

A short description to the VABus protocol

The VABus-protocol can be used with the CM-232 or the CM-485.

1.	connectors	2
2.	Baudrate	3
3.	Node-Adress	3
4.	Serial Port Defines	4
5.	Control Characters	4
6.	Protocoll	5
6.1	Enquiry-Telegramm	5
6.2	Select-Telegram f	5
6.3	inverter adresses	6
6.4	Binary Checksum BCC	7
6.5	Error handling	7
6.6	telegram / data length	7
7.	Examples	8
8.	PC / COM-Port setting	9
9.	Inverter control	9

1. connectors

Pinning X310 **CM-232**

Pin	Signal
1	-
2	RxD
3	TxD
4	-
5	0V
6	-
7	-
8	-
9	-

Pinning X310 **CM-485**

Pin	Signal
1	B
2	B
3	0V
4	-
5	+5V
6	-
7	A
8	A
9	-

Connection with shielded twisted pair.



Shield is to be connected to PE at both ends of the line.

Note: When using the CM-485 the bus line must be terminated at both physical ends of the line. The termination resistor has the value 150R. The termination is activated by the DIP-switch on the CM-485

2. Baudrate

The baudrate is set by the parameter *Baudrate* **10**.

Nr.	Name	Min.	Default	Max.
10	Baudrate	1	4	4

supported baudrates

P. 10	Baudrate
1	2400 Baud
2	4800 Baud
3	9600 Baud
4	19200 Baud

3. Node-Adress

The node-adress is set by the parameter *RS232/RS485 NodeID* **394**.

Nr.	Name	Min.	Default	Max.
394	RS232/RS485 NodeID	1	1	30

4. Serial Port Defines

One character exists of:

- 1 Startbit
- 8 Informationsbits (7 Databits, 1 Paritybit)
- 1 Stopbit

The startbit is followed by the least-significant-bit (LSB).

Start	b1	b2	b3	b4	b5	b6	b7	Parity	Stop
-------	----	----	----	----	----	----	----	--------	------

Parity = even

Note: Only ASCII-characters are used. Be careful to the BCC. This can be **any** value.

5. Control Characters

The listed control characters are used:

Control-Character	Name	HEX-Value
EOT	End_Of_Transmission	0x04
ENQ	Enquiry	0x05
STX	Start_Of_Text	0x02
ETX	End_Of_Text	0x03
ACK	Acknowledge	0x06
NAK	Negative_Acknowledge	0x15

6. Protocoll

The protocoll is a Master/Slave-System. Two different telegrams are used:

6.1 Enquiry-Telegramm

The bus-master asks for a parameter value.

Bus-Master → Inverter

EOT	ADR	0	p	n	n	n	ENQ
-----	-----	---	---	---	---	---	-----

Inverter → Bus-Master

ADR	STX	0	p	n	n	n	a	a	w	w	w	w	w	w	ETX	BCC
-----	-----	---	---	---	---	---	---	---	---	---	---	-----	-----	---	---	---	-----	-----

in case of error

ADR	NAK
-----	-----

Bus-Master → Umrichter

EOT

6.2 Select-Telegram f

The bus-master sends a parameter value.

Bus-Master → Inverter

EOT	ADR	STX	0	p	n	n	n	a	a	w	w	w	w	w	w	ETX	BCC
-----	-----	-----	---	---	---	---	---	---	---	---	---	---	------	---	---	---	-----	-----

Inverter → Bus-Master

ADR	ACK
-----	-----

in case of error

ADR	NAK
-----	-----

Bus-Master → Umrichter

EOT

ADR inverter adress
p dataset-number
nnn parameter-number
aa number of data following
ww...www data
BCC binary checksum

6.3 inverter addresses

address coding:

adress	(ASCII-) character	HEX-value
1	A	41
2	B	42
3	C	43
4	D	44
5	E	45
6	F	46
7	G	47
8	H	48
9	I	49
10	J	4A
11	K	4B
12	L	4C
13	M	4D
14	N	4E
15	O	4F
16	P	50
17	Q	51
18	R	52
19	S	53
20	T	54
21	U	55
22	V	56
23	W	57
24	X	58
25	Y	59
26	Z	5A
27	[5B
28	\	5C
29]	5D
30	^	5E
32**	`	60

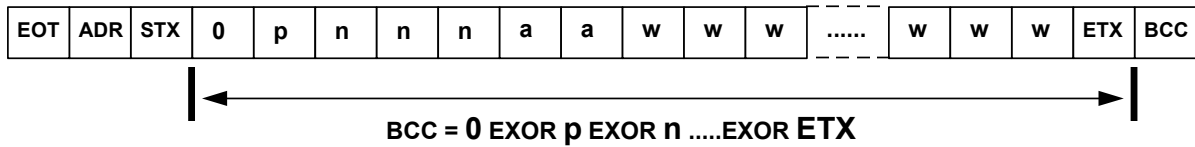
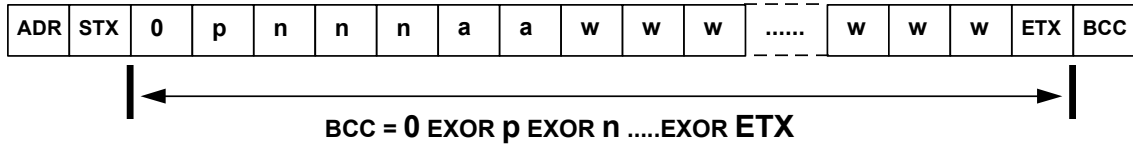
** = Broadcast-Adresse

The broadcast address can be used to send parameters simultaneous to all connected inverters by an enquiry telegram.

In this case no answer ACK/NAK is send from the inverters.

6.4 Binary Checksum BCC

The binary checksum BCC exists of one byte who is calculated as EXOR of all bytes between STX (exclusive) and ETX (inclusive).



6.5 Error handling

In case of an NAK is received, then the error register (P.11) must be read first. The error register contains the error number. Before the error register is not read it is not possible to **write** any parameter to the inverter.

error register	error
0	no error
1	invalid parameter value
2	invalid data set
3	parameter can not be read (write-only)
4	parameter can not be written (read-only)
5	read error EEPROM
6	write error EEPROM
7	checksum error EEPROM
8	Parameter not writable while drive running
9	values of data sets different
10	wrong parameter type
11	unknown parameter
12	checksum-error in string String
13	syntax error in string
14	type of parameter and number of bytes in string do not fit
15	unknown error

6.6 telegram / data length

The data field length depends on the parameter type. The data in the data field is allways HEX-ASCII.

uint/int values 4 characters

long values 8 characters

strings number of characters = number of characters in string

➔ see examples

7. Examples

Reading parameter *Fixed Frequency 2 481* dataset 0 from inverter with adress 1 (long value)

Enquiry-Telegram Master → Inverter

	EOT	ADR	0	p	n	n	n	ENQ
ASCII	◆	A	0	0	4	8	1	♣
Hex-Value	04	41	30	30	34	38	31	05

Response Inverter → Master

	ADR	STX	0	p	n	n	n	a	a	w	w	w	w	w	w	w	w	ETX	BCC
ASCII	A	☺	0	0	4	8	1	0	8	0	0	0	0	0	3	E	8	♥	H
Hex-Value	41	02	30	30	34	38	31	30	38	30	30	30	30	33	45	38	03	48	

The received value is hexadecimal 0x000003E8 = decimal 1000.

The parameter *Fixed Frequency 2 481* is 10,00 Hz.

Reading parameter *Fixed Percent 1 520* dataset 2 from inverter with adress 10 (int value)

Enquiry-Telegram Master → Inverter

	EOT	ADR	0	p	n	n	n	ENQ
ASCII	◆	J	0	2	5	2	0	♣
Hex-Value	04	4A	30	32	35	32	30	05

Response Inverter → Master

	ADR	STX	0	p	n	n	n	a	a	w	w	w	w	ETX	BCC
ASCII	J	☺	0	2	5	2	0	0	4	0	3	E	8	♥	L
Hex-Value	4A	02	30	32	35	32	30	30	34	30	33	45	38	03	4C

The received value is hexadecimal 0x03E8 = decimal 1000.

The parameter *Fixed Percent 1 520* is 10,00 %.

8. PC / COM-Port setting

C-Call for setting COM-Port (Windows):

(void) setcom(COM-Port, Baudrate, EVEN,7,1);

COM-Port	port-number (1, 2, 3 ...)
Baudrate	19200 (= ACT default)
EVEN	even parity
7	7 databits
1	1 stopbit

9. Inverter control

For the inverter control the same functions can be used as described in the Profibus manual.

The control word is equivalent to the parameter 410 (unsigned int, read/write).

The state word is equivalent to the parameter 411 (unsigned int, read only).