CDA3000 Inverter Drive System

Software Update Service, Date: 14.09.2005

Introduction

As part of our product maintenance process, we are continuously extending the firmware of the drive system. This Software Update Service is intended to provide you with information on new releases and improvements of the various software versions.

Author: Lust Antriebstechnik GmbH (GF2)

File: cda_basis_en_homepage .doc

Table of Contents:

1 Version 2.15

Changes compared with version: V 2.10-02	CS (XOR): 168B

1.1 New Functions

No.	Function	For further informations see Application Manual
1	For further improvement of the safety operation of power stages a new protection feature is included: Before the device is in condition “READY”, the motor connection is proved to short circuit of the wiring.	
2	For the scope function of the DRIVEMANAGER two new parameters are created, the actual frequency and the actual speed. Thus, a peak, caused of magnetization, is not shown.	

1.2 Changes

No.	Change	For further informations see Application Manual
1	The reference for the analog output with the setting ACTN resp. AACTN is not fixed with 3000 rpm. It is calculated: FMAXx*number of pole pairs/60	See chapter 5.2.2
2	The reference for the analog output with the setting ACTF resp. AACTF was always FMAX1. Now the reference is FMAX1 or FMAX2, depending on the characteristic of the data set.	See chapter 5.2.2

1.3 Improvements

No.	Improvements
1	Setting the **minimal frequency** with the parameters 301-FMIN1 or 302-FMIN2 and increasing of the reference value with the **motor operated potentiometer**, caused a time delay of the frequency increase.
2	The display of the **active current** on the **analog output** OSA00 did not work correct by using low loaded motors in connection with a high output frequency.
3	After parameter setting at limit switch – range (LOW signal at control terminal with function **limit switch evaluation**) the inverter could not be controlled.
4	The limit switch evaluation did not work correct during power off, if the limit switch is activated.
5	Correct work of the **scale function** only after a reset of the line. The current limiting value of the current controller on the analog input can set by the scale function.
6	The setting WFDIG for all analog outputs was without function.
7	During bus operation the function **manual-automatic switch over** the reference input via analog input was defect.
8	The output signal "**reference reached**" did not work in connection with MOP-function.
9	Switching in the **motor cable** with activated power stage caused failure E-OC by starting again.
10	The communication module **CM-CAN1** affected during "power on" the inverter module and after an error of the unit the CAN-data line was reseted, so no communication took place.
11	A digital output with the function "**motor holding brake**" reacted only in positive direction to the switching threshold. No evaluation of the parameter 311-FBCCW.
12	The switch-over of the **characteristic data set** over ISD03 did not work.
13	The response time of the MOP-function depended on the adjusted acceleration ramp.
14	If a data set was load with activated "**field bus module**", although no module was connected, the CDA3000 could not controlled via field bus after connecting the bus module.
15	If the **motor torque** directed on the **analog output** (FOSA0 = ACTT), there was no output of the torque (always 0V) with a reference value 204-TSCL < 9 Nm or 202-OAMX0< 90%.
16	Often the **KEYPAD** did not work in case of failure, after causing a failure with the reaction "RESET". Then the KP200 showed continuously the last error, also when the CDA3000 was not longer in the failure condition.
17	The **fault messages** were not saved in the fault memory, if the error response = reset was set or the error was reset by means digital input (Fixxx=RESET).
18	If a **new firmware** was updated, the error E-PAR8 could occur.
19	A data set including parameters 185-F0NN1 or 184-F0NX1 (**norming analog inputs**) or smaller values could not be load.
20	The **hour counters** 87-TOP and 413-ACTOP were not saved, if a reset (because of error reaction or digital input) occured.
21	The function **DC-braking** did not work, if during **bus operation** the start signal was set to zero.

Important!
With the "Sensorless Flux Control (SFC)" motor control method no lifting drives or applications with regenerative load torque[1)] may be operated with the V2.15

2 Version 3.00

Changes compared with version:	V 2.15-00	CS (XOR):	F1C7

2.1 New Functions

No.	Function	For further notes see application manual:
1	For motor control mode VFC the software function „synchronisation“ is included, now. The parameters of the new function will be set automatically via the self-adjustment. The function can be switched on/off by means of the parameter 630-FSSEL.	
2	From this version the new user subject area is available for customers applications. Adjustment by means of the DRIVEMANAGER 3.0 (Beta 2).	
3	The software function “SOWA-warning message” is extended with “warning threshold torque” as well as parameter “switch-on delay for warning threshold torque”. Functions selectors of the digital outputs (240-FOS00, 241-FOS01, 242-FOS02, 243-FOE00, 244-FOE01, 245-FOE02, 246-FOE03) is extended with warning message “WTQ” (warning message torque). The new warning message is signalised by means of the Hex-value 0400A in the status word warning message (parameter 120-WRN).	
4	The digital inputs ISD02 and ISD03 are extended by the functions “start clockwise” and “start counter-clockwise”. The parameters can be set in this function.	
5	The subject area “actual value” is extended with the parameter **420-OSA00 filtered output voltage** (terminal X2/5).	
6	A new firmware loader is included, so that Baudrates up to 115 k are possible.	
7	A voltage control for the new Trench-IBGT-modules for CDA34.008, X1.3 and CDA34.014, X1.4 are included.	
8	The subject area 38Tx-device capacity utilisation is extended with the parameters for medium stationary device capacity. Additionally the function “max. power during stationary operation, referring to rated current of the device”, parameter 382-CSTMX, is suited. The top value can only be calculated during stationary operation and not during the phases DC-braking or DC-holding.	

Achtung!
SmartCards, produced with CDA3000 firmware and higher, cannot be transfered to a firmeware smaller V3.00-00. In this case the SmartCard must be made always with firmware version V2.15-00, because this SmartCard version is compatible up- and downwards.

2.2 Changes

No.	Changes
1	The signal „Hardware release“ (ENPO) is available as scope variable from this version.
2	The parameters: -642-CLFL1: CDS 1: current controlled start-up sinking frequency -643-CLFR1: CDS 1: current controlled start-up using frequency -647-CLFL1: CDS 2: current controlled start-up sinking frequency -648-CLFR2: CDS 2: current controlled start-up using frequency of the subject area “64CA-current controlled acceleration” keep the attribute motor parameter and avoid an overwriting of the application data sets (ADS) during change-over.

2.3 Improvements

No.	Improvements
1	The threshold for wire breakage detecting parameter S29-R-WBK, will be set from 3,5 mA to 3 mA.
2	The possibility of configuration of the “analog output” (OSA00) is given from this version, for the negative range of value (negative taper), as well.

3 Version 3.00-02

Changes compared with version:	**V 3.00-00**	**CS (XOR):**	**3B9D**

3.1 New Functions

none

3.2 Changes

none

3.3 Improvements

No.	Improvements
1	At the first commissioning resp. self-adjustment of motors — 22kW error message "E-PL S20" appeared.
2	When resetting to factory setting (4-PROG=850) error message "E-OLM" appeared.

4 Version 3.00-03

Changes compared with version:	**V 3.00-02**	**CS (XOR):**	**D0FD**

4.1 New Functions

none

4.2 Changes

none

4.3 Improvements

No.	Improvements
1	When operating the inverter with control mode "FOR" with the following settings: • Direction of rotation left via STL or negative reference • Acceleration ramps (ACCRx = 0Hz/s) • Deceleration ramps (DECRx = 0Hz/s) to value "0Hz/s" a not wanted direction of rotation step appeared when taking away the e.g. start contact STL (STPRx = >0Hz/s)

5 Version 3.20-00

Changes compared with version:	V 3.00-03	CS (XOR):	9FAE

5.1 New Functions

No.	Function
1	The following four (4) new preset drive solutions are included: • ROT_5: process controller with analog speed input • ROT_6: analog speed input with switchover to fixed frequencies (VF1000-compatible functionality) • BUS_4: control via fieldbus in operation mode “FOR” • BUS_5: control via fieldbus in operation mode “FOR” and additional emergency operation
2	The software function _82-“process controller” is included. The single functions are: - actual value input via analog input ISA01 - free selectable references - monitoring of max. control deviation - switchover to fixed frequencies
3	Software function _73AP”antipendelum” is included. The function is for minimizing the swinging inclination of motors with low acting damper cage
4	In subject area _60TB “driving sets” the new function “ramp selection for fixed frequencies” is included. From this version the setting of the smoothing time (sin²-from ramp) acts on the driving sets too.
5	In subject area _31MB”motor holding brake” the functionality BRK2 has been changed, now a optimum lifting function is available.
6	In subject area _24OD “digital outputs” the function “switch motor protector” is included now
7	In subject area _30OL “frequency limitation” the function “rotation direction lock” is included
8	The function “reference reached” (REF) and “standstill of motor” (ROT_0) of digital outputs in the control mode “FOR” are derived from the actual value now
9	Additional monitoring “max. frequency deviation at FOR-mode” (tracking-error) is included.

Please note: The detailed explanation of the new functions are shown in the application manual Id-no. 0840.02B.4-00 (Status: February 2002)

5.2 Changes

No.	Changes
1	The maximum allowed output frequency of the power stage is limited: • CDA32.004 up to CDA34.032 to 0 ... 400 Hz • CDA 34.045 up to CDA34.170 to 0 ... 200 Hz
2	Function DC-holding-on is deactivated in factory settings. Parameter 682-HODCT is set to zero (0).

5.3 Improvements

6 Version 3.30-01

Changes compared with version:	V 3.20-00	CS (XOR):	73BF

6.1 New Functions

No.:	Function
1	Implementation of error message E-CPU39. By loading the firmware >V3.2 in the hardware of the inverter module in HF-execution the error message E-CPU39 is signalised.
2	_82-process controller 820-PRCT1 and 821-PRCT2 have been enlarged by the function ON1 and ON2. ON1 = After switching-over to the process controller it runs up from zero. ON2 = After switching-over to the process controller it will be set directly to the actual manipulated variable ref6 (output ramp generator)
3	The indication of the numbers in PARA-menu of KP200 is improved, if the result is not loss of data, it will indicate 0 in exponents. Indication of actual values in VAL-menu obtains an enforced exponent-0, also if there is a probable loss of accuracy.

6.2 Changes

No.	Changes
1	Factory setting ROT5 is adjusted according to the documentation. 212-FIS02 from OFF to CUSEL 213-FIS03 from CUSEL to SADD1 214-FIE00 from SADD1 to OFF 822-PRG1 from 0 to 0,108994 823-PRTL1 from 0 to 0,108994 Reaction at reference 0; from motor powered to OFF.
2	Factory setting ROT6 is adjusted according the documentation. 240-FOS00 from BRK1 to REF 241-FOS01 from REF to TOR_0 Current limit value CDSx from 100% to 125%.
3	Factory setting for the user-defined subject area _11UA (only available via KP100) of the parameters has been changed according to the operation manual Id.-no. 0840.00.B.3-00. For description of parameters see chapter 4.9 “Parameter list”. Please note, that no actual values will be indicated in this subject area: The parameter 95-ERR1 is not included in this subject area.
4	Factory setting BUS4 is adjusted according to the documentation. 200 ~ FOSAO from AACT to OFF
5	76CI-Stromeinprägung 766-CITM1 and 768-CITM2 can be changed in operating level 3.
6	Changing of 166-UDSSL Preset DRV_3: UDSSL=TERM DRV_4: UDSSL=TERM DRV_5: UDSSL=TERM DRV_1: UDSSL=TERM

6.3 Improvements

No.	Improvement
1	Internal resolution of parameter 297_RF1FA is improved

7 Version 3.40-00

Changes compared with version:	V 3.30-01	CS (XOR):	61CD

7.1 New Functions

No.:	Function:
1	Implementation PWM-DC-part control. In subject area _86Y-system the parameter 889-DCGN, gain of DC-control is implemented. Change of the parameter is only possible in operating level 5.
2	The software supports the new inverter module CDA34.250,Wx.x (110/132 kW) as well.
3	Extension of the subject area _65CS-characteristic line switch-over. The adjustment 651-CDSSL was extended by

BUS	KP/DM	Function
7	FIABS	Switch-over by exceeding theabsolute value in parameter FILIM. *CDS2, if frequency > value FILIM, otherwise CDS1

7.2 Changes

No.:	Changes:
1	**Improvement of the ramp setting for driving profile generator and driving sets** The application manual shows, that the ramp pair is deactivated, when one of both ramps (e.g. ACCRx or DECRx) is set to zero (0). These definition causes application errors several times, due to this the following change has been made: Change: • If a ramp of a ramp pair is set to zero (0), the firmware of the other ramp pair will be set to zero (0) automatically. Zero means, deactivating of the ramp resp. ramp pair and so max. acceleration resp. reference jump. • If both ramps of a pair are set to zero (0) and then one of the both ramps is set to >0 cycles, the firmware will set the appropriate ramp pair to >0 cycles automatically. Note: The stop ramps are excluded from the new process.

7.3 Improvements

No.:	Improvement:
1	**Improvement of UDS-switch-over** From this software version the switch-over from USD-1 to USD-2 performed correctly. Direct at the first starting signal after the UDS-switch-over the content of the new data set and the motor potentiometer function too, are accepted resp. performed.

Please note: Data sets of version 3.40-00 cannot be loaded in other firmware-versions. Please do use only firmware >V3.40-00.

8 Version 3.50-01

Changes compared with version:	V 3.40-01	CS (XOR):	39C4

8.1 New Functions

No.	Function
1	In order to reduce the vibration gradient of a mechanism with large elasticity and/or lots during acceleration resp. deceleration process the control structure of the I*R-load compensation has been extended. Additionally we have included controller setting “ON_2”. This new function guarantees that the I*R-load compensation is only activated in stationary operation, in order to avoid the appropriate application of mechanism with large elasticity.

Parameter	Function	Value range	WE	R	W
740-I*R1 740-I*R2	I*R-Load compensation ON/OFF	OFF: Switch-off ON: Switch-on ON_2: Switch-on in stationary operation	ON_2	3	3
755-I*RTV	Switch-off time constant I*R-compensation	0.005 ... 20s	0.01s	3	3
744-I*RTF	Filter time constant for I*R-load compensation	0.005 ... 20 s	0,3s	3	3

No.	Function
2	Sometimes identification of special motors or main spindle motors of >20 kW can cause a wrong calculation of the Lh-characteristic line. Often the failure occurs if the requested rated speed of the drive will not be reached. Remedy: increasing of parameter MOLMF until the motor runs approx. 5% higher than the rated speed.

Parameter	Function	Value range	WE	Unit
454- MOLMF	correction factor main inductifity (Lh-characteristic line)	0 ... 999,95	100	%

8.2 Changes

No.	Changes:
1	Automatic setting of parameter 597_RFO (Driving profile generator) at activating the process controller. Parameter will be set automatically at activating the process controller to 597_RFO=0Hz , so that the process controller can work unobjectionable.

8.3 Improvements

No.	Improvements:
1	The value range resp. factory setting of the following parameters has been extended, in order to support operation with special motors. MOL_S, MOR_S, MOR_R, MOMCO, SCG1, SCG2
2	The following parameters were not saved from version V3.25,at „Power-OFF“ (mains off) .

Parameter	Offset Motorpoti	Error
87_TOP 413_ACTOP 165_UDSAC 165_UDSWAR 166_UDSSL	380-CACMX 381_CDCMX 382_CSTMX	95_ERR! 96_ERR2 97_ERR3 98_ERR4

3	The settings of the parameters 640/645-CLSLx from CCWFS to CCWFR in all pre-set solutions are changed.
4	Softare function “Control of PWM-dc-current” is improved. Left rotating field caused EOC-switching off, however not from this version on.

9 Version 3.50-03

Changes compared with version:	**V 3.50-01**	**CS (XOR):**	**FC9F**

9.1 New Functions

none

9.2 Changes

No.	Changes
1	Adjustment of factory setting for digital output “OSD02” (ready to operate). Factory setting/pre-setting has been changed from S_RDY[26] (initialised device) to C_RDY[27] (device ready to operate).

9.3 Improvements

No.	Improvements
1	The power stage hardware detection is switched-off.

10 Version 3.60-01

Changes compared with version: V 3.50.03	CS (XOR): 5689

10.1 New Functions

No.:	Function
1	**_33MO_Motorschutz** In subject area „_33MO_Motor Protection“ the adjusting range of the parameters „330-MOPTC“ has been extended by the function PTC1(4). Function PTC1: Evaluation of threshold value PTC without short-circuit recognition.

10.2 Changes

No.:	Changes
1	PWM-calculating time at power stage switching frequency 16 kHz has been reduced to 8 kHz.

10.3 Improvements

No.:	Improvements
1	Parameter setting range of 801-CCTLG adapted to 0,001 ... 100, WE=0,0036s
2	In subject area „_21-Digital inputs“ setting E-EXT(7) „External error of other device“ and /E-Ex(35) „External error of other device (Low active)“ has been improved. This function is guaranteed now directly prior to “NET ON“ on, as well.
3	Parameter factory setting 754_KSCTF is adapted from 0,01s to 0,1s. This changing effects only to the device itself.
4	The control function “anti-pendulum“ will be activated in the factory setting. The gain of the control function will be set to -1300. Gain value can be set is not scaled, typical adjusting range is “-500 up to -4000“. **Application note:** The control function attenuates the swinging behaviour of whipping rotor shafts. This swinging behaviours occurs mostly at motors with high power (from 15 kW), typical whipping rotor speed is the half of the rated speed. Additional effect of the control function is the attenuation at acceleration processes with mechanics, show high and or loose elasticity.

5	Factory setting of “limited frequency of current injection” are raised to 5 Hz at all inverter modules. **To guarantee a running without problems of motors from 15 kW the factory setting for inverter modules from CDA34.012 has been improved. The following improvements have been made:** 1. The smoothing function in the “driving profile generator” is activated. Smoothing time (JTIME) is 200 ms. 2. 2. Activation of the software function “magnetization“. The magnetizing current ist 50% (MPCNx) and the magnetizing time is 1s (MPTx). 3. “Reference of current injection ACC/DEC“ (CICNx) will be reduced from 120% to 100%. 4. „Functions selector current injection“ (CISEL) will be set from 0 to 1. Current injection and switching-over are active during the acceleration and stationary operation. Current injection is not active at deceleration. **Special-factory setting for CDA34.250 (132 kW)** 1. „Reference of current injection ACC/DEC“ (CICNx) will be reduced from 120% to 95%. 2. „Limited value of current-controlled start-up“ will be reduced from 125 % to 110 %. **Application note:** Input frequency of “Current-controlled start-up” is 6 Hz (WE), means that the control function is active from 6 Hz on. In order to guarantee a starting without problems with the factory setting , acceleration and deceleration ramps will be reduced automatically to 25% of the set value below the initial frequency of 6 Hz.. When is a reducing of required (initial frequency = 6 Hz)? At applications with high elasticity/loose or dynamic reserving processes. When is a reducing not required (initial frequency = 0 Hz)? At applications with slow acceleration and reversing processes.
6	The function „current injection“ has been extended upon customers request. Via parameter 759 CISEL (function selector current injection) different function processes can be selected. New parameter: 759 CISEL Factory setting: CIAD (0) Value range: CIAD, CIACC, CISTA **759 CISEL = CIAD (0)** „Active at acceleration, delay and stationary operation“ Standard current injection and switching-over active, no changing compared with firmware < V3.60-01. **759 CISEL = CIACC (1) „**Active at acceleration and stationary operation“ Current injection and switching-over are active during acceleration and stationary operation. Current injection is during delay not active. **759 CISEL = CISTA (2) „**One-time active after transit stop to start“. Current injection and switching-over will be not be active if leaving after transit “Stop to Start” the range only one time.
7	Factory setting of „current injection“ resp. the function: „Switch-over reference to“ are changed. • „Switch-over reference to“ resp. parameter CICTx are increased from 30% to 50%. • Switch-over „after“ resp. the parameter CICTMx are increased from 6s to 20s.
8	In subject area „IxR load compensation“ the switching-off time delay has been changed from 0,01 s to 0,3 s.

11 Version 3.70-00

Changes compared with version: V 3.60.01	CS (XOR): 5689

11.1 New functions

No.	Function
1	**Reference guided standstill in case of error.** In subject area „_51ER-Fault signals“ the error reaction has been extended by the setting RAMP(4) „Quick stop, LOCK“ at some reaction parameters. Ramp of the error reaction has been adapted for the drive via parameter 547-ESTPR „Ramp during error reaction“. Error reaction “RAMP” can be set at the following error: • 510 R-SIO • 516 R-OTM • 519 R-OLM • 524 R-EXT • 525 R-USR • 526 R-OP1 • 527 R-OP2 • 529 R-WBK • 533 R-FDG • 534 R-LSW • 535 R-PRC • 536 R-FLW
2	Function of digital outputs has been extended by the message **MPTF(38) „Magnetization completed“.**
3	Function of the digital inputs has been extended by the function /**HALT(36) „Frequency reference=0Hz“**. Mostly this function is used for selecting the standstill torque for motor control mode FOR. **State ISDxx** / **Function** Low: Frequency reference 0Hz (FOR: Standstill torque) High: Frequency reference released (moves to the actual reference)

11.2 Changes

none

11.3 Improvements

No.	Improvements
1	**Up-synchronisation** Factory setting of the function up-synchronisation is improved. Filter time of current (637-FSTF) is increased to 50ms. Furthermore the optimisation of the control function via motor-identification is possible now. **Application note:** If the drive motor is smaller than one or more power ratings, an adaptation of the control function via motor identification is necessary.
2	**66MS-Master/Slave operation** Factory setting of parameter 838-MSECT (Error triggering time in case of failure of reference master) is increased by 10s.

3	**DC-link voltage** Calculation of DC-link voltage is improved.
4	**Speed controller in motor control mode FOR** Setting of gain of the speed controller at frequency zero (818-SCGF0) is active again from version 3.70-00.
5	**BRK2 in motor control mode FOR** Control function “motor holding brake BRK2” is extended by setting the hysteresis (315-SSHYS) 0Hz.
6	**Motor identification** A motor identification is not possible when setting cos φ (159-MOCOS) to zero.

If you detect errors in the device software, please contact the LUST Service Centre. You can get information and assistance under the following phone number: 06441/966-136; fax: -211.

You can reach us:

Mon.-Thur.: 8 a.m. - 5 p.m.

Fri.: 8 a.m. - 4 p.m.

e-mail: service@lust-tec.de

LUST ANTRIEBSTECHNIK

Lust Antriebstechnik GmbH
Gewerbestrasse 5-9 • D-35631 Lahnau
Tel. +49 (0) 64 41 / 9 66 -0 • Fax +49 (0) 64 41 / 9 66 –137
Internet: http://www.lust-tec.de • e-mail: lust@lust-tec.de