**Rexroth**
Bosch Group

# Rexroth IndraDrive MPx02-MPx05 and HMV, Error Messages and Warnings

**Troubleshooting Guide**

| | |
|---|---|
| **Title** | Rexroth IndraDrive |
| | MPx02--MPx05 and HMV, |
| | Error Messages and Warnings |
| **Type of Documentation** | Troubleshooting Guide |
| **Document Typecode** | DOK-INDRV*-GEN*ZUSATZ*-WA02-EN-P |
| **Internal File Reference** | RS-454df3c8509675c90a6846a000deb363-3-en-US-4 |

**Purpose of Documentation**

This documentation is a supplement to DOK-INDRV*-GEN-**VRS-WA04-EN-P, R911297319. Please take into special account the chapters "Important Directions for Use" and "Safety Instructions for Electric Drives and Controls" included in the same.

This documentation contains the descriptions of all error messages and warnings implemented in the firmware for drive controllers and supply units of the IndraDrive range.

It assists machine operators and installation programmers with trouble shooting.

**Record of Revision**

| Edition | Release Date | Notes |
|---|---|---|
| 120-2400-B345-01/EN | 02.2008 | First edition |
| 120-2400-B345-02/EN | 05.2008 | Second edition, entry points for Online Help added |

**Note**

This document has been printed on chlorine-free bleached paper.

# Table of Contents

Table of Contents

Table of Contents

Page

Table of Contents

Table of Contents

Page

Table of Contents

# 1 Error Messages

## 1.1 Fatal System Errors (F9xxx and E-0000)

### 1.1.1 Behavior in the Case of Fatal System Errors

In the case of fatal system errors, there is a grave problem in the drive system (e.g. watchdog error, processor crash, ...) which does no longer allow regular operation of the drive. Due to a hardware or firmware error, the drive firmware is no longer operable; clearing an error is no longer possible.

In this case the drive reacts automatically as follows:

**Drive Behavior**
- All digital outputs are set to "0".

  Safety technology: safety related feedback is deactivated!
- The "ready for operation" relay opens, this also switches power off in case the wiring is correct.
- The output stage is locked, this disables the drive torque.
- The brake output is deactivated; if a self-holding brake is used, it is applied!
- One of the following diagnostic messages is output at the display:
  - F9xxx (fatal system errors)
  - E8xxx (exceptions) or
  - xE-xxxx (processor error), e.g. E-0800 (detailed information in the English language is output via the serial interface)

**Putting the Drive Into Operation**
After a fatal system error has occurred, the drive can only be put into operation again when:

1. The 24V supply is completely switched off and on so that a restart of the drive is carried out (incl. booting process and initialization).
2. The drive is run up to the operating mode again.
3. Power is switched on again.

☞ In case fatal system errors are occurring repeatedly, contact our service department as operating the drive then is no longer possible.

### 1.1.2 E-0000 Processor exception error

**Cause**

A fatal processor error (processor exception) occurred. The drive was switched off by the firmware (torque-free).

"0000" is a wild card for hexadecimal error codes by means of which the Rexroth service department can recognize the exact cause of the occurrence of the error.

**Example**  "E-0220" means that an unauthorized (incorrect) interrupt call occurred.

| E-0000 | E-0220 | E-0460 | E-06C0 |
|--------|--------|--------|--------|
| E-0020 | E-0240 | E-0480 | E-0700 |
| E-0040 | E-0260 | E-04A0 | E-0720 |
| E-0060 | E-0280 | E-04C0 | E-0740 |
| E-0080 | E-02A0 | E-04E0 | E-0760 |
| E-00A0 | E-02C0 | E-0500 | E-0800 |

Error Messages

| E-00C0 | E-02E0 | E-0520 | E-0820 |
|--------|--------|--------|--------|
| E-00E0 | E-0300 | E-0540 | E-0A00 |
| E-0100 | E-0320 | E-0560 | E-0A20 |
| E-0120 | E-0340 | E-0580 | E-0A40 |
| E-0140 | E-0360 | E-05A0 | E-0A60 |
| E-0160 | E-0380 | E-0600 | E-0A80 |
| E-0180 | E-03A0 | E-0620 | E-0AA0 |
| E-01A0 | E-03C0 | E-0640 | E-0AC0 |
| E-01C0 | E-0400 | E-0660 | E-0AE0 |
| E-01E0 | E-0420 | E-0680 | E-0B00 |
| E-0200 | E-0440 | E-06A0 | E-0B80 |

*Fig.1-1:          Hexadecimal error codes of a processor error*

Remedy:

Switch drive off and then on again. If the processor error is still displayed, please contact our service department.

### 1.1.3     F9001 Error internal function call

The device was switched off by the firmware.

| Cause | Remedy |
|-------|--------|
| Undefined cause | Switch device off/on. If error persists, replace device |
| An error occurred in firmware (general software error) | Please contact our service department |

### 1.1.4     F9002 Error internal function call

| Cause | Remedy |
|-------|--------|
| An error occurred in the firmware (general software error). The drive was switched off by the firmware. | Please contact our service department. |

### 1.1.5     F9003 Watchdog

| Cause | Remedy |
|-------|--------|
| Firmware-side watchdog timer was triggered (general firmware error). Drive was switched off by firmware. | Replace device, contact our service department |

### 1.1.6     F9004 Hardware trap

An internal firmware error has occurred. The device was switched off by the firmware.

| Cause | Remedy |
|-------|--------|
| An error occurred in firmware | Please contact our service department |

# 1.2 Fatal Errors (F8xxx)

## 1.2.1 Behavior in the Case of Fatal Errors

Basically there are 2 kinds of fatal errors (F8 errors):

* fatal errors during initialization (initialization errors) (e.g. F8201 and F8203, F8118, F8120, ...)
* fatal errors during operation (e.g. F8060, F8022, ...)

☞ Fatal initialization errors cannot be cleared, they require the drive to be switched off completely.

In addition to completely switching off the drive, fatal errors associated with the safety technology (e.g. F8201 and F8203) require safety technology to be completely recommissioned.

**Drive Behavior** In the case of fatal errors, closed-loop control (or open-loop U/f control) of the drive is no longer ensured; with these errors the drive, independent of the setting in "P-0-0119, Best possible deceleration" and "P-0-0117, Activation of NC reaction on error", therefore is immediately switched off, i.e. it goes torque-free (see also Functional Description "Error Reaction").

☞ In the case of fatal errors, the settings in "P-0-0118, Power supply, configuration" still are taken into account.

**Putting the Drive Into Operation** After a fatal error has occurred, the drive can only be put into operation again when:

1. The error message was cleared by the error clearing command (cf. "S-0-0099, C0500 Reset class 1 diagnostics") [to do this it might possibly be necessary to switch to the parameter mode or switch the drive off completely].
2. The actual cause of the error was recognized and removed. This might possibly imply the replacement of an entire component (e.g. motor or drive controller).
3. The drive is in the operating mode again and power was switched on again ("Ab").
4. Drive enable was switched on again (0-1 edge).

☞ In case fatal errors are occurring repeatedly, contact our service department as operating the drive then is no longer possible.

## 1.2.2 F8000 Fatal hardware error

**Cause** "F8000" is a collective diagnostic message for the following fatal hardware errors:

* "F8060 Overcurrent in power section" and
* "F8069 +/-15Volt DC error"

Normally you won't see "F8000" on the display of the drive controller, because "F8060 Overcurrent in power section" or "F8069 +/-15Volt DC error" will be displayed shortly afterwards.

**Reading Exact Cause of Error at External Control Unit** An external control unit cannot recognize the exact cause of the error; the exact cause of the error, however, can be detected via the service channel by repeated reading of "S-0-0390, Diagnostic message number" and "S-0-0095, Diagnostic message".

Error Messages

Remedy    The respective cause is displayed in the diagnostic message which follows the error F8000 ("F8060 Overcurrent in power section" or "F8069 +/-15Volt DC error").

Error Reaction    The error reaction defined for fatal errors (F8xxx) is immediately carried out (see "Behavior in the Case of Fatal Error").

## 1.2.3    F8010 Autom. commutation: max. motion range when moving back

The axis moved away from its initial position during the commutation setting process.

With the **saturation method**, this error is generated when the maximum motion range was exceeded and "moving back to start position" had been set.

With the **sine-wave method**, this error is generated independent of the setting "moving back to start position".

| Cause | Remedy |
|---|---|
| Positive feedback of motor; commutation offset determination generated incorrect value for "P-0-0521, Effective commutation offset". | Check motor encoder signals. To do this, move motor knowing manufacturer-side setting for sense of rotation or velocity polarity and check actual position values with regard to polarity and validation. |
| | If necessary, invert polarity of motor encoder or invert two motor phases. Carry out commutation setting again |
| Positive feedback of motor after motor replacement (servicing) due to connection error | Check whether direction of motion (sense of rotation) of motor complies with that of motor encoder. If not, invert direction of motion of motor (invert phases) or of motor encoder |
| During commutation setting process, axis got into resonance | Set "search direction for sine-wave method" to "increase of amplitude with priority" in "P-0-0522, Control word for commutation setting" |
| | **- o -** |
| | Reduce value in "P-0-0507, Test frequency for angle acquisition" in order modify excitation frequency for sine-wave method compared to resonance frequency of axis |
| Due to low friction of mechanical system, axis moved away from its initial position at start of commutation offset setting | With saturation method, switch off "moving back to start position", if possible on axis-side! |
| | With sine-wave method, determine new start values for P-0-0506 and P-0-0507! To do this, set P-0-0506 to "0" and start command C1200! |

## 1.2.4    F8011 Commutation offset could not be determined

The sine-wave method for commutation setting could not determine any value for the commutation offset.

Error Messages

| Cause | Remedy |
|---|---|
| Axis could not carry out required motion | Check axis for stiffness or blocking; if necessary, reduce friction (lubrication, guiding device of trailing cable installation) or remove blocking<br><br>- o -<br><br>Set "search direction for sine-wave method" to "increase of amplitude with priority" in "P-0-0522, Control word for commutation setting"<br><br>- o -<br><br>Increase value in "P-0-0506, Amplitude for angle acquisition" in order to increase excitation amplitude for sine-wave method compared to frictional force of axis. |
| During commutation setting process, axis got into resonance | Set "search direction for sine-wave method" to "increase of frequency with priority" in "P-0-0522, Control word for commutation setting"<br><br>- o -<br><br>Reduce value in "P-0-0507, Test frequency for angle acquisition" in order modify excitation frequency for sine-wave method compared to resonance frequency of axis |
| Motor has not been supplied with current | Check motor connection |
| Sine-wave method without success, although axis has required freedom of motion and doesn't show any resonance phenomena | Try with manually input values if automatic search for motor-specific values for "P-0-0506, Amplitude for angle acquisition" and "P-0-0507, Test frequency for angle acquisition" doesn't provide any result in spite of several repetitions. |
| Signals of motor encoder do not reflect motion process of axis; encoder cables of 2 drives possibly mixed up<br><br>- o -<br><br>Incorrect polarity of encoder signals | Check motor encoder signals. To do this move motor knowing manufacturer-side setting for sense of rotation or velocity polarity and check actual position values with regard to polarity and validation. |

## 1.2.5    F8012 Autom. commutation: max. motion range

During commutation setting (sine-wave method) the axis left the allowed actual position value range.

| Cause | Remedy |
|---|---|
| Heavy axis motion due to too high drive torque or force generation during commutation setting | Reduce value contained in "P-0-0506, Amplitude for angle acquisition"<br><br>- and / or -<br><br>Increase value contained in "P-0-0507, Test frequency for angle acquisition" |
| External forces or torques cause axis to move out of allowed actual position value range | Check mechanical axis system for occurrence of external forces, e.g. due to trailing cable installation, vertical load etc. |
| Detent force or torque causes axis to move out of allowed actual position value range | Make sure that, during commutation setting by means of sine-wave method, detent forces of motor do not cause position limits to be exceeded near limits of actual position value range |

Error Messages

## 1.2.6    F8013 Automatic commutation: current too low

The actual current value amplitude resulting from commutation setting with the saturation method is monitored. When it does not exceed a minimum threshold, the error F8013 is generated.

| Cause | Remedy |
|---|---|
| Actual current value amplitude is not sufficient for exact determination of commutation offset | Increase signal voltage ("P-0-0506, Amplitude for angle acquisition" or reduce signal frequency ("P-0-0507, Test frequency for angle acquisition" and restart commutation setting process.<br><br>**- o -**<br><br>Enter value "0" in "P-0-0506, Amplitude for angle acquisition" Appropriate value for P-0-0506 is thereby automatically determined during commutation setting process.<br><br>**- o -**<br><br>Reduce value of "P-0-0517, Commutation: required harmonics component", if approx. 30 similar values are determined for "P-0-0521, Effective commutation offset" with repeated commutation setting for different motor positions (drive remains in "Ab"). Reduce "P-0-0517, Commutation: required harmonics component" until command error F8013 no longer occurs; finally check function several times! |

☞          If error occurs repeatedly, please contact our service department.

## 1.2.7    F8014 Automatic commutation: overcurrent

The actual current value amplitude resulting from automatic commutation offset determination is monitored. When a maximum value is exceeded, the error F8014 is generated.

| Cause | Remedy |
|---|---|
| Amplitude of actual current value is higher than allowed maximum current | Reduce signal voltage ("P-0-0506, Voltage amplitude for angle acquisition") or increase signal frequency ("P-0-0507, Test frequency for angle acquisition").<br><br>**- o -**<br><br>With "P-0-0506, Voltage amplitude for angle acquisition"=0 start automatic determination of appropriate values. |

☞          If error occurs repeatedly, please contact our service department.

## 1.2.8    F8015 Automatic commutation: timeout

**Saturation Method**    During the execution of the automatic commutation offset determination (after drive enable) an error was detected.

| Cause | Remedy |
|---|---|
| An error occurred in internal signal generator used for determining commutation offset. | Switch drive off and on again. If error continues to be signaled, contact our service department. |

**Sine-Wave Method**    The commutation setting with motion by means of the sine-wave method is completed when the axis, after commutation offset determination, has been

moved back to the initial position at which it was before the start. If this is impossible, the error F8015 is generated.

| Cause | Remedy |
|---|---|
| Axis cannot be moved back to position at which it was at beginning of commutation determination. | Check mechanical axis system, remove blocking or stiffness |

## 1.2.9    F8016 Automatic commutation: iteration without result

During the automatic commutation offset determination (after drive enable) it has been impossible to find appropriate values for "P-0-0506, Voltage amplitude for angle acquisition" and "P-0-0507, Test frequency for angle acquisition" with which it would be possible to determine a useful commutation offset of the connected motor.

| Cause | Remedy |
|---|---|
| Current generated during automatic commutation offset determination could not produce any saturation effect in motor.<br><br>Required maximum current is approx. 1.5-fold continuous current at standstill ("S-0-0111, Motor current at standstill"). | Check whether controller can supply motor with sufficiently high current (cf. "S-0-0111, Motor current at standstill" and "S-0-0110, Amplifier peak current"). If maximum controller current is too low, drive controller has to be replaced by a bigger one.<br><br>- o -<br><br>Change position of movable part of motor with regard to its rigid part restart command "P-0-0524, C1200 Commutation offset setting command".<br><br>- o -<br><br>Contact our service department and, if necessary, use an absolute measuring system, because motor characteristics do not allow automatic commutation. |

See also Functional Description of firmware  "Commutation Setting"

## 1.2.10    F8017 Automatic commutation: incorrect commutation adjust

☞        This error only occurs during sensorless positioning of synchronous motors.

An error occurred during commutation adjust of the carrier-signal-based rotor position detection. It was impossible to determine the alignment of the rotor.

| Cause | Remedy |
|---|---|
| It was impossible to determine initial position of rotor. | Check whether parameter values of sensorless positioning of synchronous motors correspond to specification. |
| Rotor was moving during transient oscillation of rotor position estimation. | Make sure that rotor does not turn during commutation process. |

Error Messages

| Cause | Remedy |
|---|---|
| An error occurred when rotor angles determined before and after commutation adjust were compared. | Make sure that rotor does not turn during commutation process<br><br>**- and/or -**<br><br>Adjust parameter values of "P-0-0506, Amplitude for angle acquisition", "P-0-0507, Test frequency for angle acquisition" and "P-0-0517, Commutation: required harmonics component" or start search mode.<br><br>**- and/or -**<br><br>Check whether parameter values of sensorless positioning of synchronous motors correspond to specification. |
| Determined commutation offset is wrong<br>**- and/or -**<br>Rotor was moving during saturation method. | Adjust parameter values of "P-0-0506, Amplitude for angle acquisition", "P-0-0507, Test frequency for angle acquisition" and "P-0-0517, Commutation: required harmonics component" or start search mode. |

☞          If error occurs repeatedly, please contact our service department.

## 1.2.11     F8022 Enc. 1: enc. signals incorr. (can be cleared in ph. 2)

The signals of the measuring system (encoder 1) are monitored with regard to their amplitudes and signal shape. If a signal (e.g. sin or cos) leaves the thresholds monitored by the hardware or if the signals are disturbed in such a way that a position error occurs, the error F8022 is generated.

☞          As the position of the measuring system is no longer generated correctly when the error F8022 is detected, it is necessary to initialize the encoder again.

The error can only be cleared in communication phase 2 (parameter mode).

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding. | Check cable to measuring system and replace it, if necessary. |
| Measuring system defective. | Check measuring system and replace it, if necessary. |
| Faulty mounting of measuring head in the case of linear measuring systems. | Check mounting of measuring head and correct it, if necessary. |
| Measuring system dirty | Clean or replace measuring system. |
| Hardware defect on control section of drive. | Replace control section or entire drive controller. |

☞          Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also "E2074 Encoder 1: encoder signals disturbed".

## 1.2.12    F8023 Error mechanical link of encoder or motor connection

The controller is monitoring the motor, among other things, by means of a model calculation. The input values required for the model calculation are checked for validity. If the check is negative, this error message is generated.

| Cause | Remedy |
|---|---|
| Mechanical connection between rotor of motor and motor encoder is loose or broken. | Check connection and fix or repair it. |
| Phase break in motor feed wire. | • Check motor feed wire for continuity. Take possible "loose contacts"into account.<br>• Check connection of motor feed wire at controller.<br>• Check connection of motor feed wire at motor.<br>• Line break in motor. Replace motor.<br>• Line break in controller. Replace controller. |
| Monitoring signal for encoder validation (P-0-0620) is not within limits of P-0-0621 and P-0-0622 (upper or lower monitoring threshold of encoder validation monitoring), because commutation offset has been incorrectly set. | Determine commutation offset again (see Functional Description of firmware " Commutation Setting ". |
| Although commutation offset has been correctly set, monitoring signal for encoder validation (P-0-0620) is not within limits of P-0-0621 and P-0-0622 (upper or lower monitoring threshold of encoder validation monitoring). | Via P-0-0520, parameterize limit values for encoder validation monitoring in such a way that monitoring range in working point of motor is not left (if necessary, make oscilloscope measurement). |

## 1.2.13    F8025 Overvoltage in power section

☞     Description in preparation; you will find current information in the Technical Note "TN_411_3_Feldorientierte_Stromregelung".

## 1.2.14    F8027 Safety related standstill while drive enabled

☞     When the error occurs, the drive immediately becomes torque-free!

**Optional Module Starting Lockout (HSI01)**

| Cause | Remedy |
|---|---|
| Starting lockout was set with active control or drive enable was set with active starting lockout | Check control and connection of starting lockout input |

**Optional Module Safety Technology I/O (HSI11)**

| Cause | Remedy |
|---|---|
| Drive enable was set while "drive interlock" or "safety related standstill" was active<br><br>- o -<br><br>Drive enable was set while drive was in error status "quasi safety related standstill" due to internal safety technology error. | Do not set drive enable while drive is in described states. |

Error Messages

## 1.2.15    F8028 Overcurrent in power section

☞ The text of the description is in preparation; for up-to-date information, see Technical Note "TN_411_3_Field-Oriented_CurrentControl"

## 1.2.16    F8042 Encoder 2 error: signal amplitude incorrect

The signals of the measuring system (encoder 2) are monitored on hardware and software level with regard to their amplitudes and signal shape. If a signal (sin or cos) leaves the allowed range or if the signals are disturbed in such a way that a position error occurs, this error is generated. The error only occurs in conjunction with the function "redundant motor encoder"!

☞ As the position is no longer generated correctly when this error is detected, it is necessary to initialize the encoder again.

☞ When using an incremental encoder with square-wave signals, monitoring is carried out with regard to an inadmissible edge.

On the software level, the signals of a resolver are monitored for their levels.

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding | Check cable to measuring system and replace it, if necessary. |
| Encoder defective | Check measuring system and replace it, if necessary. |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary. |
| Measuring system dirty | Replace measuring system |
| Hardware defect on control section of drive | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the  Project Planning Manual for the power section.

## 1.2.17    F8057 Device overload shutdown

The device was switched off due to overload.

| Cause | Remedy |
|---|---|
| Power demanded by drives is too high | Use drives with lower peak current |
| Power demanded by drives is too high | Reduce allowed acceleration of axis or reduce final velocity to which acceleration takes place. |

## 1.2.18    F8060 Overcurrent in power section

The current in the power transistors has exceeded the maximum allowed device peak current (cf. "S-0-0110, Amplifier peak current").

Error Messages

☞ In the case of an internal signal voltage error (15 V) in the power section, this error message is generated, even without power, directly when the device is switched on, before power is demanded from the power section.

| Cause | Remedy |
|-------|--------|
| External 24 V supply is not sufficiently overload-proof | Check overload withstand capability of external 24 V power supply unit and replace it, if necessary. |
| Short circuit in motor or motor cable | Check motor cable and motor for short circuit |
| Power section of drive controller is defective | Replace drive controller |
| Current loop parameterized differently | Check current loop parameterization (cf. motor data sheet) and correct it if necessary after having contacted our service department. |
| Voltage fluctuations in DC bus too high because system impedance too high | Reduce system impedance, e.g. increase feed wire cross sections. |

## 1.2.19 F8064 Interruption of motor phase

During voltage-controlled U/f operation for asynchronous motors, the drive monitors the motor current in the individual line phases.

The drive has detected that the current is "0" in at least one phase

**DANGER**

**Lethal injury caused by coasting axis (torque disable)!**

⇒ Additional measures are possibly required to stop the axis.

**Restrictions of Correct Monitoring Function**

- Safe monitoring of individual phases is only possible as of a speed command value >10 rpm.
- The monitor is also triggered in the case of totally incorrect parameterization of the motor (e.g. the setting in "P-0-4004, Magnetizing current" is by far higher than the actually available magnetizing current).

**DANGER**

**Lethal electric shock caused by live parts with more than 50 V!**

⇒ Observe the safety regulations when working at/ checking the drive controller/ motor.

| Cause | Remedy |
|-------|--------|
| At least one line phase of motor has not been connected to drive controller or line break occurred | Check motor cable connection (assignment <-> axis). Check individual motor phases from connection at drive controller for line break and high ohmic resistance. |
| For a double-axis device, the two motor power connections were interchanged or generally incorrect axis assignment was made between motor and controller | Check whether assignment of motor connections is correct for the axes. |
| Motor winding (U, V, W) has burned out | Check motor winding by means of ohmmeter and replace motor, if necessary. |

Error Messages

| Cause | Remedy |
|---|---|
| Motor incorrectly parameterized | Compare motor data in drive to actual motor data (see also Functional Description of firmware " Rexroth Motors" and " Determining the Parameter Values of Third-Party Motors"). |
| Power section defective | Replace drive controller |

> ☞ The sequence of the replacement of drive controllers is described in the documentation " Project Planning Manual for Power Section".

## 1.2.20     F8067 Synchronization PWM-Timer wrong

Digital drive control requires absolutely synchronous data processing (e.g. sampling of actual current values); if this is not guaranteed, controlled operation is impossible and the error F8067 is generated.

| Cause | Remedy |
|---|---|
| Synchronization clock of bus master oscillates very much due to software or hardware error [e.g. jitter of MST with SERCOS (F2067 and F8067)]. | Check external bus master and make sure synchronization clock is error-free and constant. |
| Control section defective | Replace control section or entire drive controller |
| Internal timing problem in drive firmware | Contact our service department for firmware update. |

> ☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware " Master Communication".

## 1.2.21     F8069 +/-15Volt DC error

An error has occurred in the internal +/-15 V supply of the device.

| Cause | Remedy |
|---|---|
| Error in external DC 24V power supply | Check external power supply |
| Power section defective | Replace device |

## 1.2.22     F8070 +24Volt DC error

The operation of IndraDrive devices requires an external 24 V control voltage supply. This voltage is monitored with regard to the allowed tolerance.

> ☞ When the error F8070 occurs, the motors within the drive system are immediately go torque-free. Apply possibly existing self-holding motor holding brakes.

| Cause | Remedy |
|---|---|
| Supply cable for control voltages defective | Check and, if necessary, replace supply cable for control voltages and connector |
| Overload of 24 V power supply unit | Check 24 V supply voltage at power supply unit |

| Cause | Remedy |
|---|---|
| Power supply unit defective | Check and, if necessary, replace power supply unit |
| Short circuit in 24 V supply wiring | Check 24 V supply wiring for short circuit |

## 1.2.23 F8076 Error in error angle loop

☞ The text of the description is in preparation; for up-to-date information, see Technical Note "TN_411_3_Field-Oriented_CurrentControl".

## 1.2.24 F8078 Speed loop error

The speed loop monitor is activated if the following conditions occur simultaneously:

- "P-0-0049, Effective torque/force command value" is at the torque/force limit.
- "P-0-0049, Effective torque/force command value" and actual velocity have different signs.
- The actual velocity at the **motor shaft** is higher than 20 rpm (or 20 mm/min for linear motors).
- Actual acceleration and control deviation have different signs.

| Cause | Remedy |
|---|---|
| Motor phases (U, V, W) interchanged so that commutation of motor is incorrect. | Check motor cable connection and correct phase assignment, if necessary. |
| Incorrect encoder arrangement | Correct encoder arrangement (inverting rotational direction of encoder can possibly resolve problem). |
| Speed loop setting incorrect | Check speed loop setting according to Application Manual. |
| Commutation offset incorrect | Replace motor (in the case of MHD, MKD, MKE motors); in the case of kit motors, make commutation settings. |
| Motor encoder defective | Replace motor encoder (or motor) |

## 1.2.25 F8079 Velocity limit value exceeded

| Cause | Remedy |
|---|---|
| "S-0-0040, Velocity feedback value" has exceeded the 1.125-fold value of one of parameterized velocity limit values. | Check and, if necessary, correct parameterization of "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value" and "S-0-0039, Negative velocity limit value". |
| Velocity control loop unstable or too heavily oscillating due to incorrect parameterization. | Check and, if necessary, correct parameterization of velocity loop. |
| Preset velocity command value too high (cf. P-0-0048 = "S-0-0036, Velocity command value" + "S-0-0037, Additive velocity command value"). | Reduce "P-0-0048, Effective velocity command value" by adjusting "S-0-0036, Velocity command value" or "S-0-0037, Additive velocity command value". |

See also Functional Description of firmware " Control Loop Structure".

## 1.2.26 F8091 Power section defective

During the initialization of the power section, the drive tries to access the power section parameters.

Error Messages

These are the following parameters:

- S-0-0140, Controller type
- P-0-0809, Properties of charging circuit
- P-0-0859, Data of internal braking resistor
- P-0-1510, Circuit board code power section
- P-0-1519, Module code of power section
- P-0-3902, Command values for power section adjust
- P-0-3903, Adjust values of power section
- P-0-4058, Amplifier type data
- P-0-4059, Electric type data of power section

| Cause | Remedy |
|---|---|
| One of power section parameters is invalid (e.g. checksum error) or contains inadmissible value. | Check content of list "S-0-0021, IDN list of invalid operating data for communication phase 2", write down IDNs it contains (IDNs/parameters) and then please contact Rexroth service department. |
| **As of MPx04VRS:**<br><br>Incorrect parameter setting when using device "HAC01" (SERCOS analog converter). | Check/correct settings in "P-0-0860, Converter configuration" (bit 15); reboot device "HAC01" after having changed parameter setting. |
| Control section and/or power section defective. | Replace drive controller |

☞ The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.2.27    F8100 Error when initializing the parameter handling

During the initialization of the drive the control section is checked for correct function. An error was detected during this check.

| Cause | Remedy |
|---|---|
| Control section configuration not allowed because an optional module (e.g. optional module 1...4, master communication,...) is not supported by firmware. | Switch drive off and on again. If error occurs again, replace control section (e.g. CSH01.1 or CDB01.1) by different control section with appropriate configuration.<br><br>If necessary, contact our service department. |
| Firmware used is not suitable (e.g. MPH02VRS for double-axis control section), i.e. hardware and software do not match. | Select suitable firmware by means of Functional Description or Version Notes/Release Notes (see "supported control section configurations"). |
| Hardware defect on control section | Switch drive off and on again. If error still occurs, contact our service department and, if necessary, replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware  "System Overview".

See also  Project Planning Manual for control section, keyword "Type Code".

## 1.2.28    F8102 Error when initializing power section

During the initialization of the drive the power section is checked for correct function. An error was detected during this check.

| Cause | Remedy |
|---|---|
| Hardware and firmware do not match | Check Firmware Release Notes or Firmware Version Notes and, if necessary, use latest firmware release. |
| Parameter "P-0-1510, Circuit board code power section" stored on power section is invalid or was incorrectly written. | Switch drive off and on again. If error occurs again, check content of "P-0-1510, Circuit board code power section" and contact our service department! Maybe you have to replace power section or entire drive controller. |
| Hardware defect on power section | Replace power section or entire drive controller. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.2.29    F8118 Invalid power section/firmware combination

The power section is incompatible with the firmware used.

| Cause | Remedy |
|---|---|
| Inappropriate firmware | Use firmware that matches power section |
| Inappropriate power section | Use power section that matches firmware |
| Operation without power section has been set, but firmware recognizes a power section | Check bit 15 in P-0-0860 |

## 1.2.30    F8120 Invalid control section/firmware combination

The control section is incompatible with the firmware used.

| Cause | Remedy |
|---|---|
| During firmware replacement, there is an attempt to copy firmware to controller which does not match | Use firmware that matches control section |
| Inappropriate control section | Use control section that matches firmware |
| Safety technology incorrectly configured for double-axis device | Check control section configuration |

## 1.2.31    F8122 Control section defective

During the initialization of the control section an error occurred.

| Cause | Remedy |
|---|---|
| Hardware of control section is defective | Replace control section or entire drive controller; use hardware configuration of same type. |

Error Messages

☞       Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 1.2.32    F8129 Incorrect optional module firmware

The firmware of an optional module is defective.

| Cause | Remedy |
|---|---|
| Firmware of an optional module programmed in invalid form<br>- or -<br>An error occurred during firmware update | Carry out firmware update (again). If error occurs repeatedly, it is necessary to replace control section or drive controller. |

☞       Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 1.2.33    F8130 Firmware of option 2 of safety technology defective

The firmware of the optional safety technology module is defective.

| Cause | Remedy |
|---|---|
| Programming of firmware for optional safety technology module is invalid. | Make firmware update. |
| An error occurred during firmware update. | Restart firmware update.<br><br>If error message is displayed again, replace control section with control section of same type, if you are authorized to do this! Otherwise entire drive controller has to be replaced. |

☞       Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 1.2.34    F8133 Error when checking interrupting circuits

In order to lock the output stage in a safety related way when the safety tech-
nology has detected an error, the correct functioning of the interrupting circuit
is cyclically checked. This is done on the one hand during the actions "release
output stage" and "lock output stage", on the other hand statically while the
output stage is being released or locked. The corresponding hardware realiza-
tion ensures that this is possible without repercussion on the PWM control
signals.

The drive torque is immediately disabled. The drive automatically switches to
"safety related standstill" and the output stage is switched off via one channel.
All poles of the mains contactor are switched off.

☞ Safety is not acknowledged; i.e. "safety technology status output controller" was cleared/reset in "P-0-3214, Safety technology signal status word, channel 1" / "P-0-3214, Safety technology status word, channel 1" or the diagnosis input/output EA10n (channel 2) was set depending on the parameterization in "P-0-3210, Safety technology control word" / "P-0-3210, Safety technology configuration".

| Cause | Remedy |
|---|---|
| An error was detected during check of interrupting circuit | Switch power supply off and on again. |
| | If error occurs repeatedly, replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.2.35 F8134 Safety related holding system: fatal error

A check detected that the motor holding brake or the redundant holding brake, with the drive torque-free, has not been controlled for the purpose of applying it or has not been applied.

| Cause | Remedy |
|---|---|
| Error in wiring between control section, control module and redundant holding brake | Check wiring |
| Hardware error of control module or error in mechanical system of redundant holding brake | Replace hardware |
| Error in parameterization | Check parameterization |

## 1.2.36 F8135 Velocity exceeded with trend monitoring

During the stopping process, the drive is not able to come to standstill within the parameterized limits.

| Cause | Remedy |
|---|---|
| In the case of drive-controlled transition to standstill from normal operation, special mode motion or in the case of error, drive is not able to reach standstill with deceleration parameterized in "P-0-3282, Safety related monitored deceleration". | Select useful value for parameter "P-0-3282, Safety related monitored deceleration". |

## 1.2.37 F8140 Fatal CCD error

| Cause | Remedy |
|---|---|
| "Error reaction active" has been set in "P-0-1600, CCD: configuration" and an F8 error occurred in a slave. | Localize faulty slave and remove cause of error for this slave. |

☞ The CCD master reacts with torque disable.

See also Functional Description of firmware "Cross Communication (CCD)".

Error Messages

## 1.2.38    F8201 Safety command for basic initialization incorrect

In the booting phase of the drive a basic initialization is carried out on both safety technology channels. The initialization sequence on channel 2 is started via an internal command.

| Cause | Remedy |
|---|---|
| Basic initialization on channel 2 is incorrect or internal command was aborted with timeout. | Carry out load defaults procedure for safety technology ("S-0-0262, C07_x Load defaults procedure command" with "P-0-4090, Index for C07 Load defaults procedure" = 165) and reset optional safety technology module (switch control voltage off and on again). **Note:** If necessary, repeat procedure if "P-0-3207, Safety technology password level" is unequal 1. |
| There are incompatible firmware versions on channel 1 and channel 2, firmware on channel 2 therefore wasn't started (to be noticed by the fact that parameter "P-0-3200, Safety technology firmware code" is without content). | Establish compatible firmware versions on channel 1 and channel 2 by reloading firmware and paying attention to complete installation and possible error messages during loading process. |
| Channel 2 signals a checksum error and therefore wasn't started (to be noticed by the fact that parameter "P-0-3200, Safety technology firmware code" is without content). | Reload firmware and pay attention to complete installation and possible error messages during loading process. |
| Error in safety memory (e.g. incorrect version for firmware upgrade) | Carry out load defaults procedure for safety technology ("S-0-0262, C07_x Load defaults procedure command" with "P-0-4090, Index for C07 Load defaults procedure" = 165) and reset optional safety technology module (switch control voltage off and on again). |
| Error in parameterization, i.e. double assignment of inputs at channel 2 (e.g. operating mode switch parameterized twice). | Check assignment of inputs in "P-0-3211, Safety technology I/O control word, channel 2". |
| Hardware error | Replace hardware |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

Only Rexroth service engineers are allowed to replace optional modules of the control section.

## 1.2.39    F8203 Safety technology configuration parameter invalid

All safety technology parameters are protected against incorrect input €" which is similar to the use of a password €" because they have to be input twice.

The time and control word parameters required for initialization are read from their parameter memory after the drive has been switched on and the two double elements are compared.

* "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration"
* "P-0-3211, Safety technology I/O control word, channel 2" or "P-0-3211, Safety technology I/O configuration list, channel 2"
* P-0-3220, Tolerance time transition from normal operation
* P-0-3221, Max. tolerance time for different channel states

- P-0-3222, Max. activation time of enabling control
- P-0-3223, Time interval for dynamization of safety function selection
- P-0-3224, Duration of dynamization pulse of safety function selection
- P-0-3225, Tolerance time transition from safety rel. oper.
- "P-0-3240, Control word of safety related motion 1" or "P-0-3240, Configuration of safety related motion 1"
- "P-0-3250, Control word of safety related motion 2" or "P-0-3250, Configuration of safety related motion 2"
- "P-0-3260, Control word of safety related motion 3" or "P-0-3260, Configuration of safety related motion 3"
- "P-0-3270, Control word of safety related motion 4" or "P-0-3270, Configuration of safety related motion 4"
- "P-0-3290, PROFIsafe: F_Destination_Address"(not MPx02VRS!)
- "P-0-3291, PROFIsafe: F_Source_Address" (not MPx02VRS!)

The comparison showed that not all of the double elements are identical.

☞ Switching to the operating mode is impossible.

| Cause | Remedy |
|---|---|
| A memory cell was overwritten by mistake. | Reset command "C07_2 Load def. proc. com. (load def. pr. for safety techn.)" and optional safety technology module (switch control voltage off and then on again). **Note:** The command "C07_2 Load def. proc. com. (load def. pr. for safety techn.)" overwrites user-defined safety technology settings! Only use this command if you want to commission safety technology again. |
| Firmware defect on optional safety technology module. | If command error occurs repeatedly, safety technology firmware has to be replaced. |
| Hardware defect on optional safety technology module. | If command error occurs repeatedly, optional safety technology module has to be replaced. |

☞ The command "C07_2 Load def. proc. com. (load def. pr. for safety techn.)" is started by parameter "S-0-0262, C07_x Load defaults procedure command" with the respective setting in "P-0-4090, Index for C07 Load defaults procedure".

## 1.2.40    F8813 Connection error mains choke

After the power supply had been switched on, a wiring error of the mains choke (e.g. incorrect phase sequence of the mains phases) was detected.

| Cause | Remedy |
|---|---|
| Mains choke was incorrectly connected | Check and correct connection of mains choke; connections to mains choke must be as short as possible and twisted → see also documentation "Drive System, Project Planning Manual", chapter "Connection to Mains Choke and Mains Filter". |

Error Messages

## 1.2.41    F8838 Overcurrent external braking resistor

The error F8838 is generated when the current in the braking resistor circuit is rising in an inadmissible way.

| Cause | Remedy |
|---|---|
| Resistance value of connected braking resistor is too low. | Connect braking resistor unit with higher resistance value (take specification into account!). |
| Short circuit at braking resistor connection. | Remove short circuit |

See also Functional Description of firmware " Power Supply".

# 1.3    Safety Technology Errors (F7xxx)

## 1.3.1    Behavior in the Case of Safety Technology Errors

In the case of safety technology errors (F7xxx), the drive, independent of the setting in "P-0-0119, Best possible deceleration" and "P-0-0117, Activation of NC reaction on error", is shut down as fast as possible; the drive is stopped by velocity command value reset (see also Functional Description "Error Reaction").

☞        NC-controlled shutdown is no longer possible in the case of safety technology errors (F7xxx).

At the end of the error reaction, the drive goes torque-free and the output stage is locked via two channels after the time entered in "P-0-3220, Tolerance time transition from normal operation" or "P-0-3225, Tolerance time transition from safety rel. oper." is over.

As of firmware MP*-03V20, the error reaction can be parameterized via the configuration bit "reaction to F7 error" in "P-0-3210, Safety technology configuration"; the error reaction "velocity command value reset" has been activated as a standard, but can be deactivated so that the drive immediately goes torque-free when an F7 error occurs.

☞        The F7 error reaction "torque disable" should only be used when forced deceleration by velocity command value reset generally causes problems, e.g. in the case of mechanically coupled axes.

**The machine manufacturer is responsible for the F7 error reaction "torque disable" and his risk analysis has to show his responsibility.**

The drive can only be put into operation again when:

**Putting the Drive Into Operation**    After a fatal system error has occurred, the drive can only be put into operation again when:

1. The error message was cleared by the error clearing command (cf. "S-0-0099, C0500 Reset class 1 diagnostics").

2. The actual cause of the error was recognized and removed (e.g. incorrect parameterization of velocity thresholds or time windows).

3. The drive is in the operating mode again and power was switched on again ("Ab").

4. Drive enable was switched on again (0-1 edge).

☞ In case safety technology errors are occurring repeatedly, contact our service department as operating the drive then is no longer allowed.

## 1.3.2    F7010 Safety related limited increment exceeded

In the special mode "safety related motion" with configured safety function "safety related limited increment", the monitoring makes sure that the values do not leave the parameterized position window (increment).

The bipolar position window is activated with the start of the special mode. For the duration of the special mode the drive can freely move within the limits of the position window.

| Cause | Remedy |
|---|---|
| At least one of the position windows relevant for special mode "safety related motion" has been incorrectly parameterized | Check parameterization of position windows and adjust it to desired travel targets.<br><br>Position windows:<br><br>• "P-0-3243, Safety related limited increment 1" or<br><br>• "P-0-3253, Safety related limited increment 2" or<br><br>• "P-0-3263, Safety related limited increment 3" or<br><br>• "P-0-3273, Safety related limited increment 4"<br><br>After trouble shooting start command "S-0-0099, C0500 Reset class 1" diagnostics in order to clear error an then set drive enable again. |
| Command value input is incorrect; i.e. drive moves to invalid target positions | Check command value input in control unit and adjust target positions according to travel range or required target positions.<br><br>After trouble shooting start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error an then set drive enable again. |

See also documentation "Integrated Safety Technology".

## 1.3.3    F7011 Safety rel. position limit val., exc. in pos. dir.

In the special mode "safety related motion" with configured safety function "safety related limited absolute position", the parameterized position limit value was exceeded in positive direction.

| Cause | Remedy |
|---|---|
| In safety function "special mode motion", value parameterized in parameter<br><br>• "P-0-3241, Safety related limited absolute position 1, positive" or<br><br>• "P-0-3251, Safety related limited absolute position 2, positive was exceeded" | Check command value input and adjust it according to parameterized position limit values<br><br>- or -<br><br>Check parameter setting and change it, if necessary.<br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. |

## 1.3.4    F7012 Safety rel. position limit val., exc. in neg. dir.

In the special mode "safety related motion" with configured safety function "safety related limited absolute position", the parameterized position limit value was exceeded in negative direction.

Error Messages

| Cause | Remedy |
|---|---|
| In special mode "safety related motion", value parameterized in<br><br>• "P-0-3242, Safety related limited absolute position 1, negative" or<br>• "P-0-3252, Safety related limited absolute position 2, negative"<br><br>was exceeded | Check command value input and adjust it according to parameterized position limit values<br><br>- or -<br><br>Check parameter setting and change it, if necessary.<br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. |

### 1.3.5    F7013 Velocity threshold exceeded

In the special mode "safety related motion" a parameterized velocity threshold was exceeded.

| Cause | Remedy |
|---|---|
| In special mode "safety related motion", velocity threshold parameterized in<br><br>• "P-0-3244, Safety related reduced speed 1" or<br>• "P-0-3254, Safety related reduced speed 2" or<br>• "P-0-3264, Safety related reduced speed 3" or<br>• "P-0-3274, Safety related reduced speed 4"<br><br>was exceeded | Check command value input and adjust it according to parameter setting<br><br>- or -<br><br>Check parameter setting and change it, if necessary.<br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. |

### 1.3.6    F7014 Acceleration threshold exceeded

| Cause | Remedy |
|---|---|
| In special mode "safety related motion", velocity threshold parameterized in<br><br>• "P-0-3245, Safety related deceleration/acceleration ramp 1" or<br>• "P-0-3255, Safetyrelated deceleration/acceleration ramp 2" or<br>• "P-0-3265, Safety related deceleration/acceleration ramp 3" or<br>• "P-0-3275, Safety related deceleration/acceleration ramp 4"<br><br>was exceeded. | Check command value input and adjust it according to parameter setting<br><br>- or -<br><br>Check parameter setting and change it, if necessary.<br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again |

### 1.3.7    F7020 Safety related maximum speed exceeded

When monitoring of the safety related maximum speed has been configured (see "P-0-3239, Configuration of global safety technology functions"), the drive in normal operation and in special mode monitors the current actual velocity.

When the velocity threshold parameterized in "P-0-3234, Safety related maximum" speed is exceeded, the error F7020 is generated.

| Cause | Remedy |
|---|---|
| Velocity threshold was incorrectly parameterized | Check and, if necessary, increase parameter setting of "P-0-3234, Safety related maximum speed". |
| Incorrect command value input; i.e. velocity command value too high | Check command value input in control unit or, for drive-internal interpolation, check parameterized positioning data (cf. "S-0-0259, Positioning velocity" or "P-0-4007, Positioning block velocity") |

Description of error reaction: "Behavior in the Case of Safety Technology Errors".

See also documentation " Integrated Safety Technology".

## 1.3.8    F7021 Safety related end position exceeded

With active safety technology, the drive in normal operation and in special mode monitors the current position in safety related form, when the safety function "safety related limited absolute end position" has been parameterized.

| Cause | Remedy |
|---|---|
| Position parameterized in "P-0-3235, Safety related end position, positive" or "P-0-3236, Safety related end position, negative" has been exceeded. | Start command "S-0-0099, C0500 Reset class 1 diagnostics" to clear error. Then set drive enable again and move axis to allowed position range. |

## 1.3.9    F7030 Pos. window for safety rel. operational stop exceeded

In the safety function "safety related operational stop" the axis is monitored for standstill. The bipolar position window used for this purpose is activated with the start of the "safety related operational stop".

| Cause | Remedy |
|---|---|
| "P-0-3230, Monitoring window for safety related operational stop" was incorrectly parameterized. | Change parameterization of "P-0-3230, Monitoring window for safety related operational stop" in useful way. |
| "P-0-3233, Velocity threshold for safety related halt" was incorrectly parameterized. | Change parameterization of "P-0-3233, Velocity threshold for safety related halt" in useful way |
| Incorrect command values are preset by drive or external control unit. | Check command value input and adjust it according to parameter setting. |

See also documentation " Integrated Safety Technology".

## 1.3.10    F7031 Incorrect direction of motion

In the special mode "safety related motion" with safety function "safety related direction of motion" configured, the drive is monitored with regard to whether it inadmissibly moves against the parameterized direction of motion by more than the distance parameterized in "P-0-3232, Monitoring window for safety related direction of motion" or "P-0-3232, Standstill window safety related direction of motion". If yes, the error F7031 is generated.

Error Messages

| Cause | Remedy |
|---|---|
| Incorrect command value input | Adjust command value input according to parameterized direction of motion and monitoring window "P-0-3232, Monitoring window for safety related direction of motion"<br><br>- or -<br><br>"P-0-3232, Standstill window safety related direction of motion". |
| Incorrect parameterization of directions of motion in corresponding control words for safety related motion | Check parameterization of direction of motion in<br><br>• "P-0-3240, Control word of safety related motion 1" / "P-0-3240, Configuration of safety related motion 1"<br><br>or<br><br>• "P-0-3250, Control word of safety related motion 2" / "P-0-3250, Configuration of safety related motion 2"<br><br>or<br><br>• "P-0-3260, Control word of safety related motion 3" / "P-0-3260, Configuration of safety related motion 3"<br><br>or<br><br>• "P-0-3270, Control word of safety related motion 4" / "P-0-3270, Configuration of safety related motion 4"<br><br>and change it, if necessary |
| Incorrect parameterization of "P-0-3232, Monitoring window for safety related direction of motion" or "P-0-3232, Standstill window safety related direction of motion". | Check parameterization of "P-0-3232, Monitoring window for safety related direction of motion" or "P-0-3232, Standstill window safety related direction of motion" and change it, if necessary. |

## 1.3.11    F7040 Validation error parameterized - effective threshold

A cyclic check is run in order to find out whether the thresholds in the internal monitoring functions comply with the values parameterized in the safety memory. The check detects errors that can occur due to subsequent change of scaling or accidental overwriting. The values are required for all safety monitoring functions and are of fundamental importance for the functioning of safety technology.

| Cause | Remedy |
|---|---|
| Safety parameters were changed without afterwards having been synchronized | Execute "P-0-3204, C3000 Synchronize and store safety technology IDN command" (channel 2 applies parameters of channel 1; internal values are recalculated and loaded).<br><br>**Note:**<br><br>Executing the command "C3000 Synchronize and store safety technology IDN" increases the change counter of the safety technology memory (P-0-3201). It is therefore necessary to carry out the acceptance test again.<br><br>Start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error an then set drive enable again. |
| Hardware defect causes incorrect parameter contents | Replace control section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 1.3.12    F7041 Actual position value validation error

| Cause | Remedy |
|---|---|
| Actual position values determined on channel 1 and channel 2 are differing | Start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. If error occurs repeatedly, replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 1.3.13    F7042 Validation error of safety related operating mode

The active safety technology operating states of channel 1 and channel 2 are
cyclically and via two channels checked for validity.

If the two channels differ for more than 5 seconds, the error F7042 is generated.

| Cause | Remedy |
|---|---|
| Criteria for transition to new safety technology operating status selected have not been fulfilled in one channel; this channel remains in old status - the other channel already went to new safety technology operating status. | Check time, velocity or position thresholds relevant for respective transition and adjust them, if necessary. |
| Control section is defective | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 1.3.14    F7043 Error of output stage interlock

When the output stage is activated, the correct functioning of the output stage
incl. control is checked. If an error is detected during the function check, the
error F7043 is generated.

| Cause | Remedy |
|---|---|
| Faulty output stage | Replace control section or entire drive controller |
| Incorrect control of output stage or error in feedback | Replace power section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section or the power section. The
replacement of the entire drive controller is described in the Project
Planning Manual for the power section.

Error Messages

## 1.3.15    F7050 Time for stopping process exceeded

During the transition of the drive from normal operation to a special mode "safety related stopping process" (or to "drive interlock") the following check is run:

After the duration entered in

- "P-0-3220, Tolerance time transition from normal operation", or
- "P-0-3225, Tolerance time transition from safety rel. oper"

is over, the actual velocity is checked with regard to the velocity threshold entered in "P-0-3233, Velocity threshold for safety related stopping process".

☞         The drive can also be shut down in an NC-controlled way (cf. "P-0-3210, Safety technology control word").

| Cause | Remedy |
|---|---|
| Parameter setting in P-0-3220 or "P-0-3225 for NC-controlled transition is Incorrect" | Check parameter setting of "P-0-3220, Tolerance time transition from normal operation"<br><br>**- or -**<br><br>"P-0-3225, Tolerance time transition from safety rel. oper"<br><br>and correct it accordingly |
| Drive enable is still set | Make sure that drive enable is removed |
| "NC-controlled shutdown" was activated by mistake. | Check parameter setting of "P-0-3210, Safety technology control word" and correct it accordingly; i.e. activate "drive-controlled shutdown". |
| Parameterized deceleration is too low or not adjusted to parameterized tolerance time. | For **drive-controlled transition**, shutdown takes place via "P-0-0119, Best possible deceleration" so that error reaction parameterized in drive has to be checked.For NC-controlled transition, check deceleration parameterized in control unit. |

See also documentation "Integrated Safety Technology".

## 1.3.16    F7051 Safety related deceleration exceeded

With the configuration "NC-controlled transitions" and "safety related monitored deceleration" ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 4 and 13), the drive monitors whether it can reach standstill within the remaining tolerance time for transition.

☞         As of **firmware MPx04VRS**, additional monitoring takes place to find out whether the drive can reach the selected velocity threshold of the special mode "safety related motion" within the remaining tolerance time for transition.

The monitor is active for NC-controlled safety technology operating mode transitions from normal operation or special mode "safety related motion" to special mode "safety related stopping process" (safety related standstill / safety related operational stop) or drive interlock.

☞         As of **firmware MPx04VRS**, the monitor, for NC-controlled safety technology operating mode transitions, is also active from normal operation to special mode "safety related stopping process" and for transitions within the special modes "safety related motion (1-4)".

| Cause | Remedy |
|---|---|
| **Only Firmware MPx04VRS:**<br><br>In the case of "NC-controlled safety technology operating mode transitions" from "normal operation" to a special mode "safety related motion" or in the case of transitions within special modes "safety related motion (1-4)", drive is not able to reach corresponding velocity threshold of special mode "safety related motion" with deceleration parameterized in "P-0-3282, Safety related monitored deceleration" within respective transition time ("P-0-3220, Tolerance time transition from normal operation" / "P-0-3225, Tolerance time transition from safety rel. oper".) | Adjust command value input to parameterized values |
| In the case of "NC-controlled safety technology operating mode transitions" from "normal operation" or special mode "safety related motion" to special mode "safety related stopping process" or drive interlock, drive is not able to reach standstill with deceleration parameterized in "P-0-3282, Safety related monitored deceleration" with in respective transition time ("P-0-3220, Tolerance time transition from normal operation" / "P-0-3225, Tolerance time transition from safety rel. oper") | Adjust command value input to parameterized values |
| Values of parameters:<br><br>• "P-0-3282, Safety related monitored deceleration",<br>• "P-0-3220, Tolerance time transition from normal operation" or<br>• "P-0-3225, Tolerance time transition from safety rel. oper"<br><br>are not useful. | Check parameter settings and change them, if necessary |

# 1.4 Travel Range Errors (F6xxx)

## 1.4.1 Behavior in the Case of Travel Range Errors

Travel range errors are errors associated with the exceeding of a travel range previously defined via hardware or software switches; independent of the settings in "P-0-0119, Best possible deceleration" and "P-0-0117, Activation of NC reaction on error" , the drive therefore is stopped as fast as can.

The kind of deceleration depends on the control mode:

• **closed-loop:**

velocity command value reset

• **open-loop:**

under compliance with "P-0-0569, Maximum stator frequency slope"

See also Functional Description of firmware "Error Reaction"

☞ In the case of travel range errors, the settings in "P-0-0118, Power supply, configuration" still are taken into account.

At the end of each error reaction, the drive goes torque-free.

Putting the Drive Into Operation    The drive can only be put into operation again when:

1. The error reaction has been completed, i.e. the drive has stopped (v=0!).

Error Messages

2.  The error message was cleared by the error clearing command (cf. "S-0-0099, C0500 Reset class 1 diagnostics").

3.  The cause of the error was removed.

4.  The drive is in the operating mode again and power was switched on ("Ab").

5.  Drive enable was switched on again (0-1 edge).

## 1.4.2    F6010 PLC Runtime Error

The PLC integrated in the drive (Rexroth IndraMotion MLD) triggers the error F6010 in the case of runtime errors or task watchdog.

Error Reaction    All tasks of the PLC are stopped. The drive is always shut down with velocity command value reset; i.e. the error reaction cannot be parameterized by the user.

| Cause | Remedy (*1) |
|---|---|
| Runtime error in PLC program<br><br>Runtime monitor (watchdog) for a task has been activated. In this task, processing was not completed in the preset time. | Remove error by modifying program (correct a possibly existing infinite loop)<br><br>The following actions according to application:<br><br>• increase task cycle time or<br><br>• increase watchdog time or reduce watchdog sensitivity (higher number)<br><br>• optimize program structure<br><br>• deactivate compilation option "Debugging" (increases processing velocity of PLC program) |
| Division by "0" | Modify PLC program: remove division by "0" |
| Array limits exceeded | Modify PLC program: check and correct array access. |
| A subrange type has been exceeded | Modify PLC program: eliminate incorrect assignment |
| Invalid access with a pointer. As of MPx05, every access with pointer is monitored. Access outside of PLC data ranges cause this error. | Modify PLC program: eliminate incorrect assignmen |
| Error in system event | Modify PLC program: modify incorrect use or programming - on this topic, see notes in task configuration. |

(*1) Additional Notes on Trouble Shooting    We distinguish the following cases for trouble shooting:

•   For removing the error in a **freely programmed application** it is necessary to modify the PLC program or the task configuration with the programming system IndraLogic.

☞    When connecting the programming system IndraLogic to the drive-internal PLC or when starting the simulation (IndraLogic: "Online"-"Login"), the message window appears; it displays messages from the last compilation, check or comparison process.

•   For a **technology function** made available by Bosch Rexroth please see the corresponding documentation for instructions on troubleshooting.

•   An extended diagnosis for determining the cause of the error is displayed in parameter "P-0-1365, PLC error message".

See also IndraLogic online help.

See also documentation " Rexroth IndraMotion MLD".

## 1.4.3    F6024 Maximum braking time exceeded

The drive checks automatically whether the motor, after drive enable has been switched off or when an error occurs, was shut down within the delay time parameterized in "S-0-0273, Maximum drive off delay time". If not, the error F6024 is generated.

| Cause | Remedy |
|---|---|
| Incorrect parameterization of "S-0-0273, Maximum drive off delay time" or "S-0-0372, Drive Halt acceleration bipolar". | Adjust delay time ("S-0-0273, Maximum drive off delay time") or acceleration (S-0-0372, Drive Halt acceleration bipolar) to acceleration capacity of drive. |
| Torque/force limitation incorrectly parameterized or current limitation active due to thermal overload. | Check torque/force limitation and current limitation (see also Functional Description of firmware " Current and Torque/Force Limitation"). |
| Incorrect motor connection | Check and, if necessary, correct motor connection |
| Hardware defect on power section | Replace control section or entire drive controller |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware " Motor Holding Brake".

## 1.4.4    F6028 Position limit value exceeded (overflow)

The drive provides a function for monitoring an allowed travel range by means of software limit switches that can be parameterized.

☞    The travel range monitor has to be activated and parameterized via "S-0-0049, Positive position limit value", "S-0-0050,Negative position limit value" and "S-0-0055, Position polarities".

The drive reaction (fatal warning or error) in case the travel range is exceeded has to be parameterized in "P-0-0090, Travel range limit parameter".

| Cause | Remedy |
|---|---|
| Command value set for drive causes axis position outside of positive travel range/position limit value ("S-0-0049, Positive position limit value" or "S-0-0050, Negative position limit value"). | 1.  Clear error and switch power on.<br>2.  Set drive enable and input a command value leading back to allowed travel range.<br>   Contact machine manufacturer in order to find out cause of incorrect command value. |
| "S-0-0049, Positive position limit value" or "S-0-0050, Negative position limit value" incorrectly parameterized | Check and, if necessary, correct parameter setting of "S-0-0049, Positive position limit value" or "S-0-0050, Negative position limit value". |
| When the position limit values are at the end of possible travel range (+/- "S-0-0278, Maximum travel range"), exceeding of travel range can no longer be unequivocally detected by means of actual position values. Therefore, overflow monitoring is carried out which generates error. | Increase "S-0-0278, Maximum travel range"<br>- o -<br>Reduce position limit values so that defined deceleration is still possible within defined travel range. |

Error Messages

☞ The parameter "S-0-0057, Position window" is used to realize a hysteresis function for evaluating the position limit values.

See also Functional Description of firmware " Position Limitation/Travel Range Limit Switch".

## 1.4.5    F6029 Positive travel limit exceeded

The drive provides a function for monitoring an allowed travel range by means of software limit switches that can be parameterized.

☞ The travel range monitor has to be activated and parameterized via "S-0-0049, Positive position limit value", "S-0-0050, Negative position limit value" and "S-0-0055, Position polarities".

The drive reaction (fatal warning or error) in case the travel range is exceeded has to be parameterized in "P-0-0090, Travel range limit parameter".

| Cause | Remedy |
|---|---|
| Command value set for drive causes axis position outside of positive travel range/position limit value ("S-0-0049, Positive position limit value"). | 1.    Clear error and switch power on.<br>2.    Set drive enable and preset command value that leads back to the allowed travel range.<br>Contact machine manufacturer in order to clarify cause of incorrect command value. |
| "S-0-0049, Positive position limit value" incorrectly parameterized. | Check and, if necessary, correct parameterization of "S-0-0049, Positive position limit value". |

☞ The "S-0-0057, Position window" parameter is used to realize a hysteresis function for evaluating the position limit values.

See also Functional Description of firmware " Position Limitation/Travel Range Limit Switch".

## 1.4.6    F6030 Negative travel limit exceeded

The drive provides a function for monitoring an allowed travel range by means of software limit switches that can be parameterized.

☞ The travel range monitor has to be activated and parameterized via "S-0-0049, Positive position limit value", "S-0-0050, Negative position limit value" and "S-0-0055, Position polarities".

The drive reaction (fatal warning or error) in case the travel range is exceeded has to be parameterized in "P-0-0090, Travel range limit parameter".

| Cause | Remedy |
|---|---|
| Command value set for drive causes axis position outside of negative travel range/position limit value ("S-0-0050, Negative position limit value"). | 1.  Clear error and switch power on<br>2.  Set drive enable and preset command value that leads back to the allowed travel range.<br>Contact machine manufacturer in order to clarify cause of incorrect command value. |
| "S-0-0050, Negative position limit value" incorrectly parameterized | Check and, if necessary, correct parameterization of "S-0-0050, Negative position limit value". |

☞    The "S-0-0057, Position window" parameter is used to realize a hysteresis function for evaluating the position limit values.

See also Functional Description of firmware " Position Limitation/Travel Range Limit Switch".

## 1.4.7    F6034 Emergency-Stop

The drive provides a function for monitoring an E-Stop input (connection of an external hardware switch).

☞    This monitor has to be activated and parameterized via "P-0-0008, Activation E-Stop function".

When the error F6034 occurs, the axis is shut down as fast as can with velocity command value reset.

| Cause | Remedy |
|---|---|
| E-Stop input was controlled (0 V at digital input) | Remove failure that caused E-Stop to be triggered and clarify cause of triggering. |
| Incorrect parameterization of digital inputs and outputs on control section. | Correct configuration of digital inputs/outputs and correct it, if necessary. |
| E-Stop switch or cable connection defective or incorrectly wired. | Check function and wiring of E-Stop switch. |
| Control section or digital inputs on control section defective. | Replace control section or entire drive controller. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware:
*    " E-Stop Function"
*    " Digital Inputs/Outputs"
*    " Velocity Command Value Reset"

## 1.4.8    F6042 Both travel range limit switches activated

The compliance with the allowed travel range of linear axes is monitored on the hardware side via two travel range limit switches. When the travel range has been exceeded, one of the two limit switches is activated, if the limit switches were correctly mounted.

The error F6042 is generated, if

Error Messages

- the controller detects that both travel range limit switches have been simultaneously activated and
- exceeding the travel range is handled as an error (setting in "P-0-0090, Travel range limit parameter").

| Cause | Remedy |
|---|---|
| Due to incorrect mounting, axis activates both travel range limit switches simultaneously. | Mount travel range limit switches in such a way that they are activated shortly before axis end position is reached. Make sure the braking distance is sufficient. |
| Travel range limit switches were incorrectly connected. | Connect travel range limit switches correctly; check compliance with switching logic set in "P-0-0090, Travel range limit parameter". |
| Switching logic of travel range limit switches does not correspond to realized wiring. | Check switching logic with regard to realized wiring, adjust it in "P-0-0090, Travel range limit parameter" if necessary. |

## 1.4.9    F6043 Positive travel range limit switch activated

The drive provides a function for monitoring travel range limit switches (external hardware limit switches).

☞      This monitor has to be activated and parameterized via "P-0-0090, Travel range limit parameter".

When the error F6043 occurs, the axis is shut down with velocity command value reset.

| Cause | Remedy |
|---|---|
| Travel range limit switch situated in positive direction (see Project Planning Manual for motor) was activated because axis is outside of travel range that was defined by means of travel range limit switches. | 1. Clear error (reset button or error clearing command) and switch power on.<br>2. Set drive enable and preset command value that leads back to the allowed travel range. |
| Incorrect parameterization of digital inputs and outputs on control section. | Correct configuration of digital inputs/outputs and correct it, if necessary. |
| Travel range limit switch or cable is defective or incorrectly wired | Check function and wiring of travel range limit switch. |
| Control section or digital inputs on control section defective. | Replace control section or entire drive controller. |

☞      Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also "E8043 Positive travel range limit switch activated".

See also Functional Description of firmware:

- " Position Limitation/Travel Range Limit Switch"
- " Digital Inputs/Outputs".

## 1.4.10    F6044 Negative travel range limit switch activated

The drive provides a function for monitoring travel range limit switches (external hardware limit switches).

☞ This monitor has to be activated and parameterized via "P-0-0090, Travel range limit parameter".

When the error F6044 occurs, the axis is shut down with velocity command value reset.

| Cause | Remedy |
|-------|--------|
| Travel range limit switch situated in negative direction (see Project Planning Manual for motor) was activated because axis is outside of travel range that was defined by means of travel range limit switches. | 1.  Clear error (reset button or error clearing command) and switch power on.<br>2.  Set drive enable and preset command value that leads back to the allowed travel range. |
| Incorrect parameterization of digital inputs and outputs on control section. | Correct configuration of digital inputs/outputs and correct it, if necessary. |
| Travel range limit switch or cable is defective or incorrectly wired. | Check function and wiring of travel range limit switch. |
| Control section or digital inputs on control section defective. | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware:

- " Position Limitation/Travel Range Limit Switch"
- " Digital Inputs/Outputs".

## 1.4.11 F6140 CCD slave error (emergency halt)

| Cause | Remedy |
|-------|--------|
| "Error reaction active" has been set in" P-0-1600, CCD: configuration" and an F6 or F7 error occurred in a slave; CCD master reacts with emergency halt (velocity command value reset). | Localize faulty slave and remove cause of error for this slave. |

See also Functional Description of firmware " Cross Communication (CCD)".

# 1.5 Interface Errors (F4xxx)

## 1.5.1 Behavior in the Case of Interface Errors

The user can influence the behavior of the drive in the case of interface errors via the parameterization of "P-0-0119, Best possible deceleration" (see Functional Description " Error Reaction").

☞ In the case of an interface error, activating the NC reaction via "P-0-0117, Activation of NC reaction on error" is no longer possible!

At the end of each error reaction, the drive goes torque-free.

**Putting the Drive Into Operation**    The drive can only be put into operation again when:

1.  The error reaction has been completed, i.e. the drive has stopped (v=0!).
2.  The error message was cleared by the error clearing command (cf. "S-0-0099, C0500 Reset class 1 diagnostics").

Error Messages

3.    The cause of the error was removed.

4.    The drive is in the operating mode again and power was switched on
("Ab").

5.    Drive enable was switched on again (0-1 edge).

## 1.5.2    F4001 Sync telegram failure

☞         In the firmware versions 02VRS, 03VRS, 04VRS and up to the
firmware version 05V06, the name of the error is "F4001 Double
MST failure shutdown".

**Master Communication SERCOS**    The master synchronization telegram (MST) was not received in the drive in
two successive SERCOS cycles.

| Cause | Remedy |
|---|---|
| Disturbance in fiber optic transmission line | Check all optic fiber connections in the SERCOS ring and re-place them, if necessary. |
| Attenuation of light signals too high | Measure attenuation of fiber optic cable again (if necessary, increase transmission power via P-0-4027). The maximum attenuation between $T_X$ and $R_X$ mustn't exceed 12.5 dB! |
| Different SERCOS cycle times in master and slave | Check SERCOS cycle times in master and slave and adjust them, if necessary. |
| Disturbance in SERCOS interface (general) | Replace control section or entire drive. |

**Master Communication CANopen**    The synchronization telegram was not received in the drive in two successive
cycles.

| Cause | Remedy |
|---|---|
| Sync master does not transmit Sync telegram | Check whether a bus node was configured as Sync master. Check Sync master to see whether it is in an error state. |
| CAN bus interrupted | Check bus line |
| Disturbance in CANopen interface (general) | Replace control section or entire drive. |

☞         Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the " Project Planning Manual for the
power section".

See also Functional Description of firmware " Interface Errors and Diagnostic
Possibilities".

## 1.5.3    F4002 RTD telegram failure

☞         In the firmware versions 02VRS, 03VRS, 04VRS and up to the
firmware version 05V06, the name of the error is "F4002 Double
MDT failure shutdown".

**Master Communication SERCOS**    The master data telegram (MDT) was not received in the drive in two successive
SERCOS or field bus cycles. The drive falls back to communication phase 0.

Error Messages

| Cause | Remedy |
|---|---|
| Bus master does not send any more cyclic telegrams to the drive. These, however, are expected in communication phase 4. | Switch master on and start cyclic communication; see manual for control unit. |
| Fiber optic cable bus: disturbance in fiber optic transmission line | Check all fiber optic cable connections in SERCOS ring. |
| Fiber optic cable bus: Input power of light signals too low. Light power to be measured at receiver (with test mode: continuous light) must be between -20dBm (10µW) and -5dBm (320µW). | Adjust transmission power or check attenuation of fiber optic cable. The maximum attenuation between $T_X$ and $R_X$ mustn't exceed 12.5 dB. |
| Different transmission times of master data telegrams in master and slave. | Synchronize transmission times of master data telegrams in master and slave. |
| Disturbance in SERCOS interface (general) | Replace control section or entire drive controller. |

**Master Communication CANopen**    The real-time data telegram (RDT) was not received in the drive in two successive field bus cycles.

| Cause | Remedy |
|---|---|
| PDO master does not send any more cyclic telegrams to the drive. | Switch master on and start cyclic communication; see manual for control unit. |
| Bus line disturbed | Check bus line and connector |
| Disturbance in CANopen interface (general) | Replace control section or entire drive controller. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the " Project Planning Manual for the power section.".

See also Functional Description of firmware " Interface Errors and Diagnostic Possibilities".

## 1.5.4    F4003 Invalid communication phase shutdown

An invalid communication phase (phase > 4) was set by the SERCOS master module.

| Cause | Remedy |
|---|---|
| Error in SERCOS master module of control unit | Error can only be corrected after consultation with control unit manufacturer. |

See also Functional Description of firmware " Interface Errors and Diagnostic Possibilities".

## 1.5.5    F4004 Error during phase progression

The compulsory order was not followed during the phase progression.

| Cause | Remedy |
|---|---|
| Error in SERCOS master module of control unit. | Error can only be corrected after consultation with control unit manufacturer. |

See also Functional Description of firmware " Interface Errors and Diagnostic Possibilities".

Error Messages

## 1.5.6    F4005 Error during phase regression

When regressing from a communication phase the drive wasn't switched to communication phase 0.

| Cause | Remedy |
|---|---|
| Error in SERCOS master module of control unit. | Error can only be corrected after consultation with control unit manufacturer. |

See also Functional Description of firmware " Interface Errors and Diagnostic Possibilities".

## 1.5.7    F4006 Phase switching without ready signal

The SERCOS master tried to carry out a phase switch without waiting for the ready signal from the drive.

| Cause | Remedy |
|---|---|
| Error in SERCOS master module of control unit. | Error can only be corrected after consultation with control unit manufacturer. |

See also Functional Description of firmware "Interface Errors and Diagnostic Possibilities".

## 1.5.8    F4009 Bus failure

Communication via the master communication interface has failed. After the master communication interface was initialized and commissioned, there hasn't any telegram been received within the monitoring time set in "P-0-4075, Field bus: watchdog".



**DANGER**

**Automatic restart after bus failure!**

In the case of bus failure (message "F4009" or "E4005"), an error reaction must be carried out in the control unit, too, to prevent automatic restart after the bus has been reestablished. This means that the bits "Drive Halt", "drive enable" and "drive ON" (e.g. bits 13, 14 and 15 in parameter "P-0-4077, Field bus: control word") should be reset in the control unit in the case of bus failure.

**Ethernet/IP**    Only Class1 connections are monitored which means that, within the watchdog time, there haven't any new output data been received from the master.

| Cause | Remedy |
|---|---|
| Master does not exchange any cyclic output data | Check master status |
| Ethernet connection aborted | Check Ethernet cable and, if necessary, switch |
| EMC problems at transmission line | Check shielding and routing |
| Network load too high | Switch off unnecessary Ethernet communication; if necessary, establish separate network for Ethernet/IP |

**DeviceNet**    Only the "Implicite Message" is monitored which means that, within the watchdog time, there haven't any new output data been received from the master.

| Cause | Remedy |
|---|---|
| Master does not exchange any cyclic output data | Check master status |
| Bus connection interrupted | Check cable and interface |
| EMC problems at transmission line | Check shielding and routing |

| Cause | Remedy |
|---|---|
| Bus load too high | Check communication settings (or communication load) ["Interscan Delay" setting at DeviceNet master]. |
| Faulty bus terminator | Check whether bus terminating resistors have been installed at most distant bus nodes. |

**CANopen**   According to the kind of node monitoring which has been set, the "Node Guarding request" (cyclic node monitoring) or the "heartbeat telegram" is monitored.

| Cause | Remedy |
|---|---|
| Master does not transmit any node monitoring telegram | Check master status |
| Bus connection interrupted | Check cable and interface |
| EMC problems at transmission line | Check shielding and routing |
| Bus load too high | Check communication settings (or communication load) |
| Faulty bus terminator | Check whether bus terminating resistors have been installed at most distant bus nodes |

**PROFIBUS**   The master must address the slave within the monitoring time.

| Cause | Remedy |
|---|---|
| Master does not exchange any cyclic output data | Check master status |
| Bus connection interrupted | Check cable and interface |
| EMC problems at transmission line | Check shielding and routing |
| Faulty bus terminator | Check whether bus terminating resistors have been installed at most distant bus nodes. At all other nodes, bus terminating resistors must not have been installed |

**SERCOS**   .

| Cause | Remedy |
|---|---|
| Communication phase 0 was set, although drive enable had been set. | First remove drive enable and then set communication phase 0. |

## 1.5.9    F4012 Incorrect I/O length

The master tries to establish communication with an I/O length that does not correspond to the I/O length parameterized in the drive.

| Cause | Remedy |
|---|---|
| Different length for input data or output data than drive expects in "P-0-4071, Field bus: length of cyclic command value data channel" and "P-0-4082, Field bus: length of cyclic actual value data channel" was configured in master. | • Check parameter set in drive<br>• Adjust master configuration |

## 1.5.10    F4016 PLC double real-time channel failure

Writing of the "RtcW" variable of the integrated PLC to the corresponding parameters failed twice in succession / didn't take place in time.

Error Messages

| Cause | Remedy |
|---|---|
| Function block "MX_SynchronControl" is used:<br><br>Interval time of RTC task (task that uses real-time channel) is too short. Processing task code takes more time than one interval time. | Increase interval time of RTC task |
| Function block "MX_SynchronControl" is **not** used:<br><br>At time of controlled transmission of "RtcW" variable, program code of RTC task hadn't yet been processed. | Increase interval time of RTC task<br><br>- o -<br><br>increase value at input "CmdDelay" of function block "MX_SynchronControl". |

See also:

- Rexroth IndraMotion MLD, Application Manual "Real-Time Channel"
- Rexroth IndraMotion MLD, Library Description "MX_SynchronControl"

## 1.5.11    F4017 S-III: incorrect sequence during phase switch

Error in SERCOS-III master module of the control unit; the SERCOS-III master tried to make a phase switch, the drive detected that the sequence of this phase switch was incorrect.

| Cause | Remedy |
|---|---|
| Timeout occurred in drive during phase switch (individual switching periods took too long).<br><br>- o -<br><br>Master changed phase without prior notice (new phase in MST without CPS bit set).<br><br>- o -<br><br>Drive was switched on while SERCOS III already was in higher phase. | Error can only be corrected after consultation with control unit manufacturer. |

## 1.5.12    F4034 Emergency-Stop

The drive provides a function for monitoring an E-Stop input (connection of an external hardware switch).

☞    This monitor has to be activated and parameterized via "P-0-0008, Activation E-Stop function".

The axis is shut down as parameterized in "P-0-0119, Best possible deceleration".

| Cause | Remedy |
|---|---|
| E-Stop input was controlled (0 V at digital input) | Remove failure that caused E-Stop to be triggered and clear error (reset button or error clearing command). Then switch power on again and clarify cause of E-Stop triggering. |
| Incorrect parameterization of digital inputs and outputs on control section. | Correct configuration of digital inputs/outputs on control section and correct it, if necessary. |
| E-Stop switch or cable connection defective or incorrectly wired. | Check function and wiring of E-Stop switch. |
| Control section or digital inputs on control section defective. | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware:

- " E-Stop Function"
- " Digital Inputs/Outputs"
- " Best Possible Deceleration"

## 1.5.13 F4140 CCD communication error

| Cause | Remedy |
|---|---|
| CCD master detected double telegram failure of cyclic telegrams<br><br>- or -<br><br>"Error reaction active" has been set in "P-0-1600, CCD: configuration" and slave has signaled communication error. | Remove error in transmission line. |

☞ The CCD master is decelerated as set in "P-0-0119, Best possible deceleration".

See also Functional Description of firmware " Cross Communication (CCD)".

# 1.6 Non-Fatal Safety Technology Errors (F3xxx)

## 1.6.1 Behavior in the Case of Non-Fatal Safety Technology Errors

Non-fatal safety technology errors are errors that still allow a freely definable, variable error reaction.

**Drive Behavior** The user can define the drive behavior for the case of non-fatal safety technology errors occurring via the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

As soon as the axis has stopped, the axis signals safety; i.e. "safety technology status output of controller" was set in "P-0-3214, Safety technology status word, channel 1" or the diagnosis input/output E/A10n (channel 2) was set depending on the parameterization in "P-0-3210, Safety technology configuration".

☞ NC-controlled shutdown activated via "P-0-0117, Activation of NC reaction on error" or an error reaction set via "P-0-0119, Best possible deceleration" is only possible for the duration entered in "P-0-3220, Tolerance time transition from normal operation" or "P-0-3225, Tolerance time transition from safety rel. oper."! In case the time is exceeded, the error "F7050 Time for stopping process exceeded" is generated.

At the end of each error reaction, the drive goes torque-free.

**Putting the Drive Into Operation** The drive therefore can only be put into operation again when:

1. The error reaction has been completed, i.e. the drive has stopped (v=0!).
2. The error message was cleared by the error clearing command (cf. "S-0-0099, C0500 Reset class 1 diagnostics").

Error Messages

3. The cause of the error was removed.

4. The drive is in the operating mode again and power was switched on ("Ab").

5. Drive enable was switched on again (0-1 edge).

---

☞         In case non-fatal safety technology errors are occurring repeatedly, contact our service department as operating the drive then is no longer allowed.

## 1.6.2    F3111 Refer. missing when selecting safety related end pos.

The drive is shut down according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

As soon as the axis has stopped the safety door can be opened.

| Cause | Remedy |
|---|---|
| Acceleration threshold parameterized in "P-0-3245, Safety related deceleration/acceleration ramp 1" has been exceeded. | Start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error an then set drive enable again. |
| | If necessary, increase value for parameter "P-0-3245, Safety related deceleration/acceleration ramp 1". |

## 1.6.3    F3112 Safety related reference missing

It was impossible to carry out the safety function "safety related limited absolute position" / "safety related limited absolute end position".

| Cause | Remedy |
|---|---|
| Monitoring of safety related limited absolute end position has been configured ("P-0-3239, Configuration of global safety technology functions"); prerequisite of channel 2 having been homed is missing and drive is in **special mode**.<br><br>- o -<br><br>Monitoring of safety related limited absolute end position has been configured ("P-0-3239, Configuration of global safety technology functions"); prerequisite of channel 2 having been homed is missing and warning E3107 had been present for 15 minutes in **normal operation**.<br><br>- o -<br><br>Safety function "safety related limited absolute position" was selected and prerequisite of channel 2 having been homed is missing<br><br>**Note**:<br><br>Status of safety related reference can be seen in "P-0-3238, Extended safety technology status". | 1. Undo selection.<br><br>2. Start command "S-0-0099, C0500 Reset class 1 diagnostics", in order to clear error.<br><br>3. Set drive enable.<br><br>4. a: For absolute measuring systems: Execute "P-0-3228, C4000 Homing procedure command channel 2" in order to establish "safety related reference" on channel 2.<br><br>b: For all other measuring systems: Execute "S-0-0148, C0600 Drive-controlled homing procedure command" (C4000 for establishing safety related reference of channel 2 is integrated). |

---

💡         When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

See documentation "Integrated Safety Technology", chapter " Safety related homing procedure".

## 1.6.4    F3115 Error, brake check time interval exceeded

When "time interval of holding brake check" was activated in "P-0-0525, Holding brake control word" or the function "safety related braking and holding system" is used, the drive monitors the time which has passed since the last holding brake check.

The space of time determined in "P-0-0550, Time interval brake check" or "P-0-3302, Safety related holding system: time interval brake check", within which the holding brake check has to be carried out again, was exceeded.

**Error Reaction**    The drive reacts with the error reaction that has been set. The "status of holding brake check" is set to "0" in "P-0-0539, Holding brake status word".

| Cause | Remedy |
|---|---|
| Drive had been put into operation and drive enable was set; after 15 minutes, drive generates error F3115. | Brake check ("P-0-0541, C2100 Brake check command") must be carried out within 15 minutes after drive was put into operation and drive enable was set. |
| Time set in "P-0-0550, Time interval brake check" or "P-0-3302, Safety related holding system: time interval brake check" has elapsed since last brake check. | Clear error; drive is operational again. Brake check must be carried out within 15 minutes (with drive enable) ("P-0-0541, C2100 Brake check command"). |
| Repeated brake check is required due to defined errors in "safety related braking and holding system".<br><br>• Signal "HAT-Diagnose" is zero (control module "HAT" signals error or connection to control module has been interrupted)<br><br>- or -<br><br>• Signal "HAT-Diagnose" does not correspond to expectations from control status of redundant holding brake<br><br>- or -<br><br>• In case of error, redundant holding brake had to be applied given Vact > standstill<br><br>• "C3000 Synchronize and store safety technology IDN" was executed. | Clear error; drive is operational again. Brake check must be carried out within 15 minutes (with drive enable) ("P-0-0541, C2100 Brake check command"). |

> When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

See also Functional Description of firmware " Motor Holding Brake".

See also documentation " ntegrated Safety Technology".

## 1.6.5    F3117 Actual position values validation error

When both safety technology channels have been homed (cf. "S-0-0403, Position feedback value status" for channel 1 and "P-0-3213, Safety technology status" for channel 2), their actual position values are cyclically checked for validity; the difference of the actual position values mustn't exceed an internal threshold that depends on the measuring system.

Error Messages

☞ For the configuration "homing procedure channel 2 via static sig-
nal", the signal at the homing input of channel 2 may only be 24 V
when the axis is within "P-0-3231, Safety related reference position
channel 2" or "P-0-3231, Reference position for safety related ref-
erence" +/- "P-0-3229, Tolerance window for safety related homing
procedure".

Error Reaction     The drive is shut down according to the setting in "P-0-0119, Best possible
deceleration".

In "P-0-3213, Safety technology status" or "P-0-3213, Safety technology oper-
ating status" the status "safely homed" is removed.

The drive automatically switches to "safety related standstill" and the output
stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Short circuit of home switch input of channel 2 with 24 V. | Check connection of home switch input at optional module "safety technology I/O". |
| Tolerance window around "safety related reference position channel 2" (P-0-3231) incorrectly parameterized. | Check parameter setting of "P-0-3229, Tolerance window for safety related homing procedure" and adjust it accordingly. |
| Control section is defective | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

After trouble shooting start command "S-0-0099, C0500 Reset class 1 diag-
nostics" in order to clear error an then set drive enable again.

Then establish safety related reference again by executing command "C4000
Homing procedure command channel 2".

💡 When using the optional module "safety technology I/O", you can,
in addition to the error message, obtain detailed information with
regard to the cause of the error or the error location. For this pur-
pose, evaluate the parameter "P-0-3219, Diagnostic safety tech-
nology message".

## 1.6.6    F3122 Safety related holding system: system error

Monitoring functions of the safety related deceleration and holding system have
detected errors in the control or feedback circuit of the redundant holding brake.

| Cause | Remedy |
|---|---|
| Brake server for controlling redundant holding brake is no lon-ger active. Lifecounter brake server has not been incremen-ted. | Replace hardware<br>Replace firmware |
| No acknowledgment when releasing/applying redundant hold-ing brake. Check takes place by means of feedback signal of control module. | Check wiring |

| Cause | Remedy |
|---|---|
| Error during static check of control and feedback signal of control module. | Check wiring<br><br>Check control module |
| Requirements for releasing redundant holding brake have not been complied with. Output stage is not active. | Replace hardware |

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.7    F3123 Safety related holding system: brake check missing

| Cause | Remedy |
|---|---|
| At selection of a safety technology operating status, a check has detected that states of holding brake monitoring of motor holding brake (P-0-0539) and/or redundant holding brake (P-0-3301) have not been set to "carried out successfully". | Deselect safety related operating status and execute "C2100 Brake check command". |

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.8    F3130 Error when checking input signals

A validity check is run for the inputs for channel 1 and channel 2 of the safety technology so that several errors can be detected.

**Optional Module "Starting Lockout"**    For the optional module "starting lockout" the selection signals "AS_A" or "AS_B" and "ASn" are monitored for states that are not allowed.

**Optional Module "Safety Technology I/O"**    For the optional module "safety technology I/O" a check is run during dynamization to find out whether all input signals of safety function selection are zero.

**Error Reaction**    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Error in wiring of input signals or contact error resp. cable break. | Remove cause of error in wiring of inputs or replace switch.<br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. |

☞ In addition to the error message, it is possible to obtain detailed information with regard to the cause of the error or the error location. For this purpose evaluate parameter "P-0-3219, Diagnostic safety technology message".

Error Messages

> When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

See also Documentation "Integrated Safety Technology", chapter " Diagnostic and Services".

## 1.6.9 F3131 Error when checking acknowledgment signal

The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

As soon as the axis has stopped the safety door can be opened.

| Cause | Remedy |
|---|---|
| When using optional module **starting lockout**: <br><br>Channel 1 monitors status of acknowledgment relay. If normal condition of relay is detected in spite of activated starting lock-out function or if operated condition of the relay is detected with starting lockout not active, error message F3131 is generated. Error in wiring of acknowledgment signal (contact error or cable break). | Remove cause of error in wiring of acknowledgment signal. <br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error an then set drive enable again. |
| When using optional module **safety technology I/O**: <br><br>During check of acknowledgment signal EA20 a static high level (short circuit with V+) or a static low level (cable break resp. loose or missing connection) was detected. | Remove cause of error in wiring of acknowledgment signal EA20. <br><br>Then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. <br><br>**Note:** <br><br>If only diagnostic safety technology slave signals F3131, this is a sign of missing connection of signal EA20 between master and slave. |
| Within defined time window there wasn't any dynamization signal detected, because SERCOS ring (or field bus circuit) in which safety technology master has been included goes to operating mode more slowly than ring (or circuit) in which axis with error message has been included. | Safety technology master always has to be included in SERCOS ring (or field bus circuit) which is last to switch to operating mode. |

> When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.10 F3132 Error when checking diagnostic output signal

With control of a safety door configured ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 1=1), the safety technology master for diagnostic message and acknowledgment ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 2=1) checks whether...:

- ...a feedback is present at the diagnostic input of channel 1 (E10) ("P-0-3212, Safety technology signal control word, channel 1 " or "P-0-3212, Safety technology control word, channel 1" bit 9) after transition to a safety function.

- ...a feedback is present at the diagnostic input of channel 1 (E10) ("P-0-3212, Safety technology signal control word, channel 1" or "P-0-3212, Safety technology control word, channel 1" bit 9) after transition to normal operation.

**Error Reaction**  The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration". The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Error in wiring of diagnostic output / check input (A10, E10 or EA10n). | Remove error in wiring of diagnostic output / check input. |
| Error in parameterization of diagnostic output / check input. | Check bit 1=1 (control of a safety door) and bit 2=1 (safety technology master for diagnostic message and acknowledgment) in parameter "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration". |
|  | Check parameterization of A10 ("P-0-3214, Safety technology signal status word, channel 1" or "P-0-3214, Safety technology status word, channel 1", bit 0) and E10 ("P-0-3212, Safety technology signal control word, channel 1" or "P-0-3212, Safety technology control word, channel 1", bit 9) for the corresponding digital inputs/outputs. |
| Internal relay on channel 2 defective. | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.11 F3133 Error when checking interrupting circuits

In order to lock the output stage in a safety related way when the safety technology has detected an error, the correct functioning of the interrupting circuit is cyclically checked. This is done on the one hand during the actions "release output stage" and "lock output stage", on the other hand statically while the output stage is being released or locked. The corresponding hardware realization ensures that this is possible without repercussion on the PWM control signals.

☞ When the safety technology has been activated, the error F3133 only occurs in normal operation. When a safety function is selected, the cause of the error causes the error "F8133 Error when checking interrupting circuit" to be triggered.

Error Messages

The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to "safety related standstill" and the output stage is switched off via one channel.

☞          Safety is not acknowledged; i.e. "safety technology status output controller" was cleared/reset in "P-0-3214, Safety technology signal status word, channel 1" or "P-0-3214, Safety technology status word, channel 1" or the diagnosis input/output EA10n (channel 2) was set depending on the parameterization in "P-0-3210, Safety technology control word" / "P-0-3210, Safety technology configuration".

| Cause | Remedy |
|---|---|
| An error was detected during check of interrupting circuit. | Start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again. |
| | If error occurs repeatedly, replace control section or entire drive controller. |

☞          Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

💡          When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.12    F3134 Dynamization time interval incorrect

The signal shape of the "dynamization signal of safety function selection" is monitored.

☞          Monitoring normally refers to the signals at the dynamization input EA30. If "separate dynamization" has been set in "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", the dynamization input for channel 1 is additionally monitored (see also "P-0-3212, Safety technology signal control word, channel 1" or "P-0-3212, Safety technology control word, channel 1").

Error Reaction    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

When the drive is in a safety function, it is automatically switched to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Error in wiring of dynamization signal (e.g. short circuit with V+). | Check wiring of dynamization signal and remove error. |
| Error in signal shape of dynamization signal in the case of external dynamization (see also "F3135 Dynamization pulse width incorrect"). | Check dynamization signal and correct it, if necessary. Relevant parameters:<br><br>"P-0-3223, Time interval for dynamization of safety function selection" (+20 % tolerance) mustn't be exceeded<br><br>"P-0-3224, Duration of dynamization pulse of safety function selection". |
| Parameterization of "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration" not useful. | In the case of internal dynamization, per safety zone configure one axis as master for dynamization (set bit 3 in "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration"). |

After having removed the error start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again.

☞     If error message occurs repeatedly, safety technology firmware has to be replaced.

- o -

Control section (only by Rexroth service engineers or especially trained users) or entire drive controller has to be replaced. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

💡     When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.13    F3135 Dynamization pulse width incorrect

For "dynamization of safety function selection" a dynamic signal is applied to the selection elements, in order to detect errors in the wiring of the input signal / input signals. The signal shape of the dynamic signal / dynamic signals is monitored, too.

The monitoring refers to the signal at the input EA30 and in the case of separate dynamization ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 7=1) additionally to the "dynamization signal channel 1" ("P-0-3212, Safety technology signal control word, channel 1" or "P-0-3212, Safety technology control word, channel 1", bit 10).

The pulse width of the dynamization signal was detected to be too short or too long; the minimum pulse width is 30 ms, the maximum pulse width is determined via "P-0-3224, Duration of dynamization pulse of safety function selection" (plus a tolerance of 20 percent).

Error Reaction    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration". When the drive is in a safety function, it is automatically switched to safety related standstill and the output stage is switched off via two channels.

Error Messages

| Cause | Remedy |
|---|---|
| Error in wiring of dynamization signal EA30 | Remove error in wiring of dynamization signal EA30 [e.g. short circuit with 0 V (GND), cable break, missing connection to master of dynamization]. |
| In the case of separate dynamization ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 7=1): error in wiring of "dynamization input channel 1" ("P-0-3212, Safety technology signal control word, channel 1" or "P-0-3212, Safety technology control word, channel 1", bit10). | Remove error in wiring of dynamization signal [e.g. short circuit with 0 V (GND), cable break, missing connection to master of dynamization]<br><br>- o -<br><br>Missing or incorrect settings for transmission via master communication. |
| In the case of internal dynamization ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 7=0): error in signal shape of dynamization signal. | Check parameterization of<br><br>● "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration" (only one drive may be selected as master for dynamization, all other drives must be declared slaves).<br><br>● "P-0-3223, Time interval for dynamization of safety function selection" and "P-0-3224, Duration of dynamization pulse of safety function selection" in involved slave axes have to be greater than or equal to values in master axis. |

| Cause | Remedy |
|---|---|
| In the case of external dynamization: error in signal shape of dynamization signal | In the case of external dynamization, **all** drives that are to be dynamized have to be parameterized as "slave for dynamization of safety function selection" via "P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration". EA30 of respective drives have to be interconnected and connected to signal source.<br><br>Dynamization signal is generated by external source and this source has to be connected to selection elements and dynamization signal EA30.<br><br>Signal shape mustn't exceed parameter values<br><br>• "P-0-3223, Time interval for dynamization of safety function selection" and<br><br>• "P-0-3224, Duration of dynamization pulse of safety function selection".<br><br>Signal monitoring takes place with retriggerable timers; i.e. dynamization may also take place in shorter intervals and with shorter pulse width (minimum 30 ms). |
| In the case of separate dynamization for channel 1 and channel 2 ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology configuration", bit 7=1): error in signal shape of dynamization signal EA30. | **Channel 2**:<br><br>Interconnect EA30 of respective drives. Dynamize N/C contacts of selection elements with dynamization signal EA30.<br><br>**Channel 1**:<br><br>Dynamization signal for channel 1 is generated by external source. "Dynamization input channel 1" ("P-0-3212, Safety technology signal control word, channel 1", bit 10) of respective drives has to be interconnected and connected to signal source. Dynamize N/O contacts of selection elements with externally generated "dynamization signal channel 1".<br><br>Signal shape mustn't exceed parameter values<br><br>• "P-0-3223, Time interval for dynamization of safety function selection" and<br><br>• "P-0-3224, Duration of dynamization pulse of safety function selection".<br><br>Signal monitoring takes place with retriggerable timers; i.e. dynamization may also take place in shorter intervals and with shorter pulse width (minimum 30 ms). |

After having removed the cause start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again.

☞        If error message occurs repeatedly, safety technology firmware has to be replaced.

- o -

Control section (only by Rexroth service engineers or especially trained users) or entire drive controller has to be replaced. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

Error Messages

> 💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.14    F3140 Safety parameters validation error

In the operating mode, a validation check is cyclically carried out for the safety parameters of channel 1 and channel 2.

Error Reaction
: The drive is shut down according to the setting in "P-0-0119, Best possible deceleration".

When the drive is in a safety function, it is automatically switched to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Change in safety parameters without subsequent synchronization of safety parameters in special mode | Execute command "P-0-3204, C3000 Synchronize and store safety technology IDN command"; channel 2 thereby applies parameters of channel 1 and internal values are recalculated and loaded |
| | **Note:** |
| | Executing the command "C3000 Synchronize and store safety technology IDN" increases the change counter of the safety technology memory (P-0-3201). It is therefore necessary to carry out the acceptance test again. |

> 💡 When using option module "Safty Technology I/O", you can, in addition to the error message, obtain detailed infomration with regard to the cause of the error or the error location. For thispurpose, evaluate the parameter "P-0-3219, Diagnostic safety technology".

Afterwards, start the command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear the error and then set drive enable again.

## 1.6.15    F3141 Selection validation error

The check carried out when selecting/deselecting safety functions has shown that the selection signals of channel 1 and channel 2 differed for a longer time than the tolerated duration preset by "P-0-3221, Max. tolerance time for different channel states".

The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

As soon as the axis has stopped the safety door can be opened.

| Cause | Remedy |
|---|---|
| Error in wiring of input signals or switch defective. | Check switch elements and wiring of input signals. |
| Different safety functions assigned to inputs of channel 1 and channel 2. | Check configuration of inputs of channel 1 and channel 2. |
| "P-0-3221, Max. tolerance time for different channel states" incorrectly parameterized. | Change parameterization of "P-0-3221, Max. tolerance time for different channel states" (increase value). |

After having removed the cause start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.16  F3142 Activation time of enabling control exceeded

The parameterized maximum time for the activation of the enabling control ("P-0-3222, Max. activation time of enabling control") has been exceeded.

**Error Reaction**  The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Enabling control was activated too long. | Remove enabling signal before time parameterized in "P-0-3222, Max. activation time of enabling control" is over. |
| Parameterization of "P-0-3222, Max. activation time of enabling control" does not make sense. | Check and, if necessary, change parameterization of "P-0-3222, Max. activation time of enabling control". |
| Enabling control is defective or incorrectly wired. | Check and, if necessary, replace/correct enabling control and wiring. |

After having removed the cause start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.17  F3143 Safety command for clearing errors incorrect

Via an internal command embedded in the call of "S-0-0099, C0500 Reset class 1 diagnostics" all errors of channel 2 are cleared. If a problem is detected during this procedure, the drive generates the error F3143.

**Error Reaction**  Axis is in "safety related standstill". The output stage has been switched off via two channels.

| Cause | Remedy |
|---|---|
| If error message coincides with a firmware update, this indicates that firmware on channel 2 was not started; in this case, "P-0-3200, Safety technology firmware code" is without content. (This can be due to following reasons: firmware of channel 2 incompatible with channel 1, checksum or hardware error on channel 2..) | Carry out firmware update again |
| Execution of internal command was aborted with timeout. | Reset module by switching control voltage off and on. If error occurs repeatedly, replace control section or entire drive controller. |

Error Messages

☞ Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

💡 When using the optional module "safety technology I/O", you can,
in addition to the error message, obtain detailed information with
regard to the cause of the error or the error location. For this pur-
pose, evaluate the parameter "P-0-3219, Diagnostic safety tech-
nology message".

See also Functional Description of firmware " Firmware Release Update".

## 1.6.18    F3144 Incorrect safety configuration

An error was detected in the configuration of safety technology.

Error Reaction    The drive is decelerated according to the setting in "P-0-0119, Best possible
deceleration".

The drive automatically switches to safety related standstill and the output stage
is switched off via two channels.

| Cause | Remedy |
|---|---|
| Safety technology control signals (selection signals) were con-figured in "P-0-3211, Safety technology I/O control word, channel 2" or "P-0-3211, Safety technology I/O configuration list, channel 2", but safety technology with PROFIsafe hasn't been configured or hardware requirements therefor are missing. | For configuration "safety technology with PROFIsafe", only assignment of home switch and safety technology inputs 1 to 4 is allowed; for the other safety technology control signals it is not allowed to establish any functional connection; change parameter setting of "P-0-3211, Safety technology I/O control word, channel 2" or "P-0-3211, Safety technology I/O config-uration list, channel 2" accordingly. |
| Safety technology control signals (selection signals) were as-signed several times in "P-0-3211, Safety technology I/O con-trol word, channel 2" or "P-0-3211, Safety technology I/O configuration list, channel 2". | Only assign safety technology control signals (selection sig-nals) once in "P-0-3211, Safety technology I/O control word, channel 2" or "P-0-3211, Safety technology I/O configuration list, channel 2". |
| Safety technology inputs 1 to 4 were configured in "P-0-3211, Safety technology I/O control word, channel 2" or "P-0-3211, Safety technology I/O configuration list, channel 2", but safety technology with PROFIsafe hasn't been configured or hard-ware requirements therefor are missing. | Safety technology inputs 1 to 4 are only allowed in conjunction with the configuration "safety technology with PROFIsafe"; change parameterization of "P-0-3211, Safety technology I/O control word, channel 2" or "P-0-3211, Safety technology I/O configuration list, channel 2" accordingly. |
| Two configurations were inadmissibly made at the same time for the axis:<br><br>master for diagnosis and acknowledgment ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology con-figuration", bit 2)<br><br>- and-<br><br>"deactivation of acknowledgment support at EA20", i.e. drive does not work in acknowledgment group ("P-0-3210, Safety technology control word" or "P-0-3210, Safety technology con-figuration", bit 8). | One of both configurations must be undone. |

After trouble shooting start command "S-0-0099, C0500 Reset class 1 diag-
nostics" in order to clear error an then set drive enable again.

> When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.19    F3145 Error when unlocking the safety door

When the special mode is deselected, a check is run to find out whether the control of the door locking device is inactive and the door is closed and locked.

Error Reaction    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration"

- or -

the axis already is in "safety related standstill".

The output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Error in mechanical system of safety door | Check mechanical system of safety door |
| Error in wiring of safety door or short circuit between EA10n, A10, E10 and 24 V | Check wiring of safety door |
| Hardware defect on control section or on optional safety technology module | Replace control section or entire drive controller |

> Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

> When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.20    F3146 System error channel 2

The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

In the case of a measuring system error, the safety door can only be opened via the command "P-0-3218, C3700 Manually unlocking the safety door".

Error Messages

| Cause | Remedy |
|---|---|
| System error on channel 2 | Reset module by switching control voltage off and on.Start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then set drive enable again.If error occurs repeatedly, replace control section or entire drive controller |
| Failure of encoder signal | • check cable to measuring system<br>• check shield connection<br>• check connection (ribbon cable) between optional safety technology module and encoder interface |
| No encoder signals | • connection (ribbon cable) between optional safety technology module and encoder interface missing<br>• check measuring system |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.21    F3147 System error channel 1

The operatability of safety monitoring functions is cyclically checked in normal operation.

A system error occurred in channel 1. The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

As soon as the axis has stopped the safety door can be opened.

| Cause | Remedy |
|---|---|
| Cyclic test of monitoring functions of safety technology channel 1 is faulty. | Reset module by switching control voltage off and on.<br>If error occurs repeatedly, replace firmware and/or hardware. |
| You use a test firmware (to be recognized, among other things, by "P-0-3213, Safety technology operating status" or "P-0-3213, Safety technology status", bit 14).<br>Test firmware was provided as an exception for applications without active safety technology; safety technology firmware test was not carried out for this firmware! | Replace firmware by **test firmware with safety technology firmware test** or **official firmware** (V-release) with which safety technology can always be used without restrictions. |

☞ Only Rexroth service engineers are allowed to replace optional modules of the control section.

Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.22    F3150 Safety command for system start incorrect

Channel 2 of the safety technology is switched from parameter mode to operating mode via an internal command. During the command channel 2 carries out the necessary initialization steps.

Error Reaction The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Time in command processing exceeded. | Start command "S-0-0099, C0500 Reset class 1 diagnostics" to clear error: |
| | ⇒ Reset optional safety technology module (switch control voltage off and on). |
| | After control voltage was switched off and on, error occurs again: |
| | ⇒ Reload firmware. |
| | Error occurs in spite of switching control voltage off and on and reloading firmware: |
| | ⇒ Hardware is defective; replace control section. |

☞ To load the firmware please read the description "Firmware Update (or Replacement)" in the Firmware Release Notes.

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

Error Messages

## 1.6.23    F3151 Safety command for system halt incorrect

Channel 2 of the safety technology is switched from operating mode to parameter mode via an internal command. During the command the necessary initialization steps are carried out in channel 2.

**Error Reaction**    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration". The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Time exceeded in command processing because other command is active (e.g. C3000). | Start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error and then switch from operating mode to parameter mode. |
| | If necessary, reset module by switching control voltage on and off. |

> When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

## 1.6.24    F3152 Incorrect backup of safety technology data

In order to use the same safety technology configuration, after the control section was replaced, without having to carry out safety technology commissioning again, the monitoring of the correct backup or acceptance of the safety technology data is contained in the drive. An error occurred during data backup.

**Error Reaction**    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration". The drive automatically switches to safety related standstill and the output stage is switched off via two channels. As soon as the axis has stopped the safety door can be opened.

| Cause | Remedy |
|---|---|
| Error in hardware or in internal sequence during data backup. | Repeat data backup. |
| | If error occurs again, execute command "load defaults procedure for safety technology". If error occurs again, optional safety technology module or entire drive controller has to be replaced. |
| | If error occurs, content of parameter "P-0-3208, Backup of safety techn. data channel 2" is incorrect |
| Content of parameter "P-0-3208, Backup of safety techn. data channel 2" is incorrect. | Check whether correct parameter set, compatible firmware version ("S-0-0030, Manufacturer version"). |
| | If error-free "P-0-3208, Backup of safety techn. data channel 2" is not available, safety technology commissioning has to be carried out again. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

Only Rexroth service engineers are allowed to replace optional modules of the control section.

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

### 1.6.25    F3160 Safety bus communication error

A cyclic check of the drive has shown that the drive cannot communicate with the master via the safety bus.

**Error Reaction**    The drive is decelerated according to the setting in "P-0-0119, Best possible deceleration". The drive automatically switches to "drive interlock" and the output stage is switched off via two channels.

| Cause | Remedy |
|---|---|
| Missing or incorrect connection | Check connection, remove cause of error |
| Failure of bus master | Remove error of master |

💡 When using the optional module "safety technology I/O", you can, in addition to the error message, obtain detailed information with regard to the cause of the error or the error location. For this purpose, evaluate the parameter "P-0-3219, Diagnostic safety technology message".

# 1.7    Non-Fatal Errors (F2xxx)

## 1.7.1    Behavior in the Case of Non-Fatal Errors

Non-fatal errors are errors that still allow a freely definable, variable error reaction.

**Drive Behavior**    The user can define the drive behavior for the case of non-fatal errors occurring via the setting of the parameters "P-0-0117, Activation of NC reaction on error" and "P-0-0119, Best possible deceleration".

**Putting the Drive Into Operation**    The drive can only be put into operation again when:

1. The error reaction has been completed, i.e. the drive has stopped (v=0!).
2. The error message was cleared by the error clearing command (cf. "S-0-0099, C0500 Reset class 1 diagnostics").
3. The cause of the error was removed.
4. Drive enable was switched on again (0-1 edge).

## 1.7.2    F2003 Motion step skipped

When the operating mode "electronic motion profile" is active, a check is run during the transition from one motion step to the next to find out whether a motion step was skipped.

Error Messages

Except for the transition from the last to the first motion step (or vice versa), the motion step number may only change by 1.

| Cause | Remedy |
|---|---|
| Master axis velocity ("P-0-0777, Effective master axis velocity") is so high that master axis distance ("P-0-0227, Cam shaft profile, access angle") covered in one position loop clock is greater than width of one motion step. | Reduce master axis velocity<br><br>- o -<br><br>Increase width of motion step (distance of two master axis initial positions in "P-0-0705, List of master axis initial positions, set 0" or "P-0-0712, List of master axis initial positions, set 1")<br><br>- o -<br><br>Reduce position loop clock (see Functional Description of firmware " Performance Data"). |

## 1.7.3    F2004 Error in motion profile

In the operating mode with electronic motion profile, the drive monitors whether the defined motion profile (max. 8 individual motion steps) is verisimilar. The error is generated if a motion profile that has not passed the validation checks is activated with the drive having been enabled. Depending on whether set 0 or set 1 had been selected, a number is displayed in parameter "P-0-0702, Motion profile, diagnosis, set 0" or "P-0-0709, Motion profile, diagnosis, set 1".

| Cause | Remedy |
|---|---|
| **1:** Master axis initial positions of motion steps used are not increasing. | Check list "P-0-0705, List of master axis initial positions, set 0" or "P-0-0712, List of master axis initial positions, set 1". |
| **2:** In the case of absolute motion profile, sum of individual distances is not "0" or a multiple of "S-0-0103, Modulo value". | Check list "P-0-0707, List of distances, set 0" or "P-0-0714, List of distances, set 1". |
| **3:** In the case of relative motion profile, number of motion steps is smaller than "2" | Check parameter "P-0-0703, Number of motion steps, set 0" or "P-0-0710, Number of motion steps, set 1". |
| **21...28:** Checked motion step is "rest in velocity" or "velocity in velocity". Following step consists of profile which is not "velocity in rest" or "velocity in velocity".<br><br>Number of checked motion step can be taken from second digit of diagnostic message number. | Check list "P-0-0706, List of motion step modes, set 0" or "P-0-0713, List of motion step modes, set 1". |
| **31...38:** Checked motion step is "rest in velocity" or "velocity in velocity". Following step consists of profile which is either "velocity in rest" or "velocity in velocity". Velocities of step that was checked and following step do not match.<br><br>Number of checked motion step can be taken from second digit of diagnostic message number. | Check list "P-0-0708, List of slave axis velocities, set 0" or "P-0-0715, List of slave axis velocities, set 1". |
| **41...48:** Checked motion step is "velocity in rest" or "velocity in velocity". Previous step consists of profile which is not "rest in velocity" or "velocity in velocity".<br><br>Number of checked motion step can be taken from second digit of diagnostic message number. | Check list "P-0-0706, List of motion step modes, set 0" or "P-0-0713, List of motion step modes, set 1". |

| Cause | Remedy |
|---|---|
| **51...58:** Checked motion step is "velocity in rest" or "velocity in velocity". Previous step consists of profile which is either "rest in velocity" or "velocity in velocity". Velocities of step that was checked and previous step do not match.<br><br>Number of checked motion step can be taken from second digit of diagnostic message number. | Check list "P-0-0708, List of slave axis velocities, set 0" or "P-0-0715, List of slave axis velocities, set 1". |
| **61...68:** 1st profile element of a cam shaft profile used is unequal "0" or cam shaft profile is invalid.<br><br>Number of rejected cam shaft profile can be taken from second digit of diagnostic message number. | Check list "P-0-0706, List of motion step modes, set 0" or "P-0-0713, List of motion step modes, set 1". |
| **71...78:** Checked motion step is "velocity in rest", "velocity in velocity" or "rest in velocity". Distance of motion step inadmissibly is "0".<br><br>Number of checked motion step can be taken from second digit of diagnostic message number. | Check list "P-0-0707, List of distances, set 0" or "P-0-0714, List of distances, set 1". |
| **As of MPx05:**<br><br>**81...88:** Checked motion step is "rest in rest with limited velocity". Indicated maximum slave axis velocity would be exceeded and segmentation into the three partial steps "rest in velocity", "constant velocity" and "velocity in rest" is impossible.<br><br>Number of checked motion step can be taken from second digit of diagnostic message number. | • Reduce distance of step (P-0-0707 or P-0-0714)<br>• Increase maximum slave axis velocity (P-0-0708 or P-0-0715)<br>• Reduce master axis velocity (P-0-0704 or P-0-0711) |

See also Functional Description of firmware " Electronic Motion Profile With Real/Virtual Master Axis".

## 1.7.4    F2005 Cam shaft invalid

When the cam shaft mode is active, the drive monitors whether one of the cam shaft profiles contains invalid elements or is incomplete.

| Cause | Remedy |
|---|---|
| One of cam shaft profiles is invalid | Check cam shaft profiles and, if necessary, reload them ("P-0-0072, Cam shaft profile1" "P-0-0092, Cam shaft profile 2", "P-0-0780, Cam shaft profile3" or "P-0-0781, Cam shaft profile4".<br><br>In case of doubt contact installation programmer or machine manufacturer. |

See also Functional Description of firmware  "Electronic Cam Shaft with Real/Virtual Master Axis".

## 1.7.5    F2006 MMC was removed

The drive monitors whether the MMC is available when it is used as an active memory, i.e. when the parameters are stored in the MMC.

Error Messages

| Cause | Remedy |
|---|---|
| MMC is used as active memory and was removed from drive controller under voltage. | Put MMC in its slot at the drive controller again and then start command "S-0-0099, C0500 Reset class 1 diagnostics" in order to clear error. |
| Loose contact in MMC slot or MMC incorrectly plugged. | Check fixing of MMC and, if necessary, plug it in correctly. |
| MMC defective | Replace MMC |
| MMC slot defective | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.6    F2007 Switching to non-initialized operating mode

When switching the active operating mode the drive was switched to a non-initialized operating mode.

For the operating modes that can be selected please see Parameter Description for the operating mode parameters:

- S-0-0032, Primary mode of operation
- S-0-0033, Secondary operating mode 1
- S-0-0034, Secondary operating mode 2
- S-0-0035, Secondary operating mode 3

| Cause | Remedy |
|---|---|
| Via "S-0-0134, Master control word" (for SERCOS) or "P-0-4077, Field bus: control word" (for field bus) an operating mode was selected that had not been initialized (e.g. S-0-0032="0"). | Enter desired operating mode in selected operating mode parameter. |

See also Functional Description of firmware " Operating Mode Selection".

## 1.7.7    F2008 RL The motor type has changed.

In the initialization phase (after the drive has been switched on) the controller checks whether the connected motor type corresponds to the type designation in "S-0-0141, Motor type". If this is not the case, the error F2008 is generated and the controller demands loading the motor-specific control loop parameter values from the encoder memory of the motor (the display of the control panel reads "RL").

| Cause | Remedy |
|---|---|
| Motor was replaced by different motor type<br><br>- o -<br><br>A parameter file was loaded to drive controller in which parameter "S-0-0141, Motor type" differs from connected motor type<br><br>- o -<br><br>Drive controller was switched on for the first time. Motor type stored in "S-0-0141, Motor type" differs from connected motor type. | Clear error by means of "S-0-0099, C0500 Reset class 1 diagnostics".<br><br>- o -<br><br>Press <ESC> button at control panel of controller.<br><br>**Note:**<br><br>If the error is cleared, command "S-0-0262, C07_x Load defaults procedure command" is then automatically executed, unless this was deactivated in "P-0-0556, Control word of axis controller".<br><br>**Attention:**<br><br>By command execution, previous control loop settings are overwritten with default control loop settings from encoder memory! |

See also Functional Description of firmware " Control Panel".

## 1.7.8    F2009 PL Load parameter default values

When the firmware is replaced (firmware update) the non-volatile memory (internal memory or MMC) is automatically analyzed; during the analysis an error was detected.

☞        When the "S-0-0262, C07_x Load defaults procedure command" is started directly with the "Load basic parameters" option the F2009 error is automatically cleared.

During the transition checks for the communication phases 3 and 4 the operating data (parameter values) are verified; parameters with invalid operating data (normally only all new parameters) are output in the "S-0-0021, IDN list of invalid operating data for communication phase 2" or "S-0-0022, IDN list of invalid operating data for communication phase 3" parameters.



**CAUTION**

**Material damage caused by unintended overwriting of parameters and positioning blocks!**

⇒ Before executing the command for loading the parameter default values by "clear errors" you should save the current parameter set.

| Cause | Remedy |
|---|---|
| Drive was started with new firmware for the first time or a version update was carried out due to which number of non-volatile parameters has changed. | By clearing error via control panel all parameter values are cleared and set to original values (default values)<br><br>- o -<br><br>Error is cleared by starting command "S-0-0099, C0500 Reset class 1 diagnostics". Parameters that can be read from memory remain with their last stored value, all parameters that cannot be read from the memory (new parameters) are set to default values and marked as being invalid. |
| Parameter memory (MMC or internal memory) is defective so that error F2009 keeps reappearing. | Check MMC and replace it, if necessary, or replace control section or entire drive controller. |

Error Messages

> ☞          Only Rexroth service engineers or especially trained users are al-
> lowed to replace the control section. The replacement of the entire
> drive controller is described in the Project Planning Manual for the
> power section.

See also Functional Description of firmware " Control Panel".

## 1.7.9      F2010 Error when initializing digital I/O (-> S-0-0423)

> ☞          Up to firmware version 04VRS, the name of the error is "F2010 Error
> when initializing digital inputs/outputs".

An error occurred during the first initialization of the drive (initialization of digital
inputs/outputs).

| Cause | Remedy |
|---|---|
| Conflict with last stored parameters of digital inputs/outputs | Check following parameter contents and correct them, if nec-essary: |
| | • P-0-0300, Digital I/Os, assignment list |
| | • P-0-0301, Digital I/Os, bit numbers |
| | • P-0-0302, Digital I/Os, direction |
| | **With master communication PL available:** |
| | • S-0-0026, Configuration list signal status word |
| | • S-0-0328, Assign list signal status word |
| | • S-0-0027, Configuration list signal control word |
| | • S-0-0329, Assign list signal control word |
| | **With optional module MD1 or MD2 available:** |
| | • P-0-0681, Assignment IDN -> parallel output 1 |
| | • P-0-0682, Assignment parallel input 1 -> IDN |
| | **As of firmware version MPx05:** |
| | You might possibly find some information on incorrectly con-figured parameters in "S-0-0423, IDN-list of invalid op. data for parameterization level". |

## 1.7.10     F2011 PLC - Error nr. 1

In conjunction with technology functions the PLC integrated in the drive (op-
tional expansion package "drive PLC") allows the user generating error mes-
sages (F2011...F2014) within the PLC program.

The causes of the error are depending on the respective PLC project (or the
active technology function). If the error message is generated by a technology
function made available by Bosch Rexroth, the causes and remedies are con-
tained in the description of the technology function.

See also documentation " Rexroth IndraMotion MLD".

## 1.7.11     F2012 PLC - Error nr. 2

In conjunction with technology functions the PLC integrated in the drive (op-
tional expansion package "drive PLC") allows the user generating error mes-
sages (F2011...F2014) within the PLC program.

The causes of the error are depending on the respective PLC project (or the
active technology function). If the error message is generated by a technology

function made available by Bosch Rexroth, the causes and remedies are contained in the description of the technology function.

See also documentation " Rexroth IndraMotion MLD".

### 1.7.12 F2013 PLC - Error nr. 3

In conjunction with technology functions the PLC integrated in the drive (optional expansion package "drive PLC") allows the user generating error messages (F2011...F2014) within the PLC program.

The causes of the error are depending on the respective PLC project (or the active technology function). If the error message is generated by a technology function made available by Bosch Rexroth, the causes and remedies are contained in the description of the technology function.

See also documentation " Rexroth IndraMotion MLD".

### 1.7.13 F2014 PLC - Error nr. 4

In conjunction with technology functions the PLC integrated in the drive (optional expansion package "drive PLC") allows the user generating error messages (F2011...F2014) within the PLC program.

The causes of the error are depending on the respective PLC project (or the active technology function). If the error message is generated by a technology function made available by Bosch Rexroth, the causes and remedies are contained in the description of the technology function.

See also documentation "Rexroth IndraMotion MLD".

### 1.7.14 F2018 Device overtemperature shutdown

The heat sink temperature of the device is monitored by a temperature sensor and a temperature model. When the heat sink temperature has reached the maximum value, the device is switched off in order to protect it against destruction.

☞ Before the error F2018 is triggered, the warning "E2050 Device overtemp. prewarning" is output for 30 seconds.

| Cause | Remedy |
|---|---|
| Overtemperature (heat sink) due to overload of device. | Switch drive off and let it cool down. Check mechanical system and drive dimensioning (working power mustn't exceed, on average, continuous power of drive). |
| Ambient temperature too high. Specified performance data are valid up to an ambient temperature of 40 C. | Reduce ambient temperature, e.g. by cooling the control cabinet. |
| Heat sink of device is dirty. | Clean heat sink |
| Convection is prevented by other components or mounting position of control cabinet. | Mount device vertically and provide sufficient space for ventilating heat sink. |
| Failure of internal blower. | If blower fails, replace device or power section. |
| Failure of air conditioning for control cabinet. | Check air conditioning of control cabinet. |
| Incorrect dimensioning of control cabinet with regard to heat discharge. | Check dimensioning of control cabinet. |

See also Functional Description of firmware " Current Limitation".

Error Messages

## 1.7.15    F2019 Motor overtemperature shutdown

The motor temperature measured by the temperature sensor has reached the limit value in "S-0-0204, Motor shutdown temperature". The drive is immediately decelerated according to the selected error reaction ("P-0-0119, Best possible deceleration") and shut down. The controller outputs F2019.

☞    For MHD, MKD, MKE and LSF motors, "S-0-0204, Motor shutdown temperature" is permanently set and cannot be changed.

| Cause | Remedy |
|---|---|
| Motor shutdown temperature incorrectly parameterized. | Check and correct parameterization of "S-0-0204, Motor shutdown temperature" by means of motor or temperature sensor data sheet. |
| The motor is overloaded. Effective torque demanded from motor has been above allowed torque for too long. | Check dimensioning of motor. In the case of installations that have been operated for a long time, check whether drive conditions have changed (with regard to dirt accumulation, friction, moved masses etc.). |
| Line interruption, ground fault or short circuit in line for motor temperature monitoring. | Check line for motor temperature monitoring for line interruption, ground fault or short circuit. |
| Instability in speed control loop. | Check parameterization of speed control loop. |

See also Functional Description of firmware " Motor Temperature Monitoring".

## 1.7.16    F2021 Motor temperature monitor defective

The function of the temperature sensor used for motor temperature monitoring is cyclically monitored by the drive, as soon as the drive is ready for power output ("Ab").

**Motors MSK, MAD, MAF**    When the voltage level of the temperature sensor is outside of the allowed range of values, the error F2021 is output for Rexroth motors of the MSK, MAD or MAF lines.

**Motors MHD, MKD, MLF, LSF**    When a voltage suggesting a temperature sensor defect or a contact error has been detected at the temperature sensor input for 30 seconds, the error F2021 is output for Rexroth motors of the MHD, MKD, MLF or LSF lines.

**Motors 2AD, ADF, 1MB**    When a voltage suggesting too low motor temperature, a temperature sensor defect or a contact error has been detected at the temperature sensor input for 30 seconds, the error F2021 is output for Rexroth motors of the 2AD, ADF or 1MB lines.

The drive reacts to F2021 with the error reaction which has been set or it refuses drive enable.

| Cause | Remedy |
|---|---|
| Interruption or short circuit in line for motor temperature monitoring. | Check motor connection and cable for interruption and short circuit. |
| Temperature sensor in motor is defective. | Use replacement temperature sensor (if available) or replace motor. |
| **Only for Rexroth motors of lines 2AD, ADF or 1MB**:<br><br>Motor temperature stays below allowed ambient temperature range. | Observe minimum allowed ambient temperature (see documentation of respective motor line). |
| Drive controller is defective. | Replace drive controller or power section. |

See also Functional Description of firmware " Motor Temperature Monitoring".

### 1.7.17    F2022 Device temperature monitor defective

The function of the temperature sensor used for device temperature monitoring is cyclically monitored.

When a temperature equal to or less than -20 °C has been measured for 30 seconds, a defect is supposed to have occurred and the F2022 error is output.

| Cause | Remedy |
|---|---|
| Sensor in drive controller is defective | Replace drive controller or power section |

### 1.7.18    F2025 Drive not ready for Control

When drive enable is set, the drive must be ready; i.e. it must signal the drive status "Ab".

If the drive only signals bb (betriebsbereit = ready for operation), i.e. the DC bus voltage is too low or the drive is in parameter mode, the drive generates this error message.

| Cause | Remedy |
|---|---|
| Drive enable (AF) was set before power supply had been switched on<br><br>- o -<br><br>Drive enable (AF) was set although drive is still in parameter mode | Check logic for activating drive in connected control unit. |

### 1.7.19    F2026 Undervoltage in power section

The DC bus voltage value is monitored by the drive controller and the supply unit.

**Drive Controllers HMS, HMD, HCS**   If the DC bus voltage falls below the minimum value determined for the drive (see value of "P-0-0114, Undervoltage threshold") or it reacts to "DC bus not ok" of the module bus, the drive generates the error message F2026 if "non-fatal error" has been set with regard to the reaction to undervoltage in "P-0-0118, Power supply, configuration".

**Supply Unit HMV01.1**   If the DC bus voltage falls below 75% of the mains voltage crest value that was detected when the mains contactor had been switched on, "error in supply" is signaled via the module bus and F2026 is displayed at the device. Power is switched off!

| Cause | Remedy |
|---|---|
| Power is switched off without previous drive deactivation by means of drive enable ("AF"). | Check logic for activating drive in connected control unit. |
| Failure in power supply or overload of power supply. | Check power supply;<br><br>for HCS02, particularly check wiring of mains supply to connection X3. |
| Mains failure | Check cause of mains failure, switch mains voltage on again. |
| Temporary supply unit overload. | Reduce processing cycle of machine. |

See also Functional Description of firmware " Power Supply".

Error Messages

## 1.7.20    F2027 Excessive oscillation in DC bus

Excessive oscillation occurs in the DC bus. The DC bus voltage fluctuates very much over a longer period.

| Cause | Remedy |
|---|---|
| Drive oscillates. Oscillation might possibly not be mechanically visible, therefore check command torque. | Check command torque of drive to know whether it corresponds to the expected load cycle. Check settings of velocity control loop and position control loop. |
| Drive loads the DC bus impulsively | Check application |

## 1.7.21    F2028 Excessive deviation

When the position control loop is closed the drive monitors whether it can follow the preset position command value. To do this a actual model position value is calculated in the drive and compared with the real actual position value. If the difference of calculated and real actual position value exceeds the value entered in parameter "S-0-0159, Monitoring window" it is obvious that the drive cannot follow the preset command value and the error F2028 is generated.

☞        The maximum deviation between calculated and real actual position value can be read from "P-0-0098, Max. model deviation".

| Cause | Remedy |
|---|---|
| Parameterized monitoring window too small | Check and, if necessary, correct content of "S-0-0159, Monitoring window". |
| Too high command acceleration due to incorrect command value set by control unit | Reduce acceleration value set by the control unit (see control unit manual) |
| **Numeric** value in "S-0-0092, Bipolar torque/force limit value" too low | Check content of parameter "S-0-0092, Bipolar torque/force limit value" and set it to maximum value allowed for application. |
| Axis is blocked or sluggish | Check mechanical system and remove axis blocking. |
| Incorrect or non-optimized control loop parameters | Check control loop setting (e. g. "S-0-0104, Position loop Kv-factor", "S-0-0100, Velocity loop proportional gain", "P-0-0556, Control word of axis controller"). |
| Acceleration capacity of drive was exceeded | Check drive dimensioning |

## 1.7.22    F2031 Encoder 1 error: signal amplitude incorrect

The signals of the measuring system (encoder 1) are monitored on hardware and software level with regard to their amplitudes and signal shape. If a signal (e.g. sin or cos) leaves the thresholds monitored by the hardware or if the signals are disturbed in such a way that a position error occurs, the error F2031 is generated in conjunction with the function "redundant motor encoder".

☞        As the position of the measuring system is no longer generated correctly when the error F2031 is detected, it is necessary to initialize the encoder again.

The error can only be cleared in communication phase 2 (parameter mode).

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding | Check cable to measuring system and replace it, if necessary |
| Measuring system defective | Check measuring system and replace it, if necessary |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary |
| Measuring system dirty | Clean or replace measuring system |
| Hardware defect on control section of drive | Replace control section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.23 F2032 Validation error during commutation fine adjust

When a synchronous motor with incremental measuring system is homed, the value of "P-0-0521, Effective commutation offset" is converted to the home point reference and compared to the optimized commutation offset in P-0-0508, Commutation offset. If the deviation determined due to this comparison is too great, the error F2032 is generated and the drive is shut down.

☞ If the deviation is too great, the operational safety of the motor is no longer guaranteed because a "runaway effect" of the motor can occur.

| Cause | Remedy |
|---|---|
| Initial commissioning was not or incompletely carried out. | Carry out initial commissioning |
| Motor encoder was replaced | Carry out initial commissioning |
| Motor connections (U, V, W) were mixed up. | Check and if necessary correct motor connection. |
| Values in "P-0-0508, Commutation offset" and/or "P-0-3008, Commutation offset, encoder memory" were manipulated. | Check value stored in "P-0-0508, Commutation offset"; carry out initial commissioning again, if required. |

See also Functional Description of firmware " Establishing the Position Data Reference (Drive-Controlled Homing)".

## 1.7.24 F2033 External power supply X10 error

If the X10 interface at the IndraDrive M controller has been equipped with a digital I/O extension, this requires an external 24 V power supply.

| Cause | Remedy |
|---|---|
| Voltage externally applied is outside of allowed range [and temporary failures (voltage peaks) are detected]. | Supply interface with controlled power supply unit. |
| At least one of the inputs was connected with reversed polarity. | Check wiring |
| At least one of the outputs has short circuit. | Check wiring |
| At least one of the outputs is overloaded. | Supply motor brake and interface with different power supply units, especially in the case of long motor cables. |

Error Messages

## 1.7.25    F2036 Excessive position feedback difference

In cyclic operation the difference between actual position value 1 and position value 2 (see also "P-0-0391, Actual position value difference encoder1 - encoder2") is compared to "S-0-0391, Monitoring window feedback 2". If the absolute value of the difference is greater than the monitoring window and both encoders have been homed, the error F2036 is generated.

The drive carries out the error reaction parameterized in "P-0-0119, Best possible deceleration" and the reference bits of both encoders are cleared ("S-0-0403, Position feedback value status").

☞          The monitoring function is inactive if the value "0" was entered in the "S-0-0391, Monitoring window feedback 2" parameter.

| Cause | Remedy |
|---|---|
| Parameters for encoder 2 incorrect | Check "S-0-0115, Position feedback 2 type" and "S-0-0117, Feedback 2 Resolution" |
| Mechanical system between motor shaft and encoder 2 incorrectly parameterized. | Check "S-0-0121, Input revolutions of load gear", "S-0-0122, Output revolutions of load gear", and "S-0-0123, Feed constant". |
| Mechanical system between motor shaft and encoder 2 is not rigid (e.g. gear play, slip) and monitoring window is too small. | Increase "S-0-0391, Monitoring window feedback 2", switch off in the case of gear with slip. |
| Encoder cable defective | Replace encoder cable |
| Maximum input frequency of encoder interface exceeded. | Reduce velocity |
| Encoder 2 was not mounted to driven axis | Set "S-0-0391, Monitoring window feedback 2" to "0" (switch monitoring function off) |
| Incorrect encoder gear settings | Check relevant encoder parameters and correct them, if necessary:<br><br>• "P-0-0121, Gear 1 motor-side (motor encoder)" / "P-0-0122, Gear 1 encoder-side (motor encoder)"<br><br>• "P-0-0124, Gear 2 load-side (optional encoder)" / "P-0-0125, Gear 2 encoder-side (optional encoder)"<br><br>• "S-0-0121, Input revolutions of load gear"/ "S-0-0122, Output revolutions of load gear" |
| Position data reference of an absolute encoder incorrect | Execute "P-0-0012, C0300 Command Set absolute measuring" |

See also Functional Description of firmware " Velocity Control with Cyclic Command Value Input".

## 1.7.26    F2037 Excessive position command difference

When the drive is running in the operating mode "position control with cyclic command value input", the incoming position command values (cf. "S-0-0047, Position command value") are monitored. If the position difference between two successive position command values is greater than or equal to the value in "S-0-0091, Bipolar velocity limit value", the position command value monitor is activated and the error F2037 is generated.

The excessive position command value is stored in parameter "P-0-0010, Excessive position command value".

The last valid position command value is stored in parameter "P-0-0011, Last valid position command value".

| Cause | Remedy |
|---|---|
| Value in "S-0-0091, Bipolar velocity limit value" too low. | Check and, if necessary, correct parameterization of "S-0-0091, Bipolar velocity limit value". |
| Incorrect command value set by control unit. | Contact control unit manufacturer or programmer. |

See also Functional Description of firmware " Velocity Control with Cyclic Command Value Input".

## 1.7.27 F2039 Maximum acceleration exceeded

In cyclic position control the allowed acceleration limit value was exceeded.

☞ The acceleration monitor can be switched off by means of "P-0-0556, Control word of axis controller".

| Cause | Remedy |
|---|---|
| Value in "S-0-0138, Bipolar acceleration limit value" too low. | Check and, if necessary, correct parameterization of "S-0-0138, Bipolar acceleration limit value". |
| Incorrect command values set by control unit (position command values). | Contact control unit manufacturer or programmer. |
| Preset acceleration value was greater than value parameterized in "S-0-0138, Bipolar acceleration limit value". | Reduce acceleration value used<br>• S-0-0042, Homing acceleration<br>• S-0-0260, Positioning acceleration<br>• P-0-0057, Return acceleration |

## 1.7.28 F2040 Device overtemperature 2 shutdown

A switch-off value for the second temperature sensor is stored in element 3 of parameter "P-0-4059, Electric type data of power section".

If parameter "P-0-0816, Amplifier temperature 2" exceeds the switch-off value, the error F2040 is generated and the device is switched off.

| Cause | Remedy |
|---|---|
| Ambient temperature too high. Specified performance data are valid up to an ambient temperature of 40 C. | Reduce ambient temperature, e.g. by cooling the control cabinet. |
| Heat sink of device is dirty. | Clean heat sink |
| Convection is prevented by other components or mounting position in control cabinet. | Mount device vertically and provide sufficient space for ventilating heat sink. |
| Blower of device is defective. | Replace device |

## 1.7.29 F2042 Encoder 2: encoder signals incorrect

The signals of the measuring system (encoder 2) are monitored with regard to their amplitudes and signal shape. If a signal (sin or cos) leaves the allowed range or if the signals are disturbed in such a way that a position error occurs, this error is generated.

☞ As the position is no longer generated correctly when this error is detected, it is necessary to initialize the encoder again.

Error Messages

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding. | Check cable to measuring system and replace it, if necessary. |
| Encoder defective | Check measuring system and replace it, if necessary. |
| Faulty mounting of measuring head in the case of linear measuring systems. | Check mounting of measuring head and correct it, if necessary. |
| Measuring system dirty | Replace measuring system. |
| Hardware defect on control section of drive. | Replace control section or entire drive controller. |

☞     Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

☞     When using an incremental encoder with square-wave signals, monitoring is carried out with regard to an unallowed edge.

With regard to the software the signals of a resolver are monitored for their level.

See also "E2075 Encoder 2: encoder signals disturbed".

## 1.7.30     F2043 Measuring encoder: encoder signals incorrect

The signals of the measuring system (measuring encoder) are monitored with regard to their amplitudes and signal shape. If a signal (e.g. sin or cos) leaves the allowed range or if the signals are disturbed in such a way that a position error occurs, this error is generated.

☞     As the position is no longer generated correctly when this error is detected, it is necessary to initialize the encoder again.

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding | Check cable to measuring system and replace it, if necessary. |
| Encoder defective | Check measuring system and replace it, if necessary. |
| Faulty mounting of measuring head in the case of linear measuring systems. | Check mounting of measuring head and correct it, if necessary. |
| Measuring system dirty | Replace measuring system. |
| Hardware defect on control section of drive. | Replace control section or entire drive controller. |

☞     Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

☞     When using an incremental encoder with square-wave signals, monitoring is carried out with regard to an unallowed edge.

See also "E2076 Measuring encoder: encoder signals disturbed".

## 1.7.31    F2044 External power supply X15 error

The external 24 V power supply for the digital I/Os at the optional module (HCC01) is monitored by the drive.

If the 24 V power supply is outside of the range of 19 V to 30 V, the error F2044 is generated.

| Cause | Remedy |
|-------|--------|
| Temporary failures (voltage peaks) or voltage drops. | Use controlled power supply unit. |
| At least one of the inputs was connected with reversed polarity. | Check wiring incl. cable and correct it, if necessary. |
| At least one of the outputs has short circuit or is overloaded. | Check wiring incl. cable and remove short circuit, if necessary. |
| Voltage drops because motor brake applied. | Supply motor brake and interface with different power supply units, especially with long motor cables. |

## 1.7.32    F2048 Low battery voltage

☞    The battery was designed for a service life of 10 years in its installed state.

In the case of Rexroth motors of the MKD/MKE line, the absolute position information is maintained, by means of battery-buffered electronics in the motor feedback, even when the drive controller has been switched off. The battery voltage is checked in the transition command from parameter to operating mode during the initialization of the drive.

☞    As long as the drive is locked with a customer password, the error F2048 cannot be cleared!

**CAUTION**

**Error when controlling motors and moving parts!**

When the error occurs for the first time, the absolute encoder function is only guaranteed for approx. another **2 weeks**!

**Replace battery** immediately!

| Cause | Remedy |
|-------|--------|
| Battery voltage has fallen below 3.1 V | Clear error and immediately arrange for and prepare replacement of battery (see instructions in Project Planning Manual for respective motor). **For replacement of battery observe warning notice below!** |
| Battery voltage has fallen below 2.8 V | Error cannot be cleared any longer. Battery must be replaced immediately (see instructions in Project Planning Manual for respective motor). **For replacement of battery observe warning notice below!** |

**DANGER**

**Lethal electric shock caused by live parts with more than 50 V!**

⇒ The battery must be replaced with the control voltage switched on. The replacement of the battery may only be carried out by a qualified electrician.

Error Messages

---

☞         If the control voltage is switched off after the battery was removed,
the absolute position data reference gets lost. The position data
reference then has to be reestablished.

---

See also Functional Description of firmware " Establishing the Position Data
Reference".

## 1.7.33    F2050 Overflow of target position preset memory

In the case of drive-controlled positioning it is possible to preset a new posi-
tioning command value x(k+1) while the drive is moving to the target position
of the last positioning command value x(k). The new positioning command val-
ue is stored in an input buffer (target position preset memory) and is not cleared
until it has been accepted.

| Cause | Remedy |
|---|---|
| There was an attempt to preset a new positioning command value x(k+2) while drive was moving to target position of positioning command value x(k) | Check command value in control unit and make sure that new positioning command value x(k+2) is only preset when positioning command value x(k+1) was accepted and drive moves to corresponding target position |
| Incorrect command value acceptance (toggling of "S-0-0346, Positioning control word") in control unit causes positioning command value to be accepted several times | Check control program and only toggle bit 0 of "S-0-0346, Positioning control word" once for each new positioning command value, because every change of the bit causes current positioning command value to be accepted. |
| Incorrect positioning mode for "approaching target" was set in "S-0-0346, Positioning control word". | Set positioning mode "immediately moving to new target" for "approaching target" in "S-0-0346, Positioning control word". |

See also Functional Description of firmware " Drive-Controlled Positioning".

## 1.7.34    F2051 No sequential block in target position preset memory

In the case of the positioning block mode "sequential block without intermediate
stop" the drive is monitoring whether a new positioning block is available in the
target position preset memory when the target position has been reached.

| Cause | Remedy |
|---|---|
| When target position of a sequential block has been reached, there is no new positioning block in target position preset memory | Preset sequential block in time (before target position has been reached) |
| Positioning block mode by mistake set to "sequential block without intermediate stop". | Check positioning block mode and switch off sequential block processing, if necessary ("S-0-0346, Positioning control word"). |

See also Functional Description of firmware " Drive-Controlled Positioning".

See also Functional Description of firmware " Positioning Block Mode".

## 1.7.35    F2053 Incr. encoder emulator: pulse frequency too high

The number of increments or lines output within the position loop cycle (Basic:
TA = 500 μs, Advanced: TA = 250 μs) is monitored in the drive in order to make
sure that the maximum allowed frequency of the incremental encoder signals
of 1024 kHz is not exceeded; otherwise a position offset would be produced
due to "lost increments".

---

☞         The maximum allowed frequency of the incremental encoder sig-
nals also has to be taken into account for dimensioning the subse-
quent evaluation electronics in the control unit!

---

| Cause | Remedy |
|---|---|
| Resolution set in "P-0-0903, Encoder emulation resolution" is too high for existing travel velocity. | Reduce number of increments of incremental encoder emulator in "P-0-0903, Encoder emulation resolution" <br><br> - o - <br><br> Reduce travel velocity. |

See also Functional Description of firmware " Incremental Encoder Emulation".

### 1.7.36    F2054 Incr. encoder emulator: hardware fault

In the case of incremental encoder emulation, a check is run at the end of each output interval (= position loop clock) to find out whether all increments to be output have been output before the next increment output is started. Exceeding the run time or hardware errors can cause overlapping that is detected during the check and signaled by the error message F2054.

| Cause | Remedy |
|---|---|
| Run time internally exceeded | Switch off all functions not required (e.g. analog output). If this does not remove error, replace control section or entire drive controller and contact our service department. |
| Hardware error | Replace control section or entire drive controller and contact our service department. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware  Incremental Encoder Emulation.

### 1.7.37    F2055 External power supply X31/X32 error

In the case of "High" control of one or several digital outputs of the interfaces X31/X32 at the drive controller (assigned in "P-0-0300, Digital I/Os, assignment list"), there is no "High" signal (+DC24 V) output.

| Cause | Remedy |
|---|---|
| Output or outputs are overloaded <br> **Only IndraDrive Mi as of firmware MPB05V06:** <br> Overloaded outputs are switched off to avoid hardware defect. | Reduce load of output |
| 24V supply of interface X31/X32 has not been connected. | Connect 24V supply |
| Short-circuited output or outputs | Remove short circuit/short circuits |

See also Functional Description of firmware "Digital Inputs/Outputs".

### 1.7.38    F2057 Target position out of travel range

In operating modes with internal position command value generation a check is run, before a movement is carried out, in order to find out whether the preset target position ("S-0-0258, Target position", "S-0-0282, Positioning command value" or "P-0-4006, Positioning block target position"[i]) is within the allowed travel range of the drive. The error F2057 was generated because the preset target position is outside of the allowed travel range.

Error Messages

The allowed travel range of the drive is defined by

- S-0-0049, Positive position limit value
- S-0-0050, Negative position limit value

The position limit value monitor and thus the monitoring of the allowed travel range is activated/deactivated in "S-0-0055, Position polarities".

The reaction to a travel range error can be set in "P-0-0090, Travel range limit parameter".

| Cause | Remedy |
|---|---|
| Position limit values ("S-0-0049, Positive position limit value", "S-0-0050, Negative position limit value") incorrectly parameterized. | Check parameterization of position limit values and adjust it according to desired travel range ("S-0-0049, Positive position limit value" has to be greater than "S-0-0050, Negative position limit value"). |
| Position limit value monitor has been activated although it is not needed. | Deactivate position limit value monitor if it is not needed (e.g. in modulo operation). |
| In the case of relative interpolation, value for travel range was set too high or several travel ranges that are added cause effective target position (cf. "P-0-0050, Effective target position") to be outside of position limits. | Check travel range (cf. "S-0-0258, Target position") and, if necessary, adjust it in control unit program. |
| In the case of absolute interpolation, preset target position is incorrect. | Check preset target position (cf. "S-0-0258, Target position" or "S-0-0282, Positioning command value") and, if necessary, adjust it in control unit program (only enter "S-0-0258, Target position" within position limit values). |
| In "positioning block mode" one or more target positions have been incorrectly parameterized or incorrect positioning block is selected | Check parameterized target positions in "P-0-4006, Positioning block target position" and block selection ("P-0-4026, Positioning block selection"). In addition, check block selection via respective master communication (e.g. field bus or digital I/Os). |

See also Functional Description of firmware " Position Limitation/Travel Range Limit Switch".

For "relative interpolation" see Functional Description of firmware "Drive-Controlled Positioning".

For "absolute interpolation" see Functional Description of firmware "Drive-Internal Interpolation".

## 1.7.39    F2058 Internal overflow by positioning input

In operating modes that are using the internal path generator (interpolation, positioning, positioning block mode and spindle positioning), the residual path to be traveled and the braking distance are monitored to find out whether the numeric range is exceeded.

| Cause | Remedy |
|---|---|
| Due to command value input a residual path was generated that is greater than 2^31.<br><br>**Note:**<br><br>As the internal position resolution is determined by the travel range (from €'travel range to +travel range the resulting max. distance is less than 2^31), this can only occur with axes with modulo scaling. In this case only if relative distances are stringed together several times without the axis being able to follow. | Check command value input, positioning velocity or potentiometer value |
| Calculated braking distance is greater than 2^31 | Increase "S-0-0278, Maximum travel range"<br><br>- or -<br><br>Increase deceleration in "S-0-0359, Positioning deceleration", "S-0-0372, Drive Halt acceleration bipolar" or "P-0-4063, Positioning block deceleration". |

## 1.7.40    F2059 Incorrect command value direction when positioning

In the operating modes "drive-controlled positioning" and "positioning block mode" it is possible to jog the axis in both directions and preset relative distances in both directions.

If "S-0-0076, Position data scaling type" was set in such a way that the position data of the axis are to be processed in modulo format and positive or negative rotational direction was selected in "S-0-0393, Command value mode", a command value in the wrong direction causes error F2059 to be generated.

| Cause | Remedy |
|---|---|
| In operating mode "drive-controlled positioning", target position points to wrong direction. | Check relative positioning input ("S-0-0282, Positioning command value") |
| Rotational direction of "modulo axis" incorrectly parameterized for drive-controlled positioning procedures | Check command value mode that was set ("S-0-0393, Command value mode") |
| In operating mode "positioning block mode", target position points to wrong direction. | Check relative positioning input ("P-0-4006, Positioning block target position"). |
| You are trying to jog in wrong direction. | Jogging only in allowed rotational direction ("S-0-0346, Positioning control word") |

See also Functional Description of firmware:

- " Drive-Controlled Positioning"
- " Positioning Block Mode"

## 1.7.41    F2063 Internal overflow master axis generator

The residual path to be traveled and the braking distance are monitored to find out whether the numeric range is exceeded.

Error Messages

| Cause | Remedy |
|---|---|
| Braking distance of axis is greater than position value range that can be displayed.<br><br>Deceleration value that was set ("P-0-0771, Virtual master axis, positioning acceleration") is too low. | Increase "P-0-0771, Virtual master axis, positioning acceleration" |
| Braking distance of axis is greater than position value range that can be displayed.<br><br>Velocity value that was set ("P-0-0770, Virtual master axis, positioning velocity") is too high. | Reduce "P-0-0770, Virtual master axis, positioning velocity" |

### 1.7.42    F2064 Incorrect cmd value direction master axis generator

With the internal master axis generator it is possible to jog the virtual master axis in both directions and preset relative distances in both directions.

| Cause | Remedy |
|---|---|
| Due to setting in "P-0-0756, Virtual master axis, scaling type", position data of virtual master axis are to be processed in modulo format and positive or negative rotational direction was selected in "P-0-0769, Virtual master axis, command value mode". Input command value leads to wrong direction. | Input command value direction according to parameter setting in "P-0-0769, Virtual master axis, command value mode". |

### 1.7.43    F2067 Synchronization to master communication incorrect

The drive control is synchronized to the bus interface (SERCOS, Profibus, Interbus, ...) via two phase control loops (Phase Locked Loop - PLL). The correct function of the synchronization is monitored by monitoring the respective control deviation of the two PLLs for an allowed threshold. When the threshold is exceeded this error message is generated.

| Cause | Remedy |
|---|---|
| Interference injection due to incorrect connection of master communication cause synchronization problems. | Check connection of master communication (incl. shield connection) and correct it, if necessary. |
| Synchronization clock of master oscillates very much due to software or hardware error in master (e.g. jitter of MST with SERCOS). | Check field bus master and make sure synchronization clock is good and constant. |
| Master communication hardware of drive controller is defective (e.g. optional SERCOS card). | Replace control section or entire drive controller. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware " Master Communication".

### 1.7.44    F2069 Error when releasing the motor holding brake

During the automatic check of the holding brake ("P-0-0525, Holding brake control word"), after drive enable or after the start of the "P-0-0541, C2100 Brake check command" the motor did not move, although half the holding torque was produced.

☞      The result of the brake check is displayed in "P-0-0539, Holding brake status word".

| Cause | Remedy |
|---|---|
| Motor brake (servo brake) was not or incorrectly connected. | Connect brake or correct connection |
| Axis is mechanically blocked | Check mechanical system and remove blocking |
| Brake is defective | Check and, if necessary, replace brake |
| Brake supply error | Check voltage |
| Friction torque of axis is greater than test torque of drive. | Deactivate brake check ("P-0-0525, Holding brake control word") because it cannot be used due to mechanical properties. |

## 1.7.45      F2074 Actual pos. value 1 outside absolute encoder window

When turning off a drive with an encoder that can be evaluated in absolute form, the current actual position will be stored in the drive. When switching the drive on again the current position is compared with the position stored when the drive was switched off the last time. If the deviation is greater than the value in "P-0-0095, Absolute encoder monitoring window for motor encoder" the F2074 error message is generated.

☞      The monitoring function can be switched off by "P-0-0095, Absolute encoder monitoring window for motor encoder" = "0".

| Cause | Remedy |
|---|---|
| While turned off, axis was moved further than distance contained in "P-0-0095, Absolute encoder monitoring window for motor encoder". | Make sure displayed position is correct in relation to machine zero point Then clear error and, if necessary, reestablish position data reference. |
| Value entered in "P-0-0095, Absolute encoder monitoring window for motor encoder" is too low for existing encoder resolution so that normal encoder jitter will already cause monitor to be triggered. | Check parameterization of "P-0-0095, Absolute encoder monitoring window for motor encoder" and increase monitoring window. |
| Switching on without reference (in the case of initial commissioning or caused, for example, by changing parameters that characterize mechanical system or influence position evaluation). | Clear error and establish position data reference |
| Switching on without reference(after replacing motor or motor encoder). | Clear error and establish position data reference |
| Amplifier replaced without parameter update | Clear error and establish position data reference |
| Parameters of mechanical system changed (gear, feed constant, ...) | Clear error and establish position data reference |
| Motor encoder defective | Replace motor or motor encoder |

⚠ WARNING

**Danger of accident by unintended axis motion!**

⇒ Check position data reference. The encoder is defective if the position data reference is incorrect! Replace the motor and send it to the manufacturer's service department for inspection.

Error Messages

## 1.7.46    F2075 Actual pos. value 2 outside absolute encoder window

When turning off a drive with an external encoder that can be evaluated in absolute form, the current actual position will be stored in the drive. When switching the drive on again the current position is compared with the position stored when the drive was switched off the last time. If the deviation is greater than the value in "P-0-0096, Absolute encoder monitoring window for opt. encoder" the F2075 error message is generated.

☞    The monitoring function can be swithced off by "P-0-0096, Absolute encoder monitoring window for opt. encoder".

| Cause | Remedy |
|---|---|
| While turned off, axis was moved further than distance contained in "P-0-0096, Absolute encoder monitoring window for opt. encoder". | Make sure displayed position is correct in relation to machine zero point Then clear error and, if necessary, reestablish position data reference. |
| Value entered in "P-0-0096, Absolute encoder monitoring window for opt. encoder" is too low for existing encoder resolution so that normal encoder jitter will already cause monitor to be triggered. | Check parameterization of "P-0-0096, Absolute encoder monitoring window for opt. encoder" and increase monitoring window. |
| Switching on without reference (in the case of initial commissioning or caused, for example, by changing parameters that characterize mechanical system or influence position evaluation). | Clear error and establish position data reference. |
| Encoder defective or encoder replacemen. | Replace encoder, clear error and establish position data reference. |
| Amplifier replaced without parameter update. | Clear error and establish position data reference. |
| Parameters of mechanical system changed (gear, feed constant, ...). | Clear error and establish position data reference. |

⚠ WARNING

**Danger of accident by unintended axis motion!**

⇒ Check position data reference. The encoder is defective if the position data reference is incorrect! Replace the encoder and send it to the manufacturer's service department for inspection.

## 1.7.47    F2076 Actual pos. value 3 outside absolute encoder window

When turning off a drive with a measuring encoder that can be evaluated in absolute form, the current actual position will be stored in the drive. When switching the drive on again the current position is compared with the position stored when the drive was switched off the last time. If the deviation is greater than the value in "P-0-0097, Absolute encoder monitoring window for measuring encoder" the F2076 error message is generated.

☞    The monitoring function can be switched off by "P-0-0097, Absolute encoder monitoring window for measuring encoder" = "0".

| Cause | Remedy |
|---|---|
| While turned off, axis was moved further than distance contained in "P-0-0097, Absolute encoder monitoring window for measuring encoder". | Make sure displayed position is correct in relation to machine zero point Then clear error and, if necessary, reestablish position data reference. |
| Value entered in "P-0-0097, Absolute encoder monitoring window for measuring encoder" is too low for existing encoder resolution so that normal encoder jitter will already cause monitor to be triggered. | Check parameterization of "P-0-0097, Absolute encoder monitoring window for measuring encoder" and increase monitoring window. |
| Switching on without reference(in the case of initial commissioning or caused, for example, by changing parameters that characterize mechanical system or influence position evaluation). | Clear error and establish position data reference. |
| Encoder defective or encoder replacement. | Replace encoder, clear error and establish position data reference. |
| Amplifier replaced without parameter update. | Clear error and establish position data reference. |
| Parameters of mechanical system changed (gear, feed constant, ...) | Clear error and establish position data reference. |

**WARNING**

**Danger of accident by unintended axis motion!**

⇒ Check position data reference. The encoder is defective if the position data reference is incorrect! Replace the encoder and send it to the manufacturer's service department for inspection.

## 1.7.48    F2077 Current measurement trim wrong

The current measurement in the drive controller is adjusted in operation. The adjust values are checked for compliance with the allowed tolerance. If the values are higher the error message F2077 is generated.

| Cause | Remedy |
|---|---|
| Hardware of control section or power section defective. | Replace power section or control section resp. entire drive controller. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section or the power section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.49    F2086 Error supply module

This error is signaled by the supply to the drives via the module bus. It has high priority and...

● causes error reaction in the drives in operation. The error message is displayed at these drives.

● causes power of the supply unit to be switched off or the Bb contact of converters to open (requires assignment of respective bit "P-0-0861, Status word of power section" to digital output!) and possibly causes DC bus short circuit (requires corresponding wiring!).

This error can also have been caused by a fatal drive error that was signaled to the supply via the module bus. The respective settings must be made in "P-0-0118, Power supply, configuration".

Error Messages

| Cause | Remedy |
|---|---|
| Failure in power supply or overload of power supply. | Check power supply |
| Fatal error message of one or several drives of a drive system and message signaled to supply (configuration P-0-0118). | Identify drive or drives signaling a fatal error. Remove cause of error at respective drive or drives. |

See also Functional Description of firmware " Power Supply".

## 1.7.50    F2087 Module group communication error

| Cause | Remedy |
|---|---|
| Failure of control voltage supply of a module bus node while the "drive system" is ready for power output or in operation. | Supply all devices of "drive system" with control voltage. |
| Disturbance on module bus | Identify and remove sources of disturbance |
| Incorrect signal timing on module bus | Identify and replace faulty device. |
| Module bus cable defective | Identify and replace defective module bus cable, replace device, if necessary. |

See also Functional Description of firmware " Power Supply".

## 1.7.51    F2100 Incorrect access to command value memory

An error occurred when accessing the flash/internal memory.

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error and contact our service department for firmware update. |
| Hardware in control section is defective | Should error occur repeatedly, control section or entire drive has to be replaced. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.52    F2101 It was impossible to address MMC

When accessing the Multi Media Card (MMC) an error occurred.

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error and contact our service department in order to get a firmware update. |
| MMC has not been plugged in correctly or is defective | Clear error and check MMC or plug it in correctly. If error occurs again when MMC is accessed, MMC has to be replaced. |
| MMC slot in control section is defective | Clear error and check MMC slot. If error occurs again when MMC is accessed, control section or entire drive controller has to be replaced. |

See also Functional Description of firmware  MultiMediaCard (MMC).

## 1.7.53    F2102 It was impossible to address I2C memory

When addressing a memory via the $I^2C$ bus an error occurred.

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error and contact our service department in order to get a firmware update. |
| Encoder cable defective or bad shielding | Clear error. Replace defective encoder cable or improve shielding. |
| Encoder memory or encoder electronics is defective. | Clear error. Replace encoder or motor. |
| Hardware defect on control section | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware " Measuring Systems".

### 1.7.54 F2103 It was impossible to address EnDat memory

When addressing a memory via the EnDat bus an error occurred.

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error and contact our service department in order to get a firmware update. |
| Encoder cable defective or bad shielding | Clear error. Replace defective encoder cable or improve shielding. |
| Encoder memory or encoder electronics is defective | Clear error. Replace encoder or motor. |
| Hardware defect on control section | Replace control section or entire drive controller. |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware " Measuring Systems".

### 1.7.55 F2104 Commutation offset invalid

The commutation offset value stored in the motor encoder memory was detected to be invalid.

☞ The motor mustn't be operated without valid commutation offset!

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error. Then execute command "P-0-0524, C1200 Commutation offset setting command"; if error occurs again contact our service department in order to get a firmware update. |
| Encoder memory or encoder electronics is defective | Clear error. Replace encoder or motor. Then execute command "P-0-0524, C1200 Commutation offset setting command". |

See also Functional Description of firmware " Commutation Setting".

Error Messages

## 1.7.56    F2105 It was impossible to address Hiperface memory

When addressing a memory via the HIPERFACE bus an error occurred.

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error and contact our service department in order to get a firmware update. |
| Encoder cable defective or bad shielding | Clear error. Replace defective encoder cable or improve shielding. |
| Encoder memory or encoder electronics is defective | Clear error. Replace encoder or motor. |
| Hardware defect on control section | Replace control section or entire drive controller. |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual of the power section, the saving and loading of the parameters is explained in the Functional Description of the firmware.

See also Functional Description of firmware " Measuring Systems".

## 1.7.57    F2110 Error in non-cyclical data communic. of power section

An error occurred in the communication between control section and power section.

| Cause | Remedy |
|---|---|
| Failure occurs sporadically (firmware error) | Clear error and contact our service department for firmware update |
| Hardware defective | Should error occur repeatedly, control section or entire device has to be replaced |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.58    F2120 MMC: defective or missing, replace

Due to the setting in "P-0-4070, Parameter storage configuration" or due to the drive (a distributed servo drive KSM[1] is used), it is necessary to have an MMC. The MMC is checked during the initialization phase; an error occurred during the check.

The drive only runs up to communication phase 2 and refuses further phase progression.

Communication via the SERCOS interface, however, and thereby the reading of the error message are ensured.

---

[1]    *Component of the drive system Rexroth IndraDrive Mi*

| Cause | Remedy |
|---|---|
| It was impossible to address MMC | Check whether MMC was plugged in and that it has been correctly inserted |
| | - or - |
| | MMC might possibly be defective, replace it by another one. |
| "Programming module mode" was set via P-0-4070, but MMC hasn't been plugged. | Change parameter storage configuration to "init/update medium" (P-0-4070=0). |

## 1.7.59    F2121 MMC: incorrect data or file, create correctly

The distributed servo drive KSM (component of the drive system Rexroth IndraDrive Mi) is only ready for operation with the MMC having been plugged. The MMC is checked during the initialization phase; an error occurred during the check.

The drive only runs up to communication phase 2 and refuses further phase progression.

Communication via the SERCOS interface, however, and thereby the reading of the error message are ensured.

| Cause | Remedy |
|---|---|
| MMC itself is alright, but directories, files or data on the MMC are faulty or missing. Particularly firmware, parameters and retain data must be available. | Copy contents of previously made backup copy to MMC (see also "Project Planning Manual", "Rexroth IndraDrive Mi": "MMC"). |

## 1.7.60    F2122 MMC: incorrect IBF file, correct it

The distributed servo drive KSM (component of the drive system Rexroth IndraDrive Mi) is only ready for operation with the MMC having been plugged. The MMC is checked during the initialization phase; an error occurred during the check.

The drive only runs up to communication phase 2 and refuses further phase progression.

Communication via the SERCOS interface, however, and thereby the reading of the error message are ensured.

| Cause | Remedy |
|---|---|
| In "Firmware" folder, operation firmware (file with extension ".ibf") is missing or more than on file with extension ".ibf" was found. | Check and correct MMC and "Firmware" folder with appropriate reader |
| Operation firmware is defective<br>**Note:**<br>Writing the MMC takes a relatively long time. If you do not wait until end of writing process, file with operation firmware on MMC is not complete and it will be detected as being defective.<br>**Tip:**<br>For firmware update, it is necessary to replace file with extension ".ibf" (operation firmware); it is strongly recommended that you do not delete operation firmware, but rename file extension, e.g. from ".ibf" to ".ibx". In any case, you should make a backup copy of current operation firmware. | Order firmware again; transmission error might possibly have occurred. Afterwards, copy firmware to MMC again.<br>- or -<br>Copy functioning operation firmware either from backup copy or from another MMC to defective MMC. |

Error Messages

## 1.7.61    F2123 Retain data backup impossible

The distributed servo drive KSM (component of the drive system Rexroth In-draDrive Mi) is only ready for operation with the MMC having been plugged. The MMC is checked during the initialization phase.

In addition, important operating data, such as the current position, operating time, travel block etc., are stored when the controller is switched off. If this storing process is faulty, it is impossible to continue operation after the next switch-on in such a way as if there hadn't been any interruption; for example, the motor loses its reference in the case of faulty retain data backup. To make sure that the retain data backup works faultlessly, such a data backup is carried out for test purposes during the initialization phase.

The drive only runs up to communication phase 2 and refuses further phase progression.

Communication via the SERCOS interface, however, and thereby the reading of the error message are ensured.

| Cause | Remedy |
|---|---|
| Backup of retain data for test purposes was terminated with an error. | Hardware specifications of MMC used might possibly be so near to limits that this (quick) write access did not work. Replace MMC by original factory-provided one. |
| Temporary failure might possibly have occurred. | Switch off and on again |
| Hardware or software defect | Read logbook and forward entry to service department . |

## 1.7.62    F2124 MMC: saving too slowly, replace

In the booting phase of the drive, a backup of the retain data on the MMC is tested. The error F2124 is generated, because the storage process takes more than 50 ms.

| Cause | Remedy |
|---|---|
| Storage process of MMC is too slow (e.g. slowed storage for reasons of aging) | Replace MMC |

## 1.7.63    F2130 Error comfort control panel

An error occurred in the communication with the comfort control panel (VCP01):

- "reset" couldn't be carried out
- error during download of application or firmware
- communication to control panel disturbed

| Cause | Remedy |
|---|---|
| Communication disturbed | Remove EMC problems; check shielding of controller |
| Firmware / application problem | Replace firmware and / or application on control panel; replace drive firmware |
| Control panel defective | Replace control panel |
| Control section defective | Should error occur repeatedly, control section or entire drive has to be replaced |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.64 F2140 CCD slave error

An error occurred in a CCD slave.

| Cause | Remedy |
|---|---|
| An F2 or F3 error occurred in a CCD slave and "error reaction active" has been set in "P-0-1600, CCD: configuration". | Locate faulty slave and remove cause of error for this slave. |
| An F8 error occurred in a CCD slave and "best possible deceleration" has been set in "P-0-1600, CCD: configuration" as reaction to an F8 error. | Locate faulty slave and remove cause of error for this slave. |
| Faulty command triggering of a remote axis (Axis2) in MLD-M master. (For example, motion function block "MC_MoveRelative" with "Acceleration"=0). | Locate faulty function block and remove error by means of function block error outputs. |

See also Functional Description of firmware " Cross Communication (CCD)".

## 1.7.65 F2150 MLD motion function block error

During command triggering with a motion function block an error occurred.

☞ The reaction to errors can be configured.

☞ The error message F2150 is available as of firmware MPx04V10.

| Cause | Remedy |
|---|---|
| Faulty command triggering in MLD-S (single-axis application)<br>- o -<br>Faulty command triggering of local axis (axis1) in MLD-M master. (For example, motion function block such as "MC_MoveRelative" with "Acceleration"=0). | Locate faulty function block and remove error by means of function block error outputs. |

See also Application Manual Rexroth IndraMotion MLD " Error Handling of IndraMotion MLD".

## 1.7.66 F2174 Loss of motor encoder reference

In the case of absolute encoder evaluation, the validity of the initialized absolute position is checked during position initialization. If the controller detects that the position data reference of the encoder cannot be established any more due to changes of the mechanical system parameters or due to replacement of encoder or device, the actual position value status ("S-0-0403, Position feedback value status") goes to "relative" and the error F2174 is generated.

Error Messages

| Cause | Remedy |
|---|---|
| Switching on without reference (in the case of initial commissioning or caused, for example, by changing parameters that characterize mechanical system or influence position evaluation). | Clear error and reestablish position data reference. |
| Switching on without reference (after replacing motor or motor encoder) | Clear error and establish position data reference. |
| Motor encoder defective | Replace motor or motor encoder, clear error and establish position data reference. |
| Parameters of mechanical system changed (gear, feed constant, ...) | Clear error and establish position data reference. |
| Amplifier replaced without parameter update | Clear error and establish position data reference |
| Switching on without reference after replacement of device with loaded axis-specific parameter values (according to list from "S-0-0192, IDN-list of backup operation data"). | Clear error and establish position data reference<br><br>- o -<br><br>Clear error, then load parameter values of "P-0-0195, IDN list of retain data (replacement of devices)", if it was possible to save them immediately before device was replaced. Check reestablished position data reference for correctness. |

## 1.7.67    F2175 Loss of optional encoder reference

In the case of absolute encoder evaluation, the validity of the initialized absolute position is checked during position initialization. If the controller detects that the position data reference of the encoder cannot be established any more due to changes of the mechanical system parameters or due to replacement of encoder or device, the actual position value status ("S-0-0403, Position feedback value status") goes to "relative" and the error F2175 is generated.

| Cause | Remedy |
|---|---|
| Switching on without reference (in the case of initial commissioning or caused, for example, by changing parameters that characterize mechanical system or influence position evaluation). | Clear error and reestablish position data reference. |
| Switching on without reference (after replacement of encoder). | Clear error and establish position data reference. |
| Optional encoder defective. | Replace encoder, clear error and establish position data reference. |
| Parameters of mechanical system changed (gear, feed constant, ...). | Clear error and establish position data reference. |
| Amplifier replaced without parameter update. | Clear error and establish position data reference. |
| Switching on without reference after replacement of device with loaded axis-specific parameter values (according to list from "S-0-0192, IDN-list of backup operation data"). | Clear error and establish position data reference<br>- o -<br>Clear error, then load parameter values of "P-0-0195, IDN list of retain data (replacement of devices)", if it was possible to save them immediately before device was replaced. Check reestablished position data reference for correctness. |

### 1.7.68    F2176 Loss of measuring encoder reference

When the controller is switched on, it determines, in the case of absolute encoder evaluation, the initial position of the measuring system (position initialization) and checks its validity. If the controller detects that the position data reference of the encoder cannot be established any more due to changes of the mechanical system parameters or due to replacement of encoder or device, the actual position value status ("S-0-0403, Position feedback value status") goes to "relative" and this diagnostic message is generated.

| Cause | Remedy |
|---|---|
| Switching on without reference (in the case of initial commissioning or caused, for example, by changing parameters that characterize mechanical system or influence position evaluation). | Clear error and establish position data reference. |
| Encoder defective | Replace measuring encoder, clear error and establish position data reference. |
| Switching on without reference (after replacement of measuring encoder). | Clear error and establish position data reference. |
| Controller replaced without parameter update. | Clear error and establish position data reference. |

### 1.7.69    F2177 Modulo limitation error of motor encoder

With active modulo scaling the drive limits its actual position values to the values parameterized in "S-0-0103, Modulo value", otherwise to the value parameterized in "S-0-0278, Maximum travel range". As these values possibly cannot be exactly displayed, the corresponding recalculation of the systematic errors in the case of position overflow takes place in the drive.

☞    In the ideal case "S-0-0278, Maximum travel range" is set in such a way that the drive always is within the defined travel range and there is no overflow.

| Cause | Remedy |
|---|---|
| "S-0-0103, Modulo value" or "S-0-0278, Maximum travel range" have been incorrectly parameterized and not adjusted to the application. | Check and, if necessary, correct "S-0-0103, Modulo value" or "S-0-0278, Maximum travel range". |
| Drive was moved as rapidly that recalculation no longer works correctly. | Reduce drive velocity at position overflow. |

### 1.7.70    F2178 Modulo limitation error of optional encoder

According to scaling, the drive limits the actual position values to the maximum travel range or to the modulo value. As these values possibly cannot be exactly displayed the corresponding recalculation of the errors takes place in the drive.

| Cause | Remedy |
|---|---|
| Encoder speed was so high that recalculation no longer works correctly. | Reduce encoder speed<br><br>- or -<br><br>change "S-0-0103, Modulo value" |

Error Messages

## 1.7.71     F2179 Modulo limitation error of measuring encoder

With active modulo scaling the drive limits its actual position values to the values parameterized in "S-0-0103, Modulo value", otherwise to the value parameterized in "S-0-0278, Maximum travel range". As these values possibly cannot be exactly displayed, the corresponding recalculation of the systematic errors in the case of position overflow takes place in the drive.

☞     In the ideal case "S-0-0278, Maximum travel range" is set in such a way that the drive always is within the defined travel range and there is no overflow.

| Cause | Remedy |
|---|---|
| "S-0-0103, Modulo value" or "S-0-0278, Maximum travel range" have been incorrectly parameterized and not adjusted to the application. | Check and, if necessary, correct "S-0-0103, Modulo value" or "S-0-0278, Maximum travel range" |
| Drive was moved as rapidly that recalculation no longer works correctly. | Reduce drive velocity at position overflow. |

## 1.7.72     F2190 Incorrect Ethernet configuration

During the initialization of the drive, the parameterization of the interfaces for Ethernet communication is checked. An error was detected during this check.

| Cause | Remedy |
|---|---|
| Configuration of parameters for Ethernet communication (TCP/IP) is not allowed; IP address and gateway address are not in the same IP network | Set parameters for Ethernet communication (TCP/IP) to valid values:<br>• P-0-1531, Control section IP address<br>• P-0-1532, Control section network mask<br>• P-0-1533, Control section gateway address<br>Additionally as of MPx05VRS:<br>• P-0-1641, CCD: IP address<br>• P-0-1642, CCD: network mask<br>• P-0-1643, CCD: gateway address<br>• S-0-1020, Master communication: IP address<br>• S-0-1021, Master communication: network mask<br>• S-0-1022, Master communication: gateway address |
| Due to storage problems, internal configuration of IP stack was inadmissibly terminated | Due to a hardware problem, it is necessary to replace control section |

☞     Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 1.7.73     F2260 Command current limit shutoff

The drive first reacts with the warning "E8260 Torque/force command value limit active" to the triggering of the current command value limitation.

If the current limitation is active for more than 1.5 seconds, the drive reacts with a drive error, when this has been parameterized in "P-0-0556, Config word of axis controller".

| Cause | Remedy |
|---|---|
| Error reaction to current limitation active | Check whether error reaction to current limitation is desired and, if necessary, deactivate error reaction to current limitation in " P-0-0556, Config word of axis controller". |
| Current limitation active | Remove cause of current limitation (see "E8260 Torque/force command value limit active") . |

## 1.7.74    F2270 Analog input 1 or 2, wire break

Conditions under which this error is triggered:

- The wire break monitor was activated in "P-0-0218, Analog input, control parameter" (by the setting for the measuring range of the analog inputs) and

- a setting in "P-0-0218, Analog input, control parameter" causes an error to be generated when the input value has fallen below the input value at analog input 1 or 2 and

- the current/voltage value at analog input 1 or 2 is lower than the minimum value of the measuring range.

☞    The value range of the voltage or current source that is connected to the analog input should be limited to the allowed value range of the analog input.

| Cause | Remedy |
|---|---|
| Input value at analog input 1 or 2 is lower than minimum value of voltage measuring range (setting "voltage signals" in "P-0-0218, Analog input, control parameter"). | Check wiring of analog input, reestablish contact to voltage source, if necessary<br>- or -<br>Check value range of voltage source. |
| Input value at analog input 1 or 2 is lower than minimum value of current measuring range (setting "current signals" in "P-0-0218, Analog input, control parameter"). | Check wiring of analog input, reestablish contact to current source, if necessary<br>- or -<br>Check value range of current source. |

☞    This error message can only be displayed at a controller containing a CSB01.1N-FC-... (BASIC OPENLOOP) control section.

## 1.7.75    F2802 PLL is not synchronized

Synchronization to the mains voltage is impossible.

| Cause | Remedy |
|---|---|
| At least one phase is missing | Check and, if necessary, replace mains circuit breakers. |
| Mains voltage is too low | Measure mains voltage and compare it to allowed value range. |
| Mains frequency is outside of specified range | Measure mains frequency and compare it to allowed value range. |

Error Messages

## 1.7.76     F2814 Undervoltage in mains

The crest value of the mains voltage has fallen below the allowed minimum value (connection voltage range see documentation for HMV01.1).

| Cause | Remedy |
|---|---|
| Mains voltage below minimum value | Use matching transformer |

See also Functional Description of firmware " Power Supply".

## 1.7.77     F2815 Overvoltage in mains

| Cause | Remedy |
|---|---|
| Mains voltage is greater than maximum specified value (500 V +10%). | Check mains voltage. If necessary, use matching transformer. |

## 1.7.78     F2816 Softstart fault power supply unit

During the soft start process (charging of DC bus capacitance) the DC bus voltage curve is monitored. Great deviations suggest a defect in the power section and are diagnosed with the error F2816.

| Cause | Remedy |
|---|---|
| Short circuit in DC bus | Check DC bus wiring, remove if there is a short circuit. |
| Load on DC bus | Check DC bus wiring; if an external braking resistor has been incorrectly connected, connect it correctly. |
| Insulation error in DC bus | Check DC bus wiring; if wiring is alright, there can be an insulation error within device or other devices connected to DC bus. To find defective device take connected devices out of drive system step by step (remove wiring). |
| Final value of DC bus voltage is not reached within a maximum time. | Check whether there is defect at load externally connected to DC bus. |
| Inadmissible voltage fluctuations in supply mains. Mains voltage has inadmissibly dropped during soft start process. | Check mains voltage |
| HMV01, HMV02: thermal overload of soft start circuit. | Check number of ON-OFF cycles. |
| Device is defective | Replace device |

## 1.7.79     F2817 Overvoltage in power section

When the warning E8025 is present for devices of the "HMV" type, the error "F2817 Overvoltage in power section" is generated after a certain length of time which depends on the hardware index of the device.

**From** the **hardware indices** listed below **upwards**, the error F2817 is generated **100 milliseconds** after the warning E8025 has been present:

- HMV02.1R-W0015: from hardware index A09 upwards
- HMV01.1R-W0018: from hardware index A43 upwards
- HMV01.1R-W0045: from hardware index A43 upwards
- HMV01.1R-W0065: from hardware index A43 upwards
- HMV01.1R-W0120: from hardware index A02 upwards
- HMV01.1E-W0030: from hardware index A33 upwards
- HMV01.1E-W0075: from hardware index A34 upwards

- HMV01.1E-W0120: from hardware index A36 upwards

For devices of the "HMV" type with **smaller hardware indices**, the error F2817 is generated **2 seconds** after the warning E8025 has occurred.

For supply units of the "HCS" type this error message does not exist.

☞ From the mentioned hardware indices upwards, the error can only be reset by switching the device off, in order to call attention to possible application errors [e.g. "coasting" of a synchronous motor at high speed (field weakening range) with a DC bus braking resistor value inadmissibly high for the motor].

## 1.7.80 F2818 Phase failure

A single-phase mains failure, which lasted for a longer time than the tolerated phase failure time, was detected for a supply unit of the HMV type.

| Supply unit | Tolerated phase failure time |
|---|---|
| HMV01.1E | approx. 2 s |
| HMV01.1R, HMV02.1R | approx. 2 s |

Fig. 1-2: Tolerated phase failure times

| Cause | Remedy |
|---|---|
| No mains voltage available | Check mains voltage and mains connection |
| Mains circuit breaker defective | Replace mains circuit breaker |
| Incorrect wiring | Check and correct wiring |

## 1.7.81 F2819 Mains failure

The mains has failed and the DC bus voltage has fallen below a threshold value.

HMV Supply Units    A mains failure, which lasted for a longer time than the tolerated mains failure time, was detected for a supply unit of the HMV type.

| Supply unit | Tolerated mains failure time |
|---|---|
| HMV01.1E | approx. 750 ms |
| HMV01.1R | approx. 1000 ms |
| HMV02.1R | approx. 1000 ms |

Fig. 1-3: Tolerated mains failure times

☞ If the mains failure occurs at regenerative supply units during a regeneration process to the supply mains, the supply unit switches off immediately.

| Cause | Remedy |
|---|---|
| Mains failure (permanent or temporary) | Search and remove cause of mains failure |
| Mains circuit breakers defective | Replace mains circuit breakers |

See also Functional Description of firmware  Power Supply.

## 1.7.82 F2820 Braking resistor overload

Power was switched off due to possible overload of the braking resistor.

Error Messages

A load of 100% is displayed in "P-0-0844, Braking resistor load". If the braking resistor is defective or has not been connected, the DC bus voltage ("S-0-0380, DC bus voltage"), with regenerative operation (e.g. when decelerating), is increased beyond the switch-on threshold of the braking resistor (element No. 4 of "P-0-0858, Data of external braking resistor").

☞        If there hasn't any braking resistor been connected or the connected braking resistor has been deactivated (possible for HCS03, for example), this is displayed by the error F2820, too. A value of 100% is displayed in "P-0-0844, Braking resistor load", although in reality there isn't any load present or possible!

☞        After having eliminated the cause of the error, check the braking resistor for operatability!

| Cause | Remedy |
|---|---|
| Allowed deceleration of connected drives too high. | Reduce deceleration of connected drives. |
| Energy absorption capacity of braking resistor is exhausted. | Switch power supply off with a delay in the case of drive OFF or E-STOP (for regenerative supply units) or reduce velocity. |
| Regenerated energy in machining cycle is too high. | Increase cycle time or reduce maximum velocity. |
| Continuous regenerative power and/or rotary drive energy is too high. | Reduce maximum velocity or check dimensioning of braking resistor and, if necessary, increase dimensioning. |
| Braking resistor is defective or has not been connected. | For external braking resistor, visual check of wiring and resistor component. If necessary, correct wiring or replace braking resistor. If internal braking resistor is defective, replace device. |

See also Functional Description of firmware " Power Supply".

## 1.7.83    F2821 Error in control of braking resistor

☞        The error can occur for devices of both the HCS and the HMV type. There are different causes and remedies for both device types!

**Devices of the HCS type**    An error has occurred in the control of the **external** braking resistor.

| Cause | Remedy |
|---|---|
| Control of braking resistor has detected inadmissibly high current. | Check braking resistor for correct resistance value. If necessary, use braking resistor with higher resistance value. |
| Terminal connectors for external braking resistor have been short-circuited. | Remove short circuit, connect braking resistor correctly, if necessary. |

**Devices of the HMV type**    An error has occurred in the control of the **internal** braking resistor.

| Cause | Remedy |
|---|---|
| Device is defective | Replace device |

## 1.7.84    F2825 Switch-on threshold braking resistor too low

For devices of the HCS type this error message is generated when the parameterized braking resistor reference switch-on voltage is too low. The braking resistor would already be active with correct DC bus voltage.

| Cause | Remedy |
|---|---|
| This error message is generated for devices of type HCS when the value of the braking resistor reference switch-on voltage (list element 4 of "P-0-0858, Data of external braking resistor") activated via "P-0-0860, Control word of power section" is too low. | Increase value of 4th list element in "P-0-0858, Data of external braking resistor"<br><br>- o -<br><br>Select different reference value for ON-OFF switching voltage of braking resistor in "P-0-0860, Control word of power section". |

### 1.7.85 F2833 Ground fault in motor line

During the loading process of the DC bus a ground fault was detected in the motor line of one of the connected converters/inverters.

| Cause | Remedy |
|---|---|
| Ground fault in a motor line within drive system<br><br>- or -<br><br>Ground fault in a controller of drive system | Take controllers of drive system successively out of device group on control voltage and power voltage side, until error no longer occurs. By doing this identify faulty drive.<br><br>Check insulation of motor cable with measuring device. If motor cable is not defective, there is a device or connection error. |

### 1.7.86 F2834 Contactor control error

The mains contactor couldn't be switched on or dropped out during operation.

| Cause | Remedy |
|---|---|
| Due to wiring or control error, contact "ZKS" ["DC bus short circuit"] (X32.8) or contact "Netz AUS" ["mains OFF"] (X32.6/X32.7) was opened while contact "Netz EIN" ["mains ON"] (X32.4/X32.5) still had been close. | Check control. "Netz EIN" ("mains ON") has to be opened simultaneously with or before "ZKS" ("DC bus short circuit") and N"etz AUS" ("mains OFF"). |
| Mains contactor could not be switched | Check wiring of interface.<br><br>Check voltages at interfaces X32, X14 (HMV0x.xR) or at L1, L2 and L3 (HMV0x.xE). |
| Contactor control has detected an error | Replace device |

### 1.7.87 F2835 Mains contactor wiring error

For supply units of the HMV01 line which do not have an internal mains contactor you have to connect an external mains contactor with external switching voltage.

| Cause | Remedy |
|---|---|
| No external mains contactor connected | Connect mains contactor |
| No external switching voltage for mains contactor connected | Check mains contactor wiring |
| External mains contactor defective | Replace mains contactor |

See also documentation " Rexroth IndraDrive Supply Units".

### 1.7.88 F2836 DC bus balancing monitor error

Unbalance was detected for supply unit HMV01.1 / converter HCS03 during the loading of the DC bus capacitances.

Error Messages

| Cause | Remedy |
|---|---|
| F2836 is signaled during loading of DC bus ("soft start") | Replace device |

## 1.7.89    F2837 Contactor monitoring error

The contactor monitor in the contactor control has detected an error.

☞ When the diagnostic message occurs at a supply unit with external mains contactor (e.g. HMV01.1R-W0120), it is impossible to reset the error via the control panel, if the cause of the message is a sticking contact of the mains contactor or the conversion relay. In this case, you have to switch the 24V supply off and on again after the cause of the error was removed.

| Cause | Remedy |
|---|---|
| Mains contactor could not be switched | Check voltages<br><br>• at interface X32,<br><br>• at X14 (HMV01.1R, HMV02.1R) or at L1-L3 (HMV01.1E) |
| Contactor monitor has detected an error | Replace device |

## 1.7.90    F2840 Error supply shutdown

A component in the drive system demands the shutdown of power supply. The supply unit switches power off and signals F2840.

The supply units (as of listed HWIs) generate this diagnostic message in the status "bb", too, in order to, for example, activate the DC bus via the Bb1 contact (see "Control Circuits for the Mains Connection" in the Project Planning Manual of the drive system and "connection point X31" in the Project Planning Manual of HMV supply units).

| Supply unit | Hardware index (HWI)<br>(as per prototype phase MPx05) |
|---|---|
| HMV01.1E-W0030 | A36 |
| HMV01.1E-W0075 | A37 |
| HMV01.1E-W0120 | A40 |
| HMV01.1R-W0018 | A48 |
| HMV01.1R-W0045 | A49 |
| HMV01.1R-W0065 | A50 |
| HMV01.1R-W0120 | A09 |
| HMV02.1R-W0015 | A14 |

| Cause | Remedy |
|---|---|
| A second supply unit connected in parallel, a DC bus resistor unit or an inverter/converter signals an error in supply. | Remove cause of error at respective supply unit, DC bus resistor unit or inverter/converter; then clear error. |

### 1.7.91     F2860 Overcurrent in mains-side power section

**For HMV01.1R**     The current in the mains-side power bridge has exceeded the maximum allowed value. The power supply is switched off.

| Cause | Remedy |
|---|---|
| Mains choke incorrectly connected | Check mains choke |
| Mains choke missing or incorrectly projected | Check mains choke |
| Mains filter missing or incorrectly projected | Check mains filter |
| Device defective | Replace device |

### 1.7.92     F2890 Invalid device code

| Cause | Remedy |
|---|---|
| Device defective | Replace device |

### 1.7.93     F2891 Incorrect interrupt timing

| Cause | Remedy |
|---|---|
| Device defective | Replace device |

### 1.7.94     F2892 Hardware variant not supported

| Cause | Remedy |
|---|---|
| Device defective | Replace device |

## 1.8     SERCOS Error Codes / Error Messages of Serial Communication

For some errors concerning serial communication, the error codes defined in the SERCOS interface specification are used (see "SERCOS interface Specification", chapter 4.3.2.3 "Service channel error messages"). These codes are also used in the case of incorrect access to control and system parameters.

| Error code | Explanation |
|---|---|
| 0x1001 | No IDN |
| 0x1009 | Invalid access to element 1 |
| 0x2001 | No name |
| 0x2002 | Name transmission too short |
| 0x2003 | Name transmission too long |
| 0x2004 | Name cannot be changed (read only) |
| 0x2005 | Name is write-protected at this time |
| 0x3002 | Attribute transmission too short |
| 0x3003 | Attribute transmission too long |
| 0x3004 | Attribute cannot be changed (read only) |
| 0x3005 | Attribute is write-protected at this time |

Error Messages

| Error code | Explanation |
|---|---|
| 0x4001 | No units |
| 0x4002 | Unit transmission too short |
| 0x4003 | Unit transmission too long |
| 0x4004 | Unit cannot be changed (read only) |
| 0x4005 | Unit is write-protected at this time |
| 0x5001 | No minimum input value |
| 0x5002 | Minimum input value transmission too short |
| 0x5003 | Minimum input value transmission too long |
| 0x5004 | Minimum input value cannot be changed (read only) |
| 0x5005 | Minimum input value is write-protected at this time |
| 0x6001 | No maximum input value |
| 0x6002 | Maximum input value transmission too short |
| 0x6003 | Maximum input value transmission too long |
| 0x6004 | Maximum input value cannot be changed (read only) |
| 0x6005 | Maximum input value is write-protected at this time |
| 0x7002 | Operation data transmission too short |
| 0x7003 | Operation data transmission too long |
| 0x7004 | Operation data cannot be changed (read only) |
| 0x7005 | Operation data is write-protected at this time (e.g. Communication phase) |
| 0x7006 | Operation data is smaller than the minimum input value |
| 0x7007 | Operation data is greater than the maximum input value |
| 0x7008 | Invalid operation data |
| 0x7009 | Operation data write protected by a password |
| 0x700A | Operation data is write protected, it is configured cyclically (IDN is configured in the MDT or AT. Therefore writing via the service channel is not allowed). |
| 0x700B | Invalid indirect addressing (e.g., data container, list handling) |
| 0x700C | Operation data is write protected, due to other settings (e.g., parameter, operation mode, drive enable, drive on etc.) |
| 0x7010 | Procedure command already active |
| 0x7011 | Procedure command not interruptible |
| 0x7012 | Procedure command at this time not executable (e.g., in this phase the procedure command can not be activated). |
| 0x7013 | Procedure command not executable (invalid or false parameters) |

*Fig.1-4:        Error specification according to SERCOS*

# 2 Warnings (Exxxx)

## 2.1 Fatal Warnings (E8xxx)

### 2.1.1 E8025 Overvoltage in power section

The DC bus voltage is monitored. When the allowed maximum value is exceeded, the fatal warning E8025 is generated.

☞ The controller switches the motor to torque-free state in the case of overvoltage. If the DC bus voltage falls below the allowed maximum value again, the motor is switched on again.

☞ Only for HMV: If the warning E8025 persists for more than 2 seconds, the error "F2817 Overvoltage in power section" is generated.

| Cause | Remedy |
|---|---|
| Energy regenerated to DC bus by mechanical machine system during braking process was so high that supply unit couldn't dissipate it during regeneration time. This caused DC bus voltage to rise to inadmissible value | Reduce regenerative power by lower acceleration values<br>– or –<br>Correct drive dimensioning<br>– or –<br>Dimension supply unit sufficiently with regard to braking energy requirements; if dimensioning of available braking resistor is insufficient, use additional braking resistor, if necessary |
| Mains supply voltage (alternating input voltage) too high | Check mains supply voltage (alternating voltage/3-phase) |
| No braking resistor connected or connection or cable defective | Connect braking resistor or check connection |

### 2.1.2 E8026 Undervoltage in power section

The DC bus voltage value is monitored by the drive controller and the supply unit.

**Drive Controllers HMS, HMD, HCS**  If the DC bus voltage falls below the minimum value determined for the drive (see value of "P-0-0114, Undervoltage threshold") or it reacts to "DC bus not ok" of the module bus, the device generates the warning E8026 if "fatal warning" has been set in "P-0-0118, Power supply, configuration" with regard to the reaction to undervoltage.

**Supply Unit HMV01.1R**  If the DC bus voltage falls by 80 V below the command value of 750 V direct voltage (DC670 V), the warning E8026 is displayed at the device and "DC bus not ok" is signaled via the module bus. The circuit is not interrupted yet!

☞ In the case of fatal warning E8026, the motive torque is locked. The control unit still can actively decelerate the drive, but no longer accelerate it.

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| Power is switched off without previous drive deactivation by means of drive enable ("AF") | Check logic for activating drive in connected control unit |
| Malfunction or overload of power supply | Check power supply |
| Mains failure | Check cause of mains failure, switch mains voltage on again |

See also Functional Description of firmware "Power Supply"

## 2.1.3    E8027 Safety related standstill while drive enabled

☞    This diagnostic message is available as of firmwares MPx03V24 and MPx04V14.

⚠ **DANGER**

**Bodily harm and property damage caused by uncontrolled axis motion!**

⇒ When the warning E8027 occurs, the drive immediately goes torque-free.

| Cause | Remedy |
|---|---|
| Starting lockout was set with active drive enable and diagnostic message has been set to fatal warning via parameter P-0-0101 | Remove drive enable |

## 2.1.4    E8028 Overcurrent in power section

The controller monitors the motor current (= controller output current) supplied by the power section.

- If the controller output current is higher than the 1.2-fold of "S-0-0110, Amplifier peak current"

- or -

- if the controller output current is higher than the product of "P-0-4013, Current limit value of demagnetization" and "S-0-0109, Motor peak current",

the output stage of the power section is locked until the controller output current has fallen to allowed values again; during this time the warning E8028 is output.

| Cause | Remedy |
|---|---|
| Current loop incorrectly parameterized | Check current loop setting ("S-0-0106, Current loop proportional gain 1", "S-0-0107, Current loop integral action time 1") and, if necessary, correct it after having contacted our service department |
| In the case of Bosch Rexroth motors with encoder data memory (MHD, MKD, MKE), values for current loop parameterization do not correspond to values in encoder data memory | Check whether values in "S-0-0106, Current loop proportional gain 1" and "S-0-0107, Current loop integral action time 1" correspond to values in encoder data memory ("P-0-2106, Current loop proportional gain 1, encoder memory" and "P-0-2107, Current loop integral-action time 1, encoder memory") |
| | **Note**: Calculation of "S-0-0106, Current loop proportional gain 1" depends on "P-0-0001, Switching frequency of the power output stage" and "P-0-0556, Control word of axis controller"! |

| Cause | Remedy |
|---|---|
| In the case of Rexroth motors without encoder data memory, values for current loop parameterization do not correspond to manufacturer-side specifications | Check whether values in "S-0-0106, Current loop proportional gain 1" and "S-0-0107, Current loop integral action time 1" correspond to manufacturer-side specifications (see Drive-Top) |
| In the case of third-party motors, output data for calculating parameter values are not correct | Check whether output data for calculating parameter values are correct |

## 2.1.5    E8029 Positive position limit exceeded

The drive provides a function for monitoring an allowed travel range by means of software limit switches that can be parameterized.

☞    The travel range monitor has to be activated and parameterized via "S-0-0049, Positive position limit value", "S-0-0050, Negative position limit value" and "S-0-0055, Position polarities".

The drive reaction (fatal warning or error) in case the travel range is exceeded has to be parameterized in "P-0-0090, Travel range limit parameter".

| Cause | Remedy |
|---|---|
| A command value was set for the drive that causes an axis position outside the positive travel range/position limit value | Set command value that leads back to the allowed travel range.<br><br>Contact machine manufacturer in order to find out cause of incorrect command value |
| Positive travel range/position limit value incorrectly parameterized | Check and, if necessary, correct parameterization of "S-0-0049, Positive position limit value" |

☞    The "S-0-0057, Position window" parameter is used to realize a hysteresis function for evaluating the position limit values.

See also Functional Description of firmware "Position Limitation/Travel Range Limit Switch"

## 2.1.6    E8030 Negative position limit exceeded

The drive provides a function for monitoring an allowed travel range by means of software limit switches that can be parameterized.

☞    The travel range monitor has to be activated and parameterized via "S-0-0049, Positive position limit value", "S-0-0050, Negative position limit value" and "S-0-0055, Position polarities".

The drive reaction (fatal warning or error) in case the travel range is exceeded has to be parameterized in "P-0-0090, Travel range limit parameter".

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| A command value was set for the drive that causes an axis position outside the negative travel range/position limit value | Set command value that leads back to the allowed travel range.Contact machine manufacturer in order to find out cause of incorrect command value |
| Positive travel range/position limit value incorrectly parameterized | Check and, if necessary, correct parameterization of "S-0-0050, Negative position limit value" |

☞ The "S-0-0057, Position window" parameter is used to realize a hysteresis function for evaluating the position limit values.

See also Functional Description of firmware "Position Limitation/Travel Range Limit Switch"

## 2.1.7    E8034 Emergency-Stop

The drive provides a function for monitoring an E-Stop input (connection of an external hardware switch). This monitor has to be activated and parameterized via "P-0-0008, Activation E-Stop function".

☞ When the warning E8034 occurs, the axis is shut down as fast as can with velocity command value reset.

There isn't any message transmitted to the control unit.

| Cause | Remedy |
|---|---|
| E-Stop input was controlled (0 V at digital input) | Remove failure that caused E-Stop to be triggered and clarify cause of triggering |
| Incorrect parameterization of digital inputs and outputs on control section | Correct configuration of digital inputs/outputs on control section and correct it, if necessary |
| E-Stop switch or cable connection defective or incorrectly wired | Check function and wiring of E-Stop switch |
| Control section or digital inputs on control section defective | Replace control section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "E-Stop Function"

See also Functional Description of firmware "Digital Inputs/Outputs"

See also Functional Description of firmware "Velocity Command Value Reset"

## 2.1.8    E8035 Quick stop with probe detection is active

| Cause | Remedy |
|---|---|
| Quick stop in the case of positive edge at probe 1 has been activated. Positive edge was detected at probe 1; drive is shut down with velocity command value reset | Quick stop is deactivated by locking probe enable ("S-0-0405, Probe 1 enable" = "0") or by deactivating probe function ("S-0-0170, Probing cycle procedure command" = "0" or "P-0-0226, Probe, extended control word", bit 9 equal "0") |

## 2.1.9    E8040 Torque/force actual value limit active

The warning E8040 is generated when the "stall protection loop" takes effect and changes the working point of the machine for its relief.

| Cause | Remedy |
|-------|--------|
| Load torque is too high | Reduce load torque |
| Torque limit values incorrectly parameterized | Check parameters "S-0-0082, Torque/force limit value positive"; "S-0-0083, Torque/force limit value negative"; "S-0-0092, Bipolar torque/force limit value" and "P-0-0109, Torque/force peak limit" and increase limits, if necessary |

See also Functional Description of firmware "Voltage-Controlled Operation"

## 2.1.10    E8041 Current limit active

The warning E8041 is generated when the current limitation loop takes effect and reduces the output voltage due to overvoltage.

| Cause | Remedy |
|-------|--------|
| "S-0-0109, Motor peak current" incorrectly parameterized | Check content of "S-0-0109, Motor peak current" and increase it, if necessary |
| Short circuit at output of power output stage (e.g. in motor cable or in motor) | Check motor connection and motor for short circuit and replace cable or motor, if necessary |
| Power output stage in drive controller defective | Replace drive controller |

☞    The replacement of the drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "Voltage-Controlled Operation"

## 2.1.11    E8042 Both travel range limit switches activated

The compliance with the allowed travel range of linear axes is monitored on the hardware side via two travel range limit switches. When the travel range has been exceeded, one of the two limit switches is activated, if the limit switches were correctly mounted.

The warning E8042 is generated, if

* the controller detects that both travel range limit switches have been simultaneously activated and

* exceeding the travel range is handled as a fatal warning (setting in "P-0-0090, Travel range limit parameter").

☞    As long as the cause of E8042 has not been removed, the controller does not accept any command value!

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| Due to incorrect mounting, axis activates both travel range limit switches simultaneously | Mount travel range limit switches in such a way that they are activated shortly before axis end position is reached. Make sure the braking distance is sufficient |
| Travel range limit switches were incorrectly connected | Connect travel range limit switches correctly; check compliance with switching logic set in "P-0-0090, Travel range limit parameter" |
| Switching logic of travel range limit switches does not correspond to realized wiring | Check switching logic with regard to realized wiring, adjust it in "P-0-0090, Travel range limit parameter", if necessary |

## 2.1.12    E8043 Positive travel range limit switch activated

The drive provides a function for monitoring travel range limit switches (external hardware limit switches). This monitor has to be activated and parameterized via "P-0-0090, Travel range limit parameter".

☞          When the warning E8043 occurs, the axis is shut down with velocity command value reset.

| Cause | Remedy |
|---|---|
| Travel range limit switch situated in positive direction (see Project Planning Manual for motor) was activated because axis is outside of travel range that was defined by means of travel range limit switches | Set drive enable and input a command value leading back to allowed travel range |
| Incorrect parameterization of digital inputs and outputs on control section | Correct configuration of digital inputs/outputs on control section and correct it, if necessary |
| Travel range limit switch or cable is defective or incorrectly wired | Check function and wiring of travel range limit switch |
| Control section or digital inputs on control section defective | Replace control section or entire drive controller |

☞          Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "Travel Range Limits"

See also Functional Description of firmware"Digital Inputs/Outputs"

## 2.1.13    E8044 Negative travel range limit switch activated

The drive provides a function for monitoring travel range limit switches (external hardware limit switches). This monitor has to be activated and parameterized via "P-0-0090, Travel range limit parameter".

☞          When the warning E8044 occurs, the axis is shut down with velocity command value reset.

| Cause | Remedy |
|---|---|
| Travel range limit switch situated in negative direction (see Project Planning Manual for motor) was activated because axis is outside of travel range that was defined by means of travel range limit switches | Set drive enable and input a command value leading back to allowed travel range |
| Incorrect parameterization of digital inputs and outputs on control section | Correct configuration of digital inputs/outputs on control section and correct it, if necessary |
| Travel range limit switch or cable is defective or incorrectly wired | Check function and wiring of travel range limit switch |
| Control section or digital inputs on control section defective | Replace control section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "Travel Range Limits"

See also Functional Description of firmware "Digital Inputs/Outputs"

## 2.1.14 E8055 Motor overload, current limit active

In order to protect the motors against thermal destruction in the case of peak loads occurring for a very short time, the thermal work load of the motor is continuously calculated in the controller by means of a motor temperature model.

If the maximum possible motor current is reduced, due to the current thermal motor load, compared to the content of "S-0-0109, Motor peak current", the drive generated the warning E8055. As a consequence thereof the drive can no longer follow the command values preset by a control unit.

☞ When the E8055 warning is active, bit 0 (overload warning) is additionally set in "S-0-0012, Class 2 diagnostics".

| Cause | Remedy |
|---|---|
| Too high acceleration torque/too high acceleration force demanded | Reduce acceleration by adjusted command value profile |
| Overload of drive by too high continuous load | Reduce overload in the case of long machining phases |
| Too high process or machining force (e.g. infeed) | Reduce process or machining force |
| Mechanical changes in axis (e.g. friction, load conditions,...) | Check mechanical system and, if necessary, optimize load conditions and/or friction conditions |

See also Functional Description of firmware "Current Limitation

## 2.1.15 E8057 Device overload, current limit active

In order to protect the devices against thermal destruction, the thermal load of the output stage in devices with digital current control is continuously calculated by a temperature model, depending on the measured current.

For HCS, HMS, HMD    If the thermal load exceeds 97% (displayed in "P-0-0141, Thermal drive load"), the continuous current limitation is activated and the warning E8057 is generated. As a consequence thereof the drive can no longer follow the command values preset by a control unit.

Warnings (Exxxx)

☞ When the E8057 warning is active, bit 0 (overload warning) is additionally set in "S-0-0012, Class 2 diagnostics".

**For HMV01.1R**    When the thermal load has reached 100%, the continuous current limitation is activated and the warning E8057 is generated. As a consequence thereof the available DC bus power is reduced and especially drives that require high power can no longer follow the preset command values.

| Cause | Remedy |
|---|---|
| Device is not adjusted to requirements of application or motor | Check dimensioning of drive and, if necessary, use more powerful device |
| Too high acceleration torque/too high acceleration force demanded | Reduce acceleration by adjusted command value profile |
| Overload of drive by too high continuous load | Reduce overload in the case of long machining phases |
| Too high process or machining force (e.g. infeed) | Reduce process or machining force |
| Mechanical changes in axis (e.g. friction, load conditions,...) | Check mechanical system and, if necessary, optimize load conditions and/or friction conditions |

See also Functional Description of firmware "Current Limitation"

## 2.1.16    E8058 Drive system not ready for operation

This fatal warning can occur for drive controllers in operation that are interconnected via the module bus. If one of these drive controllers in operation signals an error via the module bus, the drives that are to react to signaled errors ("package reaction") react with shutdown. The reacting drives display the warning E8058, the supply unit displays "E2810 Drive system not ready for operation".

The settings for error messages and error reactions for devices that are interconnected via the DC bus and module bus are made in "P-0-0118, Power supply, configuration".

| Cause | Remedy |
|---|---|
| Error message of one or several drives of a drive system | Identify drive or drives signaling an error. Remove cause of error at respective drive or drives |

See also Functional Description of firmware "Power Supply"

## 2.1.17    E8260 Torque/force command value limit active

Apart from the dynamic actual torque/force value limitation by means of a motor or amplifier temperature model, there are voltage-dependent (velocity-dependent), as well as parameterizable limitations of the torque/force command value. At least one of these limits has been reached.

☞ As regards the occurrence of the warning E8260, there are different causes and remedies for "closed-loop operation" / "controlled motor operation" (FOC, FOCsl, FXC) and sensorless, voltage-controlled motor operation ("U/f-controlled motor operation" / "open-loop operation")!

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| **"Controlled motor operation" / "closed-loop operation"**<br><br>Acceleration capacity of drive has been exceeded. In operating modes "position control" and "velocity control", this means that there is an ever-increasing position deviation (lag error) between command value and actual value | Reduce preset maximum acceleration value to allow drive to follow position or velocity command value characteristic |
| **"Controlled motor operation" / "closed-loop operation"**<br><br>Velocity command value is higher than maximum velocity of drive. Drive limits output value of velocity loop (torque command value) so that output voltage of controller, depending on load, does not exceed value of "P-0-0535, Motor voltage at no load" or "P-0-0536, Maximum motor voltage" | Reduce maximum velocity command value in such a way that values of P-0-0535 or P-0-0536 are not reached when accelerating or at maximum velocity.<br><br>If possible, use controlled supply unit (HMV-R); with uncontrolled supply unit increase supply voltage, if necessary |
| **"Controlled motor operation" / "closed-loop operation"**<br><br>Torque/force limit values incorrectly set | Increase values of "S-0-0082, Torque/force limit value positive", "S-0-0083, Torque/force limit value negative", "S-0-0092, Bipolar torque/force limit value" and "P-0-0109, Torque/force peak limit", if necessary |
| **"Controlled motor operation" / "closed-loop operation"**<br><br>Current loop incorrectly parameterized for motors without feedback data memory (e.g. kit motors or third-party motors) | Check contents of "S-0-0106, Current loop proportional gain 1" and "S-0-0107, Current loop integral action time 1" and correct them, if necessary.<br><br>See also Functional Description of firmware "Automatic Setting of Motor Control " |
| **"Controlled motor operation (FXC)"**<br><br>Controller cannot permanently provide required current at standstill of asynchronous motor | Reduce current at standstill ("P-0-0532, Premagnetization factor" * "P-0-4004, Magnetizing current") by lower value of P-0-0532<br><br>**- or -**<br><br>Use controller with higher continuous current (type current) |
| **"Open-loop operation" / "U/f-controlled motor operation"**<br><br>Acceleration capacity of controlled drive has been exceeded (velocity command value ramp too steep) | Maximum change of velocity with which drive can follow command values is determined by motor. This possibly requires adjustment of "P-0-0569, Maximum stator frequency change" |

## 2.1.18    E8819 Mains failure

A mains failure was detected. To maintain the DC bus, regenerative operation of the motor is still possible, motive operation of the motor is disabled. The function depends on "P-0-0118, Power supply, configuration" (behavior in the case of undervoltage in DC bus).

| Cause | Remedy |
|---|---|
| Power is switched off without previous drive deactivation by means of drive enable ("AF") | Check logic for activating drive in connected control unit |
| Malfunction or overload of power supply | Check power supply |
| Mains failure | Check cause of mains failure, switch mains voltage on again |

See also Functional Description of firmware "Power Supply"

## 2.2    Warnings of Category E4xxx

### 2.2.1    E4001 Double MST failure shutdown

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

Warnings (Exxxx)

☞    **As of MPx05VRS:** In "P-0-4088, Master communication, configu-
ration", you can configure the reaction to the failure of the cyclic
communication as a warning or as an error.

| Cause | Remedy |
|---|---|
| Disturbance in fiber optic transmission line | Check all optic fiber connections in the SERCOS ring and replace them, if necessary |
| Attenuation of light signals too high | Measure attenuation of optic fiber cables again.Maximum attenuation between $T_X$ and $R_X$ mustn't exceed 12.5 dB! |
| Disturbance in SERCOS interface (general) | Replace control section or entire drive |

☞    Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

See also Functional Description of firmware "Interface Errors and Diagnostic
Possibilities"

## 2.2.2     E4002 Double MDT failure shutdown

The **m**aster **d**ata **t**elegram (MDT) was not received in the drive in two successive
SERCOS or field bus cycles.

☞    **As of MPx05VRS:** In "P-0-4088, Master communication, configu-
ration", you can configure the reaction to the failure of the cyclic
communication as a warning or as an error.

| Cause | Remedy |
|---|---|
| Bus master does not send any more cyclic telegrams to the drive. These, however, are expected in communication phase 4. | Switch master on and start cyclic communication; see manual for control unit |
| Fiber optic cable bus: Disturbance in fiber optic transmission line | Check all fiber optic cable connections in SERCOS ring |
| Fiber optic cable bus: Input power of light signals too low | Adjust transmitting power or check attenuation of fiber optic cable |
| Light power to be measured at receiver (with test mode: continuous light) must be between –20 dBm (10 μW) and –5 dBm (320 μW) | Maximum attenuation between $T_X$ and $R_X$ mustn't exceed 12.5 dB! |
| Different transmission times of master data telegrams in master and slave | Synchronize transmission times of master data telegrams in master and slave |
| Disturbance in SERCOS interface (general) | Replace control section or entire drive controller |

☞    Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

See also Functional Description of firmware "Interface Errors and Diagnostic
Possibilities"

## 2.2.3 E4005 Command value input impossible via master communication

☞ In firmware version 04VRS, the name of the warning is "E4005 No data exchange possible via the field bus".

Command value input via the master communication interface is impossible.



**DANGER**

**Automatic restart after bus failure!**

In the case of bus failure (message "F4009" or "E4005"), an error reaction must be carried out in the control unit, too, to prevent automatic restart after the bus has been reestablished. This means that the bits "Drive Halt", "drive enable" and "drive ON" (e.g. bits 13, 14 and 15 in parameter "P-0-4077, Field bus: control word") should be reset in the control unit in the case of bus failure.

SERCOS
The setting in parameter "P-0-4088, Master communication, configuration" is such that there won't be any drive error reaction initiated in case communication fails, but this warning will be displayed.

| Cause | Remedy |
|---|---|
| See F4009 | See F4009 |

Other Field Buses (CANopen, PROFIBUS, ...)
Failure of master communication (double MDT failure or double MST failure) was detected.

The setting in parameter "P-0-4088, Master communication, configuration" is such that there won't be any drive error reaction initiated in case communication fails, but this warning will be displayed; the drive continues running with the last valid command value input.

| Cause | Remedy |
|---|---|
| See F4001 or F4002 | See F4001 or F4002 |

## 2.2.4 E4008 Invalid addressing command value data container A

During the index check in the multiplex channel an error occurred. During the cyclic data exchange the index for access to the lists **Data container A: configuration list command value-x** is monitored to find out whether it is pointing to a non-initialized position in the list.

| Cause | Remedy |
|---|---|
| ? | Check Data container A: configuration list command value-x |
| ? | Check low byte of "S-0-0368, Data container A: addressing" |

See also Functional Description of firmware "Multiplex Channel"

## 2.2.5 E4009 Invalid addressing actual value data container A

During the index check in the multiplex channel an error occurred. During the cyclic data exchange the index for access to the lists **Data container A: configuration list actual value-x** is monitored to find out whether it is pointing to a non-initialized position in the list.

| Cause | Remedy |
|---|---|
| ? | Check Data container A: configuration list actual value-x |
| ? | Check high byte of "S-0-0368, Data container A: addressing" |

See also Functional Description of firmware "Multiplex Channel"

Warnings (Exxxx)

## 2.2.6    E4010 Slave not scanned or address 0

During the initialization of the SERCOS ring in communication phase 1, the SERCOS master must address each slave which is to participate in the progression to higher phases. Slaves which are not addressed or for which drive address 0 has been set diagnose this by the warning E4010. Communication with these slaves in higher communication phases is impossible; they only work in repeater mode.

| Cause | Remedy |
|---|---|
| Slave was not scanned in phase 1 or address 0 has been set | Set correct slave address |
| Slave deactivated by control unit | Check SERCOS master configuration |

See also Functional Description of firmware "SERCOS interface"

## 2.2.7    E4012 Maximum number of CCD slaves exceeded

When switching to communication phase 2, too many CCD slaves (→ **CCD**: Cross Communication Drives) were detected to have been connected to the cross communication interface of the CCD master.

☞        This warning is always reset in phase 0.

| Cause | Remedy |
|---|---|
| More CCD slaves than allowed have been connected to CCD master | Reduce number of connected CCD slaves |
| | **Note:** Maximum number of axes depends on CCD cycle time and data length |

See also Functional Description of firmware "Cross Communication (CCD) "

## 2.2.8    E4013 Incorrect CCD addressing

When switching to communication phase 1, a projected CCD slave (→ **CCD**: Cross Communication Drives) could not be found.

| Cause | Remedy |
|---|---|
| A CCD slave address has been used several times; actual topology (P-0-1603) and command topology (P-0-1636) do not match. Addresses must be unequivocal | Correct slave address in slave(s) ("P-0-4025, Drive address of master communication") |
| In "P-0-1601, CCD: Addresses of projected drives" <br> - or - <br> in "P-0-1604, CCD: addresses of projected I/Os" (only MPx05), a CCD slave was projected which does not exist in CCD group | Correct "P-0-1601, CCD: addresses of projected drives" according to connected CCD slaves <br> **Only MPx05:** <br> Correct "P-0-1604, CCD: addresses of projected I/Os" according to connected slaves <br> - or - <br> Assign addresses to slaves with P-0-1635 |
| In "P-0-1601, CCD: Addresses of projected drives" <br> - or - <br> in "P-0-1604, CCD: addresses of projected I/Os" (only MPx05), a CCD slave was projected which has not been correctly connected | Connect all projected CCD slaves correctly |

See also "P-0-1630, CCD: diagnosis"

See also Functional Description of firmware "Cross Communication (CCD) "

### 2.2.9 E4014 Incorrect phase switch of CCD slaves

During the run-up of the CCD group to phase 0, 1 or 2, the correct reaction of the CCD slaves is monitored. If one or several slaves do not behave correctly, the warning E4014 is generated. There are the following possible error symptoms:

- CCD slave ignores phase switch and does not stop transmitting
- CCD slave dose not transmit again after phase switch
- list of scanned CCD slaves is not stable (list must be 100% identical for phase 0)
- no communication on port1 or port2
- no CCD slave scanned (only if "P-0-1601, CCD: addresses of projected drives" is empty, otherwise E4013)
- transmitted MST is not received correctly
- a CCD slave not supported by the CCD master has been connected

| Cause | Remedy |
|---|---|
| SERCOS III plug-in connections are loose or defective | Check SERCOS III plug-in connections and replace them, if necessary |
| One of CCD slaves is defective | Replace CCD slave |

See also Functional Description of firmware "Cross Communication (CCD) "

## 2.3 Possible Warnings When Operating Safety Technology (E3xxx)

### 2.3.1 Behavior in Case a Safety Technology Warning Occurs

☞ With activated safety technology, warnings of category E31xx only occur in normal operation. When a safety related operation is selected, the cause of the warning results in an error being triggered.

The user can define the drive behavior for the case of non-fatal safety technology errors occurring via the setting in "P-0-0119, Best possible deceleration".

The drive automatically switches to safety related standstill and the output stage is switched off via two channels.

As soon as the axis has stopped, the axis signals safety; i.e. "safety technology status output of controller" was set in "P-0-3214, Safety technology status word, channel 1" or the diagnosis input/output E/A10n (channel 2) was set depending on the parameterization in "P-0-3210, Safety technology configuration".

### 2.3.2 E3100 Error when checking input signals

When the safety technology has been activated, this warning only occurs in normal operation. When a safety related operation status is selected, the cause of the error causes the error "F3130 Error when checking input signals" or "F3141 Selection validation error" to be triggered.

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| During "dynamization of safety function selection" not all input signals are zero. Cause can be error in wiring of input signals or short circuit of switch contacts with positive supply voltage | Remove wiring error of input signals or replace switch.<br><br>**Note**: Cause of error can be localized, for example, by means of internal oscilloscope function and one of the following parameters:<br><br>• "P-0-3216, Active safety technology signals" or<br><br>• "P-0-3212, Safety technology signal control word, channel 1" or<br><br>• "P-0-3217, I/O status channel 2 (optional safety technology module)" |
| There are unequal channel states between channel 1 and 2. Cause can be error in wiring of input signals or defective switch | Remove wiring error of input signals or replace switch.<br><br>**Note**: Cause of error can be localized by means of parameter "P-0-3216, Active safety technology signals" (of channel 1 and channel 2). |
| "P-0-3221, Max. tolerance time for different channel states" incorrectly parameterized | Change parameterization of "P-0-3221, Max. tolerance time for different channel states" |

## 2.3.3 E3101 Error when checking acknowledgment signal

All drives of a safety related protective zone have to be interconnected via the acknowledgment signal EA20. One of the drives of the safety related protective zone has to be declared as master, the other ones as slaves (declaration in "P-0-3210, Safety technology control word"). The master uses the acknowledgment signal to evaluate the axis status of the connected slaves and to control a safety door via the diagnostic outputs A10, EA10n. In order to detect errors in the connection, the acknowledgment signal is dynamized.

When the safety technology has been activated, this warning only occurs in normal operation. When a safety related operating status is selected, the cause of the error causes the error "F3131 Error when checking acknowledgment signal" to be triggered.

| Cause | Remedy |
|---|---|
| There is an error in wiring of acknowledgment signals (contact error, cable break, short circuit with 0 V, missing connection to master) | Remove error in wiring of acknowledgment signals |

## 2.3.4 E3102 Actual position values validation error

When both safety technology channels have been homed (confer "S-0-0403, Position feedback value status" for channel 1 and "P-0-3213, Safety technology operating status" for channel 2), a validation check is cyclically carried out for their actual position values. The difference of the actual position values mustn't exceed an internally defined threshold.

When the safety technology has been activated, this warning only occurs in normal operation. When a safety function is selected, the cause of the error causes the error "F3117 Actual position values validation error" to be triggered.

| Cause | Remedy |
|---|---|
| Implausible values on channel 1 and 2 resulted from cyclic comparison of actual position values. An internally calculated tolerance threshold is used for this comparison | Reestablish safety related reference |

## 2.3.5       E3103 Dynamization failed

For dynamization of safety function selection a dynamic signal is applied to the selection elements, in order to detect errors in the wiring of the input signals. The signal shape of the dynamic signal is monitored, too.

The monitoring refers to the signal at the dynamization input EA30 and, in the case of separate dynamization (to be set via "P-0-3210, Safety technology configuration"), additionally to the dynamization input for channel 1 ("P-0-3212, Safety technology control word, channel 1").

When the safety technology has been activated, this warning only occurs in normal operation. When a safety function is selected, the cause of the error causes the error "F3134 Dynamization time interval incorrect" to be triggered.

| Cause | Remedy |
|---|---|
| Within time "P-0-3223, Time interval for dynamization of safety function selection" there hasn't any dynamization pulse (low level) occurred at dynamization input EA30 or "dynamization input channel 1" | Remove cause of error in wiring of dynamization input<br><br>- or -<br><br>In the case of internal dynamization, make sure that only one of involved axes has been configured as master for dynamization of safety function selection ("P-0-3210, Safety technology configuration")<br><br>- or -<br><br>In the case of external dynamization, use appropriate signal source<br><br>- or -<br><br>Make sure that in involved slave axes values for "P-0-3223, Time interval for dynamization of safety function selection" and "P-0-3224, Duration of dynamization pulse of safety function selection" are greater than or equal to values in master axis |

## 2.3.6       E3104 Safety parameters validation error

In the operating mode, a validation check is cyclically carried out for the safety parameters of channel 1 and channel 2.

When the safety technology has been activated, this warning only occurs in normal operation. When a safety function is selected, the cause of the error causes the error "F3140 Safety parameters validation error" or "F7040 Validation error parameterized - effective threshold" to be triggered.

| Cause | Remedy |
|---|---|
| A comparison has shown that channel 1 and channel 2 are not working with the same safety parameters | Execute command "P-0-3204, C3000 Synchronize and store safety technology IDN command"; channel 2 thereby accepts parameters of channel 1 |

## 2.3.7       E3105 Validation error of safety related operating mode

The active safety technology operating states ("safety related operating modes") of channel 1 and channel 2 are cyclically and via two channels checked for validity; they may differ for a maximum of 5 seconds.

The criteria for transition to a new safety technology operating status selected have not been fulfilled in one channel. This channel remains in old the status - the other channel already went to the new status.

Warnings (Exxxx)

☞ When the safety technology has been activated, this warning only occurs in normal operation. When a safety function is selected, the cause of the error causes the error "F7042 Validation error safety related operating mode" to be triggered.

| Cause | Remedy |
|---|---|
| Time, velocity or position thresholds were incorrectly parameterized | Check time, velocity or position thresholds relevant for respective transition and adjust them, if necessary |

## 2.3.8   E3106 System error safety technolog

☞ In the firmware versions 02VRS, 03VRS and 04VRS, the name of the warning is "E3106 System error channel 2".

When the safety technology has been activated, this warning only occurs in normal operation. When a safety function is selected, the cause of the error causes the error "F3146 System error channel 2" or "F3147 System error channel 1" to be triggered (as of firmware versions 05VRS).

| Cause | Remedy |
|---|---|
| System error | Via parameter mode switch to operating mode |
| | - or - |
| | Reset optional safety technology module by switching control voltage off and on |
| | If error occurs repeatedly, replace control section or entire drive controller; use hardware configuration of same type |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

Only Rexroth service engineers are allowed to replace optional modules of the control section (e.g. optional encoder module).

## 2.3.9   E3107 Safety related reference missing

A check showed that, when the special mode "safety related motion" with configured safety function "safety related limited absolute position" was selected, there is no "safety related reference" existing.

| Cause | Remedy |
|---|---|
| Monitoring of safety related end positions has been configured; requirement that channel 2 has been homed is missing (can also be recognized in "P-0-3238, Extended safety technology status"). No safety function has been selected (i.e. drive is in normal operation) | 1. Set drive enable<br>2. **For absolute measuring systems:** Execute "P-0-3228, C4000 Homing procedure command channel 2" in order to establish "safety related reference" on channel 2<br>- or -<br>**For all other measuring systems:** Execute "S-0-0148, C0600 Drive-controlled homing procedure command" (C4000 for establishing safety related reference of channel 2 is integrated) |

Description of error reaction: "Behavior in Case a Safety Technology Warning Occurs"

See documentation "Integrated Safety Technology", index entry "safety related homing procedure"

## 2.3.10 E3110 Time interval of forced dynamization exceeded

In parameter "P-0-0103, Time interval of forced dynamization" it is possible to set a time interval within which the starting lockout has to be activated. This time interval has been exceeded.

| Cause | Remedy |
|---|---|
| Setting of time interval in parameter "P-0-0103, Time interval of forced dynamization" does not comply with requirements | Set time interval in parameter "P-0-0103, Time interval of forced dynamization" according to requirements |
| Starting lockout has not been activated within time interval that was set | Activate starting lockout with drive controller being active |

## 2.3.11 E3115 Prewarning, end of brake check time interval

When "time interval of holding brake check" was activated in "P-0-0525, Holding brake control word" **or** the function "safety related braking and holding system" is used, the drive monitors the time which has passed since the last holding brake check.

| Cause | Remedy |
|---|---|
| Drive had been put into operation and drive enable was set; after 5 minutes, drive generates warning E3115 | Brake check ("P-0-0541, C2100 Brake check command") must be carried out within 15 minutes after drive was put into operation and drive enable was set |
| Space of time since last holding brake check has approached time interval parameterized in "P-0-0550, Time interval brake check" or "P-0-3302, Safety related holding system: time interval brake check" by 15 minutes or less | Start brake check within 15 minutes after occurrence of E3115 ("P-0-0541, C2100 Brake check command") |

See also Functional Description of firmware "Motor Holding Brake"

See also documentation "Integrated Safety Technology"

# 2.4 Non-Fatal Warnings (E2xxx)

## 2.4.1 E2010 Position control with encoder 2 not possible

For operating modes using parameter "S-0-0520, Control word of axis controller" it is possible to switch the control encoder during operation.

If no second encoder has been defined as control encoder, this warning is generated when you try to switch to encoder 2.

## 2.4.2 E2011 PLC - Warning no. 1

In conjunction with technology functions the drive-integrated PLC allows the user generating warnings (E2011 .. E2014) within the PLC program.

Cause and remedy of a PLC warning depend on the respective PLC project (or the active Rexroth technology function) and are contained in the respective description of the technology function.

## 2.4.3 E2012 PLC - Warning no. 2

In conjunction with technology functions the drive-integrated PLC allows the user generating warnings (E2011 .. E2014) within the PLC program.

Warnings (Exxxx)

Cause and remedy of a PLC warning depend on the respective PLC project (or the active Rexroth technology function) and are contained in the respective description of the technology function.

## 2.4.4      E2013 PLC - Warning no. 3

In conjunction with technology functions the drive-integrated PLC allows the user generating warnings (E2011 .. E2014) within the PLC program.

Cause and remedy of a PLC warning depend on the respective PLC project (or the active Rexroth technology function) and are contained in the respective description of the technology function.

## 2.4.5      E2014 PLC - Warning no. 4

In conjunction with technology functions the drive-integrated PLC allows the user generating warnings (E2011 .. E2014) within the PLC program.

Cause and remedy of a PLC warning depend on the respective PLC project (or the active Rexroth technology function) and are contained in the respective description of the technology function.

## 2.4.6      E2021 Motor temperature outside of measuring range

The lower limit of the allowed ambient temperature range of Rexroth motors is 0°C. In the case of very low temperatures (below –20°C), motor encoders risk failing, shaft bearings and housings risk getting damaged.

**Motors MSK, MAD, MAF**   The temperature sensors installed in the motor windings of Rexroth motors of the MSK, MAD and MAF lines allow measuring temperatures below the allowed temperature range. When the motor temperature has fallen below –20°C, the warning E2021 is output.

**Motors MHD, MKD, 2AD, ADF,**   The temperature sensors installed in the motor windings of Rexroth motors of
**1MB, MLF, LSF**   the MHD, MKD, 2AD, ADF, 1MB, MLF and LSF lines **cannot** measure temperatures below the allowed temperature range. Therefore, the warning cannot be generated in this case!

| Cause | Remedy |
|---|---|
| Motor temperature measured by temperature sensor is below –20°C | Warning disappears automatically when motor is heated up to more than –20°C by load or higher ambient temperature |
| Sensor defective<br><br>- or -<br><br>Cable break<br><br>- or -<br><br>Electronic monitoring system in controller defective | Check wiring and hardware, above all for loose contact and, if necessary, for malfunction |

See also Functional Description of firmware "Motor Temperature Monitoring"

## 2.4.7      E2026 Undervoltage in power section

The DC bus voltage value is monitored by the drive controller and the supply unit.

**Drive Controllers HMS, HMD, HCS**   If the DC bus voltage falls below the minimum value determined for the drive (see value of "P-0-0114, Undervoltage threshold") or it reacts to "DC bus not ok" of the module bus, the device generates the warning E2026 if "non-fatal warning" has been set with regard to the reaction to undervoltage in "P-0-0118, Power supply, configuration".

Warnings (Exxxx)

> 🖝 When drive enable is set without DC bus voltage (drive signals "bb"), the error message F2026 is generated in spite of warning having been parameterized.

**Supply Unit HMV01.1R / HMV02.1R**

If the DC bus voltage falls below the threshold value determined for the respective supply unit (see table below), the warning E2026 is displayed at the device and "DC bus not ok" is signaled via the module bus. The circuit is not interrupted yet!

| Supply unit | Hardware index (see type plate) | Threshold value |
|---|---|---|
| HMV01.1R-W0018 | up to A38 | DC 670 V |
| | from A39 upwards | DC 600 V |
| HMV01.1R-W0045 | up to A39 | DC 670 V |
| | from A40 upwards | DC 600 V |
| HMV01.1R-W0060 | up to A39 | DC 670 V |
| | from A40 upwards | DC 600 V |
| HMV01.1R-W0120 | from A00 upwards | DC 600 V |

*Fig.2-1:        Threshold values for undervoltage in DC bus*

| Cause | Remedy |
|---|---|
| Power is switched off without previous drive deactivation by means of drive enable ("AF") | Check logic for activating drive in connected control unit |
| Malfunction or overload of power supply | Check power supply |
| Mains failure | Check cause of mains failure, switch mains voltage on again |

See also Functional Description of firmware "Power Supply"

## 2.4.8     E2040 Device overtemperature 2 prewarning

A switch-off value for the second temperature sensor is stored in element 3 of parameter "P-0-4059, Electric type data of power section".

If the parameter "P-0-0816, Amplifier temperature 2" exceeds the switch-off threshold, the warning E2040 is output for 30 seconds. Afterwards, the controller is switched off with the non-fatal error F2040.

Before the controller is switched off, it is possible to stop the axis via the control unit in accordance with the process (e.g. terminate processing, leave collision area etc.) or to reduce the load of the drive controller.

| Cause | Remedy |
|---|---|
| Ambient temperature too high. Specified performance data are valid up to an ambient temperature of 40 C. | Reduce ambient temperature, e.g. by cooling the control cabinet |
| Heat sink of device is dirty | Clean heat sink |
| Convection is prevented by other components or mounting position in control cabinet | Mount device vertically and provide sufficient space for ventilating heat sink |
| Blower of device is defective | Replace device |

## 2.4.9     E2047 Interpolation velocity = 0

In operating states/ operating modes in which the drive-internal position command value interpolator is active, the preset velocity effective in the drive is

Warnings (Exxxx)

monitored with regard to the value "0"; i.e. the monitor is active in the following operating modes or operating states:

**Operating Modes**
- drive-internal interpolation
- drive-controlled positioning
- positioning block mode
- Drive Halt

**Commands**
- position spindle
- drive-controlled homing
- automatic control loop setting
- ...

| Cause | Remedy |
|---|---|
| Incorrect velocity is preset (value = "0") <br><br>(cf. "S-0-0259, Positioning velocity", "S-0-0041, Homing velocity", "P-0-4007, Positioning block velocity"[i], "S-0-0222, Spindle positioning speed", "S-0-0091, Bipolar velocity limit value", "P-0-0143, Synchronization velocity", "P-0-0686, Additive position command value, positioning velocity") | Check parameterization or cyclic command value of control unit and set value for preset velocity unequal zero |
| Analog input to which preset velocity was assigned is defective or not connected | Check wiring and function of analog input and, if necessary, replace cable or control section, or the entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 2.4.10    E2048 Interpolation acceleration = 0

In operating states/ operating modes in which the drive-internal position command value interpolator is active, the preset acceleration effective in the drive is monitored with regard to the value "0" [without acceleration (deceleration) a preset velocity can never be reached; slowing down with a deceleration "0" isn't possible either].

☞ The input values of the parameters are converted to a drive-internal format. This is why input values > "0" can, internally, also cause an acceleration = "0". The parameter values which drive-internally still cause an acceleration > "0" can be calculated.

The monitor is active in the following operating modes or operating states:

**Operating Modes**
- drive-internal interpolation
- drive-controlled positioning
- positioning block mode
- Drive Halt

**Commands**
- position spindle
- drive-controlled homing
- automatic control loop setting
- ...

| Cause | Remedy |
|---|---|
| Incorrect acceleration is preset (value = "0")<br><br>(vgl. "S-0-0260, Positioning acceleration", "S-0-0042, Homing acceleration", "S-0-0138, Bipolar acceleration limit value", "S-0-0359, Positioning deceleration", "P-0-0142, Synchronization acceleration", "P-0-0687, Additive position command value, positioning acceleration") | Check parameterization or cyclic command value of control unit and set value for preset acceleration > "0" |

## 2.4.11    E2049 Positioning velocity >= limit value

In the operating modes in which the drive-internal position command value interpolator is active, the velocity command value (positioning velocity) effective in the drive is limited to the smallest value parameterized velocity limit value.

This means that the monitor is active in the following operating modes or operating states:

**Operating Modes**
- drive-internal interpolation
- drive-controlled positioning
- positioning block mode
- Drive Halt

**Commands**
- position spindle
- drive-controlled homing
- automatic control loop setting
- ...

| Cause | Remedy |
|---|---|
| Incorrect velocity has been preset (parameterized or cyclically preset value is too high) (cf. "S-0-0259, Positioning velocity", "S-0-0041, Homing velocity", "P-0-4007, Positioning block velocity" [i], "S-0-0222, Spindle positioning speed", "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value", "S-0-0039, Negative velocity limit value") | Check parameterization or cyclic command value of control unit and set value for used preset velocity smaller than value from "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value" or "S-0-0039, Negative velocity limit value" |
| "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value" or "S-0-0039, Negative velocity limit value" incorrectly parameterized | Check parameter contents of "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value" and "S-0-0039, Negative velocity limit value". Check whether parameter possibly has been assigned to an analog input or is contained in cyclic data |
| Analog input to which "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value" or "S-0-0039, Negative velocity limit value" was assigned is defective or not connected | Check wiring and function of analog input and, if necessary, replace cable or control section, or the entire drive controller |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "Velocity Limitation"

## 2.4.12    E2050 Device overtemp. Prewarning

The heat sink temperature of the device is monitored by a temperature sensor and a temperature model. When the heat sink has become too hot, the device

Warnings (Exxxx)

is switched off in order to protect it against destruction. Before the error "F2018 Device overtemperature shutdown" is triggered, the warning "E2050 Device overtemp. Prewarning" is output.

☞      When the warning E2050 appears, it is possible to stop the axis via the control unit in accordance with the process (e.g. terminate processing, leave collision area etc.) or to reduce the load of the drive controller.

| Cause | Remedy |
|---|---|
| Amplifier overtemperature (heat sink) due to overload of drive (overcurrent) | Switch drive off and let it cool down, check mechanical system as well as drive dimensioning (working power mustn't exceed, on average, continuous power of drive) |
| Ambient temperature too high. Specified performance data are valid up to an ambient temperature of 40 C | Reduce ambient temperature, e. g. by cooling the control cabinet |
| Heat sink of device is dirty | Clean heat sink |
| Convection is prevented by other components or mounting position of control cabinet | Mount device vertically and provide sufficient space for ventilating heat sink |
| Failure of internal blower | If blower fails, replace device or power section |
| Failure of air conditioning for control cabinet | Check air conditioning of control cabinet |
| Incorrect dimensioning of control cabinet with regard to heat discharge | Check dimensioning of control cabinet |

See also Functional Description of firmware "Current Limitation"

## 2.4.13    E2051 Motor overtemp. prewarning

The motor temperature measured by the temperature sensor approaches the limit value and has reached "S-0-0201, Motor warning temperature". The controller outputs the warning E2051. The drive is only switched off (F2019) when the motor temperature has reached the limit value in "S-0-0204, Motor shutdown temperature".

| Cause | Remedy |
|---|---|
| "S-0-0201, Motor warning temperature" incorrectly parameterized | Check and correct parameterization of "S-0-0201, Motor warning temperature" by means of motor or temperature sensor data sheet |
| The motor is overloaded. The effective torque demanded from the motor has been above the allowed continuous torque for a too long time. | Check motor dimensioning and reduce motor load, e.g. by reduced infeed velocity in the case of metal-cutting machining. In the case of installations that have been operated for a long time, check whether drive conditions have changed (with regard to dirt accumulation, friction, moved masses etc.) |
| Line interruption, ground fault or short circuit in the line for motor temperature monitoring | Check line for motor temperature monitoring for line interruption, ground fault or short circuit |
| Instability in speed control loop | Check parameterization of speed control loop |
| Blower / cooling system defective | Check blower / cooling system |

See also Functional Description of firmware "Motor Temperature Monitoring"

## 2.4.14    E2053 Target position out of travel range

In operating modes with internal position command value generation a check is run, before a movement is carried out, in order to find out whether the preset

Warnings (Exxxx)

target position ("S-0-0258, Target position", "S-0-0282, Positioning command value" or "P-0-4006, Positioning block target position" [i]) is within the allowed travel range of the drive.

The allowed travel range of the drive is defined by

- S-0-0049, Positive position limit value
- S-0-0050, Negative position limit value

The position limit value monitor and thus the monitoring of the allowed travel range is activated in "S-0-0055, Position polarities".

The reaction to a travel range error can be set in "P-0-0090, Travel range limit parameter".

☞ When the position limit value monitor has been activated and the target position is outside of the allowed travel range, a warning bit is set in "S-0-0012, Class 2 diagnostics". In addition, the message "S-0-0323, Target position outside of travel range" is set. The positioning procedure is started.

| Cause | Remedy |
|---|---|
| Position limit values ("S-0-0049, Positive position limit value", "S-0-0050, Negative position limit value") incorrectly parameterized | Check parameterization of position limit values and adjust it according to desired travel range ("S-0-0049, Positive position limit value" has to be greater than "S-0-0050, Negative position limit value") |
| Position limit value monitor has been activated although it is not needed | Deactivate position limit value monitor if it is not needed (e.g. in modulo operation) |
| In the case of relative interpolation, value for travel range was set too high or several travel ranges that are added cause effective target position (cf. "P-0-0050, Effective target position") to be outside of position limits | Check preset travel range (cf. "S-0-0258, Target position") and, if necessary, adjust it in control unit program |
| In the case of absolute interpolation, preset target position is incorrect | Check preset target position (cf. "S-0-0258, Target position" or "S-0-0282, Positioning command value") and, if necessary, adjust it in control unit program (only enter "S-0-0258, Target position" within position limit values) |
| In "positioning block mode" one or more target positions have been incorrectly parameterized or incorrect positioning block is selected | Check parameterized target positions in "P-0-4006, Positioning block target position" and block selection ("P-0-4006, Positioning block selection"). In addition, check block selection via respective master communication (e.g. field bus or digital I/Os). |

See also Functional Description of firmware "Position Limitation/Travel Range Limit Switch"

For "relative interpolation" see Functional Description of firmware "Drive-Controlled Positioning"

For "absolute interpolation" see Functional Description of firmware "Drive-Internal Interpolation"

## 2.4.15 E2054 Not homed

Before a motion is carried out a check is run in the case of operating modes with drive-internal position command value generation (drive-internal interpolation, drive-controlled positioning and positioning block mode) to find out whether, with absolute target position preset ("S-0-0258, Target position" or "S-0-0282, Positioning command value", or "P-0-4006, Positioning block target

Warnings (Exxxx)

position"), the measuring system used for positioning (cf. operating mode se-
lection) has been homed.

☞      When the warning E2054 appears, the drive stops or does not ac-
cept the target position or the positioning block. In parameter
"S-0-0012, Class 2 diagnostics" a warning bit is set.

| Cause | Remedy |
|---|---|
| Absolute positioning was started although position data refer-ence of drive had not yet been established [drive has not been homed (cf. "S-0-0403, Position feedback value status")] | Establish absolute position data reference by starting com-mand "S-0-0148, C0600 Drive-controlled homing procedure command" or "P-0-0012, C0300 Command Set absolute measuring" |

See also Functional Description of firmware "Establishing the Position Data
Reference"

## 2.4.16    E2055 Feedrate override S-0-0108 = 0

By means of the "S-0-0108, Feedrate override" it is possible to make a propor-
tional scaling for the travel velocity of drive-controlled travel commands
(0..100 %).

A feedrate override of 0 % causes the effective travel velocity to become "0".
In spite of velocity command value being present (e. g. "S-0-0259, Positioning
velocity"), the drive remains stopped at the current position or brakes down until
reaching standstill.

☞      The function of the feedrate override can be switched off by setting
S-0-0108 = 100 %.

If S-0-0108 has been cyclically configured or assigned to an analog
input, this configuration has to be changed.

| Cause | Remedy |
|---|---|
| Parameter "S-0-0108, Feedrate override" was set to "0" | Set feedrate override > "0" so that drive moves. Full velocity is reached with 100%. |
| For devices with analog inputs: feedrate override via analog input has been activated and voltage at analog input is "0" | Apply voltage > "0" proportionally to desired velocity (+10 V corresponds to 100% of velocity) alternative: deactivate fee-drate override |
| Infeed potentiometer of connected control unit was set to "0" or is incorrectly evaluated | Carefully actuate infeed potentiometer, check analog signal and evaluation |
| Analog input used for feedrate override or connecting cable is defective | Check and if necessary replace cable and control section |

☞      Only Rexroth service engineers or especially trained users are al-
lowed to replace the control section. The replacement of the entire
drive controller is described in the Project Planning Manual for the
power section.

## 2.4.17    E2056 Torque limit = 0

To protect the drive or the connected mechanical system against mechanical
overload the maximum torque or the maximum force can be limited to allowed
values.

| Cause | Remedy |
|---|---|
| One of the torque-/force-limiting parameters has the value "0" | Check parameters "S-0-0082, Torque/force limit value positive"; "S-0-0083, Torque/force limit value negative"; "S-0-0092, Bipolar torque/force limit value" and "P-0-0109, Torque/force peak limit" and enter "correct" limit value (unequal "0") |
| One of the torque-/force-limiting parameters has been assigned to analog input and voltage at analog input is "0" | Apply voltage > 0 proportionally to desired torque/force limit value<br><br>**Note:** Scaling of analog input defines scaling of analog input voltage (see also Functional Description of firmware "Analog Inputs") |
| Potentiometer of connected control unit was set to "0" or is incorrectly evaluated | Carefully actuate potentiometer, check analog signal and evaluation |
| Cable connected at analog input for torque/force limitation is defective | Check and, if necessary, replace cable |
| Analog input used for torque/force limitation is defective | Replace control section or entire drive controller |
| You are using motor without encoder memory; its motor data haven't yet been set and max. allowed currents (S-0-0109, S-0-0111,...) therefore are still "0" | Load motor parameters via motor data base stored in IndraWorks D |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "Torque/Force Control"

## 2.4.18 E2058 Selected process block is not programmed.

In the "positioning block mode" the selected positioning block is checked so that only complete positioning blocks can be started.

☞ When the warning E2058 appears, the drive stops or does not accept the selected positioning block. In parameter "S-0-0012, Class 2 diagnostics" a warning bit is set.

| Cause | Remedy |
|---|---|
| Positioning block data of currently selected block are not available | Check positioning block data ("P-0-4006, Positioning block target position", "P-0-4007, Positioning block velocity", "P-0-4008, Positioning block acceleration", "P-0-4009, Positioning block jerk", and "P-0-4019, Positioning block mode") and correct respective parameters |
| Incorrect positioning block selection via field bus or digital inputs | Check "P-0-4026, Positioning block selection" and control. If necessary, also check wiring and connection of digital I/Os |
| Incorrect configuration of digital inputs causes unwanted positioning block selection | Check configuration of digital inputs and correct it accordingly |

See also Functional Description of firmware "Digital Inputs/Outputs"
See also Functional Description of firmware "Positioning Block Mode"

Warnings (Exxxx)

## 2.4.19 E2059 Velocity command value limit activ

The drive is constantly monitoring the effective velocity command value (sum of velocity command values at controller input) and is limiting it.

If the effective velocity command value exceeds "S-0-0091, Bipolar velocity limit value", the warning E2059 is output because for positioning tasks the lag error can be increased.

| Cause | Remedy |
|---|---|
| Cyclic command value preset by control unit is incorrect or too high | Control cyclic command value and, if necessary, adjust control program |
| Velocity limit value parameterized too low | Check and correct parameterization of "S-0-0091, Bipolar velocity limit value" |

See also Functional Description of firmware "Velocity Control"

## 2.4.20 E2061 Device overload prewarning

The work load of the device has exceeded a threshold. A warning is generated which warns against imminent overload, unless the load is reduced.

Devices with digital control are monitored by means of a permanently processed temperature model. If the thermal work load approaches 100 % the continuous current limit is activated shortly after and the warning "E8057 Device overload, current limit active" appears.

When the current is limited the torque/force is reduced which is not wanted for machines and installations and can cause problems. A warning is therefore output before this situation occurs.

**For HCS, HMS, HMD**   The threshold value for the overload prewarning can be set in "P-0-0441, Overload warning". If the thermal work load exceeds this value, the E2061 warning is output. Useful values for "P-0-0441, Overload warning" are at 80-90% so that there still is a little reserve capacity until the actual thermal work load is reached (100%).

☞   The warning can be deactivated by the value "100%" in "P-0-0441, Overload warning", because in this case the fatal warning "E8057 Device overload, current limit active" warning is immediately generated!

☞   As of MPx05: When the function "PWM frequency switching depending on load" has been selected (P-0-0556, bit 8=1), the device is switched to the lower switching frequency in case the prewarning threshold is exceeded.

The device is switched to the higher frequency, when the load in P-0-0141 falls below an internally calculated threshold. The value of this threshold is lower than the value in parameter "P-0-0441, Overload warning".

As long as the controller is operated with the lower switching frequency, the warning "E2061 Device overload prewarning" is displayed.

**For HMV01.1R**   The threshold value for the overload prewarning is fixed to 90%. If the thermal work load exceeds this value, the E2061 warning is output. This threshold cannot be set and therefore the warning cannot be deactivated!

| Cause | Remedy |
|-------|--------|
| Incorrect value of "P-0-0441, Overload warning" | Increase value of "P-0-0441, Overload warning", if necessary |
| Overload of drive (e.g. due to too high infeed during machining or too high acceleration to high speed) | Switch drive off and let it cool down. Check drive dimensioning and command value profile |
| Changes in mechanical system with regard to friction and moved masses | In the case of installations that have been run for a long time, check drive conditions for changes in mechanical system |

See also Functional Description of firmware "Current Limitation"

## 2.4.21 E2063 Velocity command value > limit value

The drive continuously monitors the "S-0-0036, Velocity command value".

If the velocity command value exceeds the smallest parameterized velocity limit value, the lag error can be increased for positioning tasks.

| Cause | Remedy |
|-------|--------|
| Cyclic command value preset by control unit is incorrect or too high | Control cyclic command value and, if necessary, adjust control program |
| Velocity limit value parameterized too low | Check and correct parameterization of "S-0-0091, Bipolar velocity limit value", "S-0-0038, Positive velocity limit value" and "S-0-0039, Negative velocity limit value" |

See also Functional Description of firmware "Velocity Control"

## 2.4.22 E2064 Target position out of num. range

The operating mode "drive-internal interpolation" or "drive-controlled positioning" was selected and the preset target position cannot be displayed in the internal position format.

| Cause | Remedy |
|-------|--------|
| Incorrect target position or positioning command value was preset | Check target position ("S-0-0258, Target position") or positioning command value ("S-0-0282, Positioning command value") preset by control unit (master) and, if necessary, correct control unit program |
| An "infinitely turning axis" is not operated in modulo format | Check content of "S-0-0076, Position data scaling type" and change to "modulo format" |
| Selected "S-0-0278, Maximum travel range" too small | Increase value of "S-0-0278, Maximum travel range" in order to increase position that can be displayed internally in absolute form |

See also Functional Description of firmware "Drive-Controlled Positioning"

See also Functional Description of firmware "Drive-Internal Interpolation"

## 2.4.23 E2069 Brake torque too low

When the drive enable was switched off the motor moved during the automatic brake torque check (can be activated via "P-0-0525, Holding brake control word"). The motor holding brake therefore no longer provides the required holding torque (see also "P-0-0547, Test torque with holding brake applied").

☞ The result of the brake check is displayed in "P-0-0539, Holding brake status word".

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| Due to storage, brake is covered with oxide layer<br><br>- or -<br><br>Brake is wetted with oil or grease | If warning occurs when drive enable is switched off, start "brake check" command in order to abrade brake, if this setting was made in "P-0-0525, Holding brake control word". Afterwards brake should be able to provide full torque again |
| Brake is worn (see service life of brake in Project Planning Manual for motor) | If holding torque still isn't reached after repeated start of "brake check" command (abrasion cleaning processes of brake), motor holding brake or entire motor needs to be replaced |
| Wiring or control error of brake (hardware defect on control section) | Check wiring and connection of brake (incl. brake relay).<br><br>If brake control in controller (e.g. relay) is defective, entire drive controller or control section has to be replaced |

See also Functional Description "Motor Holding Brake"

## 2.4.24    E2070 Acceleration limit active

The acceleration in the velocity loop is limited to the value of "S-0-0138, Bipolar acceleration limit value".

☞ **As of MPx05:** The acceleration monitoring can be switched off by inputting "0" in "S-0-0138, Bipolar acceleration limit value".

| Cause | Remedy |
|---|---|
| Value in "S-0-0138, Bipolar acceleration limit value" too low | Check and, if necessary, correct parameterization of "S-0-0138, Bipolar acceleration limit value" |
| Incorrect command value set by control unit | Contact control unit manufacturer or programmer |
| Preset acceleration value was greater than value parameterized in "S-0-0138, Bipolar acceleration limit value" | Reduce acceleration value used<br>• S-0-0042, Homing acceleration<br>• S-0-0260, Positioning acceleration<br>• P-0-0057, Return acceleration<br>• P-0-1201, Ramp 1 pitch<br>• P-0-1203, Ramp 2 pitch<br>• P-0-1211, Deceleration ramp 1<br>• P-0-1213, Deceleration ramp 2 |

## 2.4.25    E2074 Encoder 1: encoder signals disturbed

The hardware checks the signals of the measuring system (encoder 1) for inadmissible signal dips. If a signal (e.g. sin or cos) leaves the thresholds monitored by the hardware, the warning E2074 is generated.

In the case of major failures or several signal dips in series, the error "F8022 Enc. 1: enc. signals incorr." is generated and the drive is shut down. The warning E2074 therefore points at disturbed encoder signals before a breakdown occurs.

☞ The warning E2074 is only cleared by reinitialization of the encoder position; i. e. it is necessary to switch to communication phase 2.

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding | Check cable to measuring system and replace it, if necessary |
| Measuring system defective | Check measuring system and replace it, if necessary |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary |
| Measuring system dirty | Clean or replace measuring system |
| Hardware defect on control section of drive | Replace control section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 2.4.26 E2075 Encoder 2: encoder signals disturbed

The hardware checks the signals of the measuring system (encoder 2) for inadmissible signal dips. If a signal (e.g. sin or cos) leaves the thresholds monitored by the hardware, the warning E2075 is generated.

In the case of major failures or several signal dips in series, the error "F2042 Encoder 2: encoder signals incorrect" is generated and the drive is shut down. The warning E2075 therefore points at disturbed encoder signals before a breakdown occurs.

☞ The warning E2075 is only cleared by reinitialization of the encoder position; i. e. it is necessary to switch to communication phase 2.

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding | Check cable to measuring system and replace it, if necessary |
| Measuring system defective | Check measuring system and replace it, if necessary |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary |
| Measuring system dirty | Clean or replace measuring system |
| Hardware defect on control section of drive | Replace control section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 2.4.27 E2076 Measuring encoder: encoder signals disturbed

The hardware checks the signals of the measuring encoder for inadmissible signal dips. If a signal (e. g. sin or cos) leaves the thresholds monitored by the hardware, the warning E2076 is generated.

In the case of major failures or several signal dips in series, the error "F2043 Measuring encoder: encoder signals incorrect" is generated and the drive is shut down. The warning E2076 therefore points at disturbed encoder signals before a breakdown occurs.

Warnings (Exxxx)

☞    The warning E2076 is only cleared by reinitialization of the encoder
position; i. e. it is necessary to switch to communication phase 2.

| Cause | Remedy |
|---|---|
| Defective encoder cable or cable shielding | Check cable to measuring system and replace it, if necessary |
| Measuring system defective | Check measuring system and replace it, if necessary |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary |
| Measuring system dirty | Clean or replace measuring system |
| Hardware defect on control section of drive | Replace control section or entire drive controller |

☞    Only Rexroth service engineers or especially trained users are allowed to replace the control section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

## 2.4.28    E2077 Absolute encoder monitoring, motor encoder (encoder alarm)

The signals of an absolute measuring system (EnDat2.x) are monitored in the encoder.

In the drive controller, cyclic transmission of the absolute position is carried out. The error bit of the encoder is transmitted, too. The drive controller cyclically checks this error bit and outputs the warning E2077 when an error of the absolute position occurs.

☞    The warning E2077 is only cleared by reinitialization of the encoder
position; i.e. it is necessary to switch to communication phase 2.

| Cause | Remedy |
|---|---|
| Measuring system defective | Check measuring system and replace it, if necessary |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary |
| Measuring system dirty | Clean or replace measuring system |

## 2.4.29    E2078 Absolute encoder monitoring, opt. encoder (encoder alarm)

The signals of an absolute measuring system (EnDat2.x) are monitored in the encoder.

In the drive controller, cyclic transmission of the absolute position is carried out. The error bit of the encoder is transmitted, too. The drive controller cyclically checks this error bit and outputs the warning E2078 when an error of the absolute position occurs.

☞    The warning E2078 is only cleared by reinitialization of the encoder
position; i.e. it is necessary to switch to communication phase 2.

| Cause | Remedy |
|---|---|
| Measuring system defective | Check measuring system and replace it, if necessary |
| Faulty mounting of measuring head in the case of linear measuring systems | Check mounting of measuring head and correct it, if necessary |
| Measuring system dirty | Clean or replace measuring system |

## 2.4.30  E2079 Absolute enc. monitoring, measuring encoder (encoder alarm)

The acceleration in the velocity loop is limited to the value of "S-0-0138, Bipolar acceleration limit value".

☞    The acceleration monitor can be switched off by means of "P-0-0556, Configuration of axis controller".

| Cause | Remedy |
|---|---|
| Value in "S-0-0138, Bipolar acceleration limit value" too low | Check and, if necessary, correct parameterization of "S-0-0138, Bipolar acceleration limit value" |
| Incorrect command value set by control unit | Contact control unit manufacturer or programmer |
| Preset acceleration value was greater than value parameterized in "S-0-0138, Bipolar acceleration limit value" | Reduce acceleration value which is used<br><br>• S-0-0042, Homing acceleration<br><br>• S-0-0260, Positioning acceleration<br><br>• P-0-0057, Return acceleration<br><br>• P-0-1201, Ramp 1 pitch<br><br>• P-0-1203, Ramp 2 pitch<br><br>• P-0-1211, Deceleration ramp 1<br><br>• P-0-1213, Deceleration ramp 2 |

## 2.4.31  E2086 Prewarning supply module overload

The supply signals a warning regarding imminent overload via the module bus. The warning is displayed at the drive controllers and can be evaluated by the control master via the master communication. If there is no relief, the module bus message "error supply module" and power off (F2086) can occur.

| Cause | Remedy |
|---|---|
| Imminent overload of power supply | Reduce required power by lower infeed velocity of tools.<br>Check dimensioning of supply |
| Max. energy absorption capacity of braking resistor almost reached | Check dimensioning of braking resistor and, if necessary, increase dimensioning |

See also Functional Description of firmware "Power Supply"

## 2.4.32  E2092 Internal synchronization defective

☞    The warning E2092 is used for internal purposes of diagnosis!

**Cause:** The command value input cycle for command value processing has not been synchronized; i.e. the command value processing cycle is smaller than the command value input cycle.

Warnings (Exxxx)

## 2.4.33    E2100 Positioning velocity of master axis generator too high

| Cause | Remedy |
|---|---|
| Positioning velocity of master axis generator has reached maximum allowed limit value ("P-0-0770, Virtual master axis, positioning velocity") | Maximum velocity parameterized in "P-0-0770, Virtual master axis, positioning velocity", with which master axis generator moves to new target position, has to be adjusted:<br><br>• In the case of **modulo scaling** of master axis generator: half the modulo value ("P-0-0757, Virtual master axis, modulo value") per 2 ms<br><br>• In the case of **absolute scaling** of master axis generator: half the feed travel ("P-0-0918, Feed travel internal virtual master axis") per 2 ms |

## 2.4.34    E2101 Acceleration of master axis generator is zero

| Cause | Remedy |
|---|---|
| Preset positioning acceleration of master axis generator is "0" | Set positioning acceleration of master axis generator unequal "0" in "P-0-0771, Virtual master axis, positioning acceleration" |

## 2.4.35    E2140 CCD error at node

The warning is generated,

1. when the CCD group is in phase 4,
2. at least the simple error reaction has been activated via P-0-1600 and
3. at least one CCD node signals an error of class 1 diagnostics.

| Cause | Remedy |
|---|---|
| In a CCD slave or in CCD master, an error of class 1 diagnostics has occurred | Remove error in CCD slave or CCD master |
| In a CCD slave or in CCD master, a motion function block with faulty parameters was called in drive-integrated PLC (IndraMotion MLD-M) [see also "P-0-1367, PLC configuration", bit7] | Remove error in PLC program |

See also Functional Description of firmware "Cross Communication (CCD)"

## 2.4.36    E2270 Analog input 1 or 2, wire break

Conditions under which this warning is triggered:

• The wire break monitor was activated in "P-0-0218, Analog input, control parameter" (by the setting for the measuring range of the analog inputs) and

• a setting in "P-0-0218, Analog input, control parameter" causes a warning to be generated when the input value has fallen below the input value at analog input 1 or 2 and

• the current/voltage value at analog input 1 or 2 is lower than the minimum value of the measuring range.

The warning persists until the condition has been fulfilled.

☞        The value range of the voltage or current source that is connected to the analog input should be limited to the allowed value range of the analog input.

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| Input value at analog input 1 or 2 is lower than minimum value of voltage measuring range (setting "voltage signals" in "P-0-0218, Analog input, control parameter") | Check wiring of analog input, reestablish contact to voltage source, if necessary<br><br>- or –<br><br>Check value range of voltage source |
| Input value at analog input 1 or 2 is lower than minimum value of current measuring range (setting "current signals" in "P-0-0218, Analog input, control parameter") | Check wiring of analog input, reestablish contact to current source, if necessary<br><br>- or –<br><br>Check value range of current source |

☞ This warning can only be displayed at a controller containing a CSB01.1N-FC-... (BASIC OPENLOOP) control section.

## 2.4.37    E2802 HW control of braking resistor

During the braking process the increasing DC bus voltage is reduced by switching on the braking resistor. But when the regenerated braking power is too high the DC bus voltage keeps increasing. The warning E2802 is generated when the protective hardware circuit switches on the braking resistor in the case of high voltages (>900 V).

| Cause | Remedy |
|---|---|
| DC bus voltage >900 V due to increased regenerated braking energy | Check drive dimensioning and, if necessary, use additional capacitance |
| Braking resistor defective or not correctly connected | Check function of braking resistor (incl. cabling and connection) |
| Hardware defect in brake control | Replace power section or entire drive controller |

☞ Only Rexroth service engineers or especially trained users are allowed to replace the power section. The replacement of the entire drive controller is described in the Project Planning Manual for the power section.

See also Functional Description of firmware "Power Supply"

## 2.4.38    E2810 Drive system not ready for operation

One or several components of a "drive system" (devices interconnected via direct voltage DC bus and module bus)

● signal an error to the module bus (Fxxxx) with the supply unit not yet ready for power output

- or -

● are left in communication phase P0 by the master ("passive axis" or "deactivated axis") while other drives are in P4 ("bb").

Power on is impossible in these cases, the supply unit or the converter signal E2810 on the display.

Warnings (Exxxx)

| Cause | Remedy |
|---|---|
| Error message of one or several components of a drive system | Identify component/components which signals/signal an error. Remove cause of error at component/components |
| One or several drives still are in communication phase P2 | Switch drives to communication phase P4 ["ready for operation" (bb)] |
| "Passive axes" (communication phase P0) signal their "faulty" status to drive system via module bus. Supply unit refuses power on | For passive axes ("P0"), set bit 1=0 [no signaling, no triggering of "package reaction" in case of error ("passive axis")] in "P-0-0118, Power supply, configuration" |

See also Functional Description of firmware "Power Supply"

## 2.4.39    E2814 Undervoltage in mains

The crest value of the mains voltage during operation has fallen below the parameterized threshold value. The threshold value can be individually set by the user via "P-0-0810, Minimum mains crest value".

| Cause | Remedy |
|---|---|
| Mains voltage falls under load | Check dimensioning of mains connection, increase feed wire cross section or use matching transformer, if necessary |
| Mains voltage too low at power on | Use matching transformer |

See also Functional Description of firmware "Power Supply"

## 2.4.40    E2816 Undervoltage in power section

The warning E2816 is generated with the respective setting in "P-0-0118, Power supply, configuration" when the DC bus voltage in operation falls below the values parameterized in "P-0-0114, Undervoltage threshold".

☞        The parameter "P-0-0114, Undervoltage threshold" is preset with a default value and, if required, can be changed by the user.

| Cause | Remedy |
|---|---|
| DC bus voltage drops due to temporary overload | Check drive dimensioning incl. devices connected at DC bus |
| Required acceleration currents are too high | Reduce command acceleration by adjusting travel profile |
| Faulty mains connection (e.g. loose contact) | Check mains connection |
| "P-0-0114, Undervoltage threshold" has not been adjusted to conditions in mains | Check and, if necessary, correct content of "P-0-0114, Undervoltage threshold" |

See also Functional Description of firmware "Power Supply"

## 2.4.41    E2818 Phase failure

A **single-phase** mains failure was detected. Power is not switched off unless undervoltage occurs in the DC bus (F2026).

☞        When the phase failure lasts for a longer time, the error "F2818 Phase failure" is generated.

Warnings (Exxxx)

| Cause | Remedy |
|-------|--------|
| No mains voltage available | Check mains voltage and mains connection |
| Mains circuit breaker defective | Replace mains circuit breaker |
| Incorrect wiring | Check and correct wiring |

## 2.4.42    E2819 Mains failure

A two-phase or three-phase mains failure was detected. Power is not switched off unless undervoltage occurs in the DC bus (F2026).

☞     When the mains failure lasts for a longer time, the error "F2819 Mains failure" is generated.

| Cause | Remedy |
|-------|--------|
| No mains voltage available | Check mains voltage and mains connection |
| Mains circuit breaker defective | Replace mains circuit breaker |
| Incorrect wiring | Check and correct wiring |

## 2.4.43    E2820 Braking resistor overload prewarning

90% of the energy absorption capacity of the braking resistor have been reached.

| Cause | Remedy |
|-------|--------|
| Allowed deceleration of connected drives too high | Reduce deceleration of connected drives |
| Energy absorption capacity of braking resistor is almost exhausted | Switch power off with a delay in the case of OFF or E-STOP (for regenerative supplies) |
| Regenerated energy in machining cycle is too high | Increase cycle time or reduce maximum drive speed of application |
| Braking resistor connection is interrupted | Check wiring of external braking resistor |
| Continuous regenerative power and/or rotary drive energy is too high | Check dimensioning of braking resistor and, if necessary, increase dimensioning |

## 2.4.44    E2829 Not ready for power on

The mains voltage for power supply cannot yet be switched on for the HCS03 converter; the device is not yet ready for loading the DC bus capacitances.

| Cause | Remedy |
|-------|--------|
| Resistors for loading DC bus capacitances still are thermally loaded due to last loading process | Wait until converter clears warning E2829 |

# Index

Index

Index

Index

## Notes

R911323738