

DIAX04 Drive With Electric Gear Function

Trouble Shooting Guide: ELS 05VRS

DOK-DIAX04-ELS-05VRS**-WAR1-EN-P

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

Änderungsverlauf

Document identification of previous and present output	Release Date	Remarks
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Customer Service Locations

1 Diagnostic Message Descriptions

1.1 Overview of the diagnostic message descriptions

Diagnostic Message Types

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

Differentiations will be made between:

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

Construction of a diagnostic message

A diagnostic message consists of:

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

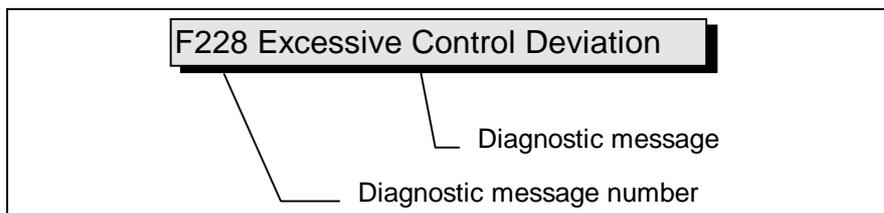


Fig. 1-1: Diagnostic message with a diagnostic number and text.

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

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

Display

The H1 display is the visual representation the diagnosis of the drive controller. H2 serves two-axis units (HDD) as an addition display.

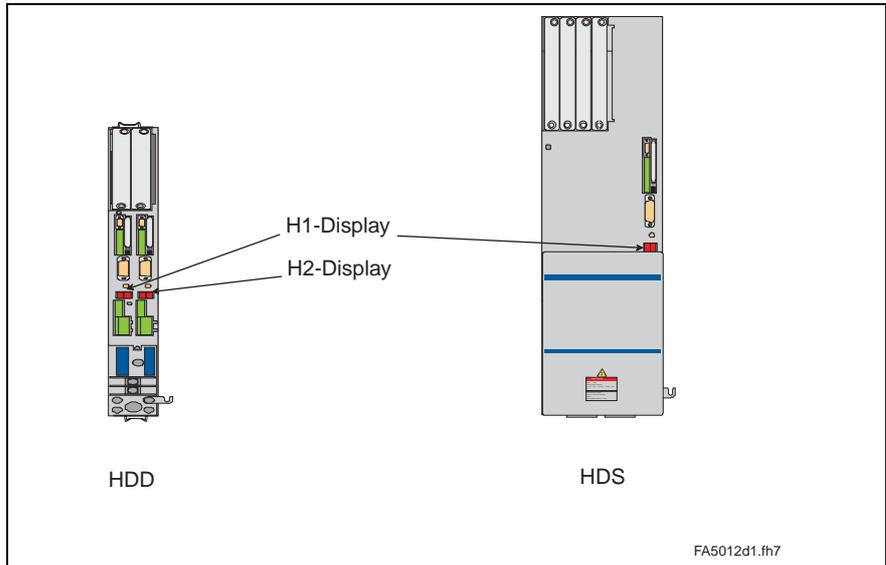


Fig. 1-2: H1 and H2 displays on the HDS and HDD controllers

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

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

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

Diagnostic Message Output Priority

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

The following graphic classifies operation status in order of importance.

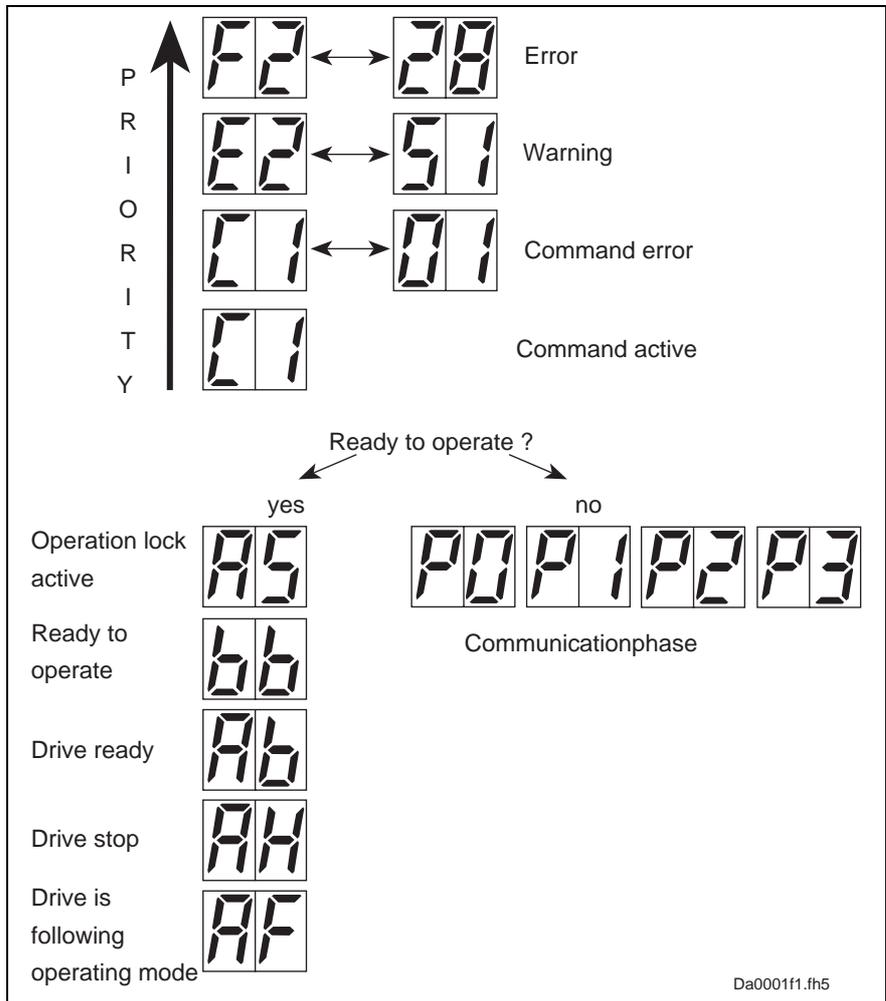


Fig. 1-3: Diagnostic message priority diagram

Clear Coded Diagnostic Message

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

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

Notes

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

2.1 Error diagnostic messages F...

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

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

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

Fig. 2-1: Error Classes and Drive Reaction

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

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

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

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

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

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

F207 Switching to uninitialized operation mode

Cause:

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

Remedy:

Enter the required mode in the activated mode parameter.

Valid modes are:

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

Fig. 2-2: Modes

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

Check for input of the permissible interpolation method.

F208 UL The motor type has changed.

Description:

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

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

Cause:

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

Remedy:

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

F209 PL Load parameter default values

Description:

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

Cause:

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

Remedy:

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



WARNING

⇒ This overwrites all parameters and positioning blocks.

F218 Amplifier overtemp. shutdown

Description:

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

Cause:

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

Remedy:

- For 1. Reduce the ambient temperature; for example, through cooling of the control cabinet
- For 2. Remove any obstruction or dirt from the heatsink.
- For 3. Install the device vertically and clear a large enough area for proper heatsink ventilation.
- For 4. Exchange drive.

F219 Motor overtemp. shutdown

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

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

Cause:

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

Remedy:

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

F221 Error Motor temp. surveillance defective

Cause:

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

Remedy:

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

F226 Undervoltage in power section

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

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

Cause:

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

Remedy:

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

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

F228 Excessive deviation

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

Cause:

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

Remedy:

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

F229 Motor encoder failure: quadrant error

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

Cause:

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

Remedy:

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

F233 External power supply error

Cause:

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

Remedy:

Check the external 24-V power supply.

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

Fig. 2-3: External power supply

F236 Excessive position feedback difference

Cause:

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

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

Remedy:

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

F237 Excessive position command difference

Cause:

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

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

Remedy:

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

F242 External encoder failure: signal too small

Cause:

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

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

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

Fig. 2-4: Pointer length

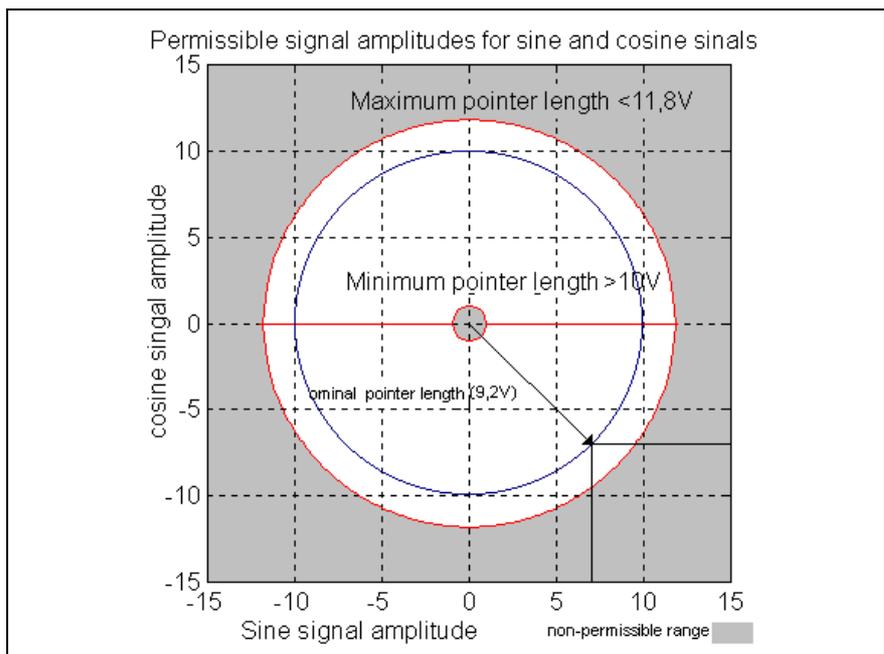


Fig. 2-5: Correct signal amplitude

Example:

Ucos = -6.5V

Usin = 6.5V

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

Remedy:

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

F245 External encoder failure: quadrant error

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

Cause:

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

Remedy:

For 1. Exchange the encoder cable.

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

For 3. Exchange the DLF module.

F248 Low battery voltage**Cause:**

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

CAUTION

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

Possible damages: Mechanical injuries

Precautionary measures: Replace the battery as soon as possible

Instructions for Exchanging Batteries

Have the following tools and accessories ready:

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

CAUTION

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

Possible damages: Mechanical injuries

Precautionary measures: Turn off the power supply.
Make sure it will not be turned back on.
Exchange the battery while the control voltage is turned on.

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

The reference point must then be reestablished.

Removing the Battery

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

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

F249 Master drive encoder failure: signal too small

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

Criteria for correct encoder signals:

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

Cause:

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

Remedy:

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

F252 Master drive encoder failure: quadrant error

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

Cause:

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

Remedy:

For 1. Exchange the encoder cable

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

For 3. Exchange the DLF plug-in card

F253 Incr. encoder emulator: pulse frequency too high

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

Remedial action:

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

F254 Incr. encoder emulator: hardware fault

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

Remedial action:

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

F255 External power supply DAE 02 error

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

Remedial action:

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

F267 Erroneous internal hardware synchronization**Cause:**

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

Remedy:

- Exchange DSS module.
- Exchange the drive controller.

F268 Brake fault

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

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

this error message will be generated.

Cause:

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

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

Remedy:

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

F270 Error power supply home switch

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

Cause:

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

Remedy:

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

Name:	Unit:	min.:	typ.:	max.:
External operating voltage +U _L	V	18	24	32
External current consumption I _L	mA			100

Fig. 2-6: External power supply

F271 Error power supply travel limit switch

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

Cause:

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

Remedy:

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

F272 Error power supply probe input

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

Cause:

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

Remedy:

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

F273 Error power supply E-Stop

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

Cause:

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

Remedy:

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

F276 Absolute encoder out of allowed window

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

Cause:

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

Remedy:

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

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

For 3. Danger of Accident through Unwanted Axis Motion

Check reference point. If the reference point is incorrect, there is a problem with the feedback. The feedback should be exchanged (with MHD-, MKD- or MKE absolute motor encoders, exchange the whole motor).

F280 Short circuit to earth**Cause:**

Ground short in the DC bus or in the motor.

This error is reported only in compact devices.

Remedy:

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

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

F316 Softstart fault power supply unit

The DC bus cannot be loaded.

Cause:

1. Short-circuit in power supply or drive controller.
2. Too many additional capacitors have been connected.
3. Interrupt in DC bus choke (only applies to HVE)

Remedy:

1. Release connection to drive controllers and turn power back on. If unit is defective, replace it.
2. Number of additional capacitor must be reduced or a separate loading device must be used.
3. DC bus choke and lines must be checked, possibly replaced.

F318 Heatsink overtemp. fault power supply unit

Power switched off due to excessive heatsink temperature.

Cause:

The unit is overloaded over ambient temperature is too high.

Remedy:

Check load and ambient temperature. Temperature pre-warning contact of the unit must be checked.

F320 Bleeder overload

Power off due to high bleeder load.

Cause:

1. In the HVR, too much regenerated drive energy even with power off.
2. In the HVE, continuous regenerated power or rotary drive energy is too high.
3. Unit is defective.

Remedy:

On 1: Reduce drive speed. Delay power off in the case of OFF or and emergency stop.

On 3: Replace unit.

F360 Overcurrent power supply unit

With HVR only!

Cause:

Short-circuit in power supply unit, drive controller, motor or a cable.

Remedy:

Disconnect power supply lines on the drive controller one at a time.
Replace a unit if it is defective.

F369 +24V/+15V/+5V fault power supply unit

Control voltage interference.

Cause:

1. Maximum permissible load has been exceeded
2. Short-circuit in wiring if control voltage is used outside of drive system.
3. Unit is defective.

Recovery

On 1: Release bus connections to drive controller one after the other.

On 2: Release control voltage taps and check for short-circuits.

On 3: Replace unit.

F380 Short to ground power supply unit**Cause:**

Ground short: in power supply unit
in drive controller
in motor or motor cable

Remedy:

Release connections to motor and power supply unit one at a time.
Replace defective drive components.

F381 Mains failure

With HVR only !

Cause:

At least one phase of the power supply is missing.

Remedy:

Check mains fuses and replace, if necessary.

F382 Mains phase loss fault

With HVE only !

Cause:

At least one phase of the power supply is missing.

Remedy:

Check mains fuses and replace, if necessary.

F383 Line voltage fault

With HVR only !

Cause:

Mains voltage exceeds permissible tolerance (3x 380 ... 480V, $\pm 10\%$).

Remedy:

Check mains voltage, use matching transformer, if necessary.

F384 Connection error at power supply unit

With HVR only !

Cause:

Power and control voltage connects are not phase coincident.

Remedy:

Check connection voltage. Terminals X5/U and X8/1, X5/V and X8/2, X5/W and X8/3 may not conduct voltage to each other.

F385 Line frequency fault

With HVR only !

Cause:

Mains frequency exceeds permissible tolerance ($\pm 2\text{Hz}$).

F394 Checksum error power supply unit

With HVR only !

Cause:

Unit failure.

Remedy:

Replace unit.

F401 Double MST error shutdown

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

Cause:

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

Remedy:

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

For 2. Measure the attenuation in the LWL cable.

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

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

F402 Double MDT error shutdown

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

Causes:

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

Remedy:

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

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

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

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

F403 Invalid communication phase shutdown

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

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

F404 Error during phase progression

The prescribed order was not maintained during phase progression.

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

F405 Error during phase regression

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

Cause:

Malfunction in the SERCOS master module of the controller.

Remedy:

Contact the controller manufacturer.

F406 Phase switching without ready signal

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

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

F434 Emergency-Stop

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

Cause:

The emergency stop switch has been pressed.

Remedy:

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

F629 Positive travel limit exceeded

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

Cause:

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

Remedy:

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

Procedure:

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

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

F630 Negative travel limit exceeded

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

Cause:

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

Remedy:

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

Procedure:

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

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

F634 Emergency-Stop

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

Cause:

The emergency stop switch has been pressed.

Remedy:

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

F643 Positive travel limit switch detected

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

Cause:

The positive range limit switch is detected.

Remedy:

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

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

F644 Negative travel limit switch detected

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

Cause:

The negative travel limit switch was detected.

Remedy:

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

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

F822 Motor encoder failure: signal too small

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

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

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

Fig. 2-7: Pointer length

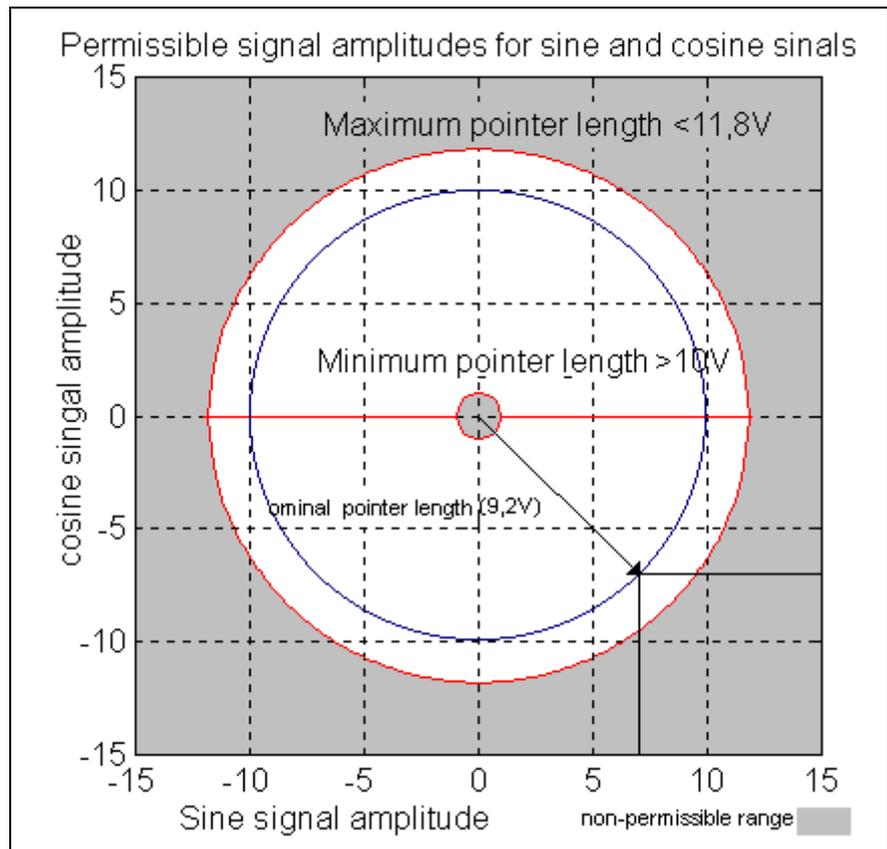


Fig. 2-8: Correct signal amplitude

Example:

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

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

$$\text{pointer length} = \sqrt{(-6,5V)^2 + 6,5V^2} \approx 9,2V$$

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

Remedy:

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

F827 Drive interlock while drive activated

Cause:

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

Remedy:

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

F860 Overcurrent: short in power stage

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

Cause:

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

Remedy:

- Ref. 1. Check the motor cable for short-circuit
Ref. 2. Replace the drive controller.
Ref. 3. The current regulator parameters and the initial values from the feedback should not differ.

F861 Overcurrent: short to ground

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

Cause:

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

Remedy:

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

F869 +/-15Volt DC error

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

Cause:

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

Remedy:

- For 1. Check the control voltage bus cable or plug connection and exchange if necessary.
For 2. Check supply module (see supply module instructions for use).

F870 +24Volt DC error

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

Causes:

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

Remedy:

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

F871 +10Volt DC error

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

Cause:

A defect in the drive controller.

Remedy:

Exchange the drive controller.

F878 Velocity loop error

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

Cause:

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

Remedy:

For 1. Check motor cable connection.

For 2. Exchange the drive controller.

For 3. Exchange the motor.

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

For 5. Decrease the maximum acceleration in the control system or decrease **P-0-1201, Ramp 1 pitch**.

F879 Velocity limit S-0-0091 exceeded

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

Cause:

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

Remedy:

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

2.2 Warning diagnostic messages

E219 Warning Drive temp. surveillance defective

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

Cause:

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

Remedy:

Exchange or repair the drive controller.

E221 Warning Motor temp. surveillance defective

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

Cause:

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

Remedy:

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

E225 Motor overload

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

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

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

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

E226 Undervoltage in power section

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

Cause:

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

Remedy:

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

E247 Interpolation velocity = 0

The drive-internal position command value interpolator is active if

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

are active.

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

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

E248 Interpolation acceleration = 0

The drive-internal position command value interpolator is active if

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

are active.

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

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

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

Cause:

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

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

Remedy:

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

E250 Drive overtemp. prewarning

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

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

Cause:

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

Remedy:

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

E251 Motor overtemp. prewarning

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

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

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

Cause:

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

Remedy:

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

E253 Target position out of travel zone

Cause:

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

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

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

Remedy:

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

E255 Feedrate-override S-0-0108 = 0

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

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

Cause:

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

Remedy:

For 1. Check the feed potentiometer.

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

E257 Continuous current limit active

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

Cause:

The drive controller was overloaded.

Remedy:

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

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

- Friction
- Components which have been moved.

E259 Command velocity limit active

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

Cause:

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

Remedy:

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

E261 Continuous current limit prewarning

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

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

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

Cause:

The drive controller was overloaded.

Remedy:

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

E263 Velocity command value > limit S-0-0091

Cause:

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

Remedy:

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

E324 Option module error power supply unit

Cause:

A component that is connected to the HVE or HVR power supply unit reports a malfunction.

Remedy:

Check the option module, and replace it if necessary.

E325 Recovery overload power supply unit

Cause:

The regenerated load of the drives is excessive.

Remedy:

Reduce permitted delays. Use a drive controller with smaller peak currents.

E326 Bus power overload

Error will be stored for no more than 500 ms!

Cause:

The input power required by the drives is excessive.

Remedy:

Reduce the permissible acceleration. Use drive controller with smaller peak current.

E350 Heat sink overtemp. warning power supply unit

The permissible heatsink temperature has been reached. Temperature prewarning contact open. Power off after 30 seconds.

Cause:

Load too high, ambient temperature too high.

Cooling air is blocked, blower in unit is defective.

Remedy:

Reduce load, reduce control cabinet temperature, check cooling air ducts, replace unit.

E352 Bleeder overload warning power supply unit

Cause:

75% of the permissible bleeder ON time has been reached due to excessive regenerated power.

Remedy:

- permissible acceleration (delay) must be reduced
- reduce drive speed
- reduce peak current of the drive

E353 Diagnostic message power supply erroneous

The power supply unit HVE or HVR cyclically sends status and error messages via a serial connection to the connected controller. If the controllers do not receive several sequential messages, then this warning is generated.

Cause:

1. serial interface of power supply unit is defective
2. break in serial connection lines
3. serial interface of controller is defective

Remedy:

- On 1. replace power supply unit.
On 2. check and replace bus cable, if necessary
On 3. replace controller, if necessary

E387 Control voltage supply fault power supply unit

With HVE only !

Cause:

The power voltage supply in the HVE exceeds permissible tolerance (3x 380 ... 480V, $\pm 10\%$).

Remedy:

Check mains fuse in control cabinet and replace, if necessary.

E410 Slave not scanned or adress 0

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

Cause:

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

Remedy:

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

E825 Overvoltage in power stage

The DC bus voltage has reached impermissibly high values. ($U_d > 900$ V). The drive controller was switched to torque-free operation so as not to endanger the drive's power amplifier.

Cause:

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

Remedy:

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

E826 Undervoltage in power section

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

Cause:

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

Remedy:

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

E829 Positive position limit exceeded

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

Cause:

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

Remedy:

Enter command values which lead back into the allowable range.

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

E830 Negative position limit exceeded

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

Cause:

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

Remedy:

Enter command values which lead back into the allowable range.

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

E834 Emergency-Stop

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

Cause:

The emergency stop switch was pressed.

Remedy:

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

E843 Positive limit switch activated

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

Cause:

Positive limit switch has been actuated.

Remedy:

Specify command values that lead back to the valid range.

E844 Negative limit switch activated

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

Cause:

Negative limit switch has been actuated.

Remedy:

Specify command values that lead back to the valid range.

Notes

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

3.1 Command Diagnostic Messages

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

Meaning:

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

C101 Invalid communication parameter (S-0-0021)

Cause:

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

Remedy:

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

The invalid parameters must be rewritten so they are correct.

C104 Config. IDN for MDT not configurable

Cause:

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

Remedy:

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

C105 Configured length > max. length for MDT

Cause:

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

Remedy:

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

C106 Config. IDN for AT not configurable

Cause:

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

Remedy:

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

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

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

Remedy:

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

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

One of the time slot parameters:

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

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

Remedy:

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

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

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

Remedy:

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

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

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

Remedy:

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

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

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

Remedy:

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

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

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

Remedy:

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

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

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

Remedy:

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

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

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

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

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

Remedy:

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

C115 T2 too small**Cause:**

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

Remedy:

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

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

C200 Communication phase 4 transition check**Meaning:**

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

C201 Invalid parameter(s) (->S-0-0022)**Cause:**

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

Remedy:

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

C202 Parameter limit error (->S-0-0022)**Cause:**

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

Remedy:

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

C203 Parameter calculation error (->S-0-0022)**Cause:**

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

Remedy:

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

C204 Motor type P-0-4014 incorrect

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

Cause:

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

Remedy:

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

For 2. Check feedback connection.

If feedback is defective, exchange motor.

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

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

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

Remedial action:

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

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

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

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

Causes:

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

Remedy:

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

Ref. 2. Replace motor

Ref. 3. Replace amplifier

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

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

Causes:

Defective hardware in the drive controller.

Remedial action:

Replace drive controller.

C213 Position data scaling error

Cause:

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

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

Remedy:

Checking and correcting the relevant parameters, such as:

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

C214 Velocity data scaling error

Cause:

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

Remedy:

Checking and correcting the relevant parameters, such as:

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

C215 Acceleration data scaling error

Cause:

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

Remedy:

Check and set the relevant parameters correctly as follows:

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

C216 Torque/force data scaling error

Cause:

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

Remedy:

Check and set the relevant parameters correctly as follows:

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

C217 Motor feedback data reading error

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

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

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

Cause:

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

Remedy:

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

C218 External feedback data reading error

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

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

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

Cause:

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

Remedy:

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

C220 Motor feedback initializing error

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

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

Cause:

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

Remedy:

For 1. Check the motor feedback cable.

For 2. Exchange the motor.

For 3. Exchange the measuring system interface (module).

C221 Ext. feedback initializing error

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

- Error while reading the angle rectification data
- Error while copying the angle rectification data

Interruption of communication with the encoder

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

Cause:

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

Remedy:

For 1. Check the external feedback cable.

For 2. Exchange feedback.

For 3. Exchange the measuring system interface (module).

C223 Input value for max. range too high

Cause:

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

Remedy:

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

C225 Coprocessor not ready for initialization

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

Cause:

Coprocessor failed.

Remedy:

Exchange the drive controller.

C226 Coprocessor acknowledge failed

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

Cause:

The coprocessor failed.

Remedy:

Exchange the drive controller.

C227 Modulo range error

Causes:

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

Remedy:

Decrease the modulo value.

C228 Controller type S-0-0140 wrong

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

Cause:

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

Remedy:

For 1. Contact Indramat.

For 2. Exchange/repair the control device.

C231 Emulator not loadable

Cause:

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

Remedial action:

Replace the DAE02.1 interface.

C232 Motor encoder interface not present

Cause:

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

Remedy:

Install or replace the selected encoder interface.

C233 External encoder interface not present

Cause:

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

Remedy:

Install or replace the selected encoder interface.

C234 Encoder combination not possible

Cause:

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

Remedy:

Select another external encoder.

C235 Load-side motor encoder with inductance motor only

Cause:

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

Remedy:

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

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

C236 Motor feedback required (P-0-0074)

Cause:

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

Remedy:

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

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

C300 Set absolute measuring

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

C302 Absolute measuring system not installed

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

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

Cause:

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

Remedy:

For 1. Stop execution of the command.

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

C400 Command: switch to parameter mode

Description:

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

C401 Drive active, switching not allowed

Cause:

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

Remedy:

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

C402 Only allowed without master

Cause:

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

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

Remedy:

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

C500 Reset class 1 diagnostic, error reset

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

C501 Error delet only in parameter mode

Cause:

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

Remedy:

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

C600 Drive controlled homing procedure command

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

C601 Homing only possible with drive enable

Cause:

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

Remedy:

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

C602 Distance home switch - reference mark erroneous

Cause:

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

Remedy:

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

C604 Homing of absolute encoder not possible

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

Remedy:

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

C700 Basic load

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

Cause:

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

C701 Basic load not possible if drive is enabled

Cause:

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

Remedy:

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

C702 Default parameters not available

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

Remedy:

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

C703 Default parameters invalid

Cause:

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

Remedy:

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

C704 Parameters not copyable

Cause:

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

Remedy:

Contact Indramat.

C705 Locked with password

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

C800 Default parameter load

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

Cause:

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

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

Cause:

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

C802 Locked with password

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

D300 Command adjust commutation

Meaning:

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

Cause:

The commutation setting command has been activated.

D301 Drive not ready for commutation command

Cause with linear motor:

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

Cause with rotary synchronous motor:

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

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

Remedial action with linear motor:

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

Remedial action with rotary synchronous motor:

Activate torque control and start the command again.

D500 Command 'get mark position'

Meaning:

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

Cause:

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

D501 Incremental encoder required

Cause:

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

Remedy:

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

Employ an encoder system with real reference markers.

D600 Cancel reference point procedure command

Meaning:

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

Cause:

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

D700 Parking axis command

Meaning:

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

Cause:

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

D800 Command measuring wheel operation mode

Meaning:

The command is active.

The position loop is closed with encoder 1 and 2.

Control loop monitoring is de-activated.

Cause:

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

D801 Measuring wheel operation not possible

Meaning:

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

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

Cause:

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

D802 Operation mode cancelled

Meaning:

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

Cause:

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

3.2 Status diagnostic messages

A000 Communication phase 0

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

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

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

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

A001 Communication phase 1

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

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

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

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

A002 Communication phase 2

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

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

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

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

A003 Communication phase 3

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

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

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

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

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

A010 Drive HALT

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

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

A011 Drive interlock open

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

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

A012 Control and power sections ready for operation

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

A013 Ready for power on

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

A100 Drive in TORQUE control

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

A101 Drive in VELOCITY control

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

A102 Position mode with encoder 1

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

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

A103 Position mode with encoder 2

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

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

A104 Position mode lagless, encoder 1

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

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

A105 Position control lagless, feedback 2

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

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

A106 Drive controlled interpolation, encoder 1

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

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

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

A107 Drive controlled interpolation, encoder 2

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

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

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

A108 Drive controlled interpolation, lagless, encoder 1

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

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

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

A109 Drive controlled interpolation, lagless, encoder 2

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

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

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

A110 Velocity Synchronization, virtuell Lead drive

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

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

A112 Phase synchronization, encoder 1, virtual master drive

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

The drive follows the command value with lag error

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

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

A113 Phase synchronization, encoder 2, virtual master drive

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

The drive follows the command value with a lag error.

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

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

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

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

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

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

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

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

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

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

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

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

A120 Pattern control, encoder 1, virtual master drive

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

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

The drive follows the command with a lag error.

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

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

A121 Pattern control, encoder 2, virtual master drive

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

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

The drive follows the command value with a lag error.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A128 Cam shaft, encoder 1, virtual master drive

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

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

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

A129 Cam shaft, encoder 2, virtual master drive

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

The drive follows the command value with a lag error.

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

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

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

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

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

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

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

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

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

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

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

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

A146 Relative drive controlled interpolation, encoder 1

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

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

into account.

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

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

A147 Relative drive controlled interpolation, encoder 2

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

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

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

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

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

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

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

into account.

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

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

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

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

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

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

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

A800 Unknown operation mode

There is no diagnosis for the activated mode.

3.3 Diagnostic messages for basic initialization and after fatal System errors

Diagnostic Message Display: -0

Cause:

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

Remedy:

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

Diagnostic Message Display: -1

Cause:

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

If an error is detected, this display will remain.

Remedy:

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

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

Diagnostic Message Display: -2

Cause:

Makeup of the parameter structure.

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

Diagnostic Message Display: -3

Cause:

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

Diagnostic Message Display: -5

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

Cause:

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

Remedy:

For 1. Check the control voltage supply.

For 2. Replace the drive.

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

A fatal processor or program error was encountered.

Remedy:

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

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

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

Remedy:

Replace the drive.

3.4 Operation Status

bb

"read for operation"

The drive is ready to be turned on.

Diagnostic message text:

Ready to be turned on (ready for operation)

Ab

"Drive is ready"

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

Diagnostic message text:

Control and power components are ready (drive is ready)

AF

"Drive enable"

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

Diagnostic message text:

according to selected operating mode.

AS

"Drive interlock"

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

Diagnostic message text:

Drive interlock

AH

"Drive Halt"

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

P0

Phase 0

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

Diagnostic message text:

Phase 0

P1**Phase 1**

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

Remedy:

see the control handbook

P2**Phase 2**

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

Note: The parameters are not checked for exactness.

Remedy:

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

P3**Phase 3**

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

Note: The parameters are not checked for exactness.

Remedy:

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

Notes

4 Exchanging Drive Components

4.1 Identifying the Drive Components

Power Supply Module

- The type plate of the power supply module is on the upper side of the machine at the front edge of the housing.

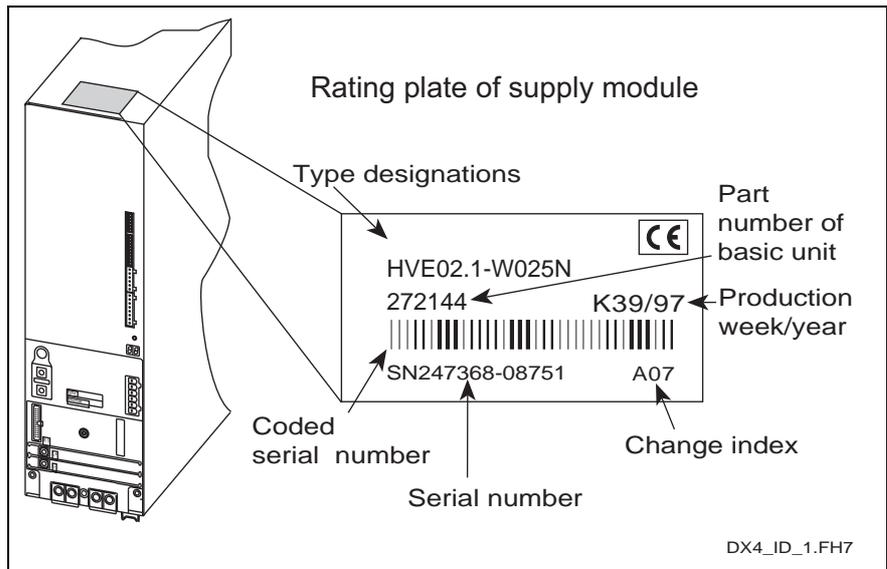


Fig. 4-1: Type plate on the power supply module (Example)

Servicing When contacting Customer Service at Indramat, it is important to know

- type designation and
- serial number

of the power supply module.

Procuring a replacement unit Use the type designations when ordering replacement units from INDRAMAT.

Drive Controllers

Three type plates are mounted to the unit to identify hardware and firmware.

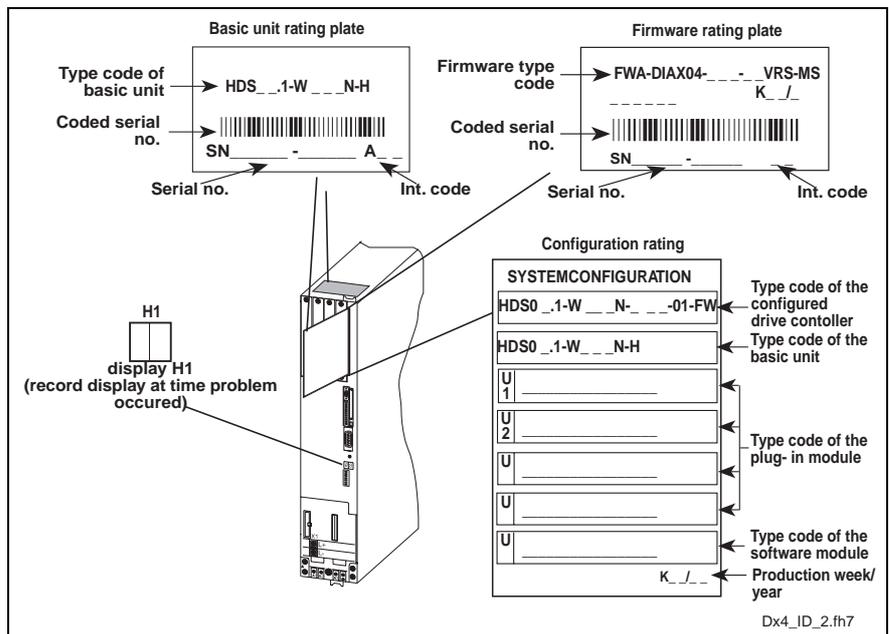


Fig. 4-2: Type plates for HDS / HDD controllers (Example)

Servicing

When contacting Customer Service at Indramat, it is important to know

- the type designation of the configured drive controller,
- the serial number of the basic unit and
- the firmware type designations.

Procuring a configured replacement unit

Replacement units can be purchased from Indramat in the form of completely configured drive controllers, whereby,

- the type designation of the configured drive controller and the
- firmware type designation

must be noted. The drive controller is then supplied with plug-in modules (U1...U4) and the software module (U5) including firmware.

Putting a replacement unit together

The replacement unit can be put together with a basic unit and the necessary plug-in modules. When ordering, if possibly even when the customer uses parts from his own warehouse, note

- the type designation of the basic unit and the
- type designation of the plug-in module.

If the customer puts the replacement unit together himself, then it is not necessary to order either software or firmware as the software module (including firmware) can be removed from the defective unit and re-used. This means that the replacement unit requires no adjustments in the machine.

Procuring a new software module

It only makes sense to replace a software module if the drive firmware has an error significant to the application or the functional expansion of a new firmware release is to be implemented.

Note: The software module of the drive controller contains the machine-specific parameters which can be lost when replacing the software module. This means that the module should only be replaced in very specific cases!

When ordering, note the

- type designation of the software module as well as the
- firmware type designation.

The latest firmware is automatically delivered.

Motors

A type plate is mounted to each motor in the vicinity of the junction box or power connector. If this type plate is in any way covered by the contours of the machine, then an additional type plate can be mounted to a more visible spot on the motor or machine. (An additional type plate is supplied with each motor, it is attached over the motor type plate with tape.)

Servicing When contacting Customer Service at Indramat, it is important to know

- the type designation and the
- serial number

of the motor.

Procuring a replacenet motor Replacement motors must be ordered from INDRAMAT specifying the complete type designation.

Electrical connections

Standard cables

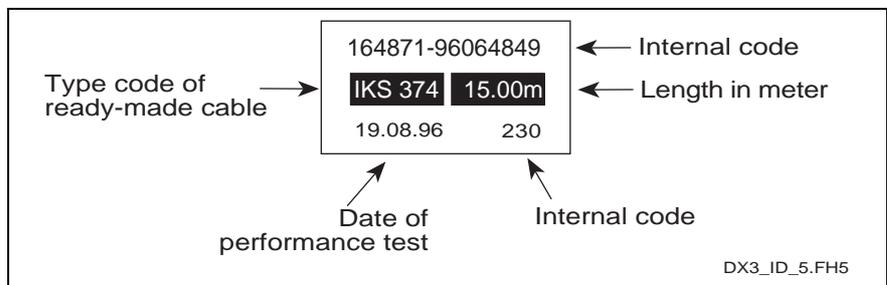


Fig. 4-3: Type plate of standard INDRAMAT cables (Example)

Servicing If cables are damaged it is advisable to replace them with standard and tested Indramat cables.

Procuring a standard cable When ordering, specify

- type designations of the cables and their
- lengths.

The type plate is situated near the end of the cable.

Making a replacement cable The replacement cable can be made of various parts, i.e., plug-in connectors, ferrules and connector sleeves. The power connectors in particular require special tools to mount the components. When obtaining the components, note

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

Information about special tools and assembly guidelines can be obtained from INDRAMAT upon request!

4.2 Replacing Drive Components

Power Supply Module

To avoid machine downtime it makes sense to replace defective drive controllers by simply exchanging the unit.

INDRAMAT power supply modules have been designed to ensure a safe, quick and uncomplicated replacement to keep production downtime to an absolute minimum.

Problems in the supply unit are diagnosed, and the steps to take when "Replacing the Power Supply Unit" are outlined in terms of the error diagnoses listed in the relevant document, i.e. DIAX04 -; Fault Clearance Guidelines".

Production can be resumed immediately after the unit is replaced because it is not necessary to adjust the drive to the machine.

Exchanging a Unit

- | | |
|-----------------------------------|--|
| Procuring a replacement | <ul style="list-style-type: none"> • To achieve the greatest functionality, it is recommended to obtain a configured drive controller for the replacement. See section "Identifying the Drive Components" on page 4-1. |
| Filling out a fault report | <ul style="list-style-type: none"> • A fault report form is incorporated into this document in section "Fault Report" on page 4-13, where it can be copied and used. The Fault Report must be completely filled out! This information ensures that the repair will be quickly and efficiently completed and also helps locate the cause of the problem! |
| Disconnecting the voltage | <ul style="list-style-type: none"> • Switch the main switch of the machine off and secure it against being switched back on. • Remove the cover of the power connection of the defective unit and all adjacent units. |
-
- 

DANGER

Voltage-conducting conductor bars (exceeding 50V), even with supply voltage off!

Electrical shock could result if touched!

⇒ Wait discharge time of DC bus (L+/L-) before checking that it has dropped below 50 volts!
-
- | | |
|-----------------------------------|---|
| Removing the supply module | <ul style="list-style-type: none"> • All electrical and mechanical connections (with the exception of the unit mounting) on the front of the unit, top and underside must be released and removed. <p>Release the screws on the underside of the unit. Lift unit up with both hands and remove it.</p> |
| Mounting the module | <ul style="list-style-type: none"> • Grip the supply module at the bottom and top and hang it into the mounting bars. Now screw into place! |

- Connecting the supply module**
 - Re-connect all electrical connections of the supply module as specified by the machine manufacturer!
 - Re-mount the power connection covers!
- Starting up the drive package**
 - Start the machine up as specified by the machine manufacturer.

Drive Controllers

To avoid machine downtimes, it makes sense to replace defective drive controllers by simply replacing them.

INDRAMAT drive controllers have been designed to quickly and simply replace the units and to keep production downtimes low.

Drive system faults are diagnosed by the drive controllers in terms of "Replacing the controller" and as dependent on the fault diagnosis found in the relevant document, "DIAX04 -; Fault Clearance Guidelines"

Production can be immediately start up after the unit is replaced as the drive does not have to be adjusted to the machine.

Exchanging a Unit

- Procuring a replacment unit**
 - To achieve the greatest functionality, it is recommended to obtain a configured drive controller for the replacement. See section "Identifying the Drive Components" on page 4-1.
- Filling out a fault report**
 - A fault report form is incorporated into this document in section "Fault Report" on page 4-13, where it can be copied and used. The Fault Report must be completely filled out! This information ensures that the repair will be quickly and efficiently completed and also helps locate the cause of the problem!
- Disconnecting the voltage**
 - Switch the main switch of machine off and secure against being switched back on.
 - Remove the cover of the power connection of the defective unit and all adjacent units.



DANGER

Voltage-conducting conductor bars (exceeding 50V), even with supply voltage off!

Electrical shock could result if touched!

⇒ Wait discharge time of DC bus (L+/L-) before checking that it has dropped below 50 volts!

- All electrical and mechanical connections (with the exception of the unit mounting) on the front of the unit, top and underside must be released and removed.

- Removing the drive controller**
- Release the screws on the underside of the unit. Lift unit up with both hands and remove it.

Release the software module (slot U5) by pressing the button, remove it from the defective unit and plug into the replacement unit.

Note: The software module contains the machine-specific parameters!
If the original software module is used, then no adjustments of the drive to the machine need be made!

- Mounting a HDDS/HDS**
- Grip the controller at the top and bottom and hang into the mounting bars. Tighten the screws!

- Connecting the controller**
- Reconnect all electrical connections as per the specifications of the machine manufacturer!
 - Remount the cover of the power connections!

- Starting up the controller**
- Start the machine up as specified by the machine manufacturer.
 - Check controller functions!

Motors

Procuring a replacement motor See section. "Identifying the Drive Components" on page 4-1.

Filling Out a Fault Report

- A fault report form is incorporated into this document in section "Fault Report" on page 4-13, where it can be copied and used. The Fault Report must be completely filled out! This information ensures that the repair will be quickly and efficiently completed and also helps locate the cause of the problem!



DANGER

High voltage at mounting clamps if not completely powered down and return of drive enable or if motor still turning!

Electrical shock could result from contact!

⇒ Check to make sure that the supply connections for power and control electronics and DC bus are not conducting voltage!

⇒ Make sure that the motor is standing still!

Removing motor



CAUTION

Error when handling and mounting

Injuries, damage to machine!

⇒ Note the specs of the machine manufacturer for removing a defective motor!

⇒ Secure hanging machine axes against falling!

- Remove defective motor as specified by machine manufacturer.

Note: Make sure that the open ends of the connectors are not dirtied! Maximum allowable degree of dirt is V2! The operating safety is not guaranteed if dirt exceeds this level!

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

DX3_AT_2.FH5

Fig. 4-4: Allowable degree of dirt on plug-in connectors of motor

- Mounting motor**
- Mount replacement motor as specified by manufacturer.

- Connecting the motor**
- Re-connect all electrical and liquid (if motor is liquid cooled) connections as specified by the machine manufacturer!

Note: Insert the connectors only if they are dry and clean!

- Re-starting the machine**
- Start up the machine as specified by the machine manufacturer. It may be necessary to re-establish the reference dimension if the measuring system of the motor supplies the feedback position for position control.
 - Check motor blower function, if necessary. The rotational direction of the blower wheel must agree with that of the direction of the arrow on the blower housing!
 - With liquid-cooled motors, check coolant level in tank!

Electrical Connections

Procuring a replacement cable

To ensure the highest degree of safety, it is recommended to use a standard INDRAMAT cable for replacement. See section "Identifying the Drive Components" on page 4-1.

Switching voltage off

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



DANGER

High voltage at connecting clamps if not completely powered down!

Electrical shock upon contact!

⇒ Check to make sure that the supply connections for power and control electronics and DC bus are not conducting voltage!

Replacing and mounting

- Remove defective cable. Possibly connect new cable to defective one thus when pulling out one, the new one is simultaneously pulled in.

Note: Make sure that the open ends of the connectors are not dirtied! Maximum allowable degree of dirt is V2! The operating safety is not guaranteed if dirt exceeds this level!

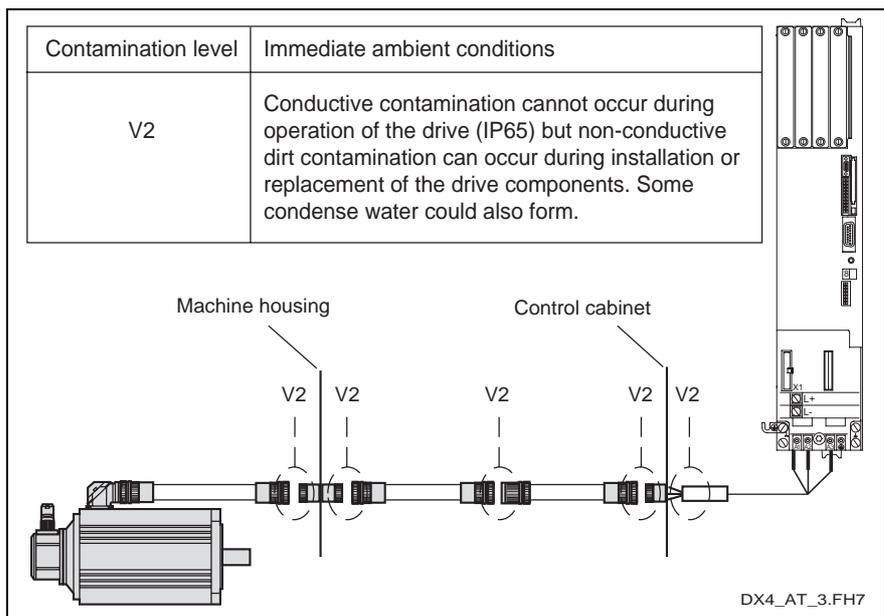


Fig. 4-5: Permissible degree of dirt contamination of plug-in connectors

Connecting a cable

- In the case of cables without plug-in connectors, connect the individual cores as per the specifications of the machine manufacturer. Ferrules and connectors sleeves must be used! Note correct phases with motor power and motor blower connections.
- Make sure cables with plug-in connectors have clean surfaces!

Note: Plug connectors in only if these are clean and dry!

- Starting machine up**
- Start the machine up as specified by the machine manufacturer. It may be necessary to check the motor blower. The rotational direction of the blower wheel must agree with the direction of the arrow on the blower housing!

Dispose of defective cable properly!

Plug-in Modules

Procuring a plug-in module See section "Identifying the Drive Components" on page 4-1.

- Disconnecting voltage**
- Remove the HDD/HDS from the mains. Make sure that the power and control power source are switched off. The displays on power supply module and controller must not be illuminated.
 - All electrical and optical connections on the front plate of the plug-in module must be removed.

Replacing plug-in modules



CAUTION

Danger when handling!

Controller and plug-in module could be damaged if plug-in module replaced with power applied!

⇒ Plug-in modules may not be removed or inserted with power on!

- Release screws at top and bottom of defective plug-in module. Pull module out and label it as "defective"!
 - Insert new module and tighten screws.
 - All electrical and optical connections must be reconnected.
- Starting controller up**
- Make sure that the cause for the defective plug-in module has been eliminated (e.g., defect in external measuring system, etc.).
 - Start machine up as specified by machine manufacturer. The HDD/HDS drive package is started up simultaneously.

Software Module

Procuring a software module

Note: The software module contains all machine-specific parameters. Prior to mounting a new software module, secure the parameters on an external medium and re-load after replacing the module.

See sec. "Identifying the Drive Components" on page 4-1.

Disconnecting the voltage

Disconnect drive controller with HDD/HDSS from mains. Make sure that power and control voltage power sources are shut down. The displays on module and controller must not be illuminated.



DANGER

Voltage-conducting conductor bars (exceeding 50V), even with supply voltage off!

Electrical shock could result if touched!

⇒ Wait discharge time of DC bus (L+/L-) before checking that it has dropped below 50 volts!

Replacing the software module



CAUTION

Danger when handling!

Danger to hardware and firmware if plug-in module replaced with voltage applied!

⇒ Do not remove software module or insert it if voltage is applied!

Starting up controller

- Remove software module (slot U5) and label it as defective.
- Insert new software module and click it into place!
- Software module replacement necessitates a restart of the drive as drive behavior could be altered by error corrections or functional firmware expansion. The data which are previously secured on an external medium can then be reloaded.

4.3 Fault Report



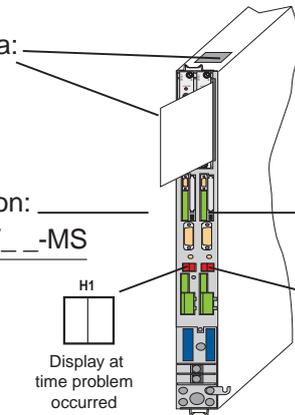
Fault Report for DIAX04

This fault report supports clarification of problems and their causes. It is absolutely necessary for finding and eliminating even hidden, sporadic or applications-specific problems.

- Always include a fault report when sending in a repair.
 - In any other case, send the fault report to the respective INDRAMAT Customer Service office, or send it into office with the address found on the back for the INDRAMAT Quality Assurance Department.
- INDRAMAT will process the matter quickly and efficiently.

Fault report from:	Co:	Loc:	Date:
	Dept.:	Name:	Tele.:

Information on the defective drive:

Rating plate basic unit data: 

HDD - _____ -

Serial no: _____

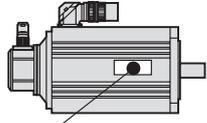
Software module information: _____

FWC-HSM ____ - ____ - V ____ -MS

S.No.: _____ -

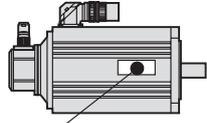
 Display at time problem occurred

 Display at time problem occurred

Motor data: 

Motortype: _____

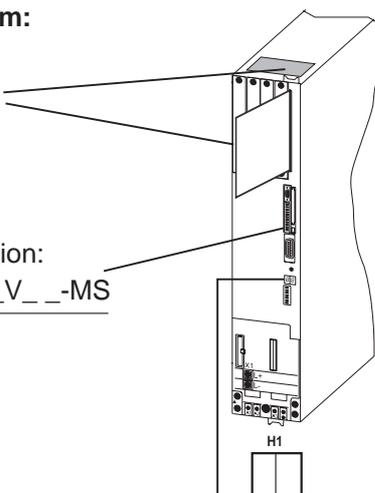
Serial no: _____

Motor data: 

Motortype: _____

Serial no: _____

Information on the problem:

Rating plate basic unit data: 

HDS - _____ -

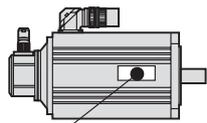
Serial no: _____

Software module information: _____

FWC-HSM ____ - ____ - V ____ -MS

S.No.: _____ -

 **Status display H1**
(Record display info at time of problem)

Motor data: 

Motortype: _____

Serial no: _____

Please look at the back

Pi6003f1.FH7

Indramat GmbH • Bgm.-Dr.-Nebel-Straße 2 • D-97816 Lohr • Telefon 09352 / 404-0 • Tx 689 421 • Fax 09352 / 404-885

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Customer Service Locations

Germany

Sales area Center INDRAMAT GmbH D-97816 Lohr am Main Bgm.-Dr.-Nebel-Str. 2 Telefon: 09352/40-4817 Telefax: 09352/40-4989	Sales area East INDRAMAT GmbH D-09120 Chemnitz Beckerstraße 31 Telefon: 0371/3555-0 Telefax: 0371/3555-230	Sales area West INDRAMAT GmbH D-40880 Ratingen Harkortstraße 25 Telefon: 02102/4318-0 Telefax: 02102/41315	Sales area North INDRAMAT GmbH D-22525 Hamburg Kieler Str.212 Telefon: 040/853157-0 Telefax: 040/853157-15
Sales area South INDRAMAT GmbH D-80339 München Ridlerstraße 75 Telefon: 089/540138-30 Telefax: 089/540138-10	Sales area South-West INDRAMAT GmbH D-71229 Leonberg Böblinger Straße 25 Telefon: 07152/972-6 Telefax: 07152/972-727		INDRAMAT Service-Hotline INDRAMAT GmbH Telefon: D-0172/660 040 6 -oder- Telefon: D-0171/333 882 6

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Customer service locations outside Europe

