USS link for:

- POSIDRIVE® FAS 4000
- POSIDRIVE® FDS 4000
- POSIDYN® SDS 4000

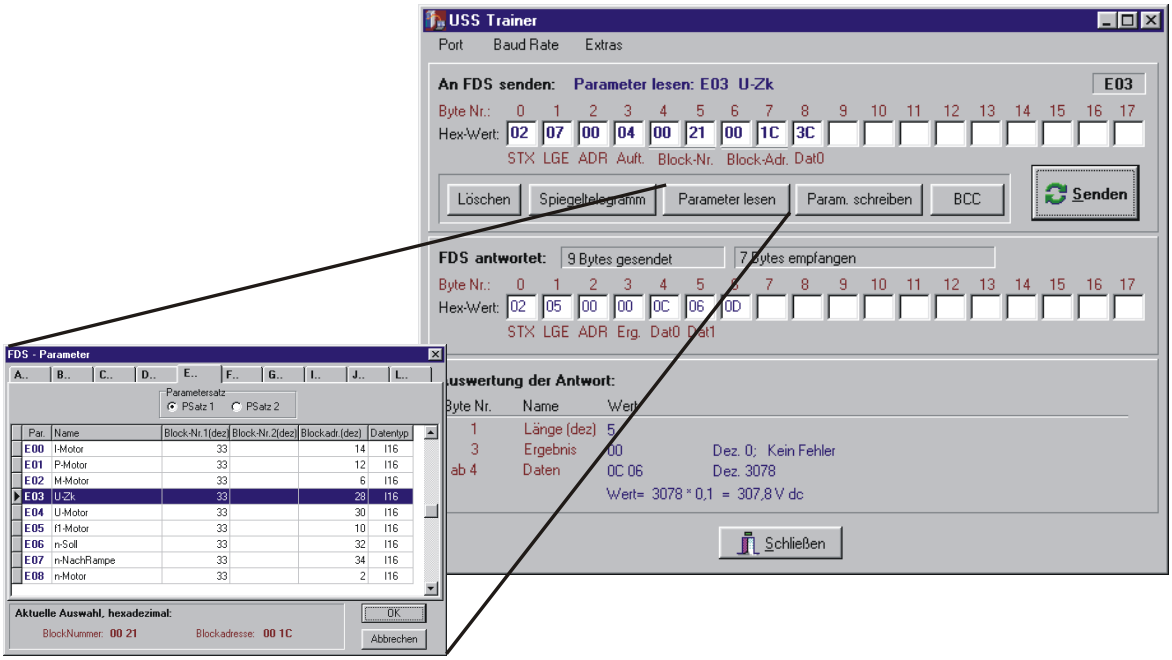
Documentation

Before commissioning the option please read these instructions and the installation and operating instructions for
- **POSIDRIVE® FAS 4000 (publ.-no. 441581) and**
- **POSIDRIVE® FDS 4000 (publ.-no. 441408) and**
- **POSIDYN® SDS 4000 (publ.-no. 441449)**

and strictly follow them!

MANAGEMENTSYSTEM

certified by DQS according to
ISO 9001, ISO 14001
Reg-No. 25780



SV. 4.5

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USS link

1. General 2. Physical layer 3. Protocol layer

1 GENERAL

This document describes serial communication with **POSIDRIVE®** FAS 4000, FDS 4000 frequency inverters and **POSIDYN®** SDS 4000 servo inverters from software version 4.5E onward. Some of the functions described here are already available with software version 3.2 and higher. We do not warrant that the information provided here is free from errors. STÖBER Antriebstechnik reserves the right to change these specifications without prior notice.

Overview of the communication layers implemented in the inverter:

Layer 1	Physical layer, chap. 2
Layer 2	Protocol layer, chap. 3
Layer 7	Session layer, chap. 4

The "USS Trainer" software for Windows 95 provides a simple introduction to unit parameterization with the USS protocol. The "USS Trainer" software is available on request from STÖBER Antriebstechnik.

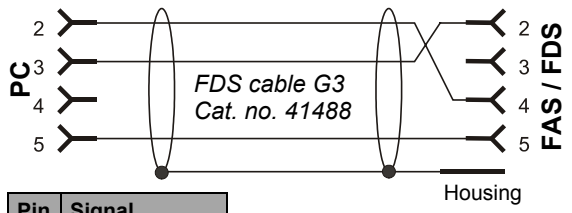
2 PHYSICAL LAYER

Connection: X3 9-pin sub D connector on unit front (FAS/FDS) – on top of unit (SDS)
Signal level: In accordance with **RS232**
Protection: Electrical isolation of the RS232 signals from all other voltage levels in the unit (integrated in the inverter)
Baud rate: **9600 bits/sec** default (can be changed via parameter and subsequent action; see X998 / chap. 13)

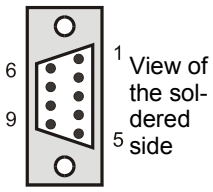
Character frame:
- 1 start bit
- 8 data bits
- 1 stop bit
- Even parity

Pin assignment: The pin assignment of the master shown below is the standard PC assignment (9-pin sub D).

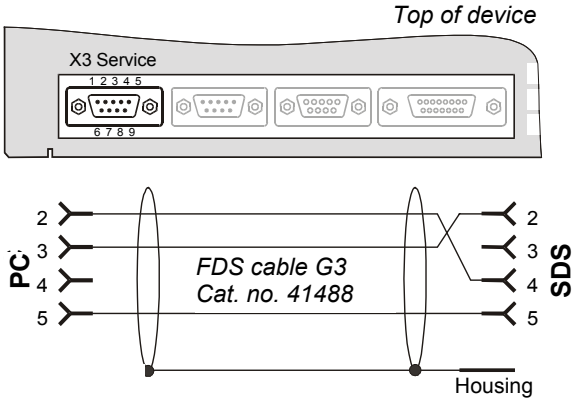
POSIDRIVE® FAS 4000 / FDS 4000



Pin	Signal
1	+10 V, 200 mA
2	Rx (RS232)
3	reserved
4	Tx (RS232)
5	SG
6	Reserved
7	Reserved
8	Reserved
9	-



POSIDYN® SDS 4000



1) PGND ground (I/O ground) is galvanically isolated from digital DGND on plug connector X1.

Pin	
1	+8 V
2	RxD
3	TxD
4	TxD
5	PGND[1]
6	CANL
7	Internally connected
8	
9	CANH

If communication to more than one station is desired, the RS232 ring can be used. See chapter 12.

3 PROTOCOL LAYER

The protocol layer is based on the Siemens USS protocol. Source:

USS protocol (specification of the universal serial interface protocol)
by Siemens, 1992, order no.: E31930-T9011-X-A

For further information see above.

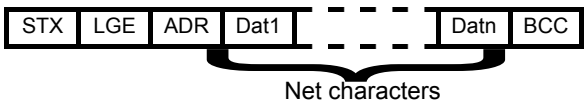
Supplementary information to the Siemens USS protocol description

- Data exchange is always in semi-duplex mode.
- Only non-cyclic message interchange is used.
- Since no fixed message length is used, no specific length is set on the inverter or the partner driver.
- The baud rate default setting is 9600 baud.
- The master must observe a start pause of at least 10 characters before it starts transmitting.
- The inverter are the slaves in USS communication.

- The response delay time of the inverter (slave) can be up to approx. 100 ms. This must be taken into account when developing a driver for the USS master.
- The slave address default setting is zero (0) for all inverter units.

4 SESSION LAYER

The structure of the bytes of all communication services with the inverter is shown below as an example.



STX = Start of Text = 02_{hex}
LGE = Message length
ADR = Address byte
BCC = Block Checksum Character

Notes:

LGE: The byte for the message length contains the number of the bytes to follow, including BCC. LGE designates the number of net characters + 2.

ADR: The serial address (**A80**) of the target unit is to be entered in bits 0 to 4 of the address byte. The default setting of this parameter is '0' for all inverters units. When the broadcast service is to be used, '1' is set in bit 5. Normally this bit is 0. 1 in bit 6 identifies the mirror message. Bit 7 is not used.

BCC: Block checksum character. Contains the exclusive OR link of all previous bytes including STX.

The meaning of the net characters is defined in the session layer. The assignment of the net characters depends on the communication request.

The inverter recognizes three different types of jobs whose identifier is stored in the first byte of the net characters (*Dat1*).

Request	Meaning	Application	Response from inverter	Broadcast
0	Mirror message	Establish communication link, test communications	Mirror message	No
4	Read single datum	Read parameter or display value	Transmit datum or negative acknowledgment	No
5	Write single datum	Write parameter or display value	Positive or negative acknowledgment	Yes (from SV 4.5E on)
8	Variable process data message			
Other values	Reserved	Do not use!		

Attention: If the message structure is wrong (e.g., checksum BCC wrong), the inverter will not answer at all (in accordance with USS specifications). The timeout setting must be monitored automatically by the master (recommended: 100 to 200 msec).

5 MIRROR MESSAGE

The mirror message (i.e., job = 0) should be the first communication service to be sent after the stations are turned on or connected to the inverter. It is returned – complete and unchanged. This allows the master to compare all bytes and check the function of the serial coupling.

Byte:	0	1	2	3	4	5	6	7	8	9	10	11
Name:	STX	LGE	ADR	Auftr.	Sp1	Sp2	Sp3	Sp4	Sp5	Sp6	Sp7	BCC
Value $_{hex}$	02	0A	40	00	01	02	03	04	05	06	07	48

Sp1 to Sp7 = mirror message data

6 READ PARAMETER

The Read Parameter service is identified by job identifier **04** in byte 3 of the message. Each parameter of the inverter is uniquely identified by the following information.

- **Block number Bn** (2 bytes) and
- **Block address Ba** (2 bytes)

Example: Motor-type **B00** is addressed with *Bn = 42* (*00 2A*$_{hex}$) and *Ba = 29* (*00 1D*$_{hex}$).
The two parameter records of the inverter inverter are distinguished by different block numbers.
Cf. parameter list in chapter 13.

6. Read parameter

Master sends message to the inverter.

Byte:	0	1	2	3	4	5	6	7	8
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	BCC
$Value_{hex}$	02	07	00	04	xx	xx	xx	xx	xx

BnM = MSB of block number
BnL = LSB of block number
BaM = MSB of block address
BaL = LSB of block address

Block number and block address together form the complete address of the destination variable (parameter list see chap. 13).

Inverter sends response to master.

Byte:	0	1	2	3	4	5 ...		
Name:	STX	LGE	ADR	Res.	Dat0			BCC
$Value_{hex}$	02	06	00	00	xx	xx ...		

Res. = Result returned by the inverter (see list to the right)
Dat0 = First data byte

Depending on the length of the destination variable more bytes may follow. The bytes are transmitted in Motorola format (more significant byte first). The data types of all available variables are listed in chap. 13.

Result byte "Erg"

0 = No fault
18 = Unknown communication request
19 = Bn or Ba wrong. There is no variable which has this address.
20 = Value too small
21 = Value too high
22 = Value in definition gap
23 = Collision with other values
24 = Access to variable from illegal interface
25 = Write access not allowed in this state. Enable is off!
26 = In reserve
27 = In reserve

Note: The data type and data length to be expected differ for every parameter. The master has to observe the data types documented in chap. 13 when evaluating the data. Motor type **B00**, for example, is returned to the master as *U8* data type (length 1 byte).

Example A: E50 Read device:

1. Look up information about **E50** in chap. 13: Block number *Bn=450* (hex **01C2**), block address *Ba=26* (hex **001A**), data type STR17. In this case it is a string with max. of 16 characters, terminated by a '\0'.
2. Enter the value **02** for STX in *byte 0* of the send buffer.
3. Enter the value **07** for LGE in *byte 1* of the send buffer. LGE (message length) contains the sum of all the bytes to follow in the send buffer. For the read service the value is always 7, as it is followed by an address byte, the job identifier byte, 2 block number bytes, 2 block address bytes and one byte for BCC.
4. Enter the value **00** for ADR in *byte 2* of the send buffer. ADR contains the destination address of the connected inverter and special bits for broadcast and mirror message. All inverters have the unit address zero.
5. Enter the value **04** for read job in *byte 3* of the send buffer.
6. Enter the value **01** for BnM (block number, MSB) in *byte 4* of the send buffer.
7. Enter the value **C2** for BnL (block number, LSB) in *byte 5* of the send buffer.
8. Enter the value **00** for BaM (block address, MSB) in *byte 6* of the send buffer.
9. Enter the value **1A** for BaL (block address, LSB) in *byte 7* of the send buffer.
10. Enter the value **D8** for BCC (block checksum) in *byte 8* of the send buffer. BCC is calculated from bytes 0 to 7 from the send buffer in an exclusive OR link. (02 xor 07 xor 00 xor 04 xor 01 xor C2 xor 00 xor 1A)= $D8_{hex}$
11. Send the complete Read message.

Message frame for example A. The master sends:

Byte:	0	1	2	3	4	5	6	7	8
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	BCC
$Value_{hex}$	02	07	00	04	01	C2	00	1A	D8

12. Wait for reply from the inverter. The inverter replies: (here FDS).

Byte:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	22
Name:	STX	LGE	ADR	Res.	Dat0																	BCC
$Value_{hex}$	02	14	00	00	46	44	53	20	34	30	32	34	2F	42	20	20	20	20	20	20	00	68
		ASCII character:			F	D	S		4	0	2	4	/	B								

13. Check the reply: The first character is STX (**02**) → OK! The number of bytes according to LGE corresponds to the content of LGE (**14**$_{hex}$) → OK! The content of BCC corresponds to the EXOR operation of all the preceding bytes → OK!
14. Evaluate bytes 4 to 21 as variable content of the STR17 variable with ASCII text: **"FDS 4024/B"**

Example B: Read the actual motor current E00 I-motor:

This example shows how the current is scaled.

1. Look up the required information in the list in chap. 13. The block number is 33 (= **00 21**$_{hex}$), the block address is 14 (= **00 0E**$_{hex}$), the data type is I16 (a 16-bit signed variable). The resolution of the variable is defined as 8000$_{hex}$ = four times the unit rated current. The FDS 4024/B has a rated current of 3.5 A (SDS 4011 rated current 1.5 A). This gives a resolution of:

   4 * 3.5 A / 8000$_{hex}$ = 14 A / 32768 = 0.43 mA / LSB. (FDS)

   4 * 1.5 A / 8000$_{hex}$ = 6 A / 32768 = 0.18 mA / LSB. (SDS)

   A typical value might, for example, be 8192 (= 2000$_{hex}$) as simple unit rated current (for FDS = 3.5 A / SDS = 1.5 A).

2. Fill the complete send buffer according to the rules explained in example A.

3. Send the complete Read message to the inverter.

Byte:	0	1	2	3	4	5	6	7	8
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	BCC
Value$_{hex}$	02	07	00	04	00	21	00	0E	2E

4. Wait for reply: The reply might look like this.

Byte:	0	1	2	3	4	5	6
Name:	STX	LGE	ADR	Res.	MSB	LSB	BCC
Value$_{hex}$	02	06	00	00	12	34	22

5. Check the reply (see example A)

6. Evaluate bytes 4 and 5 as the variable content. The value is 1234$_{hex}$ = 4660$_{dec}$. Calculation in Amps:

   I-motor = 1234$_{hex}$ / 8000$_{hex}$ * 4 * 3.5 A = 2.0 A (FDS)

   I-motor = 1234$_{hex}$ / 8000$_{hex}$ * 4 * 1.5 A = 0.85 A (SDS)

7 WRITE PARAMETER

Parameters are written with job identifier **05** in byte 3 of the message.

All parameters with an **'rw'** entry in the type column of the variable list in chap. 13 may be edited with the Write job. If the entry is **'r'** only, the variable may **NOT** be written. The inverter does not prevent write access to these variables. This means that important data could be distorted.

Write message from the master

Byte:	0	1	2	3	4	5 ...					
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	Dat0	_ _	BCC
Value$_{hex}$	02	xx	00	05	xx	xx ...					

Example C: B00 change motor-type to value 27 = 160L delta 15 kW(!) on an FDS 4024/B (1.5 kW):

This example will cause the inverter to return an error message as the requested parameter value is illegal.

1. Look up the required information in the list. The block number is 43 (= **00 2B**$_{hex}$), the block address is 29 (= **00 1D**$_{hex}$), the data type is U8 (unsigned 8-bit variable). The entry in the column "FDS" is **'rw'** (i.e., write access is permitted). The requested motor is reflected by the selection 27 (= **1B**$_{hex}$). (Cf. FAS/FDS manual.)

2. Fill the complete send buffer according to the rules which were explained in example A.
   Send the complete request message

Byte:	0	1	2	3	4	5	6	7	8	9
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	Dat0	BCC
Value$_{hex}$	02	08	00	05	00	2B	00	1D	1B	22

3. Wait for response.

Byte:	0	1	2	3	4
Name:	STX	LGE	ADR	Res.	BCC
Value$_{hex}$	02	03	00	15	14

4. Check the reply (see example A).

5. Evaluate the reply error code: *Byte 3* contains the result *Erg*. The value is ≠ 0. This mean a negative acknowledgment of the write job sent before. The value 21 (= **15**$_{hex}$) means 'value too high' (see page 3).

Example D: Change value in D12 (fix reference value 1) in parameter record 1 from 750 rpm to 500 rpm for 4-pole asynchronous motor or 6-pole servo motor

This example shows how the speed is processed internally as the frequency by the FAS/FDS.

1. Look up the required information in the parameter list. The block number is 53 (= **00 35**$_{hex}$). The block address is **00 00**. The data type is **I16** and the resolution varies with the technoloy (asynchronous: FAS/FDS in Hz; synchronous: SDS in rpm).

   FAS/FDS - 400 Hz / 8000$_{hex}$ = 0,012207 Hz / LSB
   SDS - 1 rpm (With SDS you can use rpm directly.)

   With FAS/FDS, the desired speed in rpm must first be converted to a frequency.

   $$\text{Frequency} = \text{Speed} \cdot \frac{\text{Pole number}}{2 \cdot 60}$$

   Enter the speed in rpm. The standard pole number for STÖBER motors is 4. If you are using a different pole number, correct **B10** accordingly. A desired speed of 500 rpm is shown as:

   $$\text{Frequency} = 500 \cdot \frac{4}{2 \cdot 60} \quad 16{,}\overline{6}\ \text{Hz}$$

   The inverter must be programmed to a value of *Round (16.666 Hz / 0,012207 Hz / LSB)* = 1365 = **555**$_{hex}$.

2. Fill the entire send buffer according to the rules explained in example A.
3. Send the complete Write message.

Byte:	0	1	2	3	4	5	6	7	8	9	10
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	Dat0	Dat1	BCC
FAS/FDS Value$_{hex}$	02	09	00	05	00	35	00	00	05	55	22
SDS Value$_{hex}$	02	09	00	05	00	35	00	00	01	F4	CE

4. Wait for reply.

Byte:	0	1	2	3	4
Name:	STX	LGE	ADR	Res.	BCC
Value$_{hex}$	02	03	00	00	01

5. Check the reply (see example A).
6. Evaluate the reply: *Erg* contains zero (i.e., the inverter returned a positive acknowledgment of the write request.).

Information about the baud rate and the station address:

These values can be modified in FDS Tool. The change can also be made via the serial coupling. To do this for baud rate, a different value is written to the variable with block number 14 and block address 8 **A81** (e. g., 3 for 38400 baud). The value for the new baud rate is immediately saved automatically to non-volatile memory. To activate the new baud rate the 'InitUssTreiber' action must be initiated via block number 13 and block address 8 (write value 1). It is not necessary to change the serial address when the RS232 ring is being used.

Example E: Read current actual position I80

1. Information from parameter list. Block number is 33 (= **21**$_{hex}$). Block address is 86 (=**56**$_{hex}$).
2. Fill complete sending buffer based on the rules explained in example A.

Byte:	0	1	2	3	4	5	6	7	8
Name:	STX	LGE	ADR	Req.	BnM	BnL	BaM	BaL	BCC
Value$_{hex}$	02	07	00	04	00	21	00	56	76

3. Wait for response.

Byte:	0	1	2	3	4	5	6	7	8
Name:	STX	LGE	ADR	Res.	Dat0	Dat1	Dat2	Dat3	BCC
Value$_{hex}$	02	07	00	00	00	00	44	33	72

4. Check response. See example A.
5. Evaluate the read value. The value is data type **I32** (i.e., 32-bit value with sign). Bytes 4 and 5 contain the more significant word, and bytes 6 and 7 contain the less significant word. The value is 4433 hex (i.e., a decimal value of 17459). (All posi actual values are specified in increments.)

6. Convert the increments into user units which are used for all other parameters in groups I and J.

$$\text{Display value in user units} = \frac{\text{Decimal value of } \mathbf{I08} * \text{I07 way/revolution numerator} * \mathbf{I05}}{\mathbf{I08} \text{ way/revolution denominator} * \text{posi increments} * 1E^{\mathbf{I06}}}$$

whereby the following posi increments result.

If **I02** posi encoder = *0:BE-Encoder*, then posi increments = **F36** BE-Increments * 4
If **I02** posi encoder = *1:X20* (not available with FAS), then posi increments = **H22** X20 increments * 4
If **I02** posi encoder = *2:Motor-Encoder* (not available with FAS), then:

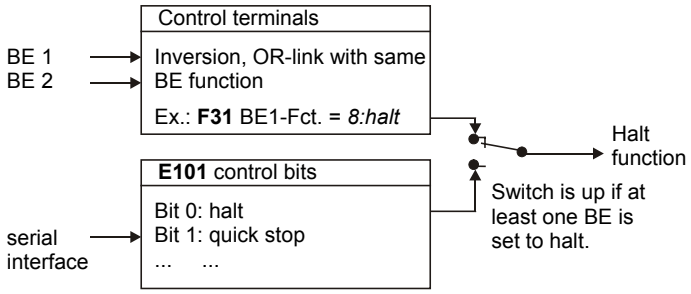
FDS - for **B26** =0 Posi increments = **F36** BE increments * 4
for **B26** =1 Posi increment = **H22** X20 increments * 4
SDS - for **B26** =2 Posi increments = 16384 (4000_{hex})
for **B26** =3 Posi increments = 16384 (4000_{hex})

When **I02** posi encoder = *3:X41* (only available with SDS), the posi increments = 16384 (4000_{hex})

8 SPECIFICATION OF THE SOURCE FOR CONTROL SIGNALS

One of the 32 functions (e.g., halt, posi start) can be assigned to each binary input of the control terminal strip (see parameter **F31**, **F32** and so on, FAS documentation, publ. no. 441581, FDS documenation, publ. no. 441408 and SDS documentation, publ. no. 441449).

Each control signal which was not assigned to a binary input can be addressed via fieldbus (**E101** control bits). One of the 14 functions can be assigned to the analog inputs. (See parameter **F20** (not with FAS) and **F25** in the above documentation.)
The missing functions can be specified via serial interface (e.g., **E102** torque limit,...).



The binary and analog signals from the terminal strip have priority over specification via serial interface!

Meaning of the bits in E101 control bits			
Bit	Name	Meaning for Bit = 1	**F31***
0	halt	Drive is decelerated to standstill on selected ramp. Then brake is applied if activated by **F00** or **F08**. Manual traversing (tip) is now possible. (Allow min. of 4 msec pause until manual traversing, *posi-start, ...*).	*8*
1	Quick stop	When the edge changes from low to high, drive is decelerated at **D81** (decel-quick). Then brake is applied if activated by **F00** or **F08**. Short pulse (≥ 4 msec) is sufficient to trigger brake. Quick stop cannot be aborted until speed **C40** is passed below. Cf. also **F38**.	*9*
2	Ext.fault	At rising edge, inverter assumes fault *"44:ext.fault."*	*12*
3	Fault reset	Rising edge acknowledges fault if cause no longer exists.	*13*
4	Wind.setD-ini	The current value of the winding diameter is set to **G14** (wind.setD-ini).	*29*
5	Parameter set-select	0 selects parameter set 1. 1 selects parameter set 2. Parameter set can only be selected if **A41**=0. Selected set does not become active until enable is removed.	*11*
6	Additional enable	Additional enable (must be on together with enable X1) to enable inverter. (Allow pause of at least 4 msec until manual traversing (tip), posi-start, ...).	*7*
7	Torque select	Switching of torque limit from **C03** M-max 1 to **C04** M-max 2	*10*
8	RV-select 0	Used together with bit 19 to select process blocks or fixed reference values. The bits on RV-select 0 to 4 are interpreted as binary coded numbers. With FAS and FDS, only RV-select 0 to 2 are available.	*1*
9	RV-select 1		*2*
10	RV-select 2		*3*
11	RV-select 3		*30*
12	Disable PID-controller	PID controller is disabled, and integrator is reset.	*26*
13	Direction of rotation	Negation of the current speed reference value during speed mode.	*6*
14	Motorpoti up	With **D90**=1, motor potentiometer can be simulated. **D00** and **D01** are used as ramps.	*4*
15	Motorpoti down		*5*
16	Posi.start	Starts movement: The process block selected with RV-select 0 to 4 is started. Any positioning procedure in progress is terminated, and the new target is approached (changing targets on the fly).	*19*
17	Posi.step	Starts movement (same as above but the running positioning procedure is not interrupted). Used primarily for manual block stepping with a process block sequence (cf. **J17**=0).	*16*

Meaning of the bits in E101 control bits			
Bit	Name	Meaning for Bit = 1	**F31***
18	Posi.next	With chained process blocks, the running block is interrupted, and a jump is made to the next block. Important: A braking path may be defined there, for example. The *posi.next* evaluation must be programmed for the specific process block (cf. **J17**=*3:posi.next.*). Otherwise the drive does not react to *posi.next.*	*20*
19	RV-select 4	See bits 8 to 11.	*31*
20	Start reference	Change in edge from low to high starts reference traversing.	*24*
21	Tip +	Manual traversing (tip) in positive direction. Halt function must be active.	*17*
22	Tip -	Manual traversing (tip) in negative direction. Halt function must be active.	*18*
23	Brake release	Manual releasing of the brake. Has priority over internal braking function.	*32*
24	Stop +	"Stop input" at positive end of the traversing area. In position mode (**C60**=2), "stop input" causes malfunctions. In speed and torque mode, the direction of rotation is disabled.	*21*
25	Stop -	"Stop input" at negative end of the traversing area.	*22*
26	Reference input	Defines the reference position for **I30**=0	*23*
27	Synchron free-run	The reference value for synchronous free run is decoupled. For example, the drive can be handled as desired via **E46**. Speed is adjusted on the current reference value ramp (e.g., **D00**).	*27*
28	Synchron reset	The angle of deviation of synchronous running control is reset.	*28*
29 ... 31	In reserve		-

* This column shows the available selections with the same function for the BE functions (**F31**, ...).

Meaning of the bits in E100 (status bits)			
Bit	Name	Meaning for Bit = 1	**F00**
0	Standstill	Amount of **E08** n-motor < **C40** n-window	*2*
1	RefVal-reached	With **C60**=*0:torque:* Operation is enabled. With **C60**=*1:speed*: Amount of (**E06** n-reference value – **E08** n-motor) < **C40** n-window. With **C60**=*2:position*: Changes to 1 when posi controller reaches target position and amount of (**I80** – **I81**) < **I22** is reached. During pauses, bit remains = 1. Changes to 0 when process block or reference traversing was started or axis was shifted out of window **I22** (only if enable=0).	*3*
2	Acceleration	Drive is accelerated or delayed.	-
3	Standstill ramp reached	Only with **C60**=1: Ramp generator is at zero (±0.5Hz for FAS/FDS)	-
4	Ref. value ramp reached	Only with **C60**=1: Ramp generator has reached reference value.	-
5	Ramp diff. > 0	Only with **C60**=1: Ramp generator accelerates.	-
6	Torque limit	Drive is at current torque limit during static operation.	*4*
7	Accel. overload	Drive is at torque limit during an acceleration procedure.	-
8	Decel overload	Drive is at the tension limit during a braking procedure.	-
9	Relay 1	Relay 1 (ready relay) is closed (no fault, warning, message).	-
10	Clockwise (n-motor>0)	**E08** n-motor is positive. During zero crossing, hysteresis with **C40**.	*14*
11	Capturing active	Only for FAS/FDS with **C60**=1: FAS/FDS captures running motor.	-
12	Skip speed active	Only for FAS/FDS with **C60**=1: Reference value in skip speed range	-
13	Load start active	Only for FAS/FDS with **C60**=1: Load start (breakaway) is active.	-
14	Active parameter set	0 = parameter set 1 is active. 1 = parameter set 2 is active. The bit changes at the beginning of the parameter-set switch-over. Bit 15 indicates the end of the switchover.	*7*
15	Parameters active	0 = not all parameters are available internally. 1 = parameter assignment after write-access with PKW service or change via device menu, parameter set switch-over. Actions are completely executed and active.	*32*
16	Referenced	Indicates that the drive is referenced (reference traversing concluded). Only applies when **C60**=2.	*13*
17	Electronic cam 1	Actual axis position is between **I60** and **I61**. Only valid when **C60**=2.	*8*
18	Operation range	Drive is within the defined operation range (**C41** to **C46**).	*6*
19	Posi traversing	Indicates when **E80** operating condition = *"18:moving"* (when a process block was started - not with manual traversing)	-
20	M-motor>0	**E02** M-motor is positive (without hysteresis).	-
21	Switch-memory 1	Output of switch memory 1, 2 and 3. Each posi switching point defined in group **N**.. can simultaneously address switch memory 1, 2 and 3.	*19*
22	Switch-memory 2		*20*
23	Switch-memory 3		*21*
24	RV-ackn.0	Only valid for **C60**=*2:position*. If no *posi.start* or *posi.next* signal is queued, the reference-value-select signals are output **inverted**. Otherwise the active **I82** process block is output.	*23*
25	RV-ackn.1		*24*

Meaning of the bits in E100 (status bits)			
Bit	Name	Meaning for Bit = 1	**F00**
26	RV-ackn.2		*25*
27	RV-ackn.3		*26*
28	RV-ackn.4		*27*
29	In reserve	-	-
30	Posi.active	Is 1 when **E80** (operating condition) = *17:posi.active*. Only when **C60**=2, and power section is on, and a traversing job can be started (no process block or sequence in progress). This permits a concluded sequence to be indicated. Is also 0 when **E80**=*19:delay* or *20:wait* is indicated.	*10*
31	Ready for ref. value	The drive is powered, the brakes are released, and, with the FDS, magnetization is established.	*22*

* This column shows the available selections with the same function for the BA/relay functions (**F00**, ...).

9 VARIABLE PROCESS DATA MESSAGE

This is a new type of message which can be used for real process data communication. As is already possible with PROFIBUS or CAN bus, the master sends a process output data message with reference values to the inverter. The inverter then replies with its own process output data message.
The process output data contain reference values or other control values and are sent from the master to the drive.
The process input data contain actual values or status values and are sent from the drive to the master.

Caution: A drive can be set in motion with this transmission protocol. To prevent accidental movement of the drive when the serial connection fails (e.g., due to cable break), take the safety precautions listed below.

- Inverter enable specified by the controller via electrical connection
- Send transmission messages cyclically and check for response message.
- Turn off inverter enable if response message does not arrive.

Prerequisites
This function expansion requires a software version starting with "**V 4.5 D**" for the device families **POSIDRIVE**® FAS 4000, **POSIDRIVE**® FDS 4000 or **POSIDYN**® SDS 4000. The inverters which are run with this transmission protocol may not be used simultaneously with PROFIBUS-DP or CAN bus since this might cause invalid data.

Message handling

In contrast to a parameter message, the inverter does not acknowledge (positively or negatively) the receipt of a process output data message. After a process output data message has been received, the inverter always replies with a process input data message containing the latest actual values regardless of the contents of the process output data message.
This makes control and monitoring of the drive fast and effective and only one message is required.

Message structure
The "process data message" variable is based on the same USS structure as the other messages for "read/write" parameters. The master must enter the identifier **0x08**$_{Hex}$ for this message in the job byte here. The result of the job is located here in the response message.
This is always 0 for OK. The bytes are transferred in Motorola format (more significant byte first).

PZD job from master	STX	LGE	ADR	Auftr.	12 bytes RVs	BCC
	02	0F	00	08		xx
PZD reply from inverter	STX	LGE	ADR	Erg.	12 bytes act. v.	BCC
	02	0F	00	00		xx

Process output data mirroring
The process data mirroring parameters **A110** process output data 0, **A111** process output data 1, **A112** process data output 2 and **A113** process output data 3 are used to specify the contents of the 12 process output data bytes. You will find these four parameters in FDS Tool in the dialog screen **A.. Inverter, Part 2**. The same set of choices is defined for all of these parameters. The parameter which is selected in **A110** is expected in the first bytes of the process output data message. When the message is received, the contents of these bytes are copied to the selected parameter. **A111** specifies that contents of the next bytes. The same applies to **A112** and **A113**.

There are approximately 30 different parameters which can be selected from group **E..** Some parameters occupy 1 byte in the process data while others require 2 bytes or 4 bytes. These data are packed tightly into the process data message. For instance, if the first parameter requires bytes 1 and 2, the second parameter starts with the 3rd byte. The maximum length of 12 bytes cannot be exceeded. If all four process data mirroring parameters are used, the value selected in **A113** may no longer be able to be sent if this value does not fit completely into the message.

Example: **A110** = **E101** control bits, **A111** = **D12** fixed RV 1
E101 has 4 bytes. **D12** has 2 bytes.

E101 = **0x00000040** (Only bit 6 for extra enable is 1)

D12 = **0x1000** = 4096 * 400 Hz/32768 = 50 Hz

00	00	00	40	10	00	00	00	00	00	00	00

Not used

Process input data mirroring
The process data mirroring parameters **A120** process input data 0, **A121** process input data 1, **A122** process input data 2 and **A123** process input data 3 specify the contents of the 12 process input data bytes. Here the actual values/status values can be selected which the inverter is to send in its response message. The same procedure is used as for process output data mirroring.

Timing of the inverter
Stöber inverters always handle all USS messages in the operating system background. This means that the processing time from receipt of a complete USS message to the start of the response message can only be specified in approximate numbers. This time depends very much on the current computing load of the processor and also which software version is used (i.e., if enable is off, messages are answered more quickly). The type of USS job also affects processing time. For instance, a read/write parameter takes longer than the variable process data message or message routing on the RS232 ring.
The following overview shows the approximate time ranges for processing USS messages with variable process data or routing time on the RS232 ring. (It takes longer to read/write parameters.) With other software versions, other times may apply.

Processing times measured	**POSIDRIVE**® FAS 4000 with SW version V 4.5 D	**POSIDRIVE**® FDS 4000 with SW version V 4.5 B	**POSIDYN**® SDS 4000 with SW version V 4.5 C
Device idling, enable off	4 to 13 msec	4 to 15 msec	15 to 30 msec
Drive moving in positioning mode, scope is active, no fieldbus!	4 to 20 msec	4 to 25 msec	15 to 35 msec

10 DIAGNOSIS

The current **operating state** is polled with parameter **E80** (BNr=**0021**$_{hex}$, BAdr=**003E**$_{hex}$). The returned value indicates the operating status in accordance with the documentation of the inverter (e.g., "*18:Travel"* in positioning mode).

For a comprehensive diagnosis other parameters of group **E..** are also of interest.

E81 ("event Level", BNr=**00 21**$_{hex}$, Badr=**00 40**$_{hex}$)) allows you to check whether the inverter has tripped and is in **Fault** status (response 3 → fault, 0 → OK). If a fault is present, the type of fault can be queried with parameter **E82**. For the meaning of the reply, see the documentation of the inverter (e.g., "*42:Temp.Motor TMS"*).

A **fault reset** via RS232 can be performed in two ways.

- Set **bit 3** (acknowledgment) in parameter **E101** (control bits) from 0 to 1 or
- Set **bit 6** (additional enable) in parameter **E101** (control bits) from 1 to 0 and then back to 1.

Attention: Setting values in **E101** to **E108** has no effect if the corresponding function has already been assigned to a programmable input.

You may also interrogate the number of faults – listed by fault type – which have occurred up to this point. For more information, see parameters of group **Z..** in chap. 13.

11 FAULT MEMORY

The iverters have a fault memory in which the last 10 faults are stored. From software version 4.3 onward these entries are sorted by the time of their occurrence (lowest fault number = last fault). Each entry in the fault memory has its own block number.

Fault	BNr$_{hex}$
0.	01 50
1.	01 51
2.	01 52
3.	01 53
4.	01 54
5.	01 55
6.	01 56
7.	01 57
8.	01 58
9.	01 59

For all block numbers from 150_{hex} to 159_{hex} the desired information is selected with the block address.

Block address	Type	Meaning
00 00	U8	Valid values. Only if the inverter returns a 1 are all further values valid.
00 01	U8	Event code. Number of the fault which occurred (e.g., "*42:Temp.Motor TMS*").
00 02	U16	Hours in terms of operating time when the fault occurred
00 03	U8	Minutes in terms of operating time when the fault occurred
00 04	U8	Seconds in terms of operating time when the fault occurred

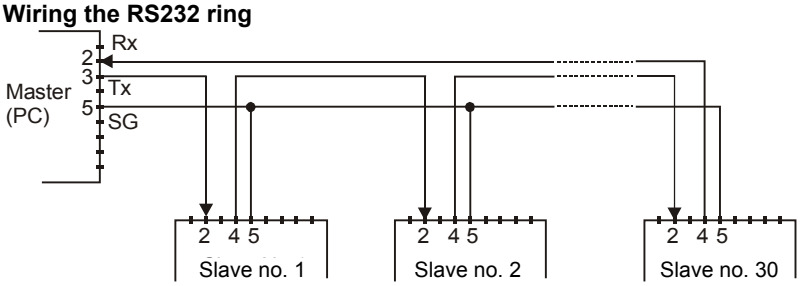
The entries in the fault memory may only be read.

12 RS232 RING

In addition to the already familiar RS232 communication, all **POSIDRIVE®** FAS 4000s, **POSIDRIVE®** FDS 4000s, **POSIDYN®** SDS 4000s offer the RS232 ring function expansion starting with version V 4.5 B. This gives you the following advantages.

- Up to 30 inverters on one master (PC, and so on)
- Easy wiring like a ring
- Compatibility with previous applications (FDS Tool, Controlbox, Mastersoftware in acc. w. USS protocol)
- Automatic search function of all stations in the RS232 ring with FDS Tool

Wiring the RS232 ring

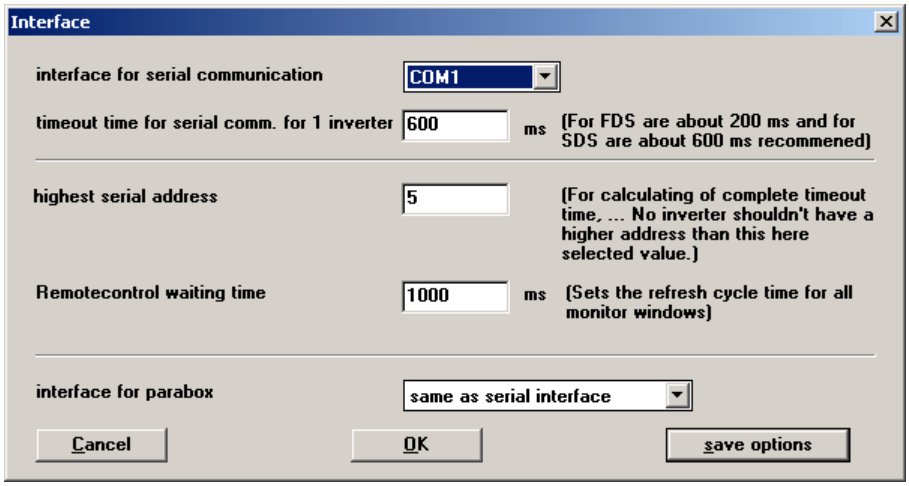


1. The ground contacts (SG) of all devices are connected with each other. (Achtung bei FAS: Nicht möglich, wenn analoge Masse X1.4 verwendet wird.)
2. The sending contact (Tx) is connected to the receiving contact (Rx) of the next device.
3. Connecting all stations from Tx to Rx creates a ring from one master to all slaves and back again to the master.
4. **POSIDRIVE®** FAS 4000/FDS 4000 and **POSIDYN®** SDS (starting with V 4.5 B) can be used as slaves and mixed as desired.

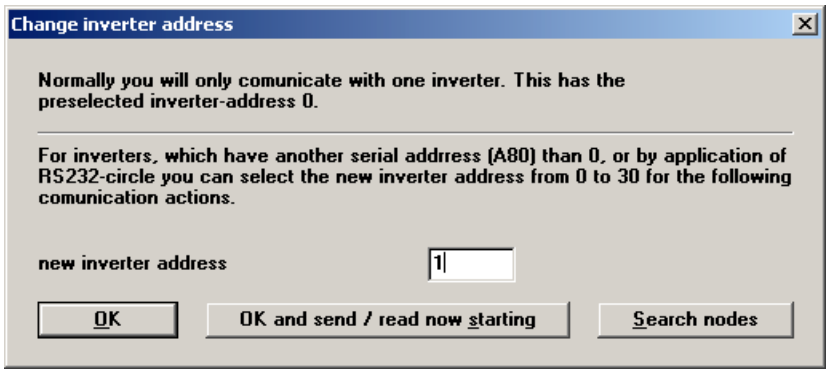
Remember!

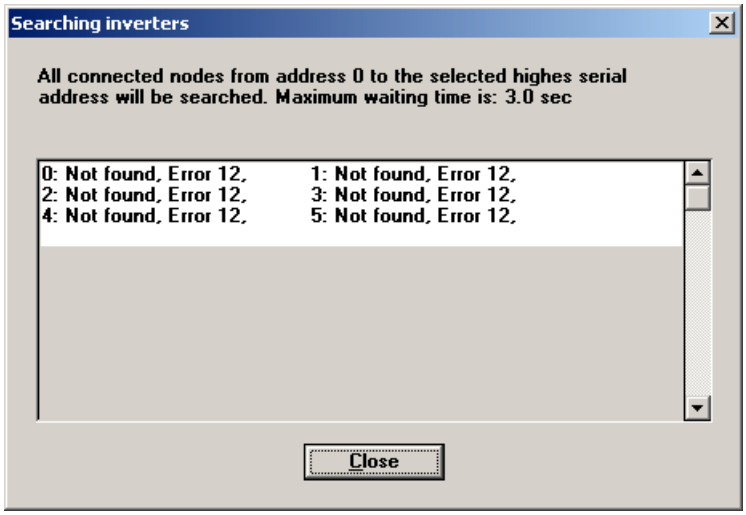
- All slaves (inverters) must have different serial addresses. The address is set with parameter **A80** serial address. (The default setting of this parameter is 0. The maximum value is 30.)
- As soon as a ring (more than 1 device) is established, 0 may no longer be used as the address.
- Despite **A80** > 0, .each device is also accessible for every Controlbox and so on under the address 0 for point-to-point communication.
- To activate the changed address, perform **A00** save parameter and turn the inverter off and on again.
- When considering the master, remember that the response delay time increases with each additional station in the ring.
- As RS232 slaves, all inverters remain simple slaves which only respond to the requests of an external master.

Support by FDS Tool starting with V 4.5 B
Each station in the RS232 ring increases the throughput time of the job and response message. To keep wire breaks or other malfunctions from increasing wait time unnecessarily, you can set the parameter for the highest serial address under menu item “Optionen / Schnittstelle.” FDS Tool uses this value for 2 functions. A) Calculation of the total permissible response delay time (timeout time) during which a response from the inverter is expected. B) Limitation of the search function in the “Teilnehmer suchen” screen.
The value 0 should be entered here for normal applications with only one inverter. The number of stations should be entered here for the RS232 ring. This reduces the maximum wait time when a malfunction occurs.



The “Datei” menu offers the selections “aus Umrichter lesen” and “zu Umrichter senden.” When one of these items is selected, this text appears again with the currently selected inverter address added. The value is always 0 without the RS232 ring. If another station is to be addressed, the new address can be set in the dialog box “Umrichteradresse ändern.” The read or send function should then be started immediately. This new value then applies to all subsequent read and send functions.





FDS Tool can switch between two active files. This means that a different inverter (with a different address) can be processed in each file.

With the RS232 ring each station must have a different address from 1 to 30. To check whether this was executed correctly, “Teilnehmer suchen” can be activated to perform this task automatically. The wait times of this search procedure vary depending on how the response delay time and the highest serial address are set. The expected wait time is shown in the upper portion of the dialog box.
After this action is concluded, a list of all search operations between 0 and “highest serial address” is indicated as the result. You can communicate with the stations which were found.

13 PARAMETER LIST

Note: Block numbers and block addresses are given as decimal figures. “Block No. 2” accesses the parameters of the second parameter record. For parameters without an entry in "Block No.2” the parameter record switch does not work. All read-only parameters are indicated with an “**r**” in the “data type” column. You are **NOT** permitted to write to these variables. Write access is not prevented by the unit and could result in damage. In the FAS column, x^P means that the parameter is only available with Posi update.

Actions: Operations such as "**A00** save parameter" are called "Actions.” They are initiated by changing the value 0 → 1. When the operation is completed the parameter value will automatically return to zero. Similarly, an action is started for serial communications (i.e., by writing the value '1' to the destination variable). The value must then be interrogated until a '0' is returned again. Afterwards the result of the action can be interrogated with block number 33 and block address 66 (decimal, see → X999). '0' means "no fault.”

Data type abbreviations: U8: 8-bit unsigned value (1 byte),
U16: 16-bit unsigned value (2 bytes),
U32: 32-bit unsigned value (4 bytes),
I8, **I16**, **I32**: 8-bit, 16-bit, 32-bit signed values
STR9, **STR17**: ANSI character string, max. of 8 or 16 characters plus 0, indicating the end of the string

Note on scaling:
User units: For easier handling, entries are made in user units for the **I..**, **J..**, and **N..** parameters. Parameters **I07** and **I08** are used to define the physical conversion of a motor revolution into the actual movement (rotating or linear movement). This makes it possible to directly enter the traversing path for a linear axis in mm, cm or m, for instance. However, positions after the decimal point in **I06** require special attention. Since the position controller uses integer numbers, the value must be multiplied by the appropriate factor when positions after the decimal point are entered. Example 1: 10° are to be entered in **J10**. Two positions after the decimal point are defined in **I06**. In user units the value is 1000. Example 2: 25.45° is to be entered in **J10**. Two positions after the decimal point are defined in **I06**. In user units the value is 2545.

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
A.. Inverter										
A00	Save parameter	13		0	0=inactive, 1=active	1	U8	rw	rw	rw
A01	Read parabox & save	13		15	0=inactive, 1=active	1	U8	rw	rw	rw
A02	Check parameter	13		3	0=inactive, 1=active	1	U8	rw	rw	rw
A03	Write to parabox	13		2	0=inactive, 1=active	1	U8	rw	rw	rw
A04	Default settings	13		4	0=inactive, 1=active	1	U8	rw	rw	rw
A05	Load stored values	13		6	0=inactive, 1=active	1	U8	rw	rw	rw
A10	Menu level	55		9	0 to 2, see device docu.	1	U8	rw	rw	rw
A12	Language	55		4	0:deutsch 1:english	1	U8	rw	rw	rw
A14	Edit password	5		10	0=no password	1	I16	rw	rw	rw
A15	Auto-return	55		5	0=inactive, 1=active	1	U8	rw	rw	rw
A20	Braking resistor type	55		16	FAS: 0 to 5, see device docu. FDS: 0 to 7, see device docu. SDS: 19 to 26, s. device docu	1	U8	rw	rw	rw
A21	Braking resistor resist.	55		10	x to 6000; x=depends on type, only if **A20**=1 (user defined)	0.1 Ohm	I16	rw	rw	rw
A22	Braking resistor rating	55		12	0 to x; x= depends on type, only if **A20**=1 (user defined)	10 W	I16	rw	rw	rw
A23	Braking resistor therm.	55		14	1 to 1000, only if **A20**=1 (user defined)	0.1 s	I16	rw	rw	rw
A30	Operation input	55		6	FAS/FDS: 0 to 2, see device docu. SDS: 0 to 4, see device docu.	1	U8	rw	rw	rw
A31	Esc-reset	55		8	0=inactive, 1=active	1	U8	rw	rw	rw
A32	Auto-reset	55		17	0=inactive, 1=active	1	U8	rw	rw	rw
A33	Time auto-reset	55		18	1 to 255	1 min	U8	rw	rw	rw
A34	Auto-start	55		7	0=inactive, 1=active	1	U8	rw	rw	rw
A35	Low voltage limit	55		0	Single phase: 1200 to 3000 Three phase: 1500 to 5700	0.1 V	I16	rw	rw	rw
A36	Mains voltage	55		2	FAS/FDS: Single phase: 1980 to 3536 Three phase: 3111 to 4800 SDS: 1980 to 6788	0.1 V	I16	rw	rw	rw
A37	Reset memorized values	13		14	0=inactive, 1=active	1	U8	rw	rw	rw
A38	DC power-input	55		43	0=inactive, 1=active	1	U8	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
A41	Select parameterset	52		89	0=ParaSet from BE or **E101**, 1=Parameter set 1 2=Parameter set 2	1	U8	rw	rw	rw
A42	Copy parameter set 1>2	13		16	0=inactive, 1=active	1	U8	rw	rw	rw
A43	Copy parameter set 2>1	13		19	0=inactive, 1=active	1	U8	rw	rw	rw
A80	serial address	14		9	0 to 31; 0=default settings	1	U8	rw	rw	rw
A81	serial baudrate	14		8	0=4.8; 1=9.6; 2=19.2	1	U8	rw	rw	rw
A82	CAN-baudrate	55		24	Selection: See device docu.	1	U8	rw	rw	rw
A83	Busaddress	55		25	0 to 125	1	U8	rw	rw	rw
A84	Profibus baudrate	33		120	Selection: See Profibus docu	1	U8	r	r	r
A100	Scaling deviceintern	458		23	0=inactive, 1=active	1	U8	rw	rw	rw
A108	Emergencyservice	458		22	0=inactive, 1=active	1	U8	rw	rw	rw
A109	Proc. output control time	458		20	FAS/FDS: 100 to 65535 SDS: 1 to 65535	1 ms	U16	rw	rw	rw
A110	Process output data 0	55		26	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A111	Process output data 1	55		30	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A112	Process output data 2	55		62	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A113	Process output data 3	55		66	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A114	CAN proc. output data 0	55		46	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A115	CAN proc. output data 1	55		50	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A116	CAN proc. output data 2	55		78	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A117	CAN proc. output data 3	55		82	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A119	Proc. output data enable	55		19	0=inactive, 1=active	1	U8	rw	rw	rw
A120	Process input data 0	55		34	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A121	Process input data 1	55		38	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A122	Process input data 2	55		70	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A123	Process input data 3	55		74	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A124	CAN proc. input data 0	55		54	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A125	CAN proc. input data 1	55		58	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A126	CAN proc. input data 2	55		86	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A127	CAN proc. input data 3	55		90	0 to $FFFFFFFF_{hex}$ Selection of funct. corr. docu.	1	U32	rw	rw	rw
A130	Process output length	33		136	0 to 12	1	U8	r	r	r
A131	CAN process output length	33		138	0 to 12	1	U8	-	-	r
A132	Process input length	33		131	0 to 12	1	U8	r	r	r
A133	CAN process input length	33		137	0 to 12	1	U8	-	-	r
B.. Motor										
B00	Motor-type	42	43	29	0 to x; x=depends on type see device docu. SDS 60 to 69 s. device docu.	1	U8	rw	rw	rw
B02	EMC-constant	42	43	30	5 to 3000	1 V	I16	-	-	rw
B03	Motor fan	42	43	62	0=inactive, 1=active	1	U8	-	-	rw
B10	Poles	42	43	26	1 to 8	2	U8	rw	rw	rw
B11	P-nominal	42	43	6	12 to x; x=depends on type	10 W	I16	rw	rw	rw
B12	I-nominal	42	43	4	0 to x; x= depends on type	10 mA	I16	rw	rw	rw
B13	n-nominal	42	43	8	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
B14	U-nominal	42	43	2	0 to 4800	0.1 V	I16	rw	rw	-
B15	f-nominal	42	43	0	819 to 27034	0.012207 Hz	I16	rw	rw	-

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
B16	cos PHI	42	43	27	50 to 100	0.01	U8	rw	rw	-
B17	M0 (standstill)	42	43	60	0 to 32767	0.01 Nm	I16	-	-	rw
B20	Control mode	40	41	6	0 to 2, see device docu.	1	U8	rw	rw	-
B21	V/f-characteristic	40	41	7	0=linear, 1=square	1	U8	rw	rw	-
B22	V/f-gain	40	41	12	7372 to 9011	0.012207 %	I16	rw	rw	-
B23	Boost	40	41	0	8000_{hex}=4*motor I-nominal	0.012207 %	I16	rw	rw	-
B24	Switching frequency	40	41	11	40 to 160	100 Hz	U8	rw	rw	-
B25	Halt flux	40	41	14	0 to 4, see device docu.	1	U8	rw	rw	-
B26	Motor-encoder	40	41	15	FAS: 0 FDS: 0 to 1 SDS: 2 to 3	1	U8	rw	rw	rw
B27	Time halt flux	40	41	17	0 to 255	1 s	U8	rw	rw	-
B30	Addit. motor-operation	40	41	8	0=inactive, 1=active	1	U8	rw	rw	-
B31	Oscillation damping	40	41	9	0 to 100	1 %	U8	rw	rw	-
B32	SLVC-dynamics	40	41	16	0 to 100	1 %	U8	rw	rw	-
B40	Phase test	13		11	0=inactive, 1=active	1	U8	rw	rw	rw
B41	Autotuning	13		13	0=inactive, 1=active	1	U8	rw	rw	-
B52	L-motor	42	43	34	0 to 32767	0.01 mH	I16	-	-	rw
B53	R1-motor	42	43	10	1 to 32767	0.01 Ohm	I16	rw	rw	rw
B60	X1S-motor	42	43	12	1 to 32767	0.01 Ohm	I16	rw	rw	-
B61	Therm-motor	42	43	22	1 to 32767	1 s	I16	rw	rw	-
B62	TB-motor	42	43	24	1 to 255	1 ms	U8	rw	rw	-
B63	Mbreakdown / Mnom.	42	43	25	1 to 255	0.1	U8	rw	rw	-
B64	Ki-IQ (moment)	42	43	16	8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
B65	Kp-IQ (moment)	42	43	14	8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
B66	Ki-ID (flux)	42	43	20	8000_{hex}=400%	0.012207 %	I16	rw	rw	-
B67	Kp-ID (flux)	42	43	18	8000_{hex}=400%	0.012207 %	I16	rw	rw	-
C.. Machine										
C00	n-Min	38	39	4	FAS/FDS: 0 to **C01** SDS: 0 to **C01**	0.012207 Hz 1 rpm	I16	rw	rw	rw
C01	n-Max	38	39	2	FAS/FDS: **C00** to 32767 SDS: **C00** to 6000	0.012207 Hz 1 rpm	I16	rw	rw	rw
C02	Perm. direction of rotation	38	39	31	0 to 2, see device docu.	1	U8	rw	rw	rw
C03	M-Max 1	40	41	2	8000_{hex}=4*motor rated torque	0.012207 %	I16	rw	rw	rw
C04	M-Max 2	40	41	4	8000_{hex}=4* motor rated torque	0.012207 %	I16	rw	rw	rw
C10	skip speed 1	38	39	6	0 to 32676	0.012207 Hz	I16	rw	rw	-
C11	skip speed 2	38	39	8	0 to 32676	0.012207 Hz	I16	rw	rw	-
C12	skip speed 3	38	39	10	0 to 32676	0.012207 Hz	I16	rw	rw	-
C13	skip speed 4	38	39	12	0 to 32676	0.012207 Hz	I16	rw	rw	-
C20	Startup mode	38	39	30	0 to 3, see device docu.	1	U8	rw	rw	-
C21	M-load start	38	39	14	8000_{hex}=4*motor rated torque	0.012207 %	I16	rw	rw	-
C22	t-load start	38	39	32	0 to 99	0.1 s	U8	rw	rw	-
C30	J-mach/J-motor	38	39	0	0 to 10000	0.1	I16	rw	rw	rw
C31	n-controller Kp	38	39	48	8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
C32	n-controller Ki	38	39	50	8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
C33	n-RefVal low pass	38	39	52	0 to 32767	0.1 ms	I16	-	-	rw
C34	n-motor low pass	42	43	70	3 to 32767	0.1 ms	I16	-	-	rw
C35	n-controll. Kp standstill	38	39	61	5 to 100	1 %	U8	rw	rw	rw
C40	n-window	38	39	16	FAS/FDS: 0 to 819 SDS: 0 to 300	0.012207 Hz 1 rpm	I16	rw	rw	rw
C41	Operating range n-Min.	38	39	18	FAS/FDS: 0 to **C42** SDS: 0 to **C42**	0.012207 Hz 1 rpm	I16	rw	rw	rw
C42	Operating range n-Max.	38	39	20	FAS/FDS: **C41** to 32676 SDS: **C41** to 6000	0.012207 Hz 1 rpm	I16	rw	rw	rw
C43	Operating range M-Min.	38	39	22	0 to **C44** 8000_{hex}=4*motor rated torque	0.012207 %	I16	rw	rw	rw
C44	Operating range M-Max.	38	39	24	**C43** to 32767 8000_{hex}=4* motor rated torque	0.012207 %	I16	rw	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
C45	Operating range X-Min.	38	39	26	-32767 to **C46** 8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
C46	Operating range X-Max.	38	39	28	**C45** to 32767 8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
C47	Operating range C45/C46	38	39	58	0 to 14, see device docu.	1	U8	rw	rw	rw
C48	Op. range of amound C47	38	39	56	0=absolute; 1=range	1	U8	rw	rw	rw
C49	Operat. range accel&ena	38	39	60	0=inactive; 1=active	1	U8	rw	rw	rw
C50	Display function	38	39	33	0 to 4, see device docu.	1	U8	rw	rw	rw
C51	Display factor	38	39	34	- 10000000 to 10000000	0.0001	I32	rw	rw	rw
C52	Display decimals	38	39	47	0 to 5	1	U8	rw	rw	rw
C53	Display text	38	39	38	ANSI-String with \0	1	STR9	rw	rw	rw
C60	Run mode	512		67	FAS/FDS: 1 to 2 SDS: 0 to 3	1	U8	rw	rw	rw
D.. Reference Value										
D00	Reference value accel	48	49	0	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D01	Reference value decel	48	49	2	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D02	Speed (max. ref. value)	53	54	18	FAS/FDS: 0 to 32676 SDS: 0 to 6000	0.012207 Hz 1 rpm	I16	rw	rw	rw
D03	Reference value-Max.	53	54	22	**D05** to 32676 8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
D04	Speed (min. ref. value)	53	54	16	FAS/FDS: 0 to 32676 SDS: 0 to 6000	0.012207 Hz 1 rpm	I16	rw	rw	rw
D05	Reference value-Min.	53	54	20	0 to **D03** 8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
D06	Reference value offset	53	54	14	-32678 to 32676 8000_{hex}=400%	0.012207 %	I16	rw	rw	rw
D07	Reference value	53	54	25	Selection of funct. corr. docu.	1	U8	rw	rw	rw
D08	Monitor reference value	53	54	28	Selection of funct. corr. docu.	1	U8	rw	rw	rw
D09	Fix reference value no.	53	54	34	0 to 7; 0=external; 1 to 7 Selection	1	U8	rw	rw	rw
D10	Accel 1	48	49	4	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D11	Decel 1	48	49	6	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D12	Fix reference value 1	53	54	0	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D20	Accel 2	48	49	8	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D21	Decel 2	48	49	10	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D22	Fix reference value 2	53	54	2	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D30	Accel 3	48	49	12	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D31	Decel 3	48	49	14	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D32	Fix reference value 3	53	54	4	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D40	Accel 4	48	49	16	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D41	Decel 4	48	49	18	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D42	Fix reference value 4	53	54	6	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D50	Accel 5	48	49	20	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D51	Decel 5	48	49	22	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D52	Fix reference value 5	53	54	8	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D60	Accel 6	48	49	24	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D61	Decel 6	48	49	26	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
D62	Fix reference value 6	53	54	10	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D70	Accel 7	48	49	28	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D71	Decel 7	48	49	30	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D72	Fix reference value 7	53	54	12	FAS/FDS: 8000_{hex}=400 Hz SDS: 0 to 6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
D80	Ramp shape	48	49	34	0=linear; 1=´S´ramp	1	U8	rw	rw	-
D81	Decel-quick	48	49	32	FAS/FDS: 0 to 30000 * **D98** SDS: 0 to 30000 * D98	0.1 s / 150 Hz 1 ms / 3000 rpm	I16	rw	rw	rw
D90	Reference value source	53	54	24	0 to 2; see device docu.	1	U8	rw	rw	rw
D91	Motorpoti function	53	54	26	0=non-volatile; 1=volatile	1	U8	rw	rw	rw
D92	Negate reference value	53	54	27	0=inactive, 1=active	1	U8	rw	rw	rw
D93	RV-Generator	52		88	0=inactive, 1=active	1	U8	rw	rw	rw
D94	Ref. value generator time	53	54	32	0 to 32767	1 ms	I16	rw	rw	rw
D98	Ramp factor	53	54	35	0=1; -1=0,1; 2=0,01	1	I8	rw	rw	-
D99	Fast reference value	53	54	29	0=inactive, 1=active	1	U8	-	-	rw
E.. Display Values										
E00	I-motor	33		14	8000_{hex}=4* device I-nominal	0.012207 %	I16	r	r	r
E01	P-motor	33		12	8000_{hex}=4* motor P-nominal	0.012207 %	I16	r	r	r
E02	M-motor	33		6	8000_{hex}=4* motor rated torque	0.012207 %	I16	r	r	r
E03	DC-link-voltage	33		28	DC voltage	0.1 V	I16	r	r	r
E04	U-motor	33		30	peak voltage	0.1 V	I16	r	r	-
E05	f1-motor	33		10	8000_{hex}=400 Hz	0.012207 Hz	I16	r	r	-
E06	n-reference value	33		32	FAS/FDS: SDS:	0.012207 Hz 0.25 rpm	I16	r	r	r
E07	n-post-rampe	33		34	FAS/FDS: SDS:	0.012207 Hz 0.25 rpm	I16	r	r	r
E08	n-motor	33		2	FAS/FDS: SDS:	0.012207 Hz 0.25 rpm	I16	r	r	r
E09	Rotor position	33		144	FAS/FDS: 1r/4*F36 or **H22** SDS: 1r=20bit; max. 4096 U	1.000 r	I32	r	r	r
E10	AE1-level	36		0	2000_{hex}=100%	0.012207 %	I16	r	r	r
E11	AE2-level	36		2	2000_{hex}=100%	0.012207 %	I16	-	r	r
E12	ENA-BE1-BE2-level	36		8	Bit5=ena,B4=Be1,B3=Be2,B2 =Be3..	1	U8	r	r	-
E13	BE3-BE4-BE5-level	36		8	analog to **E12**	1	U8	r	r	-
E14	BE5-frequence ref. value	36		6	8000_{hex}=400 Hz	0.012207 Hz	I16	r	r	-
E15	n-encoder	33		8	8000_{hex}=400 Hz	0.012207 Hz	I16	r	r	-
E16	Analog-output1-level	33		40	8000_{hex}=10 V	0.305175 mV	I16	-	r	r
E17	Relay 1	33		72	0=open, 1=closed	1	U8	r	r	r
E18	Relay 2 BA2	33		73	0=open, 1=closed 0=inactive, 1=active	1	U8	r -	r -	- r
E19	BE15...BE1 & enable	36		16	Bit0=ena,Bit1=BE1,Bit2=BE2...	1	U16	r	r	r
E20	Device utilization	33		50	8000_{hex}=400%	0.012207 %	I16	r	r	r
E21	Motor utilization	33		54	8000_{hex}=400%	0.012207 %	I16	r	r	r
E22	i2t-device	33		56	0 to 105	1 %	U8	r	r	r
E23	i2t-motor	33		57	0 to 100	1 %	U8	r	r	r
E24	i2t-braking resistor	33		58	0 to 100	1 %	U8	r	r	r
E25	Device temperature	33		60	-35 to 100	1 °C	I8	r	r	r
E26	Binary output 1	33		112	0=inactive, 1=active	1	U8	-	r	r
E27	BA15..1&Rel1	33		132	Bit0=Rel1, Bit1 = BA1, ...	1	U16	r	r	r
E28	Analog output2-level	33		122	8000_{hex}=10 V	0,305175 mV	I16	-	-	r
E29	n-ref. value raw	33		148	FAS/FDS: SDS:	0.012207 Hz 0.25 rpm	I16	r	r	r
E30	Run time	32	0		hours	1 h	STR81	r	r	r
E30	Run time	32	2		minutes	1 min		r	r	r
E30	Run time	32	3	0	seconds	1 s		r	r	r
E31	Enable time	32	12	81	hours	1 h	STR81	r	r	r

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
E31	Enable time	32	14		minutes	1 min		r	r	r
E31	Enable time	32	15		seconds	1 s		r	r	r
E32	Energy counter	32		16	watt hours	0.001 Wh	U32	r	r	r
E33	Vi-max-memorized value	32		24	0,1 V	0.1 V	I16	r	r	r
E34	I-max-memorized value	32		26	8000_{hex}=4* device I-nominal	0.012207 %	I16	r	r	r
E35	Tmin-memorized value	32		32	-128 to 127	1 °C	I8	r	r	r
E36	Tmax-memorized value	32		33	-128 to 127	1 °C	I8	r	r	r
E37	Pmin-memorized value	32		28	-32768 to 32767	1 W	I16	r	r	r
E38	Pmax-memorized value	32		30	-32768 to 32767	1 W	I16	r	r	r
E45	Control word	52		60	see Drivecom profil 21		U16	r	r	r
E46	Status word	33		84	see Drivecom profil 21		U16	r	r	r
E47	n-field-bus	52		62	see Drivecom profil 21		I16	r	r	r
E50	Device	450		26	ANSI-String with \0	1	STR17	r	r	r
E51	Software-version	5		12	ANSI-String with \0	1	STR17	r	r	r
E52	Device number	450		4	0 to 4294967295	1	U32	r	r	r
E53	Variant-number	450		8	0 to 4294967295	1	U32	r	r	r
E54	Option-board	5		3	FAS: 20 to 21, see docu. FDS: 0 to 7, see docu. SDS: 10 to 13, see docu.	1	U8	r	r	r
E55	Identity-number	15		0	0 to 65535	1	U16	r	r	r
E56	Parameter set ident. 1	40	41	10	0 to 255	1	U8	r	r	r
E57	Parameter set ident. 2	41		10	0 to 255	1	U8	r	r	r
E58	Kommubox	5		29	ANSI-String with \0	1	STR17	r	r	-
E60	Reference value selector	33		71	Selection see device docu.	1	U8	r	r	r
E61	Additional reference value	33		36	FAS/FDS: SDS:	0.012207 Hz 0.25 rpm	I16	r	r	r
E62	Actual M-max	33		38	8000_{hex}=4* motor rated torque	0.012207 %	I16	r	r	r
E63	PID-controller limit	33		103	1=limit reached	1	U8	-	r	r
E64	Brake	33		121	0=closed, 1=open	1	U8	-	-	r
E65	PID control deviation	33		134	-1000 to 1000	0.1 %	I16	-	r	r
E71	AE1 scaled	52		0	2000_{hex}=100%	0.012207 %	I16	r	r	r
E72	AE2 scaled t	52		100	2000_{hex}=100%	0.012207 %	I16	-	r	r
E73	AE2 scaled 2	52		2	2000_{hex}=100%	0.012207 %	I16	-	r	r
E80	Operating condition	33		62	0 to 26, see docu.	1	U8	r	r	r
E81	Event level	33		64	0 to 3, see docu.	1	U8	r	r	r
E82	Event name	33		63	FAS/FDS: 30 to 55, s. docu. SDS: 30 to 56, s. docu.	1	U8	r	r	r
E83	Warning time	33		65	0 to 255	1s	U8	r	r	r
E84	Active parameter set	33		61	1 to 2	1	U8	r	r	r
E85	Not saved	15		85	0=inactive, 1=active	1	U8	r	r	r
E100	Statusbits	33		104	see chap. 8	1	U32	r	r	r
E101	Control bits	52		40	see chap. 8	1	U32	rw	rw	rw
E102	Torque-limit	52		44	8000_{hex}=100% Mmot_nominal	0.012207 %	I16	rw	rw	rw
E103	Power-limit	52		46	8000_{hex}=100% Pmot_nominal	0.012207 %	I16	rw	rw	rw
E104	Additional RV	52		48	FAS/FDS: 8000_{hex}=400 Hz SDS: 0-6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
E105	RV-factor	52		50	2000_{hex}=100%	0.012207 %	I16	rw	rw	rw
E106	Override	52		52	2000_{hex}=100%	0.012207 %	I16	rw	rw	rw
E107	Posi.offset	52		54	-2147483648 to 2147483647	1 Posi-Inc	I32	rw	rw	rw
E108	Winding diameter	52		74	**G12** to **G13**	1 mm	I16	-	rw	rw
E109	M-max. rot. field magnet	52		76	2000_{hex}=100% Mmax	0.012207 %	I16	rw	rw	rw
E110	analog output	52		78	8000_{hex}=400%; 100%=10 V	0.012207 V	I16	-	rw	rw
E111	BA2	52		80	0=inactive, 1=active	1	U8	-	rw	rw
E112	BA1	52		81	0=inactive, 1=active	1	U8	rw	rw	rw
E113	BA3	52		95	0=inactive, 1=active	1	U8	rw	rw	rw
E114	BA4	52		96	0=inactive, 1=active	1	U8	rw	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
E115	BA5	52		97	0=inactive, 1=active	1	U8	rw	rw	rw
E116	BA6	52		98	0=inactive, 1=active	1	U8	-	-	rw
E117	BA7	52		99	0=inactive, 1=active	1	U8	-	-	rw
E118	Analog output 2	52		86	2000_{hex}=100%=10 V	0.012207 V	I16	-	-	rw
E119	Reference value	52		84	2000_{hex}=100%	0.012207 %	I16	rw	rw	rw
E120	Tension reduction	52		102	2000_{hex}=100%	0.012207 %	I16	-	rw	rw
E121	PID-reference	52		104	8000_{hex}=400%	0.012207 %	I16	-	rw	rw
E122	Winder-roller	52		106	8000_{hex}=400%	0.012207 %	I16	-	rw	rw
E123	Synchron offset	52		108	-80000000_{hex} to 80000000_{hex} scaled in basic increments	1 Posi-Inc	I32	-	rw	rw
E125	Synchron n-RV	52		118	FAS/FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	-	rw	rw
E126	n-Max	52		82	FAS/FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	rw	rw	rw
E127	BE-encoder-position	36		30	- 32768 to 32767	1 Posi-Inc	I16	r	r	r
E128	X20-encoder-position	36		32	- 32768 to 32767	1 Posi-Inc	I16	r	r	r
E130	Posi-Upgrade contract no.	5		48	only FAS	1	U32	r	-	-
E131	POSI next latched	33		150	Actual position is latched at Posi-Next -2147483648 ... 2147483647	Posi-Unit	I32	r	-	-
E132	SSI raw value	33		154	-2147483648 - 2147483647	1 Posi-Inc	I32	r	r	r
F.. Control Interface										
F00	Relay2-function	34	35	26	0 - 32, see device-docu.	1	U8	rw	rw	-
F01	Brake release	34	35	12	8000_{hex}=400 Hz	0.012207 Hz	I16	rw	rw	-
F02	Brake set	34	35	10	8000_{hex}=400 Hz	0.012207 Hz	I16	rw	rw	-
F03	Relay 2 t-on	34	35	14	0 to 5024 (internal 4 ms grid)	1 ms	I16	rw	rw	-
F04	Relay 2 t-off	34	35	16	0 to 5024 (internal 4 ms grid)	1 ms	I16	rw	rw	-
F05	Relay 2 invert	34	35	28	0=inactive, 1=active	1	U8	rw	rw	-
F06	t-brake release	34	35	40	0 to 5024 (internal 4 ms grid)	1 ms	I16	rw	rw	rw
F07	t-brake set	34	35	42	0 to 5024 (internal 4 ms grid)	1 ms	I16	rw	rw	rw
F08	Brake	59	60	20	0=inactive, 1=active	1	U8	-	-	rw
F10	Relay 1-function	34	35	27	0 to 2, see device-docu.	1	U8	rw	rw	rw
F19	Quick stop end	34	35	18	0=at n=0; 1=no stop	1	U8	rw	rw	rw
F20	AE2-function	34	35	24	0 to 14, see device-docu.	1	U8	-	rw	rw
F21	AE2-offset	34	35	6	2000_{hex}=100%=10 V	0.012207 %	I16	-	rw	rw
F22	AE2-gain	34	35	8	2000_{hex}=100%=10 V	0.012207 %	I16	-	rw	rw
F23	AE2-lowpass	34	35	38	0 to 10000	1 ms	I16	-	rw	rw
F24	AE2-offset2	34	35	56	8000_{hex}=400% to AE2 gain	0.012207 %	I16	-	rw	rw
F25	AE1-function	34	35	62	0 to 14, see device-docu.	1	U8	rw	rw	rw
F26	AE1-offset	34	35	60	2000_{hex}=100%=10V	0.012207 %	I16	rw	rw	rw
F27	AE1-gain	34	35	58	2000_{hex}=100%=10 V	0.012207 %	I16	rw	rw	rw
F30	BE-logic	34	35	68	0=or; 1=and	1	U8	rw	rw	rw
F31	BE1-function	34	35	19	0 to 32, see device-docu.	1	U8	rw	rw	rw
F32	BE2-function	34	35	20	0 to 32, see device-docu.	1	U8	rw	rw	rw
F33	BE3-function	34	35	21	0 to 32, see device-docu.	1	U8	rw	rw	rw
F34	BE4-function	34	35	22	0 to 32, see device-docu.	1	U8	rw	rw	rw
F35	BE5-function	34	35	23	0 to 32, see device-docu.	1	U8	rw	rw	rw
F36	BE-increments	34	35	30	30 to 4096	1 inc/r	I16	rw	rw	rw
F37	Fmax frequency-ref. value	34	35	0	30 to 512	100 Hz	I16	rw	rw	-
F38	Quick stop	34	35	29	1 to 2, see device-docu.	1	U8	rw	rw	rw
F40	Analog-output1-function	34	35	25	0 to 11, see device-docu.	1	U8	-	rw	rw
F41	Analog-output1-offset	34	35	2	2000_{hex}=100%=10 V	0.012207 %	I16	-	rw	rw
F42	Analog-output1-gain	34	35	4	2000_{hex}=100%=10 V	0.012207 %	I16	-	rw	rw
F45	Analog-output2-function	59	60	4	0 to 11, see device-docu.		U8	-	-	rw
F46	Analog-output2-offset	59	60	0	2000_{hex}=100%=10 V	0.012207 %	I16	-	-	rw
F47	Analog-output2-gain	59	60	2	2000_{hex}=100%=10 V	0.012207 %	I16	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
F49	BE-gear ratio	34	35	64	FDS: 0 to 32767 SDS: – 32768 to 32767	0.001	I16	-	rw	rw
F51	BE1-invert	34	35	32	0=inactive, 1=active	1	U8	rw	rw	rw
F52	BE2-invert	34	35	33	0=inactive, 1=active	1	U8	rw	rw	rw
F53	BE3-invert	34	35	34	0=inactive, 1=active	1	U8	rw	rw	rw
F54	BE4-invert	34	35	35	0=inactive, 1=active	1	U8	rw	rw	rw
F55	BE5-invert	34	35	36	0=inactive, 1=active	1	U8	rw	rw	rw
F60	BE6-function	34	35	44	0 to 32, see device-docu.	1	U8	-	rw	rw
F61	BE7-function	34	35	45	0 to 32, see device-docu.	1	U8	-	rw	rw
F62	BE8-function	34	35	46	0 to 32, see device-docu.	1	U8	-	rw	rw
F63	BE9-function	34	35	47	0 to 32, see device-docu.	1	U8	-	rw	rw
F64	BE10-function	34	35	48	0 to 32, see device-docu.	1	U8	-	rw	rw
F65	BE11-function	59	60	21	0 to 32, see device-docu.	1	U8	-	-	rw
F66	BE12-function	59	60	22	0 to 32, see device-docu.	1	U8	-	-	rw
F67	BE13-function	59	60	23	0 to 32, see device-docu.	1	U8	-	-	rw
F68	BE14-function	59	60	24	0 to 32, see device-docu.	1	U8	-	-	rw
F70	BE6-invert	34	35	49	0=inactive, 1=active	1	U8	-	rw	rw
F71	BE7-invert	34	35	50	0=inactive, 1=active	1	U8	-	rw	rw
F72	BE8-invert	34	35	51	0=inactive, 1=active	1	U8	-	rw	rw
F73	BE9-invert	34	35	52	0=inactive, 1=active	1	U8	-	rw	rw
F74	BE10- invert	34	35	53	0=inactive, 1=active	1	U8	-	rw	rw
F75	BE11- invert	59	60	25	0=inactive, 1=active	1	U8	-	-	rw
F76	BE12- invert	59	60	26	0=inactive, 1=active	1	U8	-	-	rw
F77	BE13- invert	59	60	27	0=inactive, 1=active	1	U8	-	-	rw
F78	BE14- invert	59	60	28	0=inactive, 1=active	1	U8	-	-	rw
F80	BA1-function	34	35	37	1 to 32, as Relay 2 (**F00**)	1	U8	-	rw	rw
F81	BA2-function	34	35	26	0 to 32, see device-docu.	1	U8	-	-	rw
F82	BA3-function	59	60	29	1 to 32, see device-docu.	1	U8	-	rw	rw
F83	BA4- function	59	60	30	1 to 32, see device-docu.	1	U8	-	rw	rw
F84	BA5-function	59	60	31	1 to 32, see device-docu.	1	U8	-	rw	rw
F85	BA6- function	59	60	32	1 to 32, see device-docu.	1	U8	-	-	rw
F86	BA7- function	59	60	33	1 to 32, see device-docu.	1	U8	-	-	rw
G.. Technology										
G00	PID-controller	46	47	8	0=inactive, 1=active	1	U8	-	rw	rw
G01	PID-controller Kp	46	47	0	0 to 1000	0.1	I16	-	rw	rw
G02	PID-controller Ki	46	47	2	0 to 1000	0.01 1/s	I16	-	rw	rw
G03	PID-controller Kd	46	47	4	0 to 1000	1 ms	I16	-	rw	rw
G04	PID-controller limit	46	47	6	8000_{hex}=400%	0.012207 %	I16	-	rw	rw
G05	PID- controller limit 2	46	47	48	8000_{hex}=400%	0.012207 %	I16	-	rw	rw
G06	PID-controller Kp2	46	47	42	0 to 1000	0.01	I16	-	rw	rw
G10	Winding operation	46	47	23	0 to 2, see device-docu.	1	U8	-	rw	rw
G11	Diameter	46	47	30	0 to 2, see device-docu.	1	U8	-	rw	rw
G12	Min. winding diameter	46	47	24	10 to 3000	1 mm	I16	-	rw	rw
G13	Max. winding diameter	46	47	26	10 to 3000	1 mm	I16	-	rw	rw
G14	Begin. winding diameter	46	47	28	10 to 3000	1 mm	I16	-	rw	rw
G15	Overdrive ref. value	46	47	32	FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	-	rw	rw
G16	Diam. calculator ramp	46	47	44	0 to 1000	0.1 mm/s	I16	-	rw	rw
G17	Tension reduction	46	47	31	0 to 100	1 %	U8	-	rw	rw
G19	Actual. winding diameter	33		118	0 to 3000	1 mm	I16	-	r	r
G20	Electronic gear	46	47	9	0 to 3, see device-docu.	1	U8	-	rw	rw
G21	Speed master	46	47	10	1 to 2147483647	1	I32	-	rw	rw
G22	Speed slave	46	47	14	1 to 2147483647	1	I32	-	rw	rw
G23	Kp synchron	46	47	18	0 to 100	1 1/s	I16	-	rw	rw
G24	max. synchron. difference	46	47	20	0 to 30000	1 °	I16	-	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
G25	Synchron reset	46	47	22	0 to 3, see device-docu.	1	U8	-	rw	rw
G26	n-correction-Max.	46	47	34	FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	-	rw	rw
G27	Synchronous encoder	46	47	40	FDS: 0: BE Encoder 1: X20 Master SDS: 0: BE Encoder 1: X20 Master 2: X41	1	U8	-	rw	rw
G28	n-master	33		142	FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	-	r	r
G29	Synchron difference	33		114	-2147483648 to 2147483647	1 °	I32	-	r	r
G30	Speed feed forward	46	47	41	0 to 100	1 %	U8	-	rw	rw
G31	Reference direction	46	47	58	0=positive; 1=negative	1	U8	-	rw	rw
G32	Reference speed fast	46	47	54	FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	-	rw	rw
G33	Reference speed slow	46	47	56	FDS: 8000_{hex}=400 Hz SDS: ±6000 rpm	0.012207 Hz 1 rpm	I16	-	rw	rw
G35	Ref. encoder signal 0	46	47	59	0=inactive, 1=active	1	U8	-	rw	rw
G38	Synchronous offset	46	47	50	-2147483648 to 2147483647	1 °	I32	-	rw	rw
G40	Static friction torque	46	47	36	0 to 327.67	0.01 Nm	I16	-	rw	rw
G41	Dynamic friction torque	46	47	38	0 to 327.67	0.01 Nm	I16	-	rw	rw
G42	T-dyn lowpass	46	47	46	0 to 10000	1 ms	I16	-	rw	rw
H.. Encoder										
H20	X20-function	34	35	63	0 to 5, see device-docu.	1	U8	-	rw	rw
H21	Encocdersim. increments	59	60	5	0 to 4, see device-docu.	1	U8	-	rw	rw
H22	X20-increments	34	35	54	30 to 4096	1 inc	I16	-	rw	rw
H23	X20-gear ratio	34	35	66	FDS: 0 to 32.767 SDS: ±32.767	0.001	I16	-	rw	rw
H24	X20-zero position	59	60	14	0 to 3600	0.1°	I16	-	-	rw
H31	Resolver poles	59	60	8	2 to 16	1 Pol	U8	-	-	rw
H32	Kommutation-offset	59	60	6	0 to 3600	0.1°	I16	-	-	rw
H40	X41-function	59	60	9	0 to 3, see device-docu.	1	U8	-	-	rw
H41	X41-increments	59	60	10	30 to 4096	1 inc	I16	-	-	rw
H42	X41-gear ratio	59	60	12	±32.767	0.001	I16	-	-	rw
H60	SSI-invert	59	60	19	0=inactive, 1=active	1	U8	-	rw	rw
H61	SSI-coding	59	60	18	0=gray, 1=binary	1	U8	-	rw	rw
H62	SSI-data bits	59	60	16	0=24 bit, 1=25 bit	1	U8	-	rw	rw
I.. Posi. Machine										
I00	Position range	512		66	0=limited, 1=unlimited	1	U8	rw^P	rw	rw
I01	Circular length	512		48	21474836.47	1 **I05** * $1E^{-I06}$	I32	rw^P	rw	rw
I02	Posi. encoder	512		86	FDS: 0 to 2, see device-docu. SDS: 0 to 3, see device-docu.	1	U8	-	rw	rw
I03	Direction optimization	512		129	0=inactive, 1=active	1	U8	rw^P	rw	rw
I04	Move direction	512		68	0 to 2, see device-docu.	1	U8	rw^P	rw	rw
I05	Measure unit selection	512		75	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
I06	Decimal digits	512		76	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
I07	Way / revolution numerator	512		52	-2147483648 to 2147483647	1 **I05** * $1E^{-I06}$ / U	I32	rw^P	rw	rw
I08	Way / revolution denomin.	512		56	1 to 2147483647	1 U	I32	rw^P	rw	rw
I09	Measurement unit	512		77	ANSI-String with \0	1	STR9	rw^P	rw	rw
I10	Max. speed	512		0	1 to 2147483647	User units /s	I32	rw^P	rw	rw
I11	Max. acceleration	512		4	0 to 2147483647	User untis /s²	I32	rw^P	rw	rw
I12	Tip speed	512		16	0 to 2147483647	User untis /s	I32	rw^P	rw	rw
I15	Accel-override	512		87	0=inactive, 1=active	1	U8	rw^P	rw	rw
I16	S-ramp	512		88	0 to 32767	1 ms	I16	rw^P	rw	rw
I19	ENA-interrupting	512		128	0=inactive, 1=active	1	U8	rw^P	rw	rw
I20	Kv-factor	512		64	0 to 100	1 / s	I16	rw^P	rw	rw
I21	Max.following error	512		8	0 to 2147483647	User units	I32	rw^P	rw	rw
I22	Target window	512		12	0 to 2147483647	User units	I32	rw^P	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
I23	Dead band pos. control.	512		92	0 to 2147483647	User units	I32	rw^P	rw	rw
I25	Speed feed forward	512		90	0 to 100	1 %	I16	rw^P	rw	rw
I30	Reference mode	512		69	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
I31	Reference direction	512		70	0=positive, 1=negative	1	U8	rw^P	rw	rw
I32	Reference speed fast	512		20	0 to 2147483647	User units	I32	rw^P	rw	rw
I33	Reference speed slow	512		24	0 to 2147483647	User units	I32	rw^P	rw	rw
I34	Reference position	512		28	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
I35	Ref. encoder signal 0	512		71	0 to 1, see device-docu.	1	U8	rw^P	rw	rw
I36	Continuous reference	512		72	0=inactive, 1=active	1	U8	rw^P	rw	rw
I37	Power-on reference	512		73	0 to 2, see device-docu.	1	U8	rw^P	rw	rw
I38	Reference block	512		74	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
I40	Posi.-step memory	512		130	0=inactive, 1=active	1	U8	rw^P	rw	rw
I50	Software-stop -	512		36	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
I51	Software-stop +	512		32	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
I60	Electronic cam 1 begin	512		40	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
I61	Electronic cam 1 end	512		44	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
I70	Position-offset	512		60	0 to 2147483647	User units	I32	rw^P	rw	rw
I80	Actual position	33		86	-2147483648 to 2147483647	User units	I32	r^P	r	r
I81	Target position	33		94	-2147483648 to 2147483647	User units	I32	r^P	r	r
I82	Active process block	33		98	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	r^P	r	r
I83	Selected process block	33		101	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	r^P	r	r
I84	Following error	33		90	-2147483648 to 2147483647	User untis	I32	r^P	r	r
I85	In position	33		102	0=false, 1= true	1	U8	r^P	r	r
I86	Referenced	33		99	0=false, 1= true	1	U8	r^P	r	r
I87	Electronic cam 1	33		100	0=false, 1=true	1	U8	r^P	r	r
I88	Speed	33		108	-2147483648 to 2147483647	User units /s	I32	r^P	r	r
I90	Switchmemory 1	33		139	0=false, 1=true		U8	rw^P	rw	rw
I91	Switchmemory 2	33		140	0=false, 1=true		U8	rw^P	rw	rw
I92	Switchmemory 3	33		141	0=false, 1=true		U8	rw^P	rw	rw
J.. Posi. Command										
J00	Posi.start	13		21	0=inactive, 1=active	1	U8	rw^P	rw	rw
J01	Posi.step	13		22	0=inactive, 1=active	1	U8	rw^P	rw	rw
J02	Process block number	514		176	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J04	Teach-in	13		23	0=inactive, 1=active	1	U8	rw^P	rw	rw
J05	Start reference	13		24	0=inactive, 1=active	1	U8	rw^P	rw	rw
J10	Position	514		0	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J11	Position mode	514		18	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J12	Speed	514		4	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J13	Accel	514		8	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J14	Decel	514		12	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J15	Repeat number	514		19	0 to 254	1	U8	rw^P	rw	rw
J16	Next block	514		20	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J17	Next start	514		21	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J18	Delay	514		16	65535	1 ms	U16	rw^P	rw	rw
J20	Position	514		22	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J21	Position mode	514		40	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J22	Speed	514		26	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J23	Accel	514		30	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J24	Decel	514		34	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J25	Repeat number	514		41	0 to 254	1	U8	rw^P	rw	rw
J26	Next block	514		42	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
J27	Next start	514		43	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J28	Delay	514		38	65535	1 ms	U16	rw^P	rw	rw
J30	Position	514		44	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J31	Position mode	514		62	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J32	Speed	514		48	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J33	Accel	514		52	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J34	Decel	514		56	0 to 2147483647	User units	I32	rw^P	rw	rw
J35	Repeat number	514		63	0 to 254	1	U8	rw^P	rw	rw
J36	Next block	514		64	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J37	Next start	514		65	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J38	Delay	514		60	65535	1 ms	U16	rw^P	rw	rw
J40	Position	514		66	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J41	Position mode	514		84	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J42	Speed	514		70	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J43	Accel	514		74	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J44	Decel	514		78	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J45	Repeat number	514		85	0 to 254	1	U8	rw^P	rw	rw
J46	Next block	514		86	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J47	Next start	514		87	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J48	Delay	514		82	65535	1 ms	U16	rw^P	rw	rw
J50	Position	514		88	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J51	Position mode	514		106	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J52	Speed	514		92	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J53	Accel	514		96	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J54	Decel	514		100	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J55	Repeat number	514		107	0 to 254	1	U8	rw^P	rw	rw
J56	Next block	514		108	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J57	Next start	514		109	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J58	Delay	514		104	65535	1 ms	U16	rw^P	rw	rw
J60	Position	514		110	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J61	Position mode	514		128	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J62	Speed	514		114	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J63	Accel	514		118	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J64	Decel	514		122	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J65	Repeat number	514		129	0 to 254	1	U8	rw^P	rw	rw
J66	Next block	514		130	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J67	Next start	514		131	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J68	Delay	514		126	65535	1 ms	U16	rw^P	rw	rw
J70	Position	514		132	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J71	Position mode	514		150	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J72	Speed	514		136	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J73	Accel	514		140	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J74	Decel	514		144	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J75	Repeat number	514		151	0 to 254	1	U8	rw^P	rw	rw
J76	Next block	514		152	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J77	Next start	514		153	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J78	Delay	514		148	65535	1 ms	U16	rw^P	rw	rw
J80	Position	514		154	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
J81	Position mode	514		172	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
J82	Speed	514		158	0 to 2147483647	User units /s	I32	rw^P	rw	rw
J83	Accel	514		162	0 to 2147483647	User units /s²	I32	rw^P	rw	rw
J84	Decel	514		166	0 to 2147483647	User units /s²	I32	rw^P	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
J85	Repeat number	514		173	0 to 254	1	U8	rw^P	rw	rw
J86	Next block	514		174	FAS / FDS: 0 to 7 SDS: 0 to 32	1	U8	rw^P	rw	rw
J87	Next start	514		175	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
J88	Delay	514		170	65535	1 ms	U16	rw^P	rw	rw
J90	Position	514		210	-2147483648 to 2147483647	User units	I32	-	-	rw
J91	Position mode	514		228	0 to 3, see device-docu.	1	U8	-	-	rw
J92	Speed	514		214	0 to 2147483647	User units /s	I32	-	-	rw
J93	Accel	514		218	0 to 2147483647	User units /s²	I32	-	-	rw
J94	Decel	514		222	0 to 2147483647	User units /s²	I32	-	-	rw
J95	Repeat number	514		229	0 to 254	1	U8	-	-	rw
J96	Next block	514		230	0 to 32	1	U8	-	-	rw
J97	Next start	514		231	0 to 4, see device-docu.	1	U8	-	-	rw
J98	Delay	514		226	65535	1 ms	U16	-	-	rw
J100	Position	516		0	-2147483648 to 2147483647	User units	I32	-	-	rw
J101	Position mode	516		18	0 to 3, see device-docu.	1	U8	-	-	rw
J102	Speed	516		4	0 to 2147483647	User units /s	I32	-	-	rw
J103	Accel	516		8	0 to 2147483647	User units /s²	I32	-	-	rw
J104	Decel	516		12	0 to 2147483647	User units /s²	I32	-	-	rw
J105	Repeat number	516		19	0 to 254	1	U8	-	-	rw
J106	Next block	516		20	0 to 32	1	U8	-	-	rw
J107	Next start	516		21	0 to 4, see device-docu.	1	U8	-	-	rw
J108	Delay	516		16	65535	1 ms	U16	-	-	rw
J110	Position	516		22	-2147483648 to 2147483647	User units	I32	-	-	rw
J111	Position mode	516		40	0 to 3, see device-docu.	1	U8	-	-	rw
J112	Speed	516		26	0 to 2147483647	User units /s	I32	-	-	rw
J113	Accel	516		30	0 to 2147483647	User units /s²	I32	-	-	rw
J114	Decel	516		34	0 to 2147483647	User units /s²	I32	-	-	rw
J115	Repeat number	516		41	0 to 254	1	U8	-	-	rw
J116	Next block	516		42	0 to 32	1	U8	-	-	rw
J117	Next start	516		43	0 to 4, see device-docu.	1	U8	-	-	rw
J118	Delay	516		38	65535	1 ms	U16	-	-	rw
J120	Position	516		44	-2147483648 to 2147483647	User units	I32	-	-	rw
J121	Position mode	516		62	0 to 3, see device-docu.	1	U8	-	-	rw
J122	Speed	516		48	0 to 2147483647	User units /s	I32	-	-	rw
J123	Accel	516		52	0 to 2147483647	User units /s²	I32	-	-	rw
J124	Decel	516		56	0 to 2147483647	User units /s²	I32	-	-	rw
J125	Repeat number	516		63	0 to 254	1	U8	-	-	rw
J126	Next block	516		64	0 to 32	1	U8	-	-	rw
J127	Next start	516		65	0 to 4, see device-docu.	1	U8	-	-	rw
J128	Delay	516		60	65535	1 ms	U16	-	-	rw
J130	Position	516		66	-2147483648 to 2147483647	User units	I32	-	-	rw
J131	Position mode	516		84	0 to 3, see device-docu.	1	U8	-	-	rw
J132	Speed	516		70	0 to 2147483647	User units /s	I32	-	-	rw
J133	Accel	516		74	0 to 2147483647	User units /s²	I32	-	-	rw
J134	Decel	516		78	0 to 2147483647	User units /s²	I32	-	-	rw
J135	Repeat number	516		85	0 to 254	1	U8	-	-	rw
J136	Next block	516		86	0 to 32	1	U8	-	-	rw
J137	Next start	516		87	0 to 4, see device-docu.	1	U8	-	-	rw
J138	Delay	516		82	65535	1 ms	U16	-	-	rw
J140	Position	516		88	-2147483648 to 2147483647	User units	I32	-	-	rw
J141	Position mode	516		106	0 to 3, see device-docu.	1	U8	-	-	rw
J142	Speed	516		92	0 to 2147483647	User units /s	I32	-	-	rw
J143	Accel	516		96	0 to 2147483647	User units /s²	I32	-	-	rw
J144	Decel	516		100	0 to 2147483647	User units /s²	I32	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
J145	Repeat number	516		107	0 to 254	1	U8	-	-	rw
J146	Next block	516		108	0 to 32	1	U8	-	-	rw
J147	Next start	516		109	0 to 4, see device-docu.	1	U8	-	-	rw
J148	Delay	516		104	65535	1 ms	U16	-	-	rw
J150	Position	516		110	-2147483648 to 2147483647	User units	I32	-	-	rw
J151	Position mode	516		128	0 to 3, see device-docu.	1	U8	-	-	rw
J152	Speed	516		114	0 to 2147483647	User units /s	I32	-	-	rw
J153	Accel	516		118	0 to 2147483647	User units /s²	I32	-	-	rw
J154	Decel	516		122	0 to 2147483647	User units /s²	I32	-	-	rw
J155	Repeat number	516		129	0 to 254	1	U8	-	-	rw
J156	Next block	516		130	0 to 32	1	U8	-	-	rw
J157	Next start	516		131	0 to 4, see device-docu.	1	U8	-	-	rw
J158	Delay	516		126	65535	1 ms	U16	-	-	rw
J160	Position	516		132	-2147483648 to 2147483647	User units	I32	-	-	rw
J161	Position mode	516		150	0 to 3, see device-docu.	1	U8	-	-	rw
J162	Speed	516		136	0 to 2147483647	User units /s	I32	-	-	rw
J163	Accel	516		140	0 to 2147483647	User units /s²	I32	-	-	rw
J164	Decel	516		144	0 to 2147483647	User units /s²	I32	-	-	rw
J165	Repeat number	516		151	0 to 254	1	U8	-	-	rw
J166	Next block	516		152	0 to 32	1	U8	-	-	rw
J167	Next start	516		153	0 to 4, see device-docu.	1	U8	-	-	rw
J168	Delay	516		148	65535	1 ms	U16	-	-	rw
J170	Position	516		154	-2147483648 to 2147483647	User units	I32	-	-	rw
J171	Position mode	516		172	0 to 3, see device-docu.	1	U8	-	-	rw
J172	Speed	516		158	0 to 2147483647	User units /s	I32	-	-	rw
J173	Accel	516		162	0 to 2147483647	User units /s²	I32	-	-	rw
J174	Decel	516		166	0 to 2147483647	User units /s²	I32	-	-	rw
J175	Repeat number	516		173	0 to 254	1	U8	-	-	rw
J176	Next block	516		174	0 to 32	1	U8	-	-	rw
J177	Next start	516		175	0 to 4, see device-docu.	1	U8	-	-	rw
J178	Delay	516		170	65535	1 ms	U16	-	-	rw
J180	Position	516		176	-2147483648 to 2147483647	User units	I32	-	-	rw
J181	Position mode	516		194	0 to 3, see device-docu.	1	U8	-	-	rw
J182	Speed	516		180	0 to 2147483647	User units /s	I32	-	-	rw
J183	Accel	516		184	0 to 2147483647	User units /s²	I32	-	-	rw
J184	Decel	516		188	0 to 2147483647	User units /s²	I32	-	-	rw
J185	Repeat number	516		195	0 to 254	1	U8	-	-	rw
J186	Next block	516		196	0 to 32	1	U8	-	-	rw
J187	Next start	516		197	0 to 4, see device-docu.	1	U8	-	-	rw
J188	Delay	516		192	65535	1 ms	U16	-	-	rw
J190	Position	516		198	-2147483648 to 2147483647	User units	I32	-	-	rw
J191	Position mode	516		216	0 to 3, see device-docu.	1	U8	-	-	rw
J192	Speed	516		202	0 to 2147483647	User units /s	I32	-	-	rw
J193	Accel	516		206	0 to 2147483647	User units /s²	I32	-	-	rw
J194	Decel	516		210	0 to 2147483647	User units /s²	I32	-	-	rw
J195	Repeat number	516		217	0 to 254	1	U8	-	-	rw
J196	Next block	516		218	0 to 32	1	U8	-	-	rw
J197	Next start	516		219	0 to 4, see device-docu.	1	U8	-	-	rw
J198	Delay	516		214	65535	1 ms	U16	-	-	rw
J200	Position	518		0	-2147483648 to 2147483647	User units	I32	-	-	rw
J201	Position mode	518		18	0 to 3, see device-docu.	1	U8	-	-	rw
J202	Speed	518		4	0 to 2147483647	User units /s	I32	-	-	rw
J203	Accel	518		8	0 to 2147483647	User units /s²	I32	-	-	rw
J204	Decel	518		12	0 to 2147483647	User units /s²	I32	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
J205	Repeat number	518		19	0 to 254	1	U8	-	-	rw
J206	Next block	518		20	0 to 32	1	U8	-	-	rw
J207	Next start	518		21	0 to 4, see device-docu.	1	U8	-	-	rw
J208	Delay	518		16	65535	1 ms	U16	-	-	rw
J210	Position	518		22	-2147483648 to 2147483647	User units	I32	-	-	rw
J211	Position mode	518		40	0 to 3, see device-docu.	1	U8	-	-	rw
J212	Speed	518		26	0 to 2147483647	User units /s	I32	-	-	rw
J213	Accel	518		30	0 to 2147483647	User units /s²	I32	-	-	rw
J214	Decel	518		34	0 to 2147483647	User units /s²	I32	-	-	rw
J215	Repeat number	518		41	0 to 254	1	U8	-	-	rw
J216	Next block	518		42	0 to 32	1	U8	-	-	rw
J217	Next start	518		43	0 to 4, see device-docu.	1	U8	-	-	rw
J218	Delay	518		38	65535	1 ms	U16	-	-	rw
J220	Position	518		44	-2147483648 to 2147483647	User units	I32	-	-	rw
J221	Position mode	518		62	0 to 3, see device-docu.	1	U8	-	-	rw
J222	Speed	518		48	0 to 2147483647	User units /s	I32	-	-	rw
J223	Accel	518		52	0 to 2147483647	User units /s²	I32	-	-	rw
J224	Decel	518		56	0 to 2147483647	User units /s²	I32	-	-	rw
J225	Repeat number	518		63	0 to 254	1	U8	-	-	rw
J226	Next block	518		64	0 to 32	1	U8	-	-	rw
J227	Next start	518		65	0 to 4, see device-docu.	1	U8	-	-	rw
J228	Delay	518		60	65535	1 ms	U16	-	-	rw
J230	Position	518		66	-2147483648 to 2147483647	User units	I32	-	-	rw
J231	Position mode	518		84	0 to 3, see device-docu.	1	U8	-	-	rw
J232	Speed	518		70	0 to 2147483647	User units /s	I32	-	-	rw
J233	Accel	518		74	0 to 2147483647	User units /s²	I32	-	-	rw
J234	Decel	518		78	0 to 2147483647	User units /s²	I32	-	-	rw
J235	Repeat number	518		85	0 to 254	1	U8	-	-	rw
J236	Next block	518		86	0 to 32	1	U8	-	-	rw
J237	Next start	518		87	0 to 4, see device-docu.	1	U8	-	-	rw
J238	Delay	518		82	65535	1 ms	U16	-	-	rw
J240	Position	518		88	-2147483648 to 2147483647	User units	I32	-	-	rw
J241	Position mode	518		106	0 to 3, see device-docu.	1	U8	-	-	rw
J242	Speed	518		92	0 to 2147483647	User units /s	I32	-	-	rw
J243	Accel	518		96	0 to 2147483647	User units /s²	I32	-	-	rw
J244	Decel	518		100	0 to 2147483647	User units /s²	I32	-	-	rw
J245	Repeat number	518		107	0 to 254	1	U8	-	-	rw
J246	Next block	518		108	0 to 32	1	U8	-	-	rw
J247	Next start	518		109	0 to 4, see device-docu.	1	U8	-	-	rw
J248	Delay	518		104	65535	1 ms	U16	-	-	rw
J250	Position	518		110	-2147483648 to 2147483647	User units	I32	-	-	rw
J251	Position mode	518		128	0 to 3, see device-docu.	1	U8	-	-	rw
J252	Speed	518		114	0 to 2147483647	User units /s	I32	-	-	rw
J253	Accel	518		118	0 to 2147483647	User units /s²	I32	-	-	rw
J254	Decel	518		122	0 to 2147483647	User units /s²	I32	-	-	rw
J255	Repeat number	518		129	0 to 254	1	U8	-	-	rw
J256	Next block	518		130	0 to 32	1	U8	-	-	rw
J257	Next start	518		131	0 to 4, see device-docu.	1	U8	-	-	rw
J258	Delay	518		126	65535	1 ms	U16	-	-	rw
J260	Position	518		132	-2147483648 to 2147483647	User units	I32	-	-	rw
J261	Position mode	518		150	0 to 3, see device-docu.	1	U8	-	-	rw
J262	Speed	518		136	0 to 2147483647	User units /s	I32	-	-	rw
J263	Accel	518		140	0 to 2147483647	User units /s²	I32	-	-	rw
J264	Decel	518		144	0 to 2147483647	User units /s²	I32	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
J265	Repeat number	518		151	0 to 254	1	U8	-	-	rw
J266	Next block	518		152	0 to 32	1	U8	-	-	rw
J267	Next start	518		153	0 to 4, see device-docu.	1	U8	-	-	rw
J268	Delay	518		148	65535	1 ms	U16	-	-	rw
J270	Position	518		154	-2147483648 to 2147483647	User units	I32	-	-	rw
J271	Position mode	518		172	0 to 3, see device-docu.	1	U8	-	-	rw
J272	Speed	518		158	0 to 2147483647	User units /s	I32	-	-	rw
J273	Accel	518		162	0 to 2147483647	User units /s²	I32	-	-	rw
J274	Decel	518		166	0 to 2147483647	User units /s²	I32	-	-	rw
J275	Repeat number	518		173	0 to 254	1	U8	-	-	rw
J276	Next block	518		174	0 to 32	1	U8	-	-	rw
J277	Next start	518		175	0 to 4, see device-docu.	1	U8	-	-	rw
J278	Delay	518		170	65535	1 ms	U16	-	-	rw
J280	Position	518		176	-2147483648 to 2147483647	User units	I32	-	-	rw
J281	Position mode	518		194	0 to 3, see device-docu.	1	U8	-	-	rw
J282	Speed	518		180	0 to 2147483647	User units /s	I32	-	-	rw
J283	Accel	518		184	0 to 2147483647	User units /s²	I32	-	-	rw
J284	Decel	518		188	0 to 2147483647	User units /s²	I32	-	-	rw
J285	Repeat number	518		195	0 to 254	1	U8	-	-	rw
J286	Next block	518		196	0 to 32	1	U8	-	-	rw
J287	Next start	518		197	0 to 4, see device-docu.	1	U8	-	-	rw
J288	Delay	518		192	65535	1 ms	U16	-	-	rw
J290	Position	518		198	-2147483648 to 2147483647	User units	I32	-	-	rw
J291	Position mode	518		216	0 to 3, see device-docu.	1	U8	-	-	rw
J292	Speed	518		202	0 to 2147483647	User units /s	I32	-	-	rw
J293	Accel	518		206	0 to 2147483647	User units /s²	I32	-	-	rw
J294	Decel	518		210	0 to 2147483647	User units /s²	I32	-	-	rw
J295	Repeat number	518		217	0 to 254	1	U8	-	-	rw
J296	Next block	518		218	0 to 32	1	U8	-	-	rw
J297	Next start	518		219	0 to 4, see device-docu.	1	U8	-	-	rw
J298	Delay	518		214	65535	1 ms	U16	-	-	rw
J300	Position	520		0	-2147483648 to 2147483647	User units	I32	-	-	rw
J301	Position mode	520		18	0 to 3, see device-docu.	1	U8	-	-	rw
J302	Speed	520		4	0 to 2147483647	User units /s	I32	-	-	rw
J303	Accel	520		8	0 to 2147483647	User units /s²	I32	-	-	rw
J304	Decel	520		12	0 to 2147483647	User units /s²	I32	-	-	rw
J305	Repeat number	520		19	0 to 254	1	U8	-	-	rw
J306	Next block	520		20	0 to 32	1	U8	-	-	rw
J307	Next start	520		21	0 to 4, see device-docu.	1	U8	-	-	rw
J308	Delay	520		16	65535	1 ms	U16	-	-	rw
J310	Position	520		22	-2147483648 to 2147483647	User units	I32	-	-	rw
J311	Position mode	520		40	0 to 3, see device-docu.	1	U8	-	-	rw
J312	Speed	520		26	0 to 2147483647	User units /s	I32	-	-	rw
J313	Accel	520		30	0 to 2147483647	User units /s²	I32	-	-	rw
J314	Decel	520		34	0 to 2147483647	User units /s²	I32	-	-	rw
J315	Repeat number	520		41	0 to 254	1	U8	-	-	rw
J316	Next block	520		42	0 to 32	1	U8	-	-	rw
J317	Next start	520		43	0 to 4, see device-docu.	1	U8	-	-	rw
J318	Delay	520		38	65535	1 ms	U16	-	-	rw
J320	Position	520		44	-2147483648 to 2147483647	User units	I32	-	-	rw
J321	Position mode	520		62	0 to 3, see device-docu.	1	U8	-	-	rw
J322	Speed	520		48	0 to 2147483647	User units /s	I32	-	-	rw
J323	Accel	520		52	0 to 2147483647	User units /s²	I32	-	-	rw
J324	Decel	520		56	0 to 2147483647	User units /s²	I32	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
J325	Repeat number	520		63	0 to 254	1	U8	-	-	rw
J326	Next block	520		64	0 to 32	1	U8	-	-	rw
J327	Next start	520		65	0 to 4, see device-docu.	1	U8	-	-	rw
J328	Delay	520		60	65535	1 ms	U16	-	-	rw
L.. Posi. Command 2										
L10	Brake	514		177	0=inactive, 1=active	1	U8	rw^P	rw	rw
L11	Switch A	522		0	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L12	Switch B	522		1	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L20	Brake	514		178	0=inactive, 1=active	1	U8	rw^P	rw	rw
L21	Switch A	522		2	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L22	Switch B	522		3	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L30	Brake	514		179	0=inactive, 1=active	1	U8	rw^P	rw	rw
L31	Switch A	522		4	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L32	Switch B	522		5	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L40	Brake	514		180	0=inactive, 1=active	1	U8	rw^P	rw	rw
L41	Switch A	522		6	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L42	Switch B	522		7	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L50	Brake	514		181	0=inactive, 1=active	1	U8	rw^P	rw	rw
L51	Switch A	522		8	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L52	Switch B	522		9	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L60	Brake	514		182	0=inactive, 1=active	1	U8	rw^P	rw	rw
L61	Switch A	522		10	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L62	Switch B	522		11	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L70	Brake	514		183	0=inactive, 1=active	1	U8	rw^P	rw	rw
L71	Switch A	522		12	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L72	Switch B	522		13	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L80	Brake	514		184	0=inactive, 1=active	1	U8	rw^P	rw	rw
L81	Switch A	522		14	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L82	Switch B	522		15	0 to 4, see device-docu.	1	U8	rw^P	rw	rw
L90	Brake	514		186	0=inactive, 1=active	1	U8	-	-	rw
L91	Switch A	520		66	0 to 4, see device-docu.	1	U8	-	-	rw
L92	Switch B	520		67	0 to 4, see device-docu.	1	U8	-	-	rw
L100	Brake	514		187	0=inactive, 1=active	1	U8	-	-	rw
L101	Switch A	520		68	0 to 4, see device-docu.	1	U8	-	-	rw
L102	Switch B	520		69	0 to 4, see device-docu.	1	U8	-	-	rw
L110	Brake	514		188	0=inactive, 1=active	1	U8	-	-	rw
L111	Switch A	520		70	0 to 4, see device-docu.	1	U8	-	-	rw
L112	Switch B	520		71	0 to 4, see device-docu.	1	U8	-	-	rw
L120	Brake	514		189	0=inactive, 1=active	1	U8	-	-	rw
L121	Switch A	520		72	0 to 4, see device-docu.	1	U8	-	-	rw
L122	Switch B	520		73	0 to 4, see device-docu.	1	U8	-	-	rw
L130	Brake	514		190	0=inactive, 1=active	1	U8	-	-	rw
L131	Switch A	520		74	0 to 4, see device-docu.	1	U8	-	-	rw
L132	Switch B	520		75	0 to 4, see device-docu.	1	U8	-	-	rw
L140	Brake	514		191	0=inactive, 1=active	1	U8	-	-	rw
L141	Switch A	520		76	0 to 4, see device-docu.	1	U8	-	-	rw
L142	Switch B	520		77	0 to 4, see device-docu.	1	U8	-	-	rw
L150	Brake	514		192	0=inactive, 1=active	1	U8	-	-	rw
L151	Switch A	520		78	0 to 4, see device-docu.	1	U8	-	-	rw
L152	Switch B	520		79	0 to 4, see device-docu.	1	U8	-	-	rw
L160	Brake	514		193	0=inactive, 1=active	1	U8	-	-	rw
L161	Switch A	520		80	0 to 4, see device-docu.	1	U8	-	-	rw
L162	Switch B	520		81	0 to 4, see device-docu.	1	U8	-	-	rw
L170	Brake	514		194	0=inactive, 1=active	1	U8	-	-	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
L171	Switch A	520		82	0 to 4, see device-docu.	1	U8	-	-	rw
L172	Switch B	520		83	0 to 4, see device-docu.	1	U8	-	-	rw
L180	Brake	514		195	0=inactive, 1=active	1	U8	-	-	rw
L181	Switch A	520		84	0 to 4, see device-docu.	1	U8	-	-	rw
L182	Switch B	520		85	0 to 4, see device-docu.	1	U8	-	-	rw
L190	Brake	514		196	0=inactive, 1=active	1	U8	-	-	rw
L191	Switch A	520		86	0 to 4, see device-docu.	1	U8	-	-	rw
L192	Switch B	520		87	0 to 4, see device-docu.	1	U8	-	-	rw
L200	Brake	514		197	0=inactive, 1=active	1	U8	-	-	rw
L201	Switch A	520		88	0 to 4, see device-docu.	1	U8	-	-	rw
L202	Switch B	520		89	0 to 4, see device-docu.	1	U8	-	-	rw
L210	Brake	514		198	0=inactive, 1=active	1	U8	-	-	rw
L211	Switch A	520		90	0 to 4, see device-docu.	1	U8	-	-	rw
L212	Switch B	520		91	0 to 4, see device-docu.	1	U8	-	-	rw
L220	Brake	514		199	0=inactive, 1=active	1	U8	-	-	rw
L221	Switch A	520		92	0 to 4, see device-docu.	1	U8	-	-	rw
L222	Switch B	520		93	0 to 4, see device-docu.	1	U8	-	-	rw
L230	Brake	514		200	0=inactive, 1=active	1	U8	-	-	rw
L231	Switch A	520		94	0 to 4, see device-docu.	1	U8	-	-	rw
L232	Switch B	520		95	0 to 4, see device-docu.	1	U8	-	-	rw
L240	Brake	514		201	0=inactive, 1=active	1	U8	-	-	rw
L241	Switch A	520		96	0 to 4, see device-docu.	1	U8	-	-	rw
L242	Switch B	520		97	0 to 4, see device-docu.	1	U8	-	-	rw
L250	Brake	514		202	0=inactive, 1=active	1	U8	-	-	rw
L251	Switch A	520		98	0 to 4, see device-docu.	1	U8	-	-	rw
L252	Switch B	520		99	0 to 4, see device-docu.	1	U8	-	-	rw
L260	Brake	514		203	0=inactive, 1=active	1	U8	-	-	rw
L261	Switch A	520		100	0 to 4, see device-docu.	1	U8	-	-	rw
L262	Switch B	520		101	0 to 4, see device-docu.	1	U8	-	-	rw
L270	Brake	514		204	0=inactive, 1=active	1	U8	-	-	rw
L271	Switch A	520		102	0 to 4, see device-docu.	1	U8	-	-	rw
L272	Switch B	520		103	0 to 4, see device-docu.	1	U8	-	-	rw
L280	Brake	514		205	0=inactive, 1=active	1	U8	-	-	rw
L281	Switch A	520		104	0 to 4, see device-docu.	1	U8	-	-	rw
L282	Switch B	520		105	0 to 4, see device-docu.	1	U8	-	-	rw
L290	Brake	514		206	0=inactive, 1=active	1	U8	-	-	rw
L291	Switch A	520		106	0 to 4, see device-docu.	1	U8	-	-	rw
L292	Switch B	520		107	0 to 4, see device-docu.	1	U8	-	-	rw
L300	Brake	514		207	0=inactive, 1=active	1	U8	-	-	rw
L301	Switch A	520		108	0 to 4, see device-docu.	1	U8	-	-	rw
L302	Switch B	520		109	0 to 4, see device-docu.	1	U8	-	-	rw
L310	Brake	514		208	0=inactive, 1=active	1	U8	-	-	rw
L311	Switch A	520		110	0 to 4, see device-docu.	1	U8	-	-	rw
L312	Switch B	520		111	0 to 4, see device-docu.	1	U8	-	-	rw
L320	Brake	514		209	0=inactive, 1=active	1	U8	-	-	rw
L321	Switch A	520		112	0 to 4, see device-docu.	1	U8	-	-	rw
L322	Switch B	520		113	0 to 4, see device-docu.	1	U8	-	-	rw
M.. Menu Skip										
M50	F1-jump to	55		94	**A00** to **N44**		U16	rw	rw	rw
M51	F1-lower limit	55		102			I32	rw	rw	rw
M52	F1-upper limit	55		106			I32	rw	rw	rw
M60	F2-jump to	55		96	**A00** to **N44**		U16	rw	rw	rw
M61	F2-lower limit	55		110			I32	rw	rw	rw
M62	F2-upper limit	55		114			I32	rw	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
M70	F3-jump to	55		98	**A00** to **N44**		U16	rw	rw	rw
M71	F3-lower limit	55		118			I32	rw	rw	rw
M72	F3-upper limit	55		122			I32	rw	rw	rw
M80	F4-jump to	55		100	**A00** to **N44**		U16	rw	rw	rw
M81	F4-lower limit	55		126			I32	rw	rw	rw
M82	F4-upper limit	55		130			I32	rw	rw	rw
N.. Posi. Switch										
N10	S1-position	512		96	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
N11	S1-method	512		112	0 to 2, see device-docu.	1	U8	rw^P	rw	rw
N12	S1-memory1	512		116	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N13	S1-memory 2	512		117	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N14	S1-memory 3	512		118	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N20	S2-position	512		100	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
N21	S2-method	512		113	0 to 2, see device-docu.	1	U8	rw^P	rw	rw
N22	S2-memory 1	512		119	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N23	S2-memory 2	512		120	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N24	S2-memory 3	512		121	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N30	S3-position	512		104	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
N31	S3-method	512		114	0 to 2, see device-docu.	1	U8	rw^P	rw	rw
N32	S3-memory 1	512		122	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N33	S3-memory 2	512		123	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N34	S3-memory 3	512		124	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N40	S4-position	512		108	-2147483648 to 2147483647	User units	I32	rw^P	rw	rw
N41	S4-method	512		115	0 to 2, see device-docu.	1	U8	rw^P	rw	rw
N42	S4-memory 1	512		125	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N43	S4-memory 2	512		126	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
N44	S4-memory 3	512		127	0 to 3, see device-docu.	1	U8	rw^P	rw	rw
U.. Protective Functions										
U00	Level low voltage	56		0	2=warning, 3=fault	1	U8	rw^P	rw	rw
U01	Time low voltage	56		1	1 to 10	1 s	U8	rw^P	rw	rw
U02	Level temp. limit dev. i2t	56		2	0=off, 1=message, 2=warning, 3=fault	1	U8	-	-	rw
U03	Time temp. limit dev. i2t	56		3	1 to 120	1 s	U8	-	-	rw
U10	Level temp. limit mot. i2t	57	58	0	0=off, 1=message, 2= warning	1	U8	rw	rw	rw
U11	Time temp. limit mot. i2t	57	58	1	1 to 120	1 s	U8	rw	rw	rw
U20	Level drive overload	57	58	2	0=off, 1=message, 2= warning, 3=fault	1	U8	rw	rw	rw
U21	Time drive overload	57	58	3	1 to 120	1 s	U8	rw	rw	rw
U22	Text drive overload	57	58	4	ANSI-String	1	STR17	rw	rw	rw
U30	Level accelerat. overload	57	58	21	0=off, 1=message, 2=warning, 3=fault	1	U8	rw	rw	rw
U31	Time accelerat. overload	57	58	22	1 to 10	1 s	U8	rw	rw	rw
U32	Text accelerat. overload	57	58	23	ANSI-String	1	STR17	rw	rw	rw
U40	Level break overload	57	58	40	0=off, 1=message, 2=warning, 3=fault	1	U8	rw	rw	rw
U41	Time break overload	57	58	41	1 to 10	1 s	U8	rw	rw	rw
U42	Text break overload	57	58	42	ANSI-String	1	STR17	rw	rw	rw
U50	Level operating range	57	58	59	0=off, 1=message, 2=warning, 3=fault	1	U8	rw	rw	rw
U51	Time operating range	57	58	60	1 to 120	1 s	U8	rw	rw	rw
U52	Text operating range	57	58	61	ANSI-String	1	STR17	rw	rw	rw
U60	Level following error	57	58	80	0=off, 1=message, 2=warning, 3=fault	1	U8	rw	rw	rw
U61	Time following error	57	58	78	0 to 32767	4 ms	I16	rw	rw	rw
U70	Level posi. refused	57	58	81	0=off, 1=message, 2=warning, 3=fault	1	U8	rw	rw	rw

Par.	Par.-name	Block No. 1	Block No. 2	Block-address	Comment / value range	Resolution / Measure unit	Data type	FAS	FDS	SDS
X..										
X998	InitUndervoltProtDriver	13		8	0=inactive, 1=active	1	U8	rw	rw	rw
X999	Action result	33		66	0=no error, >= 1 error	1	U8	r	r	r
Z.. Fault Counter										
Z31	Short circuit/to ground	346		0	0 to 65535	1	U16	r	r	r
Z32	Short circuit/to ground int.	346		2	0 to 65535	1	U16	r	r	r
Z33	Overcurrent	346		4	0 to 65535	1	U16	r	r	r
Z34	Hardware fault	346		6	0 to 65535	1	U16	r	r	r
Z35	Watchdog	346		8	0 to 65535	1	U16	r	r	r
Z36	High voltage	346		10	0 to 65535	1	U16	r	r	r
Z37	n-feedback	346		12	0 to 65535	1	U16	r	r	r
Z38	Temp. limit device sensor	346		14	0 to 65535	1	U16	r	r	r
Z39	Temp. limit device i2t	346		16	0 to 65535	1	U16	r	r	r
Z40	Invalid data	346		18	0 to 65535	1	U16	r	r	r
Z41	Temp. limit motor TMP	346		20	0 to 65535	1	U16	r	r	r
Z42	Temp. limit motor resist.	346		22	0 to 65535	1	U16	r	r	r
Z43	Line break reference value	346		24	0 to 65535	1	U16	r	r	r
Z44	extern fault	346		26	0 to 65535	1	U16	r	r	r
Z45	Temp. limit motor i2t	346		28	0 to 65535	1	U16	r	r	r
Z46	Low voltage	346		30	0 to 65535	1	U16	r	r	r
Z47	Drive overload	346		32	0 to 65535	1	U16	r	r	r
Z48	Acceleration overload	346		34	0 to 65535	1	U16	r	r	r
Z49	Deceleration overload	346		34	0 to 65535	1	U16	r	r	r
Z50	Operating range	346		38	0 to 65535	1	U16	r	r	r
Z51	Posi. refused	346		40	0 to 65535	1	U16	r	r	r
Z52	Communication	346		42	0 to 65535	1	U16	r	r	r
Z53	Stop input	346		44	0 to 65535	1	U16	r	r	r
Z54	Following error	346		46	0 to 65535	1	U16	r	r	r
Z55	Option-board	346		48	0 to 65535	1	U16	r	r	r
Z56	Overspeed	346		48	0 to 65535	1	U16	-	-	r

14 USING THE WIN32 API FUNCTIONS

Introduction

This chapter describes the Win32 API which you will need to run serial communication with FAS/FDS via USS in the programming language C/C++. For details on the functions and parameters, see “Win32-SDK.”

Alternatives

Communication does not absolutely have to be directly based on these API functions. Of course, it can also be handled by other products which offer binary transmission. An example which is often used with Visual Basic is “MS Comm Control” – an ActiveX which is supplied with Visual Basic, for instance.

Opening the interface

The interface is opened for serial communication with the function *CreateFile*. The call below opens the first serial interface for read and writing access and returns a Windows *HANDLE* which must be used as the first parameter for all subsequent functions. See also Win32-SDK.

```
HANDLE handle = CreateFile („COM1“, GENERIC_READ/GENERIC_WRITE, 0, NULL, OPEN_EXISTING, ...);
```

Configuring the interface

GetCommTimeouts / SetCommTimeouts: These functions can be used to specify the timeout behaviors of the read and write accesses. For details, see Win32-SDK.
GetCommState / SetCommState: These functions are used to assign the characteristics of the interface (parity, baud rate, and so on). Cf. Win32-SDK.
SetupComm: This function specifies the size of the internal PC input or output memory.

Read and write accessing the interface

After the interface has been opened, *WriteFile* can be used to write to the interface while *ReadFile* can be used to read access the interface. With the call of BOOL bErg = WriteFile (handle, buffer, bytestowrite, &byteswritten, NULL); *bytestowrite* number of bytes are written from *buffer* to the interface specified by *handle* (e.g., COM1). The parameter *byteswritten* is used to check how many bytes have actually been written (see also Win32-SDK). The contents of *buffer* must be structured as described in the above documentation. The *ReadFile* function is used to read the response of the inverter from the interface.
BOOL bErg = ReadFile (handle, buffer, bytestored, &bytesread, NULL);

This call attempts to read *bytestored* number of bytes from the interface and write them to *buffer*. *Bytesread* then specifies how many bytes were actually written. (With USS, two bytes can be read first (STX and LGE) so that the remaining length specified in LGE can be read.)

Other functions

ClearCommError: Permits any errors on the interface to be acknowledged and the status of the interface to be polled. It can also be used to determine how many bytes are ready to be fetched from internal memory and can be read out.
PurgeComm: This function is used to clear internal memory and to terminate queued read and write procedures.
FlushFileBuffers: This function causes Windows to write the entire internal output memory to the interface.

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