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Multi-Axis Machine Control

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Troubleshooting Guide

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Purpose of Documentation
This documentation describes …

- the use of VisualMotion Toolkit for assitance in diagnostics
- the proper steps for indentifing diagnostic faults
- and the suggested remedies for clearing faults

Record of Revisions

Description	Release Date	Notes
DOK-VISMOT-VM*-10VRS**-WA01-EN-P	08/2004	Initial release

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Table of Contents

1 VisualMotion Tools for Diagnosing

The information provided in this chapter is intended to illustrate only those screens in VisualMotion Toolkit that can assist in determining a diagnostic fault. For a complete description of VisualMotion Toolkit's menu selections, refer to *chapter 13* of the *VisualMotion Functional Description* manual.

The Diagnostics Menu

The diagnostics menu provides system information for logging and monitoring system errors and diagnostics.

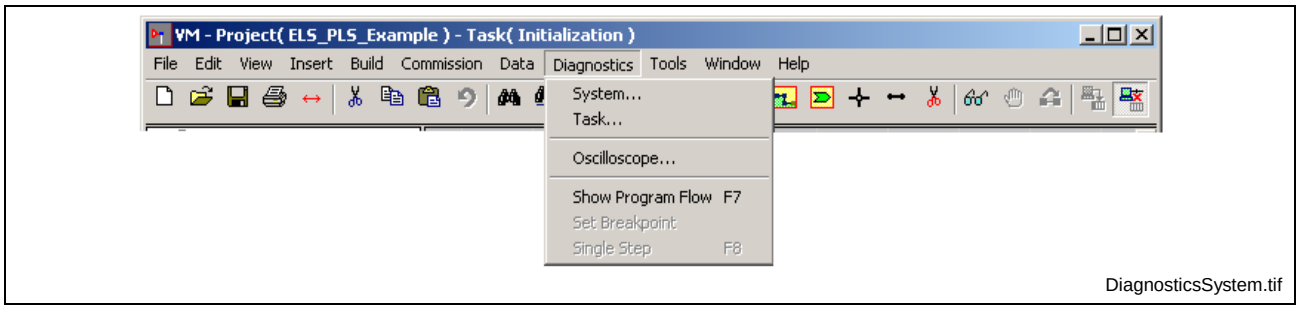


Fig. 1-1: Diagnostics Menu

System Diagnostics

The system diagnostic window displays current diagnostic information for diagnostic messages, hardware and firmware information, installed option cards, diagnostic log, hardware status, Backup flash, control load status, and Integrated PLC diagnostics. Diagnostic system information is only available in online and service modes. This section will only focus on diagnostic messages and logging.

Status and Integrated PLC

The Status tab displays the current diagnostic message with an extended message for the motion, while the Integrated PLC tab displays the logic diagnostics. The system's current mode and SERCOS phase is also displayed.

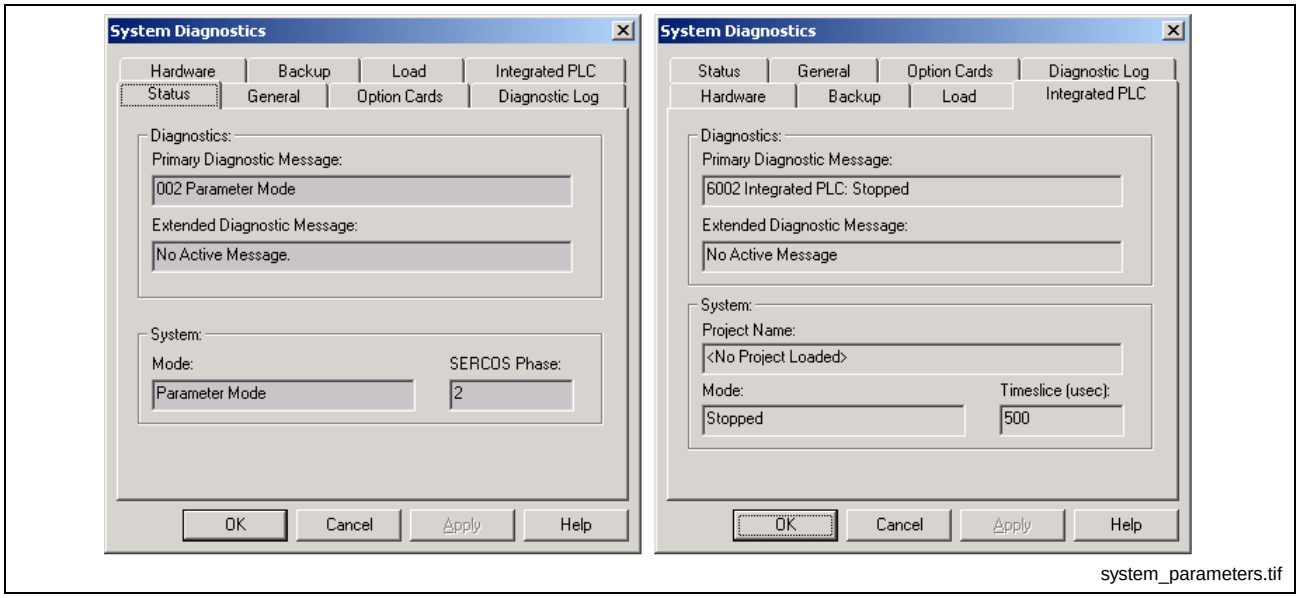


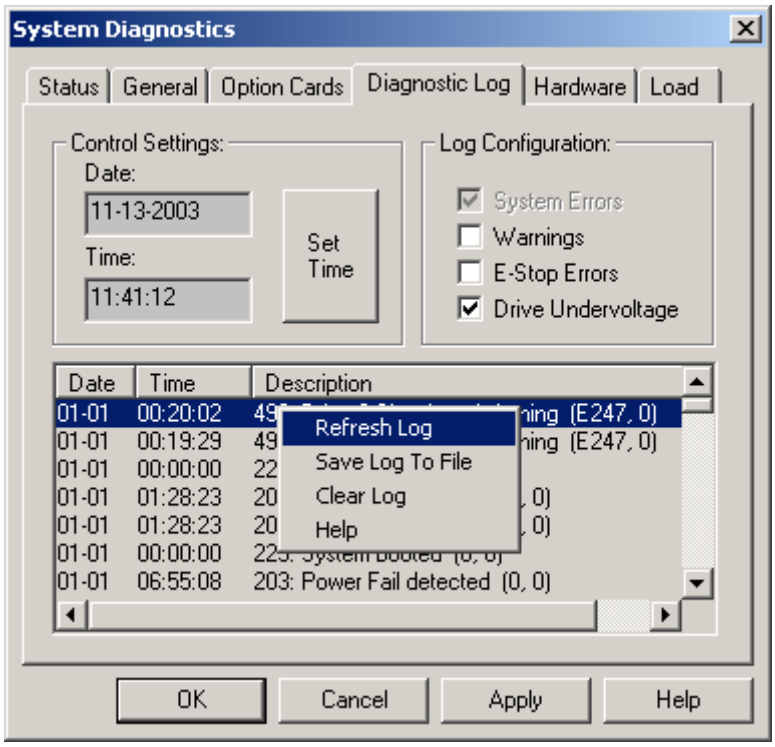
Fig. 1-2: Motion and Integrated PLC Diagnostic Message

Diagnostic Log

The diagnostic log tab displays a list of errors stored in control parameter C-0-2020. Along with the error messages, the date, time and extended error codes are displayed.

Help on Diagnostic Error

Error codes displayed in the diagnostic log contain context sensitive help. Double clicking on any error code will display help for the selected error.



diagnosticlog.tif

Fig. 1-3: Diagnostic Log Options

Date and Time

Date and time are relative to the power on of the control. After power up, select the ***Set Time*** button to retrieve the date and time from the PC. The date and time are stored in parameter C-0-0126. VisualMotion controls are equipped with a capacitor used to maintain the real-time clock for up to 3 days.

Log Configuration

The user can select what options are best suited for their application.

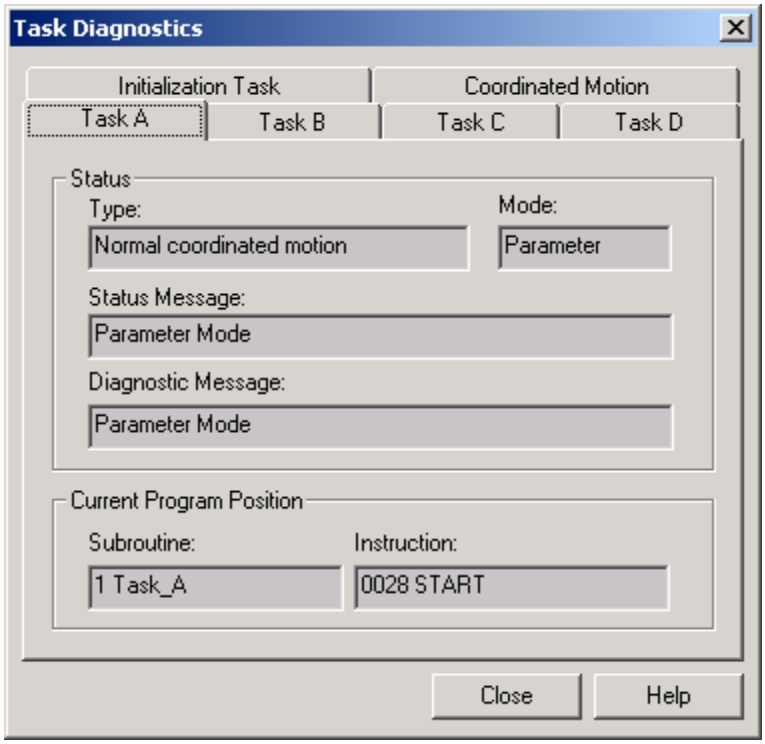
Refresh, Save and Clear Log

Right clicking over the diagnostic errors opens a small pop-up window where the user can perform the following features:

- Refresh Log
- Save Log to File
- Clear Log
- Help

Tasks Diagnostics

Selecting ***Diagnostics*** ⇒ ***Task*** opens the Task Diagnostics window and uploads data regarding all active VisualMotion tasks. Task letters are displayed only if they contain an icon program that has been compiled and downloaded to the control. All GPP 10 programs will contain the Initialization Task and Task A tabs. The Coordinated Motion tab is only visible if any task contains a coordinated program. It displays the active coordinated axes and their current X, Y, Z positions.



DiagnosticTask.tif

Fig. 1-4: Task Parameters

Status

This section indicates the type of motion programmed in the selected task for the active program and the current control mode (Parameter, Initialization, Manual or Automatic). Status and Diagnostic messages for the selected task are also displayed.

Current Program Position

This section displays the subroutine and instruction executing and its pointer. This display is useful when debugging in single-step mode. If a program is running in automatic mode, the displayed instruction is the instruction that was executing at the time that the SERCOS cycle sampled instruction execution, which may appear to be random.

Drive Overview…

Selecting ***Drive Overview*** from the ***Commission*** menu opens the DriveTop drive selection window. Double click on the desired drive to launch the DriveTop drive status window.

This window displays drive status as well as active and current values for the selected drive.

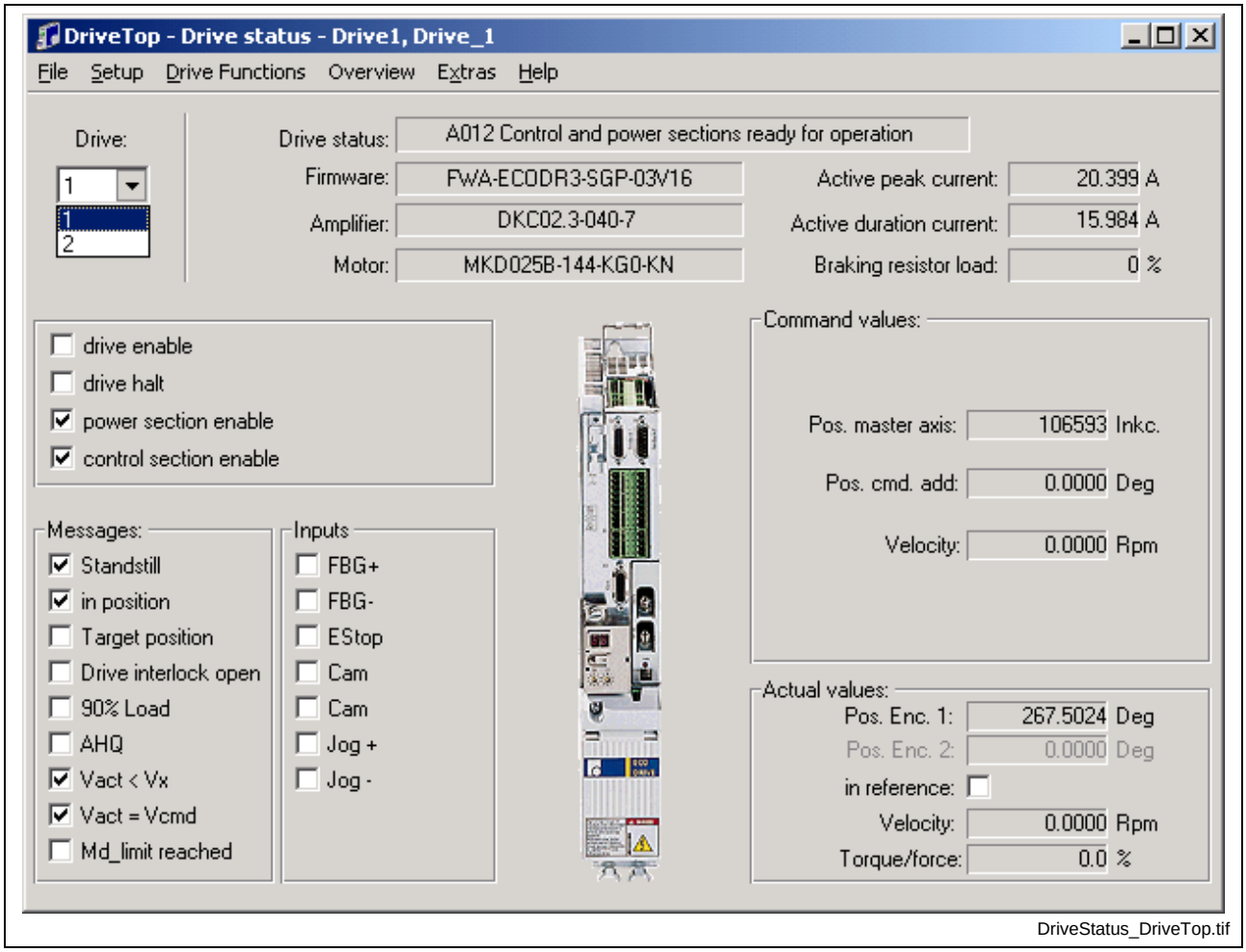


Fig. 1-5: DriveTop Drive Status

2 Monitoring and Diagnostics

2.1 System Diagnostics - Codes and Message

VisualMotion provides three types of diagnostic messages:

- Status messages
- Warning messages
- Shutdown messages

An identifying 3-digit code number precedes diagnostic messages.

Example: 400 Emergency Stop

These identifying code numbers are assigned by Bosch Rexroth and are distributed into the following groups:

- (001-199) Status messages
- (201-399) Warning messages
- (400-599) Shutdown messages

The Host can request the currently active VisualMotion diagnostic message for the control or user task from the following parameters. Drive diagnostic messages are read from the drive and displayed in VisualMotion.

Control Parameters

- C-0-0122: Displays current diagnostic message
- C-0-0123: Displays current diagnostic 3-digit code
- C-0-0124: Displays extended diagnostic message
- C-0-2020: Displays the current log of errors and warnings

VisualMotion Task Parameters

- "0**x** T-0-0122": Displays task (A-D) diagnostic message
- "0**x** T-0-0123": Displays task (A-D) status message
- "0**x** T-0-0522": Displays Init. task E diagnostic message
- "0**x** T-0-0523": Displays Init. task E status message

  (0**x** = 1-4 for Task A-D)

Drive Parameter

- "**xx** S-0-0095": Displays current drive diagnostic message
- "**xx** S-0-0375": Displays a list of drive diagnostic numbers
- "**xx** S-0-0390": Displays current drive error number
- "**xx** P-0-0009": Displays current drive error message number
- "**xx** P-0-0192": Displays a list of cleared drive error numbers in chronological order.
- "**xx** P-0-0193": Displays the time for the cleared errors in P-0-0192.

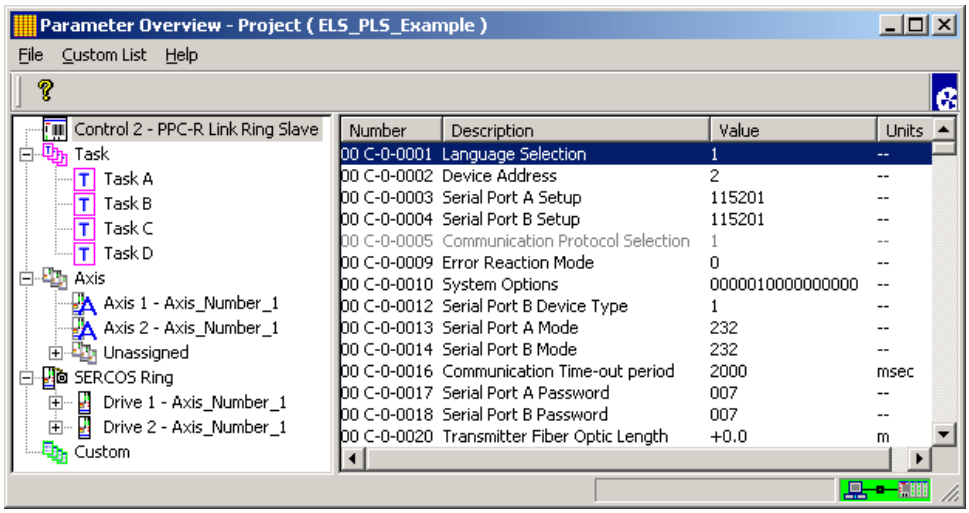
  (**xx** = 01-40 for Drive 01-40)

These diagnostic message parameters can be view by using VisualMotion Toolkit and selecting ***Data*** ⇒ ***Parameters*** from the main menu. Refer to *chapter 15* of the *VisualMotion 10 Functional Description* manual for parameter description.

Parameters

Selecting ***Data*** ⇒ ***Parameters*** opens the *Parameter Overview* window shown below. This window is used to view and modify existing Control, Drive, Task and Axis parameters.

Note: Parameters can only be viewed when VisualMotion Toolkit is either in service or online mode.



Param_Overview.tif

Fig. 2-1: Parameter Overview Window

Access to Parameters

The Parameter Overview tool controls access to parameters whether in Sercos phase 2 or Sercos phase 4. Parameters are displayed in different colors to provide a visual representation of their access level. The following table explains the color code / access combination.

Color code	Description	Access Level
grayed out text	read-only parameter or not editable in current Sercos phase	read-only
black text	parameter that can be edited	read/write
red text	used to indicate an error	read/write
green text	command parameters	read/write
blue text parameter list	parameter list that can be edited (list value displayed as 6 Xs)	read/write
grayed out parameter list	read-only parameter list or not editable in current Sercos phase	read-only

Fig. 2-2: Access to Parameters

Editing a Parameter

A parameter can be edited by double clicking the desired parameter from the Parameter Overview window or by selecting the parameter and right clicking and selecting Edit Selection. The parameter's data range is displayed above the input field. Parameters that can not be edit in the current Sercos phase display the current value in a gray field. Pressing the Help button or pressing the F1 key can access context sensitive help.

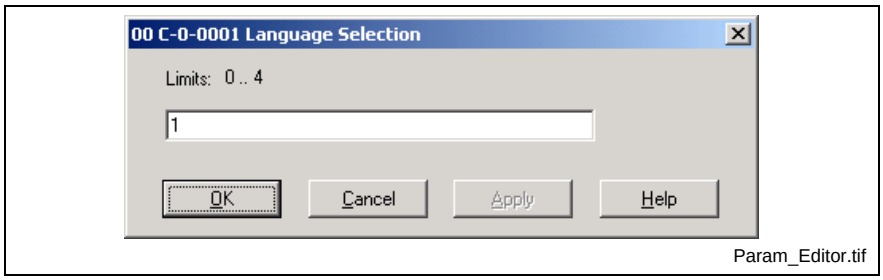


Fig. 2-3: Parameters Editor Window

DriveTop

Parameters pertaining to drive diagnostics can be viewed by selecting ***Commission*** ⇒ ***Drive Overview*** and double clicking on the desired drive in the *Drives-Project* window. This menu selection opens DriveTop.

Note: The Drive Parameter Editor used with VisualMotion 8 can only be accessed when communicating with a control using GPP 8 firmware. When communicating with GPP 10 firmware, a new version of DriveTop will be used for the commissioning digital drives.

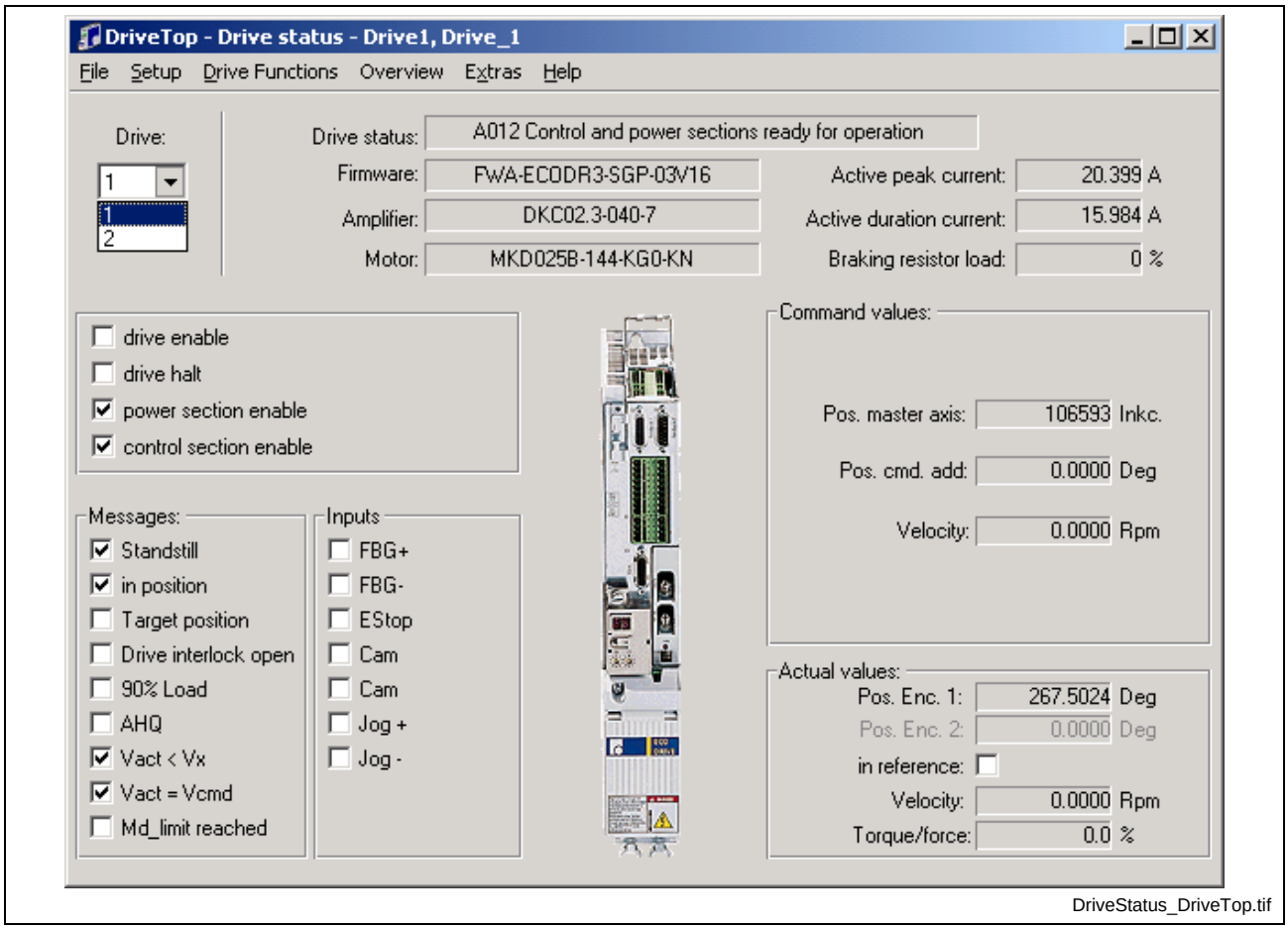


Fig. 2-4: DriveTop Drive Status

Select the drive number containing the diagnostic error code and the **Status** line will display the drive diagnostic message from parameter S-0-0095. Refer to the relevant *Digital Drive* manual for descriptions of drive diagnostics.

2.2 Control Startup Messages

On power up, the control's boot-up sequence displays a series of numbers and/or letters on the H1 display. These represent each step in the initialization process. The display stops on a numeric value if a step fails. Additionally, the H2 distortion LED flashes with a defined code if the Sercos loop is closed.

PPC Boot-Up Sequence

H1 Display		(Distortion H2 LED)	Description
PPC-R	PPC-P		
DL	d	steady on	The control is in download mode. This can occur if a blank compact flash memory card was installed in the control containing no/wrong bootloader and/or control firmware.
-01	1	blinks 4 times on failure	Checksum test (Flash application) Flash encountered a programming error, hardware failure in PFM module or hardware failure in PPC-R.
-02	2	blinks 5 times on failure	SDRAM test. Address or data bus is faulty. Hardware failure in PFM module or hardware failure in PPC-R.
-03	3	no error evaluation	Not present on current standard ROM versions.
-04	4	blinks 6 times on failure	CRC32 Checksum test (Flash application)
-05	5	blinks 2 times on failure	Copies application code from FLASH to RAM and checks correct data using CRC32. Initializes processor registers, data cache, instruction cache, disables interrupts and initializes data area. Flash encountered a programming error, hardware failure in PFM module or hardware failure in PPC-R.
-06	6	no error evaluation	Initializes decrementer, floating point unit, interrupt controller and serial ports
-07	7	no error evaluation	Initializes operating system (pSOS, pROBE). Checks BSP variables Checksum and initializes serial driver. Initializes global setup, pROBE I/O, BSP variables and application variables. Adjusts runtime system variables. Builds component configuration tables. Sets up lower serial driver in case settings changed.
-08	8	no error evaluation	Start pROBE (which starts pSOS, which starts the application).

Table 2-1: PPC-R Boot-Up Sequence

Control Firmware Sequence

H1 Display		Description
PPC-R	PPC-P	
-20	A	Obtains hardware information and clears memory if new firmware is detected. Initializes diagnostic system, CRC calculations and dynamic memory allocation.
-21	b	Initializes parameter system and path planner
-22	C	Initializes file system
-23	d	Initializes ELS system, CAM, PLS, PID, Oscilloscope, Sercos and Link ring (if present)
-24	E	Initializes communication structure (serial and Ethernet) and PLC interface
-25	F	Creates and initializes several operating system task
-26	G	Starts several operating system task
-27	H	Enables interrupts, initializes Fieldbus interfaces (if present), Option Card PLS (if present), starts Link Ring (if present), initializes temperature sensor and starts operating system tasks.

Table 2-2: PPC-R Firmware Sequence

2.3 Status Messages (001-199)

A Status Message indicates the normal operating status of an axis, task, or the system when there are no errors. A change in status that generates a new status message overwrites the previous message. No user acknowledgment is required for a change in a status message.

Status messages can be viewed within VisualMotion Toolkit (VMT) under menu selection ***Diagnostics*** ⇒ ***System***.

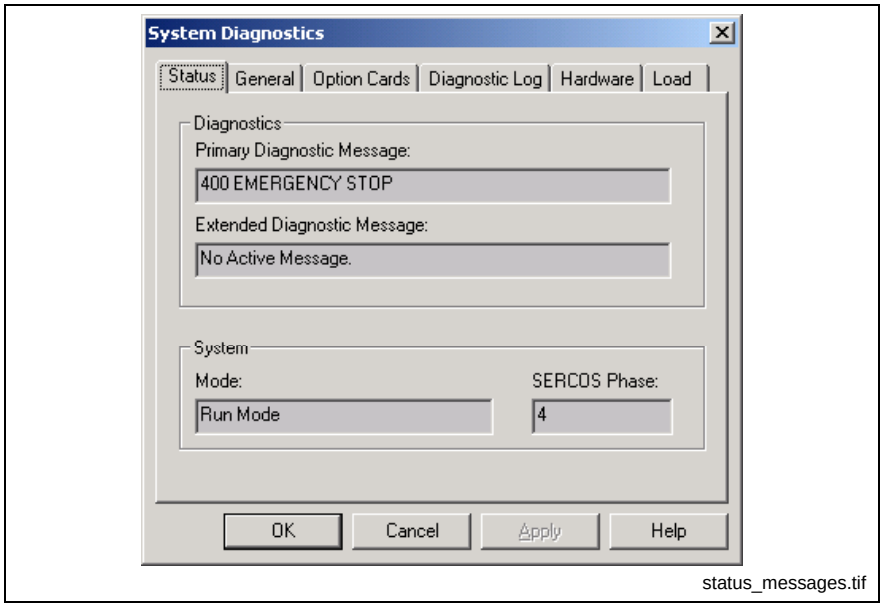


Fig. 2-5: Viewing Diagnostic Status Messages

001 Initializing System

The control is initializing the executive firmware, the Sercos ring, and other devices at power-up or exit from parameter mode.

002 Parameter Mode

The control is in parameter mode, and the drives are in Sercos phase 2. The control can be placed in parameter mode by setting bit 1 of control register 1 or bit 1 of control parameter C-0-0011.

003 Initializing Drives

Sercos has been reconfigured and the fiber optic ring is being initialized.

004 System is Ready

The system has been initialized and is ready for operation.

005 Manual Mode

All user program tasks are in manual mode.

006 Automatic Mode: ABCD

The user program tasks indicated at the end of the message are in automatic mode, and the rest are in manual mode.

Example: "Automatic Mode: B" indicates that only Task B is in automatic mode.

007 Program Running: ABCD

The user program tasks indicated at the end of the message are running, and the rest are not running or are single stepping.

008 Single-Stepping: ABCD

The user program tasks indicated at the end of the message are in single-step mode. The other tasks are not running.

009 Select Parameter Mode to Continue

An error occurred and cleared during system initialization, but the error condition was not corrected. Switch into Parameter Mode to continue.

010 Breakpoint Reached: ABCD

The user tasks indicated at the end of the message have reached a user program breakpoint, and the rest of the tasks are not running.

018 Please cycle power to continue

This status message is displayed when system parameter C-0-0996, *Clear Program and Data Memory*, is used to reset system memory. Press the S2 Reset button on the PPC-R to cycle power to the control. Error message 492 Programs were lost, see ext. diag., will follow. Transition control register 001 bit 1 from 0 -> 1 and then from 1 -> 0. This will switch the control in and out of parameter mode. Use the archive function under the file menu in VisualMotion Toolkit to restore the system.

019 Executing User Initialization Task

This status message is displayed while the Initialization task is running. Typically, the display is momentary and it's duration varies based on the length and complexity of the Initialization task program flow. The initialization task is executed during the control's Sercos phase 2 to Sercos phase 4 transition. If the initialization task runs longer than 30 seconds, error code 550 User Initialization Task Timeout will be displayed.

2.4 Warning Messages (201-399)

Warning messages occur when a non-critical condition exists in the system. User tasks remain in operation and all associated axes remain enabled.

Clearing a Warning

However, a warning may be a notification of an impending shutdown condition. The condition that caused the warning should be corrected and acknowledged to the system. The user acknowledges and clears a warning with a low-to-high (0->1) transition of bit 5 (*Clear_All_Errors)* of control register 1.

Logging Warnings in the Diagnostic Log

Warning messages can be logged into the diagnostic log by selecting ***Diagnostics*** ⇒ ***System***, selecting the Diagnostic tab and checking "Warnings" in the *Log Configuration* section. By default, warning messages are not logged.

201 Invalid jog type or axis selected

This message is issued before a coordinated I/O jog when an invalid type or axis is selected.

Causes:

1. The axis selected for jogging is not defined as a coordinated motion axis.
2. An axis defined for coordinated motion is commanded to jog as a single axis or an axis defined for single axis is commanded to jog as coordinated motion.

Remedy:

Ensure that the selected Axis icon is programmed for either coordinated motion or single-axis motion and that the jogging command selected match the axis selected.

202 Drive %d is not ready

Cause:

An attempt to jog axis for drive %d (%d = drive number) in manual mode was commanded before the drive was enabled (AF).

Remedy:

1. Clear error and wait for drive to be enabled before jogging.
2. Check the axis disable bit in AxisD_Control register under ***Data*** ⇒ ***Registers***. If the bit is high (1), the drive is disabled. Change the state to low and restart program.
3. Check the fiber optic connections and power to drive.

203 Power Fail detected

Cause:

Power was removed to the system while a program was running.

Remedy:

Make certain that all connections are correct and connected and restart system.

204 Sercos ring was disconnected

Cause:

The Sercos ring was disconnected before a shutdown error was cleared. The ring is now initialized. This message allows detection of an intermittent break in the fiber optic ring.

Remedy:

1. To continue, activate the clear input.
2. If error continues, replace fiber optic cable.
3. Ensure that the DSS card address is properly selected and has not changed.

205 Parameter transfer warning in Task %c

There is an error in the parameter transfer instruction. This indicates a warning condition that does not shutdown the task. A communication error message is displayed in the diagnostic message for the task %c (%c = task letter) in which the error occurred (T-0-0122). Information on the actual parameter number that caused the error is provided in extended diagnostics (C-0-0124).

Using VisualMotion Toolkit,

Parameter T-0-0122: Task diagnostic message can be viewed under ***Diagnostics*** ⇒ ***Tasks***

Parameter C-0-0124: Extended diagnostic can be viewed under ***Diagnostics*** ⇒ ***System***

Cause:

The parameter format, parameter number, or stored value may be invalid.

Remedy:

Verify that the Param icon (parameter transfer) is valid for the program in task %c.

207 Axis %d position limit reached

Cause:

The negative or positive travel limit of axis %d (%d = axis number) was reached, preventing a jog from occurring.

Remedy:

Clear error and move axis to a position within drive parameters
S-0-0049: Positive position limit value
S-0-0050: Negative position limit value
Current position can be view under ***Commission*** ⇒ ***Drive Overview***

208 Lost Fieldbus Connection

Cause:

A Lost Fieldbus connection is issued when cyclic communications between the slave and master fieldbus interfaces are no longer present. This message is issued when register 19 bit 4 transitions from high (1) to low (0). The error is hardware related as is normally caused by…

- a bad or disconnected cable
- a hardware related problem with the Fieldbus interface on the control

Note: Warning message **208** is only issued while in Sercos phase 4 if the Fieldbus Error Reaction in the Fieldbus Slave Configuration window is set to warning.

Remedy:

1. Check and verify all cable connects between the slave and master Fieldbus connections.
2. Contact Bosch Rexroth service for assistance.

209 Fieldbus Mapping Timeout

Cause:

The Fieldbus Mapper continually scans the system for sufficient resources to process the cyclic data mapping list (2600-list). If 10 out of 10 attempts of the mapping list update are missed, the system is considered to have insufficient resources. Error 209 Fieldbus Mapper Timeout is generated if the selected error reaction is set as "Warning," (Parameter C-0-2635), in the Fieldbus Slave Configuration window.

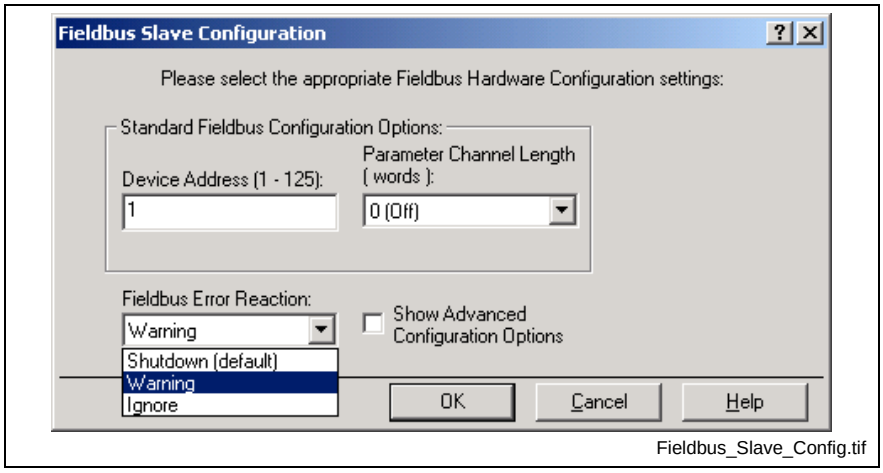


Fig. 2-6: Fieldbus Slave Configuration

Remedy:

The PPC-R mapping list is scanned every 4 ms for GPP 10 and fixed at 8 ms for GPP 8. If this error occurs, contact Bosch Rexroth Service for assistance.

210 File System Defrag: %d completed

Cause:

VisualMotion user programs, I/O user configurations (C-0-2017), Fieldbus mapping and CAMs are stored to flash into a File System on the control's memory card. As programs are deleted from flash, unusable areas of memory are created. The defragmentation program runs on power up or when request serially. Actual compression only takes place if 60% of unusable memory exist and available unused memory is less than 256K.

Remedy:

The defragmentation process will run without disrupting the active program. VisualMotion programs and necessary files are copied and processed from RAM memory on the control.

211 Program- & Data memory cleared

Cause:

This warning message is written to VisualMotion's diagnostic log when system parameter C-0-0996, *Clear Program and Data Memory*, is used to reset system memory.

Remedy:

Refer to 018 Please cycle power to continue for details.

212 Option Card PLS Warning, see ext. diag.

Cause:

This is a general warning message for the Option Card PLS. It will always be accompanied by an extended warning diagnostic message.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostics C-0-0124	**Description**
003: Table is not initialized	The Option Card PLS can switch from one set of date to another. However, the data needs to be prepared before.
0*yy*: General error	An error happened during the communication between PPC and Option Card PLS. yy is an error number (1, 4, 5, 6, 10, 16 or 17);
Error yy while initializing Option Card PLS	An error occurred during parameterization of the Option Card PLS. This error is mainly related to the Option Card PLS hardware. The Option Card PLS needs to be recognized by the hardware and firmware is downloaded and started during power up. Errors can occur during this download. Also if one tries to start a command (C-0-2903, C-0-2905) on the Option Card PLS without a Option Card PLS being present, than this error will be issued. yy is an error number that specifies the failed operation.
065: Switch *yy* outside position limit	Switch number *yy* is not within the position limits of its associate Option Card PLS master.
066: Master number > 32 or master not present	The Option Card PLS master number is either not valid, or the master is not present in the system. Check C-0-2941.

Table 2-3: Option Card PLS Warning Extended Diagnostics

213 Sercos cycle time changed

Cause:

This status message is written to VisualMotion's diagnostic log when control parameter C-0-0099 is automatically modified by the control. Refer to control parameter C-0-0099 for details.

214 PCI Bus Cyclic Mapping Timeout

The control and PLC can communicate across the register channel of the PCI Bus dual port RAM. The rate in which each device accesses the register channel varies by device and control firmware.

- PPC-P11.1 with GMP 10 firmware uses Sercos Cycle time C-0-0099
- Soft PLC over the PCI Bus uses program cycle time

Cause:

The Fieldbus Mapper continually scans the system for sufficient resources to process the PLC cyclic data mapping list C-0-2600. If 10 out of 10 attempts of the mapping list update are missed, the system is considered to have insufficient resources. This warning error message is issued when control parameter C-0-2635 (*Fieldbus/PLC Error Reaction*) is set to warning (0x0001) and C-0-2613 (*Fieldbus/PLC Cyclic Channel: Timeout Counter*) increments by 1.

Remedy:

The control's mapping list is scanned every 4 ms for GPP 10 and fixed at 8 ms for GPP 8. If this error occurs, contact Bosch Rexroth Service for assistance.

215 RECO I/O Failure, see ext. diag.

Cause:

This message is generated when GPP is configured to react to RECO I/O errors with a warning.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
Module Initialization Error, Slot 2, RECO3	An error occurred during the initialization of the I/O module in slot 2 of the Sercos RECO controller rack at Sercos address 3.
Cyclic Communications Error, Slot 3, RECO 0	A cyclic communications error occurred with the I/O module in slot 3 of the Local RECO I/O controller rack.
Incorrect Module, Slot 4, RECO 3	The I/O module found in slot 4 of the Sercos RECO I/O controller rack at Sercos address 3 is not consistent with the controller's configuration. Hot-swapping I/O modules will result in this error and could cause permanent damage.
24V Error, Slot 3, RECO 0	A 24V error exists at the RECO I/O module in slot 3 of the Local RECO I/O controller rack.
Module Error Code 7, Slot 3, RECO 0	The I/O module in slot 3 of the Local RECO rack is reporting error code 7
Unknown Error, RECO 3	An undefined error has occurred on the Sercos RECO I/O controller at Sercos address 3.

Table 2-4: Extended Diagnostics for RECO I/O Failure

216 Control PLS %d warning, see ext. diag

Cause:

A drive's primary or secondary encoder can be configured as a PLS master and assigned to a PLS switch. This warning occurs when the drive's modulo value, S-0-0103, is smaller than the value assigned to the PLS switch. An extended diagnostic error message will indicate the PLS switch. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Example:

Drive's modulo value is 360° and the user enters the following values for…

PLS1: Switch 1 is set to turn ON at 200° and OFF at 400°

The switch's OFF position is greater than the drive's modulo value.

Modulo values are dependent upon the application. For ELS applications, the modulo value is fixed at 360°. For all other, the modulo value is set in drive parameter S-0-0103 and dependent upon the application's specifications.

Remedy:

Verify that the assigned PLS switch limits are correct for the application. Correct any values that are beyond the drive's modulo value and download a new PLS configuration to the control.

217 PCI Bus Communication, see ext. diag

Cause:

During power up, the PCI Bus communication is initialized with the control. This warning is issued when a communication error is encountered. Refer to the extended diagnostic message for details.

Remedy:

Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
PLC/PCI communication not started	Register 19, bit 2=0, bit 1=0
Unknown PLC firmware	Register 19, bit 2=0, bit 1=1
PLC/PCI does not respond to initialization	Register 19, bit 2=1, bit 1=0
File: %s Line: %d	%s = filename e.g. MTS_PLC %d = line number e.g. 1395 Severe software failure
PLC in error state or not running	C-0-2635 = 0x0001 and the PLC life counter stops. The ERROR bit is set in the PLC status in the DPR, or the RUN bit is not set

Table 2-5: Extended Diagnostics for PLC Communication

218 PCI Bus Register Mapping Timeout

The control and PLC can communicate across the register channel of the PCI Bus dual port RAM. The rate in which each device accesses the register channel varies by device and control firmware.

- PPC-P11.1 with GMP 10 firmware uses Sercos Cycle time C-0-0099
- Soft PLC over the PCI Bus uses program cycle time

If the control attempts to read or write to the register channel while the PLC is currently reading or writing data, control parameter C-0-2651 (*PLC Register Channel: Current number of misses)* is incremented by a count of 1. When C-0-2651 reaches a maximum of 10 misses, C-0-2653 (*PLC Register Channel: Timeout counter)* increments by 1.

Cause:

This warning error message is issued when control parameter C-0-2635 (*Fieldbus/PLC Error Reaction*) is set to warning (0x0001) and the PLC Register Channel: Timeout counter (C-0-2653) increments by 1.

219 PCI Bus Lifecounter Timeout

The Soft PLC life counter is incremented by 1 every Soft PLC program cycle over the PCI Bus. Every increment is an indication that the Soft PLC is functioning and communicating properly. The control monitors the Soft PLC life counter value every Sercos cycle. If the control does not read a different Soft PLC life counter value, then C-0-2643 (*PLC Lifecounter Check: number of retries*) increments by a count of 1. When C-0-2643 reaches the user-defined maximum number of misses, C-0-2646 (*PLC Lifecounter Check: number of timeouts*) increments by 1.

Cause:

This warning error message is issued when control parameter C-0-2635 (*Fieldbus/PLC Error Reaction*) is set to warning (0x0001) and the PLC Lifecounter Check: number of timeouts (C-0-2643) increments by 1.

220 Excessive deviation in PMG%d, see ext. diag.

If the PMG Configuration parameter (C-0-3205, C-0-3215, C-0-3225, C-0-3235, C-0-3245, C-0-3255, C-0-3265, C-0-3275) bit 2 is set to 0 (Warning), the group is enabled and the current deviation exceeds the allowed deviation, this warning is displayed. The axis that caused the deviation will be listed in the extended diagnostic message. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

221 Excessive Master Position Slip Deviation

The slip between the Primary and Secondary ELS Masters has exceeded the value of the Maximum Deviation Window. (Slip Mon configured for Warning reaction)

222 ELS Config. Warning, see ext. diag.

Cause:

The jogging velocity program variable G#_JOG_VEL (# = *ELS Group number*) for the specified ELS Group exceeded the maximum ELS velocity for the current Sercos cycle. The ELS Group can still be jogged but will be limited to the value specified in the extended diagnostic. This error is issued with the following extended diagnostic message:

Extended Diagnostic C-0-0124	Details
"Group ***%d*** Jog. Vel. Limited to ***%.f*** "	%d = ELS Group number 1-8 %.f = Max. ELS velocity less 1 RPM

Table 2-6: ELS Config. Warning Extended Diagnostic

Remedy:

To correct the problem, the ELS Group's jogging program variable G#_JOG_VEL must be set to a value that does not exceed the calculated Max. ELS Velocity Limit Less 1 RPM.

Maximum ELS Velocities

The maximum ELS velocity limit is calculated as a function of the current Sercos cycle time.

Sercos Cycle Time	Max. ELS Velocity Limit (180° / Sercos Cycle)	Max. ELS Velocity Limit Less 1 RPM
2 ms	15,000 RPM	14,999 RPM
4 ms	7,500 RPM	7,499 RPM
8 ms	3,750 RPM	3,749 RPM
16 ms	1,875 RPM	1,874 RPM

Table 2-7: Maximum ELS Velocities

223 PCI Bus reset occurred, cyclic data are invalid

This warning is used with the PPC-P11.1 control and indicates that power to the PC's PCI bus was reset. All control data on the DPR are reset to 0 and requires a re-initialization of the system. Control parameter C-0-2635 must be set to 0X0001 (warning) for this warning to be generated.

225 System booted

This warning only appears in the diagnostic log as an indication that power to the control was cycled.

226 RS485 Serial Communication Error (port X1%d)

A serial communication hardware or messaging error has occurred in the control's RS485 serial interface. The serial port number is identified in the warning and the extended diagnostic messages listed in the following table describe the error.

Error Type	Hexadecimal Error Code	Description
Hardware	0x0203	invalid baud rate
	0x0230	framing error
	0x0231	parity error
	0x0232	overrun error
Messaging	0x000C	invalid command class
	0x000D	checksum error
	0x000E	invalid command subclass
	0x0060	duplicate Message Sequence Number (MSN)

Table 2-8: Warning 226 Extended Diagnostics

227 Control Over-temperature Warning

This warning occurs when the value in control parameter C-0-0127 is greater than or equal to 70 °C.

228 Control - SYSTEM WARNING

This error indicates a problem in the control executive firmware. Refer to the extended diagnostics parameter (C-0-0124) for more information or select ***Diagnostics*** ⇒ ***System*** within VisualMotion Toolkit, and call the Bosch Rexroth service department for assistance.

2.5 Shutdown Messages (400 - 599)

Shutdown messages are issued in an emergency situation or when the system or drives cannot operate correctly.

When an error occurs, the control determines which user task(s) to shutdown based on whether the error is fatal or non-fatal and the setting of control parameter C-0-0010. Refer to chapter 12, *Error Reaction*, of the *VisualMotion 10 Functional Description* for details.

Clearing an Error

The condition that caused the shutdown message should be investigated and corrected before clearing the error. Errors are cleared with a low-to-high (0->1) transition of bit 5(*Clear_All_Errors*) of control register 1.

400 EMERGENCY STOP

Cause:

The Emergency Stop input is active (low). The E-Stop circuit has been opened due to activation of the E-Stop push button or external logic. All drives on the ring are disabled.

Remedy:

Release the E-Stop button or correct the error condition. Clear error on control. Set Emergency Stop input active (high) and restart program.

401 Sercos Controller Error: %02d

Cause:

The Sercos communications controller has indicated an error on the Sercos ring.

Remedy:

Check the fiber optic connections, the addresses set on the drives, and the drive configuration.

402 Sercos Config. Error: see ext. diag.

Cause:

An error in the Sercos service channel has occurred when the control was initializing the timing and scaling parameters. The extended diagnostic (C-0-0124) gives a description of the error. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Remedy:

If the extended diagnostic indicates a timing error or data limit error, check the amount of data or drives on the ring and the minimum cycle time parameter C-0-0099. Otherwise, check the fiber optic connections, the addresses set on the drives, and drive firmware versions.

403 System Error see ext. diag.

Cause:

A communication problem has occurred in the Sercos ring. The extended diagnostic displayed is, “Dxx: Multiplex AT Error,” where xx is the drive number. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Remedy:

Recycle system power. If recycling power does not resolve the error, contact Bosch Rexroth service for assistance.

405 Phase %d: Drive did not respond

Cause:

A time-out in the Sercos ring occurred when the control did not receive a response from the drive during Sercos phase %d (%d = Sercos phase number) initialization. The control sent out a signal to the drive, but the drive did not respond. This distinguishes a communication error from an actual Sercos phase switch error.

Remedy:

Check the fiber optic connections, the addresses set on the drives, and the drive firmware versions.

407 Drive %d Phase 3 Switch Error

Cause:

The Sercos phase 3 switch command failed for drive %d (%d = drive number). This usually indicates that configuration parameters for the drive are invalid or have not been saved. This message is displayed when an error occurs while the drive is switching from Sercos phase 2 to Sercos phase 3.

Note: Do not clear the error or switch to parameter mode before viewing a list of invalid parameters. Doing so will clear any chance of viewing invalid parameters.

Remedy:

1. View drive diagnostic under ***Commission*** ⇒ ***Drive Overview.*** If the drive status indicates parameters are invalid or lost, display the Sercos phase 2 error parameter list for Drive %d (Step 2.)
2. To view Sercos phase 3 switch errors for the specific drive, select ***Data*** ⇒ ***Parameters,*** select the appropriate drive and double click on Sercos parameter S-0-0021. This parameter will list all parameters that are outside of their allowable ranges. Once the list is displayed, switch to parameter mode and change the invalid parameters or download a valid parameter file to the drive.
3. If the drive is not communicating, check the connections and the addresses. If drive parameters were just downloaded, switch back into parameter mode to reinitialize the interface.

409 Sercos Disconnect Error

The Sercos fiber optic ring was disconnected or a drive connected to the ring was powered down while in Sercos phase 3 or 4. A more descriptive message will be displayed in the extended diagnostic control parameter C-0-0124.

Cause:

1. A fiber optic cable has been disconnected or damaged somewhere in the Sercos ring.
2. A drive in the system may contain old firmware.

Remedy:

1. Check the fiber optic connections, the addresses set on the drives, and the drive firmware versions.
2. If a new drive was added to the Sercos ring, make sure it contains current drive firmware.

411 Drive %d Phase 4 Switch Error

Cause:

The Sercos phase 4 switch command failed for drive %d (%d = drive number). This usually indicates that configuration parameters for the drive are invalid or have not been saved. This message is displayed when an error occurs while the drive is switching from Sercos phase 3 to Sercos phase 4.

Note: Do not clear the error or switch to parameter mode before viewing a list of invalid parameters. Doing so will clear any chance of viewing invalid parameters.

Remedy:

1. View drive diagnostic using DriveTop. If the drive status indicates parameters are invalid or lost, display the Sercos phase 3 error parameter list for Drive %d (Step 2).
2. To view Sercos phase 4 switch errors for the specific drive, select ***Data*** ⇒ ***Parameters,*** select the appropriate drive and double click on Sercos parameter S-0-0022. This parameter will list all parameters that are outside of their allowable ranges. Once the list is displayed, switch to parameter mode and change the invalid parameters or download a valid parameter file to the drive.
3. If the drive is not communicating, check the connections and the addresses. If drive parameters were just downloaded, switch back into parameter mode to reinitialize the interface.

412 No drives were found on ring

Cause:

No drives were found when the control initialized the Sercos ring to Sercos phase 1.

Remedy:

Check the addresses set on the drives, in the VisualMotion program, and in the control parameters. Also, check that power is applied to all the drives and that the fiber optic connections are correct.

414 Parameters were lost

System, task, and axis parameters were lost, and default values have been loaded.

Cause:

This error has occurred for one of the following reasons:

- new firmware was loaded on the PFM memory card
- or an internal system error has corrupted the memory

Remedy:

Perform a selective restore using VisualMotion's Archive tool under ***Commission*** ⇒ ***Archive***. Browse for the directory containing the latest backup and click the ***Next*** button. Click on the ***Help*** button for details on how to perform a selective restore.

415 Drive %d was not found

Drive %d (%d = drive number) that is used in a program or selected in the system parameters was not found on the Sercos ring.

Cause:

1. The axis icon in the VisualMotion program is specifying an axis number or name that is recognized by the system.
2. The Sercos card addresses of two or more drives are set to the same number.

Remedy:

1. Verify that the Axis icon  in the VisualMotion program is programmed with the correct axis number or variable label.
2. Verify that all drives have unique Sercos card addresses anywhere from 1 to 40.

416 Invalid Instruction at %04x

Cause:

An invalid user program instruction was found by the control during compilation.

Remedy:

Recompile the program from the PC and download it again. If the error still occurs, check the source program for an instruction that may not be supported in this firmware version.

417 SYSTEM ERROR: pSOS #%04x

Cause:

An internal control operating system error has occurred. This error is generated due to a severe software fault.

Example: A Task can not be created or no memory is available.

Remedy:

Call Bosch Rexroth Service for assistance.

418 No program is active

Cause:

No active user program was found on the control during initialization.

Remedy:

Activate a user program using VisualMotion Toolkit (VMT).

1. Open a file in VMT using the ***File*** ⇒ ***Open*** menu command.
2. Save, Download and Compile the VisualMotion program
3. Using ***Build*** ⇒ ***Program Management***, activate the program.
4. Once the program is active, clear the error.

419 Invalid Program File: code = %d

Cause:

A checksum or file format error was found in the active program file. The file may be corrupt or missing information.

Remedy:

Recompile the program using VisualMotion Toolkit and download it again. If the error still occurs, call Bosch Rexroth Service for assistance.

420 Drive %d Shutdown Error

Cause:

Drive %d (%d = drive number) has issued a shutdown error, which disables motion.

Remedy:

1. Check the Sercos Drive Status message (Drive parameter S-0-0095) for a description of the error.
2. Using VisualMotion Toolkit, open the DriveTop under menu selection ***Commission*** ⇒ ***Drives*** and view the status line for a description of the drive error. Refer to the relevant *Digital Drive* manual for more information.

421 User Program Stack Overflow

Cause:

The subroutine call stack for a user program task has overflowed. The stack is an area of dedicated memory. The most likely scenario is that there are too many nested subroutines in a task. A nested subroutine is a subroutine within another subroutine.

Remedy:

Check the program for the following conditions:

- there is not a return for every subroutine call
- a subroutine is calling itself
- program flow has caused multiple returns
- more than 10 subroutines are nested

422 Parameter transfer error in Task %c

There is an error in the parameter transfer instruction. A communication error message is displayed in the diagnostic message for task %c (%c = task letter) in which the error occurred (T-0-0122). Information on the actual parameter number that caused the error is provided in extended diagnostics (C-0-0124).

Using VisualMotion Toolkit,

Parameter T-0-0122: Task diagnostic message can be viewed under ***Diagnostics*** ⇒ ***Tasks***

Parameter C-0-0124: Extended diagnostic can be viewed under ***Diagnostics*** ⇒ ***System***

Cause:

The parameter format, parameter number, or stored value may be invalid.

Remedy:

1. Use Program Flow <F7> to locate parameter transfer instruction.
2. Verify that the parameter transfer instruction  is valid for the program in task %c.

423 Unimplemented Instruction

Cause:

The command instruction or icon is not recognized by the current version of GPP, GMP firmware or VisualMotion Toolkit software.

Example: A new icon function is used with older control firmware. Using the show program flow <F7> function can identify the icon.

Remedy:

Recompile the program without the instruction indicated by the current instruction pointer or update the firmware or VisualMotion software. Contact Bosch Rexroth for updated firmware and software information.

425 Instruction error: see Task %c diag.

Cause:

An error has occurred in a user program instruction. A more specific message is displayed in the diagnostic message for task %c (%c = task letter) in which the error occurred (T-0-0122). This error usually applies to coordinated motion instructions.

Remedy:

Verify that the following icons are setup properly and do not contain variables with negative values or incorrect axis numbers.

Wait  ELS mode  ELS Stop  Text message 

426 Drive %d is not ready

Cause:

Programmed motion was commanded to the axis of drive %d (%d = drive number) before the drive was enabled (AF).

Remedy:

1. Clear error and wait for drive to be enabled before commanding motion.
2. Check the axis disable bit in Axis%d_Control register under ***Data*** ⇒ ***Registers***. If the bit is high (1), the drive is disabled. Change the state to low and restart program.
3. Check the fiber optic connections and power to drive.

427 Calc: invalid table index %d

An invalid table index %d (%d = index number) was specified using the Calc icon.

Cause:

1. In a user program calculation expression, the index to a point or event table is invalid.
2. A value used in the calculation expression is not accounted for when either a points or event table was generated.

Remedy:

1. Locate the Calc icon with the error, if more than one is used, by using program flow <F7>.
2. If the value in the Calc icon is incorrect, change it to an allowable value and clear the error.

428 Calc: division by zero

Cause:

In a user program calculation instruction, an attempt was made to divide a number by zero.

Remedy:

1. Locate the Calc icon with the error, if more than one is used, by using program flow <F7>.
2. Modify the Calc icon and remove any zero expression to the denominator. The denominator can be expressed as an integer or a variable.

429 Calc: too many operands

Cause:

In a user program calculation instruction, too many operands (+, -, *, /, etc.) and operators were used in the string. Use the show program flow <F7> function to locate the Calc icon containing the error.

Remedy:

Split the calculation operation using more than one Calc icon in consecutive order.

430 Calc: invalid operator

Cause:

An invalid arithmetic operator was found in a user program calculation instruction. The operator used is not supported by the current version of VisualMotion Toolkit.

Remedy:

Check the compiler and firmware version numbers, and call Bosch Rexroth service for assistance in upgrading software. Version information can be found for menu selection ***Diagnostics*** ⇒ ***System.***

431 Calc error: see Task %c diag.

Cause:

An error has occurred in a user program calculation instruction.

Remedy:

Refer to task %c diagnostic message (%c = task letter) for a communication error message.

432 Calc: too many nested expressions

Cause:

In a user program calculation instruction, more than 16 operations were pending. See the diagnostic message for each task to find the task and the instruction.

Remedy:

Check the number of operands in the expression, looking for unbalanced parentheses or incomplete expressions.

433 Setup instruction outside of a task

Cause:

This error is issued if initialization icons are found in a subroutine.

Remedy:

Initialization icon should be place in the initialization task. Refer to *chapter 14* of the *Functional Description* for a complete list of initialization icons.

434 Axis %d configured more than once

Cause:

Axis %d (%d = axis number) was selected more than once in the Axis icon  .

Remedy:

Modify the program so that the axis is selected once.

435 Axis %d is not assigned to a task

Cause:

Axis %d (%d = axis number) was not assigned to the task using the Axis icon but was specified in a command.

Remedy:

Modify the program so that the axis is selected and configured for the correct axis number or variable label used in the program.

436 General Compiler Error: %04x

Cause:

An error was found in a compile-time instruction (TASK/AXES, KINEMATIC) after program activation.

Remedy:

See the task diagnostic message for a description under menu selection ***Diagnostics*** ⇒ ***Tasks***. If there is no task diagnostic message, call Bosch Rexroth for assistance.

438 Invalid Axis Selected: %d

Cause:

Axis %d (%d = axis number) was not found on the Sercos ring or is an invalid axis number. This error is issued during single-axis or ELS motion commands.

Remedy:

Check the constant or variable that contains the axis number.

439 Axis %d: Invalid Motion Type

Cause:

The axis type does not match the type of motion used by the instruction. This error is issued when a single-axis command is given to a coordinated motion axis.

Remedy:

Locate the icon containing the error and verify that the axis type matches the motion type.

Example: a coordinated VisualMotion program contains an axis setup icon that was originally setup for single-axis.

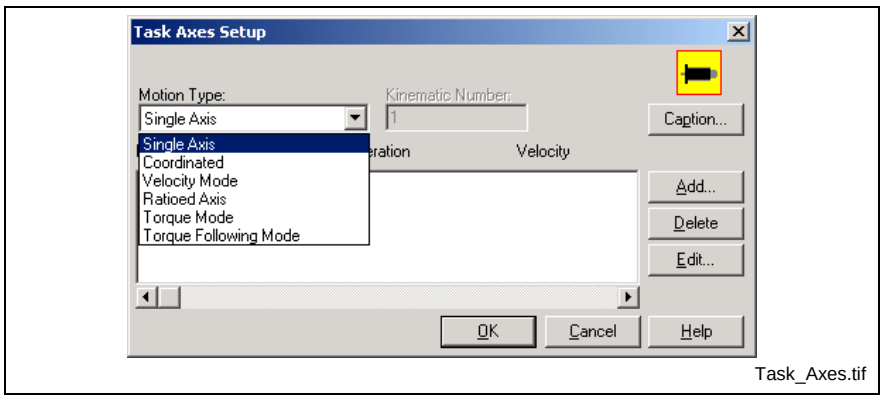


Fig. 2-7: Task Axes Setup

440 I/O Transfer Error: see task diag.

Cause:

An error occurred in a command instruction selecting a register to write to or to read from. Some examples are setting an I/O register, I/O Transfer or any other instruction that directly writes to a register.

Remedy:

Locate the instruction icon using show program flow <F7> and verify the register read and write command.

450 Event %d: invalid event type

Cause:

The event type selected in the event table %d (%d = event number) is not valid or does not match the type of motion or event. This error is also issued if an event/trigger (event arm) is executed for a motion-based event.

Remedy:

Make sure that the event type selected under ***Data*** ⇒ ***Events*** is consistent with the type of motion specified for the axis. Modify the numbered event and correct the event type. Save, compile and download the program.

451 Invalid event number '%d'

Cause:

The event number (%d = event number) is not within the bounds specified in the event table.

Remedy:

1. Verify that the event table contains the correct amount of events for the program.
2. Verify that the correct event number is selected and configured from within ***Data*** ⇒ ***Events.***

452 More than %d event timers armed

Cause:

Only %d repeating timer events (%d = number of events) can be armed at one time.

Remedy:

Check the program flow to make sure that triggered events are being disabled.

453 Homing param. transfer error: %d

Cause:

A Sercos communication error occurred during a drive-controlled homing command. The %d indicates the communication error code returned by the drive.

Remedy:

Try homing the axis again. If this error still occurs, call Bosch Rexroth Service for assistance.

454 Axis %d homing not complete

Cause:

The drive did not successfully complete the homing procedures instructed by axis %d (%d = axis number).

Remedy:

See the drive diagnostics for a status or error message. This can be viewed under ***Commission*** ⇒ ***Drive Overview***.

459 Axis %d target position out of bounds

Cause:

The programmed position in an axis/move command or the Move  icon for axis %d (%d = axis number) exceeds the drive's travel limits.

Remedy:

1. Adjust the travel limits or check the variable or constant containing the position. Drive travel limits are programmed in Sercos parameters S-0-0049, Positive position limit value and S-0-0050, Negative position limit value. Check variable values under ***Data*** ⇒ ***Variables***.
2. Check travel limits set using DriveTop. Select ***Commission*** ⇒ ***Drive Overview*** from VisualMotion Toolkit's main menu.

460 Invalid program %d from binary inputs

Cause:

Program %d (%d = program number) selected from the Binary Program Select bits 9-12 in System register 1 does not exist on the control's memory or is greater than the maximum number of programs.

Remedy:

Make certain that the program number being selected is available on the control. Program number can be viewed using VisualMotion and selecting ***Build*** ⇒ ***Program Management***.

463 Ratio command: invalid ratio

Cause:

In the Ratio icon, one of the factors is too large or the master factor is zero. The values entered in the Turns field are not correct.

Remedy:

Update the ratios so that the master is not a zero and the values are not too large.

464 Can't activate while program running

Cause:

A new program cannot be activated through the Binary Program Select inputs, bit 8 of register 1, unless the program is stopped.

Remedy:

Stop the currently running program by setting register 1 bit 8 to 0. Set the desired program number in binary format through bits 9-12 and activate the new program by setting bit 8 to 1.

465 Drive %d config. error, see ext. diag.

Cause:

Drive %d (%d = drive number) does not support a product-specific option or a drive configuration calculation has failed. Product-specific options include ELS, single-axis motion, or I-O cards. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Remedy:

1. The extended diagnostic describes the error in more detail. It often shows the parameter that failed along with a short message describing the error. If it indicates that a parameter is invalid or a configuration is not supported, check the axis configuration with the drive hardware or software.
2. If the extended diagnostic indicates an error such as 'Handshake time-out' or 'Drive is not responding', the Sercos ring may have been disconnected during initialization. Check the fiber optic connections and the addresses of the drives on the ring.

467 Invalid ELS Master Option

Cause:

An option in the ELSMstr1 icon is invalid, not supported, or inconsistent with the other options. VisualMotion is initializing all of the ELS axes in the program and has come across an axis parameter A-0-0004 option that is invalid

Remedy:

Search the program for the axis in fault and verify that the axis options in parameter A-0-0004 are correct and within range. Refer to *chapter 15* of the *VisualMotion 10 Functional Description* for an explanation of axis parameter A-0-0004.

468 ELS adjustment out of bounds

Cause:

The phase offset or fine ratio adjustment exceeded the bounds allowed by the drive. The fine adjust must be between -100 and 300%.

Remedy:

Use the show program flow <F7> function to find the ELS phase adjust or CAM phase adjust icon in fault. Correct the value entered in degrees, percentage, or the variable if programmed using variables.

ELS Phase Adjust   Cam Phase

470 Axis %d velocity > maximum

Cause:

The velocity programmed for axis %d (%d = axis number) exceeds the maximum velocity axis parameter A-0-0020.

Remedy:

Change the velocity value programmed in the velocity icon or the variable label being used in the velocity icon to a value less than parameter A-0-0020.

474 Drive %d cyclic data size too large

Cause:

Too much data is configured in the Sercos cyclic telegram. The drives currently support up to 16 bytes of configurable data.

Remedy:

Remove I/O or registration options from the parameter or program configuration.

477 Axis D: probe edge not configured

Cause:

A probe edge trigger was configured in the Event icon that does not match the same configuration in the Axis icon. Axis icon probe triggers must match the same trigger type configured in the Event icon.

This error is issued at runtime upon encountering the Event icon if the previous configuration error condition exists.

Remedy:

Check the program to ensure that probe triggers configured in the Event icon match the same configuration in the Axis icon.

478 Calc: operand out of range

Cause:

The operand of a calculation function is out of the range of valid arguments.

The following examples apply:

- Square root of a negative number
- Logarithmic of a negative number
- Arcsine and Arccosine value must be -1, 0, 1
- Raising to a power a non integer number (fraction)

Remedy:

Use show program flow <F7> feature to locate Calc icon with error and correct. If variables are being use to represent a value, correct the variable value from within ***Data*** ⇒ ***Variables***.

483 Parameter Init. Error: see Task %c diag.

There is an error in the parameter initialization or bit initialization instruction; which is executed when exiting parameter mode. The parameter format, parameter number, or stored value may be invalid.

A communication error message is displayed in the diagnostic message for the task %c (%c = task letter) in which the error occurred (T-0-0122). Information on the actual parameter number that caused the error is provided in extended diagnostics (C-0-0124).

Cause:

In many cases, this error is issued when a drive is not on the Sercos ring or the drive parameter is not found for a type of drive.

Remedy:

1. Make sure that all drives on the Sercos ring are powered up and enabled.
2. Check fiber optic connections.

484 Control SYSTEM ERROR

Cause:

This error indicates a problem in the control executive firmware.

Remedy:

See the extended diagnostics parameter (C-0-0124) for more information or select ***Diagnostics*** ⇒ ***System*** within VisualMotion Toolkit, and call the Bosch Rexroth service department for assistance.

486 Sercos Device %d is not a drive

Cause:

The Sercos device %d (%d = Sercos address) was enabled in the user program or parameterized as an axis, but an I/O slave or other type of slave was detected.

Remedy:

Check the VisualMotion program for any instances where the device (not a drive, but maybe an I/O station) number is being configured as a drive and modify the program accordingly. Once corrected, Save, Compile and Download the modified program.

487 CAM %d is invalid or not stored

Cause:

The CAM number displayed in this error is invalid or not stored on the control's memory. This can occur when an attempt is made to use, build or activate a CAM. This error can also occur during the built process when invalid data is encountered.

Remedy:

Verify that the CAM is identified properly when using a label, that the number specified in the different CAM icons is correct, or that the CAM number is stored on the control.

488 CAM Error: See Task %c diag.

Cause:

An error was issued during a CAM command in task %c (%c = task letter).

Remedy:

Refer to the task diagnostic message (T-0-0122) for a description. See also the extended message under ***Diagnostics*** ⇒ ***Tasks*** for additional information.

489 More than %d CAM axes selected

Cause:

The control limits the number of axes configured as control CAM Axes. The maximum number of control CAMs allowed on the control's memory is 40. The maximum number of control CAMs running in the program is 4.

Remedy:

Check the program and modify it so that the number of control CAMs running is less than the number specified in this diagnostic message.

490 System Memory Allocation Error

Cause:

The dynamic memory space on the control has been exhausted. This diagnostic message is related to the amount of memory consumed by the compiled program as well as operations being performed dynamically, such as index CAM builds. The amount of configured memory in the VM Data table directly effect the amount of system memory available.

Remedy:

The amount of memory available in the system can be viewed under menu selection ***Diagnostics*** ⇒ ***System***. One way to decrease memory usage would be to verify that all the items being specified within the VM Data table are necessary.

Example: If only 3 event functions are used in the current VisualMotion program but 10 events are reserved in memory within the VM Data table, then the addition 7 events use up unnecessary memory resources. Decrease each field within the VM Data table to free up memory space.

If the problem persists, contact Bosch Rexroth Service for assistance.

492 Programs were lost, see ext. diag.

Cause:

User programs and data have been erased from the control's memory. This can be due to a new firmware version or a size change in the number of parameters in the system. In addition to these reasons, commanding a C-0-0996 (Clear Programs and Data Memory) can also generate a 492 error.

Note: If the control's memory was cleared by using C-0-0996, the diagnostic log will contain the warning message *211 Programs and Memory Cleared*.

Refer to the extended diagnostic message C-0-0124 for an explanation. Extended diagnostics and diagnostic log can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit. The following extended diagnostic messages are possible:

Extended Diagnostic C-0-0124	Description
Firmware Version String Changed	A new GPP or GMP firmware version was copied to the control's memory card.
Parameter Table Size Changed	A different parameter table size was detected from the last time the control was power up.

Table 2-9: Programs were lost Extended Diagnostics

Remedy:

Perform the following steps to reestablish communication with the control:

1. Start VisualMotion Toolkit and open an existing project.
2. Changed the control's baud rate setting to 9600 (default) in offline mode. Select ***Tools*** ⇒ ***Control Selection*** and click the ***Configure*** button.
3. Switch the project to online mode by selecting the online icon  , ***File*** ⇒ ***Online*** or by pressing the ***F9*** key.

496 Can't execute this instruction from an event

Cause:

This user program instruction (icon) cannot be executed from within an event function. Refer to the task error descriptions and the current program instruction.

Remedy:

Move the instruction (icon) into a main user task or subroutine.

497 Limit switch config. error, see ext. diag.

Cause:

This error is issued at activation of a program when one of the PLS parameters defined in the program is invalid. It is also issued when the ELS setup is incorrect for PLS operation.

Remedy:

Parameter C-0-0124 provides a detailed description of the error as an extended diagnostic message. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

498 Drive %d Shutdown Warning

Cause:

This error is issued when any drive %d (%d = drive number) has a Class 2 shutdown warning. The tasks that stop for errors switch into manual mode and perform a controlled stop of all axes. A drive warning indicates a condition that will later cause a shutdown, but is serious enough to require immediate attention.

Note: Class 2 warnings may not be detected by the control if drive parameter S-0-0012 is being continuously read by the user interface or user program, since the diagnostic change bit is reset whenever this parameter is read.

Remedy:

1. Since the warning may have already been cleared on the drive, the extended diagnostic (C-0-0124) latches the class 2 diagnostic bits (drive parameter S-0-0012) from the drive so that this condition can be corrected. Extended diagnostic can be view under ***Diagnostics*** ⇒ ***System.***
2. Using VisualMotion Toolkit, open DriveTop under menu selection ***Commission*** ⇒ ***Drive Overview*** and view the status line for a description of the drive error. Refer to the relevant *Digital Drive* manual for more information.

499 Axis number %d not supported in this version

Cause:

Axis (%d = axis number) is outside the range of the number of axes allowed. VisualMotion 10 supports a maximum of 40 axes. The Sercos drive address can not exceed the number 40.

Remedy:

Check the program for an axis value greater than 40 or a variable label given to an axis with a value greater than 40.

500 Axis %d is not referenced

Cause:

Axis (%d = axis number) has not been homed, the reference position has not been set, or the reference position has been lost. The reference position bit in drive parameter S-0-0403 is zero. To enable or disable this error, use parameter A-0-0006. If parameter A-0-0006, bit 1 is set to (1), then VisualMotion will display this error.

Remedy:

1. Stop the VisualMotion program. Reinitialize the program by switching to manual mode and then back to auto mode. This process will reinitialize the program back to the ***Start*** icon. If the homing command instruction is at the beginning of the program, re-start the program to home the axis again.
2. Verify homing options within the Drive Parameter Editor if using GPP 8 firmware. ***Commission*** ⇒ ***Drive Overview*** ⇒ ***Drive Reference.***
3. For GPP 10 firmware, using DriveTop, select ***Commission*** ⇒ ***Drive Overview*** ⇒ ***Tools*** ⇒ ***Drive Editor…*** ⇒ ***Drive Functions*** ⇒ ***Homing/set absolute measurement***.
4. If the drive controlled homing procedure still does not occur, contact Bosch Rexroth Service for assistance.

501 Drive %d comm. error, see ext. diag.

Cause:

An error in drive communication has occurred while the control was reading or writing a service channel parameter for an internal operation.

Remedy:

Parameter C-0-0124, extended diagnostics, has a detailed description of the error. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

502 ELS and cams not supported in this version

Cause:

The ELS and CAM features in the currently active VisualMotion program are not supported in this version of GPP firmware.

Remedy:

The control contains a firmware version that is not capable of performing ELS and CAM functions. Verify the version of firmware in control parameter C-0-0100 or using VisualMotion Toolkit under menu selection ***Diagnostics*** ⇒ ***System***. Contact Bosch Rexroth Service for assistance.

504 Communication Timeout

Cause:

During a timed serial port transmission, the serial port has not responded within the time set in parameter C-0-0016. Timed transmissions are used for jogging through VisualMotion.

Remedy:

If this error occurs, increase the timeout value in C-0-0016.

Using VisualMotion Toolkit, switch to online mode and select ***Data*** ⇒ ***Parameters*** from the main menu. Refer to Parameters, for instructions.

505 Axis %d is not configured

Cause:

A user program command was issued to Axis %d (%d = axis number), but the axis is not configured in the program.

Remedy:

Modify the user program so that the correct axis is addressed, or exclude the axis from the system using Axis parameter A-0-0007.

508 User Watchdog Timeout

Cause:

The user watchdog timer enforces a time constraint on a user task or a user interface.

Every time a nonzero timeout value is written to C-0-0021, a timer is triggered in the control. If the timeout expires, the error "**508 User Watchdog Timeout**" is issued. The timer is checked by the control every 50ms.

If C-0-0021 is set to zero, the watchdog timer is disabled. If it is nonzero, it is active when the control is in run mode, there are no errors, and the task specified in C-0-0022 is running.

In a user program task, parameter C-0-0021 can be written to via a parameter transfer at the beginning of the main processing loop. If the VisualMotion system tasks or the user program events are consuming too much processor time, the time set in C-0-0021 will elapse, and error 508 will be issued. The programmer can then adjust the timing of the events, or increase the Sercos or I/O cycle times to allow more time for the user task.

Remedy:

1. If this feature is intentionally set and the user's desired elapse time, programmed in parameter C-0-0021, can be increased, the user can modify the value in parameter C-0-0021.
2. If this feature is **not** desired but a value other than zero appears in parameter C-0-0021, change this value to zero to disable this feature.

509 Control System Timing Error (%d)

Cause:

When the control is powered up, a timer monitors high-level control task and generates this error if the system timing overlaps.

The cause for timeout can also result from electromagnetic interference on serial communications.

Remedy:

1. The default Sercos cycle time is 2000 µsec. Applications that require multiple functionality, such as coordinated motion using Fieldbus interface across serial communications, should double the value of control parameter C-0-0099 (Sercos Cycle Time). Switch the system in and out of parameter mode to update the Sercos ring.
2. If the increase in Sercos Cycle Time does not help, contact Bosch Rexroth Service for assistance.
3. Check or replace the Serial Communication cable.

515 PLC Communications Error

Cause:

After initialization, the control monitors the Soft PLC's heartbeat by means of an internal life counter. The control reads the lifecounter value every Sercos cycle and compares it to the previous value. This error is issued if the life counter value does not change after 10 cycles.

Remedy:

Cycle power to the entire VisualMotion system and reestablish communication between the PLC and the control.

516 More than %d registration functions enabled

Cause:

The maximum of 4 registration instructions has been exceeded in the active VisualMotion program. Up to 4 axes can use the registration function at the same time. This error will be issued at compile time.

Remedy:

Make certain that the active VisualMotion program is only using the maximum of 4 registration instructions.

519 Lost Fieldbus/PLC Connection

Cause:

A Lost Fieldbus connection is issued when cyclic communications between the slave and master fieldbus interfaces are no longer present. This message is issued when register 19 bit 4 transitions from high (1) to low (0). The error is hardware related and is normally caused by…

1. a bad or disconnected cable.
2. an unused fieldbus interface that is installed but not used.
3. a hardware related problem with the Fieldbus interface on the control.

Note: Shutdown message **519** is only issued while in Sercos phase 4 if the Fieldbus Error Reaction in the Fieldbus Slave Configuration window for GPP is set shutdown.

Remedy:

1. Check and verify all cable connects between the slave and master Fieldbus connections.
2. Set C-0-2635, Fieldbus Error Reaction, from 0x0000 (shutdown) to 0x0002 (ignore).
3. Contact Bosch Rexroth Service for assistance.

520 Fieldbus Mapping Timeout

Cause:

The Fieldbus Mapper continually scans the system for sufficient resources to process the cyclic data mapping list (2600-list). If 10 out of 10 attempts of the mapping list update are missed, the system is considered to have insufficient resources. Error 520 Fieldbus Mapper Timeout is generated if the selected error reaction is set as "Shutdown (default)," (Parameter C-0-2635), in the Fieldbus Slave Configuration window. Motion to all axes will stop based on the selected error reaction at each drive.

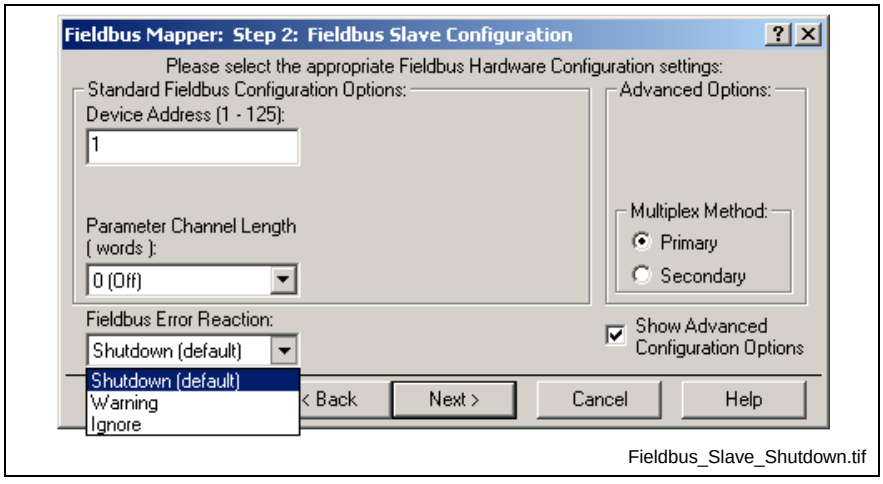


Fig. 2-8: Fieldbus Shutdown Error Reaction

Remedy:

PPC controls currently run the fieldbus mapper at a fixed 4ms Sercos scan time. If this error occurs, contact Bosch Rexroth Service for assistance.

521 Invalid Virtual Master ID: %d

Cause:

This diagnostic error is displayed when the value of an assigned label or program variable (Ix, GIx), used to identify a Virtual Master ID number, is outside of the allowable range (1 or 2).

This diagnostic error is not issued when a numeric value is used as a Virtual Master ID number. When using a numeric value, VisualMotion's 2nd pass compiler verifies the value and issues a compile error if the value is outside of the allowable range.

Remedy:

Verify that the correct ID number (1 or 2) is programmed when referring to a Virtual Master. Labels and program variables can be modified by selecting ***Data*** ⇒ ***Variables***.

522 Invalid ELS Master ID: %d

Cause:

This diagnostic error is displayed when the value of an assigned label or program variable (Ix, GIx), used to identify an ELS Master ID number, is outside of the allowable range (1-6).

This diagnostic error is not issued when a numeric value is used as a ELS Master ID number. When using a numeric value, VisualMotion's 2nd pass compiler verifies the value and issues a compiler error if the value is outside of the allowable range.

Remedy:

Verify that the correct ID number (1-6) is programmed when referring to a ELS Master. Labels and program variables can be modified by selecting ***Data*** ⇒ ***Variables***.

523 IFS status, facility = 0x%x

Cause:

A problem has occurred during file initialization, save, creation, or compression.

Remedy:

Clear the errors. If clearing the errors does not work, restart the system. If restart does not resolve the problem, erase the files to remove the corrupted files.

524 Hardware Watchdog timeout

Cause:

The Watchdog timer in the control monitors the performance of the hardware. This diagnostic is issued when the Watchdog times-out, indicating a control hardware problem or failure.

Remedy:

Bring all motion to a stop and cycle power to the control. If the problem persist, contact Bosch Rexroth Service for assistance.

525 I/O Configuration error, see ext. diag.

Cause:

This diagnostic is displayed when the I/O User Configuration C-0-2017 does **not** match the actual I/O configuration on the machine (Visible I/O Stations, C-0-2013). The I/O User Configuration is compared to the actual I/O configuration during initialization of the control, and when switched in and out of parameter mode. When the control switches from Sercos phase 2 to Sercos phase 3 and a change has occurred in the I/O

configuration, due to a replacement, modification or hardware communication failure, a *525 I/O Configuration error* is issued. This diagnostic can also occur after downloading an invalid I/O User Configuration to the control.

Example: Configuring an I/O module or drive number that does not exist on the machine.

Remedy:

1. Since many areas of an I/O configuration can cause an error, refer to the extended diagnosis for detailed information as to the root cause of the problem.
2. To view extended diagnostics using VisualMotion Toolkit, select ***Diagnostics*** ⇒ ***System***. Extended diagnostic text is displayed at the bottom of the window.

526 Sercos Multiplex Channel Config, see ext. diag.

Cause:

The Sercos multiplex channel is enabled by either the selection of the Drive PLS Fast Write feature or the detection that the AT or MDT has exceeded the 16-byte limit. **526 Sercos Multiplex Channel Config, see ext. diag.** is followed by one of the following extended diagnostics (examples: D%d = D01 for Drive 01, %s = S-0-0258).

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
D%d: Ident %s not supported in S-370	Through Parameters A-0-0180..182, a parameter was entered which is not supported by the Sercos MDT Multiplex Channel.
D%d: Ident %s not supported in S-371	Through Parameters A-0-0185 and 186, a parameter was entered which is not supported by the Sercos AT Multiplex Channel.
D%d: Probe not allowed in Single Axis Mode	With the Sercos Multiplex Channel enabled, the Probe option is not available in Single Axis mode.
D%d: Multiple probe idents in telegram	With the Sercos Multiplex Channel enabled, only one probe ident is allowed in the multiplex channel.
D%d: PLS Idents cannot be entered directly by user	The PLS Fast Write feature, A-0-0004 bit 8 set, automatically addresses the necessary idents for PLS write in the Sercos Multiplex Channel.
Maximum Quantity of Multiplex Drives Exceeded	The limit of how many drives the GPP control can support with the Sercos Multiplex Channel enabled has been exceeded.

Table 2-10: Sercos Multiplex Channel Extended Diagnostics

527 Control Initialization Error, see ext. diag.

Cause:

527 Control Initialization Error, see ext. is followed by an extended diagnostic, for example: D%d = D01 for Drive 01, %s = S-0-0258. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
D%d: Ident %s is not supported in cyclic channel	The Sercos Multiplex channel is being configured and an ident was selected that has a variable length.

Table 2-11: Control Initialization Extended Diagnostics

528 System Event %d Occurred

Cause:

This diagnostic can only be viewed using VisualMotion's diagnostic log. It monitors status information and also functions as a debugging log for unexpected firmware errors related to the File System. The File System consists of the following:

- Downloaded VisualMotion user programs # 1-10
- Fieldbus object mapping list 2600 and 2700
- I/O User Configuration (C-0-2017)
- Control CAMs # 1-40

Remedy:

If system problems result due to lost parameters within the File System and this diagnostic is found within the Diagnostic Log, contact Bosch Rexroth Service for assistance.

529 Invalid ELS Group ID: %d

Cause:

This diagnostic error is displayed when the value of an assigned label or program variable (Ix, GIx), used to identify an ELS Group ID number, is outside of the allowable range (1-8).

This diagnostic error is not issued when a numeric value is used as a ELS Group ID number. When using a numeric value, VisualMotion's 2nd pass compiler verifies the value and issues a compiler error if the value is outside of the allowable range.

Remedy:

Verify that the correct ID number (1-8) is programmed when referring to a ELS Group. Labels and program variables can be modified by selecting ***Data*** ⇒ ***Variables***.

530 CAM %d is active, can't overwrite

Cause:

This error is displayed during Sercos phase 4 (automatic mode) initialization and is a result of trying to assign an already active CAM %d (%d = CAM number) to a new build.

Remedy:

Make sure the selected CAM number for the new build is unique in the active VisualMotion program.

531 Invalid variable for Fieldbus/PCI Bus Mapping

Cause:

In order for Fieldbus Mapping list to function properly, all cyclic and non-cyclic program variables (floats, integers) used in the Fieldbus Mapper must match existing program variable in the VisualMotion user program. This error is issued when activating a different VisualMotion program containing program variables that are invalid in the current Fieldbus mapping list.

Example: Program integer 1000 is used but the program only contains 500 integers.

Remedy:

1. Make the appropriate program variable modifications in the VisualMotion user program that correspond to the program variables used in the current Fieldbus Mapping list.
2. If the VisualMotion user program contains the desired program variables, then make the appropriate modifications to the Fieldbus Mapping list or load a different Fieldbus Mapping list using the Fieldbus Mapper.

532 Power fail brown out condition detected

Cause:

The PPC-R hardware trigger interrupt has detected a drop in power causing a brown out condition. If the condition is not corrected within 1.5 to 10 ms, the control shuts down and the error is logged in the Diagnostic log. All motion to slave axes will stop based on the selected error reaction in each drive.

Remedy:

Pressing the S2 reset button found below the PFM memory card on the PPC-R can clear this error.

533 Multiple instances of index CAM: %d found

Cause:

This error is issued when the active VisualMotion program encounters a CAM Indexer %d (%d = CAM Indexer number) that is already being used somewhere else in the program. A CAM Indexer can be assigned to any ELS Group or to any slave axis within an ELS Group as long as the same CAM Indexer is not used more than once.

Remedy:

Verify that the current VisualMotion program is not using the same CAM Indexer number in more than one instance.

534 Hardware Version Not Supported

Cause:

The control has detected an older version of PPC-R hardware (PPC-R0*.1) that is not supported by the current version of GPP firmware.

Remedy:

Upgrade your current PPC hardware to a newer version (PPC-R0*.2 or later) for support of the current GPP firmware. Contact Bosch Rexroth service for assistance.

539 Invalid Parameter Number

Cause:

A Procedure command was instructed using the Command Icon with an invalid parameter number. Allowable procedure command parameters are as follows:

For Control: C-0-2903 and C-0-2905.

For Drive: A list of allowable drive procedure command parameters can be found in drive parameter S-0-0025.

Remedy:

Modify the parameter used in the Command icon. Next, compile and download the user program.

540 Option Card PLS error

Cause:

General error message for Option Card PLS. It will always be accompanied by an extended error message.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
002: Command locked	A command to the Option Card PLS could not be executed due to current operation. This can happed during Sercos phase switching.
007: PLS could not synchronize	The hardware synchronization between the Option Card PLS and the PPC failed. The Sercos time must be between 2 and 8 ms.
008: Unknown output	The number for the output is unknown / illegal. Number must be in the range of 1 to 32.
011: Unknown master axis mode	
012: Offset is larger than resolution	The offset of the PLS master axis is bigger than its resolution. Reduce number in C-0-2943.
014: Illegal master axis, see C-0-2941	The number of a master for a Option Card PLS master is not valid. Check entries in parameter C-0-2941.
015: Master axis is not active	The PLS master axis is used, but this axis is not defined.
018: Run time error occurred	A software failure occurred on the Option Card PLS.
020: Unknown output byte number	
031: Initialization error on PLS	The Option Card PLS could not initialize
032: Synchronization error	The Option Card PLS software could not synchronize to the PPC.
0*yy*: Maximum PLS speed exceeded at axis *zz*	The maximum speed of 3500 RPM had been exceeded. yy is an error number between 33 and 40; zz is the PLS master axis number that exceeded the

Extended Diagnostic C-0-0124	Description
	speed limit.
041: Cyclic handshake error	The software handshake between the PLS and the PPC failed.
042: PLS internal error	The PLS had an unrecoverable error. Power cycle is necessary.
Parameter D*y*.*z*, code=*w*, task=PLS evt=0	When the PLS needs to know further information from drives it will request the applicable parameter. This error reflects errors from this request. *y* references the drive number where the error occurred, *z* the S-parameter and *w* an internal error code
062: Position not in cyclic channel available	For real drives, the position information is not available in the cyclic channel.
063: Wrong encoder type	For real drives, only encoder of type 1 (primary encoder) or type 2 (secondary encoder) exists.
Wrong master type	See C-0-2940. Masters can only be of type ELS-master (1), ELS-group (2) or drives (3).

Table 2-12: Option Card PLS Extended Diagnostics

541 Link Ring Error, see ext. diag.

Cause:

.When a Link Ring error occurs, the H1 display on the PPC-R will display "541, *Link Ring Error* ". For detailed information, refer to the extended diagnostic message in the table below. Link ring errors are cleared with a low-to-high (0-1) transition of Bit 5 in *System_Control* register 001.

PPC-R H1 Display	Diagnostic Code C-0-0123	Diagnostic Message C-0-0122
E541	541	541 Link Ring Error

Table 2-13: Link Ring Diagnostic Code

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
Other Link Master already active	There is more than on Link Master in the Link Ring.
Link not possible	The hardware combination of PPC-R and DAQ does not permit a control link.
Transmission path defective	The link participant has detected a fiber optic cable break in the Link Ring.
Master position fault (MDT)	The transmission of the master axis position by the Link Master to the Link Slave is experiencing problems.
Master position fault (AT)	The transmission of the master axis position by the Link Slave to the Link Master is experiencing problems. or An ELS System Master has been configured to import master data from a Link Ring node that does not exist..
Selected link address not permitted	The Link Ring address, as set by control's Unit Number parameter (C-0-0002), must be between 1 and 32.
DAQ: Sercos interface – ASIC: initialization error	A hardware error occurred during the initialization of the DAQ card.
DAQ: Master interrupt error	There is a problem with the Link Master's interrupt. Verify that the DAQ-03 card's jumpers are correct.
DAQ: Slave interrupt error	There is a problem with the Link Slave's interrupt. Verify that the DAQ-03 card's jumpers are correct.

Table 2-14: Link Ring Extended Diagnostics

542 PLC Cyclic Mapping Timeout

Cause:

The Fieldbus Mapper continually scans the system for sufficient resources to process the PLC cyclic data mapping list C-0-2600. If 10 out of 10 attempts of the mapping list update are missed, the system is considered to have insufficient resources. This error message is issued when control parameter C-0-2635 (*Fieldbus/PLC Error Reaction*) is set to shutdown (0x0000) and C-0-2613 (*Fieldbus/PLC Cyclic Channel: Timeout Counter*) increments by 1.

Motion to all axes will stop based on the selected error reaction at each drive.

Remedy:

The control's mapping list is scanned every 4 ms for GPP 10 and fixed at 8 ms for GPP 8. If this error occurs, contact Bosch Rexroth Service for assistance.

543 PCI Bus Runtime Error

Cause:

This error is issued when trying to download a program over the PCI Bus while the control is in Sercos phase 4.

Remedy:

Switch the control to Sercos phase 2 before downloading a program.

544 RECO I/O Failure, see ext. diag.

Cause:

The RECO I/O module has reported a fatal error. VisualMotion acknowledges RECO I/O failures as fatal errors when bit 7 of C-0-0010 (System Options) is set to 1.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	Description
Module Initialization Error, Slot 2, RECO3	An error occurred during the initialization of the I/O module in slot 2 of the Sercos RECO controller rack at Sercos address 3.
Cyclic Communications Error, Slot 3, RECO 0	A cyclic communications error occurred with the I/O module in slot 3 of the Local RECO I/O controller rack.
Incorrect Module, Slot 4, RECO 3	The I/O module found in slot 4 of the Sercos RECO I/O controller rack at Sercos address 3 is not consistent with the controller's configuration. Hot-swapping I/O modules will result in this error and could cause permanent damage.
24V Error, Slot 3, RECO 0	A 24V error exists at the RECO I/O module in slot 3 of the Local RECO I/O controller rack.
Module Error Code 7, Slot 3, RECO 0	The I/O module in slot 3 of the Local RECO rack is reporting error code 7
Unknown Error, RECO 3	An undefined error has occurred on the Sercos RECO I/O controller at Sercos address 3.

Table 2-15: RECO I/O Extended Diagnostics

545 Invalid Coordinated Articulation Function ID: %d

Cause:

This error is issued by the firmware compiler and indicates that the Coordinated Articulation (CA) function ID %d (%d = CA number) is not in the range of 1 to 4.

546 Multiple Instance of Coordinated Articulation Function with ID: %d

Cause:

The selected Coordinated Articulation (CA) function ID %d (%d = CA number) is already being used by another icon.

547 Task %c Coordinated Articulation Error, see ext. diag.

Cause:

This error is issued by runtime code during firmware initialization for task %c (%c = task letter). Refer to the extended diagnostics in Table 2-16 for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostic C-0-0124	**Description**
Invalid % Axis Minimum/Maximum Limits	The Max limit is not greater than the Min limit
% Axis Target Position Exceeds Minimum/Maximum Limit	The commanded synchronized move or the manual mode commanded move is outside the defined axis limits
Invalid ELS Group ID Number: %d	The selected ELS group ID is not in the range 1 to 8
Invalid CAM ID Number: %d	The CAM ID is either not in range 1 to 40 or the CAM has not been defined
Invalid Axis Number: %d	The axis is not found in the Sercos ring

Table 2-16: Coordinated Articulation Error Extended Diagnostics

548 Invalid Kinematic Number: %d

Cause:

The selected Kinematic ID number (%d) is not within the existing Kinematic table size.

549 Fieldbus Initialization Error

Cause:

A problem has occurred during Fieldbus initialization.

Remedy:

If this error occurs, contact Bosch Rexroth Service for assistance. Reference the three-digit diagnostic message in the error code displayed under menu selection ***Diagnostic*** ⇒ ***System***.

550 User Initialization Task Timeout

Cause:

Task could not be completed before the 300 seconds (5 mins.) timeout.

Remedy:

Return to parameter mode and review your program to determine why the task requires longer than 300 seconds to run.

551 Master Slip Config. Error, see ext. diag

Cause:

A Slip Monitoring configuration error has occurred. Refer to the extended diagnostic message for details.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostics C-0-0124	Description
Invalid Master Selected	The Primary or Secondary ELS Master selected in the Slip Monitoring configuration is invalid (the masters must be between 1 and 6 and must be active).
Max. Dev. Window Out of Range	The Maximum Deviation Window value must be in the range: -90.0 <= MaxDevWin <= 90.0
Mast. Pos. Offset Out of Range	The Master Position Offset value must be in the range: -180.0 < MastPosOff <= 180.0

Table 2-17: Master Slip Config. Error Extended Diagnostics

552 Excessive Master Position Slip Deviation

Cause:

The slip between the Primary and Secondary ELS Masters has exceeded the value of the Maximum Deviation Window variable *ELS_MSTR_SLIP_WINDOW*.

553 Invalid Parameter Detected, see C-0-2002

This communication error is issued if a wrong CRC(**C**yclic **R**edundancy **C**heck: a mathematical method to verify data validity) has been detected. The calculation of a CRC is only necessary when writing a parameter that has to be stored permanently. This narrows the number of parameters to those, which are stored in autostore. To ensure data consistency during a power failure, a buffer mechanism is used. Each parameter has its own CRC. All CRCs are checked either on boot up, or every time the system is switched from Sercos phase 2 to Sercos phase 4. The user must fix any invalid parameter by writing to it (even if the same value is written to it) before he can switch successfully to Sercos phase 4.

554 Excessive Deviation in PMG%d, see ext. diag.

The Position Monitoring Group (PMG) function executes every Sercos cycle. Each group is scanned to see if it is ENABLED. If enabled, then the groups Master_Position_Window is calculated. Afterwards this value is compared to each of the slave's positions (plus their Offsets) to see if it exceeds the Master_Position_Window value. This error is issued when an excessive deviation is encountered in the Master_Position_Window of PMG%d (%d = PMG number).

555 PCI Bus Register Mapping Timeout

The control and soft PLC can communicate across the DPR's register channel. The rate in which each device accesses the register channel varies by device and control firmware.

- PPC-P11.1 with GMP 10 firmware uses Sercos Cycle time C-0-0099
- Soft PLC over the PCI Bus uses program cycle time

If the control attempts to read or write to the register channel while the PLC is currently reading or writing data, control parameter C-0-2651 (*PLC Register Channel: Current number of misses)* is incremented by a count of 1. When C-0-2651 reaches a maximum of 10 misses, C-0-2653 (*PLC Register Channel: Timeout counter)* increments by 1.

Cause:

This warning error message is issued when control parameter C-0-2635 (*Fieldbus/PLC Error Reaction*) is set to shutdown (0x0000) and the PLC Register Channel: Timeout counter (C-0-2653) increments by 1.

556 PCI Bus Lifecounter Timeout

The Soft PLC life counter is incremented by 1 every Soft PLC program cycle over the PCI Bus. Every increment is an indication that the Soft PLC is functioning and communicating properly. The control monitors the PLC life counter value every Sercos cycle. If the control does not read a different Soft PLC life counter value, then C-0-2643 (*PLC Lifecounter Check: number of retries*) increments by a count of 1. When C-0-2643 reaches the user-defined maximum number of misses, C-0-2646 (*PLC Lifecounter Check: number of timeouts*) increments by 1.

Cause:

This warning error message is issued when control parameter C-0-2635 (*Fieldbus/PLC Error Reaction*) is set to shutdown (0x0000) and the PLC Lifecounter Check: number of timeouts (C-0-2643) increments by 1.

557 PMG%d Maximum allowed deviation window is Zero

Cause:

During PMG group enabling (control register 86), the group's deviation window is checked for a non-zero value. This error is issued when the group is enabled and the deviation window is 0 for PMG%d (%d = PMG number).

Remedy:

Disable the PMG group and modify the deviation window by selecting ***Commission*** ⇒ ***Position Monitoring Group***, double clicking on the group number and entering a non-zero value. This value can also be changed by modifying control parameter C-0-32x1, where x = group # starting at 0.

558 PMG%d Only 1 axis parameterized

During system initialization, all parameterized PMG axes are checked. This error is issued if only one axis was configured for the given PMG%d (%d = PMG number).

559 PMG%d Number of offsets does not match number of Axis

During PMG group enabling (control register 86), all parameterized PMG offsets are checked. This error is issued if the number of offsets doesn't match the number of parameterized PMG axes for PMG%d (%d = PMG number).

560 PMG%d Max. allowed dev. window is larger than 25% of Modulo

During PMG group enabling (control register 86), all parameterized PMG deviation windows are checked. The parameterized allowed deviation window is checked against the modulo value. This error is issued if the deviation window value is greater than 25% of the modulo value for PMG%d (%d = PMG number).

561 PMG%d Offset is larger than Modulo

During PMG group enabling (control register 86), the parameterized offsets are checked. If modulo is active within a group, the parameterized offsets is checked against the modulo value. If the value is greater than the modulo value for PMG%d (%d = PMG number), this error is displayed.

562 PMG%d Parameterized Axis is not in system

PMG%d (%d = PMG number) is using an invalid axis number. During system initialization, all PMG axes numbers are verified.

563 Invalid Task Specified, Must be A-D

This error is issued if an axis is assigned to the initialization task. This error is more probable when downloading a VisualMotion textual language program to the control. The axis configuration icons for both single axis and ELS configurations use a drop-down list when assigning a task to the axis. The only allowable selections are task A-D.

564 PMG%d Invalid configuration, see ext. diag.

Each Position Monitor Group is configured using the PMG Configuration parameter (C-0-32x6), where x = group # starting at 0.

Example: Group 1 would be C-0-3206 and Group 2 would be C-0-3216, and so on.

Only bits 1-4 of the configuration parameter are used to configure a PMG group.

During PMG group enabling (control register 86), each PMG group's configuration parameter is checked. This error is issued if a bit other than the allowable bits was used for PMG%d (%d = PMG number). Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

565 Axis %d: Configuration error, see ext. diag.

This error is issued to indicate that an error has occurred in the drive's measuring wheel function. A new parameter (S-0-0386, Active position value) has been introduced in DIAX04 firmware ELS05V32 and ECODRIVE03 firmware SGP03V22 and SGP20V11. This parameter uses the measuring wheel's position (set A-0-0004, bit 5=1 and bit 11=0) as the active feedback position. When configured properly, S-0-0386 is placed in the AT telegram instead of S-0-0051 or S-0-0053. An extended diagnostic message helps pinpoint the error.

Remedy:

Refer to the extended diagnostics for details. Extended diagnostics can be viewed by selecting ***Diagnostics*** ⇒ ***System*** in VisualMotion Toolkit.

Extended Diagnostics C-0-0124	Description
Measuring wheel config error, S-0-0386 not found	This message appears if an invalid drive firmware is used.
Optional encoder not configured as measuring wheel encoder, P-0-0185	P-0-0185 is not set to 3 (Optional Encoder as Measuring Wheel)
Encoder type 2 not configured, P-0-0075	Improper configuration of P-0-0075

Table 2-18: Axis %d: Configuration Error Extended Diagnostics

566 Filter sample rate and cutoff frequency mismatch

To ensure a stable system when using feedback device as a positioning signal for a Real master or PID loop, the following calculation should be used for the Digital Filter Cutoff Frequency.

$$\text{Cutoff Frequency} \leq \frac{1}{2 * \text{Sampling Rate(sec.)}}$$

The sampling rate for a Real Master axis is the set Sercos phase 4 cycle time (S-0-0002), entered in seconds.

The sampling rate for a PID loop is the set PID Loop Time, entered in seconds.

This error will be issued and the cutoff frequency will be set to the maximum allowed value if the equation is violated.

567 ELS Config. Error, see ext. diag.

Cause:

The Virtual Master maximum velocity program variable VM#_MAX_VEL (# = *Virtual Master number*) exceeds the maximum ELS velocity for the current Sercos cycle. This error is issued with the following extended diagnostic message:

Extended Diagnostic C-0-0124	Details
"Virtual Master ***%d*** Max. Vel. Exceeds ***%.f*** RPM "	%d = Virtual Master number 1-2 %.f = Max. ELS velocity less 1 RPM

Table 2-19: ELS Config. Error Extended Diagnostic

Remedy:

To correct the problem, the Virtual Master's maximum velocity program variable VM#_MAX_VEL (# = *Virtual Master 1-2*) must be set to a value that does not exceed the calculated Max ELS Velocity Limit Less 1 RPM.

The maximum ELS velocity limit is calculated as a function of the current Sercos cycle time. Refer to warning *222 ELS Config. Warning, see ext. diag.* on page *2-14* for details.

568 Axis %d: Assigned Task is Not Defined

Cause:

This error is issued when an axis (or axes) is assigned to a user task that has not be defined in a single axis application. Axis assignments are made in the Axis icon of the Initialization task.

Remedy:

Modify the Axis icon and change the assigned task to one that exists.

570 ELS Max. Vel. Exceeded, see ext. diag.

Cause:

The maximum ELS velocity for the current Sercos cycle time has been exceeded at the input to the Group CAM. Typically, this error is issued when a Real Master encoder was configured incorrectly. Drive encoders must be configured as master axis encoders in order to function correctly as an ELS Real Master. This error is issued with the following extended diagnostic message:

Extended Diagnostic C-0-0124	Details
"Group ***%d*** CAM # > ***%.f*** "	%d = ELS Group number 1-8 %.f = Max. ELS velocity less 1 RPM

Table 2-20: ELS Max. Vel. Exceeded Extended Diagnostic

The maximum ELS velocity limit is calculated as a function of the current Sercos cycle time. Refer to warning *222 ELS Config. Warning, see ext. diag.* on page *2-14* for details.

The following is a list of possible causes:

- Incorrect Real Master configuration
- Excessive Real Master velocities
- Malfunctioning Real Master feedback
- Improper use of Dead Time Compensation with high velocities
- Excessive Real Master and Group gear ratios
- Group CAMs with aggressive profiles

Remedy:

The ELS system must always be reinitialized (by cycling control power or entering parameter mode). This will correct any phase errors that develop between the input and output of ELS System Masters and ELS Groups. In addition, place your project in parameter mode and review the entire ELS configuration in your project to correct any problems that could have caused the 570 error.

571 No Program Found

Cause:

This error is issued at power up if no user program is found on the control's memory. Lost of programs can be a result of clearing all programs under ***Build*** ⇒ ***Program Management*** in online or service mode. If programs are lost due to new firmware or commanded using control parameter C-0-0996 (*Clear Program and Data Memory*), error 492 Programs were lost, see ext. diag. has priority.

Remedy:

Download a user program to the control by opening an existing project and switching to online mode. After the program is downloaded, the error will automatically clear.

572 PCI Bus reset occurred, cyclic data is invalid

This error is used with the PPC-P11.1 control and indicates that power to the PC's PCI bus was reset. All control data on the DPR are reset to 0 and requires a re-initialization of the system. Control parameter C-0-2635 must be set to 0X0000 (shutdown) for this error to appear.

573 CAM %d is being built

Cause:

An attempt was made to use control CAM as a CAM Axis, in an ELS Group, or as a Coordinated Articulation axis, while it was still being built. A control CAM can not be used until the build has been successfully completed.

Remedy:

Allow sufficient time for the control CAM to build before using it.

575 ELS Master for ELS Group %d is invalid

Cause:

ELS Group %d (*%d = ELS Group 1-8*) is receiving invalid master position data from another Link Ring node. The Link Ring node is identified by the extended diagnostic message: "***Link Ring Node %d is invalid***".

Most likely, the Link Ring node is not transmitting valid master position data because it is not in Sercos phase 4. GPP 10 and GMP 10 firmwares only generate valid master position data over the Link Ring when the drive's Sercos ring is in phase 4.

Remedy:

1. If the ELS Group is currently switched to the correct Link Ring node, make sure that the Link Ring node is in Sercos phase 4.
2. Switch the ELS Group to another Link Ring node that is transmitting valid master position data.

576 Event for input I%d is already armed, cannot arm again

The PPC-R and PPC-P11.1 have three digital inputs for arming events from external I/O signals. These events can be directly linked to digital inputs I1, I2, and I3 on connector X1 on the PPC-R and X4 on the PPC-P11.1.

Cause:

This error occurs when both the raising edge and falling edge of the same digital input is used to arm events. The "*I%d*" indicates which control input (I1, I2, or I3) was configured incorrectly.

Remedy:

1. If the rising edge of the first digital input is used to arm an event, use the rising edge or falling edge of a second digital input to arm a different event.
2. As an alternative for measuring duration of an input signal or if no other inputs are available, the event can be armed initially with the rising or falling edge. Once the event is executed, the event can be armed with the falling or rising edge in the event function. The duration of the signal must be at least 2 Sercos cycles in order to function properly.

577 Restored non volatile memory from compact flash

Cause:

During power up of the PPC-P11.1, the control determines if it has to restore the previously backed up content of the non volatile memory from the compact flash memory card (PFM). This error is issued when the PFM is moved to a new control and powered up. It is a notification that the content of the older VisualMotion system has not changed. The file system, parameters, and variables have been restored with their previous values.

Remedy:

Clear the error with a low-to-high (0->1) transition of bit 5 (*Clear_All_Errors)* of control register 1.

578 Virtual Master %d Exceeded Its Max. Vel., see ext. diag.

Cause:

The current Virtual Master velocity exceeded the specified maximum velocity in program variable VM#_MAX_VEL by 5 percent (# = *Virtual Master 1-2*). The Virtual Master has been switched to an internal *Fast_Stop* state using the deceleration rate in program variable VM#_E_STOP_DECEL.

This error is issued with the following extended diagnostic message:

"***Internal Math Error Occurred, Return to Parameter Mode***"

Remedy:

To clear the error, switch the control in and out of parameter mode or cycle power to the control.

579 Group %d Exceeded Its Jog Velocity, see ext. diag.

Cause:

The current ELS Group jogging velocity exceeded the specified jogging velocity in program variable G#_JOG_VEL by 5 percent (# = *ELS Group 1-8*). The ELS Group jogging feature has been stopped using the deceleration rate of program variable G#_STOP_DECEL.

This error is issued with the following extended diagnostic message:

"***Internal Math Error Occurred, Return to Parameter Mode***"

Remedy:

To clear the error, switch the control in and out of parameter mode or cycle power to the control.

580 pROBE Error Occurred in Task:0x%04X

This error is an indication that a pROBE event occurred and was log in the diagnostic log. This error is used for internal purposes.

581 Probe Function for Axis # is locked by the PLC

Cause:

This error occurs when a VisualMotion icon program tries to enable a probe event on a probe that is being used by the MV_Probe function block. Either a VisualMotion icon program event or the MV_Probe function block can use any probe configured in the system. The probe cannot be used by both systems at the same time. For accommodate, a mechanism is used to lock out the other system when the probe is in use.

582 Integrated PLC: PLC Stopped in Operation Mode

Cause:

This fatal error is issued by the control when the PLC is stopped while in Sercos phase 4. The can be the result of a PLC error or the user stopping the PLC program.

583 Integrated PLC: Internal System Error

Cause:

This fatal error is issued by the control if an internal system error occurs during the initialization on the Integrated PLC.

584 ELS System Master %d is invalid, see ext. diag.

Cause:

The specified ELS Master is not valid. This error is issued with the following extended diagnostic message:

Extended Diagnostic C-0-0124	Details
"MEC Encoder %d is Invalid"	%d = ELS System Master 1-6 The specified MEC encoder is not present or is disabled. Check the configuration of the encoder.

Table 2-21: ELS System Master Invalid Extended Diagnostic

585 Drive %d separate deceleration not supported

Cause:

This error occurs when a deceleration icon is used for digital drives that do not support a separate deceleration rate. The deceleration icon is only supported by Rexroth IndraDrives using firmwares SGP03 and MGP01.

586 Master Encoder Card Error, see ext diag.

Cause:

An error was encountered with the MEC card. Refer to the following table for a list of possible extended diagnostic messages:

Extended Diagnostic C-0-0124	Details
Initialization Error	An error occurred while initializing the MEC. Report the details of this error to BRC Service.
Cyclic Handshake Error	The MEC watchdog handshake failed. Report the details of this error to BRC Service.
MEC Not Responding	The MEC did not respond to a request from the control. Report the details of this error to BRC Service.
Invalid Response From MEC	The MEC responded incorrectly to a request from the motion control. Report the details of this error to BRC Service.
Unknown Daughter Board	The MEC could not identify the daughter board attached to it. Report the details of this error to BRC Service.
Encoder %d Unknown	The specified encoder is of an unknown or unsupported type. Confirm that the encoder being used is supported by the MEC.
Encoder %d Wire Break	The specified encoder's cable is broken. Check the encoder's feedback cable for damage and replace if necessary.
Phase Switch Error	The MEC could not perform the phase switch requested by the motion control. Report the details of this error to BRC Service.
Unknown Command	The MEC did not recognize the motion control's command. Report the details of this error to BRC Service.
Unknown Error %d	The specified unknown error (number) occurred. Report the details of this error to BRC Service.
MEC System General Error	A general MEC system error occurred. Report the details of this error to BRC Service.
Encoder %d General Error	The specified encoder experienced a general error. Report the details of this error to BRC Service.
24V Error	The MEC does not have 24V being supplied to its daughter board. Check MEC's 24V daughter board wiring.

Table 2-22: MEC Encoder Card Error Extended Diagnostic

Remedy:

To clear the error, switch the control in and out of parameter mode or cycle power to the control.

2.6 Integrated PLC Status Messages

When the Integrated PLC does not have an active error, the general status messages will be displayed in the PLC diagnostic parameters. The following messages are possible:

6001 Integrated PLC: Running

The Integrated PLC program is loaded and running.

6002 Integrated PLC: Stopped

The Integrated PLC program is currently in a user initiated stop.

6002 Integrated PLC: Stopped at Breakpoint

The Integrated PLC program is stopped at a programmed breakpoint.

2.7 Integrated PLC Error Codes

The following runtime errors are related to the Integrated PLC functionality but also effect the motion on the control.

0016 Integrated PLC: Software Watchdog Error

The software watchdog from the PLC has expired.

PLC Reaction: All of the IEC tasks will be stopped.

PLC Motion Reaction: All servo axes associated to the PLC will be immediately disabled. If the ELS system is associated to the PLC, the ELS system will also be immediately stopped. No method for a coordinated error reaction is provided.

Motion Reaction: If the control is in phase 4 and parameter C-0-1601 bit 8 (Motion Control ignores PLC errors) is set to zero, then the fatal error “Integrated PLC: PLC shutdown in operation mode” will be issued. The motion system will use the normal error reaction for a fatal system error.

Motion Error Message: 582 Integrated PLC: PLC Stooped in Operation Mode

0019 Integrated PLC: Program Checksum Error

A checksum error occurred after a PLC program was downloaded.

PLC Reaction: All of the IEC tasks will be stopped.

PLC Motion Reaction: All servo axes associated to the PLC will be immediately disabled. If the ELS system is associated to the PLC, the ELS system will also be immediately stopped. No method for a coordinated error reaction is provided.

Motion Reaction: If the control is in phase 4 and parameter C-0-1601 bit 8 (Motion Control ignores PLC errors) is set to zero, then the fatal error “Integrated PLC: PLC shutdown in operation mode” will be issued. The motion system will use the normal error reaction for a fatal system error.

Motion Error Message: 582 Integrated PLC: PLC Stooped in Operation Mode

0020 Integrated PLC: Fieldbus Master Error

An error occurred during the initialization of the fieldbus master.

PLC Reaction: Continues to run.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

0021 Integrated PLC: I/O Update Error

An error occurred during the data access for the IO Image.

PLC Reaction: Continues to run.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

2000 Integrated PLC: Internal SIS System Error

An error occurred handling the Integrated PLC communications.

PLC Reaction: Continues to run.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

2001 Integrated PLC: Internal Acyclic Access Error

An internal fatal error has occurred while initialing a function block.

PLC Reaction: Continues to run. Function blocks that use the acyclic communication access with not run.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

2002 Integrated PLC: Internal Acyclic Memory Error

An error occurred allocating memory for the acyclic communication access in the function blocks.

PLC Reaction: Continues to run. Function blocks that use the acyclic communication access with not run.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

2003 Integrated PLC: PLC Configuration Error

There is an error in the PLC configuration.

PLC Reaction: Continues to run.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

2004 Integrated PLC: File Access Error

An error occurred while accessing the file system.

PLC Reaction: Continues to run. The file access will be aborted.
PLC Motion Reaction: Continues to run
Motion Reaction: None
Motion Error Message: None

2005 Integrated PLC: Internal Fatal Task Error

An internal fatal error occurred in the initialization of the Integrated PLC.

PLC Reaction: It is not able to run the PLC tasks.
PLC Motion Reaction: All servo axes associated to the PLC will be immediately disabled. If the ELS system is associated to the PLC, the ELS system will also be immediately stopped. No method for a coordinated error reaction is provided.
Motion Reaction: A fatal error is issued. The motion system will use the normal error reaction for a fatal system error.
Motion Error Message: 583 Integrated PLC: Internal System Error

6011 Integrated PLC: PLC Program Stopped in Operation Mode

The PLC program was stopped by the user while the control was in phase 4.

PLC Reaction: All of the IEC tasks will be stopped.
PLC Motion Reaction: All servo axes associated to the PLC will be immediately disabled. If the ELS system is associated to the PLC, the ELS system will also be immediately stopped. No method for a coordinated error reaction is provided.
Motion Reaction: If the control is in phase 4 and parameter C-0-1601 bit 8 (Motion Control ignores PLC errors) is set to zero, then the fatal error “Integrated PLC: PLC stopped in operation mode” will be issued. The motion system will use the normal error reaction for a fatal system error.
Motion Error Message: 582 Integrated PLC: PLC Stooped in Operation Mode

6012 Integrated PLC: General Error

This a general PLC error, see the PLC extended diagnostics for more information.

PLC and motion reaction are not applicable.

2.8 Communication Error Codes and Messages

!01 Sercos Error Code # xxxx

This error code is returned to the client when a request is made for a parameter element (such as min., max., unit, etc.) that is either missing or invalid. The following table lists the possible error codes:

Error Code	Parameter Element	Description
0000	General	No error in the service channel
0001		Service channel not open
0009		Invalid access to closing the service channel
1001	IDN	No IDN
1009		Invalid access to IDN
2001	Name	No name
2002		Name transmission too short
2003		Name transmission too long
2004		Name cannot be changed (read-only)
2005		Name is write-protected at this time
3002	Attribute	Attribute transmission too short
3003		Attribute transmission too long
3004		Attribute cannot be changed (read-only)
3005		Attribute is write-protected at this time
4001	Units	No units
4002		Unit transmission too short
4003		Unit transmission too long
4004		Unit cannot be changed (read-only)
4005		Unit is write-protected at this time
5001	Minimum	No minimum input value
5002		Minimum input value transmission too short
5003		Minimum input value transmission too long
5004		Minimum input value cannot be changed (read-only)
5005		Minimum input value is write-protected at this time
6001	Maximum	No maximum input value
6002		Maximum input value transmission too short
6003		Maximum input value transmission too long
6004		Maximum input value cannot be changed (read-only)
6005		Maximum input value is write-protected at this time
7002	Data	Operation data transmission too short
7003		Operation data transmission too long
7004		Operation data cannot be changed (read-only)
7005		Operation data is write-protected in this communication phase
7006		Operation data is smaller than the minimum input value
7007		Operation data is greater than the maximum input value
7008		Invalid data (e.g. invalid bit combination for this IDN)

Table 2-23: !01 Sercos Error Code

!02 Invalid Parameter Number

The requested or sent parameter does not exist on the control or the drive, or the format of the parameter is incorrect.

!03 Data is Read Only

The data in this parameter may not be modified.

!04 Write Protected in this mode/phase

The data in this parameter can not be written in this mode or communication phase. Switch into parameter mode (Sercos phase 2) to enter the parameter.

!05 Greater than maximum value

The parameter exceeds the maximum allowed value.

!06 Less than minimum value

The parameter is less than the minimum allowed value.

!07 Data is Invalid

Parameter data is invalid, or the format of the parameter is invalid. See the drive or control system Parameter Descriptions.

!08 Drive was not found

The requested drive was not found on the Sercos ring.

!09 Drive not ready for communication

The requested drive or the Sercos ring has not been initialized.

!10 Drive is not responding

The drive did not respond to a service channel request. Check system diagnostics for the state of the Sercos ring.

!11 Service channel is not open

When switching between initialization phases, data from the drive is momentarily invalid, and this message is sent instead of the requested data.

!12 Invalid Command Class

A serial port command is invalid or not supported at this time.

!13 Checksum Error: xx (xx= checksum that control calculated)

The control detected an invalid or missing checksum in data that was sent to it. As a debugging aid, the checksum that the control calculated on the incoming data is also sent with this message.

!14 Invalid Command Subclass

A serial port command option is invalid or not supported.

!15 Invalid Parameter Set

The parameter set number (task or axis) is invalid.

!16 List already in progress

An attempt has been made to start a parameter or program list that is already in progress.

!17 Invalid Sequence Number

The sequence number of a parameter or program list is invalid or has been sent out of order.

!18 List has not started

A parameter or program list has not been initiated (i.e., sequence number was sent before list was started).

!19 List is finished

This is an acknowledgment that a parameter or program list is complete. It does not indicate an error.

!20 Parameter is a List

This parameter is a variable-length list, and its data cannot be displayed as a normal parameter.

!21 Parameter is not a List

Only Variable-Length List parameters can use the Parameter List sequence.

!22 Invalid Variable Number

The variable mnemonic was not 'I' or 'F', or the variable number is greater than the maximum number of variables allocated.

!23 Insufficient Program Space

This message is sent after the control receives a "P W" program header if not enough contiguous memory is left on the control to store the program. Other programs may need to be deleted or their order rearranged. Check system parameters C-0-0091, C-0-0092 and C-0-0093 for system memory status.

!24 Maximum number of files exceeded

The control allows up to 10 programs resident in the control. This error message is sent when the control receives a "PW" program header and there are already 10 stored programs. One of the control resident program files must be deleted to make room to download the program.

!25 Invalid Program Header

The format of the program header sent to the control is invalid, or this command is not available for reading or writing.

!26 Checksum Error in Program

This message is sent at the end of a download if the checksum of the data does not match the checksums sent in the program or program header.

!27 Invalid Program Handle

The format of the handle is incorrect, or this command is not available for reading or writing.

!28 Function not Implemented

The function being request is not supported in this version.

!29 Program not found on Control

A program corresponding to the requested program handle was not found (e.g., the program is not resident in the control).

!30 Invalid I/O Register or Bit Number

The I/O register mnemonic is invalid or a register number greater than the maximum number of registers was sent.

!31 Invalid Table Index

The ABS, REL, or EVT table name was incorrect, or the index number was greater than the maximum number of points or events.

!32 Communication Port Error

The serial port receive buffer has overflowed. Make sure communication is set to half-duplex.

!33 Invalid Data Format

The format of the data received by the control is invalid (e.g., non-digits are sent in a decimal number).

!34 Active program can't be deleted

The active program cannot be deleted at any time. To delete an active program, first stop program and then delete.

!35 Parameter mode is required

The action requested can only be performed in Parameter Mode.

!36 Invalid Event Number

The event number selected in the ABS or REL point table is out of the range of the total number of events.

!37 Invalid or Missing Event Function

The function name selected in the event table does not exist on the control or is not defined as an event function.

!38 Program file version mismatch

The version of the file system on the control does not match that of the downloaded file. Upgrade to the latest version of VisualMotion Toolkit.

!39 Can't activate while program running

A new program cannot be activated unless all user tasks are stopped.

!40 No programs are active

No programs are active on the control. Download a program to the control's memory.

!41 System Error: pSOS #XXXX

This is an internal system error. Call Bosch Rexroth Service for assistance.

!47 Invalid Unit Number

The unit number (second character in string) is not a number between '1' and 'F' or an ASCII space character.

!50 Invalid Download Block

The block sent during a program download is incorrect in length or is not in hexadecimal format.

!52 Invalid Axis

The parameter set for the requested axis does not exist. Either this axis is disabled or the control does not support this number of axes.

!53 Waiting for service channel

When switching between drive initialization phases, data from the drive is momentarily invalid. This message is sent instead of the requested data. This message will also be issued whenever a service channel transaction cannot be completed. Continue to retry the message until a valid response is returned.

!54 List or String is too short

The text string or parameter list is smaller than the minimum length allowed by the control or the drive, or the size of a value does not match the attributes sent from the drive.

!55 List or String is too long

The text string or parameter list exceeds the maximum length allowed by the control or the drive, or the size of a value does not match the attributes sent from the drive.

!56 PC Communication Handshake Error

The control is not responding to an ASCII message. Check the address configuration on both the PC (config.sys and system.ini) and the control (address jumper switches).

!58 Cannot store CAM: already active for axis %d

CAM data cannot be changed unless no axes are currently using it. Deactivate the CAM for axis '%d', then send the CAM again.

!59 Sercos handshake/busy timeout

This is an internal error generated by the Sercos ASIC. Change modes or reset the control. If it happens again, call Bosch Rexroth Service.

!60 Executable program is too large (ddK)

The executable portion of the user program downloaded to the control exceeds the maximum limit, which is indicated in the message ('dd') in kilobytes. Optimize the program and download it again, or update the firmware to a version that has a larger program limit.

!61 System Memory Allocation Error

The dynamic memory space on the control has been exhausted. Call Bosch Rexroth Service for assistance.

!62 CAM X data is < 0 or greater than 360

All values in the x-column (right hand column) of the CAM file sent to the control must be between zero and the modulo value of the master.

!63 X-Column does not start at 0 or end at 360

In the CAM file sent to the control, the first point must be zero and the last point must be the modulo value of the master. Check the beginning and end of the CAM file.

!64 Not supported in user prog file version 1.1

The requested feature is not present in the file version of the user program from which the data was requested or sent. To use this feature, a compiler upgrade is necessary.

!72 Program does not include a PLS

PLS data was requested from a program that does not support the Programmable Limit Switch functions or does not have any PLSs configured.

!73 Invalid ABS or REL point index (%d)

Point %d is zero or is greater than the allocated maximum number of points for the selected point table.

!74 Error in command execution

A procedure command set in the control or drive parameter has not been successfully completed.

!75 Comm. port buffer overflow

The serial port received buffer has overflowed. To avoid this error, the host must communicate in half duplex or use XON-XOFF handshaking correctly.

!78 Service channel in use

The Sercos service channel is being used by a user program task or by an internal process, and has suspended the transmission of a list or text string. See the description of parameter C-0-0010 bit 12.

!79 PID block number does not exist

This error is issued when the selected PID block is not initialized in the user program.

!80 Invalid Object Number

The Fieldbus object number being transmitted to the control by way of serial communications has become corrupted and is in an invalid format. Fieldbus object numbers must always begin with a 5, e.g., 5F02.

!81 Invalid Mapping(s)

The Data Type selected in the Fieldbus Mapper is invalid. Fieldbus object number can be mapped to a Variable, Register, Card parameter, Axis parameter, or Task Parameter. The Data Types mentioned above becomes an invalid mapping if the type being selected can not be mapped or is read only. This will normally occur when mapping object numbers to parameters.

!82 Write protected by password

The Sercos parameter being modified is password protected. This password protection is reserved for Bosch Rexroth Service personnel.

!83 Valid ELS Group numbers are 1 through 8

The ELS Group number being transmitted to the control by way of serial communications has become corrupted and is an invalid. Valid ELS Group numbers are 1 through 8.

!84 ELS Group is not currently active

The ELS Group number being transmitted to the control by way of serial communications is currently not active or is invalid. Valid ELS Group numbers are 1 through 8. Verify that the request number is existing and active in the user program.

!85 Data not limited to a specific ELS Master

The data being requested from the control by way of serial communications is not specific to any one ELS master.

!86 No ELS Masters are currently active

The ELS Master number being transmitted to the control by way of serial communications is currently not active or is invalid. Valid ELS Master

numbers are 1 through 6. Verify that the request number is existing and active in the user program.

!87 Valid Virtual Master numbers are 1 and 2

The Virtual Master number being transmitted to the control by way of serial communications has become corrupted and is invalid. Valid Virtual Master numbers are 1 and 2.

!88 No Virtual Master are currently active

The Virtual Master number being transmitted to the control by way of serial communications is currently not active or is invalid. Valid Virtual Master numbers are 1 and 2. Verify that the request number is existing and active in the user program.

!89 Unsupported Parameter for mapping

The Fieldbus mapping list being transmitted to the control by way of serial communications contains a parameter(s) that is not supported as a Fieldbus mapping object.

!90 Invalid variable for mapping

The Fieldbus mapping list being transmitted to the control by way of serial communications contains invalid variables (program float or integers) that are not present in the active user program.

!91 CAM build: float table start index

The CAM build float table start index (starting float variable) being requested from the control by way of serial communications is less than 1 or greater than the allowable range in the VM Data table.

!92 CAM build: float table end index

The CAM build float table end index (end float variable) being requested from the control by way of serial communications is beyond the maximum range (number) in the VM Data table.

!93 CAM build: float table size

The CAM build float table size (range of float variables) is larger than or out of range of the allowed number of floats in the VM Data table.

!96 Duplicate Message Sequence Number (MSN)

This communication error is reserved for future development.

!97 Requested operation prohibited from network

This communication error is issued when an attempt is made to access a control, across the Ethernet network, when access is not allowed. Network access to a control is configured using control parameter C-0-0405.

!99 Request in Progress

This communication error is issued when a second request is made to flash global variables, using C-0-0082, before the initial request is done.

!100 Reset Command Parameter

Global variables are flashed to memory by setting C-0-0082 to a binary 3. This communication error is issued when a second binary 3 is set in C-0-0082 without first setting the parameter to 0.

!101 Read only From This Port

This communication error is issued when an attempt is made to access a control set to read-only.

!102 Does Not Match Password Requirements

This communication error is issued when an invalid character is used while entering the password to change the access level of a serial or network connection.

!103 Bit combination not valid

This communication error is issued if A-0-0004 bit 5=1 (Enable Measuring Wheel Services) and bit 11=1(Position using Secondary Encoder). When enabling a secondary encoder as the primary feedback device for an axis, the position bit (11) can not be set to 1. This would cause a conflict in positioning for the secondary encoder.

!104 Invalid CAM id

The control CAM id written to C-0-0166 is invalid. The allowable range for a control CAM id is between 1 and 37.

!105 CAM does not exist

The control CAM id written in C-0-0166 does not exist. The control CAM has not been built or downloaded the control.

!106 CAM is not ready

The control CAM written in C-0-0166 is not ready for use. The CAM must be completely built before it can be flashed.

!108 CAM Build: Shaping factor out of range

The CAM Build Shaping Factor is out of range. The value must be between 0 - 100%.

!109 This hardware cannot be soft-booted. Power cycle required.

The current PPC hardware can not be reset using the software reset control parameter C-0-0993. Reset the control by pressing the S2 button, above the Sercos connections, or remove power to the control.

!110 Invalid Fieldbus configuration

The maximum cyclic channel length for the current fieldbus interface was exceeded. This can only occur when the cyclic channel is configured manually by writing to control parameters C-0-2600 and C-0-2601. Refer to the relevant fieldbus interface in *chapter 7* of the *VisualMotion 10 Functional Description* manual for maximum length of the cyclic channel.

!111 Compact flash must be at least 32MB for this operation

This error is issued when a compact flash backup is commanded but the PFM compact flash memory card is less than 32 MB.

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4 Service & Support

4.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

- telefonisch: **+49 (0) 9352 40 50 60**
  über Service Call Entry Center Mo-Fr 07:00-18:00
- per Fax: **+49 (0) 9352 40 49 41**
- per e-Mail: **service@boschrexroth.de**

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

- by phone: **+49 (0) 9352 40 50 60**
  via Service Call Entry Center Mo-Fr 7:00 am - 6:00 pm
- by fax: **+49 (0) 9352 40 49 41**
- by e-mail: **service@boschrexroth.de**

4.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

+49 (0) 171 333 88 26
oder **+49 (0) 172 660 04 06**

After helpdesk hours, contact our service department directly at

+49 (0) 171 333 88 26
or **+49 (0) 172 660 04 06**

4.3 Internet

Ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen unserer Service- und Vertriebsbüros finden Sie unter **www.boschrexroth.com** – einige Angaben in dieser Dokumentation können inzwischen überholt sein.

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit Ihrem lokalen Ansprechpartner auf.

Verkaufsniederlassungen
Niederlassungen mit Kundendienst

Additional notes about service, repairs and training as well as the **actual** addresses of our sales- and service facilities are available on the Internet at **www.boschrexroth.com** – some information in this documentation may meanwhile be obsolete.

Please contact the sales & service offices in your area first.

sales agencies
offices providing service

4.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

detaillierte Beschreibung der Störung und der Umstände.

Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.

Tel.-/Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the nameplate of the affected products, especially typecodes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

4.5 Kundenbetreuungsstellen - Sales & Service Facilities

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Nordamerika – North America

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Südamerika – South America

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