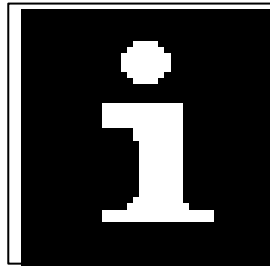


Development Information



Protocol description HSP5

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1 Common

Target of the new protocol is a higher communication speed. This shall be reached by the following measures:

1. Higher baud rates (shorter telegrams)
2. Full Duplex data transfer (higher telegram throughput)
3. Hardware signals for telegram end (faster processing onto micro controllers)
4. Point to Point connection (no evaluation of the inverter address necessary)
5. Multi-master capable (no polling of important working conditions necessary)
6. No longer ASCII-coded (shorter telegrams)

1.1 Fundamental Telegram Structure

INV-ID-OP	INV-ID-FU	Service	Set Selection, Parameter Address, Data, Acknowledgement (dep.on the Service)	BCC
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INV-ID-OP: 4 bits. Identifying of communication cycles which are initiated by the operator. Rotating counter (1 - 15). 0 at INV-ID-FU \leftrightarrow 0.

INV-ID-FU: 4 bits. Identifying of communication cycles which are initiated by the inverter. Rotating counter (1 - 15). 0 at INV-ID-OP \leftrightarrow 0.

Service: 8bits. Identifies the service to be executed. The upper two bits have special meanings.
bit 7: 0: => Request 1: => Response
bit 6: 0: => Read 1: => Write
Thereby 64 write and 64 read services are available.

Addr., Data: Contains the parameter addresses, the set information and the data. The content of this range is dependent on the actual service.

BCC: Control byte. The value of this byte is an exclusive-or-calculation of the telegram bytes ahead.

1.2 Definition of the Acknowledge

An acknowledge byte is transmitted in each response telegram. The following acknowledges are generated:

Acknowledge	Meaning
0	OK
1	not ready
2	reserved (Address/Password invalid with F4)
3	Data invalid
4	Parameter write protected
5	BCC-Error
6	Inverter / Operator busy
7	Service not available
8	Password invalid
9	Telegram framing error: wrong count of chars in telegram
10	Transmission error: Overrun-, framing-, parity error of a transferred characters
11	Set selection invalid
12	Language selection invalid
13	Address invalid
14	Operation not possible
15	-free-

In case of an error acknowledge (Acknowledge byte \neq 0) the transferred data for read requirements are invalid. In this case the telegram lengths will not be changed.
highest acknowledge value = 15 (0Fh).

2 Services

No.:	Standard services	Request	Tel.-length	Response	Tel.-length
0	Reading the parameter value (enhanced set addressing)	00000000	6	10000000	8
	Writing the parameter value (enhanced set addressing)	01000000	10	11000000	4
1	Reading the parameter value (hour set addressing)	00000001	6	10000001	8
	Writing the parameter value (hour set addressing)	01000001	10	11000001	4
2	Reading the limits	00000010	5	10000010	12
	Writing the limits	01000010	13	11000010	4
3	Reading the Default value	00000011	5	10000011	8
	Writing the Default value	01000011	9	11000011	4
4	Reading the parameter properties	00000100	5	10000100	12
	Writing the parameter properties	01000100	13	11000100	4
5	Reading the display scaling	00000101	5	10000101	12
	Writing the display scaling	01000101	13	11000101	4
6	Reading the parameter name	00000110	6	10000110	5 .. 29
	Writing the parameter name	01000110	7 .. 31	11000110	4
7	Reading the plain text indices display / COMBIVIS	00000111	5	10000111	12
	Writing the plain text indices display / COMBIVIS	01000111	13	11000111	4
8	Reading the plain text for the display	00001000	8	10001000	14
	Writing the plain text for the display	01001000	18	11001000	4
9	Reading the plain text for COMBIVIS	00001001	8	10001001	10 .. 34
	Writing the plain text for COMBIVIS	01001001	14 .. 38	11001001	4
10	Reading the group properties	00001010	5	10001010	12
	Writing the group properties	01001010	13	11001010	4
11	Reading the group name	00001011	6	10001011	5 .. 29
	Writing the group name	01001011	7 .. 31	11001011	4
12	Reading the plain text definition for COMBIVIS	00001100	7	10001100	10 .. 34
	Writing the plain text definition for COMBIVIS	01001100	13 .. 37	11001100	4

No.:	Process data	Request	Tel.-length	Response	Tel.-length
16	Read process data telegram type 1 (2 X 32 bit)	00010000	3	10010000	12
	Write process data telegram type 1 (2 X 32 bit)	01010000	11	11010000	4
17	Read process data telegram type 2 (4 X 16 bit)	00010001	3	10010001	12
	Write process data telegram type 2 (4 X 16 bit)	01010001	11	11010001	4
18	Read process data telegram type 3 (Timestamp, 2*32 bit, 2*16bit)	00010010	3	10010010	18
	Write process data telegram type 3 (Timestamp, 2*32 bit, 2*16bit)	01010010	17	11010010	4
Special Services					
32	Check parameter value for default value (enhanced set addressing)	00100000	6	10100000	4
	Set parameter value for default value (enhanced set addressing.)	01100000	6	11100000	4
33	Check parameter value for default value (hour set addressing)	00100001	6	10100001	4
	Set parameter value for default value (hour set addressing)	01100001	6	11100001	4
Write / read process data					
48	Process data telegram full Duplex type 1 (2 X 32 bit)	0X110000	11	1X110000	12
49	Process data telegram full Duplex type 2 (4 X 16 bit)	0X110001	11	1X110001	12
50	Process data telegram full Duplex type 3	0X110010	17	1X110010	16

Highest service number = 56 (38h).

Protocol description HSP5

2.1 Service 0: Reading the Parameter Value (enhanced set addressing)

Request of the operator:

0001 0000	0 0 000000	2000h	00100000	BCC
-----------	------------	-------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 0 (parameter value, enhanced set addressing)
3 – 4	Parameter address
5	Addressing byte for set selection (set 5 selected)
6	BCC

Response of the inverter

0001 0000	1 0 000000	00000046h	00h	BCC
-----------	------------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 0 (parameter value, enhanced set addressing)
3 – 6	Data (32 bit sign extended)
7	Acknowledge (0 = OK)
8	BCC

Set selection byte	Function	condition	Data	Acknowledge
= 0			invalid	11: set invalid
≠ 0	Parameter values of all selected sets are compared with each other	Parameter value is the same in all selected sets	Parameter value	0: OK
		Parameter value is not the same in all selected sets	invalid	3: Data invalid

2.2 Service 0: Writing the Parameter Value (enhanced set addressing)

Request of the operator:

0001 0000	0 1 000000	2101h	FFFFA240h	00101000	BCC
-----------	------------	-------	-----------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 0 (parameter value, enhanced set addressing)
3 – 4	Parameter address
5 – 8	Data (32 bit sign extended)
9	Addressing byte for set selection (set 3 and 5 selected)
10	BCC

Response of the inverter

0001 0000	1 1 000000	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 0 (parameter value, enhanced set addressing)
3	Acknowledge (0 = OK)
4	BCC

Set selection byte	Function	condition	Acknowledge
= 0			11: set invalid
≠ 0	Data is written to all selected sets	Data inside the limits	0: OK
		Data outside the limits	3: Data invalid
		no write access permissible at the moment	6: inverter busy
		Parameter write protected	4: read only

Protocol description HSP5

2.3 Service 1: Reading the Parameter Value (standard set addressing)

Request of the operator:

0001 0000	0 0 000001	2000h	00000001	BCC
-----------	------------	-------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 1 (parameter value, standard set addressing)
3 – 4	Parameter address
5	Addressing byte for set selection (0 = active set, 1 = Fr. 9)
6	BCC

Response of the inverter

0001 0000	1 0 000001	00000046h	00h	BCC
-----------	------------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 1 (parameter value, standard set addressing)
3 – 6	Data (32 bit sign extended)
7	Acknowledge (0 = OK)
8	BCC

Set selection byte	Function	Data	Acknowledge
= 0	Read parameter value of the active set	Parameter value	0: OK
= 1	Read parameter value of the set which is selected by Fr.9	Parameter value	0: OK
> 1		invalid	11: set invalid

2.4 Service 1: Writing the Parameter Value (standard set addressing)

Request of the operator:

0001 0000	0 1 000001	2101h	FFFFA240h	00000000	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 1 (parameter value, standard set addressing)
3 – 4	Parameter address
5 – 8	Data (32 bit sign extended)
9	Addressing byte for set selection (0 = active set, 1 = Fr. 9)
10	BCC

Response of the inverter

0001 0000	1 1 000001	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 1 (parameter value, standard set addressing)
3	Acknowledge (0 = OK)
4	BCC

Set selection byte	Function	condition	Acknowledge
= 0		writing on active set not allowed	11: set invalid
	Data is written to active set	writing on active set allowed data inside the limits	0: OK
		writing on active set allowed data outside the limits	3: Data invalid
		Parameter is write protected	4: read only
= 1	Data is written to set which is selected by Fr.9	Data inside the limits	0: OK
		Data outside the limits	3: Data invalid
> 1			11: set invalid
		no write access permissible at the moment	6: inverter busy
		Parameter write protected	4: read only

Protocol description HSP5

2.5 Service 2: Reading the Limits

Request of the operator:

0001 0000	0 0 000010	2101h	BCC
-----------	------------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 2 (parameter limits)
3 – 4	Parameter address
5	BCC

Response of the inverter

0001 0000	1 0 000010	F2345678h	1EDCBA98h	00h	BCC
-----------	------------	-----------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 2 (parameter limits)
3 – 6	Lower limit (32 bit sign extended)
7 – 10	Upper limit (32 bit sign extended)
11	Acknowledge (0 = OK)
12	BCC

2.6 Service 2: Writing the Limits

Request of the inverter:

0000 0001	0 1 000010	2101h	12345678h	23456789h	BCC
-----------	------------	-------	-----------	-----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 2 (parameter limits)
3 – 4	Parameter address
5 – 8	Lower limit (32 bit sign extended)
9 – 12	Upper limit (32 bit sign extended)
13	BCC

Response of the inverter:

0000 0001	1 1 000010	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 2 (parameter limits)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.7 Service 3: Reading the Default Value

Request of the operator:

0001 0000	0 0 000011	2103h	BCC
-----------	------------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 3 (default value)
3 – 4	Parameter address
5	BCC

Response of the inverter

0001 0000	1 0 000011	00000046h	00h	BCC
-----------	------------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 3 (default value)
3 – 6	Data (32 bit sign extended)
7	Acknowledge (0 = OK)
8	BCC

2.8 Service 3: Writing the Default Value

Request of the inverter:

0000 0001	0 1 000011	2101h	FFFFA240h	BCC
-----------	------------	-------	-----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 3 (default value)
3 – 4	Parameter address
5 – 8	Data (32 bit sign extended)
9	BCC

Response of the operator:

0000 0001	1 1 000011	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 3 (default value)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.9 Service 4: Reading the Parameter Properties

Request of the operator:

0001 0000	0 0 000100	2101h	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 4 (parameter properties)
3 – 4	Parameter address
5	BCC

Response of the inverter

0001 0000	1 0 000100	12345678h	FEDCBA98h	00h	BCC
-----------	------------	-----------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 4 (parameter properties)
3 – 6	Properties1 (32 bit binary coded)
7 – 10	Properties2 (32 bit binary coded)
11	Acknowledge (0 = OK)
12	BCC

2.10 Service 4: Writing the Parameter Properties

Request of the inverter:

0000 0001	0 1 000100	2101h	12345678h	23456789h	BCC
-----------	------------	-------	-----------	-----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 4 (parameter properties)
3 – 4	Parameter address
5 – 8	Properties1 (32 bit binary coded)
9 – 12	Properties2 (32 bit binary coded)
13	BCC

Response of the inverter:

0000 0001	1 1 000100	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 4 (parameter properties)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.11 Service 5: Reading the Display Scaling

Request of the operator:

0001 0000	0 0 000101	2101h	BCC
-----------	------------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 5 (display scaling)
3 – 4	Parameter address
5	BCC

Response of the inverter

0001 0000	1 0 000101	0123h	1234h	0000h	3456h	00h	BCC
-----------	------------	-------	-------	-------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 5 (display scaling)
3 – 4	Divisor (16 bit signed)
5 – 6	Multiplier (16 bit signed)
7 – 8	Offset (16 bit signed)
9 – 10	Flags (16 bit binary coded)
11	Acknowledge (0 = OK)
12	BCC

2.12 Service 5: Writing the Display Scaling

Request of the inverter:

0000 0001	0 1 000101	2101h	1234h	0234h	0874h	0012h	BCC
-----------	------------	-------	-------	-------	-------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 5 (display scaling)
3 - 4	Parameter address
5 - 6	Divisor (16 bit signed)
7 - 8	Multiplier (16 bit signed)
9 - 10	Offset (16 bit signed)
11 - 12	Flags (16 bit binary coded)
13	BCC

Response of the inverter:

0000 0001	1 1 000101	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 5 (display scaling)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.13 Service 6: Reading the Parameter Name

Request of the operator:

0001 0000	0 0 000110	2101h	01h	BCC
-----------	------------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 6 (parameter name)
3 - 4	Parameter address
5	Language identifier: 0 = english, 1 = german (not valid for all units)
6	BCC

Response of the inverter at acknowledge = 0 (OK):

0001 0000	1 0 000110	0CH	"Parameter XY"	00h	BCC
-----------	------------	-----	----------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 6 (parameter name)
3	Text length
4 - 27	ASCII-Text (0 - 24 Byte)
4 + TL	Acknowledge = 0 (OK)
5 + TL	BCC

The length of the response-telegram is dependent on the length of the transmitted text.

Response of the inverter at acknowledge \neq 0:

0001 0000	1 0 000110	00h	08h	BCC
-----------	------------	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 6 (parameter name)
3	Text length = 0
4	Acknowledge \neq 0
5	BCC

With negative acknowledge no text will be transmitted, the text length is 0.

condition	Acknowledge
Language identifier will not be supported	12: Language identifier invalid

2.14 Service 6: Writing the Parameter Name

Request of the inverter:

0000 0001	0 1 000110	2101h	01h	0CH	"Parameter XY"	BCC
-----------	------------	-------	-----	-----	----------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 6 (parameter name)
3 – 4	Parameter address
5	Language identifier: 0 = english, 1 = german (not valid for all units)
6	Text length
7 – 29	ASCII-Text (0 - 24 Byte)
7 + TL	BCC

The length of the request-telegram is dependent on the length of the transmitted text.

Response of the inverter:

0000 0001	1 1 000110	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 6 (parameter name)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.15 Service 7: Reading the Plain Text Indices for the Display and for COMBIVIS

Request of the operator:

0001 0000	0 0 000111	2101h	BCC
-----------	------------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 7 (plain text indices display and COMBIVIS)
3 – 4	Parameter address
5	BCC

Response of the inverter

0001 0000	1 0 000111	0017h	0009h	0024h	0036h	00h	BCC
-----------	------------	-------	-------	-------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 7 (plain text indices display and COMBIVIS)
3 – 4	Plain text index for the display
5 – 6	Count of plain texts for the display, 0 = non available
7 – 8	Plain text index for COMBIVIS
9 – 10	Count of definition indices for COMBIVIS, 0 = non available
11	Acknowledge (0 = OK)
12	BCC

2.16 Service 7: Writing the Plain Text Indices for the Display and for COMBIVIS

Request of the inverter:

0000 0001	0 1 000111	2101h	0017h	0009h	0024h	0036h	BCC
-----------	------------	-------	-------	-------	-------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 7 (plain text indices display and COMBIVIS)
3 – 4	Parameter address
5 – 6	Plain text index for the display
7 – 8	Count of plain texts for the display, 0 = non available
9 – 10	Plain text index for COMBIVIS
11 – 12	Count of definition indices for COMBIVIS, 0 = non available
13	BCC

Response of the inverter:

0000 0001	1 1 000111	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 7 (plain text indices display and COMBIVIS)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.17 Service 8: Reading a Plain Text for the Display

Request of the operator:

0001 0000	0 0 001000	0017h	0003h	00h	BCC
-----------	------------	-------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 8 (plain text display)
3 – 4	Plain text index
5 – 6	Subindex (0 ... count of plain texts - 1)
7	Language identifier: 0 = english, 1 = german (not valid for all units)
8	BCC

Response of the inverter

0001 0000	1 0 001000	00000023h	00h	" OFF"	00h	BCC
-----------	------------	-----------	-----	--------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 8 (plain text display)
3 – 6	Parameter value (32 bit sign extended), which is valid for the text
7	Plain text type
8 – 12	5 digits 7-segment-code
13	Acknowledge (0 = OK)
14	BCC

condition	Acknowledge
Language identifier will not be supported	12: Language identifier invalid
Plain text index or subindex will not be supported	3: Data invalid

2.18 Service 8: Writing a Plain Text for the Display

Request of the inverter:

0000 0001	0 1 001000	0017h	0003h	00h	01h	00000023h	"..OFF"	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Req, writing, service identifier 8 (plain text display)
3 - 4	Plain text index
5 - 6	Subindex (0 ... count of plain texts - 1)
7	Language identifier: 0 = english, 1 = german (not valid for all units)
8	Plain text type
9 - 12	Parameter value (32 bit sign extended), which is valid for the text
13 - 17	5 digits 7-segment-code
18	BCC

Response of the inverter:

0000 0001	1 1 001000	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service of inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from operator)
2	Rsp, writing, service identifier 8 (plain text display)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.19 Service 9: Reading a Plain Text for COMBIVIS

Request of the operator:

0001 0000	0 0 001001	0034h	00h	20h	00h	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 9 (plain text COMBIVIS)
3 – 4	Plain text index
5	Definition index (0 ... count of definition indices - 1)
6	Subindex (0 ... count of plain texts - 1)
7	Language identifier: 0 = english, 1 = german (not valid for all units)
8	BCC

Response of the inverter at acknowledge = 0 (OK):

0001 0000	1 0 001001	00000100h	01h	12h	"Text for Combivis"	00h	BCC
-----------	------------	-----------	-----	-----	---------------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 9 (plain text COMBIVIS)
3 – 6	Parameter value (32 bit sign extended), which is valid for the text
7	Plain text type
8	Text length
9 – 32	ASCII-Text (0 - 24 Byte)
9 + TL	Acknowledge (0 = OK)
10 + TL	BCC

The length of the response-telegram is dependent on the length of the transmitted text.

Reading the plain text for COMBIVIS (continuation)

Response of the inverter at acknowledge \neq 0:

0001 0000	1 0 001001	00000100h	01h	00h	03h	BCC
-----------	------------	-----------	-----	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 9 (plain text COMBIVIS)
3 – 6	Parameter value (32 bit, data invalid)
7	Plain text type (data invalid)
8	Text length = 0
9	Acknowledge \neq 0
10	BCC

When negative acknowledge no text will be transmitted, the text length is 0.

condition	Acknowledge
Language identifier will not be supported	12: Language identifier invalid
Plain text-, definition- or subindex will not be supported	3: Data invalid

Protocol description HSP5

2.20 Service 9: Writing a Plain Text for COMBIVIS

Request of the inverter:

0000 0001	0 1 001001	0034h	00h	20h	01h	00h	00000100h	12h	"Text for Combivis"	BCC
-----------	------------	-------	-----	-----	-----	-----	-----------	-----	---------------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Req, writing, service identifier 9 (plain text COMBIVIS)
3 – 4	Plain text index
5	Definition index (0 ... count of definition indices - 1)
6	Subindex (0 ... count of plain texts - 1)
7	Language identifier: 0 = english, 1 = german (not valid for all units)
8	Plain text type
9 – 12	Parameter value (32 bit sign extended), which is valid for the text
13	Text length
14 – 37	ASCII-Text (0 - 24 Byte)
14 + TL	BCC

The length of the request-telegram is dependent on the length of the transmitted text.

Response of the inverter:

0000 0001	1 1 001001	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Rsp, writing, service identifier 9 (plain text COMBIVIS)
3	Acknowledge (0 = OK)
4	BCC

2.21 Service 10: Reading the Group Properties

Request of the operator:

0001 0000	0 0 001010	2100h	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 10 (group properties)
3 – 4	Group address, only multiple of 0100h, Lowbyte is ignored
5	BCC

Response of the inverter

0001 0000	1 0 001010	01h	72h	75h	72h	001Bh	19h	0Dh	00h	BCC
-----------	------------	-----	-----	-----	-----	-------	-----	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 10 (group properties)
3	Index of the group = Group number 0..n
4	1. Group identifier letter (ASCII)
5	2. Group identifier letter (ASCII)
6	Shortcut (lower case letter ASCII) (Combivis)
7 – 8	Group properties (16 bit binary coded)
9	Highest parameter number in this group
10	Count of parameters of this group (value - 1)
11	Acknowledge (0 = OK)
12	BCC

Protocol description HSP5

2.22 Service 10: Writing the Group Properties

Request of the inverter:

0000 0001	0 1 001010	2100h	01h	72h	75h	72h	001Bh	19h	0Dh	BCC
-----------	------------	-------	-----	-----	-----	-----	-------	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Req, writing, service identifier 10 (group properties)
3 – 4	Group address, only multiple of 0100h, Lowbyte is ignored
5	Index of the group = Group number 0..n
6	1. Group identifier letter (ASCII)
7	2. Group identifier letter (ASCII)
8	Shortcut (lower case letter ASCII)
9 – 10	Group properties (16 bit binary coded)
11	Highest parameter number in this group
12	Count of parameters of this group (value - 1)
13	BCC

Response of the inverter:

0000 0001	1 1 001010	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Rsp, writing, service identifier 10 (group properties)
3	Acknowledge (0 = OK)
4	BCC

2.23 Service 11: Reading the Group Name

Request of the operator:

0001 0000	0 0 001011	2100h	01h	BCC
-----------	------------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 11 (group name)
3 – 4	Group address, only multiple of 0100h, Lowbyte is ignored
5	Language identifier: 0 = english, 1 = german (not valid for all units)
6	BCC

Response of the inverter at acknowledge = 0 (OK):

0001 0000	1 0 001011	09h	"Group XY"	00h	BCC
-----------	------------	-----	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 11 (group name)
3	Text length
4 – 27	ASCII-Text (0 - 24 Byte)
4 + TL	Acknowledge (0 = OK)
5 + TL	BCC

The length of the response-telegram is dependent on the length of the transmitted text.

Response of the inverter at acknowledge ≠ 0:

0001 0000	1 0 001011	00h	08h	BCC
-----------	------------	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 11 (group name)
3	Text length = 0
4	Acknowledge ≠ 0
5	BCC

When negative acknowledge no text will be transmitted, the text length is 0.

condition	Acknowledge
Language identifier will not be supported	12: Language identifier invalid

Protocol description HSP5

2.24 Service 11: Writing the Group Name

Request of the inverter:

0000 0001	0 1 001011	2100h	01h	09h	"Group XY"	BCC
-----------	------------	-------	-----	-----	------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Req, writing, service identifier 11 (group name)
3 - 4	Group address, only multiple of 0100h, Lowbyte is ignored
5	Language identifier: 0 = english, 1 = german (not valid for all units)
6	Text length
7 - 30	ASCII-Text (0 - 24 Byte)
7 + TL	BCC

The length of the request-telegram is dependent on the length of the transmitted text.

Response of the inverter:

0000 0001	1 1 001011	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Rsp, writing, service identifier 11 (group name)
3	Acknowledge (0 = OK)
4	BCC

2.25 Service 12: Reading a Plain Text Definition for COMBIVIS

Request of the operator:

0001 0000	0 0 001100	0034h	00h	00h	BCC
-----------	------------	-------	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 12 (plain text definition for COMBIVIS)
3 – 4	Plain text index
5	Definition index (0 ... count of definition indices - 1)
6	Language identifier: 0 = english, 1 = german (not valid for all units)
7	BCC

Response of the inverter at acknowledge = 0 (OK):

0001 0000	1 0 001100	00000FFFh	0CH	12h	"Text for Combivis"	00h	BCC
-----------	------------	-----------	-----	-----	---------------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 12 (plain text definition for COMBIVIS)
3 – 6	Bit mask (32 bit) for this plain text index and definition index
7	Count of plain texts for this plain text index and definition index (0 = none available)
8	Text length
9 – 32	ASCII-text description (0 - 24 byte)
9 + TL	Acknowledge (0 = OK)
10 + TL	BCC

The length of the response-telegram is dependent on the length of the transmitted text.

Protocol description HSP5

Reading the plain text definition for COMBIVIS (continuation)

Response of the inverter at acknowledge \neq 0:

0001 0000	1 0 001100	00h	03h	BCC
-----------	------------	-----	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 12 (plain text definition for COMBIVIS)
3 – 6	Bit mask (32 bit, data invalid)
7	Count of plain texts (data invalid)
8	Text length = 0
9	Acknowledge \neq 0
10	BCC

With negative acknowledge no text will be transmitted, the text length is 0.

condition	Acknowledge
Language identifier will not be supported	12: Language identifier invalid
Plain text- or definition index will not be supported	3: Data invalid

2.26 Service 12: Writing a Plain Text Definition for COMBIVIS

Request of the inverter:

0000 0001	0 1 001100	0034h	00h	01h	00000100h	00h	12h	"Text for Combivis"	BCC
-----------	------------	-------	-----	-----	-----------	-----	-----	---------------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Req, writing, service identifier 12 (plain text definition COMBIVIS)
3 – 4	Plain text index
5	Definition index (0 ... count of definition indices - 1)
6	Language identifier: 0 = english, 1 = german (not valid for all units)
7 – 10	Bit mask (32 bit) for this plain text index and definition index
11	Count of plain texts for this plain text index and definition index (0 = non available)
12	Text length
13 – 36	ASCII-text description (0 - 24 byte)
13 + TL	BCC

The length of the request-telegram is dependent on the length of the transmitted text.

Response of the inverter:

0000 0001	1 1 001100	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 1 (1st service from inverter) bit 5-7 Inv-ID-OP = 0 (service not initiated from the operator)
2	Rsp, writing, service identifier 12 (plain text definition COMBIVIS)
3	Acknowledge (0 = OK)
4	BCC

Protocol description HSP5

2.27 Service 16: Reading of Process Data Telegram Type 1

Request of the operator:

0001 0000	0 0 010000	BCC
-----------	------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 16 (process data type1)
3	BCC

Response of the inverter

0001 0000	1 0 010000	12345678h	FEDCBA98h	00h	BCC
-----------	------------	-----------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 16 (process data type1)
3 - 6	1. Process data value (32 bit sign extended)
7 - 10	2. Process data value (32 bit sign extended)
11	Acknowledge (0 = OK)
12	BCC

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

2.28 Service 16: Writing of Process Data Telegram Type 1

Request of the operator:

0001 0000	0 1 010000	12345678h	12345678h	BCC
-----------	------------	-----------	-----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 16 (process data type1)
3 - 6	1. Process data value (32 bit sign extended)
7 - 10	2. Process data value (32 bit sign extended)
11	BCC

Response of the inverter

0001 0000	1 1 010000	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 16 (process data type1)
3	Acknowledge (0 = OK)
4	BCC

condition	Acknowledge
no write access permissible at the moment	6: inverter busy
min. one process data value is outside the limits	3: Data invalid

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

2.29 Service 17: Reading of Process Data Telegram Type 2

Request of the operator:

0001 0000	0 0 010001	BCC
-----------	------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 17 (process data type2)
3	BCC

Response of the inverter

0001 0000	1 0 010001	1234h	5678h	FEDCh	BA98h	00h	BCC
-----------	------------	-------	-------	-------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 17 (process data type2)
3 - 4	1. Process data value (16 bit sign extended)
5 - 6	2. Process data value (16 bit sign extended)
7 - 8	3. Process data value (16 bit sign extended)
9 - 10	4 Process data value (16 bit sign extended)
11	Acknowledge (0 = OK)
12	BCC

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

2.30 Service 17: Writing of Process Data Telegram Type 2

Request of the operator:

0001 0000	0 1 010001	1234h	5678h	F456h	0045h	BCC
-----------	------------	-------	-------	-------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 17 (process data type2)
3 - 4	1. Process data value (16 bit sign extended)
5 - 6	2. Process data value (16 bit sign extended)
7 - 8	3. Process data value (16 bit sign extended)
9 - 10	4 Process data value (16 bit sign extended)
11	BCC

Response of the inverter

0001 0000	1 1 010001	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 17 (process data type2)
3	Acknowledge (0 = OK)
4	BCC

condition	Acknowledge
no write access permissible at the moment	6: inverter busy
min. one process data value is outside the limits	3: Data invalid

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

Protocol description HSP5

2.31 Service 18: Reading of Process Data Telegram Type 3 (Scope)

Request of the operator:

0001 0000	0 0 010010	BCC
-----------	------------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 18 (process data type3)
3	BCC

Response of the inverter

0001 0000	1 0 010010	1234h	56781234h	FEDC1234h	1234h	BA98h	00h	BCC
-----------	------------	-------	-----------	-----------	-------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 18 (process data type2)
3 - 4	Timestamp (16 bit word)
5 - 8	1. Process data value (32 bit sign extended)
9 - 12	2. Process data value (32 bit sign extended)
13 - 14	3. Process data value (16 bit sign extended)
15 - 16	4 Process data value (16 bit sign extended)
17	Acknowledge (0 = OK)
18	BCC

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

2.32 Service 18: Writing of Process Data Telegram Type 3 (Scope)

Request of the operator:

0001 0000	0 1 010010	1234h	56781234h	F4563456h	1234h	0045h	BCC
-----------	------------	-------	-----------	-----------	-------	-------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 17 (process data type3)
3 - 4	Timestamp (16 bit word)
5 - 8	1. Process data value (32 bit sign extended)
9 - 12	2. Process data value (32 bit sign extended)
13 - 14	3. Process data value (16 bit sign extended)
15 - 16	4 Process data value (16 bit sign extended)
17	BCC

Response of the inverter

0001 0000	1 1 010010	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 18 (process data type3)
3	Acknowledge (0 = OK)
4	BCC

condition	Acknowledge
no write access permissible at the moment	6: inverter busy
min. one process data value is outside the limits	3: Data invalid

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

Protocol description HSP5

2.33 Service 32: Check Parameter Value to Default Value (enhanced set addressing)

Request of the operator:

0001 0000	0 0 100000	2101h	00100000	BCC
-----------	------------	-------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 32 (parameter value = default value, enhanced set addressing)
3 - 4	Parameter address
5	Addressing byte for set selection (set 5 selected)
6	BCC

Response of the inverter

0001 0000	1 0 100000	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 32 (parameter value = default value, enhanced set addressing)
3	Acknowledge (0 = OK , parameter has default value)
4	BCC

Set selection byte	Function	condition	Acknowledge
= 0			11: set invalid
≠ 0	the parameter value is compared in all selected sets with the default value	Parameter value in all selected sets = Default value	0: OK
		Parameter value not in all selected sets = Default value	3: Data invalid

2.34 Service 32: Set Parameter Value to Default Value (enhanced set addressing)

Request of the operator:

0001 0000	0 1 100000	2101h	00100000	BCC
-----------	------------	-------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 32 (parameter value = default value, enhanced set addressing)
3 - 4	Parameter address
5	Addressing byte for set selection (set 5 selected)
6	BCC

Response of the inverter

0001 0000	1 1 100000	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 32 (parameter value = default value, enhanced set addressing)
3	Acknowledge (0 = OK , value was set to default)
4	BCC

Set selection byte	Function	condition	Acknowledge
= 0			11: set invalid
≠ 0	the parameter value is set in all selected sets to default		0: OK
		no write access permissible at the moment	6: inverter busy
		Parameter write protected	4: read only

Protocol description HSP5

2.35 Service 33: Check Parameter Value to Default Value (standard set addressing)

Request of the operator:

0001 0000	0 0 100001	2101h	00000001	BCC
-----------	------------	-------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, reading, service identifier 33 (parameter value = default value, standard, set addressing)
3 - 4	Parameter address
5	Addressing byte for set selection (0 = active set, 1 = Fr. 9)
6	BCC

Response of the inverter

0001 0000	1 0 100001	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, reading, service identifier 33 (parameter value = default value, standard, set addressing)
3	Acknowledge (0 = OK , parameter has default value)
4	BCC

Set selection byte	Function	condition	Acknowledge
= 0	the parameter value of the active set is compared with the default value	Parameter value = default value	0 : OK
		Parameter value ¹ default value	3 : Data invalid value
= 1	the parameter value of the set selected by Fr.9 is compared with the default value	Parameter value = default value	0 : OK
		Parameter value ¹ default value	3 : Data invalid value

2.36 Service 33: Set Parameter Value to Default Value (standard set addressing)

Request of the operator:

0001 0000	0 1 100001	2101h	00000001	BCC
-----------	------------	-------	----------	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 33 (parameter value = default value, standard, set addressing)
3 - 4	Parameter address
5	Addressing byte for set selection (0 = active set, 1 = Fr. 9)
6	BCC

Response of the inverter

0001 0000	1 1 100001	00h	BCC
-----------	------------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 33 (parameter value = default value, standard, set addressing)
3	Acknowledge (0 = OK , parameter value was set to default value)
4	BCC

Set selection byte	Function	condition	Acknowledge
= 0		writing in active set not allowed	11 : set invalid
	the parameter value of the active set is set to default value	writing in active set is allowed	0 : OK
= 1	the parameter value of the set selected with Fr. 9 is set to default value		0 : OK
> 1			11 : set invalid
		no write access permissible at the moment	6 : inverter busy
		Parameter write protected	4 : read only

Protocol description HSP5

2.37 Service 48: Process Data Telegram Type 1 (full duplex)

Request of the operator:

0001 0000	0 1 110000	12345678h	23456789h	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 48 (process data type1 full duplex)
3 - 6	1. Process data value (32 bit sign extended)
7 - 10	2. Process data value (32 bit sign extended)
11	BCC

Response of the inverter

0001 0000	1 1 110000	12345678h	FEDCBA98h	00h	BCC
-----------	------------	-----------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 48 (process data type1 full duplex)
3 - 6	1. Process data value (32 bit sign extended)
7 - 10	2. Process data value (32 bit sign extended)
11	Acknowledge (0 = OK)
12	BCC

condition	Acknowledge
no write access permissible at the moment	6: inverter busy
min. one process data value is outside the limits	3: Data invalid

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

2.38 Service 49: Process Data Telegram Type 2 (full duplex)

Request of the operator:

0001 0000	0 1 110001	1234h	5678h	3456h	6789h	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 49 (process data type2 full duplex)
3 - 4	1. Process data value (16 bit sign extended)
5 - 6	2. Process data value (16 bit sign extended)
7 - 8	3. Process data value (16 bit sign extended)
9 - 10	4 Process data value (16 bit sign extended)
11	BCC

Response of the inverter

0001 0000	1 1 110001	2345h	4567h	FEDCh	BA98h	00h	BCC
-----------	------------	-------	-------	-------	-------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 49 (process data type2 full duplex)
3 - 4	1. Process data value (16 bit sign extended)
5 - 6	2. Process data value (16 bit sign extended)
7 - 8	3. Process data value (16 bit sign extended)
9 - 10	4 Process data value (16 bit sign extended)
11	Acknowledge (0 = OK)
12	BCC

condition	Acknowledge
no write access permissible at the moment	6: inverter busy
min. one process data value is outside the limits	3: Data invalid

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

Protocol description HSP5

2.39 Service 50: Process Data Telegram Type 3 (full duplex)

Request of the operator:

0001 0000	0 1 110010	12345678h	5678h	1234h	3456h	34566789h	BCC
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Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Req, writing, service identifier 50 (process data type3 full duplex)
3 - 6	1. Process data value (32 bit sign extended)
7 - 8	2. Process data value (16 bit sign extended)
9 - 10	3. Process data value (16 bit sign extended)
11 - 12	Parameterizing address (16 bit, MSB: R/W, value 0: parameterizing data switched off)
13 - 16	Parameterizing data (32 bit sign extended)
17	BCC

Response of the inverter

0001 0000	1 1 110010	23456789h	4567h	1234h	1234BA98h	00h	BCC
-----------	------------	-----------	-------	-------	-----------	-----	-----

Byte:	Meaning:
1	bit 0-4 Inv-ID-FU = 0 (service not initiated from inverter) bit 5-7 Inv-ID-OP = 1 (1st service from operator)
2	Rsp, writing, service identifier 50 (process data type3 full duplex)
3 - 6	1. Process data value (32 bit sign extended)
7 - 8	2. Process data value (16 bit sign extended)
9 - 10	3. Process data value (16 bit sign extended)
11 - 14	Parameterizing data (32 bit sign extended)
15	Acknowledge (0 = OK)
16	BCC

condition	Acknowledge
no write access permissible at the moment	6: inverter busy
Parameterizing data invalid (see also description service 1)	3: Data invalid 4: read only 11: set invalid

The assignment of the process data occurs via the adjustment of special parameters in the address range 00xxh.

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