ECODRIVE
DKC01.1/DKC11.1 Drive Controllers

Version Notes: ASE 04VRS

DOK-ECODRV-ASE-04VRS**-FVN1-EN-P

275272

Indramat

Title	ECODRIVE DKC01.1/DKC11.1 Drive Controllers
Type of documentation	Version Notes FWA-ECODRV-ASE-04VRS-MS
Document code	DOK-ECODRV-ASE-04VRS**-FVN1-EN-P

Internal file reference

- Mappe 56-04V-EN / Register 10
- Drawing number 209-0073-4334-01
- Based on: 04V10

What is the purpose of this documentation?

The following documentation is a complement to the function description DOC-ECODRV-ASE-04VRS**-FKB1-EN-P

It describes the differences between ECODRIVE version 04VRS and the previous ECODRIVE version 02VRS.

Editing sequence

Firmware Status	Release date	Comments
DOK-ECODRV-ASE-04VRS**-FVN1-DE-P	01.97	02VRS - 04VRS

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Validity

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Published by

Contents

Notes

1 General Information

1.1 Product Family

The product release description refers to the product family:

> **ECODRIVE**
> DKC01.1 / DKC11.1
> FWA-ECODRV-ASE-04VRS-MS

The following drive controllers can be operated with this software:

- DKC 01.1
- DKC 11.1

1.2 EPROM Type

The following EPROM type is released for this use:

EPROM IC2:

Manufacturer	Product label
AMD	AM27C2048-90DC
Thomson	M27C4002-80XFI

Fig. 1-1: EPROM IC2:

1.3 Documentation

The documentation for the product **FWA-ECODRV-ASE-04VRS-MS** is available as follows:

- in hardcopy, i.e., paper form, and as a
- Windows help system

The following table contains a summary of the items available.

POS	Type	Document style	Register in Mappe 56-04V	Material number	Drawing number
1	DOK-ECODRV-ASE-04VRS**-56M1-EN-P	Mappe 56-04V-EN Paper	--	275269	209-0073-4331-01
2	DOK-ECODRV-ASE-04VRS**-FKB1-EN-P	Functional Description Paper	3	275270	209-0073-4332-01
3	DOK-ECODRV-DKC01/11.1*-PRJ1-EN-P	Project Planning Manual - paper	7	270950	209-0069-4390-02
4	DOK-ECODRV-ASE-04VRS**-WAR1-EN-P	Trouble Shooting Guidelines	9	275271	209-0073-4333-01
5	DOK-ECODRV-ASE-04VRS**-FVN1-EN-P	Version Notes	10	275272	209-0073-4334-01
6	DOK-ECODRV-ASE-04VRS**-56M1-EN-H1,44	Help System for Windows3.1 Disk	12	275268	209-0073-4331-01

Fig. 1-2: Documentation for FWA-ECODRV-ASE-04VRS-MS

1.4 Tips for Product Exchange

Before you exchange the product, please observe the following points:

0. The drive controller is on.

1. Secure current parameters.

2. Switch drive controller off.

3. Remove all drive controller connections.

4. Remove unit from control cabinet (two screws).

5. Relese mounting bolds of housing lid (4 screws + grounding bolts on front) and remove the lid.

6. Pull EPROM out (on top, 40p., with sticker) use appropriate lifting devices.

7. Use EPROM with new firmware there. Note:
   ☞ that the orientation is correct, the notch on the EPROM must agree with that on the base.
   ☞ Do not bend the legs. They must all be inserted in the base.

8. Replace housing lid and tighten the screws.

9. Remount the unit back into the control cabinet.

10. 24V control voltage must be switched. If the number of parameters that require backing up has changed, this will appear as „PL" in the display. If key S1 is now pressed, then all parameters are reset to their default values. During this duration, „C8 Default parameter load" appears in the display.

11. If command „C8 load default parameters" was started or there is a different motor type, then this appears during transition from phase 3 to 4 in display as „UL". Key S1 must now be pressed or the command clear error started. The controller default values are then loaded out of the motor feedback into the drive control.

12. Restart DriveTop. Load desired parameter file.

2   Version Notes FWA-ECODRV-ASE-04VRS-MS

2.1   Tips for Release

The software version **FWA-ECODRV-ASE-04V10** represents the first official edition of version 04.

Release Date is 28.04.1997

The following drive controllers can be operated with this firmware.

- DKC01.1-040-7
- DKC11.1-040-7
- DKC01.1-030-3

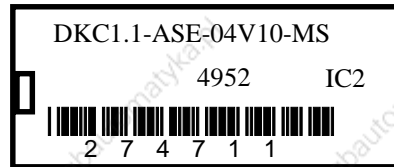**Note:**   DriveTop version SWA-DTOP**-INB-04VRS-MS-C1,44 is needed to operate ECODRIVES with drive firmware version FWA-ECODRV-ASE-04V10.

2.2   EPROM Labelling

EPROM IC2:

```
┌─────────────────────────────────┐
│   DKC1.1-ASE-04V10-MS           │
│          4952        IC2        │
│ ▌█▌██▌█ ███ ██▌ █▌██ ██▌ █      │
│        2  7  4  7  1  1         │
└─────────────────────────────────┘
```

2.3   New Functions

Command: - Automatic control loop setting

In the automatic control loop setting, both speed and position control loop are fully automatically parametrized.

This implements the new command "**D900 Automatic control loop setting**" in the drive.

In conjunction with DriveTop, the command "D9 Automatic control loop setting" in DriveTop dialog "Parameter/automatic control loop setting" is started.

The user can now influence, via the socalled damping factor, the resulting control loop dynamics. This means no further control-technical knowledge is needed that for setting the control loop.

In addition, at the end of the control loop setting, the determined moment of inertia and the maximum parametrizable acceleration is displayed and stored in a parameter.

Note: The axis must be moved to optimize the control loop!

Operating mode: - electronic gear functions

Speed synchronization

The drive runs speed-synchronously to a master axis encoder.

The ratio of master axis encoder to following drive can be parametrized.

A drive with incremental encoder emulation can also be used as master axis encoder. This means that two axes can run synchronously.

Angle synchronization

In angle synchronization mode, the drive runs with position control. The master axis position is transmitted with the ratio of the electronic gears to the drive.

A drive with incremental encoder emulation can also be used as a master axis encoder. This means that two axes can run angle synchronously.

Following block mode

In this mode it is possible to activate several **Positioning blocks (max. 64)** sequentially and without any interrupt.

In other words, the next process block is automatically selected (in rising order (e.g., block 0 → block1 → block 2 → ....)

There are four operating modes:

Acceleration at target position (Mode 1)

The drive takes position at target position **n**, which is in **current** process block **n**. As soon as this **target position is exceeded,** the drive goes to the **next** traversing block **n+1**.

Accerlation in front of the target position (Mode 2)

The drive positions at target position X_n, which is in the **current** process block **n**. Using acceleration a_n there is acceleration, in a timely manner, to the **next** positioning speed v_{n+1} so that this speed v_{n+1} is achieved at the target position X_n,.

The changeover to the next process block here as well does not occur until the target position has been passed.

Changeover with cam (external switching signal)

The drive goes to the **next traversing block** n+1 as soon as the input for the **Following block cam** 1 goes to **0->1.** If the target position is not reached, then the next process block is switched to during the course of the traversing action.

Changeover with interim halt

Switching when passing the target position with interim halt is another operating mode.

In this case, the target position of the drive is decelerated to 0 and then accelerated to the new positioning speed.

Relative process blocks with and without residual distance storage

With residual distance storage

The residual distance is stored in relative traversing blocks. In other words, the block which was interrupted is completed when restarted.

The **Chain dimension reference** in other words also is retained if the cause for the interruption was a voltage failure (the supply voltage).

Without residual distance storage

An interrupt with restart means that the residual distance is lost.

This means that the relative position block is rerun in its entirety from the actual position.

The chain dimension reference is lost if the relative block is interrupted. .

If the relative block, however, is completed (IN-POS message active), then this chain is retained.

Acknowledge block selection

The last assumed process block is secured, with a power off, in parameter **P-0-4052 last process block.** This means that, after switching power voltage back on, the previously accepted process block is generated.

If absolute encoders are used, it is possible to decide, after switching the control voltage on and off, whether the axis is in position or not (INPOS).

Select block via serial interface

In addition to select via digital interface, a block can also now be selected via a serial interface.

Processing with reduced speed

By influencing a bit in **Function parameter P-4027 (bit 6 =1)** it is possible to switch from any processing speed to a new, parametrizable, reduced speed. It is defined via parameter **S-0-259 max. positioning speed**.

If the original speed is already smaller than the value in P-0-0259, then the original speed is retained.

Otherwise, speed is limited to maximum positioning speed.

5 Languages

All parameters and diagnoses in the drive are in five European languages

- German
- English
- French
- Spanish
- Italian

2.4   New parameters, commands and diagnoses

New P parameters

P-0-4051 Process block acknowledgement

Used in process block mode

P-0-4052 Last assumed process block

Used in process block mode

P-0-4033 Master axis encoder resolution

Used in electronic gear function

P-0-0083 Gear transmission adjustment

Used in electronic gear function

P-0-1222 Speed command value filter time constant

Used in electronic gear function

P-0-0142 Synchronization acceleration

Used in electronic gear function

P-0-0143 Synchronization speed

Used in electronic gear function

P-0-0151 Synchronization window

Used in electronic gear function

P-0-0162 Command - automatic control loop setting

Used in automatic control loop setting

P-0-0163 Damping factor for automatic control loop setting

Used in automatic control loop setting

P-0-0164 Application for automatic control loop setting

Used in automatic control loop setting

P-0-0165 Select parameter for autom. control loop setting

Used in automatic control loop setting

P-0-0166 Lower processing range limit for automatic RKE

Used in automatic control loop setting

P-0-0167 Upper processing range limit for automatic RKE

Used in automatic control loop setting

P-0-0168 Maximum parametrizable acceleration

Used in automatic control loop setting

New S Parameter

S-0-0096 Slave identification

S-0-0134 Master control word

S-0-0048 Position command value additive

Used in electronic gear function

S-0-0236 Master drive 1 rotations

Used in electronic gear function

S-0-0237 Following drive rotations 1

Used in electronic gear function

S-0-0121 Load gear input revolutions

Used in electronic gear function

S-0-0122 Load gears output revolutions

Used in electronic gear function

The following S parameters were introduced as a copy of already existing P parameters, for reasons of compatibility.

S-0-0265 Switching languages

S-0-0265 is the same as P-0-0005 change language.

S-0-0390 Diagnosis number

S-0-0390 is the same as P-0-0001 diagnosis number.

S-0-0392 Actual speed value filter

S-0-0392 is the same as P-0-1003 actual speed value filter.

S-0-0348 P-gain acceleration pre-control

S-0-0348 replaces parameter P-0-0050 acceleration factor pre-control.

S-0-0393 Command value mode in modulo format

S-0-0393 is the same as P-0-0013

S-0-0298 Reference cam shifting

S-0-0298 is the same as P-0-0020

S-0-0267 Password

S-0-0267 is the same as P-0-4025

New diagnoses, commands

D900, Command automatic control loop setting

Command for the automatic determination of a control parameter.

D901, Start only with drive enable

The drive was not in control loop at command start.

D902, Motor feedback data invalid

Feedback data not valid at command start (torque constant or number of pole pairs).

D903, Determining moment of inertia - faulty

Whilst determining mass moment of inertia, a fault occurred. This means that the automatic control loop setting cannot be conducted.

D904, Automatic control loop setting failed

D905, Processing block limits not sensible

The automatic control loop setting defined for the processing range limit (P-0-166 and P-0-167) defines a range that either makes no sense (upper limit **< lower limit**) or a range that is too small (**<6 motor rotations**).

D906, Processing range limit exceeded

The **actual position,** while executing a command, exceeds the processing block range defined by both limits (P-0-166 and P-0-167).

E209 Parameter storage in progress

This warning was introduced to signal that drive storage was still in progress.

E248 Interpolation acceleration = 0

This warning signals to the internal position command value generator that the effective acceleration is equal to zero.

E260 Current command value limit active

This warning appears when speed control excedds the limits. Once this warning appears, the acceleration capacity of the drive is exceeded.

E843 Travel range limit switch - positively actuated

Warning generated if positive limit switch is actuated.

F643 Travel range limit switch - positively exceeded

Error message if position limit switch activated.

E844 Travel range limit switch negatively actuated

Warning generated if limit switch negatively actuated.

F644 Travel range limit switch negatively exceeded

Error message generated if negative limit switch triggered.

F629 Position limit value positively exceeded

Error message generated if positive position limit value exceeded.

F630 Position limit value negatively exceeded

Error message generated if negative position limit value exceeded.

E829 Position limit value positively exceeded

Warning generated if positive position limit value exceeded.

E830 Position limit value negatively exceeded

Warning generated if negative position limit value exceeded.

2.5   Changed and expanded functions

Minimum value for filter time constant

As a new minimum input vaue for the filter time constant, the numeric value **0** has been declared valid.

This means that drive-internal filters can be switched off be inputting numeric values smaller than 500µs!

Maximum value for speed parameter

As maximum input value for speed parameters (S-0-0036, S-0-0037, S-0259, P-0-4007, P-0-0143, P-0-4030, S-0-0124, S-0-0183), the bipolar speed limit **S-0-0091** is used.

Write protection for current control parameter

The current control parameters **S-0-0106** and **S-0-0107** are write protected as of version 4.

This is meant to prevent the user changing the values which have been optimally set at the factory.

Motor temperature monitoring

Temperature pre-warning

Current function:

Currently, a temporal limit of 30 seconds is implemented. In other words, a warning condition of 30 seconds was completed with an error.

New function:

Starting with a winding temperature of approximately **145°C,**a temperature prewarning (Warning **E251**) must be generated.

This state can remain for any length of time without a powering down initiated by error **F219**.

Temperature off

Current function:

If the winding temperature is greater than **155°C** for more than 30 seconds, then the drive is shutdown with an overtemperature error (error **F219**).

New function:

Starting with a winding temperature greater than **155°C** the drive is immediately shutdown with an overtemperature error (error **F219**).

Position limit value monitoring

Current function:

The actuating of the positive or negative limit switch generated **one** error message.

New function:

If both the positive and negative position limit values are exceeded, then two separate warnings are generated, i.e.,

- "**E829** position limit value positively exceeded"
- "**E830** position limit value negatively exceeded"

or error diagnoses

- "**F629** position limit value positively exceeded"
- "**F630** position limit value negatively exceeded"

Travel range limit switch exceeded

Current function:

The actuating of the positive or negative limit switch generated **one** error message.

New function:

If the positive limit switch was actuated, then, depending upon what was set, either the warning

- "**E843** travel range limit switch positively exceeded"

or the error message

- "**F643** travel range limit switch positively exceeded"

is generated.

Given an actuation of the negative limit switch, then depending upon what was set, either the warning

- "**E844** travel range limit switch negatively exceeded"

or the error message

- "**F644** travel range limit switch negatively exceeded"

was generated.

2.6 Errors cleared

V10-F1: Travel range limits

Error :

If the travel range limits (S-0-0049 and S-0-0050) have been activated with error reactions (S-0-0055) and the drive is standing on either limit value, then it was possible that the error could not be cleared.

Correct function :

The monitor has been equipped with hysteresis positioning window S-0-0057.

The hysteresis must be larger than the occurring position error.

V10-F2: Jogging into a non-permitted range

Error :

If the drive is standing on one of the travel range limits (S-0-0049 and S-0-0050) and the attempt is made to jog beyond the range, then it could happen that the warning E8/31 „jogging in a non-permitted range" was not generated.

Correct function :

The warning is entered.

V10-F3: F8/78 Error in speed control loop

Error :

If the acceleration direction was altered during a quick acceleration, then an unjustifiable actuating of the speed control loop monitor could occur (F878).

The actual speed value used for the monitoring process was excessively filtered.

Correct function :

The filtering of the actual speed value was reduced.

V10-F4: RS485 cyclical echo (Line end)

Error :

In RS485 mode, with line end and a certain type of hardware drive, it could happen that the DKC was actuated, then automatically and cyclically sent its prompt.

The ZERO, which was wrongly read in, was interpreted as an abort signal and acted as if it were a CR.

Correct function :

If a ZERO is received, then it is removed in the software.

V10-F5: RS232/485 Inputting lists

Error :

If more than 12 symbols were entered for one element when entering a word or doubleword lists, then the internal DKC memory was deleted and the software crashed. E3 was displayed on the front of the DKC.

The unit had to shut off and then on again.

Correct function :

The firmware error has been cleared. More symbols can now be entered.

V10-F6: Acceleration pre-control

Error:

The acceleration pre-control was not effective independent of operating data of S-0-0348.

Cause:

Due to a minor expansion during the calculation of the pre-control factor, the factor always equalled zero which meant that any operating data of S-0-0348 also always equalled zero.

Recovery:

Expand the pre-control factor even more.

V10-F7: Current control reset time = 0

Error:

If a current control reset time of 0 was entered, then this caused a calculation error in the current controller. This, in turn, caused the motor to "run away", i.e., "F878 error in speed control loop" was generated.

Cause:

The input value 0 was not caught in the firmware. This caused a calculation error during internal division.

Recovery:

Check input values for the numeric value 0.

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