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Device Manual Supplement

AS-i Gateway AC14
AC1401/02, AC1411/12, AC1421/22

SmartPLC DataLine AC14
AC1403/04, AC1423/24, AC1433/34

SmartPLC SafeLine AC4S
AC402S, AC412S, AC422S, AC432S

Acyclic command records

Command interface

English

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1 Preliminary note

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1.1 Legal and copyright information

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1.2 Purpose of the document

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This document describes the acyclic data records and the command interface of the following devices:

- AS-i Gateway with Profinet device interface (AC1401/AC1402)
- AS-i Gateway with Profibus slave interface (AC1411/AC1412)
- AS-i Gateway with EtherNet/IP device interace (AC1421/AC1422)
- SmartSPS DataLine with Profinet device interface (AC1403/AC1404)
- SmartSPS DataLine with EtherNet/IP device interace (AC1423/AC1424)
- SmartSPS DataLine with EtherCAT slave interface (AC1433/AC1434)
- SmartSPS SafeLine mit Profinet device interface (AC402S)
- SmartSPS SafeLine mit Profibus slave interface (AC412S)
- SmartSPS SafeLine mit EtherNet/IP device interface (AC422S)
- SmartSPS SafeLine mit EtherCAT slave interface (AC432S)

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

► Read this document before using the device.

► Keep this document during the service life of the device.

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1.3 Symbols and styles used

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► ... Instructions

> ... Reaction, result

→ ... Cross-reference or internet link

123 Decimal number
0x123 Hexadecimal number
0b010 Binary number

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

1.4 Modification history

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Version	Topic	Date
00	New creation of document	2017 / 09

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2 Safety instructions

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2.1 General

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The plant manufacturer is responsible for the safety of the plant in which the device is installed.

If the device is used in a way that is not intended by the manufacturer, the protection supported by the device may be impaired.

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

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

2.2 Required background knowledge

22046

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

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

2.3 Warnings used

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⚠ WARNING

Death or serious irreversible injuries may result.

⚠ CAUTION

Slight reversible injuries may result.

NOTICE

Property damage is to be expected or may result.

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

Information
Supplementary note.

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3 Acyclic data records

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The data records are transmitted acyclically upon request of the <fieldbus> master.

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3.1 Overview: Acyclic data records (DSx)

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

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3.2 DS1 – System information

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Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Article number [1]) (byte 0) = "A"								Article number [1]) (byte 1) = "C"							
1	Article number [1]) (byte 2) = A_1								Article number [1]) (byte 3) = A_2							
2	Article number [1]) (byte 4) = A_3								Article number [1]) (byte 5) = A_4							
3	Device number [2]) (byte 1) = G_1								Device number [2]) (byte 0) = G_2							
4	Serial number [3]) (byte 0, MSB)								Serial number [3]) (byte 1)							
5	Serial number [3]) (byte 2)								Serial number [3]) (byte 3)							
6	Serial number [3]) (byte 4)								Serial number [3]) (byte 5)							
7	Serial number [3]) (byte 6)								Serial number [3]) (byte 7)							
8	Serial number [3]) (byte 8)								Serial number [3]) (byte 9)							
9	Serial number [3]) (byte 10)								Serial number [3]) (byte 11)							
10	Software type								Software Version (Major Version)							
11	Software Version (Minor Version)								Software Version (Build Version)							
12	Operating hours [5]) Total (byte 3, high byte)								Operating hours [5]) Total (byte 2)							
13	Operating hours [5]) Total (byte 1)								Operating hours [5]) Total (byte 0, low byte)							
14	Operating hours [5]) Uptime (byte 3, high byte)								Operating hours [5]) Uptime (byte 2)							
15	Operating hours [5]) Uptime (byte 1)								Operating hours [5]) Uptime (byte 0, low byte)							
16	Operating hours [5]) standard PLC (byte 3, high byte)								Operating hours [5]) standard PLC (byte 2)							
17	Operating hours [5]) standard PLC (byte 1)								Operating hours [5]) standard PLC (byte 0, low byte)							
18	Operating hours [5]) display (byte 3, high byte)								Operating hours [5]) display (byte 2)							
19	Operating hours [5]) display (byte 1)								Operating hours [5]) display (byte 0, low byte)							
20	Device temperature [6]) (byte 0, high byte)								Device temperature [6]) (byte 1, low byte)							
21	reserved								Number of AS-i masters							
22	Language [7]) (1st letter)								Language [7]) (2nd letter)							
23	Return to start screen (on/off)								Screen saver (on/off)							
24	CODESYS standard PLC operating mode (activ/inactiv)								Output access							
25	Device cycle in µs (high byte)								Device cycle in µs (low byte)							

[1]) Article number: "AC" + A_1 + A_2 + A_3 + A_4 as character string, e.g. "AC14 and AC4S"
[2]) Device number: G_1 + G_2 as character string, e.g. "AB"
[3]) Serial number: 12-digit character string
[5]) Operating hours: in seconds, Unsigned Double word (32 bit), e.g. 0x000010A709F = 108447 seconds
[6]) Device temperature: in 1/100 °C, signed Word (16 bit), e.g. 4232 = 42.32 °C
[7]) Language: LANG_ID as ASCII code, e.g. "DE" = "D" + "E" = 0x44 + 0x45

[6]) Device temperature: in 1/100 °C, signed Word (16 bit), e.g. 4232 = 42.32 °C
[7]) Language: LANG_ID as ASCII code, e.g. "DE" = "D" + "E" = 0x44 + 0x45

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3.3 DS2 – Digital inputs of the slaves and master flags

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Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	reserved				Slave 1(A): D3...D0				reserved				reserved			
1	reserved				Slave 3(A): D3...D0				reserved				Slave 2(A): D3...D0			
2	reserved				Slave 5(A): D3...D0				reserved				Slave 4(A): D3...D0			
...	...				...				...				...			
14	reserved				Slave 29(A): D3...D0				reserved				Slave 28(A): D3...D0			
15	reserved				Slave 31(A): D3...D0				reserved				Slave 30(A): D3...D0			
16	reserved				Slave 1B: D3...D0				reserved				reserved			
17	reserved				Slave 3B: D3...D0				reserved				Slave 2B: D3...D0			
...	...				...				...							
30	reserved				Slave 29B: D3...D0				reserved				Slave 28B: D3...D0			
31	reserved				Slave 31B: D3...D0				reserved				Slave 30B: D3...D0			
32	AS-i master status flags (→ **AS-i master status flags** (→ p. 13))															
33	Execution control flags (→ **Execution control flags** (→ p. 14))															
34	Host flags (→ **Host flags** (→ p. 16))															
35	DAE / EE-Flags (→ **DAE/EE flags** (→ p. 16))															

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3.3.1 AS-i master status flags

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The AS-i master status flags provide information about the status of the AS-i master. After a status change, the AS-i master immediately updates the flags.

The AS-i master status flags are saved in the following register:

AS-i master status flags															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
ECPS				ECP				–	–	WCD	CM	–	HWDT	SER	HER

Legend:

Flag	Designation	Description		Initial value at power-on
HER	Hardware Error	1 (TRUE):	a hardware error occurred during the power-on self test	0 (FALSE)
SER	Software Error	1 (TRUE):	Software error occurred: Stack Overflow, Stack Underflow, Undefined Opcode, Instruction Fault, Illegal Access, Watchdog Timeout	0 (FALSE)
HWDT	Host Watchdog Timeout	1 (TRUE):	Host watchdog not triggered by the host within 200 ms; master changed to the offline mode	0 (FALSE)
CM	Configuration Missing	1 (TRUE):	Configuration not yet fully received from the host. Becomes FALSE as soon as PCD, PP and LPS have been set	1 (TRUE)
WCD	Watchdog Control Disabled	1 (TRUE):	Signals the host that the watchdog signal is not processed in the master.	0 (FALSE)
ECP	Execution Control Phase	Display of the different phases the execution control goes through during boot (→ table).		0
ECPS	Execution Control Phase State	Display of the substates of the different execution control phases (→ table).		0

Execution Control Phase	Execution Control Phase State
0 = inactive	–
1 = start phase	0 = master start and initialisation 1 = wait for configuration 2 = wait for start
2 = reserved	–
3 = offline phase	–
4 = detection phase	–
5 = activation phase	–
6 = normal operation	0 = normal data exchange 1 = slave finder activated

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3.3.2 Execution control flags

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The execution control flags provide information about the execution control of the AS-i master. The flags are updated by the AS-i master immediately after each change.

The execution control flags are saved in the following register:

Execution control flags															
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
–	NOPF	CCOK	PE	–	DEA	AAE	POK	OR	APF	NOA	CA	AA	AN	S0	COK

Legend:

Flag	Designation	Description		Initial value at power-on
COK	Config_OK	1 (TRUE):	The configuration of all AS-i slaves on the network corresponds to the projection data (CDI=PCD for all activated slaves) && (LDS=LPS=LAS) Exception: Flag APF = 1 and LPS = empty, then COK = 1	0 (FALSE)
S0	LDS.0	1 (TRUE):	Slave with address 0 found	0 (FALSE)
AN	Auto_Address_Assign	1 (TRUE):	Auto addressing possible (protected mode = active && auto addressing = active && PCD = CDI && LDS <= LPS)	0 (FALSE)
AA	Auto_Address_Available	1 (TRUE):	All the necessary conditions for auto addressing are fulfilled. The master waits for slave 0.	0 (FALSE)
CA	Configuration_Active	0 (FALSE): 1 (TRUE):	Master in protected mode Master in projection mode	0 (FALSE)
NOA	Normal_Operation_Active	1 (TRUE):	Master is in the normal mode (The AS-i master has communicated with at least one slave since the last offline phase. Even if the slave disappears after this, the signal will remain set.)	0 (FALSE)
APF	Asi_Power_Fail	0 (FALSE): 1 (TRUE):	AS-i voltage OK AS-i voltage too low	1 (TRUE)
OR	Offline_Ready	1 (TRUE):	Master has gone through the offline phase and waits for: APF = 0 and a timeout of 1s	0 (FALSE)
POK	Periphery_OK	1 (TRUE):	No peripheral faults present, all bits of LPF = 0.	0 (FALSE)
AAE	Auto_Address_Enable	1 (TRUE):	Auto addressing switched on (Echo of Set_Auto_Address_Enable of host)	0 (FALSE)
DEA	Data_Exchange_Active	1 (TRUE): 0 (FALSE):	Data exchange between master and slaves activated (reflects DEA of host flags) Instead of the data exchange, ReadID is continually executed on the slaves.	1 (TRUE)
PE	Protocol Error	1 (TRUE): 0 (FALSE):	CTT protocol error No CTT protocol error	0 (FALSE)

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Flag	Designation	Description		Initial value at power-on
CCOK	CTT_Config_OK	1 (TRUE):	The configuration of all CTT slaves on the network corresponds to the projected CCT data. (CCDI = PCCD for all CTT slaves)	0 (FALSE)
NOPF	No_Offline_Phase_Flag	1 (TRUE):	The master skips the offline phase if one of the following actions is performed: – change to protected mode – change of PCD – change of LPS – change of PCCD	0 (FALSE)
		0 (FALSE):	The master goes through the offline phase when changing to the protected mode the next time.	

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3.3.3 Host flags

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The host flags are regularly updated by the host. The AS-i master cyclically checks the host flags for changes.

The host flags are saved in the following register:

Host Flags															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–	DEA	OFF

Legend:

Flag	Designation	Description		Initial value at power-on
OFF	Offline	1 (TRUE):	Execution control of the master changes to the offline mode. The function Set_Offline_Mode() is implemented via this flag.	0 (FALSE)
DEA	Data_Exchange_Active	1 (TRUE):	Data exchange activated between master and slaves. The function Set_Data_Exchange_Active() is implemented via this flag	1 (TRUE)

3.3.4 DAE/EE flags

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The DAE/EE flags indicate if the double address detection and the earth fault detection are on.

The DEA/EE flags are saved in the following register:

DAE/EE flags															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
--	--	--	--	--	--	--	DAE active	--	--	--	--	--	--	--	EE active

Legend:

Flag	Designation	Description		Initial value at PowerOn
DAE active	Double address detection active	1 (TRUE): 0 (FALSE):	Double address detection is on. Double address detection is off.	0 (FALSE)
EE active	Earth fault detection is active	1 (TRUE): 0 (FALSE):	Earth fault detection is on. Earth fault detection is off.	1 (TRUE)

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3.4 DS3 – Analogue inputs of slaves 1(A)...15(B)

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Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...4	Analogue input data of single slave 1 or of (slave 1A and slave 1B)															
5...9	Analogue input data of single slave 2 or of (slave 2A and slave 2B)															
10...14	Analogue input data of single slave 3 or of (slave 3A and slave 3B)															
15...19	Analogue input data of single slave 4 or of (slave 4A and slave 4B)															
20...24	Analogue input data of single slave 5 or of (slave 5A and slave 5B)															
25...29	Analogue input data of single slave 6 or of (slave 6A and slave 6B)															
30...34	Analogue input data of single slave 7 or of (slave 7A and slave 7B)															
35...39	Analogue input data of single slave 8 or of (slave 8A and slave 8B)															
40...44	Analogue input data of single slave 9 or of (slave 9A and slave 9B)															
45...49	Analogue input data of single slave 10 or of (slave 10A and slave 10B)															
50...54	Analogue input data of single slave 11 or of (slave 11A and slave 11B)															
55...59	Analogue input data of single slave 12 or of (slave 12A and slave 12B)															
60...64	Analogue input data of single slave 13 or of (slave 13A and slave 13B)															
65...69	Analogue input data of single slave 14 or of (slave 14A and slave 14B)															
70...74	Analogue input data of single slave 15 or of (slave 15A and slave 15B)															

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3.4.1 Details of the 5-word areas

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Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	Analogue value channel 0 of single slave x or channel 0 of slave xA															
n+1	Analogue value channel 1 of single slave x or channel 1 of slave xA															
n+2	Analogue value channel 2 of single slave x or channel 0 of slave xB															
n+3	Analogue value channel 3 of single slave x or channel 1 of slave xB															
n+4	TIB	--	TIA	--	TOB	--	TOA	--	O3	V3	O2	V2	O1	V1	O0	V0

Legend:

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)
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)
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!

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3.5 DS4 – Analogue inputs of slaves 16(A)...31(B)

8759

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...4	Analogue input data of single slave 16 or of (slave 16A and slave 16B)															
5...9	Analogue input data of single slave 17 or of (slave 17A and slave 17B)															
10...14	Analogue input data of single slave 18 or of (slave 18A and slave 18B)															
15...19	Analogue input data of single slave 19 or of (slave 19A and slave 19B)															
20...24	Analogue input data of single slave 20 or of (slave 20A and slave 20B)															
25...29	Analogue input data of single slave 21 or of (slave 21A and slave 21B)															
30...34	Analogue input data of single slave 22 or of (slave 22A and slave 22B)															
35...39	Analogue input data of single slave 23 or of (slave 23A and slave 23B)															
40...44	Analogue input data of single slave 24 or of (slave 24A and slave 24B)															
45...49	Analogue input data of single slave 25 or of (slave 25A and slave 25B)															
50...54	Analogue input data of single slave 26 or of (slave 26A and slave 26B)															
55...59	Analogue input data of single slave 27 or of (slave 27A and slave 27B)															
60...64	Analogue input data of single slave 28 or of (slave 28A and slave 28B)															
65...69	Analogue input data of single slave 29 or of (slave 29A and slave 29B)															
70...74	Analogue input data of single slave 30 or of (slave 30A and slave 30B)															
75...79	Analogue input data of single slave 31 or of (slave 31A and slave 31B)															

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3.5.1 Details of the 5-word areas

8758

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	Analogue value channel 0 of single slave x or channel 0 of slave xA															
n+1	Analogue value channel 1 of single slave x or channel 1 of slave xA															
n+2	Analogue value channel 2 of single slave x or channel 0 of slave xB															
n+3	Analogue value channel 3 of single slave x or channel 1 of slave xB															
n+4	TIB	--	TIA	--	TOB	--	TOA	--	O3	V3	O2	V2	O1	V1	O0	V0

Legend:

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)
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)
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!

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3.6 DS5 – Digital outputs of the slaves

8761

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	reserved				slave 1(A): D3...D0				reserved				reserved			
1	reserved				Slave 3(A): D3...D0				reserved				Slave 2(A): D3...D0			
2	reserved				Slave 5(A): D3...D0				reserved				Slave 4(A): D3...D0			
...	...				...				...				...			
14	reserved				Slave 29(A): D3...D0				reserved				Slave 28(A): D3...D0			
15	reserved				Slave 31(A): D3...D0				reserved				Slave 30(A): D3...D0			
16	reserved				Slave 1B: D3...D0				reserved				reserved			
17	reserved				Slave 3B: D3...D0				reserved				Slave 2B: D3...D0			
...	...				...				...				...			
30	reserved				Slave 29B: D3...D0				reserved				Slave 28B: D3...D0			
31	reserved				Slave 31B: D3...D0				reserved				Slave 30B: D3...D0			

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3.7 DS6 – Analogue outputs of slaves 1(A)...15(B)

8763

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...3	analogue output data of single slave 1 or of (slave 1A and slave 1B)															
4...7	Analogue output data of single slave 2 or of (slave 2A and slave 2B)															
8...11	Analogue output data of single slave 3 or of (slave 3A and slave 3B)															
12...15	Analogue output data of single slave 4 or of (slave 4A and slave 4B)															
16...19	Analogue output data of single slave 5 or of (slave 5A and slave 5B)															
20...23	Analogue output data of single slave 6 or of (slave 6A and slave 6B)															
24...27	Analogue output data of single slave 7 or of (slave 7A and slave 7B)															
28...31	Analogue output data of single slave 8 or of (slave 8A and slave 8B)															
32...35	Analogue output data of single slave 9 or of (slave 9A and slave 9B)															
36...39	Analogue output data of single slave 10 or of (slave 10A and slave 10B)															
40...43	Analogue output data of single slave 11 or of (slave 11A and slave 11B)															
44...47	Analogue output data of single slave 12 or of (slave 12A and slave 12B)															
48...51	Analogue output data of single slave 13 or of (slave 13A and slave 13B)															
52...55	Analogue output data of single slave 14 or of (slave 14A and slave 14B)															
56...59	Analogue output data of single slave 15 or of (slave 15A and slave 15B)															

3.7.1 Details 4 channels per analogue slave

8765

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

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

Word Offset-Nr.	Content of the transferred word for parameter setting = `4 channels`
n	Mx / slave m(A) / channel
n+1	Mx / slave m(A) / channel
n+2	Mx / slave m(A) / channel 1 = Mx / slave mB / channel 1
n+3	Mx / slave m(A) / channel 2 = Mx / slave mB / channel 2

Legend:

n ...	Number of 4 word blocks 1 = for setting 4 words ... 15 = for setting 60 words
x ...	1 = AS-i master 1 2 = AS-i master 2
m ...	Numeric part of the selected AS-i slave address

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3.8 DS7 – Analogue outputs of slaves 16(A)...31(B)

8766

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...3	analogue output data of single slave 16 or of (slave 16A and slave 16B)															
4...7	Analogue output data of single slave 17 or of (slave 17A and slave 17B)															
8...11	Analogue output data of single slave 18 or of (slave 18A and slave 18B)															
12...15	Analogue output data of single slave 19 or of (slave 19A and slave 19B)															
16...19	Analogue output data of single slave 20 or of (slave 20A and slave 20B)															
20...23	Analogue output data of single slave 21 or of (slave 21A and slave 21B)															
24...27	Analogue output data of single slave 22 or of (slave 22A and slave 22B)															
28...31	Analogue output data of single slave 23 or of (slave 23A and slave 23B)															
32...35	Analogue output data of single slave 24 or of (slave 24A and slave 24B)															
36...39	Analogue output data of single slave 25 or of (slave 25A and slave 25B)															
40...43	Analogue output data of single slave 26 or of (slave 26 and slave 26B)															
44...47	Analogue output data of single slave 27 or of (slave 27 and slave 27B)															
48...51	Analogue output data of single slave 28 or of (slave 28 and slave 28B)															
52...55	Analogue output data of single slave 29 or of (slave 29 and slave 29B)															
56...59	Analogue output data of single slave 30 or of (slave 30 and slave 30B)															
60...63	Analogue output data of single slave 31 or of (slave 31and slave 31B)															

3.8.1 Details 4 channels per analogue slave

8765

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

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

Word Offset-Nr.	Content of the transferred word for parameter setting = `4 channels`
n	Mx / slave m(A) / channel
n+1	Mx / slave m(A) / channel
n+2	Mx / slave m(A) / channel 1 = Mx / slave mB / channel 1
n+3	Mx / slave m(A) / channel 2 = Mx / slave mB / channel 2

Legend:

n ...	Number of 4 word blocks 1 = for setting 4 words ... 15 = for setting 60 words
x ...	1 = AS-i master 1 2 = AS-i master 2
m ...	Numeric part of the selected AS-i slave address

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3.9 DS8 – Status flags of analogue output data of the slaves 1...31

8768

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	reserved															
1	Status of the analogue output data of single slave 1 or of (slave 1A and slave 1B)															
2	Status of the analogue output data of single slave 2 or of (slave 2A and slave 2B)															
...	...															
30	Status of the analogue output data of single slave 30 or of (slave 30A and slave 30B)															
31	Status of the analogue output data of single slave 31 or of (slave 31A and slave 31B)															

Details of the words shown above:

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n	--	TOB	--	TOA	--	OVB	--	OVA	reserved							

Legend:

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 ! Only valid for analogue **out**put slaves. For **in**put slaves set OVx = "0"!
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)

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3.10 DS9 – Slave lists LAS, LDS, LPF, LCE

8770

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...3	LAS / list of active slaves															
4...7	LDS / list of detected slaves															
8...11	LPF / list of slaves with periphery faults															
12...15	LCE / list of slaves with configuration errors															

3.10.1 Details of the slave lists

8772

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

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3.11 DS10 – Slave list LPS

8773

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...3	List of projected slaves LPS															

3.11.1 Details of the slave lists

8772

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

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3.12 DS11 – Actual configuration data (CDI)

8775

Offset Word no.	bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ID2 code				ID1 code				ID code				IO code			
0	Slave 0															
1	Slave 1(A)															
...	...															
31	Slave 31(A)															
32	reserved															
33	Slave 1B															
...	...															
63	Slave 31B															

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3.13 DS12 – Projected configuration data (PCD)

8779

Offset Word no.	bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ID2 code				ID1 code				ID code				IO code			
0	reserved															
1	Slave 1(A)															
2	Slave 2(A)															
...	...															
31	Slave 31(A)															
32	reserved															
33	Slave 1B															
...	...															
63	Slave 31B															

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3.14 DS13 – Image of the input parameters of the slaves (PI)

8781

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	reserved				Slave 1(A): P3...P0				reserved				reserved			
1	reserved				Slave 3(A): P3...P0				reserved				Slave 2(A): P3...P0			
2	reserved				Slave 5(A): P3...P0				reserved				Slave 4(A): P3...P0			
...	...				...				...				...			
14	reserved				Slave 29(A): P3...P0				reserved				Slave 28(A): P3...P0			
15	reserved				Slave 31(A): P3...P0				reserved				Slave 30(A): P3...P0			
16	reserved				Slave 1B: P3...P0				reserved				reserved			
17	reserved				Slave 3B: P3...P0				reserved				Slave 2B: P3...P0			
...	...				...				...				...			
30	reserved				Slave 29B: P3...P0				reserved				Slave 28B: P3...P0			
31	reserved				Slave 31B: P3...P0				reserved				Slave 30B: P3...P0			

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3.15 DS14 – Image of the output parameters of the slaves (PP)

8783

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	reserved				Slave 1(A): P3...P0				reserved				reserved			
1	reserved				Slave 3(A): P3...P0				reserved				Slave 2(A): P3...P0			
2	reserved				Slave 5(A): P3...P0				reserved				Slave 4(A): P3...P0			
...	...				...				...				...			
14	reserved				Slave 29(A): P3...P0				reserved				Slave 28(A): P3...P0			
15	reserved				Slave 31(A): P3...P0				reserved				Slave 30(A): P3...P0			
16	reserved				Slave 1B: P3...P0				reserved				reserved			
17	reserved				Slave 3B: P3...P0				reserved				Slave 2B: P3...P0			
...	...				...				...				...			
30	reserved				Slave 29B: P3...P0				reserved				Slave 28B: P3...P0			
31	reserved				Slave 31B: P3...P0				reserved				Slave 30B: P3...P0			

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3.16 DS15 – Slave error counter, configuration error counter, AS-i cycle counter

8785

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Error counter in slave 0															
1	Error counter in slave 1(A)															
...	...															
31	Error counter in slave 31(A)															
32	reserved															
33	Error counter in slave 1B															
...	...															
63	Error counter in slave 31B															
64	AS-i cycle counter															
65	Configuration error counter															
66	AS-i error status															
67	Telegram error rate															
68	Message error counter															
69	Voltage error counter 22.5V															
70	Voltage error counter 19V															
71	Earth fault counter															

Legend:

AS-i error status ...	**Bit 0:** Configuration error type 1 (missing slave) **Bit 1:** Configuration error type 2 (too many slaves) **Bit 2:** Configuration error type 3 (slave with wrong profile) **Bit 3:** Peripheral fault **Bit 4:** Double address **Bit 8:** internal AS-i master error **Bit 9:** Projection mode **Bit 10:** Slave address 0 detected **Bit 11:** Earth fault **Bit 12:** Voltage drop below 22.5 V **Bit 13:** Voltage drop below 19.0 V **Bit 14:** reserved **Bit 15:** reserved
Telegram error rate ...	Number of faulty telegrams during the past 2000 telegram cycles
Symmetry ...	AS-i symmetry from -100% to +100%, 0% = symmetrical-to-ground **Bit15:** bit with sign

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3.17 DS17 – AS-i master: Error lists LCEMS, LCEAS, LDAE

15911

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0...3	LCEMS (list of configuration errors - missing slaves)															
4...7	LCEAS (list of configuration errors - additional slaves)															
8...11	LDAE (list of double address errors)															

Details of the error lists

6658

The error lists (LCEMS, LCEAS, LDAE) have a size of 64 bits each. The respective bits each represent a slave address:

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

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3.18 DS18 – Fieldbus information

17038

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Fieldbus state								Fieldbus type							
1	Ethernet connection status								Profibus slave address							
2	Profinet/EtherNet/IP IP address / EtherCAT-Adresse (byte 2)								Profinet/EtherNet/IP IP address / EtherCAT-Adresse (byte 1, MSB)							
3	Profinet/EtherNet/IP IP address / EtherCAT-Adresse (byte 4, LSB)								Profinet/EtherNet/IP IP address / EtherCAT-Adresse (byte 3)							
4	Profinet/EtherNet/IP subnet mask (byte 2)								Profinet/EtherNet/IP subnet mask (byte 1, MSB)							
5	Profinet/EtherNet/IP subnet mask (byte 4, LSB)								Profinet/EtherNet/IP subnet mask (byte 3)							
6	Profinet/EtherNet/IP gateway address (byte 2)								Profinet/EtherNet/IP gateway address (byte 1, MSB)							
7	Profinet/EtherNet/IP gateway address (byte 4, LSB)								Profinet/EtherNet/IP gateway address (byte 3)							
8	MAC0 (byte 2)								MAC0 (byte 1, LSB)							
9	MAC0 (byte 4)								MAC0 (byte 3)							
10	MAC0 (byte 6, MSB)								MAC0 (byte 5)							
11	MAC1 (byte 2)								MAC1 (byte 1, LSB)							
12	MAC1 (byte 4)								MAC1 (byte 3)							
13	MAC1 (byte 6, MSB)								MAC1 (byte 5)							
14	MAC2 (byte 2)								MAC2 (byte 1, LSB)							
15	MAC2 (byte 4)								MAC2 (byte 3)							
16	MAC2 (byte 6, MSB)								MAC2 (byte 1, LSB)							
17	Profinet host address (byte 2)								Profinet host address (byte 1, MSB)							
18	Profinet host address (byte 4, LSB)								Profinet host address (byte 3)							

Legend:

Fieldbus type	Name of the fieldbus	1 byte	0x00 = no fieldbus present 0x01 = Profinet 0x02 = Profibus 0x03 = EtherNet/IP 0x04 = EtherCAT
Fieldbus status	Status of the fieldbus connection	1 byte	0x00 = initialisation 0x01 = waiting for connection 0x02 = connection is being established 0x03 = configuration of the connection in progress 0x04 = parameter setting in progress 0x05 = waiting for module configuration 0x06 = cyclic data exchange with the fieldbus controller/host 0x07 = connection release
Profibus slave address	Profibus address of the device	1 byte	0x00 = no Profibus 0x03 = address 3 ... 0x7B = address 123
Ethernet connection status	Status and Ethernet connections on ports X6 and X7	1 byte	0x00 = no connection or Profibus 0x01 = connection on port X7 established, no connection on port X6 0x02 = connection on port X6 established, no connection on port X7 0x03 = connection on ports X6 and X7 established

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Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Profinet/ EtherNet/IP IP address / EtherCAT-Adresse	address of the device				4 bytes	▪ for Profinet/EtherNet/IP: IP address One address segment per byte. e.g. `192.168.0.102` Byte 1: 192 = 0xC0 Byte 2: 168 = 0xA8 Byte 3: 0 = 0x00 Byte 4: 102 = 0x66 ▪ for EtherCAT: EtherCAT address (Configured Station Alias or Second Station Address) e.g. 3577 = 0xDF9 Byte 1: 0x0D Byte 2: 0xF9 Byte 3: 0x00 Byte 4 0x00											
Profinet/ EtherNet/IP-Subnet mask	Subnet mask of the Ethernet network				4 bytes	One address segment per byte (structre: → Profinet/EtherNet/IP IP address)										
Profinet/ EtherNet/IP gateway address	IP address of the EtherNet gateway				4 bytes	One address segment per byte (structre: → Profinet/EtherNet/IP IP address)										
MAC0	MAC0-ID of the device				6 bytes	One MAC segment per byte: e.g. `00:02:01:01:98:D2` Byte 1: 0xD2 ... Byte 6: 0x00 ▪ Profinet: MAC0 = MAC of the fieldbus interface ▪ Profibus/EtherNet/IP/EtherCAT: MAC0 = 00:00:00:00:00:00										
MAC1	MAC1-ID of the device				6 Bytes	One MAC segment per byte (structure: → MAC0) ▪ Profinet: MAC1 = MAC of the Ethernet port X6 ▪ EtherNet/IP: MAC1 = MAC2 = MAC of the EtherNet/IP interface ▪ Profibus/EtherCAT: MAC1 = 00:00:00:00:00:00										
MAC2	MAC2-ID of the device				6 bytes	One MAC segment per byte (structure: → MAC0) ▪ Profinet: MAC2 = MAC of the Ethernet port X7 ▪ EtherNet/IP: MAC2 = MAC1 = MAC of the fieldbus interface ▪ Profibus/EtherCAT: MAC2 = 00:00:00:00:00:00										
Profinet host address	IP address of the Profinet host				4 bytes	One address segment per yte (structure. → Profinet/EtherNet/IP IP address) ▪ Profinet: IP address of the Profinet host ▪ Profibus/EtherNet/IP/EtherCAT: Byte 1: 0x00 Byte 2: 0x00 Byte 3: 0x00 Byte 4: 0x00										

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4 Command channels

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4.1 Principle of the command channels

13543

A command channel consists of a request channel and a response channel.

Command request channel (fieldbus master >>> device)

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID															
2	command number															
3...120	command parameters															

Command response channel (device >>> 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															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															
5...120	reply data to the command Unused bytes receive invalid values from old command replies. DO NOT evaluate!															

4.1.1 Command status

8795

Status	Status code [hex]	Description
OK	00	Command execution was successful. Response data is available and valid.
FAILED	01	Error when executing the command. The exact cause of the error occurred is stated in the command-specific error code. The response data is invalid.
TO	02	Timeout error: The command was cancelled due to timeout.
UC	03	Unknown Command: The transmitted command number is not known in the system.
NOP	04	Not valid parameter: The transmitted command parameter is invalid.

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4.2 System commands

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11077

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4.2.1 Overview: System commands

8421

Comm. no. [hex]	Comm. no. [dez]	Description
0101	257	Quick Setup AS-i master 1 /2
0103	259	Select user language
0104	260	Change display settings
0105	261	Set output control
0106	262	Set standard PLC operating mode
0109	265	Set date / time
010A	266	Set parameters of the NTP server
010B	267	Read date / time / NTP server settings
010C	268	Reboot the system
010D	269	Read fieldbus information (only available via CODESYS)
010F	271	Read text of OSC entry
0110	272	Display target visualization

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4.2.2 Command 0x0101 – Quick setup AS-i master 1 + 2

11079

Command request channel (fieldbus master >>> device)

11080

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved						M2	M1
4 ...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

M1	AS-i master 1	1 bit	0 = "Quick set-up" command is NOT executed on the master 1 = "Quick set-up" command is executed on the master
M2	AS-i master 2	1 bit	0 = "Quick set-up" command is NOT executed on the master 1 = "Quick set-up" command is executed on the master
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

The command "blocks" further processing as long as the quick set-up needs. That means that the WRREC command signals "busy" until the function result is available. This may take a few seconds.

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Command response channel (device >>> fieldbus master)

11081

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code AS-i master 2 Possible command error codes (→ p. 41)								command error code AS-i master 1 Possible command error codes (→ p. 41)							

Possible command error codes

11087

Error Code	Error	Description
0x00		no error
0x03	SD0	slave with address 0 connected
0x04	IM	- no master M1 and/or M2 specified or: - master M2 does not exist (for units with 1 AS-i master)

When the Quick Setup is not executed for an AS-i master, the return value is always 0x00 (= OK).

The command status has the value `Failed` when one of the errors is present on AS-i master 1 or 2 after command execution.

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4.2.3 Command 0x0103 – Select user language

11089

Via the command the user lanaguage for the local HMI and the web interface can be set. The language setting always refers to both user interfaces.

Command request channel (fieldbus master >>> device)

11090

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	LANG_ID															
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

MSG_ID	User language	1 word	0x0000 = no language selection, only return active language 0x4445 = DE, German 0x454E = EN, English (default) 0x4652 = FR, French 0x4954 = IT, Italian 0x4553 = ES, Spanish 0x5054 = PT, Portuguese
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18011

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	current LANG_ID															

Possible command error codes

11095

Error Code	Error	Description
0x00		no error
0x01	IL	Language is unknown or not available in this software version

Error code only appears if command status = FAILED.
The error code `0x01` appears when querying the currently set language (`LANG_ID = 0x0000`).
This is to be interpreted as correct processing of the command.

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4.2.4 Command 0x0104 – Change display settings

11099

Command request channel (fieldbus master >>> device)

11100

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved						RS	DS
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DS	Screen saver	1 bit	0 = no screen saver for local display 1 = screen saver for local display activated
RS	return to splash screen	1 bit	0 = when the time has elapsed, device remains on current page 1 = when the time has elapsed, devices changes to the splash screen
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11101

There are no error messages for this command.

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4.2.5 Command 0x0105 – Set output control

16673

Using this command, the controller instance for the outputs of the AS-i slaves can be set.

Command request channel (fieldbus master >>> device)

16683

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								OC							
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

OC	**O**utput **C**ontrol	1 byte	0x01 = GW, gateway 0x02 = MAN, manual 0x03 = PLC, device-internal PLC

Command response channel (device >>> fieldbus master)

16685

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

16687

Error Code	Error	Description
0x00		no error
0x01	IO	Invalid parameter value transmitted for OC. OR: Control of the outputs could not be set.

Error code only appears if command status = FAILED.

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4.2.6 Command 0x0106 – Set standard PLC operating mode

16674

Using this command, the operating mode of the device-internal standard PLC can be set.

Command request channel (fieldbus master >>> device)

16689

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								Reserved							PLC
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

PLC	Operating mode of the device-internal PLC	1 bit	0x00 = stop PLC application and switch off PLC 0x01 = switch on PLC and start PLC application (boot application)

Command response channel (device >>> fieldbus master)

16690

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

16691

Error Code	Error	Description
0x00		no error
0x01	PF	PLC operating mode could not be set.

Error code only appears if command status = FAILED.

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4.2.7 Command 0x0109 – Set date/time

16677

Using this command, the system time (date and time) of the device can be set.

Command request channel (fieldbus master >>> device)

16694

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	month								Day							
4	year (byte 2, MSB)								year (byte 1, LSB)							
5	minutes								hours							
6	reserved								seconds							
7 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

day	day	1 byte	0x01 = 1 0x02 = 2 ... 0x1F = 31
month	month	1 byte	0x01 = January 0x02 = February ... 0x0C = December
Year	Year	1 word	Possible values: 1971 ... 2037 0x07B3 = 1971 0x07B4 = 1972 ... 0x07F5 = 2037 Example: 2014 = 0x07DE year (MSB) = 0x07, year (LSB) = 0xDE
hours	hours	1 byte	0x00 = 0 0x01 = 1 ... 0x17 = 23
minutes	minutes	1 byte	0x00 = 0 0x01 = 1 ... 0x3B = 59
seconds	seconds	1 byte	0x00 = 0 0x01 = 1 ... 0x3B = 59

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Command response channel (device >>> fieldbus master)

16695

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															

Possible command error codes

16696

Error Code	Error	Description
0x00		no error
0x01	IDT	Transferred values for date/time are invalid and could not be set. Error
0x02	NAE	NTP is active, transmitted value for time could not be set. Deactivate NTP to be able to set the time.

Error code appears if command status = FAILED

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4.2.8 Command 0x010A – Set parameters of the NTP server

16707

Using this command, the IP parameters of the NTP server can be set.

Command request channel (fieldbus master >>> device)

16705

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	NTP Offset								Reserved							NTP
4	NTP server IP address (high byte, net address)								NTP server IP address							
5	NTP server IP address								NTP server IP address (low byte, host address)							
6 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

NTP	Setting the NTP client	1 bit	0x0 = NTP client is inactive 0x1 = NTP client is active
NTP Offset	NTP server provides the time in UTC. NTP Offset indicates the difference between UTC and local time.	1 byte	0x00 = system clock in local time 0x01 = UTC -12:00 0x02 = UTC -11:00 0x03 = UTC -10:00 0x04 = UTC -09:00 0x05 = UTC -08:00 0x06 = UTC -07:00 0x07 = UTC -06:00 0x08 =.UTC -05:00 0x09 = UTC -04:00 0x0A = UTC -03:30 0x0B = UTC -03:00 0x0C = UTC -02:00 0x0D = UTC -01:00 0x0E = UTC +00:00 0x0F = UTC +01:00 0x10 = UTC +02:00 0x11 = UTC +03:00 0x12 = UTC +03:30 0x13 = UTC +04:00 0x14 = UTC +04:30 0x15 = UTC +05:00 0x16 = UTC +05:30 0x17 = UTC +05:45 0x18 = UTC +06:00 0x19 = UTC +06:30 0x1A = UTC +07:00 0x1B = UTC +08:00 0x1C = UTC +09:00 0x1D = UTC +09:30 0x1E = UTC +10:00 0x1F = UTC +11:00 0x20 = UTC +12:00

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NTP server IP address	IP address (IP-V4) of the NTP server	2 words	Per segment of an IP address: 0 ....255 0x00 = 000 0x01 = 001 ... 0x0FF = 255 Example: IP address: 192.168.150.5 192 = 0xC0 (high byte) 168 = 0xA8 150 = 0x96 005 = 0x05 (low byte)

The duration of the synchronisation process depends on the settings of the NTP server. This means that the synchronised system time is not immediately available after activation of the NTP client.

► Do not query the synchronised system time immediately after activation of the NTP client.

Command response channel (device >>> fieldbus master)

16706

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															

Possible command error codes

16707

Error Code	Error	Description
0x00		no error
0x01	IS	Wrong parameters transmitted. NTP server settings were not transmitted.

Error code appears if command status = FAILED

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4.2.9 Command 0x010B – Read date / time / NTP settings

16679

Using this command, the current values for time, date and NTP settings can be read.

Command request channel (fieldbus master >>> device)

16712

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Command response channel (device >>> fieldbus master)

16713

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															
5	month								day							
6	year (byte 2, MSB)								year (byte 1, LSB)							
7	minutes								hours							
8	reserved								seconds							
9	NTP Offset								reserved							NTP
10	NTP server IP address (high byte, net address)								NTP server IP address							
11	NTP server IP address								NTP server IP address (low byte, host address)							

Legend:

- day - month - year - hours - minutes - seconds	→ **Command 0x010A – Set parameters of the NTP server** (→ p. 49)
- NTP - NTP Offset - NTP server IP address	→ **Command 0x010A – Set parameters of the NTP server** (→ p. 49)

Possible command error codes

16714

Error Code	Error	Description
0x00		no error

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4.2.10 Command 0x010C – Reboot system

16680

Using the command, the device can be restarted.

Command request channel (fieldbus master >>> device)

7032

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	0x4F (= O)								0x42 (= B)							
4	0x54 (= T)								0x4F (= O)							
5 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

To prevent an unintended or unauthorised restart of the system by calling the command `0x010C`, a signature must be transmitted in addition. The command execution is stopped when a wrong signature is transmitted.
The signature is: BOOT

Command response channel (device >>> fieldbus master)

7044

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

7050

Error Code	Error	Description
0x01		Command error: Reboot could not be carried out.

Error code only appears if command status = FAILED.

4.2.11 Command 0x010D – Read fieldbus info

7052

The command reads information via the fieldbus.

The command can only be executed using the function block `ACnnnn_SysCmd` under CODESYS! (→ programming manual, section **ACnnnn_SysCmd**)

Command request channel (fieldbus master >>> device)

7064

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Command response channel (device >>> fieldbus master)

8909

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															
5 ... 23	→ **DS18 – Fieldbus information** (→ p. 33)															
24 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Possible command error codes

7030

Error Code	Error	Description
0x00		no error

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4.2.12 Command 0x010F – Read message text of an OSC entry

12126

The command reads the message text of the current OSC entry and return it.

The command can only be executed by using the function block `ACnnnn_SysCmd` in CODESYS development system (→ Programming manual, section **ACnnnnSysCmd**).

Command request channel (fieldbus master >>> device)

7171

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	Record Handle (Low Word)															
4	Record Handle (High Word)															
5 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

Record Handle	Address of the OSC entry	2 words	▪ Low Word: 0x000 = current OSC entry ▪ High Word: 0x0000 = current OSC entry

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Command response channel (device >>> fieldbus master)

7158

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															
5 ... n	Record Message Text (UTF8, zero terminated)															
(n+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend

Record Message Text	Message text of the OSC entry	n words	▪ Message text is UTF-8 coded Indication of the end of the text: zero terminated (= 0x00)

Possible command error codes

7172

Error Code	Error	Description
0x01		Internal database error
0x02		No entry found. OSC database empty or entry with the indicated Record Handle does not exist.

Error code only appears, if the command status = FAILED.

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4.2.13 Command 0x0110 – Display target visualisation

20593

This command enables switching between the menu page of the GUI and the target visualisation as well as enables/disables the use of the key combination [◀] + [▶].

Command request channel (fieldbus master >>> device)

20594

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	TargetVisu															
4	Hotkey															
5...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

TargetVisu	Content of the device display	1 Word	0x0000 = display GUI 0x0001 = display target visualisation
Hotkey	Key combination for switching from target visualisation to the menu page of the GUI	1 Word	0x0000 = key combination enabled 0x0001 = key combination disabled

Command reply channel (device >>> fieldbus master)

20595

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

20596

Error Code	Error	Description
0x00		no error
0x01		Target visualisation cannot be displayed because CODESYS PLC is not active

Error code appears if command status = FAILED

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4.3 AS-i master commands

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8797

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4.3.1 Overview: AS-i master commands

7250

Command [hex]	Command [dec]	Description	Note
0001	1	write parameters to a connected AS-i slave	
0003	3	adopt and save currently connected AS-i slaves in the configuration This command causes a reset of the fieldbus connection. The device must be rebooted!	ConfDataInput Slave → Projected Configuration Data and LDS → LPS
0004	4	Change the list of the projected AS-i slaves (LPS)	
0005	5	set the operating mode of the AS-i master	
0006	6	readdress a connected AS-i slave	
0007	7	set the auto addressing mode of the AS-i master	
0009	9	change the extended ID code 1 in the connected AS-i slave	
000A	10	change PCD	
000D	13	AS-i master supply voltage, symmetry, earth fault	
0015	21	read ID string of an AS-i slave with profile S-7.4	Slave profile S-7.4
0019	25	Set test mode	
001A	26	read AS-i master info	
001C	28	Deactivation of the slave reset when changing to the protected mode	
0021	33	read diagnosis string of an AS-i slave with profile S-7.4	Slave profile S-7.4
0022	34	read parameter string of an AS-i slave with profile S-7.4	Slave profile S-7.4
0023	35	write parameter string of an AS-i slave with profile S-7.4	Slave profile S-7.4
0024	36	CTT2 standard read: Acyclic standard read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0025	37	CTT2 standard write: Acyclic standard write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0026	38	CTT2 vendor specific read: acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0027	39	CTT2 vendor specific write: acyclic manufacturer-specific write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0040	64	CTT2 device group read: Acyclic devicegroup read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0041	65	CTT2 device group write: Acyclic devicegroup write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0042	66	CTT2 vendor specific selective read from buffer: Selective standard read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0043	67	CTT2 vendor specific selective write from buffer: Selective standard write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0044	68	CTT2 vendor specific selective read: Selective manufacturer-specific read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0045	69	CTT2 vendor specific selective write: Selective manufacturer-specific write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)

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Command [hex]	Command [dec]	Description	Note
0046	70	CTT2 device group selective read: Selective devicegroup read call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0047	71	CTT2 device group selective write: Selective devicegroup write call of an AS-i slave with CTT2 profile	CTT2 slave profile *)
0049	73	CTT2 vendor specific exchange: Manufacturer-specific data exchange with an AS-i slave with CTTS profile	CTT2 slave profile *)
004A	74	CTT2 device group exchange: Devicegroup data exchange with an AS-i slave with CTTS profile	CTT2 slave profile *)
004B	75	CTT2 device group selective read from buffer: Manufacturer-specific write/read call of an AS-i slave with CTTS profile	CTT2 slave profile *)
004C	76	CTT2 device group selective write from buffer: Devicegroup write/read call of an AS-i slave with CTTS profile	CTT2 slave profile *)
0050	80	Set AS-i master parameters	
0051	81	Reset error counter	

Legend:

CTT → chapter **Combined transaction – Use of analogue channels in the gateway depending on the slave profile**
*) CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

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4.3.2 Error codes of the AS-i master commands

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General error codes

5682

Revision: 2014-03-05

Error Code	Error	Description
0x01	NOK	no slave response OR: master is in the offline mode when requesting the command
0x02	SND	no slave with the old address found
0x03	SD0	slave with address 0 connected
0x04	SD2	slave with the new address already exists
0x05	DE	error when deleting the old address
	0x06	error when reading the IO configuration
0x07	SE	error when writing the new address or extended ID code 1
0x08	AT	new address could only be saved temporarily
0x09	ET	extended ID code 1 could only be saved temporarily
0x0A	NA	the slave is not in the LAS
0x0B	ID	parameter or address invalid
	0x0C	faulty S-7.4 protocol sequence
0x0D	ST	S-7.4 protocol aborted (timeout)
0x0E	IA	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0x0F	SSA	AS-i slave has aborted the S-7.4 string
	0x10	AS-i S-7.4 no longer connected (no longer in LAS)
0x11	STA	another S-7.4 transfer to the addressed AS-i slave is already active
0x12	HSE	the previous segmented S-7.4 transfer was not yet completed
0x13	IDL	invalid S-7.4 data length
	0x14	master is in the wrong operating mode *)
	0x16	timeout during command processing
0x17	CMD_PRE	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
0x18	NM	master is not in the protected mode
0x19		master is not in projection mode
	0x20	command could not be processed within the specified time
	0xE0...0xEF	CTT2 error detected by AS-i slave; → **Standard CTT2 error codes** (→ p. 62)
	0xF0	invalid CTT2 command
	0xF1	invalid CTT2 response
	0xF2	S-7.5 data length longer than 30 bytes

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Standard CTT2 error codes

8931

The "standard CTT2 error code" provides information about errors occurred during processing of a CTT2 command. It is transmitted in data byte 0 of the response channel of a CTT2 command. The following table shows the possible values:

Error code	Description
0x00	No fault
0x01	Invalid index
0x02	Invalid length
0x03	Command not implemented
0x04	Used, the command could not be completed in the specified time
0x05	Command was not acknowledged
0x06	Invalid sub-index
0x07	Command 'Selective Read Request' is missing

CTT2 error object

18393

In addition to the standard CTT2 error code, the "CTT2 error object" provides further manufacturer-specific information about errors which occurred during processing of a CTT2 command. It is transmitted in the response channel of a CTT2 command in the data bytes 0...5. The CTT2 error object has the following structure:

Data byte	Content
0	standard CTT2 error code (→ **Standard CTT2 error codes** (→ p. 62))
1...4	manufacturer-specific error information (→ data sheet of the AS-i slave)

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4.3.3 Command 0x0001 – Change parameters of an AS-i slave

8799

Requirement: The addressed AS-i master must be in the protected mode.
→ **Command 0x0005 – Change the operating mode of the AS-i master** (→ p. 67)

Command request channel (fieldbus master >>> device)

11103

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	reserved								reserved				New output parameter			
5...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

If the requested slave address (SLA) is not in the list of activated slaves (LAS), the new parameters are stored in the AS-i master despite error message (error code 0x0A). If an AS-i slave with this address is added to the AS-i network at a later point, the slave automatically adopts the saved parameters.

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Command response channel (device >>> fieldbus master)

11104

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	reserved								reserved				Input parameters			
6 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Possible command error codes

11105

Error Code	Error	Description
0x00		no error
0x01	NOK	no slave response OR: master is in the offline mode when requesting the command
0x0A	NA	the slave is not in the LAS
0x0B	ID	parameter or address invalid
0x0E	IA	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0x18	NM	master is not in the protected mode

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4.3.4 Command 0x0003 – Project the currrent AS-i network

8805

(= project all)

Requirement: The addressed AS-i master must be in the projection mode.

→ **Command 0x0005 – Change the operating mode of the AS-i master** (→ p. 67)

This command causes a reset of the fieldbus connection. The device must be rebooted!

Command request channel (fieldbus master >>> device)

11107

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11109

Error Code	Error	Description
0x00		no error
0x03	SD0	slave with address 0 connected
0x19		master is not in projection mode

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4.3.5 Command 0x0004 – Change LPS

8806

Requirement: The addressed AS-i master must be in the projection mode.
→ **Command 0x0005 – Change the operating mode of the AS-i master** (→ p. 67)

Command request channel (fieldbus master >>> device)

11111

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
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)	--
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	--
6	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11112

Error Code	Error	Description
0x00		no error
0x19		master is not in projection mode

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4.3.6 Command 0x0005 – Change the operating mode of the AS-i master

8807

Command request channel (fieldbus master >>> device)

11114

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								MOD							
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

MOD	operating mode	1 byte	0x00 = set master to the normal mode (protected mode) 0x01 = set master to the projection mode
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11115

Error Code	Error	Description
0x00		no error
0x03	SD0	slave with address 0 connected

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4.3.7 Command 0x0006 – Change AS-i slave address

8808

Requirement: The addressed AS-i master must be in the projection mode.
→ **Command 0x0005 – Change the operating mode of the AS-i master** (→ p. 67)

Command request channel (fieldbus master >>> device)

11117

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	old SLA				
4	reserved								reserved		ST	new SLA				
5...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															

Possible command error codes

11118

Error Code	Error	Description
0x00		no error
0x01	NOK	no slave response OR: master is in the offline mode when requesting the command
0x02	SND	no slave with the old address found
0x03	SD0	slave with address 0 connected
0x04	SD2	slave with the new address already exists
0x05	DE	error when deleting the old address
0x06		error when reading the extended ID code 1
0x07	SE	error when writing the new address or extended ID code 1
0x08	AT	new address could only be saved temporarily
0x09	ET	extended ID code 1 could only be saved temporarily
0x18	NM	master is not in the protected mode

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4.3.8 Command 0x0007 – Set the auto address mode of the AS-i master

8811

Command request channel (fieldbus master >>> device)

11120

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								AutoAd							
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

AutoAd	automatic addressing	1 byte	00 = deactivate automatic addressing 01 = activate automatic addressing
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11101

There are no error messages for this command.

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4.3.9 Command 0x0009 – Change extended ID1 in the AS-i slave

8812

Command request channel (fieldbus master >>> device)

11121

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	reserved								new Extended ID-Code 1							
5 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															

Possible command error codes

11121

Error Code	Error	Description
0x00		no error
0x02	SND	no slave with the old address found
0x03	SD0	slave with address 0 connected
0x05	DE	error when deleting the old address
0x06		error when reading the extended ID code 1
0x07	SE	error when writing the new address or extended ID code 1
0x09	ET	extended ID code 1 could only be saved temporarily
0x0E	IA	invalid AS-i slave address 0 or 0B, or address 0 indicated twice
0x18	NM	master is not in the protected mode
0x21		invalid ID code 1 (if bit 3 is set for A/B slave)

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4.3.10 Command 0x000A – Change PCD

8814

Command request channel (fieldbus master >>> device)

11125

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	ID2-Code				ID1-Code				ID-Code				IO-Code			
1	UID															
2	command number															
3	reserved															
4…34	Slave 1(A)…Slave 31(A)															
35	reserved															
36…66	Slave 1B…Slave 31B															
67...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11112

Error Code	Error	Description
0x00		no error
0x19		master is not in projection mode

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4.3.11 Command 0x000D – AS-i master supply voltage, symmetry, earth fault

8815

Command request channel (fieldbus master >>> device)

11107

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11128

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	reserved								reserved		PF1	PF2	SE	EF	PM	PS
6	Voltage ASi+ to ASi- in [mV]															
7	Voltage FE to ASi- in [mV]															
8	Symmetry (-100...100) in [%]															
9 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

EF	earth fault	1 bit	0 = no earth fault is detected 1 = asymmetric supply voltage; classified as earth fault
PF1	**p**ower**f**ail 22.5 V	1 bit	0 = no AS-i Power Fail (classic APF) 1 = AS-i voltage < 22.5 V There is an AS-i power fail (classic APF)
PF2	**p**ower**f**ail 19 V	1 bit	0 = no AS-i Power Fail (24V APF) 1 = AS-i voltage < 19 V There is an AS-i power fail (24V APF)
PM	**p**ower**m**odule	1 bit	0 = no data decoupling module is connected 1 = a data decoupling module is connected
PS	**p**ower**s**ource	1 bit	0 = the device is supplied from AUX 1 = the device is supplied from AS-i
SE	**s**tatus **e**arth fault detection	1 bit	0 = no earth fault detection possible (e.g. no AS-i voltage) 1 = earth fault detection provides valid data

Possible command error codes

11101

There are no error messages for this command.

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4.3.12 Command 0x0015 – Read ID string of an AS-i profile (S-7.4)

8822

Command request channel (fieldbus master >>> device)

11130

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11131

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	Number of bytes received as from word no. 4								reserved		ST	reflected slave address				
6	I/O	2D	DT Start			DT Count			Mux field			E type				
7	number of parameter bytes to be read								EDT Read			reserved		Diag	reserved	
8	EDT Write			reserved					Number of parameter bytes to be written							
9	Device-specific information								Manufacturer identification							
10...m	Device-specific information								Device-specific information							
(m+1)...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

2D	double data transfer	1 bit	double data transfer (redundancy) possible 0 = simple data transfer 1 = double data transfer
	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
	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
Diag	slave supports the 7.4 diagnosis string	1 bit	0 = diagnosis string is not supported 1 = diagnosis string is supported
DT-Count	number of data triples	3 bits	(information for the driver in the master)
DT-Start	start triple	3 bits	(information for the driver in the master)
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
EDT read	reserved	3 bits	reserved for later profiles
EDT write	reserved	3 bits	reserved for later profiles
	device-specific information	1 byte	as an option more bytes for the manufacturer-specific device description
	manufacturer identification	1 byte	defined manufacturer number assigned by AS-International
I/O	direction of data	1 bit	direction of data for the devices with E type ≠ 3 0 = input 1 = output
Mux field	number of multiplexed data words	3 bits	0…3 number = value in "Mux field" +1

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)

Possible command error codes

11132

Error Code	Error	Description
0x00		no error
0x01	NOK	no slave response OR: master is in the offline mode when requesting the command
0x0D	ST	S-7.4 protocol aborted (timeout)
0x0E	IA	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0x10		AS-i S-7.4 slave deleted from LAS during current transmission
0x11	STA	another S-7.4 transfer to the addressed AS-i slave is already active
0x17	CMD_PRE	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

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4.3.13 Command 0x001A – Read AS-i master info

8827

Command request channel (fieldbus master >>> device)

11107

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11137

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															
5	M12								reserved							
6	Master firmware version, places before the decimal point															
7	Master firmware version, decimal places															
8 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

M12	number of AS-i masters	1 byte	0x00 = device has 1 AS-i master 0x01 = device has 2 AS-i masters

Possible command error codes

11101

There are no error messages for this command.

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4.3.14 Command 0x001C – Deactivate slave reset when changing to the protected mode

8828

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.

Command request channel (fieldbus master >>> device)

11139

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								OLP							
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

OLP	offline phase = slave reset	1 byte	0x00 = offline phase when changing over to the protected mode 0x01 = no offline phase when changing over to the protected mode
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

Command response channel (device >>> fieldbus master)

11086

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11101

There are no error messages for this command.

4.3.15 Command 0x0021 – Read diagnosis string of an AS-i slave (S-7.4)

8829

Command request channel (fieldbus master >>> device)

11130

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11141

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	Number of bytes received								reserved		ST	reflected slave address				
6...m	Diagnosis byte n+1								Diagnosis byte n							
(m+1)...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)

Possible command error codes

11132

Error Code	Error	Description
0x00		no error
0x01	NOK	no slave response OR: master is in the offline mode when requesting the command
0x0D	ST	S-7.4 protocol aborted (timeout)
0x0E	IA	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0x10		AS-i S-7.4 slave deleted from LAS during current transmission
0x11	STA	another S-7.4 transfer to the addressed AS-i slave is already active
0x17	CMD_PRE	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

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4.3.16 Command 0x0022 – Read parameter string of an AS-i slave (S-7.4)

8830

Command request channel (fieldbus master >>> device)

11130

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11143

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	Number of bytes received								reserved		ST	reflected slave address				
6 ... m	Parameter byte n+1								Parameter byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)

Possible command error codes

11132

Error Code	Error	Description
0x00		no error
0x01	NOK	no slave response OR: master is in the offline mode when requesting the command
0x0D	ST	S-7.4 protocol aborted (timeout)
0x0E	IA	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0x10		AS-i S-7.4 slave deleted from LAS during current transmission
0x11	STA	another S-7.4 transfer to the addressed AS-i slave is already active
0x17	CMD_PRE	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

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4.3.17 Command 0x0023 – Write parameter string of an AS-i slave (S-7.4)

8831

Command request channel (fieldbus master >>> device)

11145

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	Number of bytes to be transmitted								reserved		ST	SLA				
4...m	parameter byte n+1								parameter byte n							
(m+1)...120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

The number of the bytes to be sent must be divisible by 2 since the system always transmits only multiples of 2 bytes in the S7.4 protocol.

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Command response channel (device >>> fieldbus master)

11143

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	Number of bytes received								reserved		ST	reflected slave address				
6 ... m	Parameter byte n+1								Parameter byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)

Possible command error codes

11146

Error Code	Error	Description
0x00		no error
0x01	NOK	Slave does not answer or AS-i master switches to offline mode during command execution OR: Timeout of slaves, switching of operating states with As-i parameters was not processed by the slave. Calling a not supported operating state can also cause this error message.
0x0C		7.4 sequence failed. AS-i slave generated wrong 7.4 sequence
0x0D	ST	S-7.4 protocol aborted (timeout)
0x0E	IA	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0x0F	SSA	AS-i slave has aborted the S-7.4 string
0x10		AS-i S-7.4 slave deleted from LAS during current transmission
0x11	STA	another S-7.4 transfer to the addressed AS-i slave is already active
0x12	HSE	the previous segmented S-7.4 transfer was not yet completed
0x13	IDL	invalid S-7.4 data length
0x14		invalid S-7.4 command
0x17	CMD_PRE	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

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4.3.18 Command 0x0024 – CTT2 Standard

8832

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11148

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	DL								IX							
5 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18370

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1*								data byte n							

* ... If the number of bytes to be transmitted is odd, a zero byte (= 0x00) is transmitted in the data byte n+1.

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x50 = No CTT2 error on command execution : The following data bytes contain the requested data. 0x90 = CTT2 error on command execution: - Data byte 0 contains → Standard CTT2 error codes (→ p. 62). - The data in the following data bytes is irrelevant.

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

4.3.19 Command 0x0025 – CTT2 standard write

8848

Command request channel (fieldbus master >>> device)

11152

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	DL								IX							
5 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18375

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	Command error code															
5	reserved								reserved		ST	Reflected slave address				
6	data byte 0								RC							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x51 = No CTT2 error on command execution : The data in the following data bytes is irrelevant. 0x91 = CTT2 error on command execution: Data byte 0 contains → **Standard CTT2 error codes** (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.20 Command 0x0026 – CTT2 Vendor Specific Read

8849

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11148

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	DL								IX							
5 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18371

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1*								data byte n							

* ... If the number of bytes to be transmitted is odd, a zero byte (= 0x00) is transmitted in the data byte n+1.

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x52 = No CTT2 error on command execution : The following data bytes contain the requested data. 0x92 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.21 Command 0x0027 – CTT2 Vendor Specific Write

8850

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11152

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	DL								IX							
5 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

11153

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	reserved								reserved		ST	reflected slave address				
6	Data byte 0								RC							
7 ... m	Data byte n+1								Data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x53 = No CTT2 error on command execution : The data in the following data bytes is irrelevant. 0x93 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.22 Command 0x0040 – CTT2 device group read

8851

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11148

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	DL								IX							
5 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18372

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1*								data byte n							

* ... If the number of bytes to be transmitted is odd, a zero byte (= 0x00) is transmitted in the data byte n+1.

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x54 = No CTT2 error on command execution : The following data bytes contain the requested data. 0x94 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.23 Command 0x0041 – CTT2 Device Group Write

8852

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11152

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	DL								IX							
5 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18386

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	reserved								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x55 = No CTT2 error on command execution : The data in the following data bytes is irrelevant. 0x95 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.24 Command 0x0042 – CTT2 Vendor Specific Selective Read From Buffer

8853

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11159

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5 ... m	reserved								DL							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18387

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x58 = No CTT2 error on command execution : The following data bytes contain the requested data. 0x98 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.25 Command 0x0043 – CTT2 Vendor Specific Selective Write From Buffer

8855

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11162

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5	Data byte 0								DL							
6 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18388

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x59 = No CTT2 error on command execution : Data byte 0 contains the number of bytes to be read (block length); Valid values: 0x00 ... 0xFF (→ data sheet of the AS-i slave) 0x99 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.26 Command 0x0044 – CTT2 Vendor Specific Selective Read

8857

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11159

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5 ... m	reserved								DL							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18387

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x58 = No CTT2 error on command execution : The following data bytes contain the requested data. 0x98 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.27 Command 0x0045 – CTT2 Vendor Specific Selective Write

8858

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11162

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5	Data byte 0								DL							
6 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18388

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x59 = No CTT2 error on command execution : Data byte 0 contains the number of bytes to be read (block length); Valid values: 0x00 ... 0xFF (→ data sheet of the AS-i slave) 0x99 = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.28 Command 0x0046 – CTT2 device group selective Rread

8857

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11159

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5 ... m	reserved								DL							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18392

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x5A = No CTT2 error on command execution : The following data bytes contain the requested data. 0x9A = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.29 Command 0x0047 – CTT2 Device Group Selective Write

8860

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11162

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5	Data byte 0								DL							
6 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18391

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x5B = No CTT2 error on command execution : Data byte 0 contains the block length (= number of bytes to be read); Valid values: 0x00 ... 0xFF (→ data sheet of the AS-i slave) 0x9B = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

4.3.30 Command 0x0049 – CTT2 Vendor Specific Exchange

8863

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11168

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	RL								IX							
5	Data byte 0								WL							
6 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
RL	read length	1 byte	number of bytes to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.
WL	write length	1 byte	number of bytes to be written permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)

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Command response channel (device >>> fieldbus master)

18389

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1*								data byte n							

* ... If the number of bytes to be transmitted is odd, a zero byte (= 0x00) is transmitted in the data byte n+1.

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x5D = No CTT2 error on command execution The following data bytes contain the requested data. 0x9D = CTT2 error on command execution The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.31 Command 0x004A – CTT2 Device Group Exchange

8866

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11168

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	RL								IX							
5	Data byte 0								WL							
6 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
RL	read length	1 byte	number of bytes to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.
WL	write length	1 byte	number of bytes to be written permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)

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Command response channel (device >>> fieldbus master)

18390

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1*								data byte n							

* ... If the number of bytes to be transmitted is odd, a zero byte (= 0x00) is transmitted in the data byte n+1.

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x5E = No CTT2 error on command execution : The following data bytes contain the requested data. 0x9E = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.32 Command 0x004B – CTT2 Device Group Selective Read From Buffer

8861

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11159

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5 ... m	reserved								DL							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18392

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x5A = No CTT2 error on command execution : The following data bytes contain the requested data. 0x9A = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.33 Command 0x004C – CTT2 Device Group Selective Write From Buffer

8862

CTT2 profiles = S-7.5.5, S-7.A.5 or S-B.A.5

Command request channel (fieldbus master >>> device)

11162

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	reserved								reserved		ST	SLA				
4	SIX								IX							
5	Data byte 0								DL							
6 ... m	Data byte (n+1)								Data byte n							
(m+1) ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legende:

DL	data length	1 byte	number of bytes to be transferred permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
IX	index	1 byte	pointer to the page to be read permitted values: 0x00…0xFF = 0…255 (→ data sheet of the slave)
SIX	sub-index	1 byte	pointer on element on this page (→ data sheet of the slave)
SLA	slave address	5 bits	0x00…0x1F = 0…31
ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
UID	user ID	1 word	0x0000…0xFFFF = 0…65535 The user ID ensures clear identification of the commmand response data of the command request data sent before. The user can assign any user ID in the command request. The AS-i master reflects the user ID from the command request into the corresponding command response.

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Command response channel (device >>> fieldbus master)

18391

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								Command status (→ p. 37)							
4	command error code															
5	number of bytes received								reserved		ST	reflected slave address				
6	data byte 0								RC							
7 ... m	data byte n+1								data byte n							

Legend:

ST	slave type	1 bit	0 = single slave or A slave 1 = B slave (= addition of 0x1F to the slave address)
RC	CTT2 Response Code	1 byte	0x5B = No CTT2 error on command execution : Data byte 0 contains the block length (= number of bytes to be read); Valid values: 0x00 ... 0xFF (→ data sheet of the AS-i slave) 0x9B = CTT2 error on command execution: The following data bytes 0...5 contain → CTT2 error object (→ p. 62).

Possible command error codes

11150

Error code	Error	Description
0x00		No fault
0x0A	NA	Slave is not in the LAS
0x14	IC	Invalid S-7.4 command
0x17	CMD_PRE	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
0xE1	CTT2_ACYCL_RD_NOK	Command execution error
0xE2	CTT2_ACYCL_CMD_NOK	Invalid command
0xE3	CTT2_ACYCL_RESP_NOK	Wrong response data or internal error
0xE4	CTT2_ACYCL_WR_LEN_NOK	Wrong data length when writing
0xE5	CTT2_ACYCL_STATE_NOK	Invalid state of the CTT2 state machine when executing the command
0xE6	CTT2_ACYCL_STATE_RESET	Reset when executing the command
0xE7	CTT2_ACYCL_RD_LEN_NOK	Wrong data length when reading
0xE8	CTT2_ACYCL_RD_WR_LEN_NOK	Wrong data length when reading / writing
0xEF	CTT2_ACYCL_CMD_TIMEOUT	Timeout

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4.3.34 Command 0x0050 – Adjust AS-i master settings

16772

Command request channel (fieldbus master >>> device)

16774

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3	Setting								Reserved							MOD
4 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Legend:

Setting	Selection of the diagnostic function	0x01 = ground-fault detection (EE) 0x02 = double address recognition (DAE)
MOD	Activate/deactivate the selected diagnostic function in the settings	0 = deactivate function 1 = activate function

Command response channel (device >>> fieldbus master)

16775

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

16776

Error Code	Error	Description
0x00		no error
0x01	IP	Wrong parameter assigned. Setting was not adopted.

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4.3.35 Command 0x0051 – Reset error counter

16773

Command sets the following counters to 0:

- Telegram errors
- All slave telegram errors
- Configuration errors
- Voltage drops < 22.5 V
- Voltage drops < 19.0 V
- Earth faults
- Error distribution telegram errors

Command request channel (fieldbus master >>> device)

16778

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	UID															
2	command number															
3 ... 120	The area is completely ignored. It does not matter whether the data area exists or what data is contained.															

Command response channel (device >>> fieldbus master)

16779

Offset Word no.	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID															
2	reflected command number															
3	reserved								**Command status** (→ p. 37)							
4	command error code															

Possible command error codes

11101

There are no error messages for this command.

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