

# DIAX03

## Drive With Electric Gear Functions

Trouble Shooting Guide: ELS 04VRS

DOK-DIAX03-ELS-04VRS\*\*-WAR1-EN-P

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<b>What is the purpose of this document?</b>	<p>This document is design to assists maintenance personnel in identifying errors with the machinery</p> <p>It should:</p> <ul style="list-style-type: none"> <li>• help in understanding error messages</li> <li>• help in finding the causes of errors</li> <li>• describe the procedure for trouble shooting</li> <li>• simplify the process of establishing contact with the INDRAMAT Customer service department</li> </ul>						
<b>help you use this documentation</b>	This documentation is meant as a switch board panel supplement for the machine manufacturer.						
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# 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**

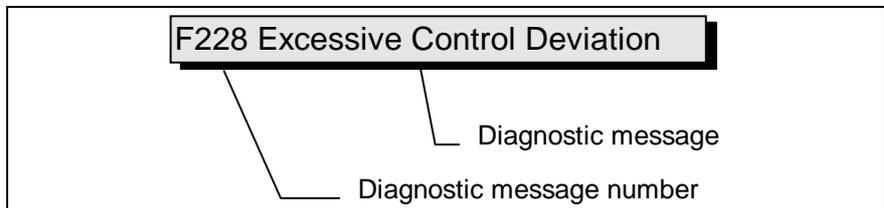


Fig. 1-1: Diagnostic message with a diagnostic number and text.

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 **P-0-0001, Diagnostic 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.

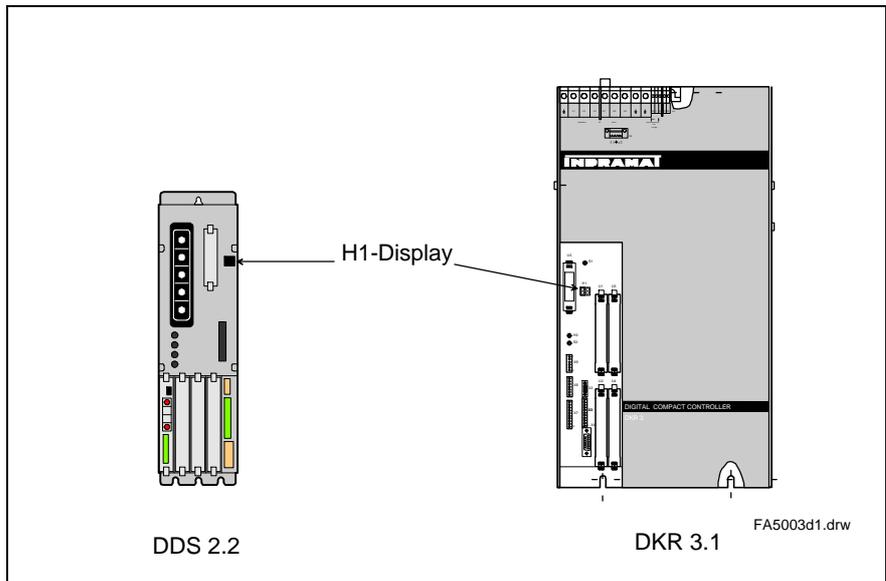


Fig. 1-2: H1-Display on DDS and DKR drives

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.

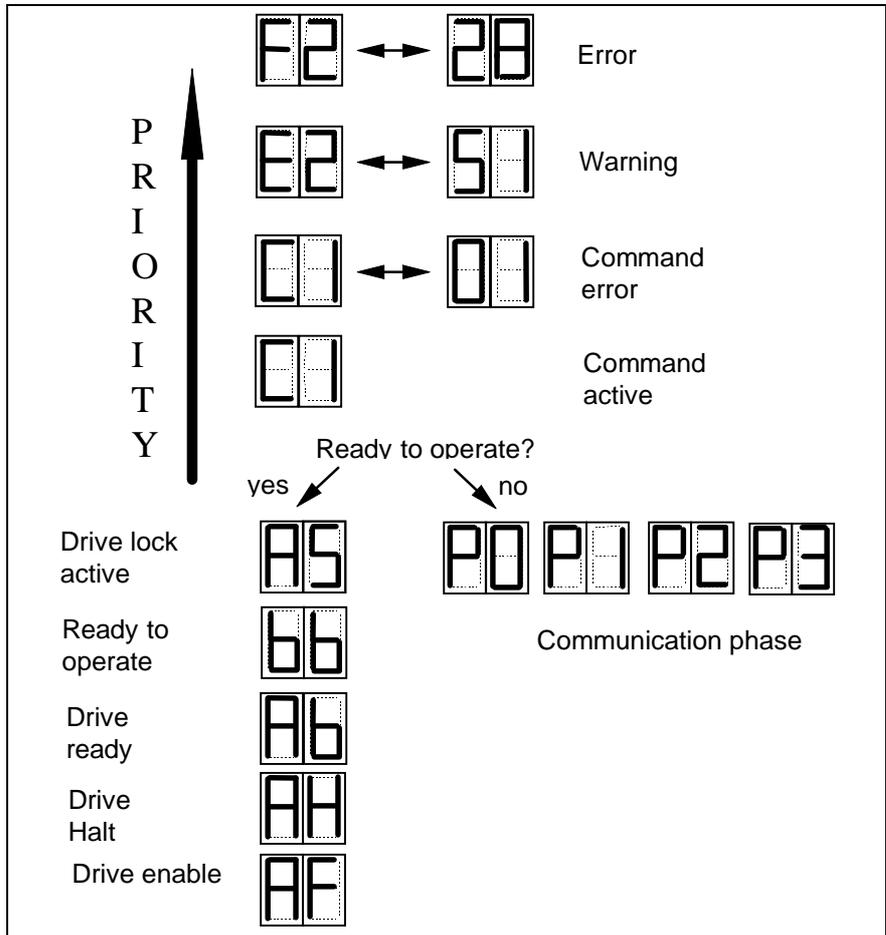


Fig. 1-3: Diagnostic message priority diagram

**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.



## 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

Table 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 Operating Mode

### Cause:

A "0" is parametered in at least one of the 4 operating mode parameters **S-0-0032..35**. This operating mode was selected via bits 8 and 9 in the master control word when the drive was activated.

### Remedy:

Enter the desired operating mode in the activated operating mode parameter.

<b>Parameters:</b>	Primary Operating Mode	S-0-0032
	Secondary Operating Mode -1	S-0-0033
	Secondary Operating Mode -2	S-0-0034
	Secondary Operating Mode -3	S-0-0035

check the allowable type of interpolation.

## F208 Motortype has changed

### Cause:

If the drive is operating with a motor type which contains a feedback memory (MDD or MKD), then the drive recognizes the type of the motor automatically and stores it internally.

This occurs each time the drive is turned on.

If the motor is exchanged for another motor type then the error message F208 will be generated.

### Remedy:

1. Set the correct motor type
2. If it involves a new motor with MKD or MDD, then the new motor type will be accepted by resetting the error.
3. If the new motor is not set to MKD or MDD, then all of the motor specific parameters must be newly executed.

## F219 Motor Overtemperature Shutdown

If the motor temperature exceeds the value in **S-0-0204, Motor Switch-Off Temperature**, the drive will generate this error message. This value in **S-0-0204** is set at 150°C for MDD and MKD motors. This value must be entered from the motor specifications for all other types of motors.

For motors from the 2AD, 1MB, LAF, LAR, and MBW series, the actual motor temperature can be called up via the **S-0-0383, Motor Temperature** parameter.

### Cause:

1. The motor became overloaded. The effective torque demanded from the motor was above its allowable continuous torque level for too long.
2. Transmission interruption or short circuit in the wiring to the motor temperature monitor.
3. Instability in the velocity loop.

**Remedy:**

- For 1. Check the installation 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 transmission interruptions or shorts.
- For 3. Check the velocity regulator loop parameterization (see the function description.)

## F221 Error Motor Temperature Control

**Cause:**

Transmission interruption in the wiring to the motor temperature monitor.

**Remedy:**

Check the wiring to the motor temperature monitor X6/1 and X6/2 for transmission interruptions.

## F222 Drive Overtemperature Watch defect

The temperature monitor checks to see if the measured drive temperature is realistic.

If it determines that it is smaller than  $-10^{\circ}\text{C}$ , it will assume that the measuring unit is defective.

The error message is generated after the accompanying E219 warning has been given for 30 seconds.

**Cause:**

- 1. Sensor not connected to the DRP3 conductor card.
- 2. Broken cable in the control drive or defective sensor.

**Remedy:**

Exchange or repair drive.

## F226 Undervoltage Error

The DC Bus voltage is monitored in the power supply module. The drive is told via the control voltage bus if the DC Bus voltage is above the minimum allowable value of +200 V for DDS and +250 for DKR. Going below this threshold stops the drive according to the selected error reaction.

Requirement: The NCB bridge is not installed on the supply module.

**Cause:**

- 1. Power cut-off without prior deactivation of the drive through the control enable (RF).
- 2. Activation of the drive via the control enable (RF) without prior activation of the power supply.
- 3. Supply module malfunction

**Remedy:**

1. Check the logic for activating the control drive enable in the connected control system.
2. Eliminate the supply module malfunction.  
See the supply module user manual.

**F228 Excessive Deviation**

If the position loop is connected, the drive will monitor to see if the inputted command value can be followed. In doing this, the drive will calculate an actual model position value and compare it to the actual position value. This error is generated if the difference between the theoretical and actual position values continually exceeds the value in the **S-0-0159, Monitoring Window** parameter.

**Cause:**

1. The acceleration ability of the control drive was exceeded.
2. The motor shaft was blocked.
3. Parameterization error in the drive parameters.
4. **S-0-0159, Monitoring Window** was parameterized incorrectly
5. The power supply was turned off with a stationary control enable.  
Possible cause: An error in an AC servo drive at the common supply module.

**Remedy:**

- For 1. Check the **S-0-0092, Bipolar Torque Limit** parameter and set it to the maximum allowable value for the operation. Reduce the acceleration handicap of the control system (see control system handbook)
- For 2. Check the mechanical system and eliminate any jamming of the motor shaft
- For 3. Check the drive parameters
- For 4. **Parameterize S-0-0159, Monitoring Window**
- For 5. Check the AC servo drive for an error message other 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. Insulation disturbance on the encoder cable
3. Defective motor encoder interface
4. Defective drive

**Remedy:**

- For 1. Exchange the encoder cable
- For 2. Separate the encoder cable from the power cables.
- For 3. Exchange the motor encoder interface
- For 4. Exchange the drive

## F233 External Power Supply Error

### Cause:

Various optional plug-in cards are available via conductive separate inputs and outputs. Orderly operation of these inputs and outputs requires that an external power supply be installed. If this supply lies outside of the allowable range, the error message will be generated.

The following functions require an external power supply:

1. Reference switch on plug-in card DSS2, activated via the parameter **S-0-0147, Homing Parameter**, bit 5.
2. Travel range limit switch on card DSS, activated via Parameter **P-0-0090, Travel Limit Switch Parameter**, bit 1
3. Measuring key inputs activated via **S-0-0170, Probing Cycle Procedure Command**
4. Emergency stop input on card DSS2, activated via parameter **P-0-0008, Activation E-Stop-Function**, bit 0.
5. Use of a DEA plug-in card.
6. Use of a DEK plug-in card.
7. Analysis of a measurement system via a DAG plug-in card.

### Remedy:

Check external power supply.

Description:	Unit:	min.:	typ.:	max.:
External Operating Voltage +UL	V	18	24	32
External Current Absorbtion IL	mA			100

Table 2-2: External Power Supply

## F234 Emergency Stop

### Cause:

The emergency stop function was activated by turning off the +24V at the X12/6 input. The drive was brought to a standstill by the selected error reaction.

### Remedy:

1. Eliminate the condition which caused the +24V at the X12/6 input to be turned off.
2. Activate the "Reset Class 1 Condition" command via the control system (see control system handbook.)

## F236 Excessive Position Feedback Difference

### Cause:

In preparation for switching to communication phase 4, the command will set position feedback value 1 and position feedback value 2 will be set to the same value. The cyclical evaluation of both encoders will also begin. In cyclical operation (phase 4), the position feedback value difference of both encoders is compared with **S-0-0391, External Encoder Monitoring Window**. If the difference is larger than the monitoring window, the error F236 "Excessive Position Feedback Difference" will be diagnosed and the drive will react according to the selected error reaction.

1. False parameter for the external encoder (**S-0-0115, Position Encoder Type-Parameter2, S-0-0117, External Encoder Resolution** ).
2. The mechanical system between the motor shaft and the external encoder has been parameterized incorrectly. (**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 the motor shaft and the external encoder is not rigid (For example, play in the transmission.)
4. Defective encoder cable.
5. Plug-in card (DLF or DEF) for evaluating the external measuring system is defective.
6. Maximum input frequency of the encoder interface has been exceeded.
7. External encoder not attached to the shaft being driven.

**Remedy:**

- For 1. Check **S-0-0115, Position Encoder Type Parameter-2** and **S-0-0117, External Encoder Resolution Encoder**
- For 2. Check **S-0-0121, S-0-0122, Load Gear Input and Output Revolutions** and **S-0-0123, Feed Constants**.
- For 3. Enlarge **S-0-0391, External Encoder Monitoring Window**.
- For 4. Exchange the encoder cable.
- For 5. Exchange the plug-in card for evaluation of the external measurement system.
- For 6. Reduce velocity.
- For 7. Set the **S-0-0391, External Encoder Monitoring Window** to 0 (switch off monitor).

## F237 Excessive Position Command Difference

**Cause:**

When the drive is operating in position control the 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**, the position command monitor gives a message. 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**.

**Remedy:**

Compare **S-0-0091, Bipolar Velocity Limit** with the velocity in the program and match it if necessary.

## 242 External Encoder Failure: Signals too small

**Cause:**

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

1. The indicator given by the sine and cosine signals must be at least 1 V.
2. The maximum indicator from the sine and cosine signals may not exceed 11.8 V.

**Remedy:**

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

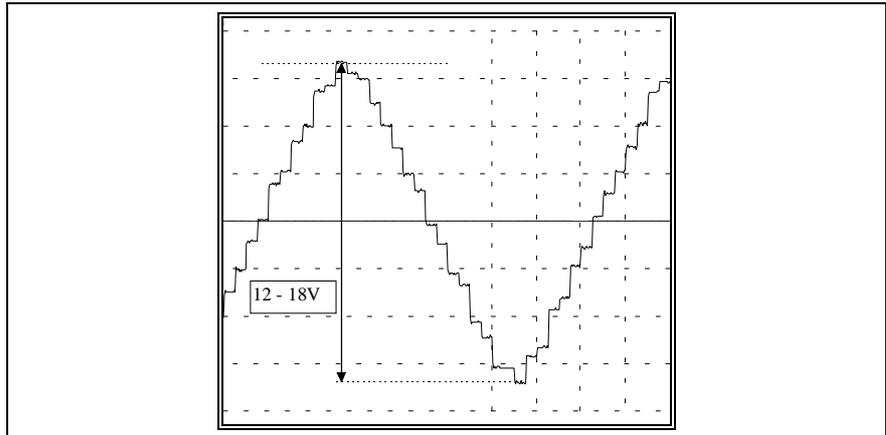


Fig. 2-1: Signal amplitude is measured via AK1 X3/1-2

**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. 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

**F248 Low-Battery Voltage**

**Cause:**

Absolute position information is stored by a battery buffer in the motor feedback in MKD and MDD motors. The battery has a 10 year life span. This message appears if the battery voltage falls below 2.8 V. The absolute encoder function will still be preserved for about 2 weeks.

**CAUTION:**

Danger areas:	A 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

Danger areas: 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 supply voltage is turned on.

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

The absolute position must be reestablished.

#### Removing the Battery

- Unscrew torx screw with a size 10 screwdriver (step 1)
- Pull out the resolver feedback RSF lid by hand
- Remove the connection to the battery (step 2)
- Loosen battery clamp and remove the battery (step 3)
- Place the factory-made battery (Part. No.: 257101) in the housing and screw on the clamp. **WARNING!** Do not kink the battery cable.
- Reconnect the battery (step 2)

Close the resolver feedback lid, screw 4 torx screws (step 1) and tighten 1.8 Nm (16 lb-in) with the torque wrench.

## F249 Lead Drive Encoder Failure: Signals too small

The signals of the master encoder will be monitored. If the signal amplitude of the master encoder falls below a minimum threshold value, then this error message will be displayed. The drive performs the established response which is in the parameter **P-0-0119, Deceleration as best as possible**.

#### Cause:

The analog signals of the measurement system are used to evaluate a steering axle encoder. These will be monitored according to two criteria:

1. The indicator given by the sine and cosine signals must be at least 1 V.
2. The maximum indicator from the sine and cosine signals may not exceed 11.8 V.

#### Remedy:

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

## F252 Lead 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

## F267 Erroneous Internal Hardware Synchronization

### Cause:

The control of all drives in a SERCOS ring is synchronized with a phase regulator loop. Proper functioning of the synchronization is monitored. This error is generated if the average of the deviation is larger than 5 usec.

### Remedy:

- Exchange DSS plug-in card
- Exchange control drive

## F268 Brake Error

The drive takes control of the brake on motors with internal brakes. The braking current is monitored.

If the braking current is outside of the allowable range between:

$$0.4 - 1.6 * \mathbf{P-0-0511, Braking Current}$$

these error message will follow.

### Cause:

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

---

**Note:** A conductive connection between 0V brake supply and 0V of the drive controller is necessary.

---

### Remedy:

For 1. Check the power supply

For 2. Check the motor cable

For 3. Exchange the motor

For 4. Exchange drive

## F276 Absolute encoder error

When switching off a drive with an absolute encoder motor (multiturn) the current actual position is saved. When it is turned back on, the position given by the absolute encoder evaluation is compared with this saved value. This error is given if the deviation is larger than the parametered **P-0-0097, Absolute Encoder Monitoring Window**.

### Cause:

1. Turning on for the first time (invalid stored position).
2. While the drive was turned off, the shaft was moved farther than allowed by the **P-0-0097, Absolute Monitoring Window** parameter.
3. Incorrect position initialization

### Remedy:

For 1. Reset the error (set measurement relationship) by pressing S1

For 2. The motor was moved while turned off and sits outside of its permissible position.  
Check to see if a travel command would cause damage.  
Reset the error afterwards.

For 3. **An accident may occur by unwanted shaft movement.**  
Check measurement relationship. A feedback defect is present if the measurement relationship is false. The feedback should be exchanged (with MDD or MKD motors, exchange the whole motor.)

## F281 Mains fault

### Cause:

The power supply voltage failed for at least 3 supply periods during operation. As a result, the drive was brought to a standstill according to the set error reaction.

### Remedy:

Check the power supply connection according to the project specifications.

## F282 Phase fault

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

### Cause:

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

### Remedy:

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

## F283 Net - overvoltage

### Cause:

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

### Remedy:

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

## F284 Maincontactor nc-low voltage

**Cause:**

When the main contactor was turned off, the DC Bus voltage sank below 400 V during the set control enable.

**Remedy:**

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

## F401 Double MST Error Shutdown

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

**Cause:**

1. Disruption in the fiber optic cables.
2. The light signal was reduced too much.
3. Malfunction in the SERCOS interface (general).

**Remedy:**

For 1. Check all fiber optic connections in the SERCOS-ring.

For 2. Measure the reduction in the fiber optic cable.

**The maximum attenuation between TX and RX is 12.5 dB.**

For 3. Exchange the SERCOS interface plug-in card in the drive.

## F402 Double MDT Error Shutdown

The master data telegram (MDT) was not received in the drive in two successive SERCOS cycles.

**Cause:**

1. Disruption in the fiber optic cables.
2. The light signal was reduced too much.
3. Malfunction in the SERCOS interface (general).

**Remedy:**

For 1. Check all fiber optic connections in the SERCOS-ring.

For 2. Measure the reduction in the fiber optic cable.

**The maximum attenuation between TX and RX is 12.5 dB.**

For 3. Exchange the SERCOS interface plug-in card in the drive.

## F403 Invalid Communication Phase Shutdown

An invalid communication phase was given by the SERCOS master module (Phase  $\setminus > 4$ )

**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 kept 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

Phase 0 was not actuated while switching back from a communication phase.

**Cause :**

Error in the SERCOS master module of the control system

**Remedy:**

Consult the control system manufacturer

## F406 Phase Switching without Ready Signal

A phase switch was attempted from the SERCOS master without waiting for the drive's ready signal.

**Cause:**

Error in the SERCOS master module of the control system

**Remedy:**

Consult the control system manufacturer

## F630 Negative Travel Limit Value is exceeded

The drive was given a command value which would lead to a position outside of the travel region. The shaft was brought to a standstill with the "Set Velocity Command Value to Zero" error reaction. In the parameter **P-0-0090, Travel Limit Switch**, "travel limit exceeded will be handled as an error", set in bit 2.

**Cause:**

The **S-0-0049** or **S-0-0050** position limits were exceeded.

**Remedy:**

1. **Check the positive S-0-0049 and negative S-0-0050 position limits**
2. Check the software limits of the control system
3. Activate the shaft after the error reaction

**Procedure:**

- Reset the error
- If the power supply was switched off, switch it back on.
- Move the shaft into the allowable working range.

---

**Note:** Only command values which lead to the allowable range will be accepted. All other command values will result in bringing the drive to a standstill again.

---

## F644 Negative Travel Limit Switch detected

The travel limit switch was activated. The shaft was brought to a standstill with the "Set Velocity Command Value to Zero" error reaction. Bit 2 of the **P-0-0090, Travel Range Limit Switch** parameter is set for "Exceeding Travel Range as an Error," or exceeding the position limit started by a drive command (such as the drive controlled homing procedure).

**Cause:**

A limit switch was activated.

**Remedy:**

1. Reverse the error
2. Switch on the power supply again
3. Move the motor into the allowable travel region.

---

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

---

## F818 Drive Overtemperature Shutdown

The power amplifier of the drive has reached a temperature which is too high. In response, the drive gives the "E250 Drive Overtemperature Warning" for 30 seconds. The drive is then brought to a standstill according to the error reaction.

**Cause:**

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

**Remedy:**

For 1. If the blower has failed, exchange the drive

For 2. Install a control cabinet climate control function.

For 3. Check the dimensions of the control cabinet

---

**Note:** Temperature monitoring may not lead to fatal error classes.

---

## F819 Drive Overtemperature Monitor Defective

**Cause:**

A NTC resistor is used to measure the drive temperature. If the resistor is defective or is not connected, the aforementioned error message is generated.

**Remedy:**

Exchange or connect the NTC resistor.

## 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 given.

### Remedy:

The braking slope should have a flatter parameter or increase the bleeder capabilities by adding an additional bleeder.

The drive can be used again after the bleeder has cooled.

## F822 Motor Encoder Failure: Signals too small

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

1. The indicator given by the sine and cosine signals must be at least 1 V.
2. The maximum indicator from the sine and cosine signals may not exceed 11.8 V.

---

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

---

### Remedy:

- Check the encoder cable.
- Reposition the cable away from the motor power cable. The drive must be shielded (see control drive project specifications.)
- Check the encoder and exchange, if necessary

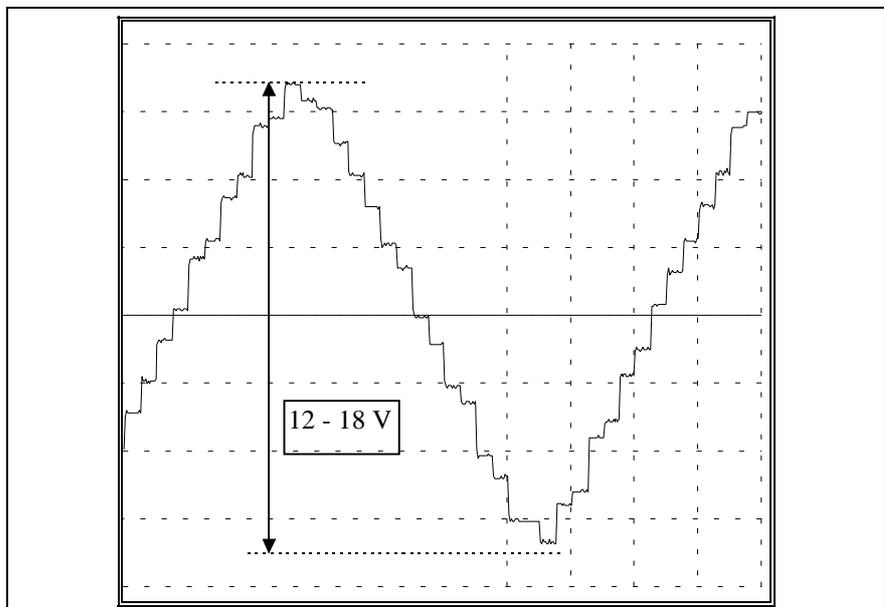


Fig. 2-2: Signal amplitude is measured via AK1 X3/1-2

## F827 Drive interlock while drive activated

**Cause:**

The drive interlock was activated at the same time as the control enable. The drive switches to torque free operation immediately.

**Remedy:**

The drive interlock should not be activated at the same time as the control enable. Check the control of the drive interlock input.

## F860 Overcurrent: Short in Powerstage

The current in the power transistor bridge has exceeded the doubled value of the peak current of the drive. As a result, the drive will be switched to torque free operation. An optional brake is immediately activated.

**Cause:**

1. Short in the motor cable.
2. The power supply of the drive is defective.

**Remedy:**

For 1. Check the motor cable for a short.

For 2. Exchange the drive.

## F861 Overcurrent: Short to Ground

The sum of the phase currents is monitored. The sum = 0 under normal operation. If the sum of the current is larger than  $0.5 \times I_N$ , the short circuit to ground fuse is activated.

**Cause:**

1. Defective motor cable
2. Short circuit to ground in the motor

**Remedy:**

Check the motor cable and motor for the short circuit to ground and exchange, if necessary.

## F869 +/- 15 Volt Error

The drive found a malfunction in the  $\pm 15$  V supply.

**Cause:**

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

**Remedy:**

For 1. Check the control supply bus cable or connector connection and exchange, if necessary

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

## F870 + 24 Volt Error

The drive found a malfunction in the + 24 V supply.

### Cause:

1. Defective control supply bus cable.
2. The 24 V power supply is overloaded.
3. Defective supply module.
4. Short in the emergency circuit.

### Remedy:

For 1. Check the control bus cable or connector connection and exchange, if necessary.

For 2. Check the supply module of the 24 V supply voltage.

For 3. Check supply module (see supply module instructions for use).

For 4. Check the emergency circuit for shorts.

## F871 + 10 Volt Error

The power supply for the current sensors has been disrupted.

### Cause:

A defect in the drive.

### Remedy:

Exchange the drive.

## F878 Velocity Loop Error

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

### Cause:

1. Motor cable is connected incorrectly.
2. Defective drive power supply.
3. Defective feedback.
4. Velocity loop parameterized incorrectly.
5. Acceleration or brake slope parameterized too steep.
6. Effective peak current is too low

### Remedy:

For 1. Check motor cable connection.

For 2. Exchange the drive.

For 3. Exchange motor.

For 4. Check the velocity controller according the user instructions (see the velocity controller chapter).

For 5. Decrease the maximum acceleration in the control system or **P-0-1201, Acceleration Slope 1**

## F879 Crossing Max. Velocity Feedback Value

The actual velocity is monitored in torque regulation mode. This error is generated when the programmed velocity in the **S-0-0091, Bipolar Velocity Limit Value** parameter is exceeded by 1.125 times or min. 100 Rpm ( rotary motors ) or 100 mm/min ( linear motors ).

**Cause:**

The load torque was less than the torque command value. This leads to an increase in the actual velocity up to the maximum possible motor velocity.

**Remedy:**

Assign the proper torque command value for the desired application. Reduce the **S-0-0092, Bipolar Torque Limit** parameter.

## F889 Regenerating overcurrent

**Cause :**

The current regenerated by the drive is larger than 1.2 times the type current ( only with DKR ).

**Remedy:**

Exchange the drive.

## F890 Regenerating electronic watchdog

**Cause :**

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

**Remedy:**

Exchange the drive or the in-out storage card.

## F891 Power supply fault

The DC Bus voltage is not increasing after the main contactor is switched on.

**Cause:**

If there is a short in the DC Bus, voltage cannot build up after the drive has been switched on. This error is given if the voltage remains under 100v for approx. 200ms.

**Remedy:**

Exchange the drive

## F892 Wrong code of current measuring unit

A faulty current measuring card was discovered after the supply voltage was switched on.

**Cause:**

The current measuring card has an incorrect code. The coding does not work with the RSK conductor card.

**Remedy:**

Exchange the current measuring card.

## F893 No regenerating current to net

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

**Cause:**

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

**Remedy:**

For 1. Check the power supply connection according to the project specifications.

For 2. Exchange the drive

## 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 is created corresponds to the one which has been stored. This error is generated if this is not the case.

**Remedy:**

Exchange the RSK conductor unit 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.

### Warning Classes

*The warning class is evident from the diagnostic message*

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	--

Table 2-3: Division of the Warning Classes

Warnings can not be externally deleted.

### E201 No mains

**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. ( Only with DKR )

**Remedy:**

Check power connections ( external relays, fuses, etc. )

### E202 Not ready for power on

**Cause:**

The main contactor K1 always switches off when the control enable is not set. As is necessary because of the drive capacities, the DC Bus voltage does not built up suddenly after the main contactor is switched off. This message is given as long as the Bus voltage > 250V and prevents switching on the main contactor.

This protects the discharge capacitors.

**Remedy:**

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

## E219 Warning Drive Overtemperature Watch Defect

The temperature monitor checks to see if the measured control drive temperature is realistic. If it determines that it is smaller than  $-10^{\circ}\text{C}$ , it will assume that the measuring unit is defective. The warning E219 "Warning Drive Overtemperature " will appear for 30 seconds. Afterwards the drive will be brought to a standstill according to the selected error reaction and message F220 "Error Drive Overtemperature Monitor Defective" will be given.

### Cause:

1. Sensor not connected to the DRP3 conductor card.
2. Broken cable in the drive or defective sensor.

### Remedy:

Exchange or repair the drive.

## E221 Warning Motor Temperature Control

The temperature monitor checks to see if the measured motor temperature is realistic. If it determines that it is smaller than  $-10^{\circ}\text{C}$ , it will assume that the measuring unit is defective. The warning E221 "Warning Motor Temperature Monitor Defective" will appear for 30 seconds. Afterwards the drive will be brought to a standstill according to the selected error reaction and the message F221 "Motor Temperature Monitor Defective" will be given.

### Cause:

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

### Remedy:

- For 1. Connect the sensor to the drive and to the motor ( see project specifications for the motor ).
- For 2. Exchange the wiring between the drive and the motor.
- For 3. Exchange motor.
- For 4. Exchange the drive.

## E249 Positioning Vel. (S-0-0259) Greater S-0-0091

### Cause:

In the "Drive Internal Interpolation" operating mode, a velocity is given in the **S-0-0259, Positioning Velocity** parameter with which the given target position should be approached.

The E249 message is generated if this is larger than the allowable maximum value **S-0-0091, Bipolar Velocity Limit Value**. The message bit 4 is set in the **S-0-0013, Condition Class 3** simultaneously.

**Remedy: Reduce S-0-0259, Positioning Velocity.**

## E250 Drive Overtemperature Warning

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

After 30 seconds the reaction set in the "**P-0-0119, Best Possible Deceleration**" parameter will follow from the drive.

### Cause:

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

### Remedy:

- For 1. If the blower fails exchange the drive.  
For 2. Create a control cabinet climitization function.  
For 3. Check the dimensions of the cabinet.

## E251 Motor Overtemperature Warning

The motor has heated up. The drive follows the command value input for a 30 second time period. This makes it possible to bring the motor to a standstill with the control system while keeping with the process. (For example, close the operation, leave the collision area, etc.)

After 30 seconds the reaction set in the "**P-0-0119, Best Possible Deceleration**" parameter will follow from the control drive.

### Cause:

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

### Remedy:

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

## E253 Target position out of range

### Cause:

In the "Drive Internal Interpolation" operating mode the **S-0-0258, Target Position** which is specified is checked to see if it is within the permissible travel region of the drive.

This is defined with the parameters **S-0-0049, Positive Position Limit** and **S-0-0050, Negative Position Limit**.

The E253 message will be generated if the target position lies outside of the travel range. Additionally, warning bit 13 is set in the **S-0-0012, Condition Class 2**.

### 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 the **S-0-00108, Feedrate Override** parameter. This warning is given if the value of this parameter is 0, since the drive cannot follow this command value.

### Cause:

1. The control system's feed potentiometer is at zero or is being interpreted incorrectly.
2. The parameter was set at the wrong value.

### Remedy:

For 1. Check feed potentiometer.

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

## E257 Continuous current limiting active

The thermal controller load is monitored. If a rated current profile is demanded of the drive which would require too high of a power transistor load over time ( too much warming of the power output,) the drive will react by dynamically reducing the effective peak current. This warning will be given at the same time. The **P-0-4046, Effective Peak Current** parameter will be reduced. The early warning **E261 Continuous Current Limit Prewarning** should have been generated before the peak current is actually limited.

### Cause:

The drive was overloaded.

### Remedy:

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

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

- Friction
- Components which have been moved

## E259 Command velocity limitation active

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

### Cause:

The **S-0-0091, Bipolar Velocity Limit Value** parameter was parameterized too low.

### Remedy:

In normal operating conditions set the **S-0-0091, Bipolar Velocity Limit Value** parameter at a value which is 10% higher than the NC effective velocity.

## E261 Continuous current limiting prewarning

Digital drives are monitored by a continually running temperature model. If the thermal load reaches 100% the continuous current limit is activated shortly thereafter.

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

Entering **P-0-0127 = 100%** into the parameter deactivates the warning.

### Cause:

The drive was overloaded.

### Remedy:

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

## E263 S-0-0036 Velocity Command Value greater than bipolar limit

### Cause:

The **S-0-0036, Velocity Command Value** was larger than allowed.

### Remedy:

It is limited to the **S-0-001, Bipolar Velocity Limit Value**.

## E410 Slave not scanned or address 0

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

### Cause:

Slave was not scanned in phase 1 or is set to the address "0".

### Remedy:

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

## E825 Overvoltage Error

The DC Bus voltage has exceeded its maximum value. ( $V_{bus} > 475 \text{ V}$ ). The drive was switched to torque free operation in order to prevent damage to its power stage.

**Cause:**

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

**Remedy:**

Decrease the Deceleration ramp in the spindle motor. Check the power supply and replace if necessary.

## E830 Negative Position limit value exceeded

The drive was given a command value which would lead to a motor position outside of the travel region. The motor was brought to a standstill by setting the velocity command value to zero. A class 1 condition error is not generated. The drive will automatically follow command values which lead into the allowable range after they are entered. "Exceeding Travel Limit as Warning" is set in bit 2 of parameter **P-0-0090, Travel Limit Parameter**.

**Cause:**

The **S-0-0049** or **S-0-0050** position limits were exceeded.

**Remedy:**

Enter command values which lead back into the allowable range.

---

**Note:** An error will be generated if the shaft is brought into the allowable travel range at the beginning of a drive command.

---

## E844 Negative Travel Zone Limit Switch Activated

The drive was given a command value which would lead to a motor position outside of the travel region. The motor was brought to a standstill by setting the velocity command value to zero. A class 1 diagnostics error is not generated. The drive will automatically follow command values which lead to the allowable range after they are entered. "Exceeding Travel Limit as Warning" is set in bit 2 of parameter **S-0-0090, Travel Zone Limit Switch**.

**Cause:**

Travel zone limit switch activated

**Remedy:**

Enter command values which lead back into the allowable range.

---

**Note:** An error will be generated if the shaft is brought into the allowable travel range at the beginning of a drive command.

---

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

### 3.1 Command Diagnostic Messages C...

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

### C100 Communication Phase 3 Transition Check

#### Cause:

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

### C101 Invalid communication parameter (S-0-0021)

#### Cause:

Communication parameters are invalid if not needed to run the drive in communication phase 3.

#### Remedy:

The invalid parameter are filed in the parameter **S-0-0021, List of invalid operating data of phase 3** .

## C102 Limit Error Communication Parameter (S-0-0021)

### Cause:

Parameters which are used for the operation of the communications phase 3 have to be outside of their minimum or maximum input values or the entered value can not be processed.

### Remedy:

The erroneous parameters are listed in **S-0-0021, IDN List of Invalid Operation Data Phase 2**.

The parameters are edited with valid values in **S-0-0021**.

## C104 Config. IDN for MDT not configurable

### Cause:

Settings for telegram type 7 are in parameter **S-0-0015, Telegram Types Parameter**. In **S-0-0024, Configurations List for the Master Data Telegram** parameters are entered, which are not contained in **S-0-0188, List of Configurable Data in MDT**.

### Remedy:

You have to either set the priority telegram ( Telegram type = 0..6 ) or the **S-0-0024, Configurations List for MDT** has to be edited with parameters which are also contained in **S-0-0188, List of Configurable Data**.

## 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 data command 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 Command in MDT**.

### Remedy:

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

## C106 Config. IDN for AT not configurable

### Cause:

Settings for telegram type 7 are in parameter **S-0-0015, Telegram types parameter**. In **S-0-0016, List of Configurable Data for the AT**, parameters are entered which are not contained in **S-0-0187, List of configurable daten in AT**.

### Remedy:

The parameter has to be either set to **S-0-0015, Telegram Type Parameter** as a priority telegram ( telegram type = 0..6 ) or you have to set **S-0-0016, List of Configurable Data for the AT** on parameters which are also contained in **S-0-0187, List of Configurable Data in AT**.  
C107 Configured Length > Max.Length For AT.

## C107 Configured Length > Max. Length For AT

### Cause:

The telegram type 7 is set in **S-0-0015, Telegram type parameter**. The length of the configurable data set in AT which is determined by **S-0-0016, Custom Amplifier Telegram Configuration List**, exceeds the maximum permissible length **S-0-0187, Length of the Configurable Data in AT**.

### Remedy:

Either set the priority telegram with **S-0-0015, Telegram type parameter** (telegram type = 0..6) or reduce the number of configurable parameters in 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**.

### Remedy:

Correction of the appropriate parameter(s). The determination of these times are set by the control manufacturer and is specified through the SERCOS Interface

## C109 Position of Data Record in MDT even (S-0-0009)

### Cause:

The parameter **S-0-0009, Starting address in MDT** contains an even value. This is invalid.

### Remedy:

The parameter **S-0-0009, Starting address in MDT** has to be set odd. The determination of this parameter is the responsibility of the control manufacturer and is specified in the SERCOS Interface.

## C110 Length of MDT odd (S-0-0010)

### Cause:

The parameter **S-0-0010, Length Master Data telegram** contains an odd value. This is invalid.

### Remedy:

The parameter **S-0-0010, Length Master Data Telegram** has to be set even. The determination of this parameter is the responsibility of the control manufacturer and is specified in the SERCOS Interface.

## C111 S-0-0009 + Record Length - 1 > (S-0-0010)

### Cause:

An error is present in parameter set **S-0-0009, Starting address in Master Data telegram** and **S-0-0010, Length Master Data telegram**. The length of the data command in MDT for the drive and the starting address in MDT is larger than the total length of MDT.

### Remedy:

The parameter set of **S-0-0009, Starting address in Master data telegram** and **S-0-0010, Length Master Data telegram** have to be corrected. The determination of these parameters is the responsibility of the control manufacturer and is specified in the SERCOS Interface.

## C112 TNcyc (S-0-0001) or TScyc (S-0-0002) Error

### Cause:

The only correct values allowed for **S-0-0001, NC Cycle Time** and **S-0-0002, SERCOS Cycle Time** are 500 usec or integral multiples of 1ms. This is not the case.

### Remedy:

**S-0-0001, NC Cycle Time** and **S-0-0002, SERCOS Cycle Time** have to be corrected. The determination of this parameter is the responsibility of the control manufacturer and is specified in the SERCOS Interface.

## C113 Relation TNcyc to TScyc Error

### Cause:

The value of **S-0-0001, NC Cycle Time** can only be equal to or be a multiple of **S-0-0002, SERCOS Cycle Time**. This is not the case.

### Remedy:

**S-0-0001, NC Cycle time** and **S-0-0002, SERCOS cycle time** have to be corrected. The determination of those parameters is responsibility of the control manufacturer and is specified in the SERCOS Interface.

## C114 T4 > TScyc (S-0-0002) - T4min

### Cause:

The maximum permissible value for **S-0-0007, Measurement Acquisition Time T4** is:

**S-0-0002, SERCOS Cycle Time - S-0-0005, Minimum Feedback Acquisition Time T4min.**

The value for **S-0-0007, Feedback Acquisition Starting Time T4** contains an error.

### Remedy:

**Correcting S-0-0007, Feedback Acquisition Starting Time T4.** The determination of this parameter is the responsibility of the control manufacturer and is specified in the SERCOS Interface.

### Cause:

The set value for **S-0-0089, MDT Transmit Starting Time T2** contains an error. The drive can't work with this value.

## C115 T2 to small

**Cause:**

The set value for **S-0-0089, MDT Transmit Starting Time T2** contains an error. The drive can't work with this value.

**Remedy:****Correcting S-0-0089, MDT Transmit Starting Time T2.**

The determination of this parameter is the responsibility of the control manufacturer and is specified in the SERCOS Interface.

## C200 Communication Phase 4 Transition Check

**Meaning:**

The command **S-0-0128, C2 Communication phase 4 Transition Check** is activated.

## C201 Parameter Set Incomplete(-> S-0-0022)

**Cause:**

Parameters which will be necessary to operate the drive in communication phase 4 are invalid. The invalid parameters are listed in **S-0-0022, IDN-List of Invalid Operation Data for Communication Phase 3**.

**Remedy:**

The parameters from **S-0-0022, IDN-List of Invalid Operation Data for Communication Phase 3** have to be edited with valid values.

## 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 commands). The invalid parameters are listed in **S-0-0022, IDN List of Invalid Operation Data for Communication Phase 3**.

**Remedy:**

The parameters from **S-0-0022, IDN-List of invalid operation data for Communication Phase 3** have to be edited with valid values.

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

**Cause:**

Parameters which are necessary to operate in phase 4 can't be processed. The invalid parameters are listed in **S-0-0022, IDN List of Invalid Operation Data for Communication Phase 3**. For example, the entered parameter **P-0-0075, External Feedback Interface** is for a DLF-plug-in card; this value is, however, not available.

**Remedy:**

The parameters in **S-0-0022, IDN-List of Invalid Operation Data for Communication Phase 3** have to be edited with valid values.

## C204 Motor type (P-0-4014) incorrect

In parameter **P-0-4014, Motor Type**, an MDD- or MKD-Motor is entered (value 1 or 5), The corresponding extension "MDD" or "MKD" was not found in the data memory motor feedback in parameter **S-0-0141, Motor Type**.

### Cause:

1. Type of motor is set wrong
2. The motor feedback memory can't be read.

### Remedy:

- For 1. In parameter **P-0-4014, Motor Type**, enter the connected motor.  
For 2. Check feedback connection Feedback defective exchange Motor

## C210 External feedback required (-> S-0-0022)

### Cause:

In the parameters **S-0-0147, Homing Parameter** or in the **Operational type parameters S-0-0032..35** there are values entered which require the use of an external feedback. In the parameter **P-0-0075, External Feedback Interface** only "0" (for no setting) is entered.

### Remedy:

**S-0-0147, Homing Parameter** or **Operational Type Parameters S-0-0032..35** need to be changed to the application of a Motor feedback instead of an external feedback.

External measurement system is activated through the input of the value **P-0-0075, External Feedback Interface** that is not "0".

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

When using an MDD- or MKD- Motor, invalid data was found while processing the parameters stored in the motor feedback.

### Causes:

1. Defective motor feedback cable
2. Defective motor feedback
3. Drive defective

### Remedy:

- For 1. Check the motor feedback cable  
For 2. Exchange the motor  
For 3. Exchange the drive

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

During the drive initialization, the operating software retrieves data from the EEPROM in the drive. If this access was unsuccessful, an error message will be generated.

### Cause:

Defective hardware in the drive

### Remedy:

Exchange drive

## C213 Position data scaling error

### Cause:

The display format of the position data can be set via the position data scaling parameter. The internal drive format of the position data is dependent on the motor transmitter and the transmitter resolution. The factor for the conversion of the position data from the internal drive format into the display format or the reverse conversion is outside of the workable area because either:

- Linear motor and rotary positional scaling of the Motor or
- Rotary motor and linear positional scaling are not representable or
- Linear motor and modulo scaling is set or
- the average factor for conversion of the position data from the display format into the internal format (or reverse process) is not representable.

### Remedy:

Check and set the relevant parameters correctly as follows:

- **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, Rotary position resolution**
- **S-0-0116, Resolution of Rotational 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, Motor Feedback Interface**
- **S-0-0277, Position Feedback 1 Type Parameter**

## C214 Velocity data scaling error

### Cause:

The display format of the velocity data can be set for velocity data with the help of the scaling parameter. The drive internal format of the velocity data depends on the used motor feedback and the feedback resolution. The factor for the conversion of the velocity data from the internal drive format into the display format (or the reverse process) is outside of the workable area.

### Remedy:

Check and set the relevant parameters correctly as follows:

- **S-0-0044, Velocity Data Scaling Type**
- **S-0-0045, Velocity Data Scaling Factor**
- **S-0-0046, Velocity Data Scaling Exponent**
- **S-0-0116, Rotational feedback resolution 1**
- **S-0-0121, Input Revolutions of Load Gear**
- **S-0-0122, Output Revolutions of Load Gear**
- **S-0-0123, Feed Constant**
- **P-0-0074, Motor Feedback Interface**
- **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 with the help of the scaling parameter. The internal drive format of the acceleration data is dependent on the applied rotational feedback and the feedback resolution. The factor for the conversion of the acceleration data from the internal drive format into the display format (or the reverse process) is outside of the workable area.

### 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, Rotational feedback resolution 1**
- **S-0-0121, Input Revolutions of Load Gear**
- **S-0-0122, Output Revolutions of Load Gear**
- **S-0-0123, Feed Constant**
- **P-0-0074, Motor Feedback Interface**
- **S-0-0277, Position Feedback 1 Type Parameter**

## C216 Torque/Force data scaling error

### Cause:

The display format of the torque data can be set for the torque data with the help of the scaling parameter. The factor for the conversion of the torque data from the internal drive format into the display format (or the reverse process) is outside of 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 the **P-0-0074, Motor feedback interface** is set at

- "1" for Standard interface,
- "4" for DFF plug-in card, or
- "8" for DAG plug-in card (Endat)

then the closed feedback has to have feedback data memory. The values for the feedback 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 the **P-0-0075, External Feedback Interface** is set at

- "1" for Standard interface,
- "4" for DFF plug-in card, or
- "8" for DAG plug-in card (Endat)

is set, then the closed feedback has to have feedback data memory. The values for feedback resolution and feedback type are taken from there. An error was discovered while reading these values.

**Cause:**

1. Defective encoder cable
2. Defective encoder

**Remedy:**

- For 1. Check the encoder cable  
For 2. Exchange the encoder

## C219 Leed drive feedback data reading error

If parameter **P-0-0076, Interface Position Feedback Value 3**

- "1" for standard Interface,
- "4" for DFF plug-in card, or
- "8" for DAG plug-in card

The system will then check

- if the parameter feedback type and the feedback resolution is available and valid;
- and if the initialization enable is within 10 seconds during the use of the DFF 1.1M card.

If one of these requirements is not fulfilled, an error message will be generated.

**Cause:**

1. Feedback cable is defect or not connected
2. Feedback defective
3. Initialization Enable for Master Encoder Connection over DFF 1.1 card not available.

**Remedy:**

- For 1. Check feedback cable  
For 2. Exchange feedback  
For 3. Check initialization enable of the following drives. The enable is given if the drive completed the conversion command without error.

## C220 Mot. Feedback Initializing Error

A number of tests are performed when the motor feedback is initialized. An error was detected while doing this. This error can be:

- Error during reading the angle rectification data
- Error during copying the angle rectification data
- Disturbance in the communication with the feedback
- Assembly error with the position of a initialization track
- Reading error of the analog signal of a initialization track
- Pointer length error of the analog signal of a initialization track
- Invalid offset between the high and low dissipating track
- Error in the micro-controller of the measuring system

### 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 (plug-in card)

## C221 Ext. Feedback Initializing Error

During the initialization of an external encoder several checks are performed. An error was detected while doing this. This error can be:

- Error during reading the angle rectification data
- Error during copying the angle rectification data
- Disturbance in the communication with the feedback
- Assembly error with the position of a initialization track
- Reading error of the analog signal of a initialization track
- Pointer length error of the analog signal of a initialization track
- Invalid offset between the high and low dissipating track
- Error in the micro-controller of the measuring system
- Setting error for the external 24V for DAG 1.2 to the SSI-Interface

### Cause:

1. Defective external feedback cable
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 (plug-in card)

## C222 Lead Drive Feedback Initializing Error

When the master encoder is initialized some checks are performed. An error was detected while doing this. This error can be:

- Error during reading the angle rectification data
- Error during copying the angle rectification data
- Disturbance in the communication with the feedback
- Assembly error with the position of a initialization track
- Reading error of the analog signal of a initialization track
- Pointer length error of the analog signal of a initialization track
- Invalid offset between the high and low dissipating track
- Error in the micro-controller of the measuring system
- Setting error for the external 24V for DAG 1.2M to the SSI-Interface

**Cause:**

1. Defective external feedback cable
2. Defective feedback

**Remedy:**

For 1. Check the external feedback cable

For 2. Exchange feedback

## C225 Coprocessor Not Ready For Initialization

The drive has a coprocessor. This coprocessor can be initialized during the conversion command. The coprocessor signals its availability for initialization. If this is not the case an error occurs.

**Cause:**

Coprocessor failed.

**Remedy:**

Exchange the drive.

## C226 Coprocessor Acknowledge Failed

The drive has a coprocessor. This coprocessor will be initialized during the conversion command. If the coprocessor doesn't confirm to the initialization through the master processor an error is generated.

**Cause:**

Coprocessor failed.

**Remedy:**

Exchange the drive.

## C227 Modulo range error

An error was discovered during the computation of the modulo values. The calculated value is no longer in the representable area.

**Remedy:**

Check the parameters which will be used for the modulo function.

## C228 Controller Type (S-0-0140) incorrect

With the parameter **S-0-0140, Drive Type** several different internal setting will be done in the software. If the content of this parameter can't be used, this error will be generated.

### Cause:

1. The drive type can't be processed by the Software.
2. Amplifier EEPROM defect.

### Remedy:

- For 1. Contact Indramat.  
For 2. Exchange/repair the drive.

## C300 Set absolute measurement

The command **P-0-0012, Set Absolute Measurement** was activated by the control system.

## C302 Absolute Measuring System Not Installed

The command: set **P-0-0012, Set Absolute Measurement** was started without an absolute encoder present.

The command can not be processed because no absolute encoder was found

### Cause:

1. The command was falsely activated.
2. The connected motor or the external measurement system is not set as an absolute encoder.

### Remedy:

- For 1. Stop the command process.  
For 2. Equip the motor or external measurement system with an absolute encoder function.

## C500 Reset Class 1 diagnostic (error reset)

The command for resetting errors, "**S-0-0099, Reset Class 1 Diagnostics**" was activated by the connected control system.

## C501 Error delet only in Parameter Mode

### Cause:

An attempt was made to rest the error, **F8/22 Motor encoder Failure, Signals too small**, in communications phase 4. This is only possible in communications phases < 4.

### Remedy:

1. Reset communication phase
2. Retry command.

## C600 Drive controlled homing procedure command

The command "**S-0-0148, Drive Controlled Homing Procedure**" was activated via the connected control system.

## C601 Homing not possible if drive is not enabled

### Cause:

This command was selected without enabling the drive. This is not allowed.

### Remedy:

1. Turn the drive enable on.
2. Give the command again.

## C602 Distance homing switch-reference mark erroneous

### Cause:

Calculation of the zero switch is activated. The distance between the positive zero switch edge and the calculated homing mark is outside of the permissible range.

### Remedy:

Transfer the value in parameter **S-0-0298, Reference Cam Shifting to...** to parameter **S-0-0299, Home switch offset**.

## C604 Homing of absolute encoder not possible

The command **S-0-0148, Drive Controlled Homing Procedure** was activated. With the feedback selection in **S-0-0147, Homing Parameter** an absolute measurement system is selected. This command can only then run if previously **P-0-0012, setting absolute measurement** was selected.

### Remedy:

First activate the command **P-0-0012, Setting Absolute Measurement**, then start with the command **S-0-0148, Drive controlled Homing Procedure**. With this procedure you define the absolute measurement range.

## C700 Basic load

The adjustment of the machine mechanic to the digital drive is done through the activation of the motor feedback in the stored RPM control parameter for the motors of the type MDD and MKD. The drive signals with the C700 message that the C700 basic load command was activated with the "**S-0-0262, Command Basic Load**" command.

### Cause:

Activation of the command C700 basic load

## C701 Basic load not possible if drive is enabled

**Cause:**

The command **S-0-0262, Command Basic Load** can't be processed with the drive enabled.

**Remedy:**

1. Disable control enable.
2. Repeat the command.

Run the Load Default Settings feature as a command"

## C702 Default parameters not available

The adjustment of the machine mechanic to the digital drive is done through the activation of the motor feedback in the stored RPM control parameter for the motors of the type MDD and MKD. With the message C702 the drive signals that the command **S-0-0262, Command basic load** is activated, however, no data memory is available at the connected motor.

**Remedy:**

Order the parameter information sheet from the Indramat Customer service and enter parameters.

Run the Load Default Settings feature as a command"

## C703 Default parameters invalid

**Cause:**

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

**Remedy:**

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

Run the Load Default Settings feature as a command"

## C704 Default parameters error

**Cause:**

The available default parameters are not compatible with the software version used.

**Remedy:**

Contact Indramat.

Run the Load Default Settings feature as a command"

## 3.2 Drive Mode Diagnostic Messages A...

### A000 Communication Phase 0

The communication process is separated into four communication phases: The phases 0 and 1 are used to recognize the participating components. Phase 2 is used to provide the time and data protocols for communication phases 3 and 4.

The initialization proceeds by an increasing sequence. The defaults of the communication phase is set by the control. By switching to communication phase 4, the initialization is completed and the performance setting is enabled.

If the phase progression switch is interrupted, one can recognize this interruption by the state display remaining still in the previously connected communication phase. If the diagnostic **A000 Communication phase 0** is active, the drive stays in phase 0 and waits for a phase transfer to 1 by the control.

### A001 Communication Phase 1

The communication process is separated into four communication phases: The phases 0 and 1 are used to recognize the participating components. Phase 2 is used to provide the time and data protocols for the communication phases 3 and 4.

The initialization proceeds by an increasing sequence. The defaults of the communication phase is done through the control. By switching to the communication phase 4, the initialization is completed and the performance setting is enabled.

If the phase progression switch is interrupted, you can recognize this interruption by the state display remaining still in the previously connected communication phase.

If the diagnosis **A001 Communication phase 1** is active, the drive stays in phase 1, the transfer from phase 1 to 2 is not yet indicated by the control.

### A002 Communication Phase 2

The communication process is separated into four communication phases: The phases 0 and 1 are used to recognize the participating components. Phase 2 is used to provide the time and data protocols for the communication phases 3 and 4.

The initialization proceeds by an increasing sequence. The preset of the communication phase is done through the control. By switching to the communication phase 4, the initialization is completed and the performance setting is enabled.

If the phase progression switch is interrupted, one can recognize this interruption by the state display remaining still in the previously connected communication phase. If the diagnosis **A002 Communication phase 2** is active, the drive then is in phase 2.

Before the control transfers to communication phase 3, the command

**S-0-0127, C1 Communication Phase 3 Transition Check** has to be started. If the command is being confirmed negative, then the transfer into communication phase 3 is impossible. The problems that were diagnosed by the drive must first be solved.

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**Note:** The parameters are not checked for exactness:

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## A003 Communication Phase 3

The communication connection is separated into four communication phases: The phases 0 and 1 are used to recognize the participating components. Phase 2 is used to provide the time and data protocols for the communication phases 3 and 4.

The initialization proceeds by an increasing sequence. The defaults of the communication phase is done through the control. By switching to communication phase 4 the initialization is complete and the performance setting is enabled.

If the phase progression switch is interrupted, one can recognize this by the state display remaining still in the previously connected communication phase. If the diagnosis **A003 Communication phase 3** is active, then the drive is in phase 3.

Before the control transfers to communication phase 4 (Operation mode), the command **S-0-0128, C2 Communication phase 4 transition check** has to be started. If the command is being confirmed negative, the transfer into communication phase 4 is impossible. The problems that were diagnosed by the drive must first be solved.

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**Note:** The parameters are not checked for exactness.

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## A010 Halt Drive

The feature “**Drive Halt**” was activated. The drive halt function serves to stop the motor with a defined acceleration and defined jerk. This feature can either be activated by deleting the drive halt Bits (BIT 13) in the master control word or by disconnecting a drive command (i.e., in the drive controlled homing).

## A011 Drive Interlock Open

Digital drives are equipped with a interlock function. It prevents an undesired start of a servo axis. Through activation of the interlock function the control transmitter of the power output is disconnected from the power output through a relay contact.

At the connectors AS+;AS- of phoenix connector X3 is +24V power.

## 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 control drive. The drive is ready to be turned on.

## A100 Drive in Torque Mode

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

## A101 Drive in Velocity Mode

The drive is in velocity control operating mode. It follows the velocity position value sequence inputted by the control system. The velocity loop is closed at the drive.

## A102 Position Mode Encoder 1

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The control only sets the position command value. The drive follows the position value which contains a lag error.

**Encoder 1** indicates that the position feedback is mounted on the motor shaft (indirect measurement of the axis position).

## A103 Position Mode Encoder 2

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The control only sets the position command value. The drive follows the position value which contains a lag error.

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

## A104 Position Mode Encoder 1 / lagless positioning

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The control system only inputs the position command value sequence. The drive follows the command value **without lag**.

**Encoder 1** indicates that the position feedback is mounted on the motor shaft (indirect measurement of axis position).

## A105 Position Control / Feedback 2 / lagless

The drive is in **Position mode**. The position loop is closed at the drive through a position encoder. The control system only inputs the position command value sequence, the drive follows the command value **without lag**.

**Encoder 2** indicates that the position feedback is mounted on the machine axis (direct measurement of axis position).

## A106 Drive controlled interpolation / Encoder 1

The drive receives a position command value from the control, which is identical with the target position of the movement path. The drive generates (**interpolates**) a internal position command value path which is established by the control and contains the maximum values for jerk, velocity and acceleration sequences.

The drive moves with a lag error to the target position of the movement path.

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

## A107 Drive controlled interpolation / Encoder 2

The drive receives a position command value from the control, which is identical with the target position of the movement path. The drive generates (**interpolates**) an internal position command value path, which is established by the control and contains the maximum values for jerk, velocity and acceleration sequences.

The drive moves with a lag error to the target position of the movement path.

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

## A108 Drive controlled interpolation / Encoder 1 / lagless

The drive receives a position command value from the control, which is identical with the target position of the movement path. The drive generates (**interpolates**) an internal position command value path which is established by the control and contains the maximum values for jerk, velocity and acceleration sequences.

The drive moves **without lag** to the target position of the movement path.

**Encoder 1** indicates that the position feedback is mounted on the motor shaft (indirect measurement of the axis position).

## A109 Drive controlled interpolation / Encoder 2 / lagless

The drive receives a position command value from the control, which is identical with the target position of the movement path. The drive generates (**interpolates**) an internal position command value path, which is established by the control and contains the maximum values for jerk, velocity and acceleration sequences.

The drive moves **without lag** to the target position of the movement path.

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

## 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.

**Diagnostic message number :** A110

## A112 Phase Synchronization, Encoder 1, virt. Lead 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, virt. Lead 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, virt. Lead 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, virt. Lead 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, virt., Lead 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, virt., Lead 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, Encoder 1, virt. Lead 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, Encoder 2, virt. Lead 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, virt. Lead 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

**Encoder 1** indicates that the position the master encoder. The drive follows the command value with a lag error. 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, virt. Lead 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. Lead 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. Lead 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.

## 3.3 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 (S-0-0136) 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.

---

Note!

### 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.



# 4 Exchanging Drive Components

Avoid spending a long time looking for errors in individual devices and repairing devices connected to the machinery because of the loss of production that results from these repair activities.

The diagnostic message displays and the message signals on the DDS control drive make a targeted and effective search for malfunctions possible.

Defective drive components can be exchanged without any difficulty which guarantees the quickest possible resolution of the malfunction and return to operation without lengthy assembly and adjustment work.

Pay attention to the following when exchanging a component:

The new drive, motor, or cable (packaged by INDRAMAT) must have the exact type description as the part being replaced (see figure 3.1).

The type description should be specified when getting replacement parts from INDRAMAT.

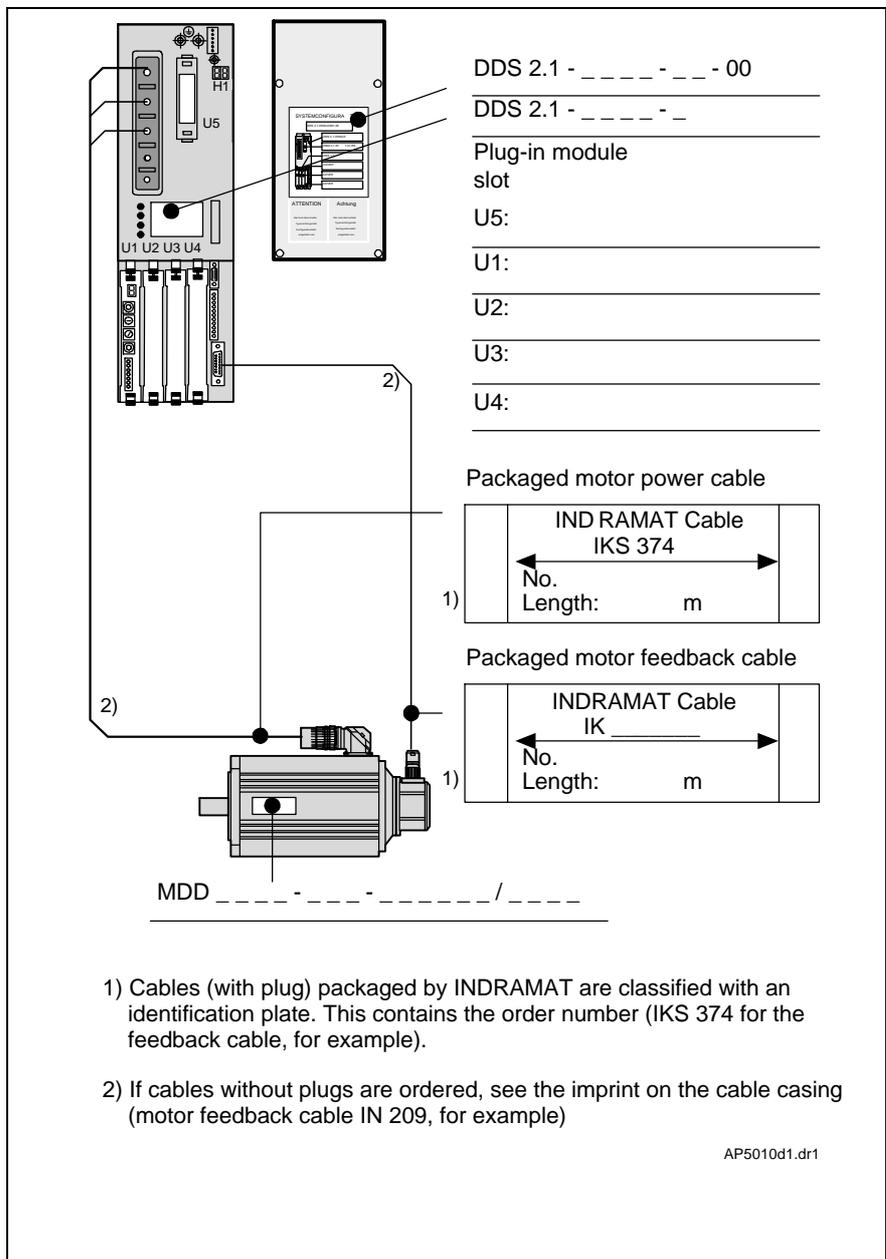


Fig. 4-1: Type Description of the Drive Components

## 4.1 Procedure for Exchanging Devices



**DANGER**

### Voltage conducting parts (larger than 50V)

touching may result in an electrical shock

⇒ Before working with electrical equipment, turn off the main switch and take steps to ensure that it will not be switched on again. The drives must be kept at a standstill, since voltage is generated as the motor turns. Wait for the DC Bus L+, L- to be emptied (= 5 min) and ensure that the voltage is under 50 V before doing any work. Do not disconnect live plug connections

### Drive

- Turn off the main switch.
- Ensure that it will not be turned back on.
- Unscrew the controller's contact safety device and the devices next to the drive packet.
- Check to see that the voltage in the DC Bus is under 50 V.
- Remove the DC bus bar and all other connections.
- Undo the screws on the top and bottom sides of the housing and take the drive out of the drive packet.
- Replace with a new drive and fasten the screws.

**Note:** Do not remove or insert the software module when the voltage is live!

- Remove the DSM software module... from the defective control drive and insert it in the new one (this makes adjustments unnecessary).
- Connect the new control drive to the machine circuit diagram!
- Attach the contact safety device with a configuration type plate.
- Put the equipment back into operation.

### AC Servo Motor

- Turn off the main switch.
- Ensure that it will not be turned back on.
- Observe the machine manufacturer's directions for mechanically exchanging the AC servo motor.



**DANGER**

### Error in controlling motors and components which move

mechanical injuries

⇒

- Reestablish the measurement relationship via the motor's own measurement system when using servo motors with absolute encoders.

## Exchanging Cables

- Turn off the main switch.
- Ensure that it will not be turned back on.



**DANGER**

**Voltage conducting parts (larger than 50V)**

touching may result in an electrical shock  
 ⇒ Connect and disconnect the power connectors of the cable only when the circuits are dead

**Note:** Put protective covers on open power connection plugs when exchanging cables or motors if the plugs may be moistened with cooling lubricating fluid or may experience contamination (permissible contamination level V2).

**Note:** Only join power plug connectors when the plugs are dry and clean!

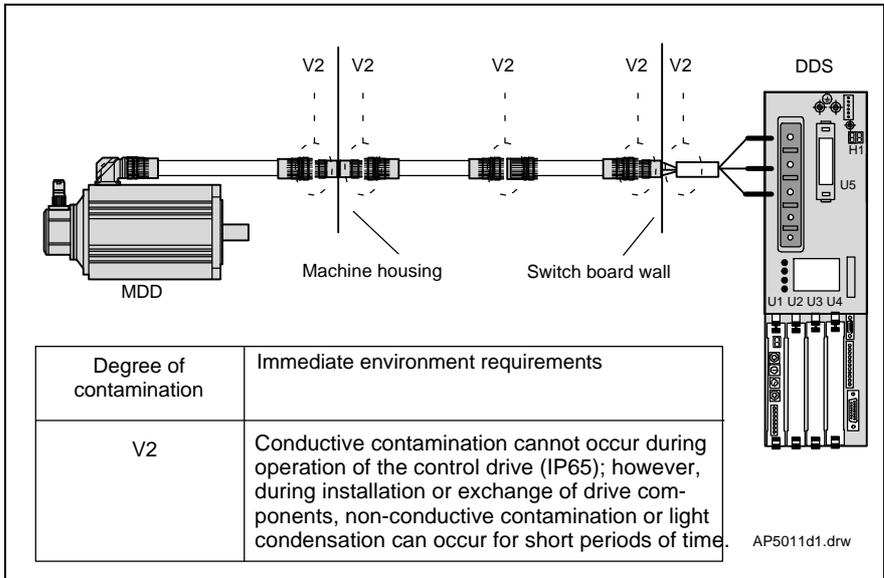


Fig. 4-2: Contamination level according to DIN VDE 0160

**Authentic INDRAMAT Cables**

Exchanging cables is effortless, the replacement cable is immediately ready for operation.

**Other Brands of Cables**

Check the cable according to the machines manufacturer's connection diagram!

**Notes:**

