

DIAX03 Drive With Electric Gear Function

Trouble Shooting Guide: ELS 05VRS

DOK-DIAX03-ELS-05VRS**-WAR1-EN-P

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- What is the purpose of this documentation?** This document is designed to assist maintenance personnel in identifying errors with the machinery
- help in understanding error messages
 - help in finding the causes of errors
 - describe the procedure for trouble shooting
 - simplify the process of establishing contact with the INDRAMAT Customer service department
- Use of this documentation** This documentation is meant as a switch board panel for the machine manufacturer.

Änderungsverlauf

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Contents

1 Diagnostic Message Descriptions	1-1
1.1 Overview of the diagnostic message descriptions	1-1
Diagnostic Message Types	1-1
Construction of a diagnostic message	1-1
2 Description of diagnostic letters F... and E...	2-1
2.1 Error diagnostic messages F...	2-1
F207 Switching to uninitialized operation mode	2-2
F208 UL The motor type has changed.....	2-2
F209 PL Load parameter default values	2-3
F218 Amplifier overtemp. shutdown.....	2-3
F219 Motor overtemp. shutdown	2-3
F221 Error Motor temp. surveillance defective	2-4
F228 Excessive deviation.....	2-4
F229 Motor encoder failure: quadrant error	2-5
F233 External power supply error	2-5
F236 Excessive position feedback difference	2-6
F237 Excessive position command difference.....	2-6
F242 External encoder failure: signal too small	2-7
F245 External encoder failure: quadrant error	2-8
F248 Low battery voltage	2-8
F249 Master drive encoder failure: signal too small.....	2-9
F252 Master drive encoder failure: quadrant error.....	2-9
F253 Incr. encoder emulator: pulse frequency too high.....	2-10
F254 Incr. encoder emulator: hardware fault	2-10
F255 External power supply DAE 02 error	2-10
F267 Erroneous internal hardware synchronization.....	2-10
F268 Brake fault.....	2-10
F270 Error power supply home switch	2-11
F271 Error power supply travel limit switch.....	2-11
F272 Error power supply probe input.....	2-12
F273 Error power supply E-Stop	2-12
F276 Absolute encoder out of allowed window	2-12
F280 Short circuit to earth	2-13
F281 Mains fault.....	2-13
F282 Phase loss fault.....	2-13
F283 Line voltage fault	2-13
F284 Main contactor off, low voltage	2-13
F401 Double MST error shutdown	2-14


F402 Double MDT error shutdown	2-14
F403 Invalid communication phase shutdown	2-14
F404 Error during phase progression	2-14
F405 Error during phase regression	2-15
F406 Phase switching without ready signal	2-15
F434 Emergency-Stop	2-15
F629 Positive travel limit exceeded.....	2-15
F630 Negative travel limit exceeded	2-16
F634 Emergency-Stop	2-16
F643 Positive travel limit switch detected.....	2-16
F644 Negative travel limit switch detected	2-17
F820 Bleeder overload	2-17
F822 Motor encoder failure: signal too small	2-17
F827 Drive interlock while drive activated.....	2-18
F860 Overcurrent: short in power stage.....	2-19
F861 Overcurrent: short to ground.....	2-19
F869 +/-15Volt DC error.....	2-19
F870 +24Volt DC error	2-19
F871 +10Volt DC error	2-20
F878 Velocity loop error	2-20
F879 Velocity limit S-0-0091 exceeded.....	2-20
F889 Regeneration overcurrent	2-21
F890 Processor fault power supply unit	2-21
F891 Power stage fault	2-21
F892 Wrong code of current measuring unit	2-21
F893 No regenerating current to mains	2-21
F894 Checksum error	2-22
2.2 Warning Diagnostic Messages E.....	2-23
E201 No mains connected	2-23
E202 Not ready for power on	2-23
E219 Warning Drive temp. surveillance defective	2-23
E221 Warning Motor temp. surveillance defective.....	2-24
E225 Motor overload	2-24
E226 Undervoltage in power section.....	2-24
E247 Interpolation velocity = 0	2-25
E248 Interpolation acceleration = 0.....	2-25
E249 Positioning velocity S-0-0259 > S-0-0091	2-25
E250 Drive overtemp. prewarning.....	2-25
E251 Motor overtemp. prewarning.....	2-26
E253 Target position out of travel zone.....	2-26
E255 Feedrate-override S-0-0108 = 0	2-26
E257 Continuous current limit active.....	2-27
E259 Command velocity limit active	2-27
E261 Continuous current limit prewarning	2-27
E263 Velocity command value > limit S-0-0091.....	2-28
E410 Slave not scanned or adress 0	2-28
E825 Overvoltage in power stage	2-28

E826 Undervoltage in power section.....	2-29
E829 Positive position limit exceeded.....	2-29
E830 Negative position limit exceeded	2-29
E834 Emergency-Stop	2-30
E843 Positive limit switch activated.....	2-30
E844 Negative limit switch activated.....	2-30

3 Description of Diagnostic Letters C... and A... 3-1

3.1 Command Diagnostic Messages C... and D.....	3-1
3.2 Command diagnostic messages.....	3-2
C100 Communication phase 3 transition check.....	3-2
C101 Invalid communication parameter (S-0-0021)	3-2
C104 Config. IDN for MDT not configurable	3-2
C105 Configured length > max. length for MDT	3-2
C106 Config. IDN for AT not configurable.....	3-2
C107 Configured length > max. length for AT.....	3-3
C108 Time slot parameter > Sercos cycle time	3-3
C109 Position of data record in MDT (S-0-0009) even.....	3-3
C110 Length of MDT (S-0-0010) odd.....	3-3
C111 ID9 + Record length - 1 > length MDT (S-0-0010)	3-4
C112 TNcyc (S-0-0001) or TScyc (S-0-0002) error	3-4
C113 Relation TNcyc (S-0-0001) to TScyc (S-0-0002) error	3-4
C114 T4 > TScyc (S-0-0002) - T4min (S-0-0005).....	3-4
C115 T2 too small.....	3-5
C200 Communication phase 4 transition check.....	3-5
C201 Invalid parameter(s) (->S-0-0022)	3-5
C202 Parameter limit error (->S-0-0022)	3-5
C203 Parameter calculation error (->S-0-0022).....	3-5
C204 Motor type P-0-4014 incorrect	3-6
C210 External feedback required (->S-0-0022)	3-6
C211 Invalid feedback data (->S-0-0022)	3-6
C212 Invalid amplifier data (->S-0-0022)	3-7
C213 Position data scaling error	3-7
C214 Velocity data scaling error	3-7
C215 Acceleration data scaling error	3-8
C216 Torque/force data scaling error	3-8
C217 Motor feedback data reading error	3-9
C218 External feedback data reading error	3-9
C220 Motor feedback initializing error.....	3-9
C221 Ext. feedback initializing error.....	3-10
C223 Input value for max. range too high	3-10
C225 Coprocessor not ready for initialization.....	3-10
C226 Coprocessor acknowledge failed.....	3-11
C227 Modulo range error	3-11
C228 Controller type S-0-0140 wrong.....	3-11
C231 Emulator not loadable.....	3-11
C232 Motor encoder interface not present.....	3-11

C233 External encoder interface not present.....	3-12
C234 Encoder combination not possible.....	3-12
C235 Load-side motor encoder with inductance motor only	3-12
C236 Motor feedback required (P-0-0074)	3-12
C300 Set absolute measuring.....	3-12
C302 Absolute measuring system not installed	3-13
C400 Command: switch to parameter mode	3-13
C401 Drive active, switching not allowed.....	3-13
C402 Only allowed without master	3-13
C500 Reset class 1 diagnostic, error reset	3-13
C501 Error delet only in parameter mode	3-14
C600 Drive controlled homing procedure command.....	3-14
C601 Homing only possible with drive enable.....	3-14
C602 Distance home switch - reference mark erroneous.....	3-14
C604 Homing of absolute encoder not possible	3-14
C700 Basic load	3-15
C701 Basic load not possible if drive is enabled.....	3-15
C702 Default parameters not available.....	3-15
C703 Default parameters invalid.....	3-15
C704 Parameters not copyable.....	3-15
C705 Locked with password	3-16
C800 Default parameter load	3-16
C801 Parameter default value erroneous (-> S-0-0021).....	3-16
C802 Locked with password	3-16
D300 Command adjust commutation.....	3-16
D301 Drive not ready for commutation command	3-16
D500 Command 'get mark position'	3-17
D501 Incremental encoder required.....	3-17
D600 Cancel reference point procedure command	3-17
D700 Parking axis command	3-17
D800 Command measuring wheel operation mode.....	3-18
D801 Measuring wheel operation not possible	3-18
D802 Operation mode cancelled.....	3-18
3.3 Status diagnostic messages	3-19
A000 Communication phase 0	3-19
A001 Communication phase 1	3-19
A002 Communication phase 2	3-19
A003 Communication phase 3.....	3-20
A010 Drive HALT	3-20
A011 Drive interlock open	3-20
A012 Control and power sections ready for operation	3-20
A013 Ready for power on.....	3-20
A100 Drive in TORQUE control	3-20
A101 Drive in VELOCITY control	3-21
A102 Position mode with encoder 1.....	3-21
A103 Position mode with encoder 2.....	3-21
A104 Position mode lagless, encoder 1.....	3-21

A105 Position control lagless, feedback 2	3-21
A106 Drive controlled interpolation, encoder 1	3-21
A107 Drive controlled interpolation, encoder 2	3-22
A108 Drive controlled interpolation, lagless, encoder 1	3-22
A109 Drive controlled interpolation, lagless, encoder 2	3-22
A110 Velocity Synchronization, virtuell Lead drive	3-22
A112 Phase synchronization, encoder 1, virtual master drive	3-22
A113 Phase synchronization, encoder 2, virtual master drive	3-23
A116 Phase synchr. lagless, encoder 1, virtual master drive	3-23
A117 Phase synchr. lagless, encoder 2, virtual master drive	3-23
A120 Pattern control, encoder 1, virtual master drive	3-23
A121 Pattern control, encoder 2, virtual master drive	3-24
A124 Pattern control lagless, enc. 1, virtual master drive	3-24
A125 Pattern control lagless, enc. 2, virtual master drive	3-24
A128 Cam shaft, encoder 1, virtual master drive	3-24
A129 Cam shaft, encoder 2, virtual master drive	3-25
A132 Cam shaft, lagless, encoder 1, virt. master drive	3-25
A133 Cam shaft, lagless, encoder 2, virt. master drive	3-25
A146 Relative drive controlled interpolation, encoder 1	3-25
A147 Relative drive controlled interpolation, encoder 2	3-26
A148 Relative drive contr. interpolation, enc. 1, lagless.....	3-26
A149 Relative drive contr. interpolation, enc. 2, lagless.....	3-26
A800 Unknown operation mode.....	3-27
3.4 Diagnostic messages for basic initialization and after fatal System errors	3-28
Diagnostic Message Display: -0	3-28
Diagnostic Message Display: -1	3-28
Diagnostic Message Display: -2	3-28
Diagnostic Message Display: -3	3-28
Diagnostic Message Display: -5	3-28
Diagnostic Message Display: -6	3-29
Diagnostic Message Display: Watchdog 	3-29
3.5 Operation Status	3-30
bb	3-30
Ab	3-30
AF	3-30
AS	3-30
AH	3-30
P0	3-30
P1	3-31
P2	3-31
P3	3-31

4 Exchanging Drive Components 4-1

4.1 Identification of the Drive Components	4-1
Supply Modules	4-1
Drive Controllers.....	4-2
Motors	4-5

Electrical Connections.....	4-5
4.2 Replacing Drive Components	4-6
Supply Modules.....	4-6
Drive Controllers.....	4-6
Motors	4-11
Electrical Connections.....	4-12
Plug-in module	4-13
Software Module	4-13
4.3 Fault report.....	4-15

1 Diagnostic Message Descriptions

1.1 Overview of the diagnostic message descriptions

Diagnostic Message Types

Each operational state of the drive will be characterized with a diagnostic message.

Differentiations will be made between:

- **Error diagnostic messages**
- **Warning diagnostic messages**
- **Command diagnostic messages**
- **Drive Mode diagnostic messages**
- **Operation status**

Construction of a diagnostic message

A diagnostic message consists of:

- **A diagnostic number** and a
- **diagnostic text**

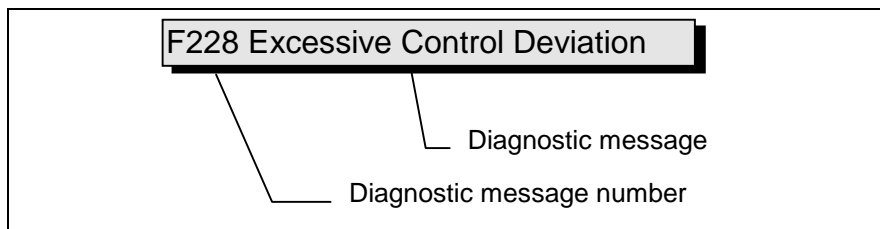


Fig. 1-1: Diagnostic message with a diagnostic number and text.

For the example in the graphic, "F2" and "28" are shown alternately on the H1-Display.

The control system can read out the diagnostic number in hexadecimal form with the **S-0-0390, Diagnostic message number** parameter.

In addition, the drive allocates to the control system the diagnostic number and diagnostic text as a string **F228 Excessive deviation** with the **S-0-0095, Diagnostic message** parameter.

H1-Display

The H1-Display serves as an optical display of the diagnostic message on the drive.

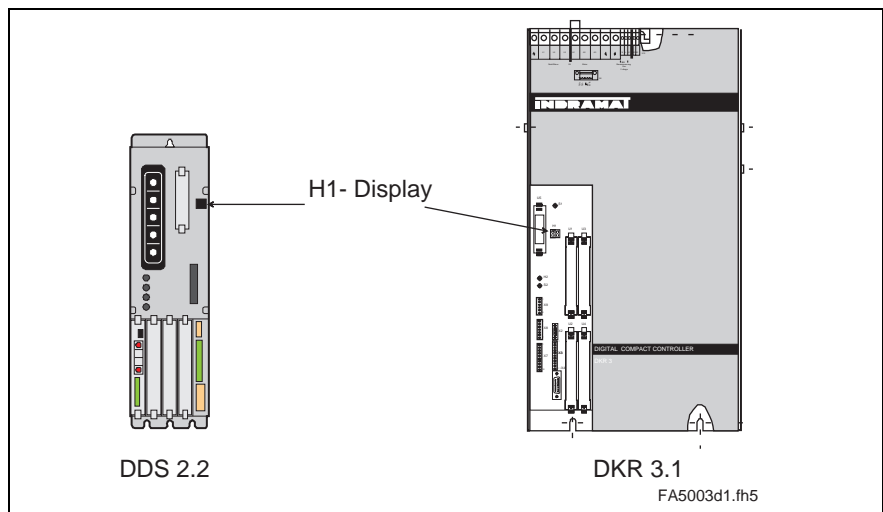


Fig. 1-2: H1-Display on DDS and DKR drives

The diagnostic number appears on this two-positional seven-segment display. The image can be seen on the "Diagnostic Message Priority Display".

This display quickly shows the current operation status without the use of a communications interface.

The operating mode cannot be seen from the H1-Display. If the drive follows the operating mode and no command was activated, then the symbol "AF" appears on the display.

Diagnostic Message Output Priority

If more than one diagnostic message is waiting, then the message with the highest priority will be displayed.

The following graphic classifies operation status in order of importance.

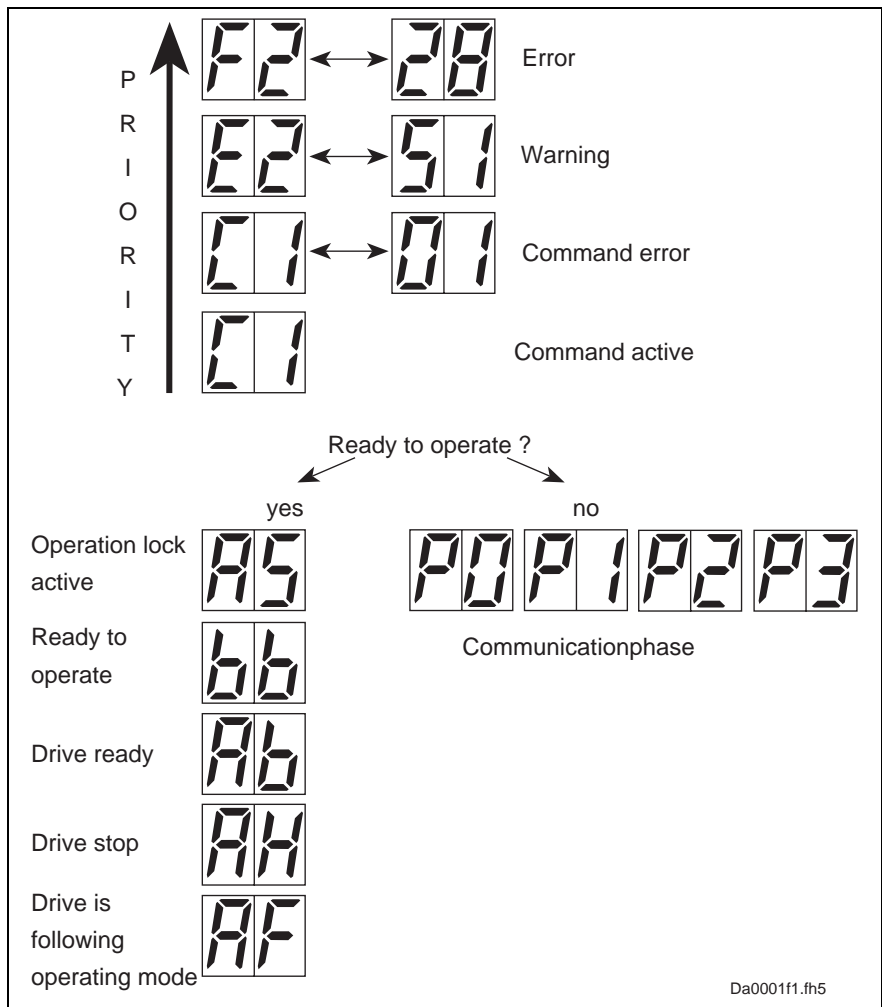


Fig. 1-3: Diagnostic message priority diagram

Clear Coded Diagnostic Message

The clear coded diagnostic message contains the diagnostic number followed by the diagnostic text, as shown in the example, "Excessive Output Error" (Fig. 1-1). It can be read out with the **S-0-0095, Diagnostic message** parameter and directly displays the operation status on an operator surface.

The clear coded diagnostic message will be switched to the current language.

Notes

2 Description of diagnostic letters F... and E...

2.1 Error diagnostic messages F...

Many areas are monitored in connection with operating modes and parameter settings. An error message is generated if a condition is discovered which no longer allows proper operation.

Error Classes The errors are separated into four different error classes. The error class is evident from the diagnostic message. They are determined with the drive's error response..

Error class :	Diagnostic Message:	Drive Reaction:
Fatal	F8xx	Torque free switching
Travel range	F6xx	Velocity command value-zero switch
Interface	F4xx	In accordance with best possible deceleration
Non-fatal	F2xx	In accordance with best possible deceleration

Fig. 2-1: Error Classes and Drive Reaction

Drive's Error Reaction If an error state is detected in the drive then an automatic operation of the drive's error response will be started as long the drive is in control. The H1 display blinks a Fx / xx.

The drive's reaction can be parameterized by **P-0-0119, Deceleration as best as possible**, with interface and non-fatal errors. At the end of each error reaction the drive is switched off.

Reset the Error Errors will not be automatically deleted but must be:

- Reset from the control through the initialization of the command **S-0-0099, Reset Class 1 Diagnostics**, or
- reset by pressing the "S1" button.

If the error state is still present then the error will be immediately detected again.

A positive edge bit on the control enable signal is necessary in order to turn on the drive again.

F207 Switching to uninitialized operation mode

Cause:

0 has been selected in at least one of the four mode parameters **S-0-0032..35**. This mode was selected by the bits 8 and 9 in the master control word when the drive controller was on.

Remedy:

Enter the required mode in the activated mode parameter.

Valid modes are:

Meaning:	Bit list of the mode parameters:
Torque control	0000 0000 0000 0001
Velocity control	0000 0000 0000 0010
Position control with act. feedback val. 1	0000 0000 0000 x011
Position control with act. feedback val. 2	0000 0000 0000 x100
Drive-internal interpolation with actual feedback value 1	0000 0000 0001 x011
Drive-internal interpolation with actual feedback value 2	0000 0000 0001 x100
Relative drive-internal interpolation with actual feedback value 1	0000 0010 0001 x011
Relative drive-internal interpolation with actual feedback value 2	0000 0010 0001 x100

Fig. 2-2: Modes

Parameter:	Primary mode of operation	S-0-0032
	Secondary operation mode 1	S-0-0033
	Secondary operation mode 2	S-0-0034
	Secondary operation mode 3	S-0-0035

Check for input of the permissible interpolation method.

F208 UL The motor type has changed.

Description:

The settings for current regulation, velocity command, and position loop are stored in the feedback of the motor. After powering up, the drive motor type. If the two do not match, the drive remains in this state.

By pressing the S1 key, the drive overwrites its stored parameters with the control loop parameters from the motor feedback.

Cause:

- The motor has been exchanged.
- A parameter file has been loaded, but the parameter **P-0-4036, Contacted motor type** contained a different motor type.

Remedy:

Command **C700 Basic Load** or press the S1 button.

F209 PL Load parameter default values

Description:

After the firmware is replaced (EPROMs), if the parameters have been changed in regards to the old product, the drive displays “PL”. By pressing the S1 button on the drive or by starting the command “load basic parameters”, all the parameters will be erased and restored with the default values.

Cause:

Product was replaced. The number of parameters in comparison to the new products has changed.

Remedy:

Press S1 button on the drive controller and all the paramters will be erased and restored with default values



WARNING

⇒ This overwrites all parameters and positioning blocks.

F218 Amplifier overtemp. shutdown

Description:

The temperature of the DKC heatsink will be monitored. If the temperature of the heatsink is too high, the drive will power down in order to protect against damage.

Cause:

1. Ambient temperature is too high. The specified operational data is valid up to an ambient temperature of 45°C.
2. The DKC's heatsink is dirty.
3. Air flow is prevented by other assembly parts or a control cabinet panel assembly.
4. Heatsink blower may be defective

Remedy:

For 1. Reduce the ambient temperature; for example, through cooling of the control cabinet

For 2. Remove any obstruction or dirt from the heatsink.

For 3. Install the device vertically and clear a large enough area for proper heatsink ventilation.

For 4. Exchange drive.

Class: non-fatal

F219 Motor overtemp. shutdown

If the motor temperature exceeds the value in **S-0-0204, Motor shutdown temperature**, the drive will generate this error message. The value in **S-0-0204** is fixed at 150°C for MDD-,MKD- and MKE motors. The appropriate value must be entered from the motor's technical specifications for all other types of motors.

For motors of series: 2AD, 1MB, LAF, LAR, and MBW, the current motor temperature can be called up with parameter **S-0-0383, Motor temperature**.

Cause:

1. The motor became overloaded. The effective torque demand on the motor was above its permissible continuous torque level for too long.
2. Short circuit or ground in the connection to motor temperature monitoring.
3. Instability in the velocity control loop.

Remedy:

- For 1. Check the layout of the motor. For motors which have been in operation for longer periods of time, check to see if the operating conditions have changed (in regards to cleanliness, friction, moved components, etc.).
- For 2. Check the wiring to the motor temperature monitor X6/1 and X6/2 for grounds and short circuits.
- For 3. Check the velocity control loop parameters (see the functional description).

F221 Error Motor temp. surveillance defective**Cause:**

Short-circuit in the wiring to the motor temperature monitoring.

Remedy:

Check the wiring to the motor temperature monitoring X6/1 and X6/2 for short-circuits.

The DC bus voltage is monitored in the power supply module. The drive controller is notified via the control voltage bus whether the DC bus voltage is above a minimum permissible value. If the DC bus voltage falls below that threshold, the DC bus voltage message will be removed by the power supply unit and the selected **P-0-0119, Best possible deceleration** will be performed.

Requirement: The **P-0-0118, Power off on error** parameter has been set such that the undervoltage condition is handled as a fault.

Cause:

1. The power is switched off without having de-activated the drive via the controller enabling signal (RF) before.
2. The drive has been activated via the controller enabling signal (RF) without having activated the power section before.
3. Malfunction of the power supply unit.

Remedy:

Ref. 1.+2. Checking the logic that is used for activating the drive in the connected controller.

Ref. 3. Eliminate the malfunction of the power supply unit. See Applications Manual of the power supply unit.

F228 Excessive deviation

When the position loop is closed, the drive monitors whether it is able to follow the specified command value. This is done by calculating a model position value in the drive and comparing that value with the actual feedback value. This error is generated if the difference between theoretical and actual position value permanently exceeds the value of the **S-0-0159, Monitoring window** parameter.

Cause:

1. The drive's acceleration capacity is exceeded.
2. The axis is blocked.
3. Incorrect parameter values set in the drive parameters.
4. Incorrect parameter values in **S-0-0159, Monitoring window**
5. The power supply has been switched of while the controller enabling signal is applied. Possible cause: Malfunction in an AC servo drive at the common power supply module.

Remedy:

- Ref. 1. Check the **S-0-0092, Bipolar torque/force limit value** parameter and set it to the maximum permissible value of the application. Reduce the specified acceleration value from the controller (see controller Manual).
- Ref. 2. Check the mechanical system and eliminate jamming of the axis.
- Ref. 3. Check the drive parameters.
- Ref. 4. Set the parameter values of **S-0-0159, Monitoring window**.
- Ref. 5. Check AC servo drive with error message different than "28".

F229 Motor encoder failure: quadrant error

A hardware error was discovered in the motor encoder interface being used.

Cause:

1. Defective encoder cable.
2. Disruptive electro-magnetic interference on the encoder cable.
3. Defective motor encoder interface.
4. Defective drive controller.

Remedy:

- For 1. Exchange the encoder cable.
- For 2. Keep the encoder cable well away from the power cables.
- For 3. Exchange the motor encoder interface.
- For 4. Exchange the drive controller.

F233 External power supply error

Cause:

The DEA plug-in modules have isolated inputs and outputs. Proper operation of those inputs and outputs requires an external 24-V voltage to be applied. The drive monitors that voltage as soon as a DEA plug-in module has been installed.

Remedy:

Check the external 24-V power supply.

Name:	Unit:	min.:	typ.:	max.:
External operating voltage +U _L	V	18	24	32

Fig. 2-3: External power supply

F236 Excessive position feedback difference

Cause:

In the communication phase 4 transition check command, position feedback value 1 and position feedback value 2 are set to the same value and the cyclic evaluation of both encoders is started. In cyclic operation (phase 4), the position feedback difference of both encoders is compared with **S-0-0391, Monitoring window ext. feedback**. If the amount of the difference exceeds the monitoring window, error **F236 Excessive position feedback difference** is diagnosed, the parameter-selected error response performed, and the reference bits of both encoders are cleared.

1. Incorrect parameter for the external encoder (**S-0-0115, Position feedback 2 type parameter, S-0-0117, Resolution of external feedback**).
2. Incorrect parameter setting of mechanical system between motor shaft and external encoder. (**S-0-0121, Input revolutions of load gear; S-0-0122, Output revolutions of load gear S-0-0123, Feed constant**).
3. The mechanical system between motor shaft and external encoder is not rigid (e.g. gear play).
4. Defective encoder cable.
5. Defective module (DLF or DEF) for the evaluation of the external measuring system.
6. Maximum input frequency of the encoder interface exceeded.
7. External encoder is not mounted to the driven axis.
8. Incorrect reference dimension of an absolute encoder.

Remedy:

- Ref. 1. Check **S-0-0115, Position feedback 2 type parameter** and **S-0-0117, Resolution of external feedback**
- Ref. 2. Check **S-0-0121, S-0-0122, Input/Output revolutions of load gear** and **S-0-0123, Feed constant**
- Ref. 3. Increase **S-0-0391, Monitoring window ext. feedback**.
- Ref. 4. Replace encoder cable.
- Ref. 5. Replace module for the evaluation of the external measuring system.
- Ref. 6. Reduce the velocity.
- Ref. 7. Set **S-0-0391, Monitoring window ext. feedback** to 0 (de-activate monitoring function)
- Ref. 8. Perform **P-0-0012, C300 Command 'Set absolute measurement'**.

F237 Excessive position command difference

Cause:

When the drive is operating in position control, position command values which come via the SERCOS interface are monitored. If the velocity required of the drive by two successive position command values is greater than or equal to the value in **S-0-0091, Bipolar velocity limit value**, position command value monitoring is initiated. The **Excessive position command value** is stored in parameter **P-0-0010**. The **last valid position command value** is stored in parameter **P-0-0011**.

If position data are to be processed in modulo format, then the interpretation of the command values is also dependent on the value set in **S-0-0393, Command value mode for modulo format**. The parameter should be set for the "shortest path" (0).

Remedy:

Compare S-0-0091, Bipolar velocity limit value with the velocity in the program and adjust to match it, if necessary.

F242 External encoder failure: signal too small

Cause:

The analog signals of an external measurement system are used for high resolution analysis of that measurement system. These are monitored according to two criteria:

1. The pointer length, which is calculated from the sine and cosine signals, must be at least 1 V.
2. The maximum pointer length resulting from the sine and cosine signals must not exceed 11.8 V.

$$\text{pointer length} = \sqrt{\sin^2 + \cos^2}$$

Fig. 2-4: Pointer length

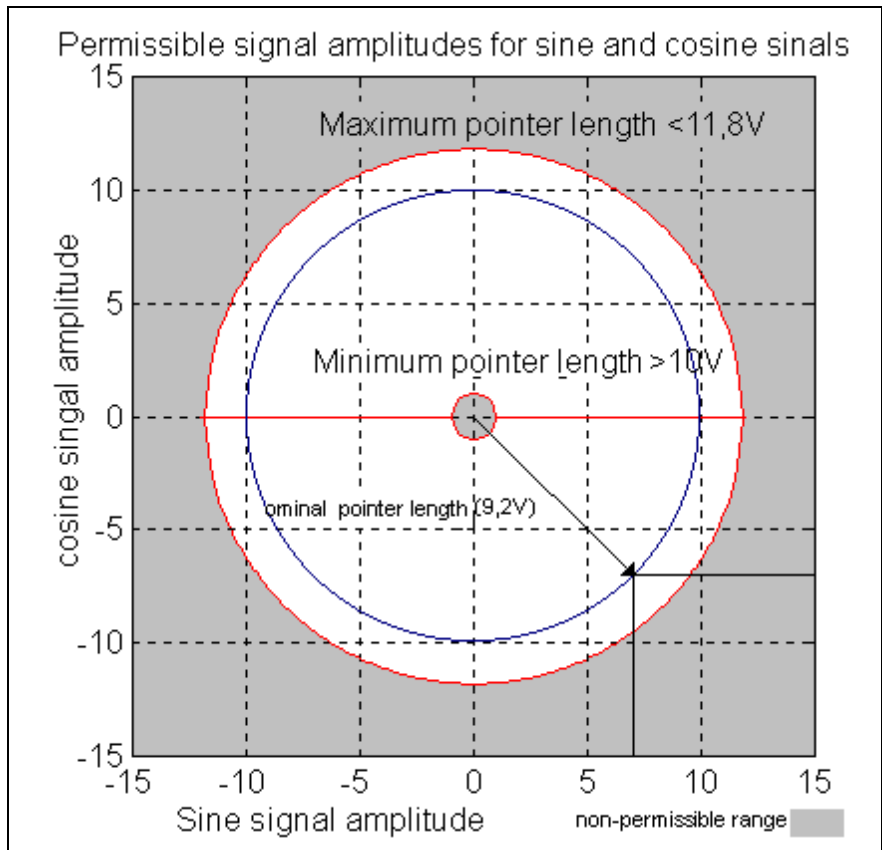


Fig. 2-5: Correct signal amplitude

Example:

Ucos = -6.5V

Usin = 6.5V

$$\text{pointer length} = \sqrt{(-6.5\text{V})^2 + 6.5\text{V}^2} \approx 9.2\text{V}$$

Remedy:

1. Check the measurement system cable.
2. Check the measurement system.

F245 External encoder failure: quadrant error

A hardware error was discovered in the high resolution position interface for "DLF" sine signals of the external measurement system.

Cause:

1. Defective encoder cable.
2. Disruptive electro-magnetic interference on the encoder cable.
3. Defective DLF module.

Remedy:

For 1. Exchange the encoder cable.

For 2. Keep the encoder cable well away from the power cables.

For 3. Exchange the DLF module.

F248 Low battery voltage**Cause:**

For motors of series MKD and MKE, the absolute position information is stored by a battery-powered buffer in the motor feedback. The battery is designed for a 10-year life span. If the battery voltage falls below 2.8 V, this message appears. The absolute encoder function will still be preserved for about 2 weeks.

CAUTION

Source of danger: Malfunction in the control of motors and moving elements

Possible damages: Mechanical injuries

Precautionary measures: Replace the battery as soon as possible

Instructions for Exchanging Batteries

Have the following tools and accessories ready:

- Torx screwdriver size 10
- Needle-nose pliers, torque wrench
- New packaged battery (Part No.: 257101)

CAUTION

Source of danger: A malfunction in the control of motors and moving elements

Possible damages: Mechanical injuries

Precautionary measures: Turn off the power supply.
Make sure it will not be turned back on.

Exchange the battery while the control voltage is turned on.

If the control voltage is turned off while the battery is taken out, the absolute reference point will be lost.

The reference point must then be reestablished.

Removing the Battery

- Unscrew torx screw with a size 10 screwdriver.
- Pull out the resolver feedback (RSF) lid by hand.
- Pull off the battery connection.
- Loosen battery clamp and remove the battery.
- Place the factory-made battery (Part No.: 257101) in the housing and screw on the clamp. **WARNING!** Do not kink the battery cable.
- Attach connection to the battery.

Close the resolver feedback lid, screw in 4 torx screws and tighten to 1.8 Nm with the torque wrench.

F249 Master drive encoder failure: signal too small

The signals of the master encoder are monitored. If its signal amplitude falls below a minimum threshold value, then this error message appears. The drive performs the best possible deceleration, as selected in the parameter P-0-0119.

Criteria for correct encoder signals:

1. The pointer addition of the sine and cosine signals must give at least 1 V.
2. The maximum pointer sum of the sine and cosine signals may not exceed 11.8 V.

Cause:

The analog signals of the measurement system at the master axis do not have the correct amplitude.

Remedy:

1. Check the encoder cable.
2. Check the encoder.

F252 Master drive encoder failure: quadrant error

A hardware error was discovered in the high resolution position interface for "DLF" sine signals of the external measurement system.

Cause:

1. Defective encoder cable
2. Insulation disturbance on the encoder cable
3. Defective DLF plug-in card

Remedy:

For 1. Exchange the encoder cable

For 2. Separate the encoder cable from the power cables.

For 3. Exchange the DLF plug-in card

F253 Incr. encoder emulator: pulse frequency too high

The incremental encoder emulator can process a maximum of 1023 lines per scan period (250 µs). This value was exceeded.

Remedial action:

1. Reduce the number of lines of the incremental encoder emulator (P-0-0502).

or

2. Reduce the travel velocity.

F254 Incr. encoder emulator: hardware fault

Before the next increment output is started, the system checks at the end of each scan interval (250 µs) whether all increments have been output. This error is generated if the outputs overlap.

Remedial action:

Write down the number of lines (P-0-0502) and the travel velocity at which the error has occurred, and notify INDRAMAT Service.

F255 External power supply DAE 02 error

The analog interface DAE 02.1 requires an external 24-V power supply that must be connected to terminal X75, pin 8 (+24 V) and pin 9 (0 V). This error message is issued if the external power supply is missing or outside the range 18...32 V. This function also detects transient faults, caused by spikes, etc.

Remedial action:

1. Provide power to the interface from a regulated power supply unit.
2. Use different power supply units or motor brake and interface; in particular if long motor cables are used.

F267 Erroneous internal hardware synchronization

Cause:

The drive control of all drives in a SERCOS ring is synchronized by a phase control loop. Proper functioning of the synchronization is monitored. This error is generated if the average deviation is greater than 5 µsec.

Remedy:

- Exchange DSS module.
- Exchange the drive controller.

F268 Brake fault

The drive controller takes control of the brake for motors with an integrated holding brake. The braking current is monitored. If the braking current is outside of the permissible range between:

$$0.4 - 1.6 * \mathbf{P-0-0511, Break current}$$

this error message will be generated.

Cause:

1. The power supply for the brake is not connected properly or is outside of the (24 V +/- 10%) tolerance.
2. The motor cable is incorrectly connected (wiring error).
3. Defective brake.
4. Defective drive controller.

Note: A metallic connector between the 0V brake supply and the 0V of the drive controller is required.

Remedy:

- For 1. Check the power supply.
 For 2. Check the motor cable.
 For 3. Exchange the motor.
 For 4. Exchange the drive controller.

F270 Error power supply home switch

To be able to monitor the home switch in drive-controlled homing, the DSS2.1 plug-in module requires an external 24-V power supply. The drive monitors the external 24-V power supply if homing with home switch has been selected via **S-0-0147, Homing parameter** (bit 5).

Cause:

The external 24-V power supply of the DSS2.1 plug-in module is missing.

Remedy:

1. Set **S-0-0147, Homing parameter** to "Homing without home switch" (bit 5 = 1).
2. Check the 24-V power supply at connector X12 of the DSS2.1 module.

Name:	Unit:	min.:	typ.:	max.:
External operating voltage $+U_L$	V	18	24	32
External current consumption I_L	mA			100

Fig. 2-6: External power supply

F271 Error power supply travel limit switch

To be able to monitor the travel limit switches, the DSS2.1 plug-in module requires an external 24-V power supply. The drive monitors the external 24-V power supply if the travel limit switches have been activated via the **P-0-0090, Travel limit parameter**.

Cause:

The external 24-V power supply of the DSS2.1 plug-in module is missing.

Remedy:

1. De-activate **P-0-0090, Travel limit parameter**.
2. Check the 24-V power supply at connector X12 of the DSS2.1 module.

F272 Error power supply probe input

The probe inputs of the DSS2.1 plug-in module require an external 24-V power supply. The drive monitors the external 24-V power supply if the probes are activated via the **S-0-0170, Probing cycle procedure command**.

Cause:

The external 24-V power supply of the DSS2.1 plug-in module is missing.

Remedy:

Connect the 24-V power supply to the connector X12 of the DSS2.1 module.

F273 Error power supply E-Stop

The emergency stop input of the DSS2.1 plug-in module requires an external 24-V power supply. The drive monitors the external 24-V power supply if the emergency stop function is activated via the **P-0-0008, Activation E-Stop-Function** parameter.

Cause:

The external 24-V power supply of the DSS2.1 plug-in module is missing.

Remedy:

1. Connect 24-V power supply to the connector X12 of the DSS2.1 module.
2. Use the **P-0-0008, Activation E-Stop-function** parameter to deactivate the emergency stop function.

F276 Absolute encoder out of allowed window

When a drive controller with an absolute encoder motor (multiturn) is switched off, the actual feedback position is saved. When it is turned back on, the position determined by the absolute encoder evaluation is compared with this stored position. This error is given if the deviation is greater than the value set by parameter in **P-0-0097, Absolute encoder control window**.

Cause:

1. Turning on for the first time (invalid stored position).
2. The axis was moved further in switched-off state than allowed by parameter **P-0-0097, Absolute encoder monitoring window**.
3. Incorrect position initialization.

Remedy:

For 1. Clear the error and set the reference point.

For 2. The axis was moved while turned off and is located outside of its permissible position.
Check to see if a new travel command would cause damage.
Then clear errors.

For 3. **Danger of Accident through Unwanted Axis Motion**
Check reference point. If the reference point is incorrect, there is a problem with the feedback. The feedback should be exchanged (with MDD-, MKD- or MKE absolute motor encoders, exchange the whole motor).

F280 Short circuit to earth

Cause:

Ground short in the DC bus or in the motor.

This error is reported only in compact devices.

Remedy:

- Isolation test of the motor and motor power supply cable.

- Disconnect the power supply cable from the motor to the drive and turn on the drive and the power. If the error recurs, the drive should be exchanged.

F281 Mains fault

Cause:

The power supply voltage was not present during operation for at least 3 power periods. As a result, the drive controller was brought to a standstill according to the set error response.

Remedy:

Check the power supply connection according to the project planning specifications.

F282 Phase loss fault

The power supply voltage is checked each time the control voltage is switched on and each time the controller enable is switched off. A phase error was found during this check.

Cause:

A power supply phase has failed or is outside of the permissible tolerance.

Remedy:

Check the power supply connection according to the project planning specifications of the drive controller being used.

F283 Line voltage fault

Cause:

The power supply voltage is above the permissible value $> 460V+15\%$

Remedy:

Make sure the power supply is connected properly according to the project planning specifications of the drive controller being used.

F284 Main contactor off, low voltage

Cause:

When the main contactor was turned off, the DC bus voltage went below 400 V while controller enable was set.

Remedy:

Switch off the controller enable before switching off the main contactor.

F401 Double MST error shutdown

The master sync telegram was not received in the drive controller in two successive SERCOS cycles.

Cause:

1. Disruption in the LWL transmission line.
2. Too much attenuation in the light signal.
3. Malfunction in the SERCOS interface (general).

Remedy:

For 1. Check all LWL connections in the SERCOS ring.

For 2. Measure the attenuation in the LWL cable.

The maximum attenuation between TX and RX must not fall below 12.5 dB.

For 3. Exchange the SERCOS interface module in the drive controller.

F402 Double MDT error shutdown

The master data message frame (MDT) has not been received in the drive in two consecutive SERCOS cycles.

Causes:

1. Fault in the fiber optics transmission line.
2. Excessive damping of the light signals.
3. Malfunction in the SERCOS interface (general).

Remedy:

Ref. 1. Check all fiber optics connections in the SERCOS loop.

Ref. 2. Measure the damping in the fiber optics cable.

The maximum damping between TX and RX may not be less than 12.5 dB.

Ref. 3. Replace the SERCOS interface module in the drive.

F403 Invalid communication phase shutdown

An invalid communications phase was given by the SERCOS master module (phase > 4).

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

F404 Error during phase progression

The prescribed order was not maintained during phase progression.

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

F405 Error during phase regression

Switching back from a communication phase did not switch to phase 0.

Cause:

Malfunction in the SERCOS master module of the controller.

Remedy:

Contact the controller manufacturer.

F406 Phase switching without ready signal

The SERCOS master attempted a phase switch without waiting for the drive controller's ready signal.

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

F434 Emergency-Stop

Pressing the emergency stop switch has caused the drive to perform the emergency stop function that was selected in the **P-0-0119, Best possible deceleration** parameter. Setting bit 15 of **S-0-0011, Class 1 diagnostics** causes an error message to be issued to the controller.

Cause:

The emergency stop switch has been pressed.

Remedy:

Eliminate the malfunction that has caused the emergency switch to be actuated, and clear the error.

F629 Positive travel limit exceeded

The drive has received a command value which has led to an axis position outside the positive travel range. The axis was brought to a standstill with the error response "Set velocity command value to zero". Bit 2 of parameter **P-0-0090, Travel limit parameter** is set for "Exceeding travel range is an error", or after exceeding the position limit a drive control command has been started (such as the drive-controlled homing procedure).

Cause:

S-0-0049, Positive position limit value exceeded.

Remedy:

1. **Check S-0-0049, Positive position limit value.**
2. Check the software limits of the control system.
3. Activate the axis after the error response.

Procedure:

- Clear the error.
- If the power supply was turned off, turn it back on.
- Move the axis into the permissible working range.

Note: Only such command values will be accepted which lead back into the allowed working range. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a hysteresis for the travel limits.

F630 Negative travel limit exceeded

The drive has received a command value which has led to an axis position outside the negative travel range. The axis was brought to a standstill with the error response "Set velocity command value to zero". Bit 2 of parameter **P-0-0090, Travel limit parameter** is set for "Exceeding travel range is an error", or after exceeding the position limit a drive control command has been started (such as the drive-controlled homing procedure).

Cause:

S-0-0050, Negative travel limit value exceeded.

Remedy:

1. **Check S-0-0050, Negative travel limit value.**
2. Check the software limits of the control system.
3. Activate the axis after the error response.

Procedure:

- Clear the error.
- If the power supply was turned off, turn it back on.
- Move the axis into the permissible working range.

Note: Only such command values will be accepted which lead back into the allowed working range. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a hysteresis for the travel limits.

F634 Emergency-Stop

Pressing the emergency stop switch has caused the drive to stop the drive by setting the velocity command value to zero. An error is reported in the **S-0-0011, Class 1 diagnostics** parameter.

Cause:

The emergency stop switch has been pressed.

Remedy:

Eliminate the malfunction that has caused the emergency switch to be actuated, and clear the error.

F643 Positive travel limit switch detected

The positive travel limit switch was encountered. The axis was brought to a standstill with the "Set velocity command value to zero" error response. Bit 2 of parameter **P-0-0090, Travel limit parameter** is set for "Exceeding travel range as error," or exceeding the position limit began a drive control command (such as the drive-controlled homing procedure).

Cause:

The positive range limit switch is detected.

Remedy:

1. Reset the error.
2. Turn the power supply on again.
3. Move the axis into the permissible travel region.

Note: The drive will not accept command values which lead out of the permissible travel range. Entering these command values in the drive controller will result in this error.

F644 Negative travel limit switch detected

The negative travel limit switch was encountered. The axis was brought to a standstill with the "Set velocity command value to zero" error response. Bit 2 of parameter **P-0-0090, Travel limit parameter** is set for "Exceeding travel range as error," or exceeding the position limit began a drive control command (such as the drive-controlled homing procedure).

Cause:

The negative travel limit switch was detected.

Remedy:

1. Reset the error.
2. Turn the power supply on again.
3. Move the axis into the permissible travel region.

Note: The drive will not accept command values which lead out of the permissible travel range. Entering these command values in the drive controller will result in this error.

F820 Bleeder overload

Cause:

The energy of a braking motor cannot be converted quickly enough by the bleeder resistors.

The energy converted by the internal bleeder is analyzed. When the maximum energy capacity of the bleeder is exceeded, it is shut off. The bleeder overload error is generated.

Remedy:

The braking slope should have a flatter parameter, or the bleeder capacity can be increased by adding an additional bleeder. The drive can be used again after the bleeder has cooled down.

F822 Motor encoder failure: signal too small

The analog signals of an external measurement system are used for high resolution analysis of that measurement system. These are monitored according to two criteria:

1. The pointer length, which is calculated from the sine and cosine signals, must equal at least > 1 V.
2. The maximum pointer length resulting from the sine and cosine signals must not exceed 11.8 V.

$$\text{pointer length} = \sqrt{\sin^2 + \cos^2}$$

Fig. 2-7: Pointer length

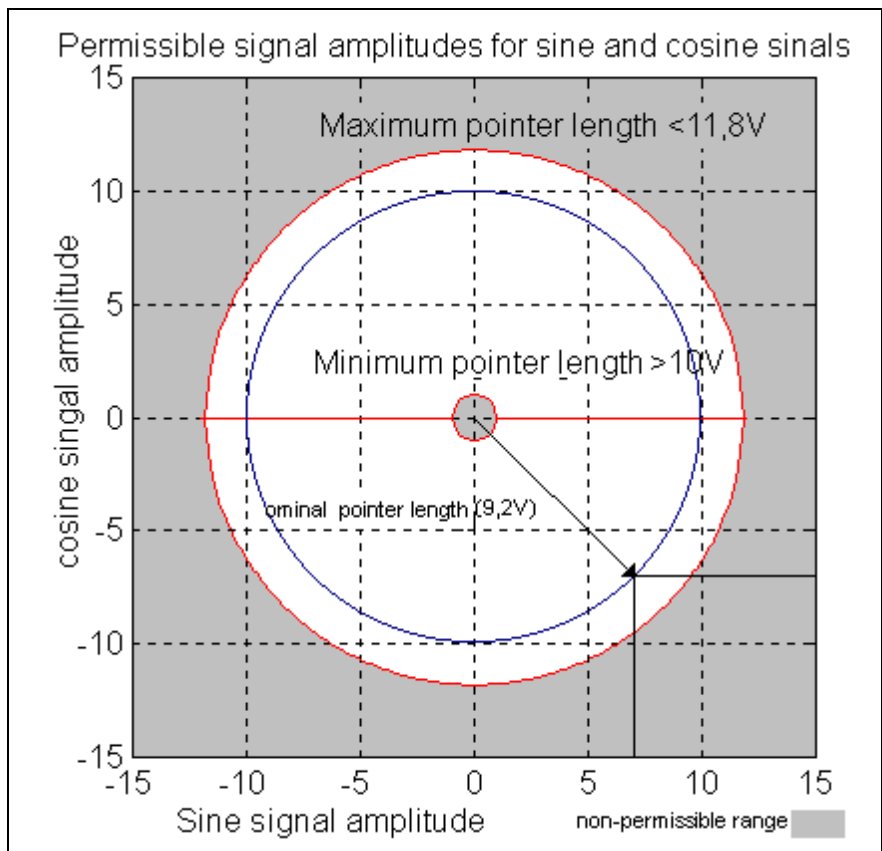


Fig. 2-8: Correct signal amplitude

Example:

$$U_{\cos} = -6,5V$$

$$U_{\sin} = 6,5V$$

$$\text{pointer length} = \sqrt{(-6.5V)^2 + 6.5V^2} \approx 9.2V$$

Note: The error cannot be cleared in communications phase 4. Before clearing the error, switch to communications phase 2.

Remedy:

- Check the measurement system cable.
- Lay the feedback cable well away from the motor power cable. The cover must be placed over the drive controller (see drive controller project specifications.)
- Check the measurement system and exchange, if necessary.

F827 Drive interlock while drive activated

Cause:

The drive interlock was activated while controller enable was set. The drive controller switches to torque-free state immediately.

Remedy:

The drive interlock should not be activated when controller enable is set. Check the control system of the drive interlock input.

F860 Overcurrent: short in power stage

The current in the power transistor bridge has exceeded the twofold value of the device peak current. The drive is immediately set to no torque. An optional blocking brake is applied immediately.

Cause:

1. Short-circuit in the motor cable.
2. Power stage of the drive controller is defective.
3. Parameter values of the current regulator do not comply.

Remedy:

Ref. 1. Check the motor cable for short-circuit

Ref. 2. Replace the drive controller.

Ref. 3. The current regulator parameters and the initial values from the feedback should not differ.

F861 Overcurrent: short to ground

The phase current sum is monitored. $\text{Sum} = 0$ in normal mode. The ground-fault fuse responds if the current sum exceeds $0.5 \times I_N$.

Cause:

1. Defective motor cable.
2. Ground fault in the motor.

Remedy:

Check motor cable and motor for ground fault; replace if necessary.

F869 +/-15Volt DC error

The drive controller found a malfunction in the ± 15 V power supply.

Cause:

1. Defective control voltage bus cable.
2. Defective supply module.

Remedy:

For 1. Check the control voltage bus cable or plug connection and exchange if necessary.

For 2. Check supply module (see supply module instructions for use).

F870 +24Volt DC error

The drive controller requires a 24-V control voltage. The drive's torque is released immediately when the maximum permissible tolerance of +20% is exceeded. An optional blocking brake is applied.

Causes:

1. Defective cable for the control voltages.
2. 24-V power supply overload.
3. Defective power supply unit.
4. Short-circuit in the emergency stop circuit.

Remedy:

- Ref. 1. Check and, if necessary, replace the cable and connections of the control voltages.
- Ref. 2. Check the 24-V power at the power supply unit.
- Ref. 3. Check the power supply unit.
- Ref. 4. Check the emergency stop circuit for a short-circuit.

F871 +10Volt DC error

The power supply voltage for the current sensors has been disrupted.

Cause:

A defect in the drive controller.

Remedy:

Exchange the drive controller.

F878 Velocity loop error

If the difference between velocity command value and feedback value is greater than 10% of the maximum motor velocity while the velocity control loop is active, then the feedback velocity value must move in the direction of the command value. This error is generated if the feedback value does not come closer to the command value within 20 ms and the effective torque/force command value is at the limit (=P-0-4046, **Active peak current**).

Cause:

1. Motor cable is connected incorrectly.
2. Defective power section of the drive.
3. Defective feedback.
4. Parameters set incorrectly for velocity controller.
5. Parameters for acceleration or brake slope are too steep.
6. Effective peak current is too low.

Remedy:

- For 1. Check motor cable connection.
- For 2. Exchange the drive controller.
- For 3. Exchange the motor.
- For 4. Check the velocity controller according to the user instructions (see the velocity controller chapter).
- For 5. Decrease the maximum acceleration in the control system or decrease **P-0-1201, Ramp 1 pitch**.

F879 Velocity limit S-0-0091 exceeded

In torque control, the actual velocity is monitored. This error is generated if the programmed velocity in the **S-0-0091, Bipolar velocity limit value** parameter is exceeded by the 1.125-fold value and/or a minimum of 100 rpm (rotary motor) or 100 mm/min (linear motor).

Cause:

The torque command value was for too long a time greater than the load torque. This causes the actual speed to be increased up to the maximum possible motor speed.

Remedy:

Assign the correct torque command value to the required task. Reduce the **S-0-0092, Bipolar torque/force limit value** parameter value.

F889 Regeneration overcurrent**Cause:**

The feedback current of the drive is greater than 1.2 times the type current (with HDD only).

Remedy:

Replace the drive.

F890 Processor fault power supply unit**Cause:**

The RSK processor on the plug-in storage card is not working.

Remedy:

Exchange drive controller or the plug-in storage card.

F891 Power stage fault

The DC bus voltage is not established after the main contactor has been switched on.

Cause:

If there is a short-circuit in the DC bus, voltage cannot build up after the drive has been switched on. This error is generated if the voltage remains under 100 V for approx. 200ms.

Remedy:

Exchange the drive controller.

F892 Wrong code of current measuring unit

A faulty current measuring unit was discovered after the control voltage was turned on.

Cause:

The current measuring unit has an incorrect code. The coding does not work with the RSK circuit board.

Remedy:

Exchange the current measuring unit.

F893 No regenerating current to mains

This error message is generated if the feedback current command value is at its maximum and no current is flowing for approx. 50ms.

Cause:

1. Power supply not properly connected.
2. Defective feedback.

Remedy:

- For 1. Check the power supply connection according to the project planning specifications.
- For 2. Exchange the drive controller.

F894 Checksum error**Cause:**

The checksum is stored in the EPROM during the initial programming. Each time the drive is turned on, the processor checks to see if the checksum which was created from the processor corresponds to the one which has been stored. This error is generated if this is not the case.

Remedy:

Exchange the RSK circuit board EPROM.

2.2 Warning Diagnostic Messages E...

Warnings do not lead to an automatic shutdown

Many areas are monitored in connection with operating modes and parameter settings. As a result, if a state is discovered which is still allowed by the order of operation, but in continuous operation generates an error and thereafter leads to shutdown of the drive, a warning will be generated in the case where this state appears again.

The warning class is evident from the diagnostic message

Warning Classes

Warnings can be separated into 2 classes. They differentiate if the drive will perform an automatic response with the appearance of a warning.

Warning Class:	Diagnostic Message:	Drive Reaction:
with Drive Response	E8xx	Drive Stop
without Drive Response	E2xx	--

Fig. 2-9: Division of the Warning Classes

Warnings can not be externally deleted.

E201 No mains connected

Cause:

After the control voltage has been switched on, the drive checks to see if the mains connection of the power supply has also been switched on. This warning is given if this has not happened correctly.

Remedy:

Check power connections (external relay, fuse, etc.).

E202 Not ready for power on

Cause:

As usually happens, the main contactor K1 was turned off when the controller enable was not set. Because of the drive controller capacities, the DC bus voltage must not decrease suddenly after the main contactor is turned off. This message is generated as long as the DC bus voltage > 250V and prevents the main contactor from being turned on. This serves to protect discharging resistors.

Remedy:

The warning is automatically recalled by the drive controller when the DC bus voltage falls below 250V.

E219 Warning Drive temp. surveillance defective

Temperature monitoring checks to see if the measured drive controller temperature is within reasonable bounds. If it determines that it is lower than -10°C, then it is assumed the measuring unit is defective. Warning **E219 Warning Drive temp. surveillance defective** will appear for 30 seconds. Afterwards the drive will be brought to a standstill according to the selected error response and message **F220 Bleeder overload shutdown** will be generated.

Cause:

1. Sensor not connected to the DRP3 circuit board.
2. Broken cable in the drive controller, or defective sensor.

Remedy:

Exchange or repair the drive controller.

E221 Warning Motor temp. surveillance defective

Temperature monitoring checks to see if the measured motor temperature is within reasonable bounds. If it determines that it is lower than -10°C , then it is assumed the measuring unit is defective. Warning **E221 Warning Motor temp. surveillance defective** will appear for 30 seconds. Afterwards the drive controller will be brought to a standstill according to the selected error response and message **F221 Error Motor temp. surveillance defective** will be generated.

Cause:

1. Motor temperature sensor not connected.
2. Broken cable.
3. Defective sensor.
4. Broken cable in drive controller.

Remedy:

For 1. Connect the sensor to the drive controller and to the motor (see project planning specifications for the motor).

For 2. Exchange the wiring between the drive controller and the motor.

For 3. Exchange the motor.

For 4. Exchange the drive controller.

E225 Motor overload

The maximum possible motor current is reduced in order to protect the motor from being destroyed.

If a current flows in the that is greater than 2.2 times the motor current at standstill S-0-0111, the maximum possible motor current (motor peak current S-0-0109) is reduced. With 4-fold motor current at standstill, the reduction starts after 400 ms. With 5-fold current it starts earlier, and with 3-fold current later.

The **E225 Motor overload** warning is issued when the motor peak current is reduced by the limitation.

The reduction also has an effect on the active permanent current P-0-4045.

E226 Undervoltage in power section

If bit 5 of the **P-0-0118, Power off on error** parameter has been set, an undervoltage condition will be handled as a nonfatal warning. The drive issues this warning if the drive enabling signal is present and the DC bus voltage message disappears.

Cause:

Power supply unit is switched off or mains failure occurs while the drive enabling signal is set.

Remedy:

Switch off the drive enabling signal before you switch off the power supply unit.

E247 Interpolation velocity = 0

The drive-internal position command value interpolator is active if

- the "drive-internal interpolation" mode,
- the "relative drive-internal interpolation" mode,
- drive-controlled homing
- drive halt

are active.

The E247 warning is issued if the employed velocity specification is 0. Possible velocity specifications are:

- **S-0-0259, Positioning velocity**
- **S-0-0041, Homing velocity**
- **S-0-0091, Bipolar velocity limit value**

E248 Interpolation acceleration = 0

The drive-internal position command value interpolator is active if

- the "drive-internal interpolation" mode,
- the "relative drive-internal interpolation" mode,
- drive-controlled homing
- drive halt

are active.

The E248 warning is issued if the employed acceleration specification is 0. Possible acceleration specifications are:

- **S-0-0260, Positioning acceleration**
- **S-0-0042, Homing acceleration**
- **S-0-0138, Bipolar acceleration limit value**

E249 Positioning velocity S-0-0259 > S-0-0091

Cause:

A velocity that is used for approaching a target position is specified in the **S-0-0259, Positioning velocity** parameter for the "drive-internal interpolation" and "relative drive-internal interpolation" modes.

Message E249 is generated if this velocity is greater than the permissible maximum value **S-0-0091, Bipolar velocity limit value**. At the same time, bit 5 of **S-0-0012, Class 2 diagnostics** is set.

Remedy:

Reduce the value of **S-0-0259, Positioning velocity**.

E250 Drive overtemp. prewarning

The temperature of the heatsink in the drive controller has reached the maximum permissible temperature. The drive controller follows the command value input for a period of 30 seconds. This makes it possible to bring the axis to a standstill with the control system while keeping true to the process (for example, close the operation, leave the collision area, etc.).

After 30 seconds, the response set in parameter **P-0-0119, Best possible deceleration** will be performed by the drive controller.

Cause:

1. Failure of the drive's internal blower.
2. Failure of the control cabinet's climate control.
3. Incorrect control cabinet dimensioning in regards to heat dissipation.

Remedy:

- For 1. If the blower fails, exchange the drive controller.
- For 2. Install climatization feature in the cabinet.
- For 3. Check the dimensions of the control cabinet.

E251 Motor overtemp. prewarning

The motor is too hot. The motor temperature, which is displayed in parameter **S-0-0383, Motor temperature**, has exceeded the value in **S-0-0201, Motor warning temperature**. Warning E251 is generated. If the temperature increases above the value in **S-0-0204, Motor shutdown temperature**, error **F219 Motor overtemp. shutdown** will be generated.

The values for parameters **S-0-0201, Motor warning temperature** and **S-0-0204, Motor shutdown temperature** are set at 140°C and 150°C for MKD and MDD motors respectively.

Set MDD, MKD and MKE motors to 145°C or 155°C.

Cause:

The motor became overloaded. The effective torque required of the motor was above the permissible continuous standstill torque for too long.

Remedy:

Check the layout of the motor. For systems which have been in use for a long time, check to see if the drive controller conditions have changed (in regards to pollution, friction, components which have been moved, etc.).

E253 Target position out of travel zone

Cause:

In "Drive-controlled interpolation" operating mode, a check is performed to see whether the specified **S-0-0258, Target position**, is within the possible travel region of the drive.

This is defined by parameters **S-0-0049, Positive position limit value** and **S-0-0050, Negative position limit value**.

Message E253 is generated if the target position lies outside of the travel range. Additionally, warning bit 13 is set in **S-0-0012, Class 2 diagnostic**.

Remedy:

Check the specified **S-0-0258, Target position** and correct it, if necessary.

E255 Feedrate-override S-0-0108 = 0

The travel velocity used in drive-controlled travel commands can be changed with parameter **S-0-0108, Feedrate override**.

This warning is given if the value of this parameter is 0, since the drive cannot then follow command values.

Cause:

1. The control system's feed potentiometer is set to zero or is being evaluated incorrectly.
2. The parameter was set to an incorrect value.

Remedy:

For 1. Check the feed potentiometer.

For 2. Set the parameter to the correct value for the application.

E257 Continuous current limit active

The thermal controller load is monitored. If a rated current profile is demanded of the drive controller which would require too high a power transistor load over time (too much warming of the power output stage), the drive controller will react by dynamically reducing the effective peak current. This warning will be given at the same time. Parameter **P-0-4046, Active peak current** is reduced. Before the peak current is actually limited, the advance warning message **E261 Continuous current limitation prewarning** should have been generated.

Cause:

The drive controller was overloaded.

Remedy:

1. Check the drive layout.
2. Reduce acceleration.

With systems which have been used for longer periods of time, check to see if drive controller conditions have changed in regards to:

- Friction
- Components which have been moved.

E259 Command velocity limit active

In the position control and velocity control operating modes, the effective velocity command value is limited to the value in parameter **S-0-0091, Bipolar velocity limit value**. The warning is given if the resulting velocity command value reaches this limit.

Cause:

Parameter **S-0-0091, Bipolar velocity limit value** was set too low.

Remedy:

In normal operating conditions, set parameter **S-0-0091, Bipolar velocity limit value** to a value 10% greater than the NC effective velocity.

E261 Continuous current limit prewarning

Digital drives are monitored by a continually operating temperature model. If the thermal load reaches 100%, the continuous current limit will be activated shortly thereafter.

Before the torque is reduced, a continuous current limit early warning is given via a switching threshold, which is determined by parameter **P-0-0127, Overload warning**.

To deactivate the warning, enter **P-0-0127 = 100%** into the parameter.

Cause:

The drive controller was overloaded.

Remedy:

1. Check the drive layout.
2. Reduce acceleration.
3. Increase the switching threshold in parameter **P-0-0127, Overload warning**
4. With systems which have been used for longer periods of time, check to see if drive controller conditions have changed in regards to:
 - Friction
 - Components which have been moved
 - Feed during processing.

E263 Velocity command value > limit S-0-0091**Cause:**

The value given to the drive for **S-0-0036, Velocity command value** was greater than permissible.

Remedy:

It is limited to **S-0-0091, Bipolar velocity limit value**.

E410 Slave not scanned or adress 0

While the SERCOS ring is being initialized in communications phase 1, each slave which is to participate in the additional phase uptake must be addressed by the SERCOS master. Slaves which are not addressed or which have been set to drive address "0" indicate this by generating warning E410. Communication with these slaves in higher communications phases is not possible. They work only in the repeater mode.

Cause:

The slave was not scanned in phase 1, or "0" address is set.

Remedy:

- Set the correct slave address.
- Check the SERCOS master configuration.

E825 Overvoltage in power stage

The DC bus voltage has reached impermissibly high values. ($U_d > 475$ V). The drive controller was switched to torque-free operation so as not to endanger the drive's power amplifier.

Cause:

The energy regenerated by a braking drive controller (a main-spindle drive, for example) cannot be converted by the bleeder resistors quickly enough.

Remedy:

The braking slope should have a flatter parameter, or the bleeder capacity can be increased by adding an additional bleeder.

E826 Undervoltage in power section

If bit 3 of the **P-0-0118, Power off on error** parameter has been set, an undervoltage condition will be handled as a "fatal warning", and the motor-driven operation will be shut down. The drive issues this warning if the drive enabling signal is present and the DC bus voltage message disappears.

Cause:

Power supply unit is switched off or mains failure occurs while the drive enabling signal is set.

Remedy:

Switch off the drive enabling signal before you switch off the power supply unit.

E829 Positive position limit exceeded

The drive received a command value which resulted in an axis position outside the positive travel range. The axis was brought to a standstill by setting the velocity command value to zero. A class 1 diagnostic error is not generated. The drive will automatically follow command values which lead into the allowable range after they are entered. "Handle travel range exceeded as warning" is set in bit 2 of parameter **P-0-0090, Command value transmit time (TMTSG)**.

Cause:

S-0-0049, Positive position limit value exceeded.

Remedy:

Enter command values which lead back into the allowable range.

Note: Only such command values will be accepted which lead back into the allowed working range. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a hysteresis for the travel limits.

E830 Negative position limit exceeded

The drive received a command value which resulted in an axis position outside the negative travel range. The axis was brought to a standstill by setting the velocity command value to zero. A class 1 diagnostic error is not generated. The drive will automatically follow command values which lead into the allowable range after they are entered. "Handle travel range exceeded as warning" is set in bit 2 of parameter **P-0-0090, Travel limit parameter**.

Cause:

S-0-0050, Negative travel limit value exceeded.

Remedy:

Enter command values which lead back into the allowable range.

Note: Only such command values will be accepted which lead back into the allowed working range. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a hysteresis for the travel limits.

E834 Emergency-Stop

The emergency stop switch was pressed, thus causing the drive to perform the emergency stop function that has been selected via the **P-0-0119, Best possible deceleration** parameter. There is no error message issued to the controller.

Cause:

The emergency stop switch was pressed.

Remedy:

Eliminate the malfunction that led to the activation of the emergency stop switch. The warning will then extinguish.

E843 Positive limit switch activated

The drive has been provided with a command value that leads to an axis position outside the positive travel range. The axis is topped by setting the velocity command value to zero. A status class 1 error is not generated. The drive automatically follows command values that lead back into the valid range. Bit 2 of **P-0-0090, Travel limit parameter** is set to "**Overtravelling is handled as a warning**".

Cause:

Positive limit switch has been actuated.

Remedy:

Specify command values that lead back to the valid range.

E844 Negative limit switch activated

The drive has been provided with a command value that leads to an axis position outside the negative travel range. The axis is topped by setting the velocity command value to zero. A status class 1 error is not generated. The drive automatically follows command values that lead back into the valid range. Bit 2 of **P-0-0090, Travel limit parameter** is set to "**Overtravelling is handled as a warning**".

Cause:

Negative limit switch has been actuated.

Remedy:

Specify command values that lead back to the valid range.

3 Description of Diagnostic Letters C... and A...

3.1 Command Diagnostic Messages C... and D

The commands are used for control of complex features in the drive.

For example, the features "drive controlled homing procedure" or "Communication Phase 4 Transition Check" are defined as commands.

Commands can start, interrupt or erase a primary control.

A parameter belongs to each command whereby the command can be controlled by the parameter.

During the command operation, the diagnostic message "Cx" appears in the H1 display where the x stands for the number of the command.

It can distinguish between 3 types of commands.

Command Types

- **Drive Commands**
 - Lead to an eventual automatic drive movement
 - Can be started only through an inputted control enable
 - Deactivates the active operating mode during its operation
- **Monitor Commands**
 - Activation or deactivation of monitors or features
- **Management Commands**
 - Lead management tasks that are not interruptable

3.2 Command diagnostic messages

C100 Communication phase 3 transition check

Meaning:

The command **S-0-0127, C1 Communication phase 3 transition check** has been activated.

C101 Invalid communication parameter (S-0-0021)

Cause:

Communications parameters which are needed to operate the drive in communication phase 3 are invalid.

Remedy:

A list of the invalid parameters can be seen in parameter **S-0-0021, List of invalid op. data for comm. ph. 2**.

The invalid parameters must be rewritten so they are correct.

C104 Config. IDN for MDT not configurable

Cause:

Telegram type 7 was set in parameter **S-0-0015, Telegram type parameter**. Parameters which are missing in **S-0-0188, List of configurable data in MDT** are kept in **S-0-0024, Configuration list for the master data telegram**.

Remedy:

You must either set a priority telegram (Telegram type = 0..6) or else provide **S-0-0024, Config. list of the master data telegram** with parameters. These parameters are also contained in **S-0-0188, List of configurable data in the MDT**.

C105 Configured length > max. length for MDT

Cause:

Telegram type 7 was set in parameter **S-0-0015, Telegram type parameter**. The length of the configured record in MDT, which is determined by **S-0-0024, Configurations list of the master data telegram**, exceeds the maximum permissible length **S-0-0186, Length of the configurable data record in the MDT**.

Remedy:

You must either set a priority telegram in **S-0-0015, Telegram type parameter** (telegram type = 0..6) or else reduce the number of configurable parameters in MDT.

C106 Config. IDN for AT not configurable

Cause:

Telegram type 7 was set in parameter **S-0-0015, Telegram type parameter**. Parameters which are not contained in **S-0-0187, List of configurable data in AT** can be seen in **S-0-0016, Custom amplifier telegram configuration list**.

Remedy:

You must either set a priority telegram in parameter **S-0-0015, Telegram type parameter** (telegram type = 0..6) or you must provide **S-0-0016, Custom amplifier telegram configuration list** with parameters that are contained in **S-0-0187, List of configurable data in the AT**.

C107 Configured length > max. length for AT**Cause:**

Message frame type 7 has been selected in **S-0-0015, Telegram Type Parameter**. The length of the configured data record in the AT, that is defined via **S-0-0016, Custom amplifier telegram configuration list**, exceeds the maximum permissible **S-0-0185, Length of the configurable data record in the AT**.

Remedy:

Either select the priority message frame via **S-0-0015, Telegram Type Parameter** (message frame type = 0..6) or reduce the number of configured parameters in the AT (**S-0-0016**).

C108 Time slot parameter > Sercos cycle time**Cause:**

One of the time slot parameters:

- **S-0-0006, AT transmission starting time (T1)**
- **S-0-0089, MDT transmission starting time (T2)**
- **S-0-0007, Feedback acquisition starting time (T4)**
- **S-0-0008, Command valid time (T3)**

exceeds **S-0-0002, SERCOS Cycle time (Tscyc)**.

Remedy:

Correct the appropriate parameter(s). These times are determined by the manufacturer of the control system and are specified by the SERCOS interface.

C109 Position of data record in MDT (S-0-0009) even**Cause:**

Parameter **S-0-0009, Beginning address in master data telegram** contains an even value. This is not permitted.

Remedy:

Parameter **S-0-0009, Beginning address in master data telegram** must be set to an odd value. These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

C110 Length of MDT (S-0-0010) odd**Cause:**

Parameter **S-0-0010, Length of master data telegram** contains an odd value. This is not permitted.

Remedy:

Parameter **S-0-0010, Length of master data telegram** must be set to an even value. These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

C111 ID9 + Record length - 1 > length MDT (S-0-0010)**Cause:**

Parameter(s) are set incorrectly for **S-0-0009, Beginning address in master data telegram** and **S-0-0010, Length of master data telegram**. The length of the record in MDT for the drive plus the starting address in MDT is greater than the total length of the MDT.

Remedy:

The parameters for **S-0-0009, Beginning address in master data telegram** and **S-0-0010, Length of master data telegram** must be corrected. Those parameters are determined by the manufacturer of the control system and are specified by the SERCOS interface.

C112 TNcyc (S-0-0001) or TScyc (S-0-0002) error**Cause:**

Only 500 us or even multiples of 1ms are permitted as valid values for **S-0-0001, NC Cycle time (TNcyc)** and **S-0-0002, SERCOS Cycle time (Tscyc)**. Here, this is not the case.

Remedy:

S-0-0001, NC Cycle time (TNcyc) and **S-0-0002, SERCOS Cycle time (Tscyc)** must be corrected. These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

C113 Relation TNcyc (S-0-0001) to TScyc (S-0-0002) error**Cause:**

The value of **S-0-0001, NC Cycle time (TNcyc)** can only be equal to or be a multiple of **S-0-0002, SERCOS Cycle time (Tscyc)**. Here this is not the case.

Remedy:

S-0-0001, NC Cycle time (Tncyc) and **S-0-0002, SERCOS Cycle time (Tscyc)** must be corrected. These parameters are determined by the manufacturer of the control system and are specified by the SERCOS interface.

C114 T4 > TScyc (S-0-0002) - T4min (S-0-0005)**Cause:**

The maximum permissible value for **S-0-0007, Feedback acquisition starting time (T4)** is:

**S-0-0002, SERCOS Cycle time (Tscyc) -
S-0-0005, Minimum feedback acquisition time(T4min).**

The value for **S-0-0007, Feedback acquisition starting time (T4)** is incorrect.

Remedy:

****Correct S-0-0007, Feedback acquisition starting time (T4).** These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

C115 T2 too small

Cause:

The value set for **S-0-0089, MDT Transmit starting time (T2)** is incorrect. The drive cannot work with this value.

Remedy:

****Correct S-0-0089, MDT Transmit starting time (T2).**

These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

C200 Communication phase 4 transition check

Meaning:

The command **S-0-0128, C200 Communication phase 4 transition check** has been activated.

C201 Invalid parameter(s) (->S-0-0022)

Cause:

Parameters which will be necessary to operate the drive in communications phase 4 are invalid. The invalid parameters can be seen in **S-0-0022, IDN list of invalid op. data for comm. ph. 3.**

Remedy:

The parameters of **S-0-0022, IDN list of invalid op. data for comm. ph. 3** must be rewritten so they are correct.

C202 Parameter limit error (->S-0-0022)

Cause:

Parameters which are necessary to operate the drive in communications phase 4 are either outside of their minimum or maximum input values or the entered value can't be processed (for BIT bars). The incorrect parameters are listed in **S-0-0022, IDN list of invalid op. data for comm. ph. 3.**

Remedy:

The parameters of **S-0-0022, IDN list of invalid op. data for comm. ph. 3** must be rewritten so they are correct.

C203 Parameter calculation error (->S-0-0022)

Cause:

Parameters that are required for phase-4 operation (operating mode) cannot be processed in that way. The incorrect parameters are listed in **S-0-0022, IDN List of Invalid Op. Data for Comm. Ph. 3.**

Remedy:

Write correct values to the parameters in **S-0-0022, IDN List of Invalid Op. Data for Comm. Ph. 3**.

C204 Motor type P-0-4014 incorrect

An MDD-, MKD or MKE motor (value 1 or 5) is entered into parameter **P-0-4014, Motor type**. The appropriate abbreviation "MDD", "MKD", or MKE however, was not found in parameter **S-0-0141, Motor type** in the motor feedback data memory.

Cause:

1. Incorrect parameter set for type of motor.
2. The motor feedback memory cannot be read.

Remedy:

For 1. Enter the type of motor used in parameter **P-0-4014, Motor type**

For 2. Check feedback connection.

If feedback is defective, exchange motor.

C210 External feedback required (->S-0-0022)**Cause:**

Values that require an external encoder have been entered in **S-0-0147, Homing Parameter** or in the **S-0-0032...35, Mode of Operation** parameters. However, zero (not available) has been entered in the **P-0-0075, Interface Feedback 2, external** parameter.

The ident number of the parameter that requires the external encoder is entered in **S-0-0022, IDN List of Invalid Op. Data for Comm. Ph. 3**.

Remedial action:

Modify **S-0-0147, Homing Parameter** or the **S-0-0032...35, Mode of Operation** parameters to utilization of the motor encoder instead of external encoder.

Set **P-0-0075, Interface Feedback 2, external** to a value different than zero to activate the external measuring system.

C211 Invalid feedback data (->S-0-0022)

Invalid data has been encountered when the parameters stored in the motor feedback were read, or an error has occurred when the data was read.

Causes:

1. Motor feedback cable not connected or defective
2. Motor feedback defective
3. Drive controller defective

Remedy:

Ref. 1. Check motor feedback cable; connect both sides

Ref. 2. Replace motor

Ref. 3. Replace amplifier

C212 Invalid amplifier data (->S-0-0022)

During drive initialization, the operating software fetches data from an EEPROM in the drive controller. This error message is generated after that access has failed.

Causes:

Defective hardware in the drive controller.

Remedial action:

Replace drive controller.

C213 Position data scaling error

Cause:

The scaling parameters for position data permit the position data display format to be selected. The drive-internal position data format depends on the employed motor encoder and the encoder resolution. The factor used for converting the position data from the drive-internal format into the display format or vice versa is outside the processable range, because either

- linear motor and rotary position scaling with motor reference, or
- rotary motor and linear position scaling with motor reference, or
- linear motor with modulo scaling has been selected; or
- the determined factor used for converting the position data from the display format to the internal format, and vice versa, cannot be represented.

Remedy:

Checking and correcting the relevant parameters, such as:

- **S-0-0076, Position data scaling type**
- **S-0-0077, Linear position data scaling factor**
- **S-0-0078, Linear position data scaling exponent**
- **S-0-0079, Rotational position resolution**
- **S-0-0116, Resolution of motor feedback**
- **S-0-0121, Input revolutions of load gear**
- **S-0-0122, Output revolutions of load gear**
- **S-0-0123, Feed constant**
- **P-0-0074, Interface feedback 1**
- **S-0-0277, Position feedback 1 type parameter**

C214 Velocity data scaling error

Cause:

The scaling parameters for velocity data permit the velocity data display format to be selected. The drive-internal velocity data format depends on the employed motor encoder and the encoder resolution. The factor used for converting the velocity data from the drive-internal format into the display format or vice versa is outside the processable range.

Remedy:

Checking and correcting the relevant parameters, such as:

- **S-0-0044, Velocity data scaling type**
- **S-0-0045, Velocity data scaling factor**
- **S-0-0046, Velocity data scaling exponent**
- **S-0-0116, Resolution of motor feedback**
- **S-0-0121, Input revolutions of load gear**
- **S-0-0122, Output revolutions of load gear**
- **S-0-0123, Feed constant**
- **P-0-0074, Interface feedback 1**
- **S-0-0277, Position feedback 1 type parameter**

C215 Acceleration data scaling error

Cause:

The display format of the acceleration data can be set for the acceleration data using scaling parameters. The drive-controlled format of the acceleration data is dependent on what motor encoder and encoder resolution are used. The factor for converting acceleration data from internal drive format to display format (or vice-versa) is outside the workable range.

Remedy:

Check and set the relevant parameters correctly as follows:

- **S-0-0160, Acceleration data scaling type**
- **S-0-0161, Acceleration data scaling factor**
- **S-0-0162, Acceleration data scaling exponent**
- **S-0-0116, Resolution of motor feedback**
- **S-0-0121, Input revolutions of load gear**
- **S-0-0122, Output revolutions of load gear**
- **S-0-0123, Feed constant**
- **P-0-0074, Interface feedback 1**
- **S-0-0277, Position feedback 1 type parameter**

C216 Torque/force data scaling error

Cause:

The display format of the torque/force data can be set for the torque/force data using scaling parameters. The factor for converting torque data from drive-controlled format to display format (or vice-versa) is outside the workable area.

Remedy:

Check and set the relevant parameters correctly as follows:

- **S-0-0086, Torque/force data scaling type**
- **S-0-0093, Torque/force data scaling factor**
- **S-0-0094, Torque/force data scaling exponent**
- **S-0-0110, Amplifier peak current**
- **S-0-0111, Motor current at standstill**

C217 Motor feedback data reading error

If you have entered these values into **P-0-0074, Interface feedback 1**:

- "1" for standard interface,
- "4" for DFF module, or
- "8" for DAG module (Endat)

then the attached encoder must have a feedback data memory. The values for the encoder resolution and the feedback type are taken from there. An error was discovered while reading these values.

Cause:

1. Defective motor feedback cable.
2. Defective motor feedback.

Remedy:

- For 1. Check the motor feedback cable.
For 2. Exchange the motor.

C218 External feedback data reading error

If **P-0-0075, Interface feedback 2, external** is set at

- "1" for standard interface,
- "4" for DFF module, or
- "8" for DAG module (Endat)

then the attached encoder must have a feedback data memory. The values for the encoder resolution and the feedback type are taken from there. An error was discovered while reading these values.

Cause:

1. Defective measurement system cable.
2. Defective measurement system.

Remedy:

- For 1. Check the measurement system cable.
For 2. Exchange the measurement system.

C220 Motor feedback initializing error

A number of tests are performed when the motor encoder is initialized. An error was detected during this process. This error may be:

- Error while reading the angle rectification data
- Error while copying the angle rectification data
- Interruption of communication with the encoder
- Assembly error with the position of an initialization track
- Error while reading the analog signal of an initialization track
- Error in the pointer length of the analog signal of an initialization track
- Invalid offset between the high and low resolution track
- Error in the measuring system micro-controller

Cause:

1. Defective motor feedback cable.
2. Defective motor feedback.
3. Defective measurement system interface.

Remedy:

- For 1. Check the motor feedback cable.
- For 2. Exchange the motor.
- For 3. Exchange the measuring system interface (module).

C221 Ext. feedback initializing error

Several checks are performed during the initialization of an external encoder. An error was detected during this process. This error may be:

- Error while reading the angle rectification data
 - Error while copying the angle rectification data
- Interruption of communication with the encoder
- Assembly error with the position of an initialization track
 - Error while reading the analog signal of an initialization track
 - Error in the pointer length of the analog signal of an initialization track
 - Invalid offset between the high and low resolution track
 - Error in the measuring system micro-controller
 - External 24V set for SSI interface with DAG 1.2

Cause:

1. External encoder cable defect.
2. Defective feedback.
3. Defective measurement system interface.

Remedy:

- For 1. Check the external feedback cable.
- For 2. Exchange feedback.
- For 3. Exchange the measuring system interface (module).

C223 Input value for max. range too high

Cause:

An internal position resolution has been selected via the **S-0-0278, Maximum travel range** parameter that no longer guarantees a correct commutation of the motor.

Remedy:

Select a smaller value for the **S-0-0278, Maximum travel range** parameter.

C225 Coprocessor not ready for initialization

The drive controller has a coprocessor. This coprocessor is initialized during the transfer command. The coprocessor signals that it is ready for initialization. If it is not ready, this error is generated.

Cause:

Coprocessor failed.

Remedy:

Exchange the drive controller.

C226 Coprocessor acknowledge failed

The drive controller has a coprocessor. This coprocessor is initialized during the transfer command. If the coprocessor does not confirm the initialization by the master processor, this error will be generated.

Cause:

The coprocessor failed.

Remedy:

Exchange the drive controller.

C227 Modulo range error

Causes:

The selected modulo value is greater than half the position representation range of the drive.

Remedy:

Decrease the modulo value.

C228 Controller type S-0-0140 wrong

Several internal software settings are made based on parameter **S-0-0140, Controller type**. If the content of this parameter cannot be used, then this error will be generated.

Cause:

1. The controller type cannot be processed by this software.
2. Amplifier EEPROM defective.

Remedy:

For 1. Contact Indramat.

For 2. Exchange/repair the control device.

C231 Emulator not loadable

Cause:

The position emulator on the DAE02.1 interface is loaded from a ROM module according to the selection made in P-0-4020. With ELS firmware, the incremental encoder firmware is always loaded; P-0-4020 does not exist in this case. The loading process is monitored; this error message is generated in the event of a malfunction. The cause is a hardware defect on the DAE02.1 interface.

Remedial action:

Replace the DAE02.1 interface.

C232 Motor encoder interface not present

Cause:

The encoder interface that was selected in the **P-0-0074, Interface feedback 1** parameter has not been installed or cannot be found by the drive (due to a defect).

Remedy:

Install or replace the selected encoder interface.

C233 External encoder interface not present

Cause:

The encoder interface that has been selected in the **P-0-0075, Interface Feedback 2, external** parameter has not been installed, or is defective and can therefore not be recognized by the drive.

Remedy:

Install or replace the selected encoder interface.

C234 Encoder combination not possible

Cause:

The encoder interface that has been selected in the **P-0-0075, Interface Feedback 2, external** parameter cannot be supported by the drive; it has already been allocated to the motor encoder.

Remedy:

Select another external encoder.

C235 Load-side motor encoder with inductance motor only

Cause:

The functionality of the external encoder can be defined in the **P-0-0185, Function of ext. encoder** parameter. If 'load-side motor encoder' has been selected as the function of the external encoder, that function will only be supported for asynchronous motors.

Remedy:

Set the **P-0-4014, Motor type** parameter according to the employed motor type.

Check the **P-0-0185, Function of ext. encoder** parameter.

C236 Motor feedback required (P-0-0074)

Cause:

A motor encoder is not required ($P-0-0074 = 0$) if a load-sided motor encoder has been selected via the **P-0-0185, Function of ext. encoder** parameter. However, **S-0-0147, Homing parameter** or the **S-0-0032...35, Mode of Operation** parameters contain values that require a motor encoder.

Remedy:

Change **S-0-0147, Homing parameter** or the **S-0-0032...35, Mode of Operation** parameters such that they are suitable for using an external encoder.

Enter a value $\neq 0$ in the **P-0-0074, Interface feedback 1** parameter to activate the motor encoder.

C300 Set absolute measuring

Command **P-0-0012, C300 Command 'Set absolute measurement'** was activated by the control system in use.

C302 Absolute measuring system not installed

Command **P-0-0012, C300 Command 'Set absolute measurement'** was started without an absolute measuring system being present.

The command cannot be processed because no absolute measuring system is available.

Cause:

1. The command should not have been activated.
2. The contacted motor or the external measurement system was not executed as an absolute encoder.

Remedy:

For 1. Stop execution of the command.

For 2. Equip the motor or external measurement system with an absolute encoder function.

C400 Command: switch to parameter mode

Description:

The command for transition is in parameter mode. While editing the parameters that can be edited only in parameter mode, this command must be processed.

C401 Drive active, switching not allowed

Cause:

The command **C400 Command: Switch to parameter mode** would be started without the control enable being activated.

Remedy:

End the command and turn off the drive enable, then the command can be started from the beginning.

C402 Only allowed without master

Cause:

The command **P-0-4023, C400 Communication phase 2 transition** was started via the serial interface. The command is not executed and terminated with this error message because the active SERCOS interface is of a higher priority and was disturbed.

The command can only be executed if the SERCOS interface is inactive (i.e. there are no signals applied to the receiver of the SERCOS interface).

Remedy:

Perform phase selection via SERCOS interface or de-activate SERCOS interface before the command is started.

C500 Reset class 1 diagnostic, error reset

The command for clearing errors, **S-0-0099, C500 Reset class 1 diagnostic** was activated by the control system in use.

C501 Error delet only in parameter mode

Cause:

An attempt has been made of clearing the error **F822 Motor encoder failure: signal too small** in communication phase 4 (operating mode). This is only possible in communication phases < 4 (parameter setting mode).

Remedy:

1. Switch back the communication phase.
2. Activate the command again.

C600 Drive controlled homing procedure command

Command **S-0-0148, C600 Drive controlled homing procedure command** was activated by the control system in use.

C601 Homing only possible with drive enable

Cause:

The controller enabling signal was not active when the program was started. This is not permitted.

Remedy:

1. Switch on the controller enable signal.
2. Start the command again.

C602 Distance home switch - reference mark erroneous

Cause:

The evaluation of the homing switch has been activated. The distance between the positive homing switch edge and the reference mark that shall be interpreted is outside the valid range.

Remedy:

Read the value from the **S-0-0298, Reference cam shift by..** parameter and enter it in the **S-0-0299, Home switch offset** parameter.

C604 Homing of absolute encoder not possible

Command **S-0-0148, C600 Drive controlled homing procedure command** was activated. An absolute measuring system was selected using the encoder selection in **S-0-0147, Homing parameter**. This command can only run if command **P-0-0012, C300 Command 'Set absolute measurement'** has been previously activated.

Remedy:

First activate command **P-0-0012, C300 Command 'Set absolute measurement'**, and then start command **S-0-0148, C600 Drive controlled homing procedure command**. This procedure will define the absolute reference point.

C700 Basic load

With motors of the MDD, MKD and MKE series, the controller parameters for the connected motor that are stored in the controller are set to their default values by activating the controller parameters that are stored in the motor feedback. The drive controller issues the C7 message to indicate that the **C700 Basic load** command has been activated via the command parameter **S-0-0262, C700 Command basic load**.

Cause:

The command **C700 Basic load** has been activated.

C701 Basic load not possible if drive is enabled

Cause:

Command **S-0-0262, C700 Command basic load** cannot be run if the controller enable is set.

Remedy:

1. Disable controller enable.
2. Start the command again.

C702 Default parameters not available

With motors of the MDD, MKD and MKE series, adapting the control loops to the connected digital drive is done by activating the speed controller parameters that are stored in the motor feedback. The drive controller employs the C702 message to signal that the **S-0-0262, C700 Command basic load** command has been activated, but that there is no data memory at the connected motor.

Remedy:

Order the parameter sheet of the employed motor from INDRAMAT Service, and enter the parameters.

C703 Default parameters invalid

Cause:

The default parameters are read from the motor feedback data memory. At least one of these parameters is invalid.

Remedy:

Check the connection to the motor feedback. Exchange motor if necessary.

C704 Parameters not copyable

Cause:

The default parameters in use are not compatible with this software version.

Remedy:

Contact Indramat.

C705 Locked with password

The parameter **S-0-0267, Password** offers the possibility to set a write protection for the drive parameters. The diagnostic message **C705 Locked with Password** indicates, that the command **C700 Basic Load** has been started, although the drive parameters are protected with the customer password.

C800 Default parameter load

Default values of all parameters in the **S-0-0192, IDN-list of backup operation data** are stored in the drive. Those values define a basic state of the drive that permits the drives to be switched "operational". Mechanical components and control loop settings are **not** taken into consideration. Starting the **C800 Default parameter load** command loads the default values into the related parameters and sets them valid.

Cause:

The **C800 Default parameter load** command has been activated.

C801 Parameter default value erroneous (-> S-0-0021)

Cause:

During the execution of **P-0-4094, C800 Command Base-parameter load**, a default value that has been stored in the drive was recognized as being incorrect. The related parameter is entered in **S-0-0021, IDN-list of invalid op. data for comm. Ph. 2**.

C802 Locked with password

The parameter **S-0-0267, Password** offers the possibility to set a **write protection** for the drive parameters. The diagnostic message **C705 Locked with password** indicates, that the command **P-0-4094, C800 Command Base-parameter load** has been started, although the drive parameters are protected with the customer password.

D300 Command adjust commutation

Meaning:

A correctly adjusted commutation offset is mandatory for the operation of synchronous motors. The "D3" message indicates that the command has been activated, that is used for determining the commutation offset.

Cause:

The commutation setting command has been activated.

D301 Drive not ready for commutation command

Cause with linear motor:

There must not be a controller enable signal when the command is started. However, it must be in communication phase 4 ("bb" or "Ab" displayed).

Cause with rotary synchronous motor:

The drive must be in torque control mode when the "D3" command is started.

This error message is generated if those conditions are not satisfied.

Remedial action with linear motor:

Depending on the motor type, switch off the controller enable signal and start the command again.

Remedial action with rotary synchronous motor:

Activate torque control and start the command again.

D500 Command 'get mark position'

Meaning:

The **P-0-0014, D500 Command determine marker position** command can be used for checking the correct acquisition and position of the reference marker of an incremental measuring system. The "d5" display shows that the command has been activated.

Cause:

The **Determine marker position** command has been activated.

D501 Incremental encoder required

Cause:

The command has been started for a measuring system that does not possess real reference markers. These include measuring systems such as DSF, EnDat, SSI or resolver measuring systems.

Remedy:

Check whether the correct encoder has been selected in **S-0-0147, Homing parameter**.

Employ an encoder system with real reference markers.

D600 Cancel reference point procedure command

Meaning:

The reference of the encoder that has been selected via **S-0-0147, Homing parameter** is canceled.

Cause:

The **D600 Cancel reference point procedure command** has been activated.

D700 Parking axis command

Meaning:

The command permits one or more drives of a drive package to be stopped without error messages being issued to the controller and/or the power supply module. The remaining drives of the package can be handled without any restrictions.

Cause:

The **S-0-0139, D700 Command parking axis** command has been activated.

D800 Command measuring wheel operation mode

Meaning:

The command is active.

The position loop is closed with encoder 1 and 2.

Control loop monitoring is de-activated.

Cause:

The **P-0-0220, D800 Command measuring wheel operation mode** command has been activated.

D801 Measuring wheel operation not possible

Meaning:

The measuring wheel command cannot be executed because one of the following conditions is not satisfied:

- External encoder available
- External encoder logged on as measuring wheel encoder (P-0-0185 = 3)
- Position control is active.

Cause:

The **P-0-0220, D800 Command measuring wheel operation mode** command has been activated without the above-mentioned conditions being fulfilled.

D802 Operation mode cancelled

Meaning:

Processing the measuring wheel operation mode command cannot be continued because the required position control mode has been deactivated.

Cause:

The drive enabling signal has been removed while the measuring wheel operation mode command was active; or an error has led to an erroneous reaction.

3.3 Status diagnostic messages

A000 Communication phase 0

The communication process is divided into four communications phases: Phases 0 and 1 are used to recognize the participants. Phase 2 is used to provide the time and data protocols for communications phases 3 and 4.

Initialization is performed in ascending order of the sequence. The defaults of the communications phase are set by the control system. When the switch to communications phase 4 takes place, initialization is completed and input power is enabled.

If the delayed phase switch is interrupted, the status display in the communications phase which has already been reached freezes.

If diagnostic message **A000 Communication phase 0** is active, the drive is in phase 0 and is waiting for a phase transfer to 1 by the control system.

A001 Communication phase 1

The communication process is divided into four communications phases: Phases 0 and 1 are used to recognize the participants. Phase 2 is used to provide the time and data protocols for communications phases 3 and 4.

Initialization is performed in ascending order of the sequence. The defaults of the communications phase are set by the control system. When the switch to communications phase 4 takes place, initialization is completed and input power is enabled.

If the delayed phase switch is interrupted, the status display in the communications phase which has already been reached freezes.

If diagnostic message **A001 Communication phase 1** is active, the drive is in phase 1, and transfer from phase 1 to 2 has not yet been initiated by the control system.

A002 Communication phase 2

The communication process is divided into four communications phases: Phases 0 and 1 are used to recognize the participants. Phase 2 is used to provide the time and data protocols for communications phases 3 and 4.

Initialization is performed in ascending order of the sequence. The defaults of the communications phase are set by the control system. When the switch to communications phase 4 takes place, initialization is completed and input power is enabled.

If the delayed phase switch is interrupted, the status display in the communications phase which has already been reached freezes. If diagnostic message **A002 Communication phase 2** is active, the drive is in phase 2. Before the control system transfers to communications phase 3, command **S-0-0127**, **C100 Communication phase 3 transition check** must be started. If the command is acknowledged negatively, transfer to communications phase 3 is not possible. The problems that were diagnosed by the drive must be solved first.

Note: The parameters are not checked to see if they are correct.

A003 Communication phase 3

The communication connection is divided into four communication phases: Phases 0 and 1 are used to recognize the participants. Phase 2 is used to provide the time and data protocols for communications phases 3 and 4.

Initialization is performed in ascending order of the sequence. The defaults of the communications phase are set by the control system. When the switch to communications phase 4 takes place, initialization is completed and input power is enabled.

If the delayed phase switch is interrupted, the status display in the communications phase which has already been reached freezes. If diagnostic message **A003 Communication phase 3** is active, the drive is in phase 3.

Before the control system transfers to communications phase 4 (operating mode), command **S-0-0128, C200 Communication phase 4 transition check** must be started. If the command is acknowledged negatively, transfer to communications phase 4 is not possible. The problems that were diagnosed by the drive must be solved first.

Note: The parameters are not checked to see if they are correct.

A010 Drive HALT

The feature "Halt drive" was activated. The halt drive feature serves to stop the motor at a defined deceleration and a defined jerk.

This feature can either be activated by deleting the drive halt bits (BIT 13) in the master control word or by interrupting a drive control command (i.e., in drive-controlled homing).

A011 Drive interlock open

Digital drive controllers are equipped with a starting lockout device that prevents an unwanted start of a servo axis. Activating the starting lockout device separates the power stage control electronics from the power stage via a relay contact.

+24 V is applied to the AS+; AS- terminals of the X3 connector.

A012 Control and power sections ready for operation

The drive is supplied with control voltage and the power is switched on. The drive is ready for power delivery.

A013 Ready for power on

The drive is supplied with a control voltage; there are no errors in the drive controller. The drive is ready to be turned on.

A100 Drive in TORQUE control

The drive is in the torque control operating mode. It follows the torque command value sequence which was set by the control system.

A101 Drive in VELOCITY control

The drive is in the velocity control operating mode. It follows the velocity command value sequence set by the control system. The RPM control loop is closed in the drive.

A102 Position mode with encoder 1

The drive is in **position control mode**. The position loop is closed in the drive by a position encoder. The control system only sets the position command value sequence; the drive follows the command value with following (lag) error.

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of the axis position).

A103 Position mode with encoder 2

The drive is in **position control mode**. The position loop is closed in the drive by a position encoder. The control system only sets the position command value sequence; the drive follows the command value with following (lag) error.

Encoder 2 indicates that the position encoder is installed on the machine axis (direct axis position measurement).

A104 Position mode lagless, encoder 1

The drive is in **position control mode**. The position loop is closed in the drive by a position encoder. The control system only sets the position command value sequence; the drive follows the command value **without following (lag) error**.

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of axis position).

A105 Position control lagless, feedback 2

The drive is in **position control mode**. The position loop is closed in the drive by a position encoder. The control system only sets the position command value sequence; the drive follows the command value **without following (lag) error**.

Encoder 2 indicates that the position encoder is installed on the machine axis (direct axis position measurement).

A106 Drive controlled interpolation, encoder 1

The drive receives a position command value from the control system which is identical to the target position of the travel path. Then the drive generates (**interpolates**) an internal position command value sequence, which uses the control system to maintain maximum values for jerk, velocity and acceleration sequences.

The drive moves with following (lag) error to the target position of the travel path.

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of the axis position).

A107 Drive controlled interpolation, encoder 2

The drive receives a position command value from the control system which is identical to the target position of the travel path. Then the drive generates (**interpolates**) an internal position command value sequence, which uses the control system to maintain maximum values for jerk, velocity and acceleration sequences.

The drive moves with following (lag) error to the target position of the travel path.

Encoder 2 indicates that the position encoder is installed on the machine axis (direct axis position measurement).

A108 Drive controlled interpolation, lagless, encoder 1

The drive receives a position command value from the control system which is identical to the target position of the travel path. Then the drive generates (**interpolates**) an internal position command value sequence, which uses the control system to maintain maximum values for jerk, velocity and acceleration sequences.

The drive moves **without following error** to the target position of the travel path.

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of the axis position).

A109 Drive controlled interpolation, lagless, encoder 2

The drive receives a position command value from the control system which is identical to the target position of the travel path. Then the drive generates (**interpolates**) an internal position command value sequence, which uses the control system to maintain maximum values for jerk, velocity and acceleration sequences.

The drive moves **without following error** to the target position of the travel path.

Encoder 2 indicates that the position encoder is installed on the machine axis (direct axis position measurement).

A110 Velocity Synchronization, virtuell Lead drive

The drive is in velocity control mode. The velocity command will be determined in the drive under consideration of the gear ratio as well as the master encoder position.

Virtual Master Encoder means that the position of the master encoder is calculated by the control system.

A112 Phase synchronization, encoder 1, virtual master drive

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The position command value is determined in the drive under consideration of the gear ratio as well as the position of the master encoder.

The drive follows the command value with lag error

Encoder 1 indicates that the position encoder is mounted at the motor shaft (axis position measurement not directly)

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control system.

A113 Phase synchronization, encoder 2, virtual master drive

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The position command value will be determined in the drive under consideration of the gear ratio as well as the position of the master encoder.

The drive follows the command value with a lag error.

Encoder 2 indicates that the position encoder is mounted at the machine axis (axis position measurement directly).

Virtual Master Encoder means, that the position of the master encoder will be calculated through the control.

A116 Phase synchr. lagless, encoder 1, virtual master drive

The drive is in **position mode**. The position loop is closed at the drive through a position encoder. The position command value is determined in the drive under consideration of the gear ratio as well as the position of the master encoder.

The drive follows the command value **without a lag error**.

Encoder 1 indicates that the position encoder is mounted at the motor shaft (axis position measurement not directly)

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control system.

A117 Phase synchr. lagless, encoder 2, virtual master drive

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The position set value is determined in the drive under consideration of the gear ratio as well as the position of the master encoder.

The drive follows the command value **without a lag error**.

Encoder 2 indicates that the position encoder is mounted at the machine axis (axis position measurement directly).

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control.

A120 Pattern control, encoder 1, virtual master drive

The drive is now in operation mode **Patterned gearing**. The position set points are depending on:

- the position of the master encoder
- stored tables in the drive
- a pattern calculator created from conveyed target positions

The drive follows the command with a lag error.

Encoder 1 indicates that the position feedback is mounted at the motor shaft (axis position measurement not directly)

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control.

A121 Pattern control, encoder 2, virtual master drive

The drive is now in operation mode **patterned gearing**. The position command values are dependent on:

- the position of the master encoder
- stored tables in the drive
- a pattern calculator created from conveyed target positions

The drive follows the command value with a lag error.

The encoder 2 indicates that the position feedback is mounted at the machine axis (axis position measurement directly).

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control system.

A124 Pattern control lagless, enc. 1, virtual master drive

The drive is now in operation mode **patterned gearing**. The position command values are dependent on:

- the position of the master encoder
- stored tables in the drive
- a pattern calculator created from conveyed target positions

The drive follows the command value **without a lag error**.

Encoder 1 indicates that the position feedback is mounted at the motor shaft (axis position measurement not directly)

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control.

A125 Pattern control lagless, enc. 2, virtual master drive

The drive is now in operation mode **patterned gearing**. The position command values are depending on:

- the position of the master encoder
- stored tables in the drive
- a pattern calculator created from conveyed target positions

The drive follows the set value **lagless**.

Encoder 2 indicates that the position feedback is mounted at the machine axis (axis position measurement directly).

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control.

A128 Cam shaft, encoder 1, virtual master drive

The drive is in operation mode **cam shaft**. The feature has its origin from the mechanical cam shaft. With this setting a set position relation exists between master- and following axis. The position command values are retrieved from a table, which will be created from the average position of the master encoder. The drive follows the command value with a lag error.

Encoder 1 indicates that the position feedback is mounted at the motor shaft (axis position measurement not directly)

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control.

A129 Cam shaft, encoder 2, virtual master drive

The drive is in operation mode **cam shaft**. The feature has its origin from the mechanical cam shaft. With this setting a set position relation exists between master- and following axis. The position command values are retrieved from a table which will be created from the average position. of the master encoder.

The drive follows the command value with a lag error.

Encoder 2 indicates that the position feedback is mounted at the machine axis (axis position measurement directly).

Virtual Master Encoder means, that the position of the master encoder will be calculated by the control.

A132 Cam shaft, lagless, encoder 1, virt. master drive

The drive is in operation mode **cam shaft**. The feature has its origin from the mechanical cam shaft. With this setting a set position relation exists between master- and following axis. The position command values are retrieved from a table which will be created from the average position of the master encoder.

The drive follows the command value **without a lag error**.

Encoder 1 indicates that the position feedback is mounted at the motor shaft (axis position measurement not directly)

Virtual master Encoder means, that the position of the master encoder will be calculated by the control.

A133 Cam shaft, lagless, encoder 2, virt. master drive

The drive is in operation mode **cam shaft**. The feature has its origin from the mechanical cam shaft. With this setting a set position relation exists between master- and following axis. The position command values are retrieved from a table which will be created from the average position of the master encoder.

The drive follows the command value **without a lag error**.

Encoder 2 indicates that the position feedback is mounted at the machine axis (axis position measurement directly).

Virtual Master Encoder means that the position of the master encoder will be calculated by the control.

A146 Relative drive controlled interpolation, encoder 1

In the **S-0-0282, Travel distance** parameter, the drive receives a distance specification from the controller. When bit 0 of the **S-0-0346, Setup flag for relative command values** parameter is toggled, this distance is summed up to the value in **S-0-0258, Target position**. In order to get from the current position to the new target position, the drive now generates (interpolates) an internal position command value curve. This is done taking the limit values of velocity, acceleration, and jerk in the parameters

- **S-0-0259, Positioning velocity**
- **S-0-0260, Positioning acceleration**
- **S-0-0193, Positioning jerk**

into account.

The drive approaches the target position with a position lag that is proportional to the velocity.

Encoder 1 means that the position encoder is attached to the motor shaft (indirect measurement of the axis position).

A147 Relative drive controlled interpolation, encoder 2

In the **S-0-0282, Travel distance** parameter, the drive receives a distance specification from the controller. When bit 0 of the **S-0-0346, Setup flag for relative command values** parameter is toggled, this distance is summed up to the value in **S-0-0258, Target position**. In order to get from the current position to the new target position, the drive now generates (interpolates) an internal position command value curve. This is done taking the limit values of velocity, acceleration, and jerk in the parameters

- **S-0-0259, Positioning velocity**
- **S-0-0260, Positioning acceleration**
- **S-0-0193, Positioning jerk**

The drive approaches the target position with a position lag that is proportional to the velocity.

Encoder 2 means that the position encoder that is attached to the load is used for closing the position control loop (direct axis position measurement).

A148 Relative drive contr. interpolation, enc. 1, lagless

In the **S-0-0282, Travel distance** parameter, the drive receives a distance specification from the controller. When bit 0 of the **S-0-0346, Setup flag for relative command values** parameter is toggled, this distance is summed up to the value in **S-0-0258, Target position**. In order to get from the current position to the new target position, the drive now generates (interpolates) an internal position command value curve. This is done taking the limit values of velocity, acceleration, and jerk in the parameters

- **S-0-0259, Positioning velocity**
- **S-0-0260, Positioning acceleration**
- **S-0-0193, Positioning jerk**

into account.

The drive approaches the target position of the travel path without a position lag.

Encoder 1 means that the position encoder is attached to the motor shaft (indirect measurement of the axis position).

A149 Relative drive contr. interpolation, enc. 2, lagless

In the **S-0-0282, Travel distance** parameter, the drive receives a distance specification from the controller. When bit 0 of the **S-0-0346, Setup flag for relative command values** parameter is toggled, this distance is summed up to the value in **S-0-0258, Target position**. In order to get from the current position to the new target position, the drive now generates (interpolates) an internal position command value curve. This is done taking the limit values of velocity, acceleration, and jerk in the parameters

- **S-0-0259, Positioning velocity**
- **S-0-0260, Positioning acceleration**
- **S-0-0193, Positioning jerk**

The drive approaches the target position of the travel path without a position lag.

Encoder 2 means that the position encoder that is attached to the load is used for closing the position control loop (direct axis position measurement).

A800 Unknown operation mode

There is no diagnosis for the activated mode.

3.4 Diagnostic messages for basic initialization and after fatal System errors

Diagnostic Message Display: -0

Cause:

The data storage for the controller is tested for its functional capability. If an error is detected, this display will remain.

Remedy:

The drive controller is defective (DRP3) and must be exchanged.

Diagnostic Message Display: -1

Cause:

The data storage for the DSS 2.1 Module is tested for its functional capability.

If an error is detected, this display will remain.

Remedy:

The DSS Module or the connection to the main device is defective.

- If DSS module is defective > exchange
- If drive controller is defective > exchange

Diagnostic Message Display: -2

Cause:

Makeup of the parameter structure.

If the EPROMS are exchanged for another version of the firmware, the parameter memory on the programming module is erased (duration appx. 5 sec.).

Diagnostic Message Display: -3

Cause:

The motor type and the type of the motor feedback are determined by reading their parameter storage areas.

Diagnostic Message Display: -5

During basic initialization, an error was reported by the coprocessor.

Cause:

1. Control voltage error (+24 V or +/-15 V).
2. +/-10 V - error.

Remedy:

For 1. Check the control voltage supply.

For 2. Replace the drive.

Diagnostic Message Display: -6**Cause:**

A fatal processor or program error was encountered.

Remedy:

The error in question is a system error. Please contact the appropriate software development company.

Diagnostic Message Display: Watchdog ●●**Cause:**

A fatal processor or program error (Watchdog) was encountered.

Remedy:

Replace the drive.

3.5 Operation Status

bb

"read for operation"

The drive is ready to be turned on.

Diagnostic message text:

Ready to be turned on (ready for operation)

Ab

"Drive is ready"

The control and power components of the drive are ready for operation.

Diagnostic message text:

Control and power components are ready (drive is ready)

AF

"Drive enable"

The drive enable was issued and operated the activation of the drive. This follows a command value input.

Diagnostic message text:

according to selected operating mode.

AS

"Drive interlock"

The power output was locked. This signal serves the secured torque free switching of the drive independent from existing operating states of the drive packs.

Diagnostic message text:

Drive interlock

AH

"Drive Halt"

The drive will be stopped under the conditions of the acceleration parameter and stays in control.

P0

Phase 0

The drive is in phase 0 and is waiting on the phase transition from phase 0 to phase 1.

Diagnostic message text:

Phase 0

P1**Phase 1**

The transition from phase 1 to phase 2 was still not initiated from the control system.

Remedy:

see the control handbook

P2**Phase 2**

Before the control system switches in the communications phase 3, the controller checks inputted parameters for content of the input limits and for completeness. If invalid parameter values were found, the phase progression switch will stop the drive.

Note: The parameters are not checked for exactness.

Remedy:

In the parameter "Identification Number List Invalid Operating Data Communications Phase 2", the ID numbers S-0-0021 are recorded which were recognized as invalid from the drive before the phase progression switch in communications phase 3. The completion of this parameter is required in order for switching into communications phase 3.

P3**Phase 3**

Before the control system switches in the communications phase 4, the controller checks inputted parameters for content of the input limits and for completeness. If invalid parameter values are recognized, the phase progression switch will be stopped by the controller.

Note: The parameters are not checked for exactness.

Remedy:

In the parameter "ID Number Lists of Invalid Operating Data Communications Phase 3", ID number S-0-0022 records the parameters which were recognized as invalid by the drive before the phase progression switch in communications phase 4. The completion of this parameter is required in order for switching into communications phase 4.

Notes

4 Exchanging Drive Components

4.1 Identification of the Drive Components

Supply Modules

The rating plate of the supply module is below the DC supply terminals L+/L- for the DC bus.

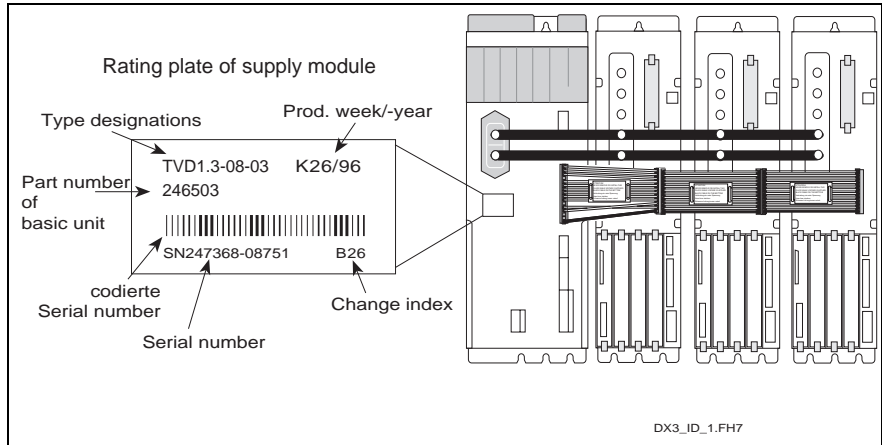


Fig. 4-1: Rating plate on the supply module (Example)

Servicing When contacting INDRAMAT's Customer Service, it is important to have readily available

- the type designation and the
- serial number

of the supply module.

Procuring a Replacement Unit Replacement units are ordered from INDRAMAT with type designation.

Drive Controllers

There are three rating plates on the drive controller to identify firmware and hardware.

DDS02.2/DDS03.2

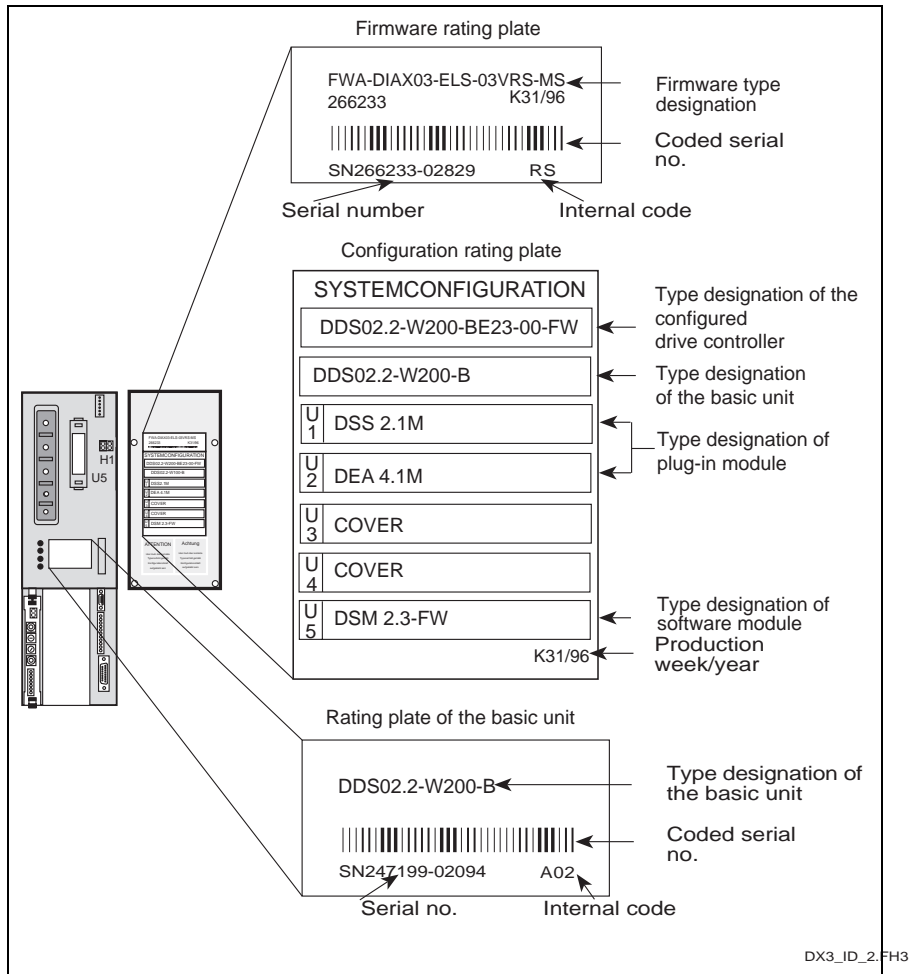


Fig. 4-2: The rating plate of the DDS02.2 and DDS03.2 (Example)

DKR03

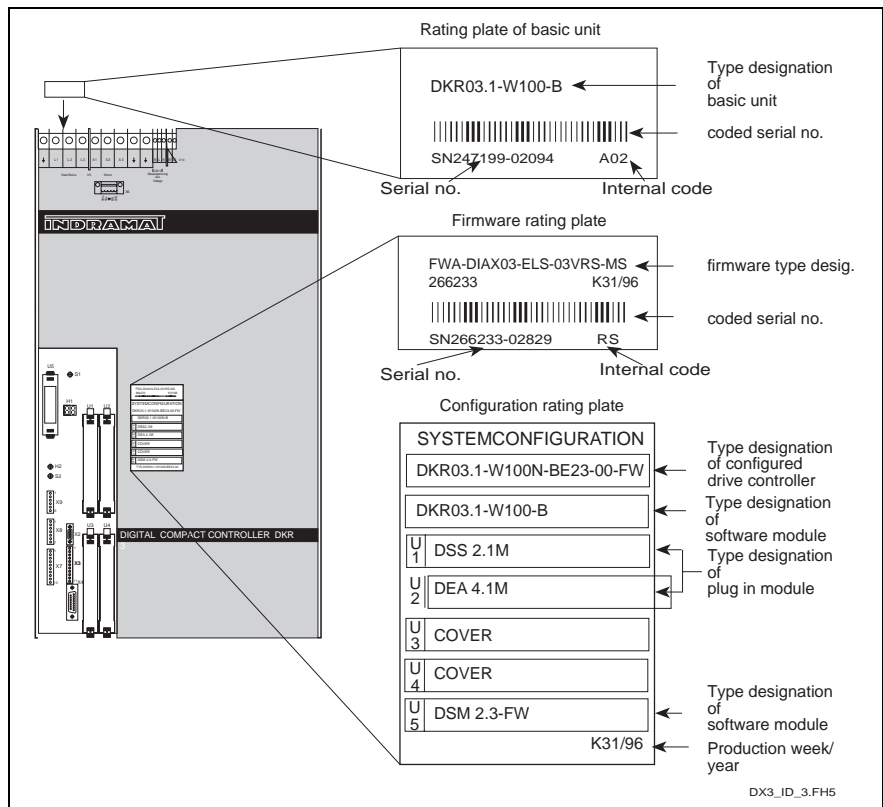


Fig. 4-3: Rating plate of the DKR03.1 (Example)

DKR02, DKR04

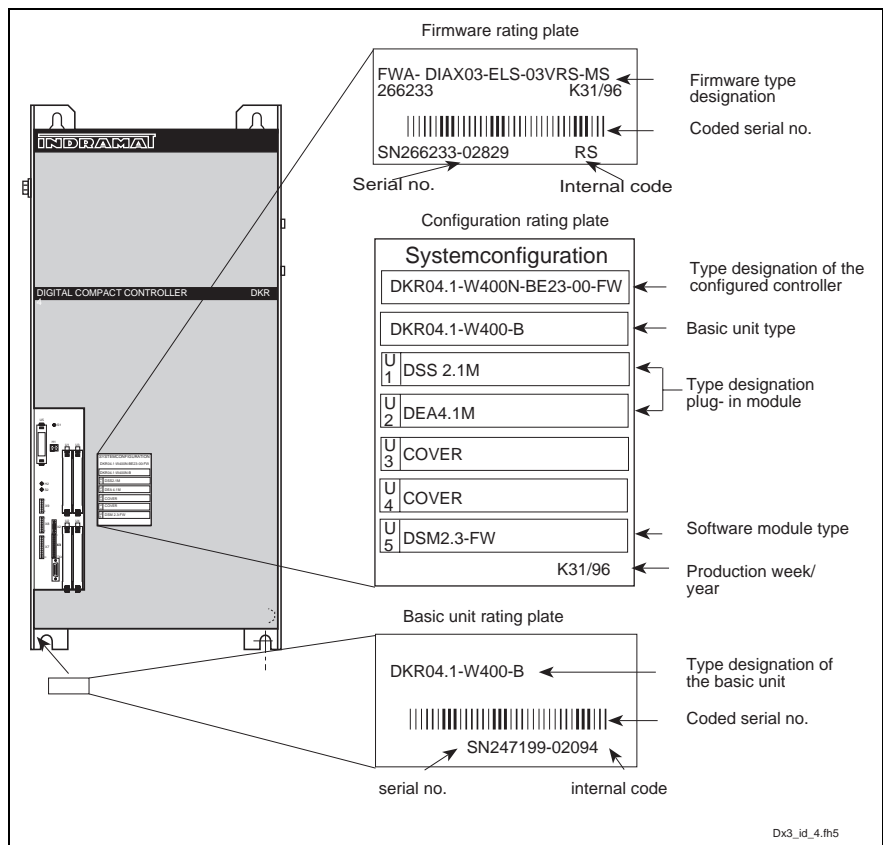


Fig. 4-4: Rating plate of the DKR02.1 and DKR04.1 (Example)

Servicing	<p>When contacting INDRAMAT's Customer Service, it is important to have readily available</p> <ul style="list-style-type: none"> • the type designation of the configured drive controller, • the serial number of the basic unit • and the firmware type designation.
Procuring a configured replacement unit	<p>Replacement units can be obtained from INDRAMAT in the form of completely configured drive controllers . When ordering, please indicate</p> <ul style="list-style-type: none"> • the type designation of the configured drive controller and the • firmware designation. <p>The drive controller is then delivered with plug-in modules U1 to U4, and the software module (U5) plus firmware.</p>
Putting a replacement unit together	<p>The replacement unit can be put together with the basic unit and the plug-in modules. When placing the order or taking it out of a replacement parts facility, e.g., possibly the customer's own, then</p> <ul style="list-style-type: none"> • the type designation of the basic unit and the • type designation of the plug-in module are needed. <p>In the case of a self-configured replacement unit, it is not necessary to order the software module as it can be re-utilized in the replacement. This means that no adjustments of the replacement are needed.</p>
Procuring a new software module	<p>It only makes sense to replace a software module if the drive firmware has a significant error or the functions are to be expanded with a new firmware release status.</p>

Note: The machine parameters are stored on the software module of the drive controller. They can be lost when replacing a module. This means it is advisable to replace the software module only when absolutely necessary!

Needed when ordering are the

- type designations of the software module
- and the firmware type designations.

The most recent and up-to-date firmware version is always delivered.

Motors

A rating plate is mounted on every motor in close proximity to the terminal box or power connector. Should this rating plate be covered by any part of the machine, then an additional rating plate could be mounted in a more visible location on the motor. An additional rating plate is always delivered with every motor. It is taped over the motor rating plate.

- Servicing** When contacting INDRAMAT Customer Service, have ready
- the type designation and the
 - serial number of the motor.

Procuring a replacement motor A replacement motor is ordered from INDRAMAT with the entire type designation.

Electrical Connections

Ready-made cables

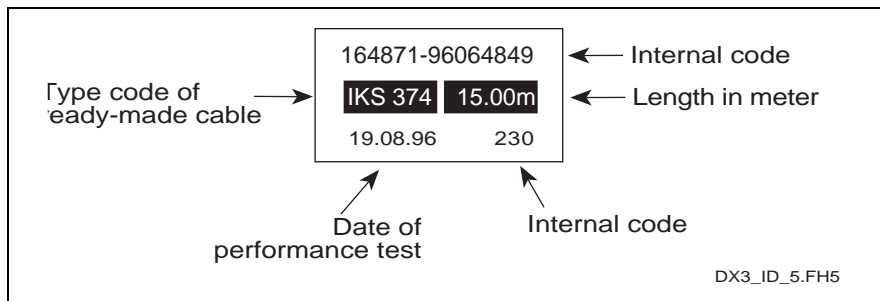


Abb. 4-5: Rating plate of ready-made INDRAMAT cables (Example)

Servicing It is advisable with damaged cables to replace them with tested, ready-made INDRAMAT cables.

Procuring ready-made cables When ordering, indicate

- type designation of the ready-made cable and the
- length of the cable.

The rating plate is located near the end of the cable.

Components for a customer-made cables The replacement cable can also be put together with components, i.e., plug-in connectors, leads, ferrules and ring terminals. Special tools are required, in particular for the power connectors. When obtaining components, have ready

- the type designation of the plug-in connector and
- type designation of the lead.

Information about special tools and assembly guidelines are available from INDRAMAT upon request!

4.2 Replacing Drive Components

Supply Modules

See document "Supply Modules for AC Drives; Error Messages, Diagnoses and Fault Clearance", no. 209-0049-4308.

Drive Controllers

To avoid production downtime of the machine, it makes sense to simply replace defective drive controllers.

INDRAMAT drive controllers are conceived towards a safe, quick and simple replacement, keeping downtime to an absolute minimum.

The drive controller diagnosis faults in the drive system. Depending upon the fault diagnosis, the remedial action, "Replacing the Drive Controller" is detailed in the document „DIAX03 -; Notes on Fault Clearance".

Production can be resumed immediately after the unit is replaced as the drive does not have to be set to the machine in any way.

Replacing DDS02.2/DDS03.2

Procuring a replacement unit

- To achieve the highest degree of safe functioning, procuring a configured drive controller for replacement is recommended. See section on „Identification of the Drive Components“ on page 4-1.

Filling out a fault report

- There is a sample of the fault report in section "Fault Report" of this document on page 4-15. It can be copied for your convenience. Carefully and completely fill it out! This information will ensure a rapid completion of any repair tasks and help identify the application and technical problems!

De-energizing

- Switch main switch of machine off and secure it against being switched back on.
- Remove the transparent cover of the defective unit and the immediately adjacent units.



DANGER

Live conductor rail (greater than 50V) even with mains voltage off!

Electrical shock upon contact!

⇒ Wait discharge time of the DC bus (L+/L-), check for less than 50 V before touching!

Removing the drive controller

- Release all electrical and mechanical connections, with the exception of the fixing bolts, on the front, top and bottom of the unit. With liquid-cooled units, the coolant connections can be removed with coolant in the system. The coolant will not run out!
- Fixing bolts on top and bottom of unit must be removed. Lift unit up with both hands and take it out.
- Software module (slot U5) must be removed from the defective and inserted into the replacement unit.

Note: The machine parameters are stored on the software module. No new adjustments of the drive to machine are needed if the original software module is used!

Mounting DDS02.2/DDS03.2-W...or DDS02.2-F...

- Grasp the controller at the bottom and top and hang it onto the slackened fixing bolts. Tighten screws.
-

Mounting DDS02.2-A...



CAUTION

Sharp-edged heatsink of the controller must be pushed into the opening in the mounting panel!

Injuries to hands by crushing and cutting are possible!

⇒ When inserting the controller hold the long stay-bolts at the top and bottom.

Connecting the drive controller

- Tighten stay-bolts at top and bottom of unit!
- Re-connect all the electrical and coolant connections (for liquid cooling) as per manufacturer's diagram!
- Remount the cover!

Restarting the controller

- Re-start the machine as per the guidelines of the manufacturer.
- Check the functions and the cooling system of the controller! In units with liquid cooling, check the coolant level in the tank after restarting!

Replacing DKR02 / DKR03

Procuring a replacement unit

To achieve the highest degree of safe functioning, obtaining a configured drive controller for replacement is recommended. See section on „Identification of the Drive Components“ on page 4-1.

Filling out a fault report

There is a sample of the fault report in section "Fault Report" of this document on page 4-15. It can be copied for your convenience. It must be carefully and completely filled out! This information will ensure a rapid completion of any repair tasks and help identify the application and technical problems!

De-energizing

Switch off main switch of machine and secure it against being switched back on.



DANGER

Live supply terminals if not completely de-energized

Danger of electrical shock upon contact!

⇒ Check the mains supply terminals to make sure that the power or the control electronics are de-energized!

- Release all electrical and mechanical connections, with the exception of the fixing bolts for the unit, on the front, top and bottom of the unit and remove.
 - With duct cooling, remove the ducts from their connections.
 - With liquid-cooled units, the coolant connections on the unit can be removed with coolant in the system. It will not run out!!

Removing the drive controller

**CAUTION****Drive controller with sharp-edged housing and excessive weight!**

Injuries to hands from crushing and cutting!

⇒ When removing, use appropriate lifting devices and gloves!

- Slacken the fixing bolts at the top and bottom of the unit. Do not remove them!
- Lift the unit up and remove it off of the fixing bolts using suitable lifting equipment. Note that the DKR02 weighs approximately 120, the DKR03 49 kg.
- Remove software module (slot U5) from the defective unit and insert it into the replacement unit.

Note: The machine parameters are on the software module! If reused, then no readjusting of the drive to machine is needed!

Check whether the cooling system of the replacement unit is the same as that of the unit being replaced.

Converting the drive controller

- If the cooling air is to be pulled in and blown out over vents in the back wall of the control cabinet, then convert the drive controller!
- ⇒ Screw in the sealing lid at the top and bottom of the controller! (Two lids with conversion guidelines are included in the delivery!)
- If the cooling air is to be pulled in via a duct, then the controller must also be converted!
- ⇒ The duct connecting supports at the top and bottom of the defective machine must be mounted onto the replacement unit!

Mounting the controller

**CAUTION****Controller with sharp-edged housing and excessive weight!**

Injuries to hands from crushing and cutting are possible!

⇒ Use suitable equipment and wear protective gloves when mounting!

- Hang the controller onto the slackened fixing bolts using suitable equipment.
- Tighten screws!

Connecting the controller

- Restore the electrical and the coolant connections (applies to controllers with liquid or duct cooling) of the controller as per the diagrams of the manufacturer!

Restarting the controller

- Restart the machine as per the manufacturer's guidelines.
- Check the functions and the cooling system of the controller! In units with liquid cooling, check the coolant level in the tank after restarting!

Replacing the DKR04

Procuring a replacement unit

To achieve the highest degree of safe functioning, it is recommended to procure a configured drive controller for replacement. See section on „Identification of the Drive Components“ from page 4-1.

Filling out a fault report

There is a sample of the fault report in section "Fault Report" of this document from page 4-16. It can be copied for your convenience. Carefully and completely fill it out! The information will ensure a rapid completion of any repair tasks and help identify the application and technical problems!

De-energizing

- Switch off main switch of machine. Secure it against being accidentally or intentionally switched back on.



DANGER

Live supply terminals if not completely de-energized!

Danger of electrical shock upon contact!

⇒ Check the mains supply terminals to make sure that the power or the control electronics are de-energized!

- Release all electrical and mechanical connections, except for the fixing bolts of the unit, on the front, top and bottom of the unit and remove.
 - With duct cooling, remove ducts from their connections.
 - With liquid-cooled units, the coolant connections on the unit can be removed with coolant in the system as it will not run out!

Removing the drive controller



CAUTION

Drive controller with sharp-edged housing and excessive weight!

Injuries to hands from crushing and cutting are possible!

⇒ When removing, use appropriate lifting devices and gloves!

- Slacken fixing bolts at top and bottom of unit. Do not remove them! Lift and remove the unit from the fixing bolts using the suitable equipment. Note that the DKR04 weighs approximately 150 kg.
- Remove the software module (slot U5) from the defective unit and insert it into the replacement unit.

Note: The parameters of the machine are on the software module! Re-using it means that the drive does not have to be re-adapted to the machine!

Check that the replacement unit is identical to the replaced unit with respect to the cooling mode!

Converting the controller

- If there are **no** vents in the mounting panel of the control cabinet, then convert the controller!
- ⇒ Remove the round sealing lid (snap-on type) on the right and the sealing lid (screw type) at the bottom of the unit!

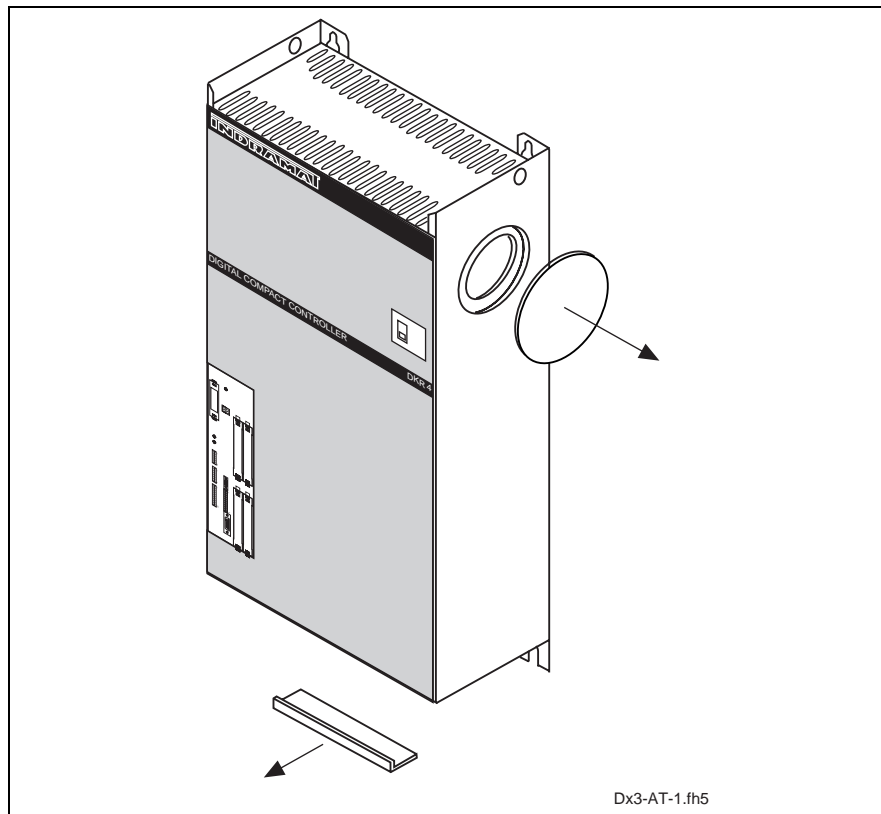


Abb. 4-6: Converting the DKR04 to control cabinet cooling!

- If the cooling air is to be pulled in and blown out via ducts, then convert the controller!
- ⇒ Remove the duct connecting supports on the top and bottom of the defective unit and mount them onto the replacement!

Mounting the controller



CAUTION

Controller with sharp-edged housing and excessive weight

Injuries to hands from crushing and cutting are possible!
⇒ Use suitable lifting equipment and wear gloves when mounting!

- Hang the controller onto the slackened fixing screws.
- Tighten screws!

Connecting the controller

- Restore electrical and coolant connections (controllers with liquid or duct cooling) of the controller as per the manufacturer's diagrams!

Restarting the controller

- Restart the machine as per the manufacturer's guidelines!
- Check the functions and the cooling system of the controller! In units with liquid cooling, check the coolant level in the tank after restarting!

Motors

Procuring a replacement motor

See section. „Exchanging Drive Components“ from page **Fehler! Textmarke nicht definiert.**

Filling out a fault report

There is a sample of the fault report in section "Fault Report" of this document on page 4-15 for AC drives with DDS or DKR. It can be copied for your convenience. Carefully and completely fill it out! The information will ensure a rapid completion of any repair tasks and help identify the application and technical problems!

De-energizing

- Switch off main switch of machine. Secure it against being accidentally or intentionally switched back on.



High voltage at supply terminals with incomplete de-energizing, or re-application of drive enable, or if motor is still turning!

- Electrical shock from contact!
- ⇒ Mains supply terminals for power and control electronics and DC bus must be checked to make sure they are de-energized!
- ⇒ Make sure that the motor is standing still!

Removing the motor



Improper handling or mounting

- Injuries, damage to the machine are possible!
- ⇒ Follow the manufacturer's instructions when removing the defective motor!
- ⇒ Secure hanging axes against falling!

- Remove defective motor as per manufacturer's guidelines.

Note: Avoid dirt contamination of open connectors! Maximum permissible degree of contamination is V2! Operating safety is not secured by greater contamination!

Contamination level	Immediate ambient conditions
V2	Dirt that is capable of conducting cannot occur during operation (IP65), but non-conductive contamination can occur during installation or during replacement of drive components. Some condense water could also form for short periods.

DX3_AT_2.FH5

Abb. 4-7: Permissible contamination levels of plug-in connectors on the motor

- Mounting the motor**
- Mount the replacement motor as per manufacturer's instructions.

- Connecting the motor**
- Reconnect all electrical and liquid cooling connections of the motor as per the manufacturer's guidelines.

Note: Insert plug-in connectors only if these are dry and clean!

- Restarting the machine**
- Restart the machine as per manufacturer's guidelines. It may be necessary to home the machine if the measuring system of the motor supplies the actual position value for position control.
 - Check the motor blower functions.
 - The rotational direction of the blower must agree with the direction of the arrow on the blower housing!
 - Check coolant level in tank with liquid-cooled motors!

Electrical Connections

- Procuring replacement cables**
- To achieve the highest degree of safe functioning, it is recommended to procure ready-made INDRAMAT cables for replacement. See section on „Identification of the Components“ from page 1-1.

- De-energizing**
- Switch off main switch of machine. Secure it against being accidentally or intentionally switched back on.



High voltage at supply terminals with incomplete de-energizing!

Electrical shock from contact!

⇒ Mains supply terminals for power and control electronics and DC bus must be checked to make sure they are de-energized!

- Mounting and removing cables**
- Remove defective cable, or attach new cable to defective one and when pulling out the defective cable, immediately pull in the new one.

Note: Avoid dirt contamination of open connectors! Maximum permissible degree of contamination is V2! Operating safety is not secured by greater contamination!

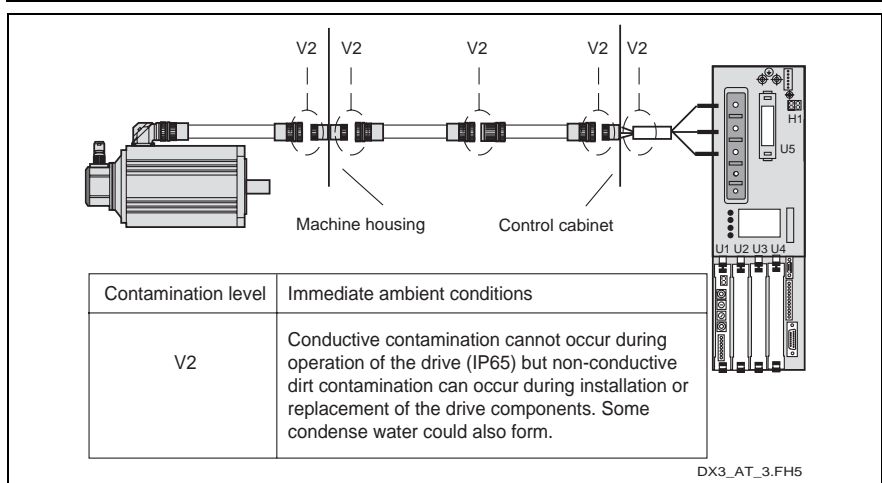


Abb. 4-8: Permissible degree of dirt contamination of plug-in connections

- Connecting the cables**
- In the case of cables without plug-in connectors, connect the individual strands of the cable as per the manufacturer's guidelines. Use ferrules or ring terminals!
 - Note phase when connecting motor power and motor blower!
 - Make sure that the plug-in contact of cables with plug-in connectors are clean!

Note: Insert plug-in connectors only when these are clean and dry!

- Restarting the machine**
- Restart the machine as per the manufacturer's guidelines. Check motor blower functions.
The rotational direction of the blower blade must agree with the direction of the arrow on the blower housing!
 - Dispose of the defective cable!

Plug-in module

Procuring a plug-in module See section „Exchanging Drive Components“ in “Drive Components” from page 4-1.

- De-energizing**
- Switch off the drive package with DDS02.2/DDS03.2 or the controller DKR from the mains. Make sure that the power and control voltage sources are absolutely switched off. The LEDs on the supply module and the H1 status display on the controller must be dark, i.e., not lit up.
 - Remove all electrical or optical connections from the front panel of the plug-in module. Do not remove the transparent cover of the controller!

Replacing the plug-in module



Improper handling!

A defect in the controller or plug-in module can be caused when replacing the plug-in module with voltage still being applied!
⇒ Neither insert or remove the plug-in module with voltage applied.

- ⇒ Release the safety screws at the top and bottom of the defective plug-in module.
- ⇒ Pull defective plug-in module out and then label it as "defective".
- ⇒ Insert new plug-in module and manually retighten the safety screws.
- ⇒ Reconnect all electrical and optical connections of the plug-in module.

- Restarting the controller**
- ⇒ Make sure that the cause of the plug-in module defect has been eliminated (e.g., a defect in the external measuring system, etc.).
 - ⇒ Restart the machine as per the guidelines of the machine manufacturer.
This restarts the drive package with DDS or DKR controller as well.

Software Module

Procuring a software module

Note: All machine parameters are stored on software module. Prior to mounting a new software module, it makes sense to secure the parameter settings on an external data carrier to then reload and store it on the new software module!

See section "Identifying the Drive Components" in "Drive Controller" starting from page 4-1.

De-energizing

- Separate the drive package with DDS or the DKR controller from the mains. Make sure that the power and the control voltage sources are safely switched off.

The LEDs on the supply module and the H1 status display on the controller must be dark, i.e., not lit up.

(Applies only to DDS)

- Remove transparent cover! Do not touch the conductor rails of the DC bus which run horizontally underneath the software module (slot U5)!

**DANGER**

Live conductor rails (greater than 50V) even with mains voltage off!

Electrical shock on contact!

⇒ Wait discharge time of DC bus (L+/L-). Check to make sure it is below 50 V before touching!

After switching off, when removing the software module make sure that there is sufficient distance to the conductor rails

**Replacing the software module
(with the DDS and DKR)**
**CAUTION**

Improper handling!

Hardware and firmware can be damaged if plug-in module is replaced with energy applied!

⇒ Neither remove nor insert with voltage applied!

- Pull the software module out of slot U5 of the controller and label, if necessary.
- Insert new software module and make sure it is locked into place!

(only with the DDS)

- Screw the transparent cover back into place!

Restarting the controller

A restart of the controller is necessary if the software module has been replaced. This is due to possible drive behavior changes caused by correction of errors or function expansions of the firmware.

4.3 Fault report


	<h2 style="margin:0;">Fault Report</h2> <p style="margin:0;">for digital DDS AC Drives</p>																				
<p>This fault report supports clarification of problems and their causes. It is absolutely necessary for finding and eliminating even hidden, sporadic or applications-specific problems.</p> <ul style="list-style-type: none"> - Always include a fault report when sending in a repair. - In any other case, send the fault report to the respective INDRAMAT Customer Service office, or send it into office with the address found on the back for the INDRAMAT Quality Assurance Department. <p>INDRAMAT will process the matter quickly and efficiently.</p>																					
Fault report from:	Co:	Lo	Date:																		
	Dept.:	Name	Tel																		
<p>Information on the problem:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Firmware rating</p> <p>Firmware type code → FWA-DIAX03- - V - K / J</p> <p>Coded serial no. → SN</p> <p>Serial no. → Int. code →</p> </div> <div style="width: 45%;"> <p>Configuration rating</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;">SYSTEMCONFIGURATION</td></tr> <tr><td>DDS_2- - - - -FW</td><td>Type code of the configured drive controller</td></tr> <tr><td>DDS_2- - - - -</td><td>Type code of the basic unit</td></tr> <tr><td>U 1</td><td rowspan="5">Type code of the plug-in module</td></tr> <tr><td>U 2</td></tr> <tr><td>U 3</td></tr> <tr><td>U 4</td></tr> <tr><td>U 5</td></tr> <tr><td colspan="2" style="text-align: right;">K / J</td></tr> <tr><td colspan="2" style="text-align: right;">Type code of the software module</td></tr> <tr><td colspan="2" style="text-align: right;">Production week/year</td></tr> </table> </div> </div> <div style="margin-top: 10px;"> <p>Basic unit rating plate</p> <p>Type code of basic unit → DDS_2- - - - -</p> <p>Coded serial no. → SN</p> <p>Serial no. → Internal coder → A</p> </div> <div style="margin-top: 10px;"> <p>Motor data</p> <p>Type: _____</p> <p>Serial no: _____</p> </div> <div style="margin-top: 10px; text-align: center;"> <p>Status displays H1 and H2 (Record display info at time of problem)</p> </div>				SYSTEMCONFIGURATION		DDS_2- - - - -FW	Type code of the configured drive controller	DDS_2- - - - -	Type code of the basic unit	U 1	Type code of the plug-in module	U 2	U 3	U 4	U 5	K / J		Type code of the software module		Production week/year	
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<p>Additional data:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%;">Problem status:</th> <th style="width:30%;">Causes:</th> <th style="width:30%;">Accompanying</th> <th style="width:10%;"></th> </tr> </thead> <tbody> <tr> <td> <input type="checkbox"/> is always present <input type="checkbox"/> during commissioning <input type="checkbox"/> occurs sporadically <input type="checkbox"/> occurs after _____ hours <input type="checkbox"/> occurs with shocks <input type="checkbox"/> is temperature dependent <input type="checkbox"/> Additional data: _____ _____ _____ </td> <td> <input type="checkbox"/> unknown <input type="checkbox"/> conn. error <input type="checkbox"/> external causes <input type="checkbox"/> mechanical damage <input type="checkbox"/> loose cable connection <input type="checkbox"/> condensation in unit <input type="checkbox"/> foreign object in unit </td> <td> <input type="checkbox"/> problems in mechanics <input type="checkbox"/> power section failure <input type="checkbox"/> control failure <input type="checkbox"/> motor failure <input type="checkbox"/> cable break <input type="checkbox"/> defective blower <input type="checkbox"/> defective feedback </td> <td> Air conditioner in control cabinet? J / N <input type="checkbox"/> Have there been similar problems before ? How often? _____ Did the problems occur on certain days or times of the day ? _____ _____ </td> </tr> </tbody> </table>				Problem status:	Causes:	Accompanying		<input type="checkbox"/> is always present <input type="checkbox"/> during commissioning <input type="checkbox"/> occurs sporadically <input type="checkbox"/> occurs after _____ hours <input type="checkbox"/> occurs with shocks <input type="checkbox"/> is temperature dependent <input type="checkbox"/> Additional data: _____ _____ _____	<input type="checkbox"/> unknown <input type="checkbox"/> conn. error <input type="checkbox"/> external causes <input type="checkbox"/> mechanical damage <input type="checkbox"/> loose cable connection <input type="checkbox"/> condensation in unit <input type="checkbox"/> foreign object in unit	<input type="checkbox"/> problems in mechanics <input type="checkbox"/> power section failure <input type="checkbox"/> control failure <input type="checkbox"/> motor failure <input type="checkbox"/> cable break <input type="checkbox"/> defective blower <input type="checkbox"/> defective feedback	Air conditioner in control cabinet? J / N <input type="checkbox"/> Have there been similar problems before ? How often? _____ Did the problems occur on certain days or times of the day ? _____ _____										
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Abb. 4-9: Fault report for AC drives with DDS02.2/DDS03.2




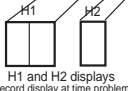
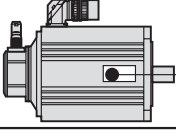
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		<p>Date: _____</p> <p>Tele: _____</p>																
<p>Information on the problem:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Rating plate of basic unit</p> <p>Type code of basic unit → DKR _____</p> <p>Coded serial no. → </p> </div> <div style="width: 30%;"> <p>Firmware rating plate</p> <p>Firmware type code → FWA-DIAX03-____V____K____</p> <p>Coded serial no. → </p> </div> <div style="width: 30%;"> <p>Configuration rating plate</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th colspan="2">SYSTEMCONFIGURATION</th></tr> <tr><td>DKR _____-FW</td><td>Type code of the configured drive controller</td></tr> <tr><td>DKR _____</td><td>Type code of the basic unit</td></tr> <tr><td>U 1 _____</td><td rowspan="5">Type code of the plug-in module</td></tr> <tr><td>U 2 _____</td></tr> <tr><td>U 3 _____</td></tr> <tr><td>U 4 _____</td></tr> <tr><td>U 5 _____</td></tr> <tr><td>K_/_</td><td>Type designation of the software module</td></tr> <tr><td></td><td>Production week/year</td></tr> </table> </div> </div> <div style="margin-top: 20px;"> <p>H1 and H2 displays (record display at time problem occurred)</p>  </div> <div style="margin-top: 20px;"> <p>Motor data</p> <p>Type: _____</p> <p>Serial no: _____</p>  </div>			SYSTEMCONFIGURATION		DKR _____-FW	Type code of the configured drive controller	DKR _____	Type code of the basic unit	U 1 _____	Type code of the plug-in module	U 2 _____	U 3 _____	U 4 _____	U 5 _____	K_/_	Type designation of the software module		Production week/year
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	Production week/year																	
<p>Data on the machine with problem:</p> <p>Manufacturer: _____ Typ: _____ Op. hours: _____</p> <p>Machine no.: _____ Commissioning date: _____</p> <p>Manuf. of and machine controller type: _____</p> <p>Designation of machine axis in which problem occurred: _____</p> <p>Please describe the problem:</p> <p>_____</p> <p>_____</p> <p>_____</p>																		
<p>Additional data:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:33%;">Problem status:</th> <th style="width:33%;">Causes:</th> <th style="width:33%;">Accompanying prob.:</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <input type="checkbox"/> is always present <input type="checkbox"/> during commissioning <input type="checkbox"/> occurs sporadically <input type="checkbox"/> occurs after _____ hours <input type="checkbox"/> occurs with shocks <input type="checkbox"/> is temperature dependent <input type="checkbox"/> Additional data: _____ _____ _____ </td> <td style="vertical-align: top;"> <input type="checkbox"/> unknown <input type="checkbox"/> conn. error <input type="checkbox"/> external causes <input type="checkbox"/> mechanical damage <input type="checkbox"/> loose cable conn. <input type="checkbox"/> condensation in unit <input type="checkbox"/> foreign object in unit </td> <td style="vertical-align: top;"> <input type="checkbox"/> problems in mechanics <input type="checkbox"/> power section failure <input type="checkbox"/> control failure <input type="checkbox"/> motor failure <input type="checkbox"/> cable break <input type="checkbox"/> defective blower <input type="checkbox"/> defective feedback is there an air condition in the cabinet ? J / N <input type="checkbox"/> Have there been similar problems before? How often: _____ Did the problems occur on certain days or times of the day? _____ _____ </td> </tr> </tbody> </table>			Problem status:	Causes:	Accompanying prob.:	<input type="checkbox"/> is always present <input type="checkbox"/> during commissioning <input type="checkbox"/> occurs sporadically <input type="checkbox"/> occurs after _____ hours <input type="checkbox"/> occurs with shocks <input type="checkbox"/> is temperature dependent <input type="checkbox"/> Additional data: _____ _____ _____	<input type="checkbox"/> unknown <input type="checkbox"/> conn. error <input type="checkbox"/> external causes <input type="checkbox"/> mechanical damage <input type="checkbox"/> loose cable conn. <input type="checkbox"/> condensation in unit <input type="checkbox"/> foreign object in unit	<input type="checkbox"/> problems in mechanics <input type="checkbox"/> power section failure <input type="checkbox"/> control failure <input type="checkbox"/> motor failure <input type="checkbox"/> cable break <input type="checkbox"/> defective blower <input type="checkbox"/> defective feedback is there an air condition in the cabinet ? J / N <input type="checkbox"/> Have there been similar problems before? How often: _____ Did the problems occur on certain days or times of the day? _____ _____										
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<p>DX3_AT_5.FH7</p>																		

Abb. 4-10: Fault report für AC-Antriebe mit DKR

5 Index

A

A000 Communication phase 0 3-19
A001 Communication phase 1 3-19
A002 Communication phase 2 3-19
A003 Communication phase 3 3-20
A010 Drive HALT 3-20
A011 Drive interlock open 3-20
A012 Control and power sections ready for operation 3-20
A013 Ready for power on 3-20
A100 Drive in TORQUE control 3-20
A101 Drive in VELOCITY control 3-21
A102 Position mode with encoder 1 3-21
A103 Position mode with encoder 2 3-21
A104 Position mode lagless, encoder 1 3-21
A105 Position control lagless, feedback 2 3-21
A106 Drive controlled interpolation, encoder 1 3-21
A107 Drive controlled interpolation, encoder 2 3-22
A108 Drive controlled interpolation, lagless, encoder 1 3-22
A109 Drive controlled interpolation, lagless, encoder 2 3-22
A112 Phase synchronization, encoder 1, virtual master drive 3-22
A113 Phase synchronization, encoder 2, virtual master drive 3-23
A116 Phase synchr. lagless, encoder 1, virtual master drive 3-23
A117 Phase synchr. lagless, encoder 2, virtual master drive 3-23
A120 Pattern control, encoder 1, virtual master drive 3-23
A121 Pattern control, encoder 2, virtual master drive 3-24
A124 Pattern control lagless, enc. 1, virtual master drive 3-24
A125 Pattern control lagless, enc. 2, virtual master drive 3-24
A128 Cam shaft, encoder 1, virtual master drive 3-24
A129 Cam shaft, encoder 2, virtual master drive 3-25
A132 Cam shaft, lagless, encoder 1, virt. master drive 3-25
A133 Cam shaft, lagless, encoder 2, virt. master drive 3-25
A146 Relative drive controlled interpolation, encoder 1 3-25
A147 Relative drive controlled interpolation, encoder 2 3-26
A148 Relative drive contr. interpolation, enc. 1, lagless 3-26
A149 Relative drive contr. interpolation, enc. 2, lagless 3-26
A800 Unknown operation mode 3-27
Ab 3-30
AF 3-30
AH 3-30
AS 3-30

B

bb 3-30


C

C100 Communication phase 3 transition check 3-2
C101 Invalid communication parameter (S-0-0021) 3-2
C104 Config. IDN for MDT not configurable 3-2
C105 Configured length > max. length for MDT 3-2

- C106 Config. IDN for AT not configurable 3-2
- C107 Configured length > max. length for AT 3-3
- C108 Time slot parameter > Sercos cycle time 3-3
- C109 Position of data record in MDT (S-0-0009) even 3-3
- C110 Length of MDT (S-0-0010) odd 3-3
- C111 ID9 + Record length - 1 > length MDT (S-0-0010) 3-4
- C112 TNcyc (S-0-0001) or TScyc (S-0-0002) error 3-4
- C113 Relation TNcyc (S-0-0001) to TScyc (S-0-0002) error 3-4
- C114 T4 > TScyc (S-0-0002) - T4min (S-0-0005) 3-4
- C115 T2 too small 3-5
- C200 Communication phase 4 transition check 3-5
- C201 Invalid parameter(s) (->S-0-0022) 3-5
- C202 Parameter limit error (->S-0-0022) 3-5
- C203 Parameter calculation error (->S-0-0022) 3-5
- C204 Motor type P-0-4014 incorrect 3-6
- C210 External feedback required (->S-0-0022) 3-6
- C211 Invalid feedback data (->S-0-0022) 3-6
- C212 Invalid amplifier data (->S-0-0022) 3-7
- C213 Position data scaling error 3-7
- C214 Velocity data scaling error 3-7
- C215 Acceleration data scaling error 3-8
- C216 Torque/force data scaling error 3-8
- C217 Motor feedback data reading error 3-9
- C218 External feedback data reading error 3-9
- C220 Motor feedback initializing error 3-9
- C221 Ext. feedback initializing error 3-10
- C223 Input value for max. range too high 3-10
- C225 Coprocessor not ready for initialization 3-10
- C226 Coprocessor acknowledge failed 3-11
- C227 Modulo range error 3-11
- C228 Controller type S-0-0140 wrong 3-11
- C231 Emulator not loadable 3-11
- C232 Motor encoder interface not present 3-11
- C233 External encoder interface not present 3-12
- C234 Encoder combination not possible 3-12
- C235 Load-side motor encoder with inductance motor only 3-12
- C236 Motor feedback required (P-0-0074) 3-12
- C300 Set absolute measuring 3-12
- C302 Absolute measuring system not installed 3-13
- C400 Command
 - switch to parameter mode 3-13
- C401 Drive active, switching not allowed 3-13
- C402 Only allowed without master 3-13
- C500 Reset class 1 diagnostic, error reset 3-13
- C501 Error delet only in parameter mode 3-14
- C600 Drive controlled homing procedure command 3-14
- C601 Homing only possible with drive enable 3-14
- C602 Distance home switch - reference mark erroneous 3-14
- C604 Homing of absolute encoder not possible 3-14
- C700 Basic load 3-15
- C701 Basic load not possible if drive is enabled 3-15
- C702 Default parameters not available 3-15
- C703 Default parameters invalid 3-15
- C704 Parameters not copyable 3-15
- C705 Locked with password 3-16

C800 Default parameter load 3-16
C801 Parameter default value erroneous (-> S-0-0021) 3-16
C802 Locked with password 3-16
Cable damage 4-7
configured drive controller 4-6

D

D300 Command adjust commutation 3-16
D301 Drive not ready for commutation command 3-16
D500 Command 'get mark position' 3-17
D501 Incremental encoder required 3-17
D600 Cancel reference point procedure command 3-17
D700 Parking axis command 3-17
D800 Command measuring wheel operation mode 3-18
D801 Measuring wheel operation not possible 3-18
D802 Operation mode cancelled 3-18
Diagnostic Message Display
-0 3-28
-1 3-28
-2 3-28
-3 3-28
-5 3-28
-6 3-29
Watchdog  3-29

E

E201 No mains connected 2-23
E202 Not ready for power on 2-23
E219 Warning Drive temp. surveillance defective 2-23
E221 Warning Motor temp. surveillance defective 2-24
E225 Motor overload 2-24
E226 Undervoltage in power section 2-24
E247 Interpolation velocity = 0 2-25
E248 Interpolation acceleration = 0 2-25
E249 Positioning velocity S-0-0259 > S-0-0091 2-25
E250 Drive overtemp. prewarning 2-25
E251 Motor overtemp. prewarning 2-26
E253 Target position out of travel zone 2-26
E255 Feedrate-override S-0-0108 = 0 2-26
E257 Continuous current limit active 2-27
E259 Command velocity limit active 2-27
E261 Continuous current limit prewarning 2-27
E263 Velocity command value > limit S-0-0091 2-28
E410 Slave not scanned or adress 0 2-28
E825 Overvoltage in power stage 2-28
E826 Undervoltage in power section 2-29
E829 Positive position limit exceeded 2-29
E830 Negative position limit exceeded 2-29
E834 Emergency-Stop 2-30
E843 Positive limit switch activated 2-30
E844 Negative limit switch activated 2-30

F

- F207 Switching to uninitialized operation mode 2-2
- F208 UL The motor type has changed. 2-2
- F209 PL Load parameter default values 2-3
- F218 Amplifier overtemp. shutdown 2-3
- F219 Motor overtemp. shutdown 2-3
- F221 Error Motor temp. surveillance defective 2-4
- F228 Excessive deviation 2-4
- F229 Motor encoder failure
 - quadrant error 2-5
- F233 External power supply error 2-5
- F236 Excessive position feedback difference 2-6
- F237 Excessive position command difference 2-6
- F242 External encoder failure
 - signal too small 2-7
- F245 External encoder failure
 - quadrant error 2-8
- F248 Low battery voltage 2-8
- F249 Master drive encoder failure
 - signal too small 2-9
- F252 Master drive encoder failure
 - quadrant error 2-9
- F253 Incr. encoder emulator
 - pulse frequency too high 2-10
- F254 Incr. encoder emulator
 - hardware fault 2-10
- F255 External power supply DAE 02 error 2-10
- F267 Erroneous internal hardware synchronization 2-10
- F268 Brake fault 2-10
- F270 Error power supply home switch 2-11
- F271 Error power supply travel limit switch 2-11
- F272 Error power supply probe input 2-12
- F273 Error power supply E-Stop 2-12
- F276 Absolute encoder out of allowed window 2-12
- F280 Short circuit to earth 2-13
- F281 Mains fault 2-13
- F282 Phase loss fault 2-13
- F283 Line voltage fault 2-13
- F284 Main contactor off, low voltage 2-13
- F401 Double MST error shutdown 2-14
- F402 Double MDT error shutdown 2-14
- F403 Invalid communication phase shutdown 2-14
- F404 Error during phase progression 2-14
- F405 Error during phase regression 2-15
- F406 Phase switching without ready signal 2-15
- F434 Emergency-Stop 2-15
- F629 Positive travel limit exceeded 2-15
- F630 Negative travel limit exceeded 2-16
- F634 Emergency-Stop 2-16
- F643 Positive travel limit switch detected 2-16
- F644 Negative travel limit switch detected 2-17
- F820 Bleeder overload 2-17
- F822 Motor encoder failure
 - signal too small 2-17
- F827 Drive interlock while drive activated 2-18

F860 Overcurrent
short in power stage 2-19

F861 Overcurrent
short to ground 2-19

F869 +/-15Volt DC error 2-19

F870 +24Volt DC error 2-19

F871 +10Volt DC error 2-20

F878 Velocity loop error 2-20

F879 Velocity limit S-0-0091 exceeded 2-20

F889 Regeneration overcurrent 2-21

F890 Processor fault power supply unit 2-21

F891 Power stage fault 2-21

F892 Wrong code of current measuring unit 2-21

F893 No regenerating current to mains 2-21

F894 Checksum error 2-22

Firmware release status 4-6

P

P0 3-30

P1 3-31

P2 3-31

P3 3-31

R

Rating plate of ready-made INDRAMAT cables 4-7

Rating plate of the DDS02.2 4-3

Rating plate of the DDS03.2 4-3

Rating plate of the DKR02.1 4-4

Rating plate of the DKR03.1 4-4

Rating plate of the DKR04.1 4-4

Rating plate on the supply module 4-2

Ready-made cables 4-7

Release status of the firmware 4-6

Removing the motor 4-13

Replacement cable 4-7

Replacement motors 4-7

Replacing a software module 4-6

Replacing cables 4-14

Replacing DDS02.2/DDS03.2 4-8

Replacing DKR02 / DKR03 4-9

Replacing plug-in module 4-15

Replacing the DKR04 4-11

Replacing the software module 4-16

S

Supply module 4-2

V

Velocity Synchronisation, virtuell Lead drive 3-22

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