUs in the output circuit is 6
7	0111	the number of POUs in the output circuit is > 6
> 8	1xxx	reserved / not defined

Description of the different fields in word no. 6...17 for [colour output circuit]

Module address 1...6 in output circuit 1/2: Indicates the index of the module of the configuration. The module address which was defined in the program ASIMON is indicated.

Value [hex.]	Value [bin.]	Meaning
0	0000	green, continuous
1	0001	green, flashing
2	0010	yellow, continuous
3	0011	yellow, flashing
4	0100	red, continuous
5	0101	red, flashing
6	0110	grey, off

Response from device to host in case of a fault

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								error code							
4...19	not changed *)								not changed *)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
00…02	general errors during command processing
0A…0C	internal protocol error
10	sub command invalid
11	no slave with the profile S-7.F.F on the slave address
16	the monitor with the address was changed in the protocol mode
20	command could not be processed within the specified time
EE	fatal error during command execution

Example: one-time execution of the extended safety monitor protocol on address 30

Request of host to device

Word no.	Value [hex.]	Meaning
1	0765	07 = user ID changes to 7 65 = command request
2	001F	1F = command number 31
3	001E	00 = sub command 0 = one-time execution of the extended safety monitor protocol $1E_{hex} = 30_{dec}$ = Safety-at-Work monitor with the slave address 30
4…19	xxxx	not used

Response from device to host in the normal case : Safety-at-Work monitor has not triggered

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	001F	1F = command number 31
3	001E	reflected command data
4	0000	green: contacts of the output circuits closed
5	0000	both output circuits green
6…17	xxxx	not relevant, because 5th word = 0000
18	0000	reflected field number
19	xxxx	not changed

Response from device to fieldbus master in the normal case : Safety-at-Work monitor has triggered

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	001F	reflected command number
3	001E	reflected command data
4	2211	2x = output circuit 1 red; x2 = invalid, → word 5; 11 = protective operation, output circuit 1 off
5	0003	00 = OSSD2 green 03 = OSSD1 not green, provides 3 modules which are not green
6	0421	04 = red permanently lit 21 = module 33
7	0422	04 = red permanently lit 22 = module 34
8	0423	04 = red permanently lit 23 = module 35
9…11	xxxx	not relevant, because low byte of 5th word = 03 ⇒ 3 modules relevant
12…17	xxxx	not relevant, because high byte of 5th word = 00 ⇒ green, no module relevant
18	0000	reflected field number
19	xxxx	not changed

Response from device to fieldbus master in case of a fault

Word no.	Value [hex.]	Meaning
1	076B	07 = reflected user ID 6B = error during command execution
2	001F	reflected command number
3	0011	error code=11: no slave with the profile S-7.F.F on the slave address
4…19	xxxx	not changed

12.8.15 Acyclic command 33 (21hex) – read 7.4 diagnostic string of an AS-i slave

5882

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res. = 0		ST	SLA					command number = 33_{dec} = 21_{hex}							
3...17	not used								not used							
18	field number								DL							
19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
	field number	1 byte	???
DL	data length	1 byte	number of bytes to be transferred permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	S	reflected slave address					F=0	reflected command number							
3	diagnostic byte 1								diagnostic byte 0							
4...16	diagnostic bytes 2...27															
17	diagnostic byte 29								diagnostic byte 28							
18	reserved = 0								Number of bytes received							
19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Info

The control bytes defined in profile 7.4 with follow and valid bits are filtered out by the system.

Example: read 8 diagnostic bytes of AS-i slave 3(A)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0321	(slave no. **3**) + (32, if B slave) = 03_{dec} = 03_{hex} 21 = command number 33
3...17	xxxx	not used
18	??08	??? = field number 08 = read 8 bytes diagnostic data
19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	0621 8621	0xxx/8xxx = the toggle bit TG changes after each execution S=0: last sequence x6 = slave address 3(A), shifted 1 bit to the left reflected command number
3	2D01	01 = diagnostic byte 0 of slave 3 2D = diagnostic byte 1 of slave 3
4	0203	03 = diagnostic byte 2 of slave 3 02 = diagnostic byte 3 of slave 3
5	1122	22 = diagnostic byte 4 of slave 3 11 = diagnostic byte 5 of slave 3
6	3344	44 = diagnostic byte 6 of slave 3 33 = diagnostic byte 7 of slave 3
7...17	xxxx	not changed
18	0008	8 bytes diagnosis data
19	xxxx	not changed

12.8.16 Acyclic command 34 (22hex) – read 7.4 parameter string of an AS-i slave

5883

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res. = 0		ST	SLA					command number = 34_{dec} = 22_{hex}							
3...17	not used								not used							
18	field number								DL							
19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
	field number	1 byte	???
DL	data length	1 byte	number of bytes to be transferred permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	S	reflected slave address					F=0	reflected command number							
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	reserved = 0								number of bytes received							
19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Info

The control bytes defined in profile 7.4 with follow and valid bits are filtered out by the system.

Example: read 4 bytes parameter data of AS-i slave 3(A)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0865	08 = user ID changes e.g. to 8 65 = command request
2	0322	(slave no. **3**) + (32, if B slave) = 03_{dec} = 03_{hex} 22 = command number 34
3...17	xxxx	not used
18	??04	??? = field number 04 = read 4 bytes parameter data
19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	086F	08 = reflected user ID 6F = command status is "done" (no error)
2	0622 8622	0xxx/8xxx = the toggle bit TG changes after each execution S=0: last sequence x6 = slave address 3(A), shifted 1 bit to the left 22 = reflected command number 34
3	1234	34 = parameter byte 0 of slave 3 12 = parameter byte 1 of slave 3
4	5678	78 = parameter byte 2 of slave 3 56 = parameter byte 3 of slave 3
5...17	xxxx	not changed
18	0004	4 parameter bytes were read
19	xxxx	not changed

12.8.17 Acyclic command 35 (23hex) – write 7.4 parameter string of an AS-i slave

5885

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res.	S	ST	SLA					command number = 35_{dec} = 23_{hex}							
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	Field number								DL							
19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$
	field number	1 byte	???
DL	data length	1 byte	number of bytes to be transferred permitted values: $00…FF_{hex}$ = $0…255_{dec}$ (→ data sheet of the slave)

NOTE

The number of the bytes to be sent must be divisible by 2 since the system always can transmit only multiples of 2 bytes in the S7.4 protocol.

The control bytes defined in profile 7.4 with follow bit and valid bit are automatically added by the system. Therefore, without segmentation, this command is limited to 20 bytes of parameter data. Larger data volumes must be divided into several segments.

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	S	SLA					F=0	reflected command number							
3...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
SLA	slave address	5 bits	$00…1F_{hex} = 0…31_{dec}$
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: write 4 bytes parameter data to AS-i slave 3(A)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0323	S=0: sequence here always 0 03 = slave address 3(A) 23 = command number 35
3	1AF4	1st word of the parameter string for slave 3(A)
4	5BB9	2nd word of the parameter string for slave 3(A)
5...17	xxxx	not used
18	0004	00 = field nubmer 0 04 = send 4 bytes parameter data
19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	096F	09 = reflected user ID 6F = command status is "done" (no error)
2	0623 8623	0xxx/8xxx = the toggle bit TG changes after each execution S=0: last sequence x6 = slave address 3(A), shifted 1 bit to the left 23 = reflected command number
3...19	xxxx	not changed

12.8.18 Acyclic command 36 (24hex) – acyclic standard read call to an AS-i slave with CTT2 profile

5886

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res.	S	ST	SLA					command number = 36_{dec} = 24_{hex}							
3	res. = 0			DL					IX							
4...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
S	sequence bit	1 bit	a large data packet is transmitted in several partial sequences: 0 = data transmission completed 1 = data transmission not yet completed, at least one more packet follows
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	6 bits	number of bytes to be transferred permitted values: 01…20_{hex} = 01…32_{dec} (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	L32	reflected slave address					F=0	reflected command number							
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 **or:** number of bytes read								parameter byte 30							
19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
L32	32 parameter bytes	1 bit	0 = number of bytes read is < 32_{dec} ⇒ high byte in word 18 contains the number of read bytes 1 = number of read bytes is = 32_{dec} ⇒ high byte in word 18 contains parameter byte 31
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0							reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0						F=1	reflected command number							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: acyclically read parameter bytes of AS-i slave 3A (standard)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	0324	S=0: sequence here always 0 03 = slave address 3A 24 = command number 36
3	0409	In index 9, 4 parameter bytes are to be read
4...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	046F	04 = reflected user ID 6F = command status is "done" (no error)
2	0024 8024	0xxx/8xxx = the toggle bit TG changes after each execution L32=0 ⇒ number of read bytes < 32 24 = reflected command number
3	1234	1st and 2nd parameter byte from index 9 in slave 3A
4	5678	3rd and 4th parameter byte from index 9 in slave 3A
5...17	xxxx	invalid / not changed
18	0400	04 = 4 parameter bytes were read
19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	046B	04 = reflected user ID 6B = error during command execution
2	0124 8124	0xxx/8xxx = the toggle bit TG changes after each execution 24 = reflected command number
3	0016	error code 16_{hex} = timeout during command processing
4...19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	046B	04 = reflected user ID F=1: error when executing the command copy of the request
2	0124 8124	0xxx/8xxx = the toggle bit TG changes after each execution x1xx = error when executing the command 24 = reflected command number
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave. error code E1 = error detected by AS-i slave; CTT2 error
4...19	xxxx	not changed

12.8.19 Acyclic command 37 (25hex) – acyclic standard write call to an AS-i slave with CTT2 profile

5889

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res. = 0		ST	SLA					command number = 37_{dec} = 25_{hex}							
3	reserved = 0			DL					IX							
4	parameter byte 1								parameter byte 0							
5...17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							
19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$
DL	data length	5 bits	$00…1F_{hex}$ = $0…31_{dec}$
IX	index	1 byte	pointer to the page to be written permitted values: $00…FF_{hex}$ = $0…255_{dec}$ (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	reserved = 0						F=0	reflected command number							
3...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0							reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0						F=1	reflected command number							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: acyclically write parameter bytes to AS-i slave 3A (standard)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0565	05 = user ID changes e.g. to 05 65 = command request
2	0325	03 = slave address 3A 25 = command number 37
3	0207	in index 7, 2 parameter bytes are to be written
4	1AF4	these two parameter bytes are for slave 3A
5...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	056F	05 = reflected user ID 6F = command status is "done" (no error)
2	0025 8025	0xxx/8xxx = the toggle bit TG changes after each execution F=0: command processed, no error occurred 25 = reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	056B	05 = reflected user ID 6B = error during command execution
2	0025 8025	0xxx/8xxx = the toggle bit TG changes after each execution 25 = reflected command number
3	0016	error code 16_{hex} = timeout during command processing
4...19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	056B	05 = reflected user ID 6B = error during command execution
2	0125 8125	0xxx/8xxx = the toggle bit TG changes after each execution x1xx = error when executing the command 25 = reflected command number
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave. error code E1 = error detected by AS-i slave; CTT2 error.
4...19	xxxx	not changed

12.8.20 Acyclic command 38 (26hex) – acyclic manufacturer-specific read call to an AS-i slave with CTT2 profile

5890

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res. = 0		ST	SLA					command number = 38_{dec} = 26_{hex}							
3	res. = 0		DL						IX							
4...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	$00…1F_{hex}$ = $0…31_{dec}$
DL	data length	6 bits	number of bytes to be transferred permitted values: $01…20_{hex}$ = $01…32_{dec}$ (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: $00…FF_{hex}$ = $0…255_{dec}$ (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	L32	reserved = 0					F=0	reflected command number							
3	parameter byte 1								parameter byte 0							
4...16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 **or:** number of bytes read								parameter byte 30							
19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
L32	32 parameter bytes	1 bit	0 = number of bytes read is < 32_{dec} ⇒ high byte in word 18 contains the number of read bytes 1 = number of read bytes is = 32_{dec} ⇒ high byte in word 18 contains parameter byte 31
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0							reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0						F=1	reflected command number							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: acyclically read 4 parameter bytes of AS-i slave 3A (manufacturer-specific)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0665	06 = user ID changes e.g. to 6 65 = command request
2	0326	03 = slave address 3A 26 = command number 38
3	0409	in index 9, 4 parameter bytes are to be read
4...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	066F	06 = reflected user ID 6F = command status is "done" (no error)
2	0026 8026	0xxx/8xxx = the toggle bit TG changes after each execution L32=0 ⇒ number of read bytes < 32 26 = reflected command number
3	1234	1st and 2nd parameter byte from index 9 in slave 3A.
4	5678	3rd and 4th parameter byte from index 9 in slave 3A.
5...17	xxxx	invalid / not changed
18	0400	04 = 4 parameter bytes were read
19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	066B	06 = reflected user ID 6B = error during command execution
2	0026 8026	0xxx/8xxx = the toggle bit TG changes after each execution 26 = reflected command number
3	0016	error code 16_{hex} = timeout during command processing
4...19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	066B	06 = reflected user ID 6B = error during command execution
2	0126 8126	0xxx/8xxx = the toggle bit TG changes after each execution x1xx = error when executing the command 26 = reflected command number
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave. error code E1 = error detected by AS-i slave; CTT2 error.
4...19	xxxx	not changed

12.8.21 Acyclic command 39 (27hex) – acyclic manufacturer-specific write call to an AS-i slave with CTT2 profile

5891

– Available from master profile M4 onwards –
CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	res. = 0		ST	SLA					command number = 39_{dec} = 27_{hex}							
3	reserved = 0			DL					IX							
4	parameter byte 1								parameter byte 0							
5...17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							
19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
ST	slave type	1 bit	0 = A slave 1 = B slave (addition of 20_{hex} or 32_{dec} to the slave address)
SLA	slave address	5 bits	00…$1F_{hex}$ = 0…31_{dec}
DL	data length	5 bits	00…$1F_{hex}$ = 0…31_{dec}
IX	index	1 byte	pointer to the page to be written permitted values: 00…FF_{hex} = 0…255_{dec} (→ data sheet of the slave)

Response from device to fieldbus master in the normal case

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	TG	reserved = 0						F=0	reserved = 0							
3...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0							reflected command number							
3	reserved = 0								error code							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
16	timeout during command processing
17	start requirements for S-7.4 command not met: - wrong slave profile (is not S-7.4) or: - slave is not in LAS or: - master is not in the Protected mode
E0...EF	error detected by AS-i slave; → CTT2 error codes (→ page 210)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	TG	reserved = 0						F=1	reflected command number							
3	CTT2 error codes (→ page 210)								error code = $E1_{hex}$							
4...19	not changed*)								not changed*)							

Legend:

TG	toggle bit	1 bit	value changes for each execution of the command
F	error bit	1 bit	0 = no error detected 1 = error when executing the command

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: acyclically write parameter bytes to AS-i slave 3A (manufacturer-specific)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0327	03 = slave address 3A 27 = command number 39
3	0207	in index 7, 2 parameter bytes are to be written
4	1AF4	these two parameter bytes are for slave 3A
5...19	xxxx	not used

Response from device to fieldbus master in the normal case

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	0027 8027	0xxx/8xxx = the toggle bit TG changes after each execution F=0: command processed, no error occurred 27 = reflected command number
3...19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i master

Word no.	Value [hex.]	Meaning
1	076B	07 = reflected user ID 6B = error during command execution
2	0027 8027	0xxx/8xxx = the toggle bit TG changes after each execution 27 = reflected command number
3	0016	error code 16_{hex} = timeout during command processing
4...19	xxxx	not changed

Response from device to fieldbus master in case of a fault , if error detected by AS-i slave

Word no.	Value [hex.]	Meaning
1	076B	07 = reflected user ID 6B = error during command execution
2	0127 8127	0xxx/8xxx = the toggle bit TG changes after each execution x1xx = error when executing the command 27 = reflected command number
3	01E1	CTT2 error codes (→ page 210) 01 = invalid index, → data sheet of the AS-i slave. error code E1 = error detected by AS-i slave; CTT2 error.
4...19	xxxx	not changed

12.8.22 Acyclic command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A)

5892

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 50_{dec} = 32_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 0(A), ID2				slave 0(A), ID1				slave 0(A), ID code				slave 0(A), IO config.			
4	slave 1(A), ID2				slave 1(A), ID1				slave 1(A), ID code				slave 1(A), IO config.			
5	slave 2(A), ID2				slave 2(A), ID1				slave 2(A), ID code				slave 2(A), IO config.			
6	slave 3(A), ID2				slave 3(A), ID1				slave 3(A), ID code				slave 3(A), IO config.			
7	slave 4(A), ID2				slave 4(A), ID1				slave 4(A), ID code				slave 4(A), IO config.			
8	slave 5(A), ID2				slave 5(A), ID1				slave 5(A), ID code				slave 5(A), IO config.			
9	slave 6(A), ID2				slave 6(A), ID1				slave 6(A), ID code				slave 6(A), IO config.			
10	slave 7(A), ID2				slave 7(A), ID1				slave 7(A), ID code				slave 7(A), IO config.			
11	slave 8(A), ID2				slave 8(A), ID1				slave 8(A), ID code				slave 8(A), IO config.			
12	slave 9(A), ID2				slave 9(A), ID1				slave 9(A), ID code				slave 9(A), IO config.			
13	slave 10(A), ID2				slave 10(A), ID1				slave 10(A), ID code				slave 10(A), IO config.			
14	slave 11(A), ID2				slave 11(A), ID1				slave 11(A), ID code				slave 11(A), IO config.			
15	slave 12(A), ID2				slave 12(A), ID1				slave 12(A), ID code				slave 12(A), IO config.			
16	slave 13(A), ID2				slave 13(A), ID1				slave 13(A), ID code				slave 13(A), IO config.			
17	slave 14(A), ID2				slave 14(A), ID1				slave 14(A), ID code				slave 14(A), IO config.			
18	slave 15(A), ID2				slave 15(A), ID1				slave 15(A), ID code				slave 15(A), IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: read current configuration of the AS-i slaves 0(A)...15(A)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0032	32 = command number 50
3...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	026F	02 = reflected user ID 6F = command status is "done" (no error)
2	0032	32 = reflected command number
3	FFFF	current configuration slave 0: ID2 =F, ID1=F, ID=F and IO=F
4	EF03	current configuration slave 1(A): ID2 =E, ID1=F, ID=0 and IO=3
...	...	...
18	EF37	current configuration slave 15(A): ID2 =E, ID1=F, ID=3 and IO=7
19	xxxx	not changed

12.8.23 Acyclic command 51 (33hex) – read current configuration of AS-i slaves 16(A)...31(A)

5894

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 51_{dec} = 33_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 16(A), ID2				slave 16(A), ID1				slave 16(A), ID code				slave 16(A), IO config.			
4	slave 17(A), ID2				slave 17(A), ID1				slave 17(A), ID code				slave 17(A), IO config.			
5	slave 18(A), ID2				slave 18(A), ID1				slave 18(A), ID code				slave 18(A), IO config.			
6	slave 19(A), ID2				slave 19(A), ID1				slave 19(A), ID code				slave 19(A), IO config.			
7	slave 20(A), ID2				slave 20(A), ID1				slave 20(A), ID code				slave 20(A), IO config.			
8	slave 21(A), ID2				slave 21(A), ID1				slave 21(A), ID code				slave 21(A), IO config.			
9	slave 22(A), ID2				slave 22(A), ID1				slave 22(A), ID code				slave 22(A), IO config.			
10	slave 23(A), ID2				slave 23(A), ID1				slave 23(A), ID code				slave 23(A), IO config.			
11	slave 24(A), ID2				slave 24(A), ID1				slave 24(A), ID code				slave 24(A), IO config.			
12	slave 25(A), ID2				slave 25(A), ID1				slave 25(A), ID code				slave 25(A), IO config.			
13	slave 26(A), ID2				slave 26(A), ID1				slave 26(A), ID code				slave 26(A), IO config.			
14	slave 27(A), ID2				slave 27(A), ID1				slave 27(A), ID code				slave 27(A), IO config.			
15	slave 28(A), ID2				slave 28(A), ID1				slave 28(A), ID code				slave 28(A), IO config.			
16	slave 29(A), ID2				slave 29(A), ID1				slave 29(A), ID code				slave 29(A), IO config.			
17	slave 30(A), ID2				slave 30(A), ID1				slave 30(A), ID code				slave 30(A), IO config.			
18	slave 31(A), ID2				slave 31(A), ID1				slave 31(A), ID code				slave 31(A), IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: → Acyclic command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A) (→ page 379)

12.8.24 Acyclic command 52 (34hex) – read current configuration AS-i slaves 1B...15B

5895

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 52_{dec} = 34_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 0B, ID2				slave 0B, ID1				slave 0B, ID code				slave 0B, IO config.			
4	slave 1B, ID2				slave 1B, ID1				slave 1B, ID code				slave 1B, IO config.			
5	slave 2B, ID2				slave 2B, ID1				slave 2B, ID code				slave 2B, IO config.			
6	slave 3B, ID2				slave 3B, ID1				slave 3B, ID code				slave 3B, IO config.			
7	slave 4B, ID2				slave 4B, ID1				slave 4B, ID code				slave 4B, IO config.			
8	slave 5B, ID2				slave 5B, ID1				slave 5B, ID code				slave 5B, IO config.			
9	slave 6B, ID2				slave 6B, ID1				slave 6B, ID code				slave 6B, IO config.			
10	slave 7B, ID2				slave 7B, ID1				slave 7B, ID code				slave 7B, IO config.			
11	slave 8B, ID2				slave 8B, ID1				slave 8B, ID code				slave 8B, IO config.			
12	slave 9B, ID2				slave 9B, ID1				slave 9B, ID code				slave 9B, IO config.			
13	slave 10B, ID2				slave 10B, ID1				slave 10B, ID code				slave 10B, IO config.			
14	slave 11B, ID2				slave 11B, ID1				slave 11B, ID code				slave 11B, IO config.			
15	slave 12B, ID2				slave 12B, ID1				slave 12B, ID code				slave 12B, IO config.			
16	slave 13B, ID2				slave 13B, ID1				slave 13B, ID code				slave 13B, IO config.			
17	slave 14B, ID2				slave 14B, ID1				slave 14B, ID code				slave 14B, IO config.			
18	slave 15B, ID2				slave 15B, ID1				slave 15B, ID code				slave 15B, IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: → Acyclic command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A) (→ page 379)

12.8.25 Acyclic command 53 (35hex) – read current configuration AS-i slaves 16B...31B

5896

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 53_{dec} = 35_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 16B, ID2								slave 16B, ID1				slave 16B, ID code			slave 16B, IO config.
4	slave 17B, ID2								slave 17B, ID1				slave 17B, ID code			slave 17B, IO config.
5	slave 18B, ID2								slave 18B, ID1				slave 18B, ID code			slave 18B, IO config.
6	slave 19B, ID2								slave 19B, ID1				slave 19B, ID code			slave 19B, IO config.
7	slave 20B, ID2								slave 20B, ID1				slave 20B, ID code			slave 20B, IO config.
8	slave 21B, ID2								slave 21B, ID1				slave 21B, ID code			slave 21B, IO config.
9	slave 22B, ID2								slave 22B, ID1				slave 22B, ID code			slave 22B, IO config.
10	slave 23B, ID2								slave 23B, ID1				slave 23B, ID code			slave 23B, IO config.
11	slave 24B, ID2								slave 24B, ID1				slave 24B, ID code			slave 24B, IO config.
12	slave 25B, ID2								slave 25B, ID1				slave 25B, ID code			slave 25B, IO config.
13	slave 26B, ID2								slave 26B, ID1				slave 26B, ID code			slave 26B, IO config.
14	slave 27B, ID2								slave 27B, ID1				slave 27B, ID code			slave 27B, IO config.
15	slave 28B, ID2								slave 28B, ID1				slave 28B, ID code			slave 28B, IO config.
16	slave 29B, ID2								slave 29B, ID1				slave 29B, ID code			slave 29B, IO config.
17	slave 30B, ID2								slave 30B, ID1				slave 30B, ID code			slave 30B, IO config.
18	slave 31B, ID2								slave 31B, ID1				slave 31B, ID code			slave 31B, IO config.
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: → Acyclic command 50 (32hex) – read current configuration of AS-i slaves 0(A)...15(A) (→ page 379)

12.8.26 Acyclic command 54 (36hex) – read current parameters of the AS-i slaves

5897

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 54_{dec} = 36_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	parameter slave 4(A)				parameter slave 3(A)				parameter slave 2(A)				parameter slave 1(A)			
4	parameter slave 8(A)				parameter slave 7(A)				parameter slave 6(A)				parameter slave 5(A)			
5	parameter slave 12(A)				parameter slave 11(A)				parameter slave 10(A)				parameter slave 9(A)			
6	parameter slave 16(A)				parameter slave 15(A)				parameter slave 14(A)				parameter slave 13(A)			
7	parameter slave 20(A)				parameter slave 19(A)				parameter slave 18(A)				parameter slave 17(A)			
8	parameter slave 24(A)				parameter slave 23(A)				parameter slave 22(A)				parameter slave 21(A)			
9	parameter slave 28(A)				parameter slave 27(A)				parameter slave 26(A)				parameter slave 25(A)			
10	parameter slave 1B				parameter slave 31(A)				parameter slave 30(A)				parameter slave 29(A)			
11	parameter slave 5B				parameter slave 4B				parameter slave 3B				parameter slave 2B			
12	parameter slave 9B				parameter slave 8B				parameter slave 7B				parameter slave 6B			
13	parameter slave 13B				parameter slave 12B				parameter slave 11B				parameter slave 10B			
14	parameter slave 17B				parameter slave 16B				parameter slave 15B				parameter slave 14B			
15	parameter slave 21B				parameter slave 20B				parameter slave 19B				parameter slave 18B			
16	parameter slave 25B				parameter slave 24B				parameter slave 23B				parameter slave 22B			
17	parameter slave 29B				parameter slave 28B				parameter slave 27B				parameter slave 26B			
18	not changed*)								parameter slave 31B				parameter slave 30B			
19	not changed*)								not changed*)							

Example: read current parameters of the AS-i slaves

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0665	06 = user ID changes e.g. to 6 65 = command request
2	0036	36 = command number 54
3...18	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	066F	06 = reflected user ID 6F = command status is "done" (no error)
2	0036	36 = reflected command number
3	4321	1 = parameter of slave 1(A) 2 = parameter of slave 2(A) 3 = parameter of slave 3(A) 4 = parameter of slave 4(A)
4	8765	5 = parameter of slave 5(A) 6 = parameter of slave 6(A) 7 = parameter of slave 7(A) 8 = parameter of slave 8(A)
...	...	...
18	xx98	8 = parameter of slave 30(B) 9 = parameter of slave 31(B)
19	xxxx	not changed

12.8.27 Acyclic command 55 (37hex) – read current AS-i slave lists

5898

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 55_{dec} = 37_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Word no.	Bit / AS-i slave address																
	–	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	–	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	–	reserved = 0								reflected command number							
3	LAS	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
4		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
6		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7	LDS	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0
8		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
9		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
10		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
11	LPF	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
12		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
13		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
14		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
15	LPS	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
16		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
17		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
18		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
19	–	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: read current AS-i slave lists

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0037	37 = command number 55
3...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	0037	37 = reflected command number
3	0102	0102_{hex} = 0000 0001 0000 0010_{bin} LAS of slaves (0) to 15(A): slaves 1(A) and 8(A) are active
4	8001	8001_{hex} = 1000 0000 0000 0001_{bin} LAS of the slaves 16(A) to 31(A): slaves 16(A) and 31(A) are active
...	...	...
18	8001	8001_{hex} = 1000 0000 0000 0001_{bin} LPS of slaves 16B to 31B: slaves 16B and 31B are projected
19	xxxx	not changed

12.8.28 Acyclic command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A)

5899

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 56_{dec} = 38_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 0(A), ID2				slave 0(A), ID1				slave 0(A), ID code				slave 0(A), IO config.			
4	slave 1(A), ID2				slave 1(A), ID1				slave 1(A), ID code				slave 1(A), IO config.			
5	slave 2(A), ID2				slave 2(A), ID1				slave 2(A), ID code				slave 2(A), IO config.			
6	slave 3(A), ID2				slave 3(A), ID1				slave 3(A), ID code				slave 3(A), IO config.			
7	slave 4(A), ID2				slave 4(A), ID1				slave 4(A), ID code				slave 4(A), IO config.			
8	slave 5(A), ID2				slave 5(A), ID1				slave 5(A), ID code				slave 5(A), IO config.			
9	slave 6(A), ID2				slave 6(A), ID1				slave 6(A), ID code				slave 6(A), IO config.			
10	slave 7(A), ID2				slave 7(A), ID1				slave 7(A), ID code				slave 7(A), IO config.			
11	slave 8(A), ID2				slave 8(A), ID1				slave 8(A), ID code				slave 8(A), IO config.			
12	slave 9(A), ID2				slave 9(A), ID1				slave 9(A), ID code				slave 9(A), IO config.			
13	slave 10(A), ID2				slave 10(A), ID1				slave 10(A), ID code				slave 10(A), IO config.			
14	slave 11(A), ID2				slave 11(A), ID1				slave 11(A), ID code				slave 11(A), IO config.			
15	slave 12(A), ID2				slave 12(A), ID1				slave 12(A), ID code				slave 12(A), IO config.			
16	slave 13(A), ID2				slave 13(A), ID1				slave 13(A), ID code				slave 13(A), IO config.			
17	slave 14(A), ID2				slave 14(A), ID1				slave 14(A), ID code				slave 14(A), IO config.			
18	slave 15(A), ID2				slave 15(A), ID1				slave 15(A), ID code				slave 15(A), IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: read projected configuration of the AS-i slaves 1(A)...15(A)

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0038	38 = command number 56
3...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	026F	02 = reflected user ID 6F = command status is "done" (no error)
2	0038	38 = reflected command number
3	FFFF	here not used since slave 0 cannot be projected
4	EF03	current configuration slave 1(A): ID2 =E, ID1=F, ID=0 and IO=3
...	...	...
18	EF37	current configuration slave 15(A): ID2 =E, ID1=F, ID=3 and IO=7
19	xxxx	not changed

12.8.29 Acyclic command 57 (39hex) – read projected configuration of the AS-i slaves 16(A)...31(A)

5901

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 57_{dec} = 39_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 16(A), ID2				slave 16(A), ID1				slave 16(A), ID code				slave 16(A), IO config.			
4	slave 17(A), ID2				slave 17(A), ID1				slave 17(A), ID code				slave 17(A), IO config.			
5	slave 18(A), ID2				slave 18(A), ID1				slave 18(A), ID code				slave 18(A), IO config.			
6	slave 19(A), ID2				slave 19(A), ID1				slave 19(A), ID code				slave 19(A), IO config.			
7	slave 20(A), ID2				slave 20(A), ID1				slave 20(A), ID code				slave 20(A), IO config.			
8	slave 21(A), ID2				slave 21(A), ID1				slave 21(A), ID code				slave 21(A), IO config.			
9	slave 22(A), ID2				slave 22(A), ID1				slave 22(A), ID code				slave 22(A), IO config.			
10	slave 23(A), ID2				slave 23(A), ID1				slave 23(A), ID code				slave 23(A), IO config.			
11	slave 24(A), ID2				slave 24(A), ID1				slave 24(A), ID code				slave 24(A), IO config.			
12	slave 25(A), ID2				slave 25(A), ID1				slave 25(A), ID code				slave 25(A), IO config.			
13	slave 26(A), ID2				slave 26(A), ID1				slave 26(A), ID code				slave 26(A), IO config.			
14	slave 27(A), ID2				slave 27(A), ID1				slave 27(A), ID code				slave 27(A), IO config.			
15	slave 28(A), ID2				slave 28(A), ID1				slave 28(A), ID code				slave 28(A), IO config.			
16	slave 29(A), ID2				slave 29(A), ID1				slave 29(A), ID code				slave 29(A), IO config.			
17	slave 30(A), ID2				slave 30(A), ID1				slave 30(A), ID code				slave 30(A), IO config.			
18	slave 31(A), ID2				slave 31(A), ID1				slave 31(A), ID code				slave 31(A), IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: → Acyclic command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A) (→ page 388)

12.8.30 Acyclic command 58 (3Ahex) – read projected configuration of AS-i slaves 1B...15B

5902

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 58_{dec} = $3A_{hex}$							
3...18	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 0B, ID2				slave 0B, ID1				slave 0B, ID code				slave 0B, IO config.			
4	slave 1B, ID2				slave 1B, ID1				slave 1B, ID code				slave 1B, IO config.			
5	slave 2B, ID2				slave 2B, ID1				slave 2B, ID code				slave 2B, IO config.			
6	slave 3B, ID2				slave 3B, ID1				slave 3B, ID code				slave 3B, IO config.			
7	slave 4B, ID2				slave 4B, ID1				slave 4B, ID code				slave 4B, IO config.			
8	slave 5B, ID2				slave 5B, ID1				slave 5B, ID code				slave 5B, IO config.			
9	slave 6B, ID2				slave 6B, ID1				slave 6B, ID code				slave 6B, IO config.			
10	slave 7B, ID2				slave 7B, ID1				slave 7B, ID code				slave 7B, IO config.			
11	slave 8B, ID2				slave 8B, ID1				slave 8B, ID code				slave 8B, IO config.			
12	slave 9B, ID2				slave 9B, ID1				slave 9B, ID code				slave 9B, IO config.			
13	slave 10B, ID2				slave 10B, ID1				slave 10B, ID code				slave 10B, IO config.			
14	slave 11B, ID2				slave 11B, ID1				slave 11B, ID code				slave 11B, IO config.			
15	slave 12B, ID2				slave 12B, ID1				slave 12B, ID code				slave 12B, IO config.			
16	slave 13B, ID2				slave 13B, ID1				slave 13B, ID code				slave 13B, IO config.			
17	slave 14B, ID2				slave 14B, ID1				slave 14B, ID code				slave 14B, IO config.			
18	slave 15B, ID2				slave 15B, ID1				slave 15B, ID code				slave 15B, IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: → Acyclic command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A) (→ page 388)

12.8.31 Acyclic command 59 (3Bhex) – read projected configuration of AS-i slaves 16B...31B

5903

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 59_{dec} = $3B_{hex}$							
3...18	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	slave 16B, ID2				slave 16B, ID1				slave 16B, ID code				slave 16B, IO config.			
4	slave 17B, ID2				slave 17B, ID1				slave 17B, ID code				slave 17B, IO config.			
5	slave 18B, ID2				slave 18B, ID1				slave 18B, ID code				slave 18B, IO config.			
6	slave 19B, ID2				slave 19B, ID1				slave 19B, ID code				slave 19B, IO config.			
7	slave 20B, ID2				slave 20B, ID1				slave 20B, ID code				slave 20B, IO config.			
8	slave 21B, ID2				slave 21B, ID1				slave 21B, ID code				slave 21B, IO config.			
9	slave 22B, ID2				slave 22B, ID1				slave 22B, ID code				slave 22B, IO config.			
10	slave 23B, ID2				slave 23B, ID1				slave 23B, ID code				slave 23B, IO config.			
11	slave 24B, ID2				slave 24B, ID1				slave 24B, ID code				slave 24B, IO config.			
12	slave 25B, ID2				slave 25B, ID1				slave 25B, ID code				slave 25B, IO config.			
13	slave 26B, ID2				slave 26B, ID1				slave 26B, ID code				slave 26B, IO config.			
14	slave 27B, ID2				slave 27B, ID1				slave 27B, ID code				slave 27B, IO config.			
15	slave 28B, ID2				slave 28B, ID1				slave 28B, ID code				slave 28B, IO config.			
16	slave 29B, ID2				slave 29B, ID1				slave 29B, ID code				slave 29B, IO config.			
17	slave 30B, ID2				slave 30B, ID1				slave 30B, ID code				slave 30B, IO config.			
18	slave 31B, ID2				slave 31B, ID1				slave 31B, ID code				slave 31B, IO config.			
19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: → Acyclic command 56 (38hex) – read projected configuration of AS-i slaves 1(A)...15(A) (→ page 388)

12.8.32 Acyclic command 96 (60hex) – save data non-volatilely in the flash memory of the device

5904

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 96_{dec} = 60_{hex}							
3	reserved = 0								area number							
4...19	not used								not used							

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
	area number	1 byte	02 = saves the configuration of the AS-i master 1 03 = saves the configuration of the AS-i master 2

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	reserved = 0								reflected command data							
4...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: save data non-volatilely in the flash memory of the device

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0060	60 = 96
3	0002	02 = saves the configuration of the AS-i master 1 in a non volatile manner
4...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	096F	09 = reflected user ID 6F = command status is "done" (no error)
2	0065	reflected command number
3	0002	reflected command data
4...19	xxxx	not changed

12.8.33 Acyclic command 97 (61hex) – carry out settings in the device

5905

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 97_{dec} = 61_{hex}							
3	reserved = 0								command number							
4...18	parameters 1...16 (depending on the command number)															
19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$
	command number	1 byte	10_{hex} = changes the operating mode of the PLC (without function in the gateway), (according parameters → word 4) 12_{hex} = reset all slave error counters 13_{hex} = reset configuration error counter 14_{hex} = reset AS-i cycle error counter
	parameter for command number	1 word	parameters; here for command number 10: 0000 = activates the gateway mode 0001 = stops the PLC 0002 = sets the operating mode of the PLC to RUN

Response from device to fieldbus master

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Example: reset all slave error counters

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0061	60 = command number 96
3	0012	command number = 12 ⇒ reset all slave error counters
4...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	096F	09 = reflected user ID 6F = command status is "done" (no error)
2	0061	61 = reflected command number
3...19	xxxx	not changed

12.8.34 Acyclic command 102 (66hex) – user menu

5906

Request from fieldbus master to device

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 102_{dec} = 66_{hex}							
3	reserved = 0								command number							
4...19	parameter(s) (depending on the command number) Or: not used															

Legend:

UID	user ID	1 byte	00…FF_{hex} = 0…255_{dec}
	command number	1 byte	01 = reads the current menu status 02 = jumps to the start menu screen no. 0 03 = jumps to the user menu screen no. 161 04 = deletes the → empty screen, only for user menus 05 = writes a defined string to a defined position in the display, only for user menus: parameter 1 = X position (1…128 pixels) parameter 2 = Y position(1…8 lines per 8 pixels) parameter 3 = character set and representation (values can be combined): 00x1 = "Small" 00x2 = "Big" 00x3 = "Fix" 00x4 = "Bitmap" 00x5 = "Big underlined" 001x = delete line invertedly (→ black bar) 002x = do not delete points 1 to X 004x = do not delete from string end to point 128 008x = shows the string invertedly parameter 4…5 = pointer towards string (string with "0000" completed) 06 = writes a defined "byte matrix" at a defined position in the display, only for user menus: parameter 1 = X1 position upper left (1…128 pixels) parameter 2 = Y1 position upper left (1…8 lines 8 pixels each) parameter 3 = X2 position bottom right (1…128 pixels) parameter 4 = Y2 position bottom right (1…8 lines 8 pixels each) parameter 5…6 = pointer towards byte matrix (1 byte corresponds to a vertical field of 8 pixels height, bit 0 = top … Bit 7 = bottom) 07 = shows a defined arrow in the display next to the image number, only for user menus: parameter = 0001 → ▲ parameter = 0002 → ▼ parameter = 0003 → ▲ + ▼ -- continued on the following page --

<table>
<tr>
<td></td>
<td>command number</td>
<td>1 byte</td>
<td>-- continued --

08 = defines the texts allocated to the outer keys, only for user menus:
parameter 1 = key index (0…13)
parameter 2 = definition of the key index, e.g.:
<table>
<tr><th>Index</th><th>left key</th><th>right key</th></tr>
<tr><td>0000</td><td>OK</td><td>ESC</td></tr>
<tr><td>0001</td><td>==></td><td>ESC</td></tr>
<tr><td>0002</td><td>MORE</td><td>ESC</td></tr>
<tr><td>0003</td><td>NEXT</td><td>ESC</td></tr>
<tr><td>0004</td><td>OK</td><td></td></tr>
<tr><td>0005</td><td></td><td>ESC</td></tr>
<tr><td>0006</td><td>MORE</td><td>MENU</td></tr>
<tr><td>0007</td><td>OK</td><td>MENU</td></tr>
<tr><td>0008</td><td>MENU</td><td>USER</td></tr>
<tr><td>0009</td><td><==</td><td>ESC</td></tr>
<tr><td>000A</td><td>INFO</td><td>ESC</td></tr>
<tr><td>000B</td><td>CLEAR</td><td>ESC</td></tr>
<tr><td>000C</td><td></td><td></td></tr>
<tr><td>000D</td><td>-WAIT-</td><td>-WAIT-</td></tr>
</table>
</td>
</tr>
</table>

Response from device to fieldbus master (command number = 01)

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	keys pressed															
4	activated menu area															
5	process error occurred															
6	currently displayed menu window															
7	activated system language															
8...19	not changed*)								not changed*)							

Legend:

	keys pressed	1 word	0001 = bit 0: left key 0002 = bit 1: key [▲] 0004 = bit 2: key [▼] 0008 = bit 3: right key	combinations possible by adding the values
	activated menu area	1 word	00A0 = system menu active 00A1 = user menu active 00AE = process error display active (E10...E30) 00AF = system error display active (acknowledgement required)	
	process error occurred	1 word	0000 = no process errors given 0001 = one or more process errors given	
	currently displayed menu window	1 word	number of the menu screen	
	activated system language	1 word	0000 = menu display in English 0001 = menu display in the second system language	

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Response from device to fieldbus master (command number = 02)

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

Response from device to fieldbus master in the normal case (command number = 04…08)

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3...19	not changed*)								not changed*)							

Response from device to fieldbus master in case of a fault (command number = 04…08)

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6B_{hex}$							
2	reserved = 0								reflected command number							
3	not changed*)								error code							
4...19	not changed*)								not changed*)							

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

Possible error codes:

Value [hex.]	Meaning
AD	Access denied. The user menu must be active!
E0	parameter invalid

Example: read the status of the display

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0066	66 = command number 102
3	0001	01 = command number: reads the current menu status
4...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	076F	07 = reflected user ID 6F = command status is "done" (no error)
2	0066	66 = reflected command number
3	0008	0008_{hex} = 0000 0000 0000 0100_{bin} ⇒ right key is pressed
4	00A0	A00 = system menu active
5	0001	0001 = one or more process errors occurred
6	001B	$001B_{hex}$ = 0027_{dec} ⇒ menu screen "Quick Setup" is currently displayed
7	0000	0000 = the English menus are displayed
8...19	xxxx	not changed

12.8.35 Acyclic command 105 (69hex) – read device features

5907

Request from fieldbus master to device

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID								command request = 65_{hex}							
2	reserved = 0								command number = 105_{dec} = 69_{hex}							
3...19	not used								not used							

Legend:

UID	user ID	1 byte	$00…FF_{hex}$ = $0…255_{dec}$

Response from device to fieldbus master

Offset Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								Command status (→ page 322) = $6F_{hex}$							
2	reserved = 0								reflected command number							
3	2M	DP	EN	reserved = 0					Mod **)							
4	reserved = 0								AT							
5	reserved = 0								flash memory type							
6	hardware version															
7	RTS firmware version number															
8	RTS firmware release number															
9	AS-i master 1 firmware version number															
10	AS-i master 1 firmware release number															
11	AS-i master 2 firmware version number															
12	AS-i master 2 firmware release number															
13	Linux kernel version															
14	Linux ramdisk version															
15...19	not changed*)								not changed*)							

Legend:

2M	2 AS-i master	1 bit	0 = unit has 1 AS-i master 1 = unit has 2 AS-i masters
DP	Profibus DP	1 bit	0 = fieldbus interface Profibus DP not available 1 = fieldbus interface Profibus DP available
EN	Ethernet	1 bit	0 = Ethernet programming interface not available 1 = Ethernet programming interface available
Mod	PLC mode	1 byte	$0000\ 0001_{bin}$ = 01_{dec} = PLC in RUN $0000\ 0010_{bin}$ = 02_{dec} = PLC in STOP $0000\ 0100_{bin}$ = 04_{dec} = PLC stops at the breakpoint $0000\ 1000_{bin}$ = 08_{dec} = gateway mode

AT	Anybus type	1 byte	01 = Anybus Profibus DP 04 = Anybus CANopen 05 = Anybus DeviceNet 09 = Anybus Ethernet IT 0A = Anybus Ethernet/IP 0B = ifm Profibus DP 0C = no fieldbus module detected

*) **IMPORTANT:** For the query read only the required bytes!
Unused bytes can contain information of previous queries.

**) parameter in the gateway (AC1375/76) without function = "0"

Example: Read device features

Request from fieldbus master to device

Word no.	Value [hex.]	Meaning
1	0665	06 = user ID changes e.g. to 6 65 = command request
2	0069	69 = command number 105
3...19	xxxx	not used

Response from device to fieldbus master

Word no.	Value [hex.]	Meaning
1	066F	06 = reflected user ID 6F = command status is "done" (no error)
2	0069	69 = reflected command number
3	0008	0008_{hex} = 0000 0000 0000 1000_{bin} ⇒ 2M=0: device has 1 AS-i master DP=0: fieldbus interface Profibus DP not available EN=0: Ethernet programming interface not available PLC mode = 08 ⇒ gateway mode
4	000B	Anybus type = 000B ⇒ ifm Profibus DP
5	0002	flash memory type
6	1000	hardware version
7	0002	1st part of the RTS firmware version (here: 02.218B) ⇒ version number 02.xxxx
8	218B	2nd part of the RTS firmware version (here: 02.218B) ⇒ release number xx.218B
9	0000	1st part of the AS-i master 1 firmware version (here: 0.238A) ⇒ version number 0.xxxx
10	238A	2nd part of the AS-i master 1 firmware version (here: 0.238A) ⇒ version number x.238A
11	0000	1st part of the AS-i master 2 firmware version (here: 0.238A) ⇒ version number 0.xxxx
12	238A	2nd part of the AS-i master 2 firmware version (here: 0.238A) ⇒ version number x.238A
13	0196	Linux kernel version: 406
14	0A6E	Linux ramdisk version 10,110
15...19	xxxx	not changed

13 Further functions for Profibus DPV1

Contents

5909

13.1 AS-i diagnosis via Profibus DP

Contents

5911

13.1.1 Digital inputs

5912

The AS-i master status information in the first byte of the digital input data of the single/A slaves contains master flags of the corresponding AS-i system:

Byte 0	Bit 7	Bit 6	Bit 5	Bit 4
	reserved	configuration error in the AS-i system	no AS-i slave detected	peripheral fault

13.1.2 Digital outputs

5913

The AS-i master control information in the first byte of the digital output data of the single/A slaves controls the stored diagnostic information:

Byte 0	Bit 7	Bit 6	Bit 5	Bit 4
	reserved	reserved	reset of the stored diagnostic data	activate transfer of the stored diagnostic data

If the bits 4 and 5 of the control information (byte 37) are set to 0 (default), the extended diagnosis contains the current system states. If short-time faults are to be detected, the device can be prompted via bit 4 to store the error states. This storage is reset by bit 5 or by switching off the device.

This means if bit 4 is set and a configuration error occurs with a slave, the corresponding bit in the extended device diagnosis remains set even if the slave is correctly detected again.

If the parameter "Extended Profibus Diag." is set to "Disabled" (byte 37 bit 5 = FALSE), the device transmits no extended device-specific diagnostic data. The device only transmits the standard diagnostic data which each Profibus DP slave must at least supply (the first 6 bytes).
→ example in the chapter Definition in the GSD file (→ page 170)

In some plants jitters (→ chapter Terms and abbreviations) which occur for example for diagnostic calls are not allowed in the Profibus DP cycle time. In these cases it is better to make the plant diagnosis via I/O data even if this extends the DP cycle time.

13.1.3 Extended device-specific diagnosis for Profibus DP

5915

The extended device-specific Profibus DP diagnosis is activated by setting the Profibus DP parameter byte 37 bit 5 and contains the following status information:

Diagnosis	Byte	Contents	Diagnosis
standard diagnosis	0	station status 1	standard diagnosis
	1	station status 2	
	2	station status 3	
	3	station number DP master	
	4	manufacturer ID (high byte) 04_{hex}	
	5	manufacturer ID (low byte) $D8_{hex}$	
extended diagnosis	6	length of the extended diagnosis (38_{hex})	header of the extended diagnosis
	7	status type: status manufacturer-specific	
	8	slot number (04_{hex})	
	9	0	
	10, 11	master flags	diagnosis AS-i master 1 A and B slaves
	12…19	LDS: list of detected slaves	
	20…27	configuration error	
	28…35	LPF: list of peripheral faults	
	36, 37	master flags	diagnosis AS-i master 2 A and B slaves
	38…45	LDS: list of detected slaves	
	46…53	configuration error	
	54…61	LPF: list of peripheral faults	

With an activated diagnosis the device always generates 62 bytes of diagnostic data even if it is a device with only one master!

13.1.4 Diagnostic master flags (byte 10 / byte 36)

5916

Format of the first byte of the diagnostic master flags, that is:
for AS-i master 1 = byte 10
for AS-i master 2 = byte 36

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit1	Bit 0
reserved	Cerr	Offl	PF	APF	Sl0	ProjM	reserved

Legend

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 the operating mode projecting

Format of the slave lists:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit1	Bit 0
7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0(A)
15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)
23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)
7B	6B	5B	4B	3B	2B	1B	res.*)
15B	14B	13B	12B	11B	10B	9B	8B
23B	22B	21B	20B	19B	18B	17B	16B
31B	30B	29B	28B	27B	26B	25B	24B

*) slave address 0B is not allowed

13.2 Set the Profibus slave address on the gateway

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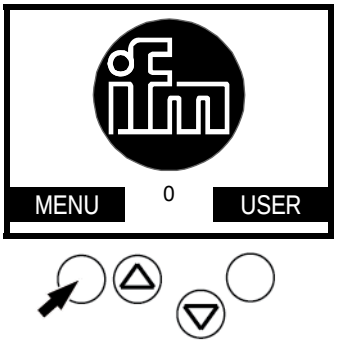
The device provides 2 options to obtain the fieldbus data:

- menu [Quick Setup] > [Fieldbus Setup],
- or: menu [Fieldbus Setup].

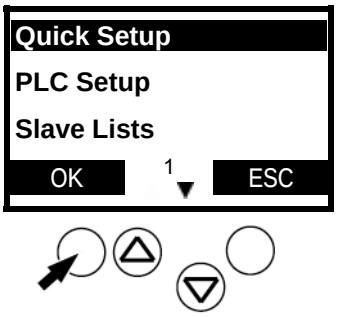
The first variant is described below:

[Menu] > [Quick Setup] > [Fieldbus Setup] > Select address > [OK]



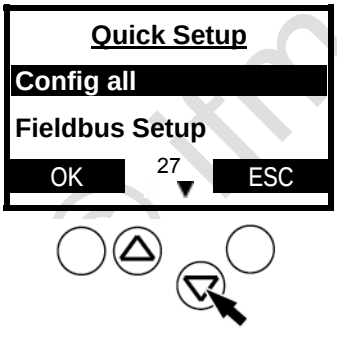
Step 1:

► Press [Menu].



Step 2:

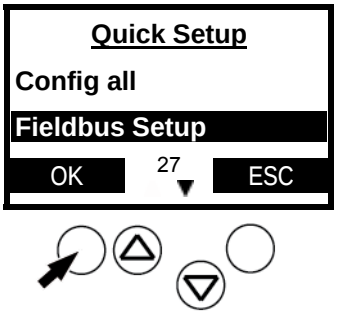
► Select [Quick Setup] with [OK].



Step 3:

AC1375: Menu screen number = 12

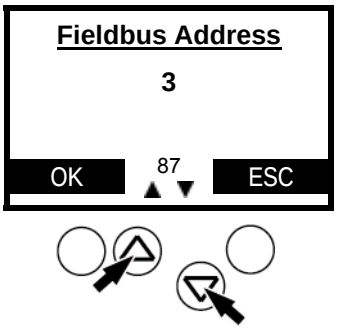
► Press [▼] to scroll to [Fieldbus Setup].



Step 4:

AC1375: Menu screen number = 12

► Press [OK] to select [Fieldbus Setup].



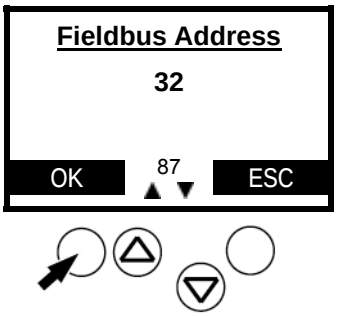
Step 5:

AC1375: Menu screen number = 43

> Display of the first enabled Profibus slave address:
0...2 reserved,
3…127 first to last Profibus slave address.

► Press [▲] / [▼] to scroll to the requested address.

NOTE:
The address must match the indication in the fieldbus master.



Step 6:

AC1375: Menu screen number = 43

► Save the requested fieldbus address with [OK].

13.3 Read fieldbus parameters

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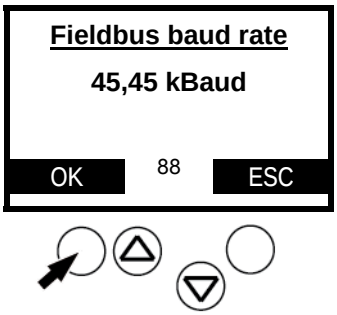
Displayed values → chapter Device-specific Profibus DP parameters (→ page 169)



Step 7:

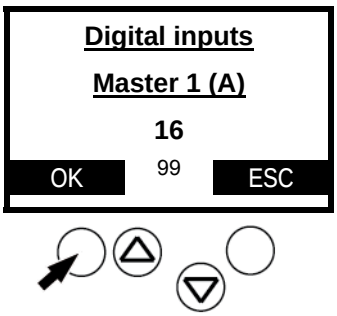
AC1375: Menu screen number = 44

> If there is communication with the fieldbus master:
Display of the baud rate set in the master.

► Confirm with [OK].

> If there is no communication with the fieldbus master:
Display value not defined.

► Cancel with [ESC].



Step 8:

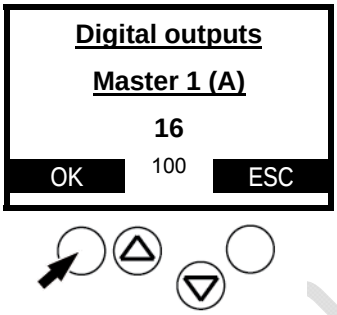
AC1375: Menu screen number = 51

> Display how many bytes in the fieldbus master were configured for digital inputs in the fieldbus master of single or A slaves on AS-i master 1.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 9:

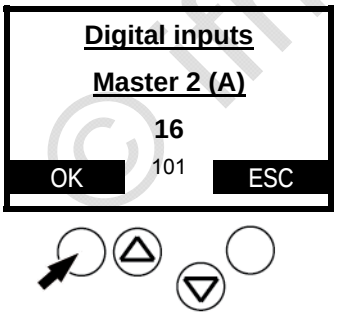
AC1375: Menu screen number = 52

> Display how many bytes in the fieldbus master were configured for digital outputs in the fieldbus master of single or A slaves on AS-i master 1.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 10:

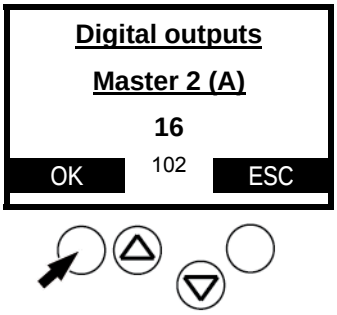
AC1375: Menu screen number = 53 (without function)

> Display how many bytes in the fieldbus master were configured for digital inputs in the fieldbus master of single or A slaves on AS-i master 2.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 11:

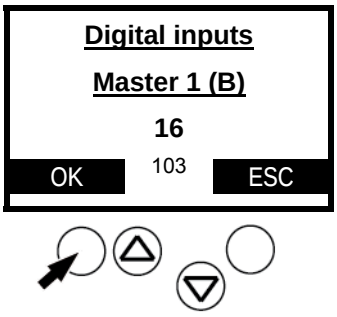
AC1375: Menu screen number = 54 (without function)

> Display how many bytes in the fieldbus master were configured for digital outputs in the fieldbus master of single or A slaves on AS-i master 2.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 12:

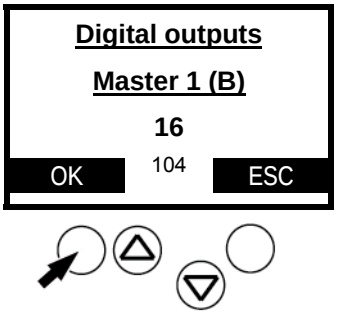
AC1375: Menu screen number = 55

> Display how many bytes in the fieldbus master were configured for digital inputs in the fieldbus master of B slaves on AS-i master 1.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 13:

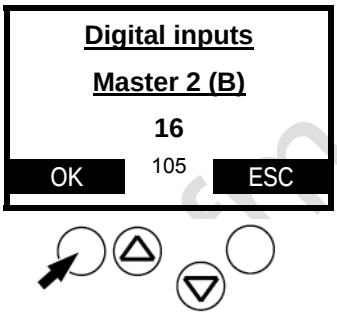
AC1375: Menu screen number = 56

> Display how many bytes in the fieldbus master were configured for digital outputs in the fieldbus master of B slaves on AS-i master 1.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 14:

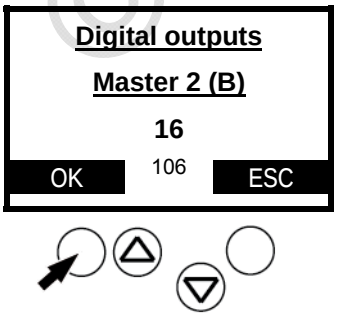
AC1375: Menu screen number = 57 (without function)

> Display how many bytes in the fieldbus master were configured for digital inputs in the fieldbus master of B slaves on AS-i master 2.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 15:

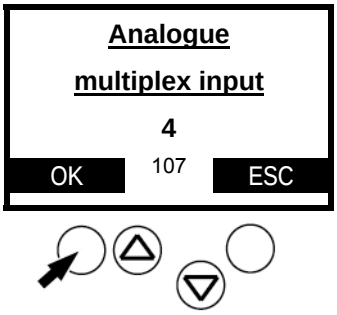
AC1375: Menu screen number = 58 (without function)

> Display how many bytes in the fieldbus master were configured for digital outputs in the fieldbus master of B slaves on AS-i master 2.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 16:

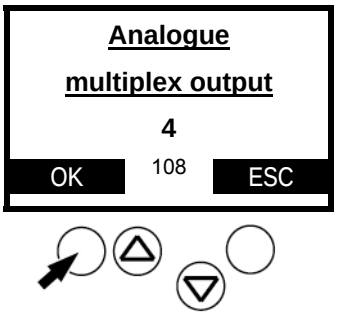
AC1375: Menu screen number = 59

> Display how many bytes in the fieldbus master were configured for analogue multiplex inputs in the fieldbus master.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 17:

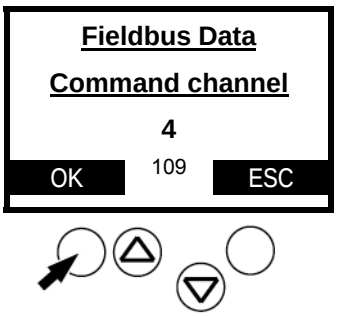
AC1375: Menu screen number = 60

> Display how many bytes in the fieldbus master were configured for analogue multiplex outputs in the fieldbus master.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 18:

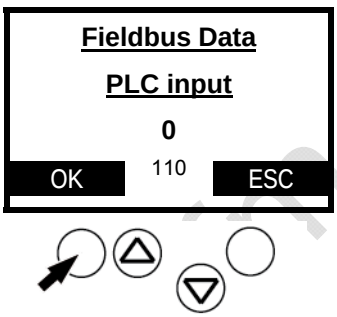
AC1375: Menu screen number = 61

> Display how many bytes in the fieldbus master were configured for the fieldbus data command channel.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 19:

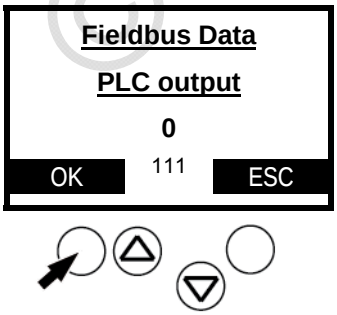
AC1375: Menu screen number = 62

> Display how many bytes in the fieldbus master were configured for fieldbus data plc inputs in the fieldbus master (without function in the gateway).

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 20:

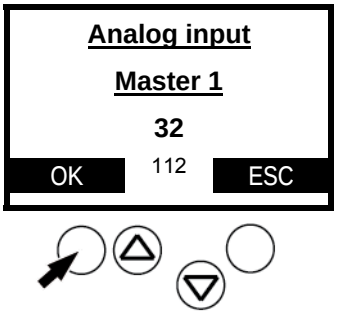
AC1375: Menu screen number = 63

> Display how many bytes in the fieldbus master were configured for fieldbus data plc outputs in the fieldbus master (without function in the gateway).

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 21:

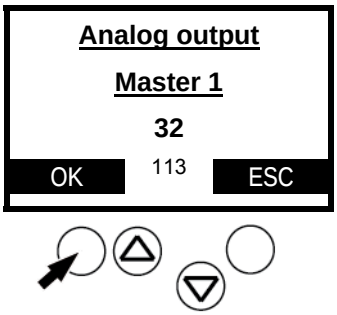
AC1375: Menu screen number = 64

> Display how many bytes in the fieldbus master were configured for analogue inputs in the fieldbus master of AS-i master 1.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 22:

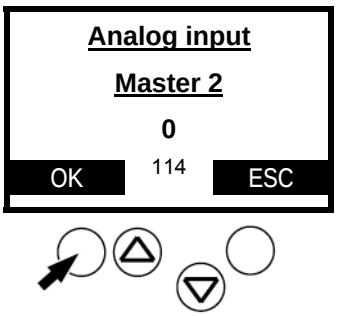
AC1375: Menu screen number = 65

> Display how many bytes in the fieldbus master were configured for analogue outputs in the fieldbus master of AS-i master 1.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 23:

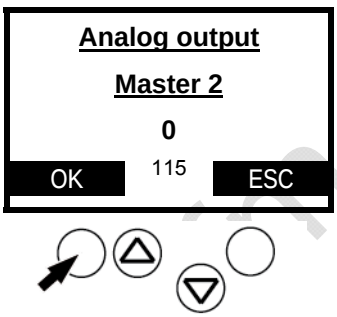
AC1375: Menu screen number = 66 (without function)

> Display how many bytes in the fieldbus master were configured for analogue inputs in the fieldbus master of AS-i master 2.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 24:

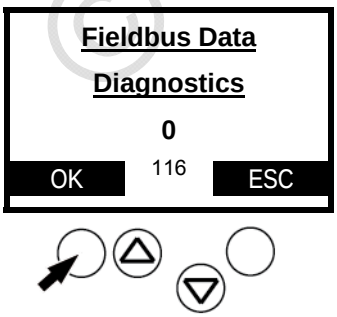
AC1375: Menu screen number = 67 (without function)

> Display how many bytes in the fieldbus master were configured for analogue outputs in the fieldbus master of AS-i master 2.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 25:

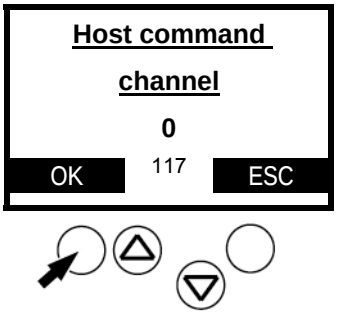
AC1375: Menu screen number = 68

> Display how many bytes in the fieldbus master were configured for diagnostic data in the fieldbus master.

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 26:

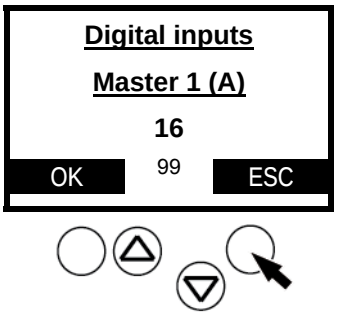
AC1375: Menu screen number = 69

> Display how many bytes in the fieldbus master were configured for the command channel (module 12).

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 27:

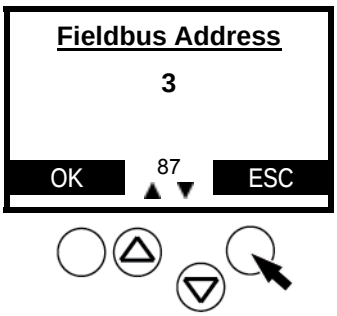
AC1375: Menu screen number = 51

> Repetition of the display series (→ step 8).

► Press [OK] to scroll to the next display.

OR:

► [ESC] to return to the screen [Fieldbus Address].



Step 28:

AC1375: Menu screen number = 43

► Return to the start screen with [ESC].

14 Operation

Contents

5934

In this chapter you get to know what you can do with the device during operation.

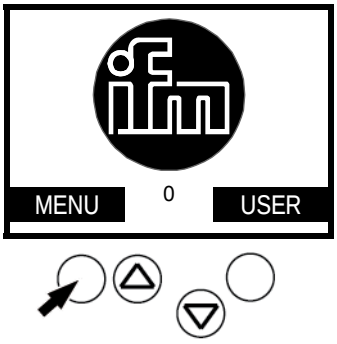
14.1 Display of the list of detected slaves (LDS)

5936

Display at which slave address the device detected a slave (or several slaves) type A, B or S (standard) on the bus irrespective of whether the slave is active on the bus.

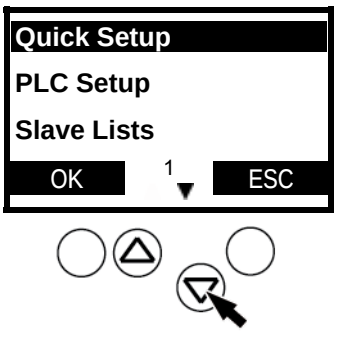
Definition: A slave is considered to be detected by an AS-i master if the slave is switched on and has sent the master its identifier.

[MENU] > [Slave Lists] > Select master > [Detected Slaves]



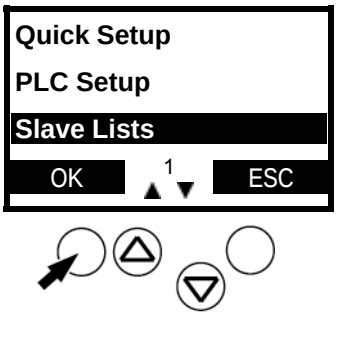
Step 1:

► Press [Menu].



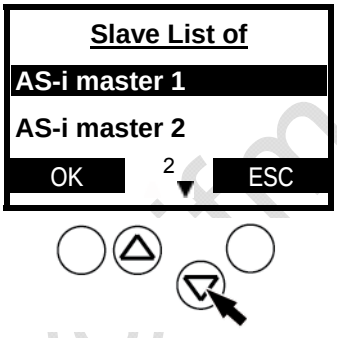
Step 2:

► Press [▼] to scroll to [Slave Lists].



Step 3:

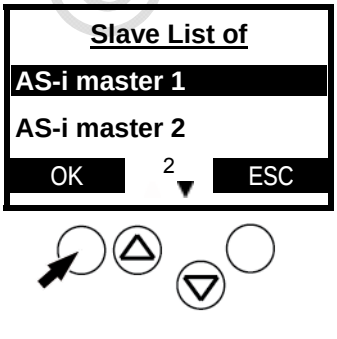
► Select [Slave Lists] with [OK].



Step 4:

AC1375: Menu screen not available.

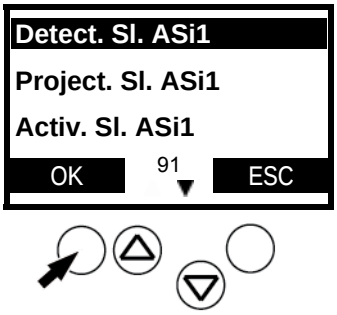
► If necessary, press [▼] to scroll to [Master 2].



Step 5:

AC1375: Menu screen not available.

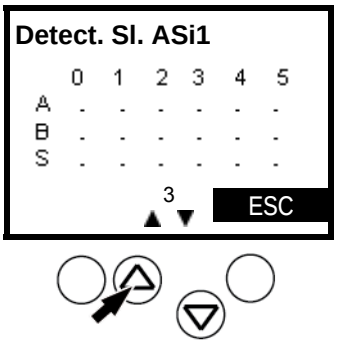
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 47

► Select [Detected Slaves] with [OK].



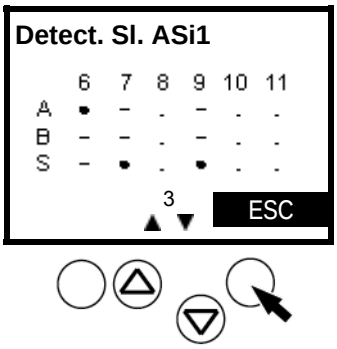
Step 7:

AC1375: Menu screen number = 2

> A table of detected slaves is displayed.
Here **an example**:

- No slaves have been detected on master 1 with the addresses 0 to 5.

► If necessary, press [▲] to scroll to the next address block.



Step 8:

AC1375: Menu screen number = 2

> A table of detected slaves is displayed.
Here in the **example** the slaves 6A, 7, 9:

- An A/B slave has been detected as A slave at the address 6,
- a single slave each has been detected at the addresses 7 and 9.

► Note the slave addresses found.

► If necessary, press [▲] to scroll to the next address block.
OR:
Press [ESC] to return to the start screen.

> That's it!

14.2 Display of the list of projected slaves (LPS)

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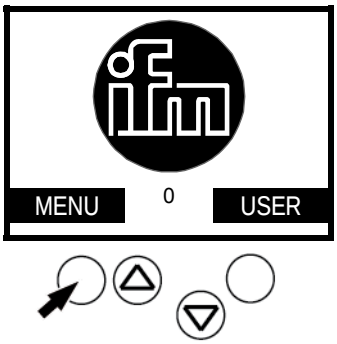
Display at which slave address a slave (or several slaves) type A, B or S (standard) is projected on the bus.

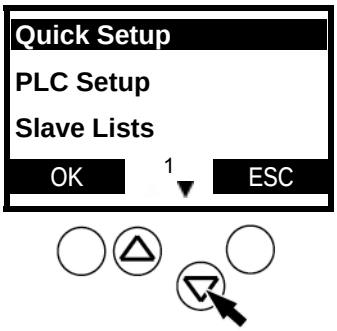
Definition: A slave is considered to be projected on an AS-i master if the slave is entered in the "list of projected slaves" (LPS) on the device. To be entered in the LPS, the slave must be activated at this time and have a valid, unique address.

[MENU] > [Slave Lists] > Select master > [Project. Sl.]



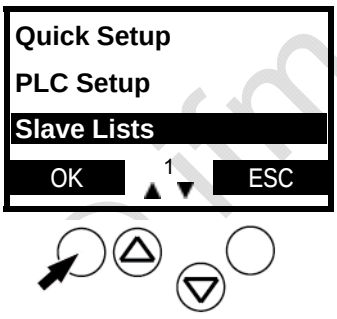
Step 1:

► Press [Menu].



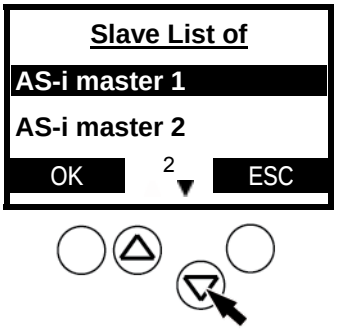
Step 2:

► Press [▼] to scroll to [Slave Lists].



Step 3:

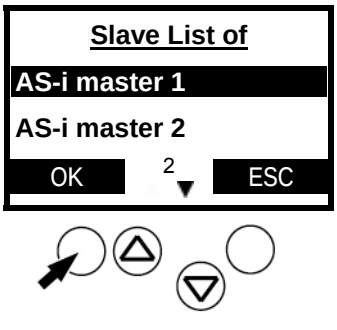
► Select [Slave Lists] with [OK].



Step 4:

AC1375: Menu screen not available.

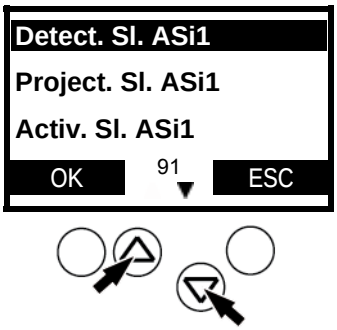
► If necessary, press [▼] to scroll to [Master 2].



Step 5:

AC1375: Menu screen not available.

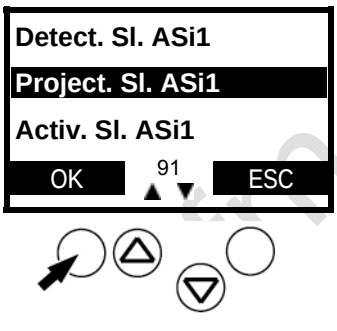
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 47

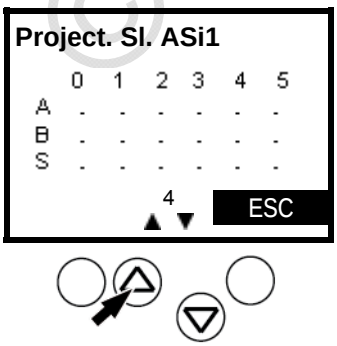
► Press [▼] to scroll to [Project. Sl.].



Step 7:

AC1375: Menu screen number = 47

► Select [Project. Sl.] with [OK].



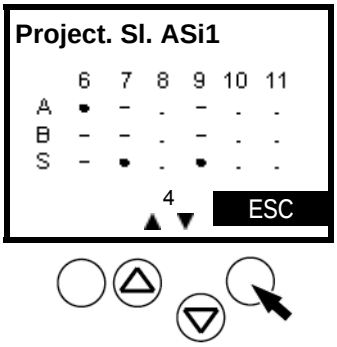
Step 8:

AC1375: Menu screen number = 3

> A table of projected slaves is displayed.
Here **an example**:

- No slave has been projected on master 1 with the addresses 0 to 5.

► If necessary, press [▲] to scroll to the next address block.



Step 9:

AC1375: Menu screen number = 3

> A table of projected slaves is displayed.
Here in the **example** the slaves 6A, 7, 9:

- An A/B slave has been projected as A slave at the address 6,
- a single slave was projected at the addresses 7 and 9.

► Note the slave addresses found.

► If necessary, press [▲] to scroll to the next address block.
OR:
Press [ESC] to return to the start screen.

> That's it!

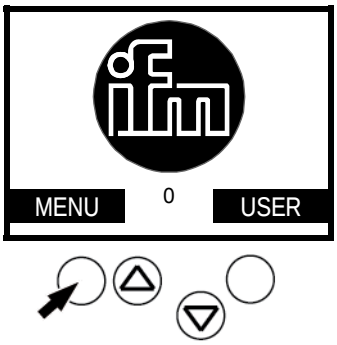
14.3 Display list of activated slaves (LAS)

5948

Display at which slave address a slave (or several slaves) type A, B or S (standard) is activated on the bus.

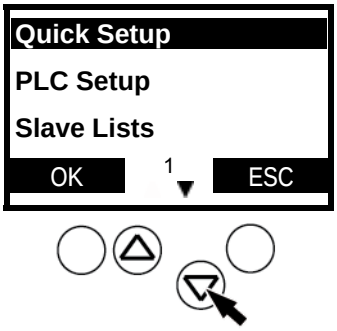
Definition: A slave is considered to be activated on an AS-i master if the AS-i master exchanges data with the slave cyclically.

[MENU] > [Slave Lists] > Select master > [Activ. Sl.]



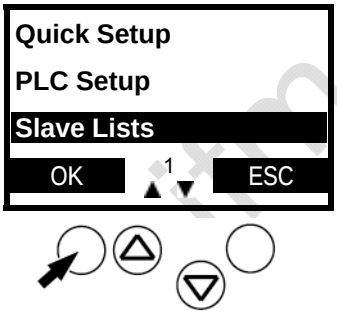
Step 1:

► Press [Menu].



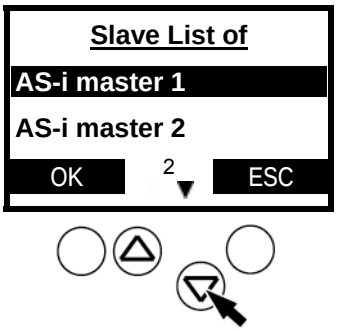
Step 2:

► Press [▼] to scroll to [Slave Lists].



Step 3:

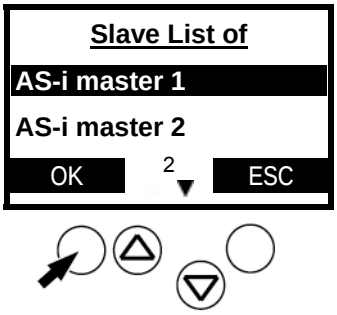
► Select [Slave Lists] with [OK].



Step 4:

AC1375: Menu screen not available.

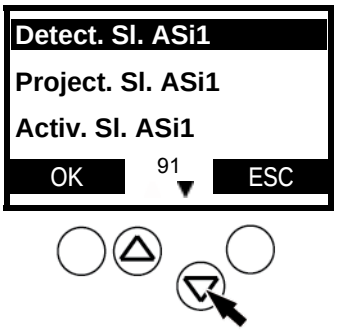
► If necessary, press [▼] to scroll to [Master 2].



Step 5:

AC1375: Menu screen not available.

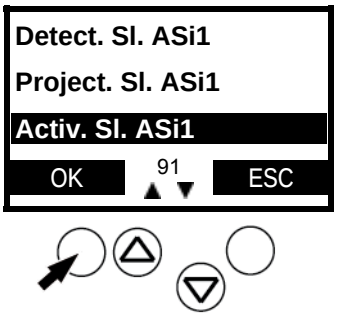
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 47

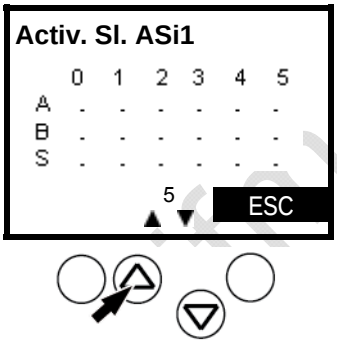
► Press [▼] to scroll to [Activ. Sl.].



Step 7:

AC1375: Menu screen number = 47

► Select [Activ. Sl.] with [OK].



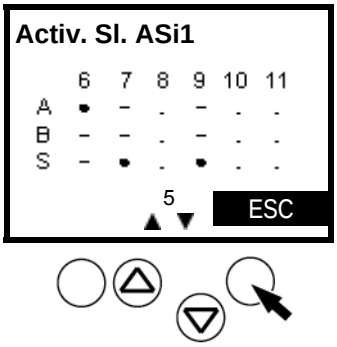
Step 8:

AC1375: Menu screen number = 4

> A table of the activated slaves is displayed.
Here **an example**:

- no slaves have been activated on master 1 with the addresses 0 to 5.

► If necessary, press [▲] to scroll to the next address block.



Step 9:

AC1375: Menu screen number = 4

> A table of activated slaves is displayed.
Here in the **example** the slaves 6A, 7, 9:

- an A/B slave has been activated as A slave at the address 6,
- a single slave each has been activated at the addresses 7 and 9.

► Note the slave addresses found.

► If necessary, press [▲] to scroll to the next address block.
OR:
Press [ESC] to return to the start screen.

> That's it!

14.4 Display of the list of slaves with peripheral fault (LPF)

5949

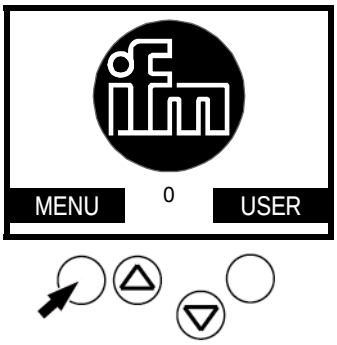
Display at which slave address the device has detected one slave (or several slaves) type A, B or S (standard) with a wiring fault on the bus.

> The LED [CONF/PF] flashes as soon as there is a peripheral fault.

What is a peripheral fault? Peripheral faults depend on the used slaves and can have different reasons. **Examples:**

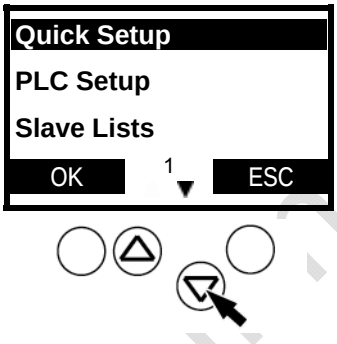
- A slave with analogue inputs is projected but does not receive a signal in the defined value range on one of its enabled inputs (faulty electrical connection to the sensor).
- External 24V voltage supply missing at one slave which needs it.

[MENU] > [Slave Lists] > Select master > [Periph. Flt.]



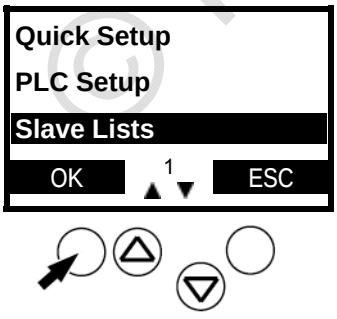
Step 1:

► Press [Menu].



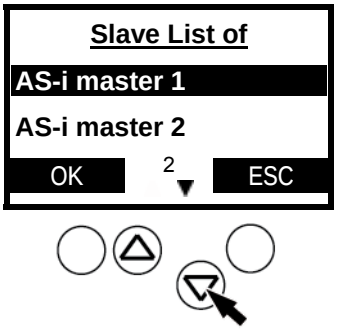
Step 2:

► Press [▼] to scroll to [Slave Lists].



Step 3:

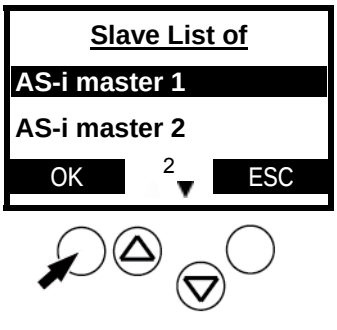
► Select [Slave Lists] with [OK].



Step 4:

AC1375: Menu screen not available.

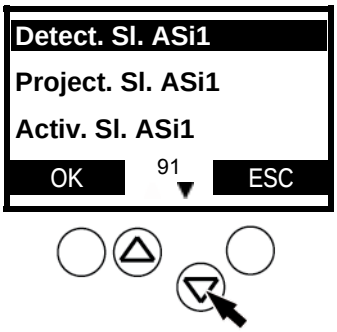
► If necessary, press [▼] to scroll to [Master 2].



Step 5:

AC1375: Menu screen not available.

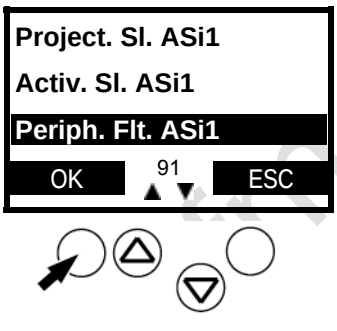
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 47

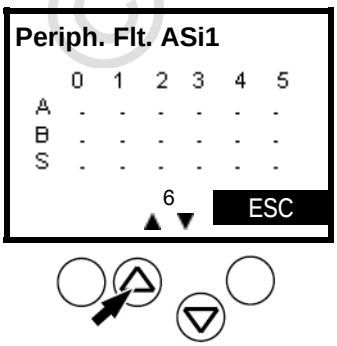
► Press [▼] to scroll to [Periph. Flt.].



Step 7:

AC1375: Menu screen number = 47

► Select [Periph. Flt.] with [OK].



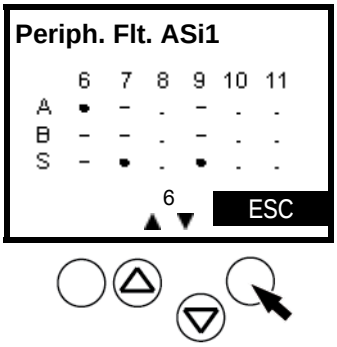
Step 8:

AC1375: Menu screen number = 5

> A table of the slaves with peripheral fault is displayed.
Here **an example**:

- No slaves with peripheral fault have been detected on master 1 with the addresses 0 to 5.

► If necessary, press [▲] to scroll to the next address block.



Step 9:

AC1375: Menu screen number = 5

> A table of the slaves with peripheral fault is displayed.
Here in the **example** the slaves 6A, 7, 9:

- At address 6A a slave with peripheral fault was detected
- At the addresses 7 and 9 slaves with peripheral fault were detected.

► Note the slave addresses found.

► If necessary, press [▲] to scroll to the next address block.
OR:
Return to the start screen with [ESC].

> That's it!

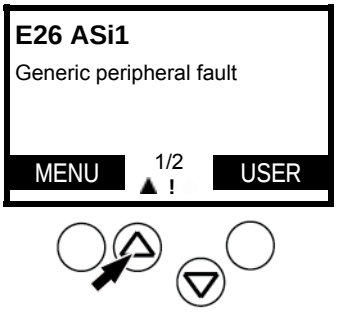
14.5 Display of slave with peripheral fault

5951

Display at which slave address the device has detected a slave type A, B or S (standard) with a wiring fault (periphery) on the bus.

→ also chapter Display of the list of slaves with peripheral fault (LPF) (→ page 422).

In case of a configuration error or failure the start screen of the text/graphics display will provide information as shown in the following screen:



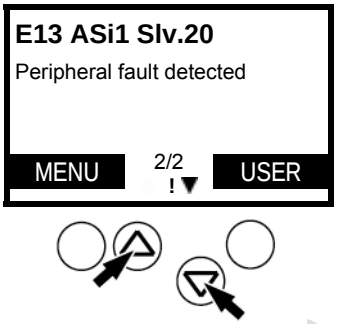
Step 1:
Display of an error when the start screen was active:

> The display on the left appears instead of the ifm start screen:
Peripheral fault on AS-i master 1:

- E26 = fault number, → chapter Troubleshooting (→ page 479).
- ASi1 = concerned AS-i master channel number.
- Generic peripheral fault: There is a peripheral fault.
- 1/2: First page of 2 with troubleshooting.
- Flashing "**!**": There is an error message.

> LED [CONF/PF] flashes.

► Press [▲] to scroll to the next error screen.



Step 2:
Display of the fault details:

> Slave 20 on AS-i master 1 signals peripheral fault.

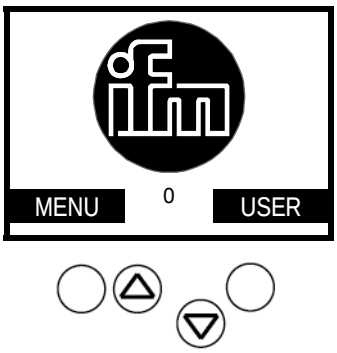
> LED [CONF/PF] flashes.

► Press [▼] to return to the start screen.
OR (if further faults exist):
Press [▲] to scroll to the next error screen.

14.6 Detect an unknown slave address

5954

If the address of a connected slave is not known, you can find it out very easily:

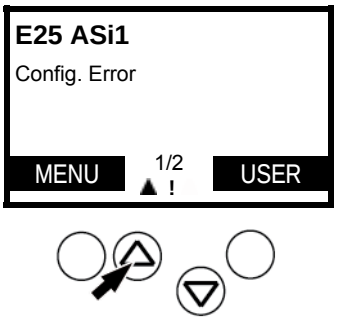


Step 1:

► If the LED [PROJ] lights, switch the AS-i master to the operating mode "protected mode".
→ How to switch the operating modes for the AS-i master.
(→ page 117)

> LED [PROJ] is off.

► Remove the unknown slave from the bus.



Step 2:

> LED [CONF/PF] lights.

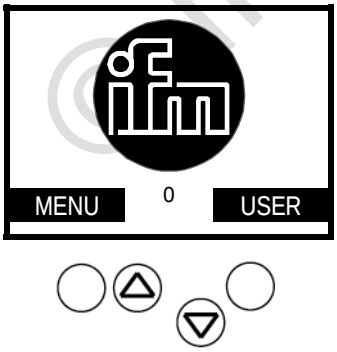
> The display on the left appears instead of the ifm start screen: "Configuration error".
Cause: At least 1 slave in the projection list of the device cannot be found in the bus.

► Press [▲] to scroll to the next error screen.

Step 3:
Display of the fault details:

> Display error message:
"AS-i master 1: slave 7 missing"
Here **an example**: The unknown slave has the address 7.

► Reconnect the slave removed before.



Step 4:

> Done: The ifm start screen is displayed again.

> LED [CONF/PF] is off.

14.7 Number of AS-i voltage failures on the AS-i master

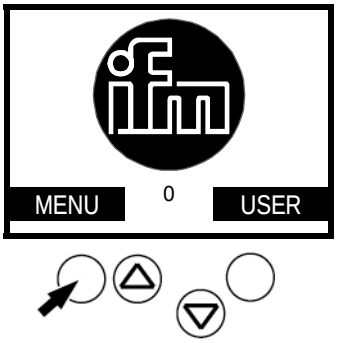
5956

How often was an inadmissible decrease or interruption of the voltage supply of the AS-i bus responsible for system failures? The device displays:

Here you cannot see in detail when which error occurred.
→ chapter Troubleshooting (→ page 479).

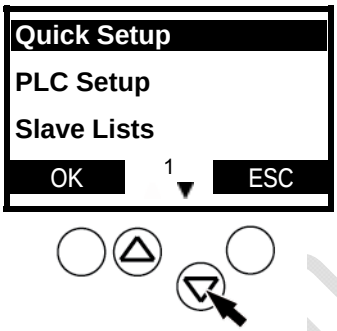
The error counter is reset...
- when the device is switched off and on again,
- with the function Reset error counter (→ page 437).

[MENU] > [Diagnostics] > Select master > [Voltage Disturb.]



Step 1:

► Press [Menu].

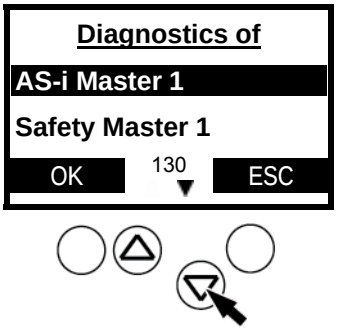


Step 2:

► Press [▼] to scroll to [Diagnostics].

Step 3:

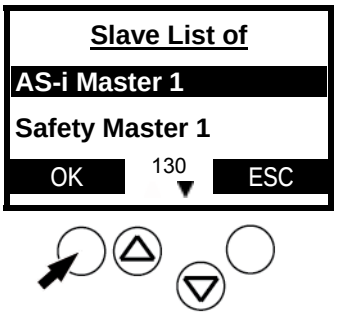
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

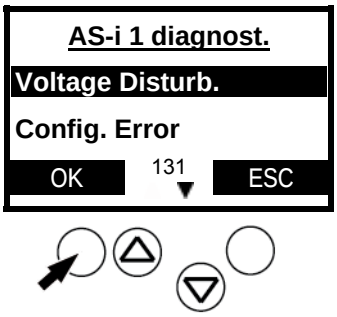
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

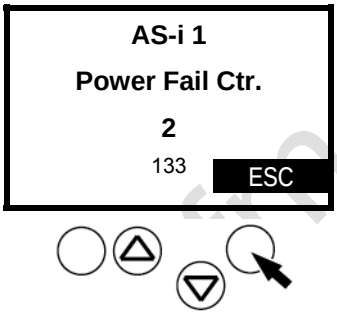
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 72

► Select [Voltage Disturb.] with [OK].



Step 7:

AC1375: Menu screen number = 74

> Display of the number of failures of the AS-i supply on the master.

(Reset error counter (→ page 437))

► Press [ESC] to return to the start screen.

14.8 Number of configuration errors on the master

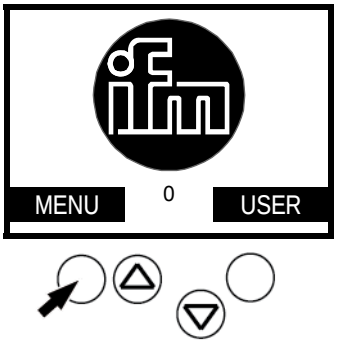
5958

Display of the number of configuration errors on the master.

Here you cannot see in detail when which error occurred.
→ chapter Troubleshooting (→ page 479).

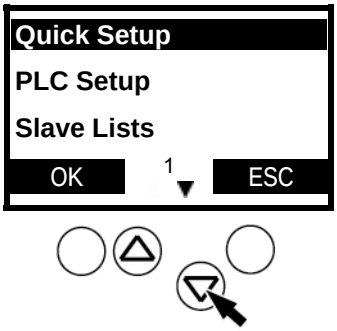
The error counter is reset...
- when the device is switched off and on again,
- with the function Reset error counter (→ page 437).

[MENU] > [Diagnostics] > Select master > [Config. Error]



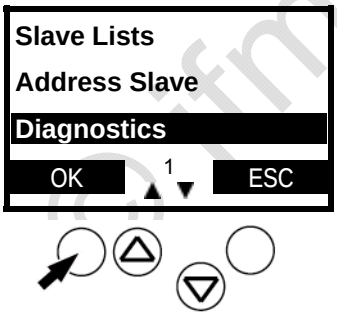
Step 1:

► Press [Menu].



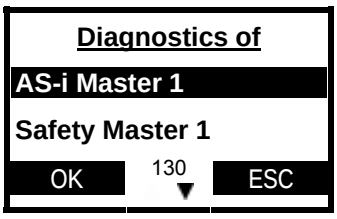
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

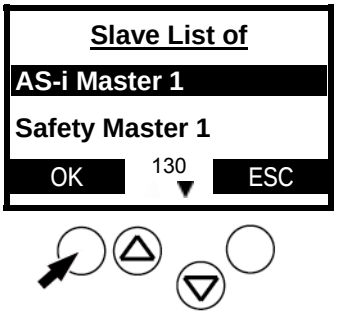
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

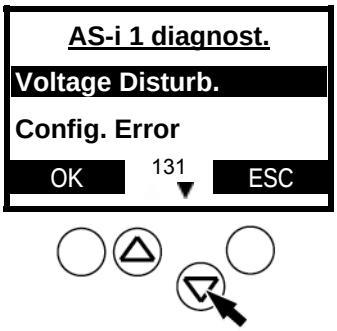
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

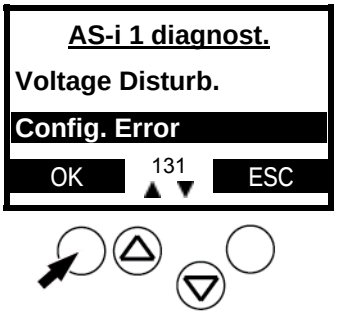
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 72

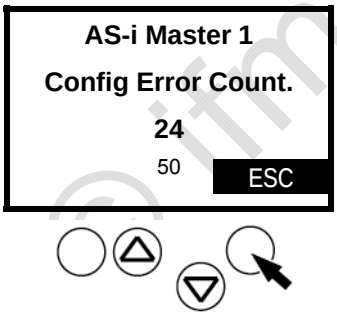
► Press [▼] to select [Config. Error].



Step 7:

AC1375: Menu screen number = 72

► Select [Config. Error] with [OK].



Step 8:

AC1375: Menu screen number = 28

> Display of the number of configuration errors on the master.

(Reset error counter (→ page 437))

► Press [ESC] to return to the start screen.

14.9 AS-i telegram errors on the master

5960

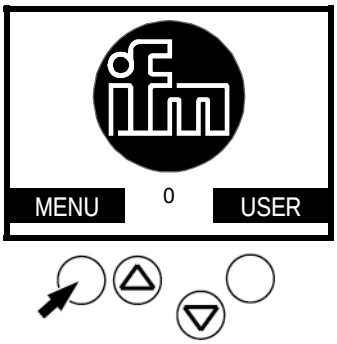
We talk of a telegram error if the expected response telegram from a slave is not received within a defined time or the signal sequences in the response telegram cannot be interpreted by the AS-i master. **Examples**:

- Due to an electrical fault the AS-i cable is used asymmetrically (one-sided earth fault). The AS-i signal is no longer clearly recognisable.
- The electrical AS-i connection to an AS-i slave is not OK.
- The electrical environment of the AS-i system (EMC) interferes with the AS-i telegrams.

Here you cannot see in detail when which error occurred.
→ chapter Troubleshooting (→ page 479).

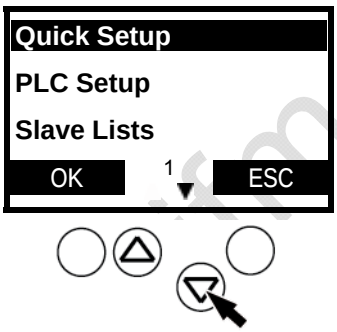
The error counter is reset...
- when the device is switched off and on again,
- with the function Reset error counter (→ page 437).

[MENU] > [Diagnostics] > Select master > [Telegr. Error]



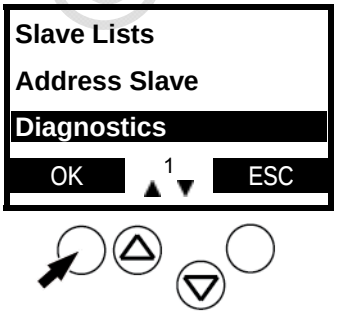
Step 1:

► Press [Menu].



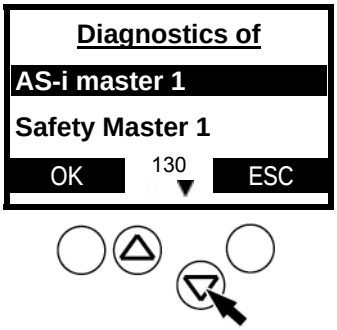
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

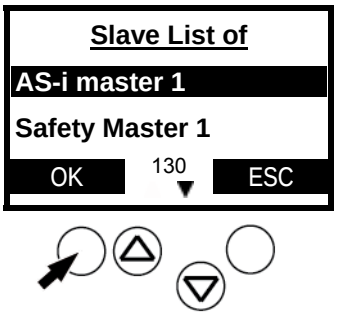
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

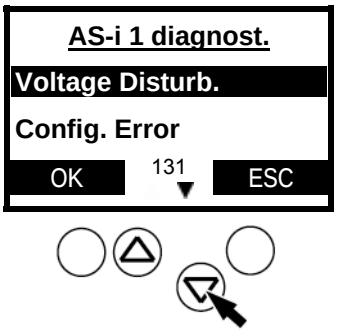
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

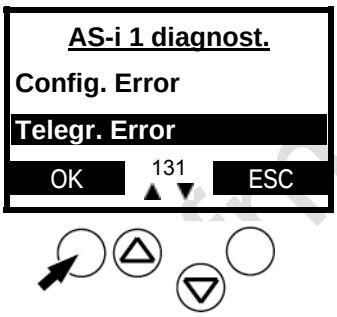
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 72

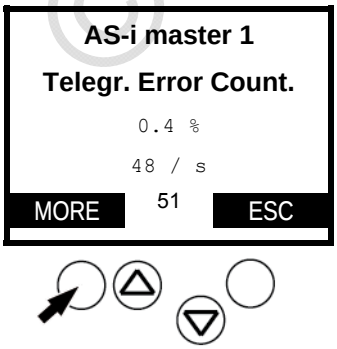
► Press [▼] to scroll to [Telegr. Error].



Step 7:

AC1375: Menu screen number = 72

► Select [Telegr. Error] with [OK].



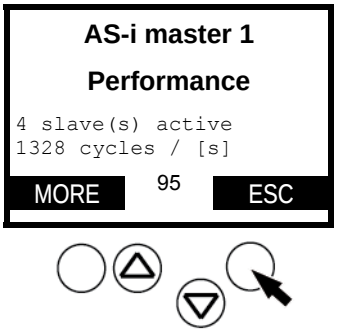
Step 8:

AC1375: Menu screen number = 29

> Dynamic display of AS-i telegram errors in per cent of the transmitted telegrams.

> Dynamic display of AS-i telegram errors per second.

► Scroll to the next screen with [MORE].



Step 9:

AC1375: Menu screen number = 49

> Dynamic display of the performance of this master:

- number of active slaves,
- number of AS-i cycles per second.

► Press [ESC] to return to the start screen.

14.10 Number of disturbed telegrams on the master (by noisy slaves)

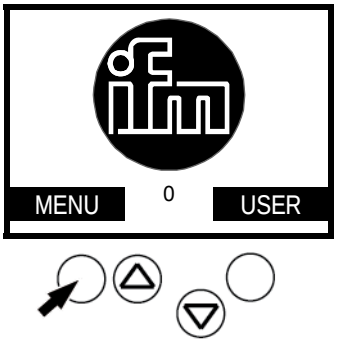
5962

You want to know how many disturbed telegrams the individual slaves have transmitted (since last [Reset error counter]? The device shows it, sorted by the number of distorted telegrams.

Here you cannot see in detail when which error occurred.
→ chapter Troubleshooting (→ page 479).

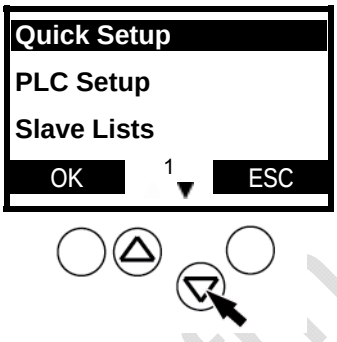
The error counter is reset...
- when the device is switched off and on again,
- with the function Reset error counter (→ page 437).

[MENU] > [Diagnostics] > Select master > [Noisy Slaves]



Step 1:

► Press [Menu].

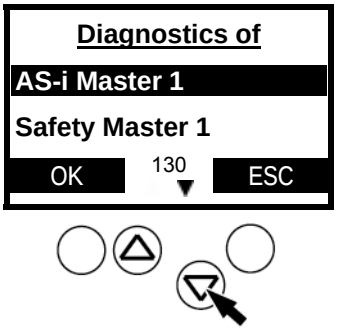


Step 2:

► Press [▼] to scroll to [Diagnostics].

Step 3:

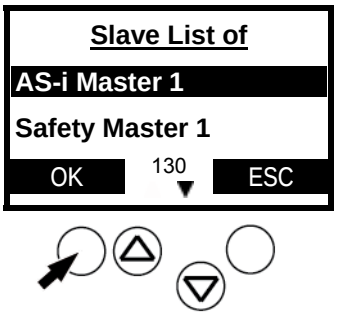
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

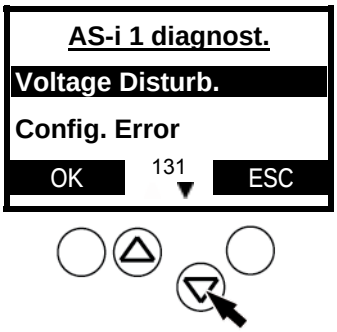
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

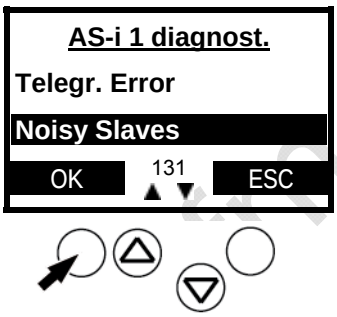
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 72

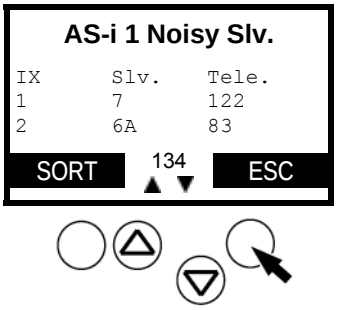
► Press [▼] to scroll to [Noisy Slaves].



Step 7:

AC1375: Menu screen number = 72

► Select [Noisy Slaves] with [OK].



Step 8:

AC1375: Menu screen number = 71

> Dynamic display of the number of disturbed telegrams of the different slaves, sorted by frequency of occurrence:

- Column "IX": Number of ranking (frequency of occurence),
- Column "Slv.": Address of the slave,
- Column "Tele.": Number of disturbed telegrams,
- only AC1375: Column "Config": Configuration error counter

► Press [SORT] for a new sorting according to the current ranking.

► ►Press [▲] or [▼] to scroll to the slaves with higher or lower rank order.

OR:

► Press [ESC] to return to the start screen.

14.11 Reset error counter

5964

Here you will find out how you can reset the error counter of the device in the diagnostic memory.

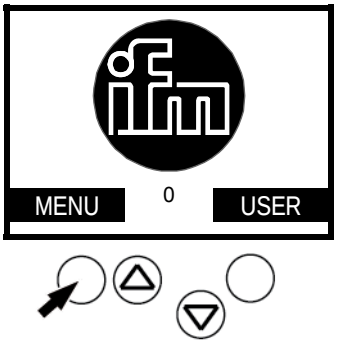
NOTE

► Do not reset the diagnostic memory of the device **before** the analysis of the values stored so far.
The reset process cannot be reversed.

Info

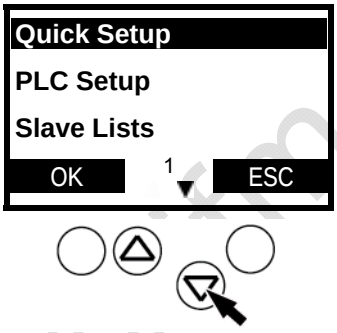
Password level 1 required: → chapter Password setting (→ page 138).

[MENU] > [Diagnostics] > Select master > [Reset Error Count.] > [OK]



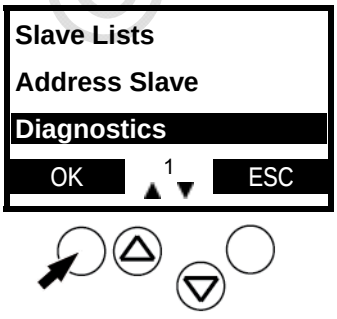
Step 1:

► Press [Menu].



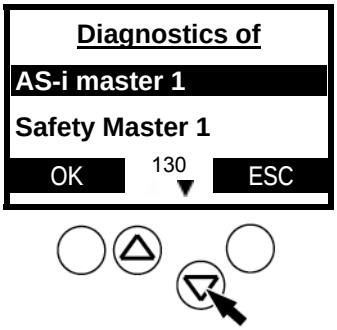
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

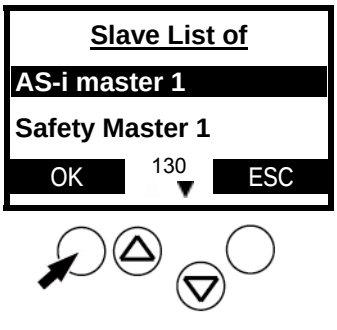
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

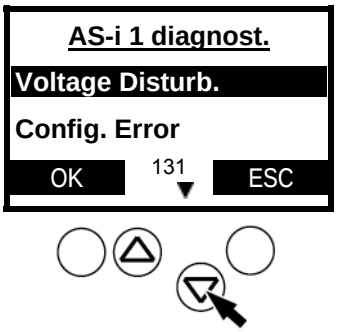
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

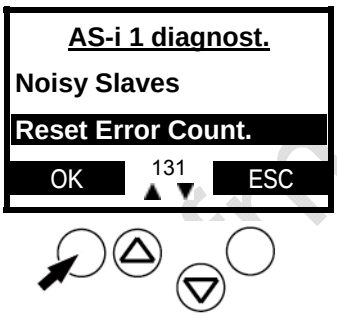
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 72

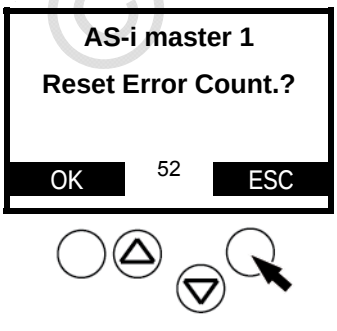
► Press [▼] to scroll to [Reset Error Count.]



Step 7:

AC1375: Menu screen number = 72

► Select [Reset Error Count.] with [OK].



Step 8:

AC1375: Menu screen number = 30

> Safety query:
"Reset Error Count.?"

► Reset all error counters with [OK].

> Return to screen (→ step 7).

Alternatively:

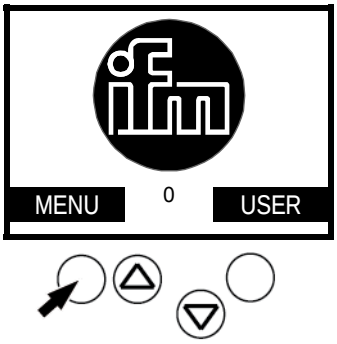
► Exit the screen with [ESC] without changing the error counters.

14.12 Display of the longest cycle time

5970

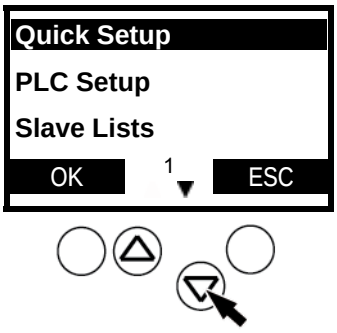
Display of the longest cycle time of the system in [ms] since the last reset or after the last power-on of the unit:

[MENU] > [Diagnostics] > Select master > [Cycle time]



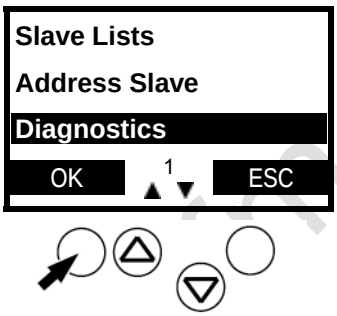
Step 1:

► Press [Menu].



Step 2:

► Press [▼] to scroll to [Diagnostics].



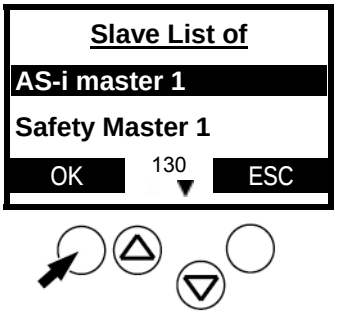
Step 3:

► Select [Diagnostics] with [OK].

Step 4:

AC1375: Menu screen not available.

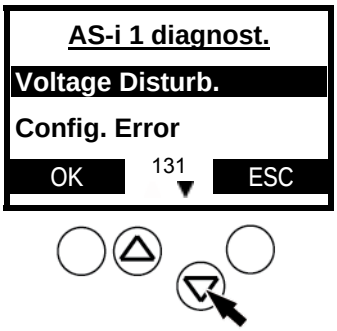
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

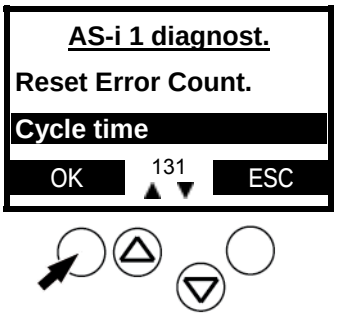
► Select AS-i master with [OK].



Step 6:

AC1375: Menu screen number = 72

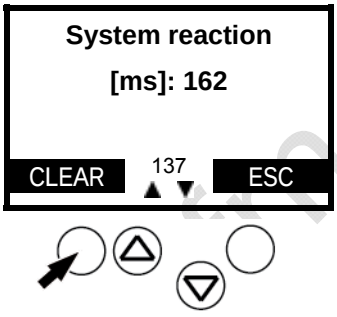
► Press [▼] to scroll to [Cycle time].



Step 7:

AC1375: Menu screen number = 72

► Select [Cycle time] with [OK].



Step 8:

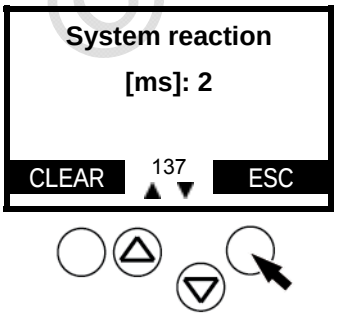
AC1375: Menu screen number = 73

> Display of the longest cycle time of the AS-i system in [ms] since the last reset.

► To update the display retrieve the image again:
Keys [ESC] > [OK] > [OK].

> Value increases or remains unchanged.

► Set cycle time measurement series to 0 with [CLEAR].



Step 8:

AC1375: Menu screen number = 73

> Reset previous measurement series.

> Start new measurement series.

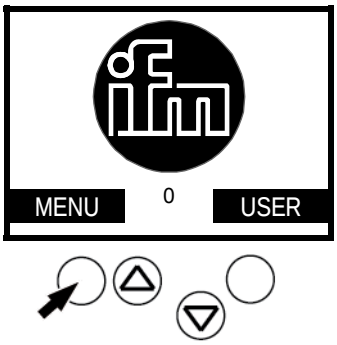
► Press [ESC] to return to the start screen.

14.13 Read states of the safety monitor

5973

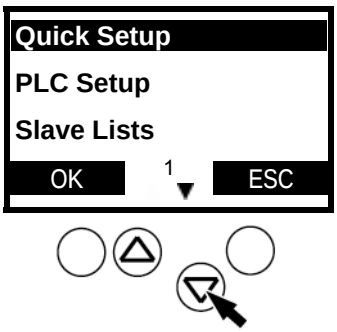
By means of the following method the device shows you the current data of the AS-i safety monitor.

[MENU] > [Diagnostics] > Select safety master > [Read Monitor]



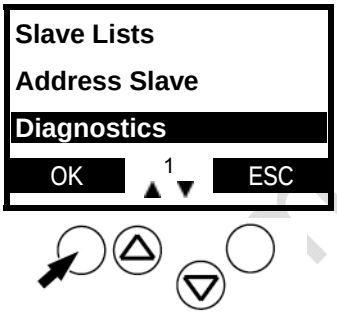
Step 1:

► Press [Menu].



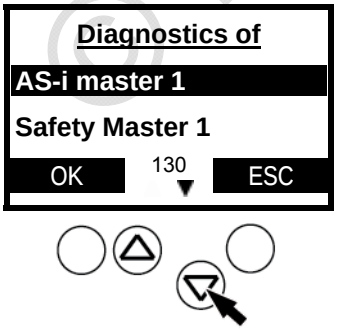
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

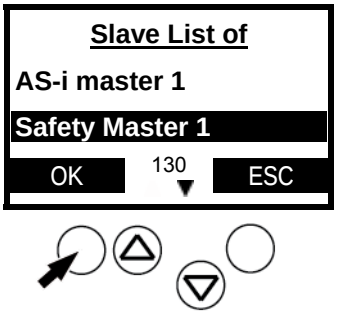
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

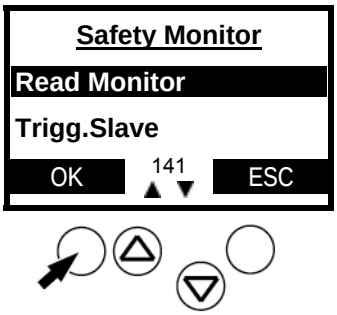
► Press [▼] to scroll to requested safety master.



Step 5:

AC1375: Menu screen not available.

► Select safety master with [OK].



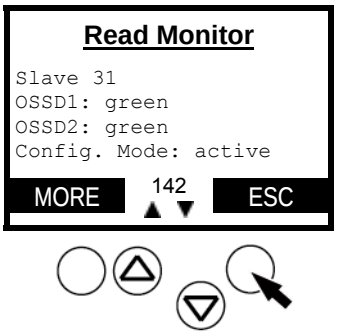
Step 6:

► Select [Read Monitor] with [OK].

Continue with:
- Case A: no safety device has triggered (→ page 443)
- Case B: a safety device has triggered (→ page 443)

14.13.1 Case A: no safety device has triggered

5975



Step 7:

> Display of the current data of the safety monitor:
- Slave = configured AS-i slave address,
- OSSD1 = LED colour* for enable circuit 1,
- OSSD2 = LED colour* for enable circuit 2,
- Configuration mode active / not active = operating mode of the safety monitor.

► Scroll to more data with [MORE].
OR:
Return to screen 141 with [ESC] .

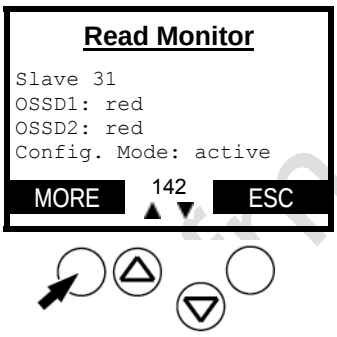
*) red = relay contact interrupted: a safety device has triggered.
yellow = relay contact interrupted + restart disable = ready to start.
green = relay contact closed: safety devices ok.

Info

Depending on the type of connected safety devices (one / two channels) the displays of OSSD1 and OSSD2 may be different.

14.13.2 Case B: a safety device has triggered

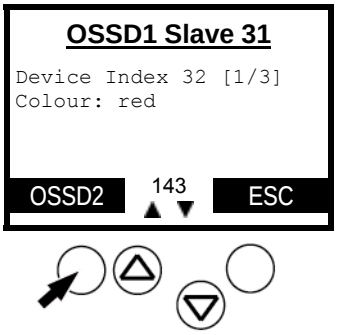
5977



Step 7:

> Display of the current data of the safety monitor:
- Slave = configured AS-i slave address,
- OSSD1 = LED colour* for enable circuit 1 here: enable circuit interrupted,
- OSSD 2 = LED colour* for enable circuit 2 here: enable circuit interrupted,
- Configuration mode active / not active = operating mode of the safety monitor (not active = Run mode).

► Scroll to more data with [MORE] (only possible in case of a fault).
OR:
Return to screen 141 with [ESC] .



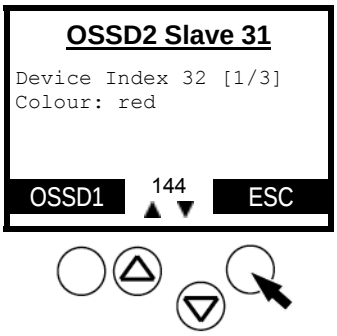
Step 8:

> Display of the data of enable circuit 1 :

- Slave = configured AS-i slave address,
- Device index (corresponding to the configuration of the safety monitor with the software "ASIMON"),
- [1/3] = display of the first of 3 sub-indexes:
  Sub-index 1 = sensor,
  Sub-index 2 = start condition,
  Sub-index 3 = relay contact,
- LED colour* for enable circuit 1 .

► Press [▲] / [▼] to scroll between the status messages of the other concerned index devices.

► Scroll to enable circuit 2 with [OSSD2].
OR:
Return to screen 141 with [ESC] .



Step 9:

> Like screen 143, but for OSSD2.

► Scroll to enable circuit 1 with [OSSD1].
OR:
Return to screen 141 with [ESC] .

*) red = relay contact interrupted: a safety device has triggered.
yellow = relay contact interrupted + restart disable = ready to start.
green = relay contact closed: safety devices ok.

Info

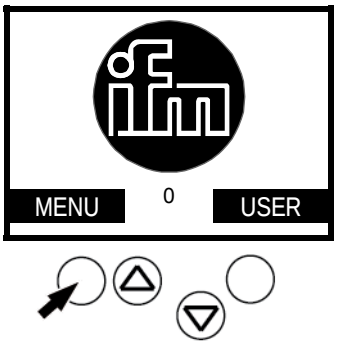
Depending on the type of connected safety devices (one / two channels) the displays of OSSD1 and OSSD2 may be different.

14.14 Read states of safety slaves

5980

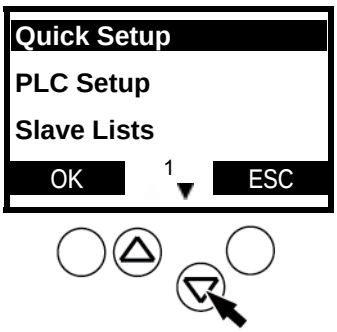
Using the following method the device shows you the current data of the AS-i safety slaves.

[MENU] > [Diagnostics] > Select safety master > [Trigg. Slaves]



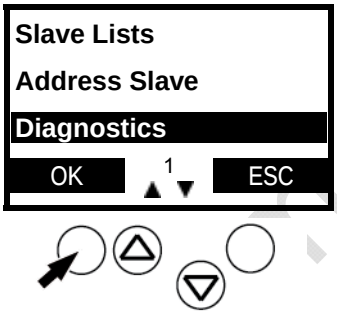
Step 1:

► Press [Menu].



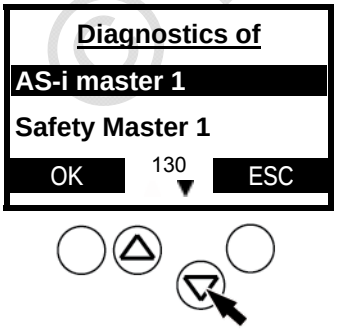
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

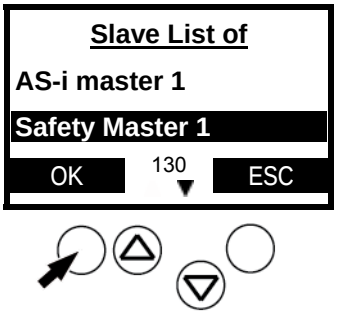
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

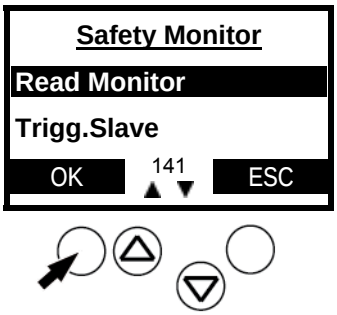
► Press [▼] to scroll to requested safety master.



Step 5:

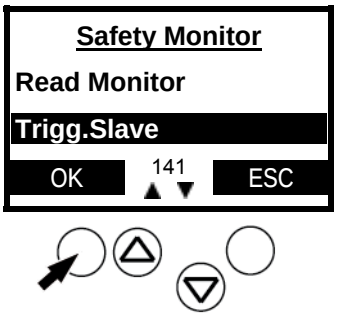
AC1375: Menu screen not available.

► Select safety master with [OK].



Step 6:

► Press [▼] to scroll to [Trigg. Slave].



Step 7:

► Select [Trigg.Slave] with [OK].

Continue with:
- Case A: Safety sensor not actuated / not triggered (→ page 447)
- Case B: Safety sensor actuated / not triggered (→ page 448)

14.14.1 Case A: Safety sensor not actuated / not triggered

5982

Step 8:

> Display of the current data of the first detected and triggered safety slave.

- Here **an example**: no sensor triggered.
  No further displays / functions.

► Return to screen 141 with [ESC] .

14.14.2 Case B: Safety sensor actuated / not triggered

5984

Step 8:

> Display of the current data of the first detected and triggered safety slave.

- Address = current address of the safety slave on the safety monitor.
  active = sensor has triggered,
  inactive = sensor not / no longer triggered,
- (1/2) = display/number of triggered sensors,
- Event 1/1 = no./number* of triggered sensors,
- POT (Power On Time) shows the time elapsed since power-on until the occurrence of the trigger event.

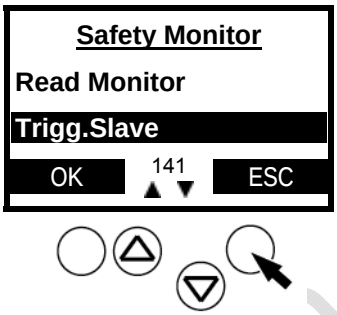
► Press [▲] / [▼] to scroll between several triggered sensors.

► [RESET] deletes the display of the now no longer triggered sensors. Sensors still triggered remain in the display.

OR:

► Return to screen 141 with [ESC] .

*) The events (1/1 ⇒ 1/2) are counted up automatically as soon as another sensor triggers.
Counting down carried out only after [RESET].



Step 9:

► Return to the start screen with [ESC].

> That's it!

14.15 Set AS-i address of the safety monitor

5987

The following method allows you to set the same AS-i address for the safety monitor in the device as that already stored in the safety monitor using the safety parameter setting software "ASIMON".

This is why the AS-i master can now exchange data with the safety monitor via a special protocol.

More information on the protocol → device manual of the safety monitor.

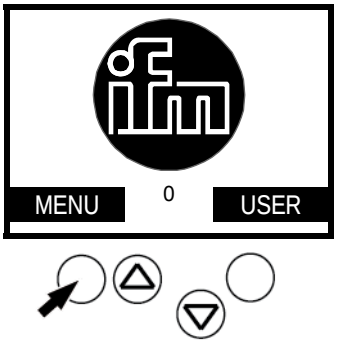
⚠ WARNING

The protocol changes output states of the set slaves.

Danger for people and machine by uncontrolled machine states.

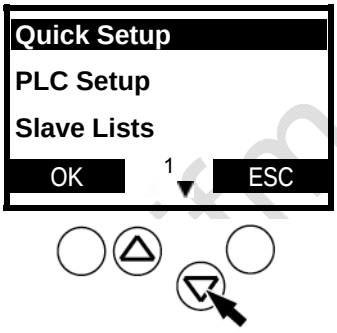
► Set AS-i safety monitors in this menu only.

[MENU] > [Diagnostics] > Select safety master > [Enable Monitor]



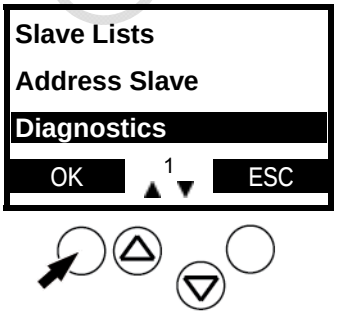
Step 1:

► Press [Menu].



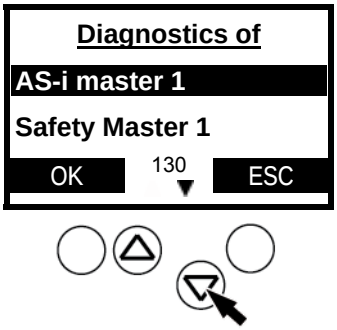
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

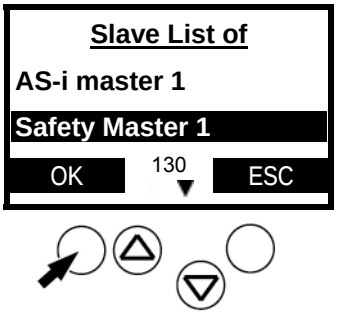
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

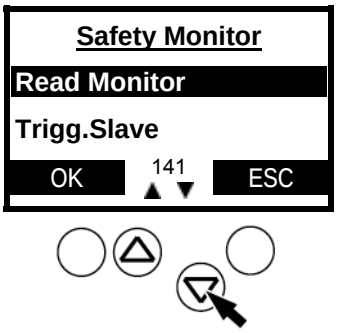
► Press [▼] to scroll to requested safety master.



Step 5:

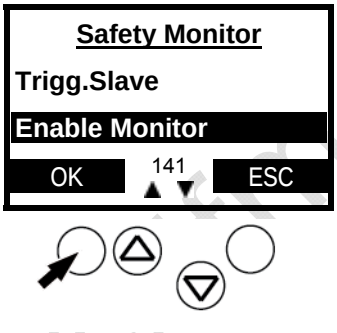
AC1375: Menu screen not available.

► Select safety master with [OK].



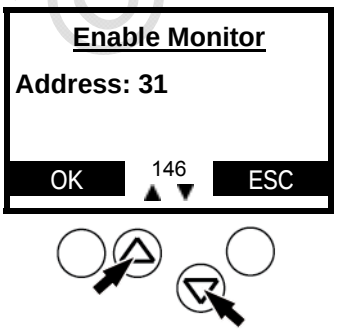
Step 6:

► Press [▼] to scroll to [Enable Monitor].



Step 7:

► Select [Enable Monitor] with [OK].



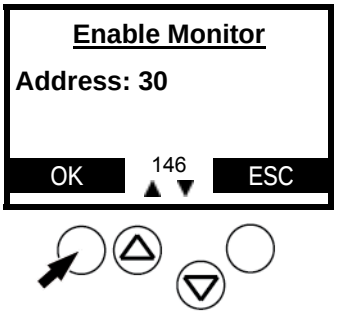
Step 8:

> Display safety note.

► Confirm with [OK].

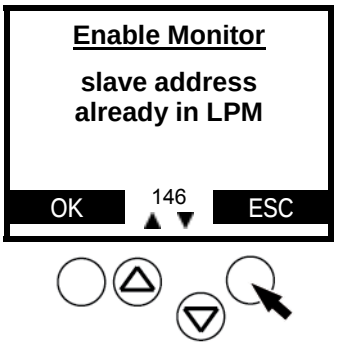
> Display of the address of the first found safety monitor.

► Press [▲] or [▼] to scroll to the requested address of the safety monitor.
IMPORTANT: Select the same setting as with "ASIMON" in the safety monitor.



Step 9:

► Confirm the requested address of the safety monitor with [OK].



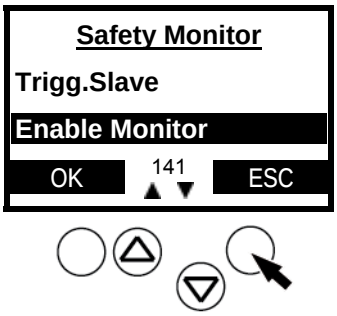
Step 10:

> Message that the selected address has been found in the list of projected monitors (LPM).

> Device enters the AS-i address of the safety monitor in its list of participants.

> This is why the AS-i master can now exchange data with the safety monitor via a special protocol.

► Return to screen 141 with [ESC] .



Step 11:

► Return to the start screen with [ESC].

> That's it!

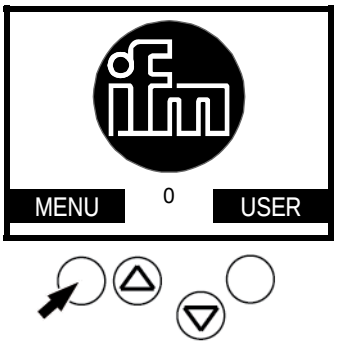
14.16 Reset AS-i address of the safety monitor

5990

The following method can be used to delete the AS-i address of the safety monitor in the AS-i master.

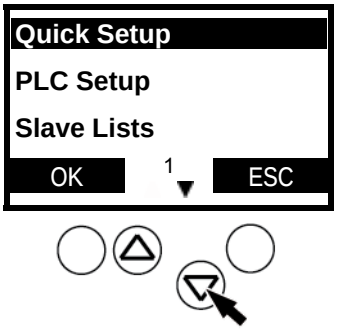
IMPORTANT:
Therefore, the AS-i master processes the safety monitor just like any ordinary slave (4I/4O) - without taking safety-related data into account.

[MENU] > [Diagnostics] > Select safety master > [Disable Monitor]



Step 1:

► Press [Menu].



Step 2:

► Press [▼] to scroll to [Diagnostics].

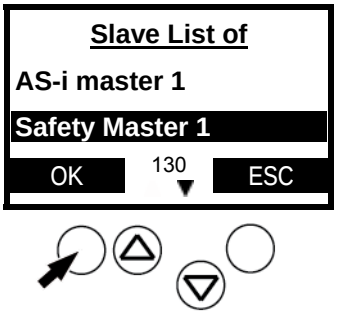
Step 3:

► Select [Diagnostics] with [OK].

Step 4:

AC1375: Menu screen not available.

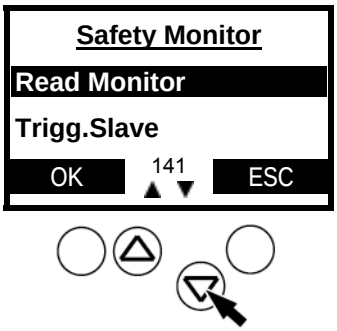
► Press [▼] to scroll to requested safety master.



Step 5:

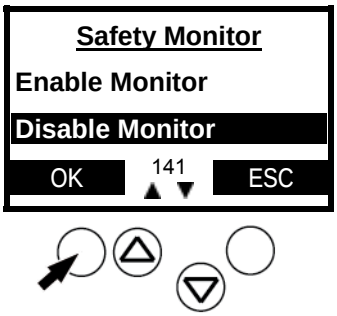
AC1375: Menu screen not available.

► Select safety master with [OK].



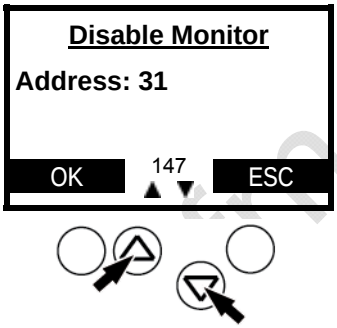
Step 6:

► Press [▼] to scroll to [Disable Monitor].



Step 7:

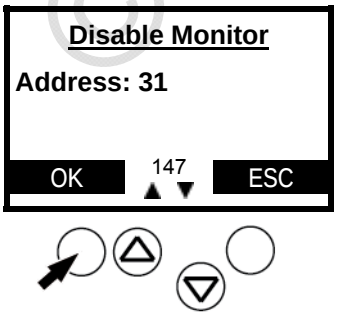
► Select [Disable Monitor] with [OK].



Step 8:

> Display of the address of the first found safety monitor.

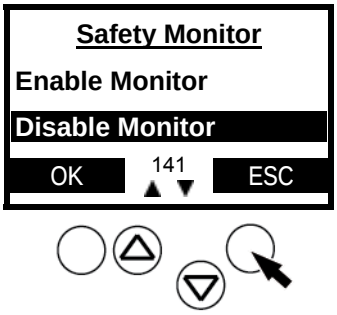
► Press [▲] or [▼] to scroll to the requested address of the safety monitor.



Step 9:

► Confirm the requested address of the safety monitor with [OK].

► Confirm safety query with [OK].



Step 10:

> The AS-i master deletes the AS-i address from its list of participants.

> Therefore, the AS-i master processes the safety monitor just like any ordinary slave - without taking safety-related data into account.

► Return to the start screen with [ESC].

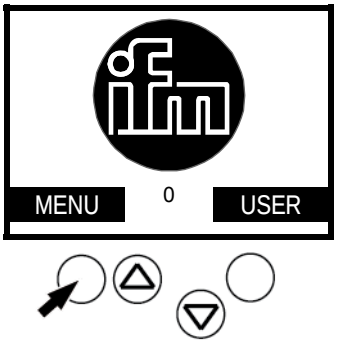
> That's it!

14.17 Set the diagnostic characteristics of the safety monitor

5993

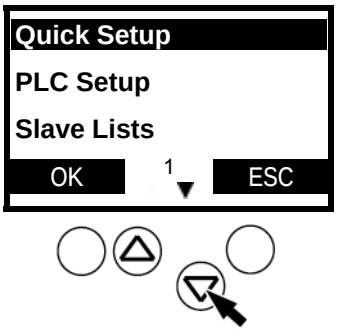
The following method can be used to select the same parameters as those set with "ASIMON" in the safety monitor for the AS-i master as well.

[MENU] > [Diagnostics] > Select safety master > [Setup Monitor]



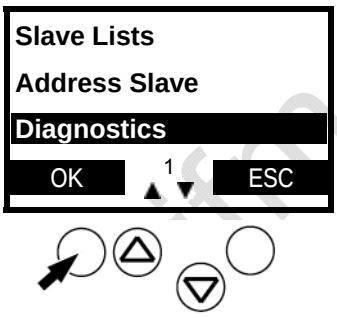
Step 1:

► Press [Menu].



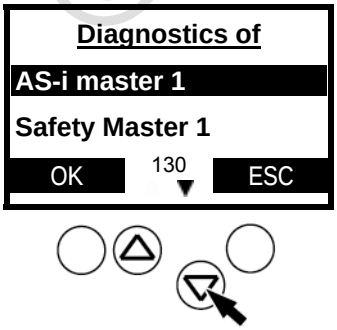
Step 2:

► Press [▼] to scroll to [Diagnostics].



Step 3:

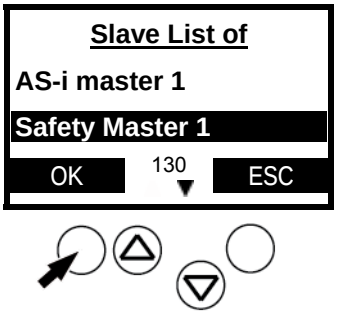
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

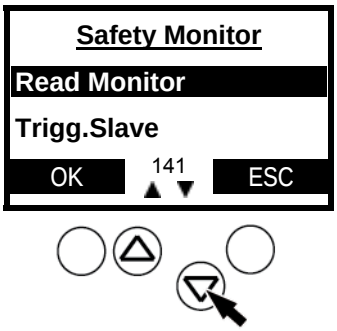
► Press [▼] to scroll to requested safety master.



Step 5:

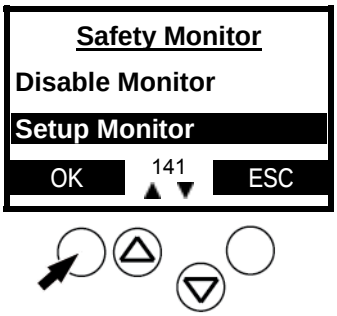
AC1375: Menu screen not available.

► Select safety master with [OK].



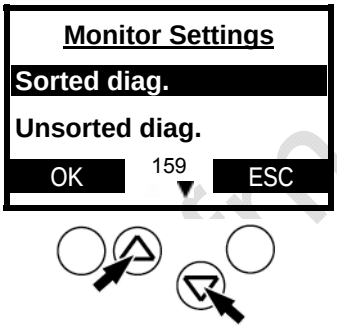
Step 6:

► Press [▼] to scroll to [Setup Monitor].



Step 7:

► Select [Setup Monitor] with [OK].

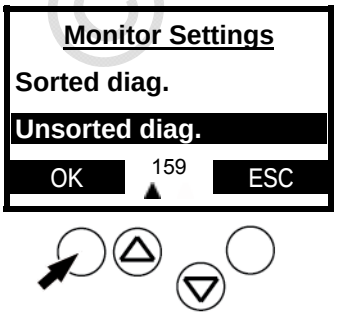


Step 8:

> Display of the current setting of the safety monitor (marked line = active):

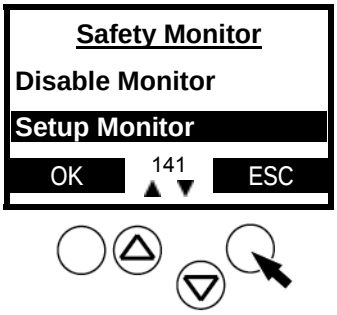
- sorted = sorting by enable circuits,
- unsorted = sorting by numbers of the safety devices.

► Press [▲ or ▼] to scroll to the requested setting.
IMPORTANT: Select the same setting as with "ASIMON" in the safety monitor.



Step 9:

► Confirm the setting with [OK].



Step 10:

► Return to the start screen with [ESC].

> That's it!

14.18 Reset diagnostic states of safety devices

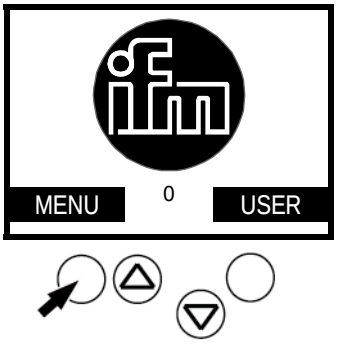
5996

The following method can be used to delete the stored diagnostic states of the safety devices.

Info

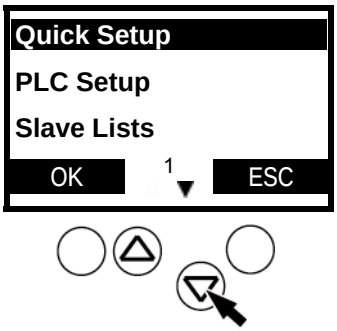
Password level 1 required: → chapter Password setting (→ page 138).

[MENU] > [Diagnostics] > Select safety master > [Reset all] > [OK]



Step 1:

► Press [Menu].

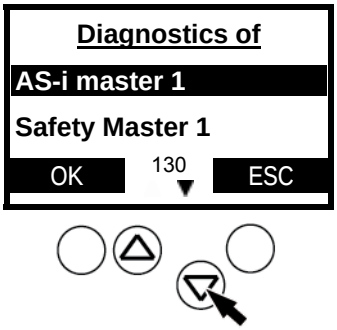


Step 2:

► Press [▼] to scroll to [Diagnostics].

Step 3:

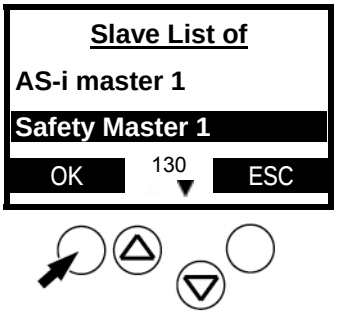
► Select [Diagnostics] with [OK].



Step 4:

AC1375: Menu screen not available.

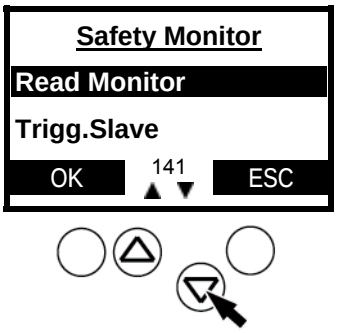
► Press [▼] to scroll to requested safety master.



Step 5:

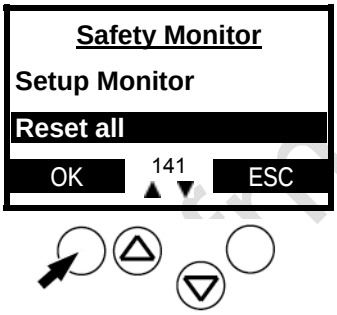
AC1375: Menu screen not available.

► Select safety master with [OK].



Step 6:

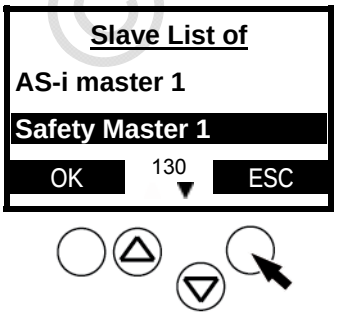
► Press [▼] to scroll to [Reset all].



Step 7:

► Select [Reset all] with [OK].

► Confirm safety query with [OK].



Step 8:

> The device deletes the entries in the event list.

► Return to the start screen with [ESC].

> That's it!

14.19 Switch operating modes

5998

Please read the following chapter for this:

→ Which operating modes are available for the AS-i master? (→ page 116)

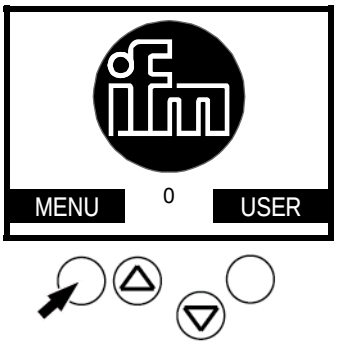
→ How to switch the operating modes for the AS-i master. (→ page 117)

14.20 Display slave data

6000

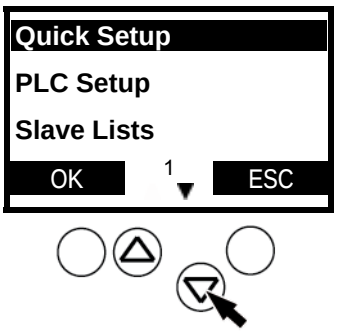
You want to know how the individual slaves are configured? You can see it here:

[MENU] > [Slave info] > Select master



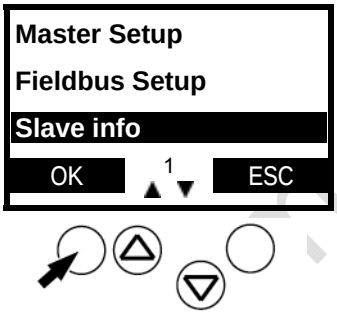
Step 1:

► Press [Menu].



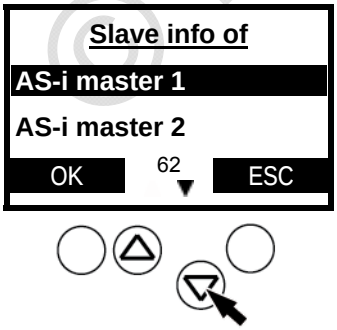
Step 2:

► Press [▼] to scroll to [Slave Info].



Step 3:

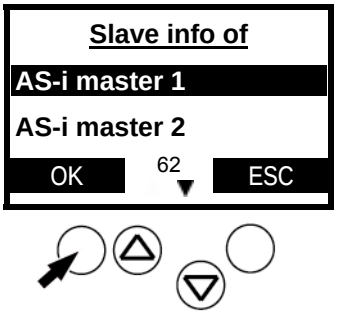
► Select [Slave info] with [OK].



Step 4:

AC1375: Menu screen not available.

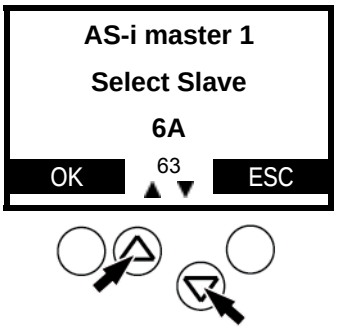
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

► Select AS-i master with [OK].



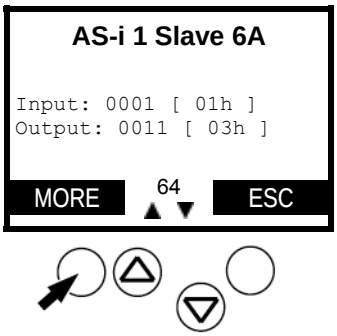
Step 6:

AC1375: Menu screen number = 31

> Display of the lowest found valid slave address.

► If necessary, press [▲] or [▼] to scroll to another slave address active on the master.

► Select the slave address with [OK].



Step 7:

AC1375: Menu screen number = 32

> Dynamic display of the digital inputs and outputs as binary value and hex value:

- Input: Digital inputs,
- Output: digital outputs.

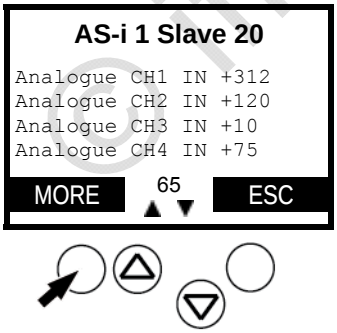
► Press [▲] or [▼] to scroll to any other slave address.

> Display of the values of the other slave address.
If the address is not assigned to an active slave:
display of values as "0000 [00h]".

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.



Step 8:

AC1375: Menu screen number = 33

> Dynamic display of the analogue (input) channels as decimal values:

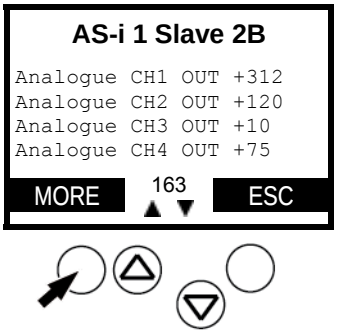
- If the slave has no analogue channel:
  Display of the value as ". . . . . .".
- If no CTT slave:
  - analogue inputs: "IN" in front of the value,
  - analogue outputs: "OUT" in front of the value.

► Press [▲] or [▼] to scroll to any other slave address.

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.



Step 9:

Figure only for CTT slaves

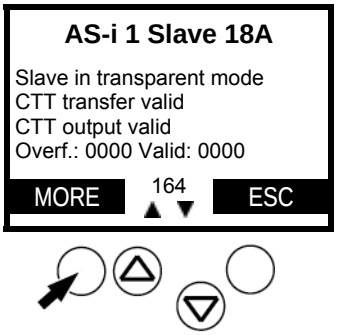
> Dynamic display of the analogue output channels as decimal values:
  - If the slave has no analogue channel:
    Display of the value as ". . . . . .".

► Press [▲] or [▼] to scroll to any other slave address.

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.



Step 10:

Figure only for CTT slaves

> Dynamic display of the flags of the analogue channels:
Meaning → chapter Status information of analogue slaves (→ page 465).

► Press [▲] or [▼] to scroll to any other slave address.

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.

6003

Step 11:

AC1375: Menu screen number = 34

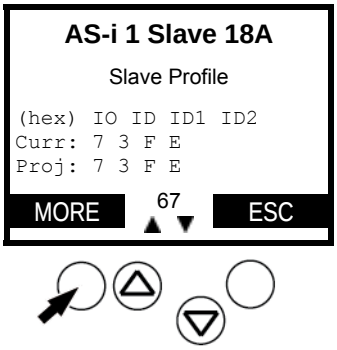
> Display in which slave lists the slave is entered:
  - LAS: list of activated slaves,
  - LDS: list of detected slaves,
  - LPS: list of projected slaves,
  - LPF: list of slaves with peripheral fault.

► Press [▲] or [▼] to scroll to any other slave address.

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.



Step 12:

AC1375: Menu screen number = 35

> Display of configuration data of the slave:

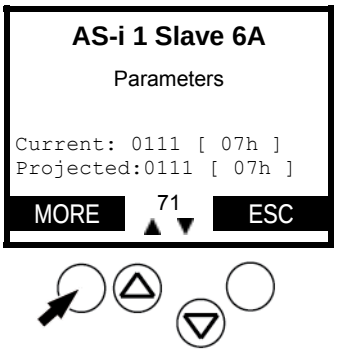
- Current: current value of the slave,
  here: slave type = S-7.3.E,
  or, if the slave is not activated on the master:
  display "F F F F",
- Projected: value which is entered in the projection table.

► Press [▲] or [▼] to scroll to any other slave address.

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.



Step 13:

AC1375: Menu screen number = 39

> Display of the parameters of the slave as binary value and as hex value:
Default value: "1111 [0Fh]":

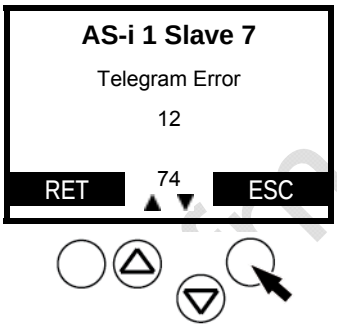
- Current: current value of the slave,
- Projected: value which is entered in the projection table.

► Press [▲] or [▼] to scroll to any other slave address.

► Scroll to the next screen with [MORE].

Alternatively:

► Press [ESC] to return to the screen in step 5.



Step 14:

AC1375: Menu screen number = 42

> Display of the number of telegram errors.

► Press [▲] or [▼] to scroll to any other slave address.

► Press [RET] to return to the screen in step 6.

OR:

► Press [ESC] to return to the start screen.

14.20.1 Status information of analogue slaves

5338

Word no.	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	analogue data channel 0 from/to slave 1 or: analogue data channel 0 from/to slave 1A															
1	analogue data channel 1 from/to slave 1 or: analogue data channel 1 from/to slave 1A															
2	analogue data channel 2 from/to slave 1 or: analogue data channel 0 from/to slave 1B															
3	analogue data channel 3 from/to slave 1 or: analogue data channel 1 from/to slave 1B															
4	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
...	→ table Details of the slave assignment (→ page 26)															
150	analogue data channel 0 from/to slave 31 or: analogue data channel 0 from/to slave 31A															
151	analogue data channel 1 from/to slave 31 or: analogue data channel 1 from/to slave 31A															
152	analogue data channel 2 from/to slave 31 or: analogue data channel 0 from/to slave 31B															
153	analogue data channel 3 from/to slave 31 or: analogue data channel 1 from/to slave 31B															
154	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0

Legend:

Vn	valid bit	1 bit	0 = values in channel n are invalid 1 = values in channel n are valid Output data must be valid (Vn = 1) to be enabled in the AS-i slave!
On	overflow bit	1 bit	0 = data is in the valid range 1 = data is in the invalid range (especially in case of input modules when the measuring range is not reached or exceeded)
OVx	output valid	1 bit	channel-independent bit "output data valid" from the slave: CTT1: 0 = more than 3.5 s have elapsed since the last update of the output values 1 = slave requests new output data within the next 3 s CTT2…CTT5: 0 = slave receives no new output data 1 = slave receives new output data **NOTE:** only valid for analogue **out**put slaves. For **in**put slaves set OVx = "0"!
TVx	transfer valid	1 bit	channel-independent bit "transfer valid" from the slave: 0 = error during transfer or: timeout 1 = transfer of analogue input/output data OK
TIx	transfer to the slave (transfer Input)	1 bit	from master profile M4 onwards: 0 = slave transmits input data as a value (15 bits long, plus sign) 1 = slave transmits input data as a bit pattern (16 bits long, no sign)
TOx	transfer from the slave (transfer output)	1 bit	from master profile M4 onwards: 0 = slave receives output data as a value (15 bits long, plus sign) 1 = slave receives output data as a bit pattern (16 bits long, no sign)

14.21 Set output values

Contents

6005

For testing it might be useful to set the value of an output without being affected by the PLC program. The device helps you.

⚠ WARNING

Risk of personal injury! Risk of material damage to the machine/plant!
After changing the slave outputs the output values remain unchanged.

The output values only change in the following cases:

- Manual new setting of the outputs via Slave Setup,
- when changing from projection mode to protected mode, unless the "slave reset" function was deactivated via the menu,
- host processes the outputs,
- deactivate and restart the gateway.

► Secure the concerned area.

► Only trained personnel is allowed to set outputs manually.

► Switch the outputs off again immediately after the end of the test!

Info

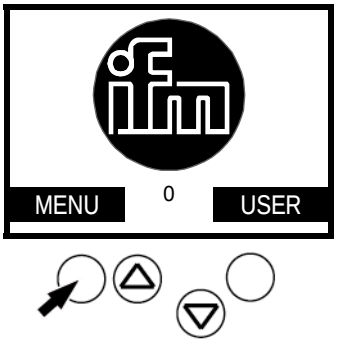
Password level 2 required: → chapter Password setting (→ page 138).
Changed values are not adopted in case of a wrong password level.

NOTE

Changes to the outputs are not effective in the following cases:

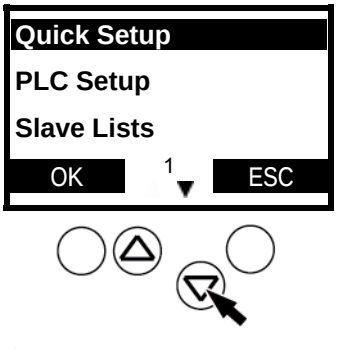
- The corresponding outputs are processed by the host.
- Changes of digital outputs on analogue modules.
- Changes of analogue outputs on digital modules.

[MENU] > [Slave Setup] > Select master > Select slave



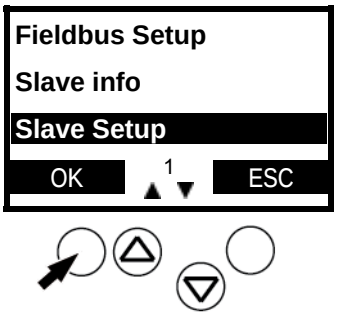
Step 1:

► Press [Menu].



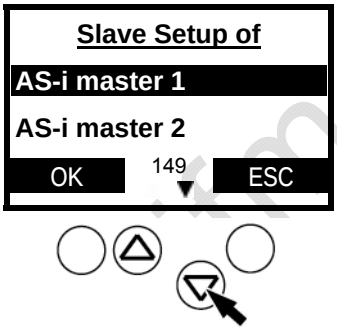
Step 2:

► Press [▼] to scroll to [Slave Setup].



Step 3:

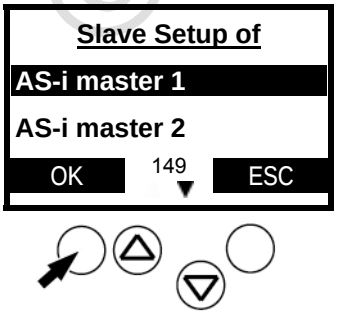
► Select [Slave Setup] with [OK].



Step 4:

AC1375: Menu screen not available.

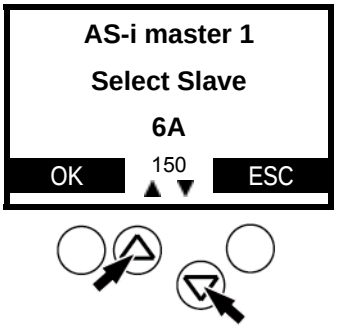
► If necessary, press [▼] to scroll to another master.



Step 5:

AC1375: Menu screen not available.

► Select AS-i master with [OK].

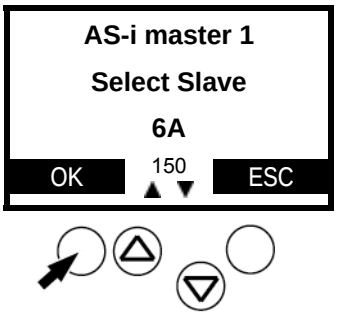


Step 6:

> Display of the lowest found valid slave address.

► If necessary, press [▲] or [▼] to scroll to another slave address active on the master.

► Select the slave address with [OK].



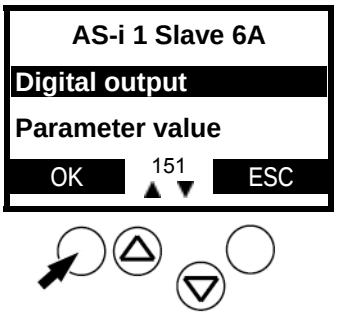
Step 7:

► Select requested slave with [OK].

As an option continue with:
→ Set digital output (→ page 469)
→ Set analogue output (→ page 471)

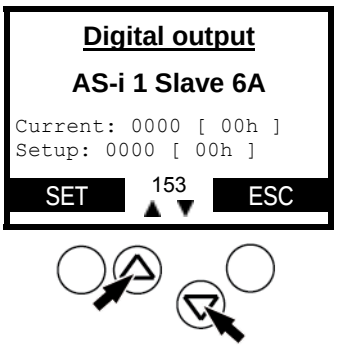
14.21.1 Set digital output

6006



Step 8:

► Select [Digital output] with [OK].

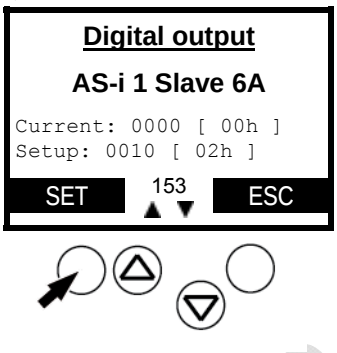


Step 9:

> Current = digital outputs current value binary / hexadecimal.

> Setup = digital outputs target value binary / hexadecimal.

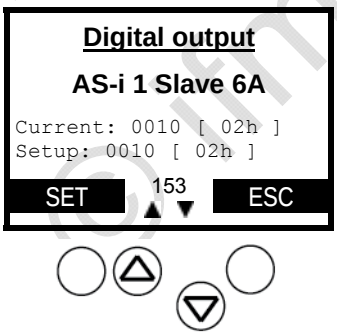
► Set the requested target value by pressing [▲] or [▼].



Step 10:

> Setup = set target value.

► Transmit the set target value to the outputs of the slaves by pressing [SET].

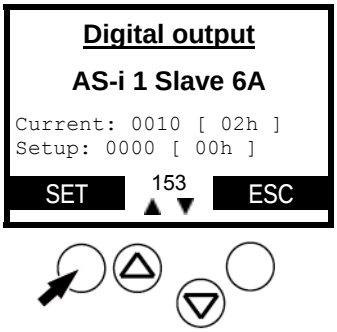


Step 11:

> Value in "Current" adopts value from "Setup".

> Outputs on the slave are switched accordingly.

> Set outputs remain on until a new setup or a new connection to the Profibus DP master changes the outputs again.

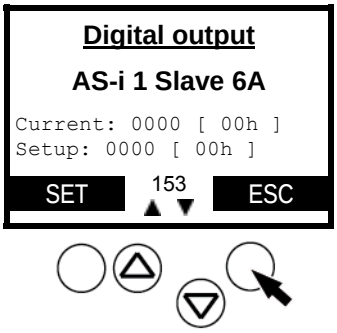


Step 12:

When the test has been finished:

► Reset of the target value to "0000" by pressing [▼]!

► Transmit the set target value to the outputs of the slaves by pressing [SET].



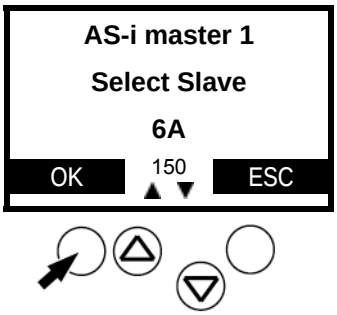
Step 13:

> Value in "Current" adopts value from "Setup".

> Outputs on the slave are switched accordingly.

> Set outputs remain on until a new setup or a new connection to the Profibus DP master changes the outputs again.

► Return to screen 150 with [ESC].



Step 14:

► If necessary, press [▲] or [▼] to scroll to another slave address active on the master.

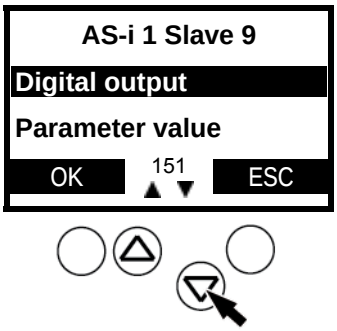
► Select requested slave with [OK].

► Repeat steps 8 to 13 accordingly.

> That's it!

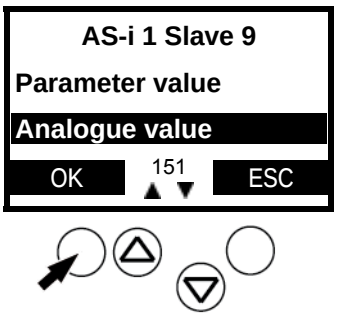
14.21.2 Set analogue output

6008



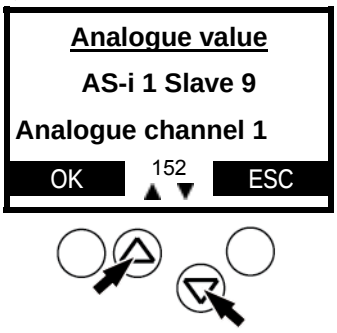
Step 8:

► Press [▼] to scroll to [Analogue value].



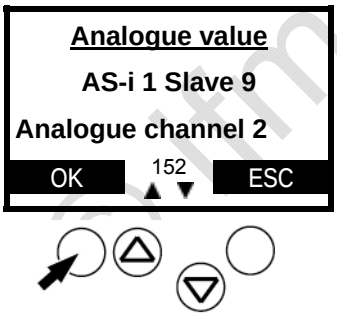
Step 9:

► Press [OK] to select [Analogue Value].



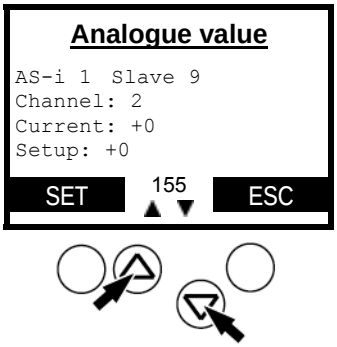
Step 10:

► Press [▲] or [▼] to scroll to the requested analogue channel.



Step 11:

► Select requested analogue channel with [OK].

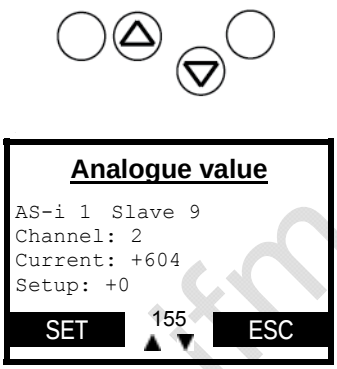


Step 12:

> Current = analogue output channel current value.

> Setup = analogue output channel target value.

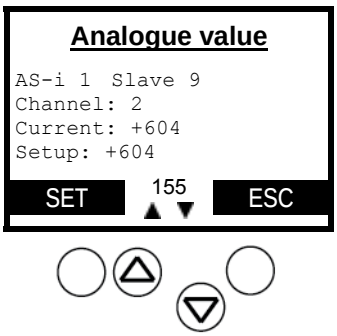
► Press [▲] or [▼] to set the requested target value:
Brief pressing: step increment 1.
Long pressing: step increment 100.



Step 13:

> Setup = set target value.

► Transmit the set target value to the outputs of the slaves by pressing [SET].



Step 14:

> Value in "Current" adopts value from "Setup".

> Outputs on the slave are set accordingly.

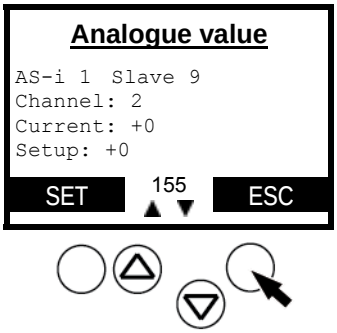
> The value of set outputs remains unchanged until a new setup or a new connection to the Profibus DP master changes the outputs again.

Step 15:

When the test has been finished:

► Reset of the target value to "0" by pressing [▼]!

► Transmit the set target value to the outputs of the slaves by pressing [SET].



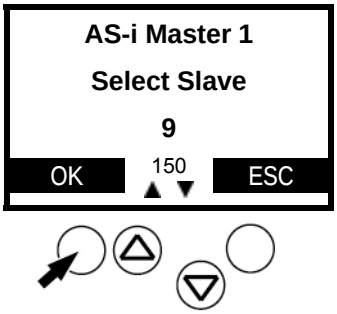
Step 16:

> Value in "Current" adopts value from "Setup".

> Outputs on the slave are set accordingly.

> The value of set outputs remains unchanged until a new setup or a new connection to the Profibus DP master changes the outputs again.

► Return to screen 150 with [ESC].



Step 17:

► If necessary, press [▲] or [▼] to scroll to another slave address active on the master.

► Select requested slave with [OK].

► Repeat steps 8...16.

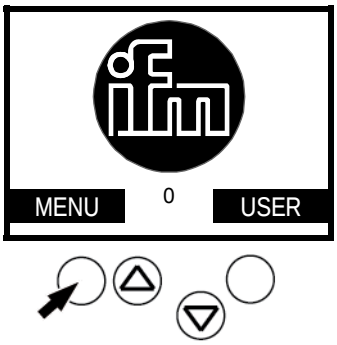
> That's it!

14.22 Display system parameters

6011

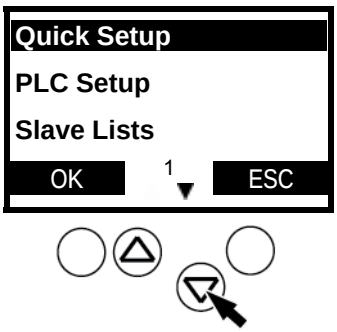
Here the device shows you everything it knows of itself.

[MENU] > [System Info]



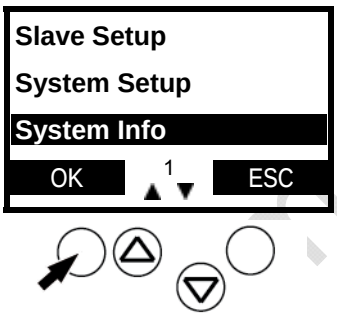
Step 1:

► Press [Menu].



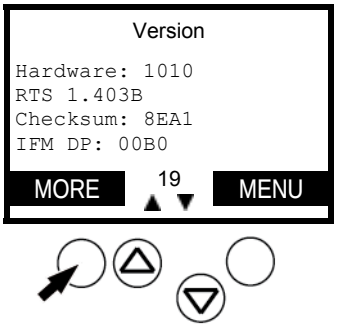
Step 2:

► Press [▼] to scroll to [System Info].



Step 3:

► Press [OK] to select [System Info].



Step 4 for AC1375:

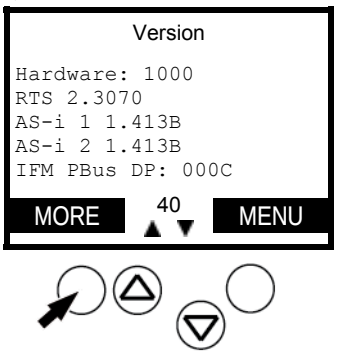
> Display of system versions:

- Information on the version of the hardware,
- operating system version of the unit,
- checksum of the operating system,
- The integrated fieldbus is Profibus DP with the indication of the ifm version.

► Press [MORE] to scroll to the next screen (→ step 6).

Alternatively:

► Scroll to screen 1 with [MENU] (main menu).



Step 4 for AC1376:

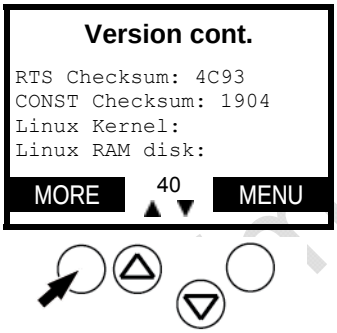
> Display of system versions (1st page):

- Information on the version of the hardware,
- operating system version of the unit,
- operating system version for master 1,
- operating system version for master 2,
- The integrated fieldbus is Profibus DP with the indication of the ifm version.

► Scroll to the next screen with [MORE].

Alternatively:

► Scroll to screen 1 with [MENU] (main menu).



Step 5 for AC1376:

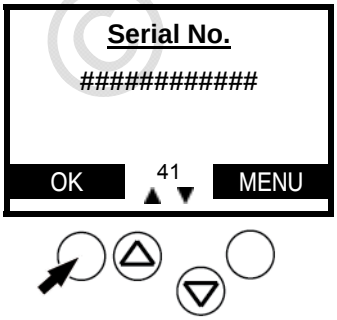
> Display of system versions (2nd page):

- checksum of the operating system,
- checksum of the system constants.

► Scroll to the next screen with [MORE].

Alternatively:

► Scroll to screen 1 with [MENU] (main menu).



Step 6:

AC1375: Menu screen number = 20

> Display of the serial number of the device.

► Scroll to the next screen with [OK].

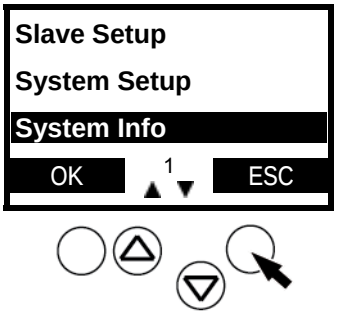
Alternatively:

► Scroll to screen 1 with [MENU] (main menu).

For more displays (according to the serial number):

Info

Password level 3 required: → chapter Password setting (→ page 138).
For the administrator mode please contact your AS-i sales specialist.



Step 7:

► Press [ESC] to return to the start screen.

> That's it!

15 Technical data

Contents

6013

15.1 General data

6014

operating voltage	20...30 V DC (PELV)
current consumption	< 0.4 A (depending on the implemented options)
ambient temperature	0...+60 °C
storage temperature	-20...+70 °C
protection rating to DIN 40050	IP 20
housing material	aluminium, galvanised steel
fixing	on DIN rail 35 mm
housing dimensions	AC1375: 138 x 85 x 68 mm AC1376: 131 x 85 x 107 mm

15.2 Data AS-i master

6016

number of AS-i masters	AC1375: 1 AC1376: 2
AS-Interface profile	M4 to version 3.0
AS-Interface voltage	26.5...31.6 V (special AS-i power supply)
current consumption from AS-i	AC1375: < 0.20 A AC1376: 0.01 A / master
microcontroller	Infineon C1610
supported V2.1 features	A/B slaves peripheral fault detection analogue plug + play (profiles 7.3 / 7.4 / CTT1) extended ID codes
supported V3.0 features	CTT2…CTT5
other features	AS-i cycle counter communication error counter per slave configuration error counter change to the protected mode without resetting the AS-i system

15.3 Interface Profibus DPV1

6017

Baud rate *)	9.6 Kbaud to 12 Mbaud
connection	SUB D 9 socket with LED for error indication
slave address range	3…126

*) The baud rate is set in the fieldbus master and is automatically transmitted from there to all fieldbus slaves.

16 Troubleshooting

Contents

6019

There are 2 different types of error messages in the device:

Handling errors and internal system errors:

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Process errors (error codes E10...E30):

- Error message appears instead of the start screen.
- No interruption of the menu operation.
- Exclamation mark flashes in the text/graphics display in the middle of the line at the bottom (only if projection mode is deactivated).
- The error message disappears again as soon as the error has been corrected.

The following tables are sorted in groups by error code.

16.1 Boot errors – error codes B00...B11

6020

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
B00	ControllerE boot error After power-on of the device, an error was found during initialisation of the individual device components. For further details please refer to the following error messages.	► Check further error messages.
B01	Master 1 initialisation Unsuccessful initialisation of the master. Possible causes: • Unacceptable interference on the 24 V power supply. • Unacceptable interference on the AS-i power supply. • Unacceptably high electrostatic charges and electromagnetic fields in close proximity of the device.	► Ground the device via the rail. ► Connect the FE terminal to the machine ground. ► Use a switched-mode power supply to supply the device with power.
B02	Master 2 initialisation	→ B01
B03	General FAT error An error was found in the data field of the "File Allocation Table" FAT.	► Check further error messages.
B04	Only one master detected The operating system can only detect 1 master in the device although 2 masters should be present. Possible cause: Hardware fault.	► Replace the device and project again.
B05	Two masters detected The operating system can detect 2 masters in the device although communication with only 1 master is allowed. Possible cause: Hardware fault.	→ B04
B06	Fieldbus type not detected During automatic detection of the integrated fieldbus no enabled fieldbus module could be detected. Possible cause: Hardware fault.	→ B04

Error message	Cause(s)	Remedy
B07	Number of masters not correct Invalid information was received when querying the versions of the masters. Possible cause: Hardware fault.	→ B04
B08	Exec. of PLC blocked by user (for gateway: reserved) When the device was started the automatic start of the PLC program was disabled by the user. The left function key of the device was pressed during power-on.	► Release function key during power-on. or: ► No action because this is requested.
B09	reserved	—
B10	Master 1 firmware obsolete The AS-i master firmware does not contain functions required for the RTS operating system.	► Update AS-i master firmware to the required minimum version.
B11	Master 2 firmware obsolete	→ B10

16.2 AS-i system errors – error codes E10...E32

6024

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
E10	Slave not activated The slave was detected in the system but not activated by the master. Detected slave profile does not correspond to the projected slave profile and the master is in the "protected mode".	► Check slave profile: [Menu] > [Slave Info]: → Display slave data (→ page 461) ► Connect slave with the right profile. ► Reproject slaves: [Menu] > [Quick Setup]: → Finish configuration (→ page 128)
E11	Slave not present Slave present in the "List of projected slaves" LPS but not detected on the AS-i master.	► Check slave connections. ► Connect slave again.
E12	Slave not projected The slave was detected on the AS-i bus but is missing in the "List of projected slaves" LPS.	► Reproject slaves: [Menu] > [Quick Setup]: → Finish configuration (→ page 128)
E13	Peripheral fault detected Peripheral fault detected on at least one connected slave.	→ Display of the list of slaves with peripheral fault (LPF) (→ page 422) → Display of slave with peripheral fault (→ page 425)
E14	Safety slave alert	Error message not active at present.
E15	Analogue protocol error	Error message not active at present.
E20	AS-i voltage error The master is in the "Protected mode" and detects that the AS-i voltage supply is not greater than 28 V. The message is only generated if at least one slave is projected.	► Check AS-i voltage supply on the master and replace - if necessary
E21	No slave detected The master is in the "Protected mode" and detects that no slave is connected to the AS-i bus. The message is only generated if at least one slave is projected.	► Check slave connections. ► Check AS-i line.
E22	Slave 0 detected The master is in the "Protected mode" and detects a slave with the address 0 on the AS-i bus. This message is only generated if the profile of the missing slave on the AS-i bus is identical to the profile of the slave with the address 0.	► Switch master to the operating mode "Projection mode": → How to switch the operating modes for the AS-i master. (→ page 117)
E23	Slave 0 has wrong profile The master is in the "Protected mode" and detects a slave with the address 0 on the AS-i bus. This message is only generated if the profile of the missing slave on the AS-i bus is not identical with that of the slave with the address 0.	► Check and replace slave. ► Reproject slaves: [Menu] > [Quick Setup]: → Finish configuration (→ page 128)

Error message	Cause(s)	Remedy
E24	Autoaddress not enabled The master is in the "Protected mode" and detects a slave with the address 0 on the AS-i bus. This message is only generated if the profile of the missing slave on the AS-i bus is identical with the profile of the slave with the address 0 and the "Automatic Addressing" in the master has not been activated.	► Activate "Automatic addressing" in the master: → Automatic individual addressing of slaves (→ page 121)
E25	Projection error The master is in the "Normal Operating Mode" and detects a projection error. Possible causes: • The profiles of the detected slaves are not identical with the projected slaves. • One or more slaves are additionally detected on the AS-i bus. • One or several slaves are missing on the AS-i bus.	► Check the detected and projected slave profile in the menu [Slave Info]. → Display slave data (→ page 461) ► Check the entries of slaves in the lists LAS, LDS, LPS, LPF in the menu [Slave Lists]. → Display of the list of detected slaves (LDS) (→ page 413) → Display of the list of projected slaves (LPS) (→ page 416) → Display list of activated slaves (LAS) (→ page 419) → Display of the list of slaves with peripheral fault (LPF) (→ page 422)
E26	General peripheral fault The master is in the "Normal operating mode" and detects that at least one slave on the AS-i bus signals a peripheral fault.	→ Display of the list of slaves with peripheral fault (LPF) (→ page 422) → Display of slave with peripheral fault (→ page 425)
E27	Normal mode not active The master reports that it is not in the "Normal Operating Mode". Possible causes:	
	1. The master detects an AS-i voltage lower than 22 V and therefore changes into the "Offline Mode".	► Check AS-i voltage supply on the master and replace - if necessary
	2. The master has received a request from the operating system to change into the "Offline Mode".	→ 1.
	3. The master has detected a transfer error in the communication with the operating system.	► Switch PLC off and on again ► If this does not help: Replace the device and project again.
	Other causes which can lead to the error message directly after the device has been switched on:	
	4. Initialisation of the master after switching on the device was not successful.	→ 3.
	5. The master has not yet received the projection nor the projected parameters from the operating system.	► Wait. ► If too long: → 4.
	6. The master has not yet been started by the operating system.	→ 5.
E28	Status command channel The command channel has detected an invalid status. Possible causes: Overwriting of the command channel by Profibus DPV1. Profibus DP module 12, word 1.	► Check request of command channel (1st word).

Error message	Cause(s)	Remedy
E29	Unknown MUX field identifier (for gateway: reserved) The transmission between AS-I master and PLC processor has been deranged.	► Check data accesses via pointers into area < 4000_h of your PLC program. ► Check the electrical environment for unacceptably high electro-magnetic fields and static charging. ► Check the grounding of the device.
E30	Safe slave triggered (1) For the indicated AS-i slave the opening of the contacts of the first safety circuit is detected.	no error status information of the runtime system
E31	Safe slave triggered (2) For the indicated AS-i slave the opening of the contacts of the second safety circuit is detected.	no error status information of the runtime system
E32	Safe slave triggered (1/2) Master has detected a "safe slave" on the AS-i line, whose inputs are constantly switched to LOW for a period > 64 ms.	► Bring the slave into the safe state.

16.3 FAT errors – error codes F01...F10

6026

FAT = **F**ile **A**llocation **T**able (part of the storage management)

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
F01	Wrong FAT checksum The checksum of the FAT contains an invalid value. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	► Ground the device via the rail. ► Connect the FE terminal to the machine ground. ► Use a switched-mode power supply to supply the device with power. ► Repeat command.
F02	Wrong FAT header The identifier in the header of the FAT contains an invalid entry. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	→ F01
F03	Wrong FAT ID The field ID of an FAT area contains an invalid value. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	→ F01
F04	Unused FAT found The FAT contains no entry. Possible cause: The user completely deleted the flash device.	► Replace the device and project again.
F05	Wrong NV field checksum The checksum of the non-volatile data within the FAT contains an invalid value. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	→ F01
F06	Wrong NV field ID The field ID of the non-volatile data contains an invalid value. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	→ F01

Error message	Cause(s)	Remedy
F07	Wrong area NV pointer The start address of the non-volatile data is outside the permitted area. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	→ F01
F08	FAT memory An error occurred during the storage of the FAT. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	→ F01
F09	NV field storage An error has occurred during the storage of the non-volatile data. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	► Repeat command.
F10	General NV mirroring An error has occurred during the change to the mirror range of the non-volatile data. Possible cause: Unacceptable interference on the 24 V power supply during the storage operation of the data in the flash device.	► Repeat command.

16.4 Flash errors – error codes F20...F30

6028

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
F20	General flash error This error message contains all unsuccessful operations which have to do with the integrated flash device. For further details please refer to the following error messages.	► Check further error messages.
F21	Bad flash command The operating system has received an invalid command for the flash function block. Possible cause: Error in the command from the PLC.	► Check and correct command. ► Repeat command.
F22	Deletion of flash sector The flash device has not executed the command to erase a flash sector. Possible cause: Access to the flash module which is currently processing commands.	► Repeat command.
F23	Flash write verify failed The data to be stored in the flash device could not be verified. Possible cause: Access to the flash module which is currently processing commands.	► Repeat command.
F24	Flash device: Timeout The flash device reports a timeout during a command execution. Possible cause: Access to the flash module which is currently processing commands.	► Repeat command.
F25	Flash device: Command The flash device received an invalid command. Possible cause: Software error in the operating system.	► Check and correct command. ► Repeat command.
F26	Flash system: Timeout The operating system has found a timeout during the execution of a flash command. Possible cause: Access to the flash module which is currently processing commands.	► Repeat command.

Error message	Cause(s)		Remedy
F27	Deletes PLC sectors in the flash (for gateway: reserved) The attempt to delete the sectors in which the PLC program is stored was unsuccessful. Possible causes:		
	1.	The sectors were blocked against overwriting (AC1325 and AC1326).	► Command not possible.
	2.	Access to the flash module which is currently processing commands.	► Repeat command.
	3.	Flash device defective.	► Replace the device and project again.
F28	Storage PLCPRG in the flash (for gateway: reserved) Storing the PLC program in the flash device failed. Possible causes:		
	1.	The sectors were blocked against overwriting (AC1325 and AC1326).	► Command not possible.
	2.	Access to the flash module which is currently processing commands.	► Repeat command.
	3.	Flash device defective.	► Replace the device and project again.
F29	Storage NV in the flash Storing of the non-volatile data in the flash device was unsuccessful (%MB... [Var_Retain]). Possible causes:		
	1.	Access to the flash module which is currently processing commands.	► Repeat command.
	2.	Flash device defective.	► Replace the device and project again.
F30	PLC protection (for gateway: reserved) The attempt to store the PLC program in the flash device was unsuccessful. Possible cause: The PLC program was protected against overwriting.		► Disable write protection via program `freeflash.pro`.

16.5 Information errors – error code I01

6030

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
I01	Flash Sector switched (for gateway: reserved) The runtime system RTS changed the flash sector for storage of the non-volatile data. If this information appears several times in one hour: Cause: Non-volatile data is cyclically stored without permission. **NOTE:** After 100 000 write operations an error is to be expected when storing the non-volatile data. Example: At 1 storage operation per minute, the maximum write cycles are reached after about 69.5 days.	no error status information of the runtime system ► Store non-volatile data only if required, never cyclically!

16.6 AS-i master command errors – error codes M01...M44

6032

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
M01	Command execution error An error has occurred during the execution of an AS-i command which has stopped the execution of the command. For further details please refer to the following error messages.	► Check further error messages.
M02	Slave not found It was tried to access a slave which is not on the AS-i bus by means of an AS-i command. The slave is not in the LDS.	► Check slave connections. ► Connect slave again.
M03	Slave 0 found The master detects a slave with the address 0 on the AS-i bus and can therefore not execute the command. **Example:** The address of a slave is to be changed while a slave with the address 0 is present on the AS-i bus.	► Remove slave with the address 0 or address it correctly.
M04	Slave with same address found During the execution of a command the master detects that there is already a slave at the requested address on the AS-i bus. **Example:** The address of a slave is to be changed to an address which is already assigned to another slave on the AS-i bus.	► Remove one of the slaves with double address. ► Readdress the remaining slave. ► Reactivate the removed slave.
M05	Delete the old slave address The attempt to reprogram a slave to the address 0 fails. **Example:** AS-i slave has a limited number of possibilities to change the address, these are now exhausted.	► Replace slave.
M06	Reading "Extended ID Code 1" The master receives no or no valid response when reading the "Extended ID code 1". **Example:** Attempt to readdress an A/B slave to another address.	► Repeat command.
M07	Writing to slave failed:	
	1. The attempt of the master to readdress a slave to the new target address fails.	► Repeat command.
	2. Writing the "Extended ID Code 1" on slave 1 fails. **Example:** Attempt to readdress an A/B slave to another address.	► Repeat command.

Error message	Cause(s)		Remedy
M08	New address only stored temporarily During the readdressing of a slave the new address could not be written to the slave because the slave is no longer detected on the AS-i bus. Possible causes:		
	1.	Double addressing.	→ M04
	2.	Major bus interference.	► Remove the cause of the interference.
M09	Extended ID1 temporarily stored While writing the "ID Code 1" to the slave the code could not be written to the slave because the slave is no longer detected on the AS-i bus. Possible causes: • Double addressing. • Major bus interference.		→ M08
M10	Slave not in LAS The master detects that a slave has not been activated. Possible causes: The slave profile in the projection data is not identical with the profile of the detected slave and the master is in the "Protected Mode".		► Switch master to the operating mode "Projection mode": → How to switch the operating modes for the AS-i master. (→ page 117) ► Check and replace slave. ► Reproject slaves: [Menu] > [Quick Setup]: → Finish configuration (→ page 128)
M11	Slave data invalid This error message has a multiple meaning and thus depends on the requested command:		
	1.	Readdressing of the slave Address 32 = 0B was indicated as target address.	Address 0B is not valid. ► Indicate valid address.
	2.	Write parameters The attempt has been made to write a value greater than 7_{hex} to an A/B slave, ID=A_{hex}.	► Indicate valid value.
M12	Sequence failure During the transfer according to the "7.4 slave protocol" the master detected an error in the triple sequence of the slave. Possible causes:		
	1.	Interference on the bus.	► Remove the cause of the interference.
	2.	Software error in the AS-i slave.	► Contact AS-i specialist or manufacturer.
M13	Timeout during sequence transmission (for gateway: reserved) During the transfer to the "7.4 Slave protocol" the master detected a timeout in the communication with the operating system. Possible cause: • Long PLC cycle which slows down the transfer of the individual 7.4 segments from the operating system or PLC to the master to an unacceptable degree: t > 1 sec. • If this case occurs, the master will end the 7.4 transfer started last and will again enter into normal data exchange with the respective slave.		► Shorten cycle by optimising the PLC program. ► Avoid program loops and complex arithmetic operations.

Error message	Cause(s)		Remedy
M14	Invalid address This error message has a multiple meaning and thus depends on the requested command:		
	1.	The attempt was made to write a parameter to slave 0.	► Correct the slave address to a value of $1...31_{dec}$.
	2.	During readdressing the address 0 or 0B was indicated as start and target address.	► Indicate valid address.
	3.	During the attempt to write the "Extended ID code 1" the address 0 was used.	► Indicate valid address.
M15	Slave interrupted 7.4 transfer The addressed 7.4 slave has stopped the transfer. Possible cause: Error in the 7.4 data of the PLC. Possible causes:		
	1.	Interference on the bus.	► Remove the cause of the interference.
	2.	Software error in the AS-i slave.	► Contact slave manufacturer.
M16	Slave deleted during active transfer During an active 7.4 protocol transfre the slave was deleted from the list of active slaves by the master. Possible cause: Interference on the bus.		► Remove the cause of the interference.
M17	7.4 transfer active The attempt was made to start a new 7.4 transfer during an active 7.4 protocol transfer.		► Repeat command.
M18	7.4 host sequence failure The sequence bit was set to 1 by the host or the PLC although a value < 30_{dec} was indicated in the "Dlen" data field.		► Correct value "Dlen". or: ► Change sequence bit.
M19	Invalid 7.4 data length The indicated data length "Dlen" is not a multiple of the factor 3.		► Correct value "Dlen". A 7.4 protocol transfer always consists of several data triples.
M20	Invalid command Master received an unknown command.		► Check the cause for the wrong command and correct.
M21	Safety monitor protocol error During the processing of the safety monitor protocol a transmission error occurred. Possible cause: Interference on the bus.		► Check the cause for the wrong command and correct.
M22	Timeout command The execution of the master command exceeded the permissible execution time. The command was cancelled.		► Remove the cause of the interference. Details → command description
M23	Command requirements not met The necessary conditions for the execution of the master command to be executed are not met.		► Correction of parameters which are necessary for the execution of the AS-i master command! Details → command description
M24…M32	reserved		—

Error message	Cause(s)	Remedy
M33	Internal safety protocol error Error when processing the safety monitor protocol on the AS-i line, phase "Init A".	► Improve the transmission quality on the AS-i line. ► To do so, monitor the telegram error counter. If the counter values change: ► Check AS-i line for earth fault using earth fault monitor. ► Modify the laying of the AS-i line so that no more telegram errors occur.
M34	Internal safety protocol error Error when processing the safety monitor protocol on the AS-i line, phase "Init B".	→ M33
M35	Timeout on Safety Protocol Timeout when processing the safety monitor protocol on the AS-i line.	→ M33
M36	SubCmd invalid The sub-command entry of the command _PCS_SAFETY_MONITOR is invalid.	► Only use permitted sub-commands.
M37	Slave address has no profile S-7.F.F The slave to be added to the list "LPM" (list of projected (safety) monitors) does not have the allowed profile in the CDI data.	► Correct the slave address to the address of a slave with the profile S-7.F.
M38	Slave address outside range 1...31 The slave to be added to the list "LPM" does not have the allowed address.	► Correct the slave address to a value of $1...31_{dec}$.
M39	LPM already full The LPM list is already full so that no other entries can be added.	► Delete a superfluous slave that already is in the LPM. ► Check distribution of the slaves to the AS-i masters and modify, if necessary.
M40	Slave address already given in the LPM	► Delete wrong slave from the LPM.
M41	Slave-Adresse in der LPM unbekannt	► Slave in der LPM speichern.
M42	Monitor protocol changed The safety monitor protocol was interrupted during processing. The last received data are probably not consistent.	► Retrieve the last received data once again.
M43	HostCmd loop timeout Processing of the command "_PCS_SAFETY_MONITOR" could not be started within the permitted time.	► Check PLC command channel for cyclical use. ► Interrupt cyclical use.
M44	Internal safety protocol error During processing of the protocol of the safety monitor an error occurred in the internal "AS-i master state machine".	► Project AS-i master again.

16.7 RTS errors – error codes R01...R43

6040

RTS = **R**un**t**ime **S**ystem (= operating system of the device)

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
R01	Unknown RTS operating mode The operating system does not recognise the set operating mode of the device ("RUN" / "STOP" / "GATEWAY"). Possible cause: Modification of the device from a gateway variant into a device with PLC support.	► Switch the device off and keep the left function key pressed during the switch-on operation.
R02	Master 1 MUX field error During the transfer of the MUX fields from the operating system the master detected an invalid field number. Possible causes:	
	1. Parts of the operating system have been overwritten by the PLC.	► Check the cause for the wrong command and correct. ► Reinstall operating system.
	2. Unacceptable interference on the 24 V power supply.	► Ground the device via the rail. ► Connect the FE terminal to the machine ground. ► Use a switched-mode power supply to supply the device with power. ► Repeat command.
R03	Master 2 MUX field error	→ R02
R04	Master 1 protocol error (EDET) The master has detected a protocol error during the transfer of the data fields.	→ R02
R05	Master 2 protocol error (EDET)	→ R02
R06	General RTS program failure The operating system has detected an invalid status in the process while executing the program internally. Possible cause: Operating system software error.	► Reinstall operating system.
R07	Projection mode not active It was tried to execute an AS-i command which is only permitted in the projection mode.	► Switch master to the operating mode "Projection mode": → How to switch the operating modes for the AS-i master. (→ page 117)

Error message	Cause(s)		Remedy
R08	No PLC program loaded (for gateway: reserved) The attempt was made to start a PLC program although no program had been loaded to the controllerE.		► Load PLC program to the controllerE: → chapter Connect the programming device
R09	RS-232 recognition baud rate (for gateway: reserved) The hardware of the integrated serial interface chip has found a transfer error in the RS-232 data flow. Possible causes:		
	1.	Baud rate setting in the device different from the setting in the PC.	► Adapt baud rate
	2.	Other programs (e.g. messenger) send via the RS-232 interface of the PC.	► Exit other programs on the PC.
R10	RS-232 buffer overflow A buffer overflow was found in the serial receive buffer of the RS-232 interface. Possible causes:		
	1.	RS-232 telegram too long or baud rate too high.	► Check driver or reduce baud rate.
	2.	Faulty connection cable between PC and RS-232 connection on the device.	► Replace connection cable.
R11	RS-232 parity check The parity check of the serial data flow of the RS-232 interface was unsuccessful. Possible cause: Electromagnetic interference.		► Reduce interference on the RS-232 cable by means of the following measures: - Screen cable, - Reduce cable length, - Remove interfering source.
R12	ASC0 handler switched The decoding of the serial data flow was changed. Possible cause: Command for switching the device to the test mode / normal operating mode during serial data flow.		► Remove error in the protocol driver.
R13	24 V voltage unstable During normal operation voltage drops below 1 V were found on the 24 V power supply cable.		► Permanently stabilise 24 V supply voltage above 20 V. Better: ► Use a switched-mode power supply to supply the device with power.
R14	24 V voltage error restart The voltage failure of the 24 V power supply caused the device to start again.		► Acknowledge message. ► The device resumes the normal operating mode. ► In future: Use a switched-mode power supply to supply the device with power.

Error message	Cause(s)		Remedy
R15	C165 Watchdog Timeout The main processor has detected a timeout. Possible causes:		
	1.	Unacceptable interference on the AS-i power supply.	► Ground the device via the rail. ► Connect the FE terminal to the machine ground. ► Use a switched-mode power supply to supply the device with power.
	2.	Unacceptably high electrostatic charges and electromagnetic fields in close proximity of the device.	→ 1.
	3.	Hardware error.	► Replace the device and project again.
	4.	Operating system software error.	► Reinstall operating system.
R16	Software restart The main processor has detected a restart of the device which was not caused by a voltage failure.		► Find the reason, maybe also further error messages.
R17	Device waits for 24 V (for AC1375: reserved) After power-on of the device an unacceptably low 24 V power supply of < 18 V was detected.		→ R14
R18	Master 1: Host WDT error The AS-i master signals a timeout during the communication with the fieldbus master (host). During the continuous communication of the master with the operating system the master has detected a timeout. Possible causes:		
	1.	Voltage drops on the 24 V power supply cable.	► Use a switched-mode power supply to supply the device with power.
	2.	Operating system software error.	► Reinstall operating system.
R19	Master 2: Host WDT error		→ R18
R20	Profibus DP configuration The configuration of the Profibus master for the device is not valid. Possible causes: Module lengths incorrect. Number of modules incorrect. Sum of the data lengths across all modules too large.		► Check the received data lengths in the menu [Fieldbus Setup].
R21	No ifm Profibus DP interface present A Profibus DP card is expected in the device, however, it has not been detected. Possible cause: Wrong operating system in the device: **e.g.:** AC1325 operating system software in an AC1311.		► Install valid operating system.

Error message	Cause(s)	Remedy
R22	DP parameter invalid The parameter setting of the Profibus master for the device is not valid. Possible causes: Structure of the parameter field incorrect. Length of the parameter field incorrect. Coding of the different parameters does not correspond to the specification.	► Adopt parameter field from the `GSD` file and modify it according to the specification.
R23	DP parameter download The attempt to download the current / projected parameters of the AS-i slaves via the Profibus was unsuccessful. Possible causes: The slave to which the parameter was to be written was deleted from the list of detected slaves. A timeout was found during the execution of the AS-i command "Write Parameter".	► Disconnect from the Profibus master. ► Reestablish the connection to the Profibus master. ► Download current / projected parameters of the AS-i slaves via the Profibus.
R24	Missing pos. CPTE edge During communication with the master a change in the state of the control signal was not detected. Possible cause: Operating system software error.	► Reinstall operating system.
R25	Master 1: Abnormal condition The master reports that it is not in the "Normal Operating Mode". Possible causes:	
	1. The master detects an AS-i voltage smaller than 22 V and therefore changes into the "Offline Mode".	► Use a switched-mode power supply to supply the device with power.
	2. The master has received a request from the operating system to change into the "Offline Mode".	► Check the cause for the wrong command and correct.
	3. The master has detected a transfer error in the communication with the operating system.	→ R15
	4. With the AS-i power supply connected the master detects that no slave is connected to the AS-i bus.	► Check and correct the wiring on the AS-i bus.
	Other causes which can lead to the error message directly after the device has been switched on:	
	5. Initialisation of the master during power on of the device was not successful.	→ Boot errors – error codes B00...B11 (→ page 480) error message B01
	6. The master has not yet received the projection nor the projected parameters from the operating system.	→ 5.
	7. The master has not yet been started by the operating system.	→ 5.
R26	Master 2: Abnormal condition	→ R25

Error message	Cause(s)	Remedy
R27	Profibus PLC access violation (for gateway: reserved) The PLC has tried to access the protected address range of the Profibus DP ASIC. Possible cause: A PLC project was loaded with the support of an Anybus fieldbus card.	► Remove functions from the PLC project which make use of an Anybus card.
R28	Password protected A functionality of the device was requested which is not allowed with the currently active password.	► Set higher password level: → Password setting (→ page 138)
R29	PC command unknown An unknown command was received In the "Test Mode" operating mode of the device.	► Check the cause for the wrong command and correct.
R30	PC checksum error An invalid checksum was detected in the "Test Mode" operating mode in the data flow of the device.	► Configure data flow according to the specification.
R31	Menu not available The selected menu could not be displayed. Possible causes:	
	1. Required hardware is not available in the device.	► Check device by means of data sheet.
	2. Required hardware was not detected by the RTS operating system.	► Switch the device off and on again.
R32	RTS checksum error The checksum of the runtime system does not correspond to the stored checksum. Possible causes:	
	1. Faulty flash memory.	► Replace faulty device.
	2. Strong ESD fields in case of unacceptable grounding of the device.	► Minimise ESD fields. ► Correct grounding of the device.
R33	reserved	—
R34	Error in font data The data of the character set is not correct. Possible causes: • No data is available in the areas where font data is expected. • The expected formatting is not correct.	► Reprogram the firmware or send the device to the after-sales service.
R35	Error in menu text Possible causes: • No data is available in the areas where menu text is expected. • The expected formatting is not correct.	→ R34
R36	Error in user language Text of the user language is incorrect.	→ R34
R37	Error in text format The indicated text format is incorrect.	→ R34
R38	reserved	—

Error message	Cause(s)	Remedy
R39	reserved	—
R40	Const. data checksum error A checksum error occurred in the const. areas (character sets, system language, user language) of the runtime system.	► Reprogram the firmware or send the device to the after-sales service.
R41	reserved	—
R42	reserved	—
R43	reserved	—
R44	Invalid AS-i command	► Correct command number to a valid value.
R45	DP module 12 illegal word access When configuring the Profibus DP modules, an invalid value (odd address) was detected for the memory to be transmitted.	► Check and correct the defined data lengths of the modules 1...11 in the GSD file.
R46	Internal DP stack error A fatal error was detected in the Profibus DP stack.	► Reprogram the firmware or send the device to the after-sales service.

16.8 Timeout errors – error codes T00...T13

6043

- Menu operation interrupted.
- Error message superposes the menu screen.
- Error message only disappears after the following actions:
  1. Error removed AND
  2. Error message acknowledged with the right function key.

Error message	Cause(s)	Remedy
T00	Timeout communication master The operating system has detected a timeout during communication with the master. Possible causes: • Unacceptable interference on the 24 V power supply. • Unacceptable interference on the AS-i power supply. • Unacceptably high electrostatic charges and electromagnetic fields in close proximity of the device.	► Ground the device via the rail. ► Connect the FE terminal to the machine ground. ► Use a switched-mode power supply to supply the device with power.
T01	Timeout system cycle A system cycle took too long. Possible cause: Overwriting of parts of the operating system in SRAM by the PLC.	► Check the cause for the wrong command and correct.
T02	Timeout AS-i 1 command channel 1 The operating system has detected a timeout during the execution of a command for the master 1 on channel 1. Possible cause: The status information of the command channel has been overwritten by the PLC.	→ T01
T03	Timeout AS-i 1 command channel 2	→ T01
T04	Timeout AS-i 2 command channel 1	→ T01
T05	Timeout AS-i 2 command channel 2	→ T01
T06	reserved	—
T07	Timeout command channel (for gateway: reserved) During the execution of a command started by the PLC a timeout was detected. Possible causes: Overwriting the status information of the command channel by the PLC or an installed fieldbus.	► Check the cause for the wrong command and correct.

Error message	Cause(s)		Remedy
T08	Timeout command channel request During the attempt to start a command on the command channel a timeout was detected. Possible causes: The status information of the command channel has been overwritten by the PLC. Permanent use of the command channel by the installed fieldbus.		→ T07
T09	Timeout fieldbus communication A timeout was detected during the communication of the device with the connected fieldbus. This monitoring is active after a first communication of the device via the connected fieldbus. Possible causes:		
	1.	Fieldbus master has stopped the communication.	► Check the cause for the wrong command and correct.
	2.	Connection cable interrupted.	► Check and correct connection cable.
T10	Timeout for master mode Switching the master to another operating mode failed Possible causes:		
	1.	AS-i cable too long.	► Install repeater (e.g. AC2225).
	2.	AS-i cable not terminated.	► Install bus termination (e.g. AC1147).
T11	Timeout MUX update (for gateway: reserved) A timeout was detected when updating the MUX fields, e.g.: analogue values of slaves 1...31. Possible causes:		
	1.	Parts of the operating system have been overwritten by the plc.	► Check the cause for the wrong command and correct.
	2.	Interference on the 24 V power supply cable.	► Use a switched-mode power supply to supply the device with power.
T12	Only in AC1345/46, AC1355/56, AC1365/66, AC1375/76 Timeout when sending DP diagnosis The DP user diagnosis could not be transmitted. Possible causes:		
	1.	Interference on the Profibus DP.	► Check the layout of the Profibus system.
	2.	The DP master no longer exchanges data with the device.	► Check function of the Profibus master and the connection.
T13	reserved		—

16.9 List of errors

6044

Incorrect behaviour	Cause(s)	Remedy
Device does not display the start screen after power-on: Text/graphics display blank or not readable. LEDs light / flash mazily.	error in the contents of the PLC memory, e.g.: program error in the boot project	► Switch off the device. ► Press the left function key and keep it pressed. ► Switch on the device again. Display can be read again. ► Release the function key. Start of the boot project is disabled. PLC is in the operating mode "STOP". ► Check PLC program in the PC and correct. ► Store PLC program in the device and create it as boot project.
	electromagnetic incompatibility	Voltage supply does not correspond to the AS-i rule? ► Correct it. Grounding not according to specifications? ► Correct it. Strong interference by neighbouring machines? ► If possible: Change location. ► Correct or screen interfering machines.
The text/graphics display indicates nothing any more (only background illumination active). All other functions of the device are not affected.	system errors	► [▲] and [▼] pressed simultaneously for about 2 seconds. Text/graphics display is reinitialised. Language selection is active. ► Quit language selection with [ESC].
The LDS slave list does not show any slave with the address 0 although such a slave has just been connected.	there is at least one other slave with the address 0 connected to the master	► Remove the last slave with the address 0 from the bus. ► Program the old slave with the address 0 to the intended address → Automatic individual addressing of slaves (→ page 121) → Manual slave addressing (→ page 124). ► Reactivate the previously removed slave. ► Reconfigure the device → Finish configuration (→ page 128)

Incorrect behaviour	Cause(s)	Remedy
2 identical slaves with the same address on the AS-i master.	a) slave replacement: • Slave was replaced. • The new slave did not have the address "0" before.	Red LED on the slave is lit: slave was not correctly addressed. Error message on the master: "slave not present".
	b) set-up: Master in the projection mode • New slave addressed using handheld addressing unit and then connected.	The red LED on the slave lights when the address is already occupied: slave was not correctly addressed.
	c) set-up: Master not in the projection mode	For all readdressed and connected slaves the red LEDs light: slaves were not correctly addressed ► Reconfigure the device → Finish configuration (→ page 128) In case of slaves with different profiles: Red LED on the slave is lit: slave was not correctly addressed. In case of slaves with the same profile: At first everything is ok, until you have different input signals. Then, the message "configuration error" is displayed.
When changing the address of A/B slaves the device sometimes freezes in the "Wait" display.	system errors	► Leave the menu item with [ESC] (= right button).

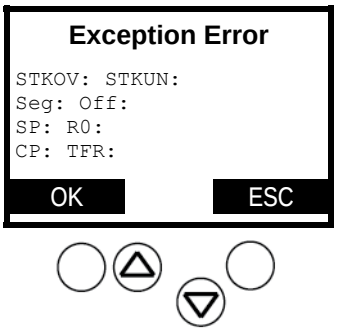
16.10 How does the device react in case of a fault?

6045

Faults displayed during operation	Reaction
The slave is disconnected from the AS-i bus.	Slave without watchdog: Output signals remain unchanged. Slave with watchdog: Outputs switched off. AS-i master as PLC: **IMPORTANT:** Evaluate the slave failure in the PLC program. If necessary: Stop the machine/plant.
The AS-i master is disconnected from the fieldbus.	AS-i master as gateway: Outputs switched off. AS-i master as PLC: Input signals from the fieldbus master are reset. PLC triggers AS-i outputs with "0". **IMPORTANT:** Evaluate the fieldbus failure in the PLC program. If necessary: Stop the machine/plant.
The device fails as fieldbus slave.	Effect → Description of the fieldbus master (host).

16.11 Hardware errors, exception errors

6046



> The main processor has detected an exception error.

> All current activities are interrupted.

► Switch the device off and on again.

► If without success: Note down the display indications and contact a sales specialist.

The following entries in the TFR register give further details about the error cause:

TFR register															
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
NMI	STKOF	STKUF	–	–	–	–	–	UNDOPC	–	–	–	PRTFLT	ILLOPA	ILLINA	ILLBUS

Bit	Name	Possible error source
NMI	non maskable interrupt	hardware
STKOF	stack overflow	hardware
STKUF	stack underflow	hardware
UNDOPC	unknown machine command	hardware
PRTFLT	32 bit execution code error	hardware
ILLOPA	invalid access to 16-bit operand	hardware
ILLINA	invalid jump address	hardware
ILLBUS	invalid access to external bus	hardware

Examples:

TFR 0004_{16}	$0000\ 0000\ 0000\ 0100_2$	Invalid access to 16-bit operand, e.g. by the PLC
TFR 0002_{16}	$0000\ 0000\ 0000\ 0010_2$	invalid jump address, e.g. by the PLC

17 Glossary of Terms

A

A/B slave

AS-i slave with an A or B being appended to its address number and which may therefore be present twice on the →master.

Acyclic data transmission

Usually data are transmitted to one slave at a time by the master once per cycle (= cyclic data transmission). Data transmission only at certain events (e.g. when the device is switched on or when values have been changed) is called acyclic data transmission.

Address

This is the "name" of the bus participant. All participants need a unique address so that the signals can be exchanged without problem.

Application software

Software specific to the application, implemented by the machine manufacturer, generally containing logic sequences, limits and expressions that control the appropriate inputs, outputs, calculations and decisions

Necessary to meet the specific (→SRP/CS) requirements.
→ Programming language, safety-related

Architecture

Specific configuration of hardware and software elements in a system.

AS-i

The AS-Interface (AS-i = Actuator Sensor Interface) is a standard for fieldbus communication to EN 50295 and IEC 62026-2. It was developed for the connection of actuators and sensors with a simple wiring to replace the conventional parallel wiring.

An unscreened two-wire yellow flat cable (max. 500 m) serves for data transmission as well as for voltage supply (24...30 V DC) for the communication electronics and for participants with a low current requirement. Loads with a greater energy requirement additionally receive a separate (black) flat cable for energy supply with 24 V DC.

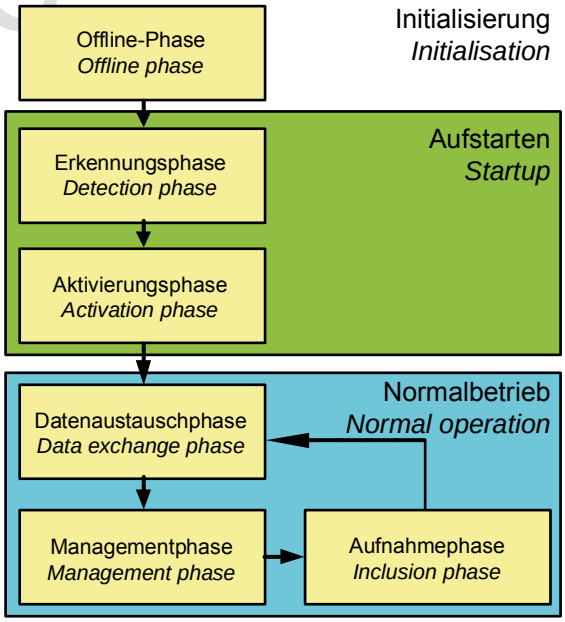
AS-Interface is a single master system. Up to 62 slaves can be connected per master. Each of these slaves needs an unambiguous address. The master cyclically polls (→polling) all projected slaves and exchanges the up to 248 input data and 186 output data with them.

More information → www.as-interface.net AS-International Association (user association)

AS-i cycle

An AS-i cycle contains the data exchange of up to 31 slaves plus a telegram inclusion phase plus, if required, a telegram management phase (→ AS-i phases (status machine) (→ page 507)). In the case of the extended addressing mode, two AS-i cycles are required for data transfer to all A/B slaves.

AS-i phases (status machine)



- Offline phase: No AS-i data traffic takes place during initialisation.
- Detection phase: In the detection phase, the AS-i master first of all searches for existing slaves - irrespective of whether they are projected or not.
- Activation phase: In this phase, the found slaves are activated depending on the operating mode.

- Data exchange phase: The AS-i master carries out cyclical data exchange with the activated slaves.
- Management phase: At the end of a cycle the AS-i master goes into the management phase, during which the master can send a command to a specific slave (if requested).
- Inclusion phase: After this, the AS-i master goes into the inclusion phase, during which it sends a command to a free slave address to detect new slaves.

ASIsafe

The name for Safety at Work used by Siemens.

B

Baud

Baud, abbrev.: Bd = unit for the data transmission speed. Do not confuse baud with "bits per second" (bps, bits/s). Baud indicates the number of changes of state (steps, cycles) per second over a transmission length. But it is not defined how many bits per step are transmitted. The name baud can be traced back to the French inventor J. M. Baudot whose code was used for telex machines.

1 MBd = 1024 x 1024 Bd = 1 048 576 Bd

Burst errors

Burst errors are errors occurring depending on others. The class indicates the maximum permissible number of burst errors:
Class 1 = high protection,
Class 2 = lower protection etc.

Bus

Serial data transmission of several participants on the same cable.

C

CCDI

CCDI = **C**TT **C**onfiguration **D**ata **I**mage = current CTT configuration

Configuration of 7.4 and 7.5 slaves currently determined by the AS-i master:
- Manufacturer ID,
- Vendor ID,
- Device ID,
- Device Group ID.

CDI

CDI = **C**onfiguration **D**ata **I**mage = current AS-i configuration

The configuration of the connected AS-i slaves determined by the AS-i master:
LDS and AS-i profiles (IO, ID, ID1, ID2)

CoDeSys

CoDeSys® is a registered trademark of 3S – Smart Software Solutions GmbH, Germany.

"CoDeSys for Automation Alliance" associates companies of the automation industry whose hardware devices are all programmed with the widely used IEC 61131-3 development tool CoDeSys®.

Homepage → http://www.3s-software.com

ControllerE

Master in the AS-i bus system of the generation E.

CTT

e.g. CTT2 = Combined Transaction Type 2
→ Combined transaction – Use of analogue channels in the gateway depending on the slave profile (→ page 39)

Cycle time

This is the time for one cycle. The following happens:

- PLC cycle: The PLC program performs one complete run.
- AS-i cycle: all AS-i slaves are updated (5...10 ms).
  The cycle time mainly depends on the AS-i slaves involved in the data exchange. Message errors and management phase may extend the cycle time (⇒ no constant cycle time).

Cyclic data transmission

Data are transmitted to one slave at a time by the master once per cycle.

Cyclical polling

AS-i master cyclically polls the data of all →slaves in the bus (see above). The data is updated in the →master after max. 5 ms. If A/B slaves are used, the →cycle time can be extended to 10 ms.

D

Data image (AS-i)

see →process image; Sum of all digital and analogue input and output data.

As regards the time, the data image represents the current condition of each individual slave and NOT a consistent image of the entire AS-i network at an exact point in time.

DeviceNet

Fieldbus system for larger data volumes based on →CAN technology, requires special cables, complex connection technology. Can be used e.g. as a supplier for AS-i over longer distances. Corresponding →gateways are available.

DHCP

DHCP = **D**ynamic **H**ost **C**onfiguration **P**rotocol = protocol for the dynamic configuration by the →host

DHCP is a protocol that provides dynamic configuration of IP addresses and associated information. The protocol supports use of IP addresses which are only available in limited number by a centralised management of the address assignment.

The participant logs on to a server with this service when it is switched on in a network for the first time. The server assigns a local free →IP address to the participant.

Diagnosis

During the diagnosis, the "state of health" of the device is checked. It is to be found out if and what faults are given in the device.

Depending on the device, the inputs and outputs can also be monitored for their correct function.
- wire break,
- short circuit,
- value outside range.

For diagnosis, configuration and log data can be used, created during the "normal" operation of the device.

The correct start of the system components is monitored during the initialisation and start phase. Errors are recorded in the log file.

For further diagnosis, self-tests can also be carried out.

DRAM

DRAM = **D**ynamic **R**andom **A**ccess **M**emory

Technology for an electronic memory module with random access (Random Access Memory, RAM). The memory element is a capacitor which is either charged or discharged. It becomes accessible via a switching transistor and is either read or overwritten with new contents. The memory contents are volatile: the stored information is lost in case of lacking operating voltage or too late restart.

E

EMV

EMC = **E**lectro **M**agnetic **C**ompatibility

According to the EC directive (2004/108/EEC) concerning electromagnetic compatibility (in short EMC directive) requirements are made for electrical and electronic apparatus, equipment, systems or components to operate satisfactorily in the existing electromagnetic environment. The devices must not interfere with their environment and must not be adversely influenced by external electromagnetic interference.

Ethernet

Ethernet is a widely used, manufacturer-independent technology which enables data transmission in the network at a speed of 10 or 100 million bits per second (Mbps). Ethernet belongs to the family of so-called "optimum data transmission" on a non exclusive transmission medium. The concept was developed in 1972 and specified as IEEE 802.3 in 1985.

F

FC

FC = flat cable
The yellow or black AS-i cable is meant.

FE – functional earth

Functional **e**arth is a reference potential which is not connected to protective earth or only connected when special measures are taken. The functional earth serves as equalisation of potential for an ungrounded installation (e.g. →SELV).

Fieldbus

A →bus for industrial applications: mechanically extremely robust and excellent data protection.

Firmware

System software, basic program in the device, virtually the operating system.

The firmware establishes the connection between the hardware of the device and the user software. This software is provided by the manufacturer of the controller as a part of the system and cannot be changed by the user.

Flash memory

Flash ROM (or flash EPROM or flash memory) combines the advantages of semiconductor memory and hard disks. Just like every other semiconductor memory the flash memory does not require moving parts. And the data is maintained after switch-off, similar to a hard disk.

The flash ROM evolved from the EEPROM (**E**lectrical **E**rasable and **P**rogrammable **R**ead-**O**nly **M**emory). The storage function of data in the flash ROM is identical to the EEPROM. Similar to a hard disk, the data are however written and deleted blockwise in data blocks up to 64, 128, 256, 1024, ... bytes at the same time.

Advantages of flash memories

- The stored data are maintained even if there is no supply voltage.
- Due to the absence of moving parts, flash is noiseless and insensitive to shocks and magnetic fields.
- In comparison to hard disks, flash memories have a very short access time. Read and write speed are virtually constant across the entire memory area.
- The memory size that can be obtained has no upper limit, due to the simple and space-saving arrangement of the storage cells.

Disadvantages of flash memories

- A storage cell can tolerate a limited number of write and delete processes:
  - Multi-level cells: typ. 10 000 cycles
  - Single level cells: typ. 100 000 cycles
- Given that a write process writes memory blocks of between 16 and 128 Kbytes at the same time, memory cells which require no change are used as well.

FMEA

FMEA = **F**ailure **M**ode and **E**ffects **A**nalysis

Method of reliability engineering, to find potential weak points. Within the framework of quality or security management, the FMEA is used preventively to prevent faults and increase the technical reliability.

FRAM

FRAM, or also FeRAM, means **Fe**rroelectric **R**andom **A**ccess **M**emory. The storage operation and erasing operation is carried out by a polarisation change in a ferroelectric layer.

Advantages of FRAM as compared to conventional read-only memories:

- non-volatile,
- compatible with common EEPROMs, but:
- access time approx. 100 ns,
- nearly unlimited access cycles possible.

G

Gateway

Gateway = access, coupler

Gateways enable connection of completely different systems. Gateways are used when two incompatible network types are to be connected by converting the protocol of one

system to the protocol of the other system.

Example: connection between AS-i and higher-level fieldbus systems such as → Ethernet DP, →DeviceNet, Interbus-S or other interfaces, e.g. RS-485. The device includes an AS-i master which is directly coupled to the →host interface (e.g. →Ethernet DP slave).

Gateway transfer time

The time that is needed for the input data in the DP-RAM of the AS-i master to be copied into the output data of the netX, and vice versa. The distance from DP-RAM to DP-RAM is decisive.

GSD

Generic **S**tation **D**escription

Describes the interface to the device to be connected to the fieldbus.

You can find the current version of the GSD file on the **ifm** homepage:
→ www.ifm.com > select your country > [Service] > [Download] > [Bus system AS-Interface]
e.g. for AC1375:
→ GSD file for SmartLink AC1375
→ download the file `ifm...07E5.gsd` (... = version)

GSDML

GSDML = **G**eneric **S**tation **D**escription **M**arkup **L**anguage

Description language which can describe the characteristics of a device family across several levels. In this XML scheme, as much as possible of the semantics of the →GSD was adopted.

H

HMI

HMI = **H**uman **M**achine **I**nterface

Host

The controller in the hierarchy above the AS-i master, e.g. a PLC or a processor.

I

I&M

I&M = **I**dentification **&** **M**aintenance

→ Profibus Profile Guidelines Part 1: Identification & Maintenance Functions

ID

ID = **Id**entifier

Name to differentiate the devices / participants connected to a system or the message packets transmitted between the participants.

Instructions

Superordinate word for one of the following terms:
installation instructions, data sheet, user information, operating instructions, device manual, installation information, online help, system manual, programming manual, etc.

Intended use

Use of a product in accordance with the information provided in the instructions for use.

IO-Link

Point-to-point connection between 2 devices. The following transmission is possible:
- binary signals or
- greater data fields for parameter setting.

More informations → www.io-link.com

IP address

IP = **I**nternet **P**rotocol

The IP address is a number which is necessary to clearly identify an internet

participant. For the sake of clarity the number is written in 4 decimal values, e.g. 127.215.205.156.

J

Jitter

Jitter means a slight fluctuation in accuracy in the transmission cycle when transmitting digital signals. More generally, jitter in transmission technology means an abrupt and undesired change of the signal characteristics.

L

LAS

List of **A**ctive **S**laves

In this slave list the controllerE enters the slaves detected as active for this AS-i master.

LDS

List of **D**etected **S**laves

In this slave list the controller enters the slaves detected as present for this AS-i master.

LED

LED = **L**ight **E**mitting **D**iode

Light emitting diode, also called luminescent diode, an electronic element of high coloured luminosity at small volume with negligible power loss.

LFS

List of **F**ailed **S**laves = list of slaves with configuration errors

In this slave list the controller enters the slaves with a projection error on this AS-i master.

Link

A link is a cross-reference to another part in the document or to an external document.

LKCS

LKCS = **L**ist of **K**nown **C**TT **S**laves

In this list the CTT slaves (profile 7.4 and 7.5) which are indicated in the LDS and whose CTT configuration has already been read are entered. This list is independent of the LDS, LPS, LAS and LNACS.

LNACS

LNACS = **L**ist of **N**ot **A**ctivated **C**TT **S**laves

In this list, the CTT slaves (profiles 7.4 and 7.5) which have been detected as CTT slaves but not activated are entered. As soon as the slave is entered in the LAS, it is deleted from this list. These slaves only take part in the data exchange until the CTT configuration has been read.

LPS

List of **P**rojected **S**laves

In this slave list the controller enters the slaves projected for this AS-i master.

LSB

Least **S**ignificant **B**it/Byte

M

MAC-ID

MAC = **M**anufacturer‘s **A**ddress **C**ode = manufacturer's serial number

→ID = **Id**entifier

Every network card has a MAC address, a clearly defined worldwide unique numerical code, more or less a kind of serial number. Such a MAC address is a sequence of 6 hexadecimal numbers, e.g. "00-0C-6E-D0-02-3F".

Master

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

Master-slave communication

AS-i strictly operates to the master-slave principle. The master polls all slaves one after the other in always the same order. Only one master per network line is allowed (→cyclical polling).

MBd

MegaBaud

Baud, abbrev.: Bd = unit for the data transmission speed. Do not confuse baud with "bits per second" (bps, bits/s). Baud indicates the number of changes of state (steps, cycles) per second over a transmission length. But it is not defined how many bits per step are transmitted. The name baud can be traced back to the French inventor J. M. Baudot whose code was used for telex machines.

1 MBd = 1024 x 1024 Bd = 1 048 576 Bd

MMI

HMI = **H**uman **M**achine **I**nterface
→ HMI (→ page 511)

Modbus

The Modbus protocol is a communication protocol based on a →master/slave architecture and was generated by Modicon in 1979 for communication with its PLCs. In the industry, Modbus has become a de facto standard.

Modbus/TCP is based on →Ethernet TCP/IP. Modbus/TCP ports the protocol defined for the serial interface to TCP. The →IP address clearly identifies each device in a network. Therefore the slave address was used to identify one of several logical units (unit IDs) in a physical device. To do so, the extended IP addressing is used.

Example: 192.168.83.28.1 means unit ID 1 on IP address 192.168.83.28.

*) Modicon passed from AEG to the group Schneider in 1994.

MRAM

MRAM means **M**agnetoresistive **R**andom **A**ccess **M**emory. The information is stored by means of magnetic storage elements. The property of certain materials is used to change their electrical resistance when exposed to magnetic fields.

Advantages of MRAM as compared to conventional RAM memories:

- non volatile (like FRAM), but:
- access time only approx. 35 ns,
- unlimited number of access cycles possible.

MSB

Most **S**ignificant **B**it/Byte

O

Operating system

Basic program in the device, establishes the connection between the hardware of the device and the user software.

OSC

OSC = **O**nline **S**upport **C**enter → Online diagnosis system
Help system in the device

OSSD

OSSD = **O**utput **S**ignal **S**witching **D**evice

= output signal of a switching device. Here: output signal of an AS-i safety monitor.

P

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.

PCCD

PCCD = **P**rojected **C**TT **C**onfiguration **D**ata

Configuration data for the 7.4 and 7.5 slaves stored in the device:
- Manufacturer ID,
- Vendor ID,
- Device ID,
- Device Group ID.

PCD

PCD = **P**rojected **C**onfiguration **D**ata

Configuration data stored in the device:
LPS and AS-i profile (IO, ID, ID1, ID2)

PDM

PDM = **P**rocess and **D**ialogue **M**odule

Device for communication of the operator with the machine / plant.

PELV

PELV = **P**rotective **E**xtra **L**ow **V**oltage

Functional extra low voltage with safe separation, grounded variant of SELV.

Extra low voltage with safe separation (grounded variant of SELV). The specification as PELV system to IEC 364-4-41 covers a measure to protect against direct and indirect contact with dangerous voltages by a "safe separation" between primary and secondary side in the device (e.g. power supply to PELV specification).

For this reason no separate PE conductor is required in a PELV system. It is allowed to ground circuits and / or bodies in a PELV system.

Pictogram

Pictograms are figurative symbols which convey information by a simplified graphic representation.

→ Chapter What do the symbols and formats mean? (→ page 9)

PLC configuration

Part of the CoDeSys user interface.

► The programmer tells the programming system which hardware is to be programmed.

> CoDeSys loads the corresponding libraries.

> Reading and writing the peripheral states (inputs/outputs) is possible.

Polling

to poll = to count votes

The controller master fetches the data from every participant in the system successively:

1. Master calls participant 1.
2. Participant 1 replies with its current data (actual values).
3. Master transfers more data (target values) to participant 1, if needed.
4. Participant 1 acknowledges reception of the data.

etc. the same procedure for each further participant.

Cyclical polling: AS-i master cyclically polls the data of all →slaves in the bus (see above). The data is updated in the →master after max. 5 ms. If A/B slaves are used, the →cycle time can be extended to 10 ms.

Power-on delay time

The time required by the controller K6 from the application of the voltage supply until all of the following targets are reached:

- both AS-i networks have reached normal operation
- the master has read the configuration data of the CTTx slaves
- the field buses can use the gateway (optional)
- the PLC program was started (optional).

Process image

Process image is the status of the inputs and outputs the PLC operates with within one cycle.

- At the beginning of the cycle the PLC reads the conditions of all inputs into the process image.
  During the cycle the PLC cannot detect changes to the inputs.
- During the cycle the outputs are only changed virtually (in the process image).
- At the end of the cycle the PLC writes the virtual output states to the real outputs.

Profibus

PROFIBUS (**Pro**cess **Fi**eld **Bus**) is a standard for fieldbus communication in automation technology. There are three 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.

More information → www.profibus.com (umbrella organisation)

Profinet

PROFINET (**Pro**cess **Fi**eld **Net**work) is the open Industrial Ethernet Standard of Profibus & Profinet International (PI) for automation. Profinet uses TCP/IP and IT standards, is real-time Ethernet compatible and enables the integration of fieldbus systems.

The Profinet concept has a modular design, so that the user can choose the functionality himself. This is basically different as regards the type of data exchange, to meet the requirements regarding the speed.

For Profinet, there are the two perspectives Profinet-CBA and Profinet-IO:

- Profinet-CBA (Component Based Automation) is intended for the component-based communication via TCP/IP and the real-time communication for real-time requirements in modular plant construction. Both ways of communication can be used in parallel.
- Profinet-IO has been created for real-time (RT) and synchronous communication IRT (IRT = isochronous real-time) with the decentralised periphery. The designations RT and IRT only describe the real-time characteristics in the communication within Profinet-IO.

More information → www.profibus.com (umbrella organisation)

R

Redundant

Redundancy is the presence of more than the necessary means so that a function unit performs a requested function or that data can represent information.

Several kinds of redundancy are distinguished:

- Functional redundancy aims at designing safety-related systems in multiple ways in parallel so that in the event of a failure of one component the others ensure the task.
- In addition it is tried to separate redundant systems from each other with regard to space. Thus the risk that they are affected by a common interference is minimised.
- Finally, components from different manufacturers are sometimes used to avoid that a systematic fault causes all redundant systems to fail (diverse redundancy).

The software of redundant systems should differ in the following aspects:

- specification (different teams),
- specification language,
- programming (different teams),
- programming language,
- compiler.

Remanent

Remanent data is protected against data loss in case of power failure.

The operating system for example automatically copies the remanent data to a flash memory as soon as the voltage supply falls below a critical value. If the voltage supply is available again, the operating system loads the remanent data back to the RAM memory.

The data in the RAM memory of a controller, however, is volatile and normally lost in case of power failure.

RTC

RTC = **R**eal **T**ime **C**lock

Provides (batter-backed) the current date and time. Frequent use for the storage of error message protocols.

RTS

RTS = **R**un **T**ime **S**ystem

Runtime systems are basic versions of

applications. These minimum versions are supplied with certain products to meet the prerequisites for the execution of the actual product or to be able to look at or use results generated by this product on other processors: making available all routines required to execute a program in a programming language, e.g. interactions with the →operating system, memory requirements, error routines, inputs and outputs.

S

SD card

An SD memory card (short for **S**ecure **D**igital Memory Card) is a digital storage medium that operates to the principle of flash storage.

Self-test

Test program that actively tests components or devices. The program is started by the user and takes a certain time. The result is a test protocol (log file) which shows what was tested and if the result is positive or negative.

SELV

SELV = **S**afety **E**xtra **L**ow **V**oltage

Active parts of safety extra low voltage circuits must neither be connected to ground nor to protective wires of other circuits. They must be safely separated from active parts with higher voltage.

SELV circuit = secondary circuit (output voltage) which is rated and protected so that its voltages do not exceed a safe value in case of correct operation (of the power supply) or in case of a single fault (of the power supply).

SELV circuits are separated from the input voltage (mains voltage) by double or enhanced insulation. The voltage value must not exceed 60 V DC (or 42.4 V AC).

Single slave

→Slave whose address number may only occur once on the →master.

Slave

Passive participant on the bus, only replies on request of the →master. Slaves have a clearly defined and unique →address in the bus.

Slave configuration

The following terms need to be distinguished...
- AS-i projected configuration (PCD (→ page 513)),
- AS-i current configuration (CDI (→ page 508)),
- CTT projected configuration (PCCD (→ page 513)),
- CTT current configuration (CCDI (→ page 508)).

Symbols

Pictograms are figurative symbols which convey information by a simplified graphic representation.

→ Chapter What do the symbols and formats mean? (→ page 9)

System variable

Variable to which access can be made via IEC address or symbol name from the PLC.

T

Target

The target indicates the target system where the PLC program is to run. The target contains the files (drivers and if available specific help files) required for programming and parameter setting.

TCP

The **T**ransmission **C**ontrol **P**rotocol is part of the TCP/IP protocol family. Each TCP/IP data connection has a transmitter and a receiver. This principle is a connection-oriented data transmission. In the TCP/IP protocol family the TCP as the connection-oriented protocol assumes the task of data protection, data flow control and takes measures in the event of data loss. (compare: →UDP)

U

UDP

UDP (**U**ser **D**atagram **P**rotocol) is a minimal connectionless network protocol which belongs to the transport layer of the internet protocol family. The task of UDP is to ensure that data

which is transmitted via the internet is passed to the right application.

At present network variables based on CAN and UDP are implemented. The values of the variables are automatically exchanged on the basis of broadcast messages. In UDP they are implemented as broadcast messages, in CAN as PDOs. These services are not confirmed by the protocol, i.e. it is not checked whether the message is received. Exchange of network variables corresponds to a "1 to n connection" (1 transmitter to n receivers).

Unit ID

→Modbus

Use, intended

Use of a product in accordance with the information provided in the instructions for use.

W

Watchdog

In general the term watchdog is used for a component of a system which watches the function of other components. If a possible malfunction is detected, this is either signalled or suitable program branchings are activated. The signal or branchings serve as a trigger for other co-operating system components to solve the problem.

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