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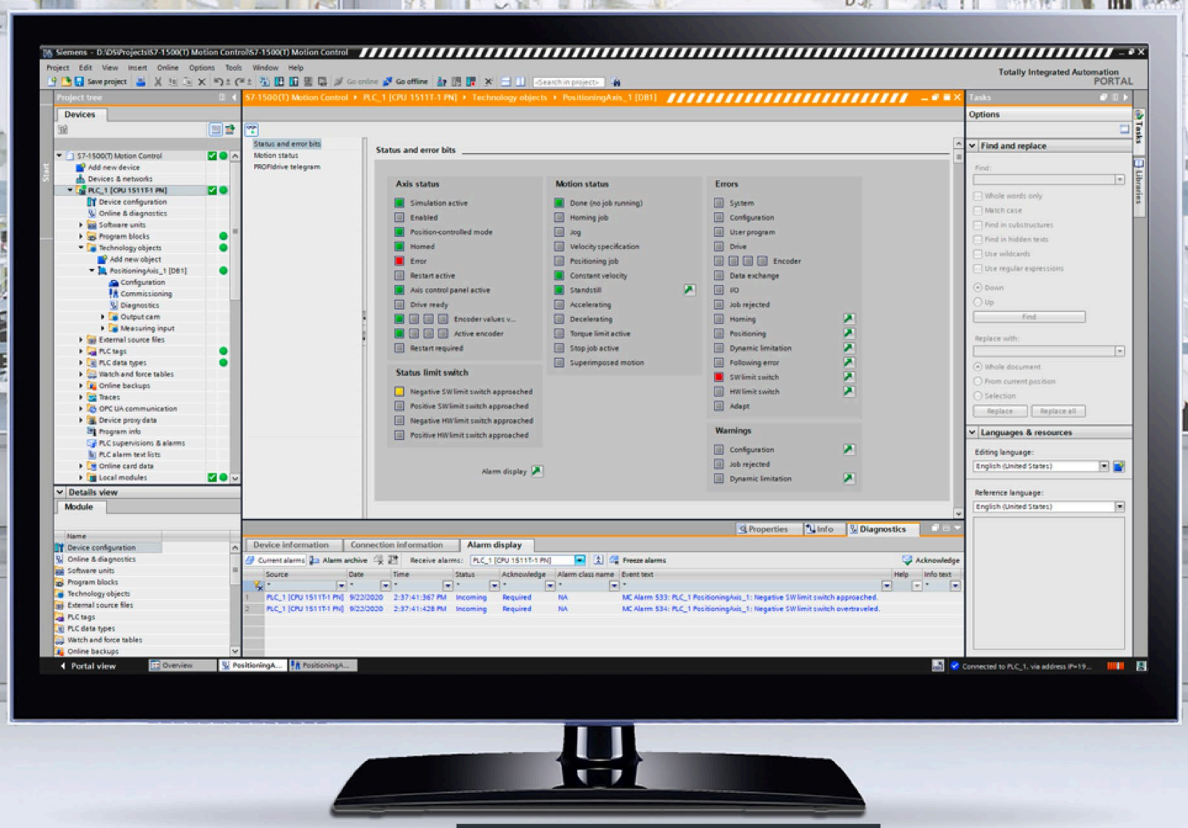

Function manual

SIMATIC

S7-1500

S7-1500/S7-1500T Motion Control alarms and error IDs V6.0, STEP 7 V17 or higher

Edition 05/2021

support.industry.siemens.com

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SIMATIC

S7-1500
S7-1500/S7-1500T Motion Control alarms and error IDs V6.0, STEP 7 V17 or higher

Diagnostics Manual

S7-1500/S7-1500T Motion Control

05/2021
A5E50859265-AA

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠**DANGER**
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠**WARNING**
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠**CAUTION**
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠**WARNING**
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Preface (S7-1500, S7-1500T)

Purpose of the documentation

This documentation provides important information that you need to configure and commission the integrated Motion Control functionality of the S7-1500 Automation systems.

Required basic knowledge

In order to understand this documentation, the following knowledge is required:

- General knowledge in the field of automation
- General knowledge in the field of drive engineering and motion control

Validity of the documentation

This documentation is valid for the S7-1500 product range.

Conventions

- For the path settings in the project navigation it is presumed that the "Technology objects" object is opened in the CPU subtree. The "Technology object" placeholder represents the name of the technology object.

  Example: "Technology object > Configuration > Basic parameters".
- The <TO> placeholder represents the name set in tags for the respective technology object.

  Example: <TO>.Actor.Type
- This documentation contains pictures of the devices described. The pictures may differ in minor details from the devices supplied.

You should also observe the notes that are marked as follows:

Note

A note contains important information about the product described in the documentation, about the handling of the product, and about sections in this documentation demanding your particular attention.

Further support

- The range of technical documentation for the individual SIMATIC products and systems is available on the Internet (http://www.siemens.com/simatic-tech-doku-portal).
- The online catalog and the online ordering system is available on the Internet (http://mall.industry.siemens.com).

Security information (S7-1500, S7-1500T)

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

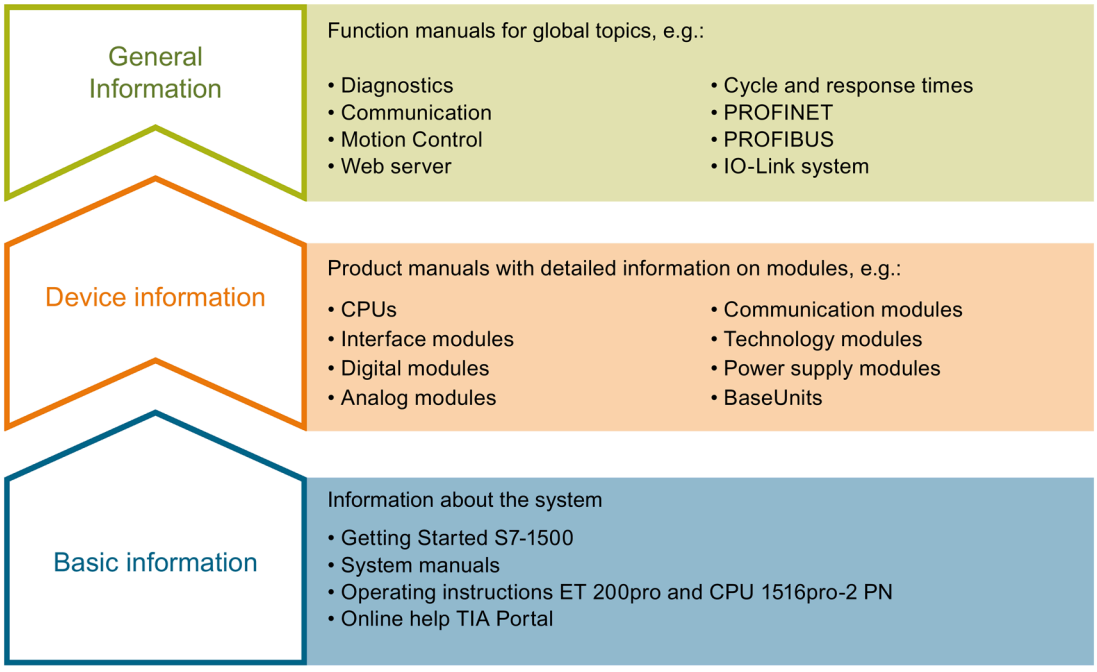
Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customers' exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed visit (https://www.siemens.com/industrialsecurity).

Table of contents

Function manuals Documentation Guide (S7-1500, S7-1500T) 1

The documentation for the SIMATIC S7-1500 automation system, the CPUs 1513/1516pro-2 PN based on SIMATIC S7-1500, and the distributed I/O systems SIMATIC ET 200MP, ET 200SP and ET 200AL is divided into three areas.
This division allows you easier access to the specific information you require.



Basic information

System manuals and Getting Started manuals describe in detail the configuration, installation, wiring and commissioning of the SIMATIC S7-1500, ET 200MP, ET 200SP and ET 200AL systems. Use the corresponding operating instructions for the CPUs 1513/1516pro-2 PN. The STEP 7 online help supports you in the configuration and programming.

Device information

Product manuals contain a compact description of the module-specific information, such as properties, terminal diagrams, characteristics and technical specifications.

General information

The function manuals contain detailed descriptions on general topics such as diagnostics, communication, Motion Control, Web server, OPC UA.

You can download the documentation free of charge from the Internet (https://support.industry.siemens.com/cs/ww/en/view/109742705).

Changes and additions to the manuals are documented in product information sheets.

You will find the product information on the Internet:

- S7-1500/ET 200MP (https://support.industry.siemens.com/cs/us/en/view/68052815)
- ET 200SP (https://support.industry.siemens.com/cs/us/en/view/73021864)

Manual Collections

The Manual Collections contain the complete documentation of the systems put together in one file.

You will find the Manual Collections on the Internet:

- S7-1500/ET 200MP (https://support.industry.siemens.com/cs/ww/en/view/86140384)
- ET 200SP (https://support.industry.siemens.com/cs/ww/en/view/84133942)
- ET 200AL (https://support.industry.siemens.com/cs/ww/en/view/95242965)

"mySupport"

With "mySupport", your personal workspace, you make the best out of your Industry Online Support.

In "mySupport", you can save filters, favorites and tags, request CAx data and compile your personal library in the Documentation area. In addition, your data is already filled out in support requests and you can get an overview of your current requests at any time.

You must register once to use the full functionality of "mySupport".

You can find "mySupport" on the Internet (https://support.industry.siemens.com/My/ww/en).

"mySupport" - Documentation

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You must register once to use the full functionality of "mySupport".

You can find "mySupport" on the Internet (https://support.industry.siemens.com/My/ww/en/documentation).

"mySupport" - CAx data

In the CAx data area of "mySupport", you can access the latest product data for your CAx or CAe system.

You configure your own download package with a few clicks.

In doing so you can select:

- Product images, 2D dimension drawings, 3D models, internal circuit diagrams, EPLAN macro files
- Manuals, characteristics, operating manuals, certificates
- Product master data

You can find "mySupport" - CAx data on the Internet (https://support.industry.siemens.com/my/ww/en/CAxOnline).

Application examples

The application examples support you with various tools and examples for solving your automation tasks. Solutions are shown in interplay with multiple components in the system - separated from the focus on individual products.

You will find the application examples on the Internet (https://support.industry.siemens.com/cs/ww/en/ps/ae).

TIA Selection Tool

With the TIA Selection Tool, you can select, configure and order devices for Totally Integrated Automation (TIA).
This tool is the successor of the SIMATIC Selection Tool and combines the known configurators for automation technology into one tool.
With the TIA Selection Tool, you can generate a complete order list from your product selection or product configuration.

You can find the TIA Selection Tool on the Internet (https://support.industry.siemens.com/cs/ww/en/view/109767888).

SIMATIC Automation Tool

You can use the SIMATIC Automation Tool to perform commissioning and maintenance activities simultaneously on various SIMATIC S7 stations as a bulk operation independent of TIA Portal.

The SIMATIC Automation Tool provides a multitude of functions:

- Scanning of a PROFINET/Ethernet system network and identification of all connected CPUs
- Address assignment (IP, subnet, gateway) and station name (PROFINET device) to a CPU
- Transfer of the date and the programming device/PC time converted to UTC time to the module
- Program download to CPU
- RUN/STOP mode switchover
- CPU localization by means of LED flashing
- Reading out of CPU error information
- Reading of the CPU diagnostics buffer
- Reset to factory settings
- Firmware update of the CPU and connected modules

You can find the SIMATIC Automation Tool on the Internet (https://support.industry.siemens.com/cs/ww/en/view/98161300).

PRONETA

SIEMENS PRONETA (PROFINET network analysis) allows you to analyze the plant network during commissioning. PRONETA features two core functions:

- The topology overview automatically scans the PROFINET and all connected components.
- The IO check is a fast test of the wiring and the module configuration of a plant.

You can find SIEMENS PRONETA on the Internet (https://support.industry.siemens.com/cs/ww/en/view/67460624).

SINETPLAN

SINETPLAN, the Siemens Network Planner, supports you in planning automation systems and networks based on PROFINET. The tool facilitates professional and predictive dimensioning of your PROFINET installation as early as in the planning stage. In addition, SINETPLAN supports you during network optimization and helps you to exploit network resources optimally and to plan reserves. This helps to prevent problems in commissioning or failures during productive operation even in advance of a planned operation. This increases the availability of the production plant and helps improve operational safety.

The advantages at a glance

- Network optimization thanks to port-specific calculation of the network load
- Increased production availability thanks to online scan and verification of existing systems
- Transparency before commissioning through importing and simulation of existing STEP 7 projects
- Efficiency through securing existing investments in the long term and the optimal use of resources

You can find SINETPLAN on the Internet (https://www.siemens.com/sinetplan).

Introduction (S7-1500, S7-1500T) 2

2.1 Interplay of the various documents (S7-1500, S7-1500T)

For a better overview, the documentation of the Motion Control functions is divided into the following documents:

Documentation	Description
S7-1500/S7-1500T Motion Control overview Function manual "S7-1500/S7-1500T Motion Control overview" (https://support.industry.siemens.com/cs/ww/en/view/109781848)	This documentation describes the general Motion Control functions independent of technology objects.
Using S7-1500/S7-1500T axis functions Function manual "S7-1500/S7-1500T Axis functions" (https://support.industry.siemens.com/cs/ww/en/view/109781849)	This documentation describes the Motion Control functions for the following technology objects: • Speed axis • Positioning axis • External encoder
Using S7-1500/S7-1500T measuring input and output cam functions Function manual "S7-1500/S7-1500T Measuring input and output cam functions" (https://support.industry.siemens.com/cs/ww/en/view/109781852)	This documentation describes the Motion Control functions for the following technology objects: • Measuring input • Output cam • Cam track
Using S7-1500/S7-1500T synchronous operation functions Function manual "S7-1500/S7-1500T Synchronous operation functions" (https://support.industry.siemens.com/cs/ww/en/view/109781851)	This documentation describes the Motion Control functions for the following technology objects: • Synchronous axis • Cam (S7-1500T) • Leading axis proxy (S7-1500T)
Using S7-1500T kinematics functions Function manual "S7-1500T Kinematics functions" (https://support.industry.siemens.com/cs/ww/en/view/109781850)	This documentation describes the Motion Control functions for the following technology objects: • Kinematics (S7-1500T)
S7-1500/S7-1500T Motion Control alarms and error IDs Function manual "S7-1500/S7-1500T Motion Control alarms and error IDs" (https://support.industry.siemens.com/cs/ww/en/view/109781853)	This documentation describes the technology alarms of the technology objects and the error identifications of the motion control instructions.

Additional information

You can find an overview, application examples and other important links to the topic "SIMATIC Motion Control" in the Siemens Industry Online Support under the entry ID 109751049 (https://support.industry.siemens.com/cs/ww/en/view/109751049).

2.2 Diagnostic concept (S7-1500, S7-1500T)

The diagnostic concept encompasses alarms and associated messages, as well as error messages in the Motion Control instructions. The TIA Portal also supports you with consistency checks during configuration of the technology objects, and during the creation of your user program.

All alarms in runtime (from the CPU, technology, hardware etc.) are displayed in the Inspector window of the TIA Portal. Diagnostic information that relates to technology objects (technology alarms, status information) are additionally displayed in the Diagnostics window of the respective technology object.

During motion control, if an error occurs at a technology object (e.g. approaching a hardware limit switch), then a technology alarm (Page 15) is triggered, and a corresponding message is displayed in the TIA Portal as well as on HMI devices.

In your user program, technology alarms are generally signaled via error bits in the technology data block. The number of the technology alarm with the highest priority is also displayed. In order to simplify error evaluation, the "Error" and "ErrorID" parameters of the Motion Control instructions also indicate that a technology alarm is pending.

Program errors (Page 72) can occur during parameter assignment or during the processing sequence of the Motion Control instructions (e.g. invalid parameter specification when calling the instruction, initiation of a job without enable via "MC_Power"). With active jobs, errors in Motion Control instructions are indicated by the "Error" and "ErrorID" parameters.

Technology alarms (S7-1500, S7-1500T) 3

If an error occurs at a technology object (e.g. approaching a hardware limit switch), a technology alarm is triggered and indicated. The impact of a technology alarm on the technology object is specified by the alarm response.

Alarm classes

Technology alarms are divided into three classes:

- **Acknowledgeable warning**

  The processing of Motion Control job is continued. The current motion of the axis can be influenced, e.g. by limiting the current dynamic values to the configured limit values.

- **Alarm requiring acknowledgment**

  Motion jobs are aborted in accordance with the alarm response. You must acknowledge the alarms in order to continue execution of new jobs after eliminating the cause of the error.

- **Fatal error**

  Motion jobs are aborted in accordance with the alarm response.

  To be able to use the technology object again after eliminating the cause of the error, you must restart the technology object.

Display of technology alarms

A technology alarm is displayed in the following locations:

- **TIA Portal**
  - **"Technology object > Diagnostics > Status and error bits"**

    Display of pending technology alarms for each technology object
  - **"Technology object > Commissioning > Axis control panel"**

    Display of the last pending technology alarm for each technology object
  - **"Inspector window > Diagnostics > Message display"**

    Select the "Receive messages" check box under "Online & Diagnostics > Online Access" in order to display technology alarms via the message display.

    With an online connection to the CPU, the pending technology alarms for all technology objects are displayed. Additionally, the archive view is available to you.

    The message display can also be activated and displayed on a connected HMI.
  - **"CPU > Online & diagnostics"**

    Display of the technology alarms that have been entered in the diagnostic buffer
- **User program**
  - **Tags "<TO>.ErrorDetail.Number" and "<TO>.ErrorDetail.Reaction"**

    Indication of the number and the reaction of the technology alarm with the highest priority
  - **Tag "<TO>.StatusWord"**

    A pending technology alarm is indicated with bit 1 ("Error").
  - **Tag "<TO>.ErrorWord"**

    Indication of alarms and fatal errors
  - **Tag "<TO>.WarningWord"**

    Indication of warnings
  - **Parameter "Error" and "ErrorID"**

    In a Motion Control instruction, the parameters "Error" = TRUE and "ErrorID" = 16#8001 indicate that a technology alarm is pending.

- **Display of the CPU**

  In order to show technology alarms on the CPU display, make the following setting when loading to the CPU:
  In the "Load preview" dialog, select the action "Consistent download" for the "Text libraries" entry.

- **Web server**
  - **"Motion Control diagnostics > Diagnostics"**

    Display of pending technology alarms for each technology object
  - **"Motion Control diagnostics > Service overview"**

    Status display of technology objects

Alarm response

A technology-alarm always leads to an alarm response, which describes the effect on the technology object. The alarm response is specified by the system.

The following table shows possible alarm response:

Alarm response	Validity		Description
	TO[1)]	Kin[2)]	
No reaction (warnings only) <TO>.ErrorDetail.Reaction = 0	✓	✓	The processing of Motion Control job is continued. The current motion of the axis can be influenced, e.g. by limiting the current dynamic values to the configured limit values.
Stop with current dynamic values <TO>.ErrorDetail.Reaction = 1	✓	-	Active motion commands are aborted. The axis is braked with the dynamic values that present in the Motion Control instruction and brought to a standstill.
Stop with maximum dynamic values <TO>.ErrorDetail.Reaction = 2	✓	-	Active motion commands are aborted. The axis is braked with the dynamic values configured under "Technology object > Extended parameters > Dynamic limits", and brought to a standstill. The configured maximum jerk is hereby taken into account.
Stop with emergency stop ramp <TO>.ErrorDetail.Reaction = 3	✓	-	Active motion commands are aborted. The axis is braked with the emergency stop deceleration configured under "Technology object > Extended parameters > Emergency stop ramp", without any jerk limit, and brought to a standstill.
Remove enable <TO>.ErrorDetail.Reaction = 4	✓	-	Active motion commands are aborted. The setpoint zero is output and the enable is removed. The axis is braked to a standstill according to the configuration in the drive.
Track setpoints <TO>.ErrorDetail.Reaction = 5	✓	-	Active motion commands are aborted. The setpoint zero is output. The actual values supplied by the drive are automatically tracked as setpoints.

Alarm response	Validity		Description
	TO[1]	Kin[2]	
Terminate processing of the technology object: • Output cam <TO>.ErrorDetail.Reaction = 6 • Cam track <TO>.ErrorDetail.Reaction = 7 • Measuring input <TO>.ErrorDetail.Reaction = 8 • Cam <TO>.ErrorDetail.Reaction = 9 • External encoder <TO>.ErrorDetail.Reaction = 10 • Leading axis proxy <TO>.ErrorDetail.Reaction = 13	✓	-	Processing of the technology object is terminated. All running Motion Control jobs are aborted.
Stop without leaving the path <TO>.ErrorDetail.Reaction = 11	-	✓	The kinematics are decelerated and brought to a standstill. The current path is not exited when the kinematics is stopped. Linear and circular motion jobs are braked without jerk limit.
Stop with maximum dynamic values of the axes <TO>.ErrorDetail.Reaction = 12	-	✓	Active and queued motion jobs are canceled. The axes are decelerated with the maximum dynamic values configured under "Technology object > Configuration > Extended parameters > Limits > Dynamic limits", and brought to a standstill. The configured maximum jerk is hereby taken into account.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

Acknowledging technology alarms

You can acknowledge technology alarms as follows:

- **TIA Portal**
  - **"Technology object > Commissioning > Axis control panel"**

    Click "Confirm" to acknowledge all alarms and warnings pending for the selected technology object.
  - **"Inspector window > Diagnostics > Message display"**

    You can acknowledge the alarms and warnings for all technology objects either individually, or all at once.
- **HMI**

  At an HMI with enabled message display, you can acknowledge the alarms and warnings for all technology objects either individually, or all at once.
- **User program**

  Acknowledge pending technology alarms for a technology object with the Motion Control instruction "MC_Reset".
- **CPU display**

  Acknowledge pending technology alarms via the display of the CPU.
- **Web server**

  Acknowledge pending technology alarms under "Alarms".

3.1 Overview of the technology alarms (S7-1500, S7-1500T)

The following table shows an overview of the technology alarms and the corresponding alarm responses. When a technology alarm occurs, evaluate the entire indicated alarm text, in order to find the precise cause.

Legend

Table column	Description
No.	Number of the technology alarm (corresponds to "<TO>.ErrorDetail.Number")
Validity	Validity of the descriptions for the technology objects
TO	Applies to all technology objects with the exception of the Kinematics technology object.
Kin	Applies only to the Kinematics technology object.
Reaction	Effective alarm response (corresponds to "<TO>.ErrorDetail.Reaction")
F	Error bit Bit that is set in "<TO>.ErrorWord" when the technology alarm occurs A description of the bits can be found in the tags of the corresponding technology object.
W	Warning bit Bit that is set in "<TO>.WarningWord" when the technology alarm occurs A description of the bits can be found in the tags of the corresponding technology object.
R	Restart To acknowledge the technology alarm, the technology object must be reinitialized (Restart).
D	Diagnostic buffer The alarm is entered in the diagnostics buffer.
Alarm text	Displayed alarm text

List of the technology alarms

No.	Validity		Reaction	F	W	R	D	Alarm text
	TO	Kin						
101	✓	-	Remove enable	X1	-	✓	✓	Configuration error.
	-	✓	Stop with maximum dynamic values of the axes					
102	✓	-	Remove enable	X15	-	✓	✓	Drive configuration adaptation error.
103	✓	-	Remove enable	X15	-	✓	✓	Encoder configuration adaptation error.
104	✓	-	Stop with maximum dynamic values	X1	-	-	-	SW limit switch specification error.
105	✓	-	Remove enable	X1	-	✓	✓	Drive configuration error.
106	✓	-	Remove enable	X1	-	-	✓	Drive connection configuration error.
107	✓	-	Remove enable	X1	-	✓	✓	Encoder configuration error.
108	✓	-	Remove enable	X1	-	-	✓	Encoder connection configuration error.
109	✓	-	Remove enable	X1	-	✓	-	Configuration error.
110	✓	-	No reaction	-	X1	-	-	Configuration is adjusted internally.
111	✓	-	No reaction	-	X15	-	✓	TO and drive configuration inconsistent.

No.	Validity		Reaction	F	W	R	D	Alarm text
	TO	Kin						
112	✓	-	No reaction	-	X15	-	✓	TO and encoder configuration inconsistent.
113	✓	-	Remove enable	X2	-	✓	-	Isochronous mode not possible.
114	✓	-	Remove enable	X1	-	✓	✓	Cross-PLC synchronous operation configuration error.
201	✓	-	Remove enable	X0	-	✓	✓	Internal error.
	-	✓	Stop with maximum dynamic values of the axes					
202	✓	-	No reaction	X0	-	✓	-	Internal configuration error.
	-	✓	Stop with maximum dynamic values of the axes					
203	✓	-	Remove enable	X0	-	✓	-	Internal error.
	-	✓	Stop with maximum dynamic values of the axes					
204	✓	-	Remove enable	X0	-	-	-	Commissioning error.
	-	✓	Stop with maximum dynamic values of the axes					
304	✓	-	Stop with emergency stop ramp	X2	-	-	-	Velocity limit is zero.
	-	✓	Stop with maximum dynamic values of the axes					
305	✓	-	Stop with emergency stop ramp	X2	-	-	-	• Limit value of the acceleration is zero. • Limit value of the deceleration is zero.
	-	✓	Stop with maximum dynamic values of the axes					
306	✓	-	Stop with emergency stop ramp	X2	-	-	-	Jerk limit is zero.
	-	✓	Stop with maximum dynamic values of the axes					
307	✓	-	Stop with maximum dynamic values	X2	-	-	✓	• Negative numerical value range of the position reached. • Positive numerical value range of the position reached.
308	✓	-	Remove enable	X2	-	-	✓	• Negative numerical value range of the position exceeded. • Positive numerical value range of the position exceeded.
321	✓	-	Stop with emergency stop ramp	X3	-	-	-	Axis is not homed.
322	✓	-	No reaction	-	X3	-	-	Restart not executed.
323	✓	-	Remove enable	X3	-	-	-	MC_Home could not be executed.
341	✓	-	Stop with maximum dynamic values	X10	-	-	-	Homing data faulty.
342	✓	-	Stop with emergency stop ramp	X10	-	-	-	Reference cam/encoder zero mark not found.
343	✓	-	Remove enable	X1	-	-	-	Homing function not supported by device.
401	✓	-	Remove enable	X13	-	-	✓	Error accessing logical address.
411	✓	-	Remove enable	X5	-	-	✓	Encoder at the logical address disrupted.

No.	Validity		Reaction	F	W	R	D	Alarm text
	TO	Kin						
412	✓	-	Remove enable	X5	-	-	-	Permitted actual value range exceeded.
421	✓	-	Remove enable	X4	-	-	✓	Drive disrupted at the logical address.
431	✓	-	Remove enable	X7	-	-	✓	Communication to the device under logical address is disturbed.
501	✓	✓	No reaction	-	X6	-	-	Programmed velocity is limited.
502	✓	✓	No reaction	-	X6	-	-	• Programmed acceleration is being limited. • Programmed deceleration is being limited.
503	✓	✓	No reaction	-	X6	-	-	Programmed jerk is limited.
504	✓	-	No reaction	-	X6	-	-	Speed setpoint monitoring active.
511	✓	-	No reaction	-	X6	-	-	Dynamic limit is violated by kinematics motion.
521	✓	-	Remove enable	X11	-	-	-	Following error.
522	✓	-	No reaction	-	X11	-	-	Warning following error tolerance.
531	✓	-	Remove enable	X9	-	-	-	• Positive HW limit switch approached. • Negative HW limit switch approached. • Invalid retraction direction of active hardware limit switch
						✓	-	• HW limit switch polarity reversed, retraction not possible. • Both hardware limit switches active, retraction not possible. • Encoder error with triggered HW limit switch, no free travel possible.
533	✓	-	Stop with maximum dynamic values	X8	-	-	-	• Negative SW limit switch is approached. • Positive SW limit switch is approached.
534	✓	-	Remove enable	X8	-	-	-	• Negative SW limit switch was crossed. • Positive SW limit switch was crossed.
541	✓	-	Remove enable	X12	-	-	-	Position monitoring error.
542	✓	-	Remove enable	X2	-	-	-	Clamping monitoring error: Axis leaving clamping tolerance window.
550	✓	-	Track setpoints	X13	-	-	-	Drive-autonomous motion is being executed.
551	✓	-	No reaction	X2	X6	-	-	Maximum velocity cannot be reached with drive/axis parameters.
552	✓	-	Remove enable	X15	-	-	-	Encoder adaptation error during ramp-up.
561	-	✓	No reaction	-	X6	-	-	Programmed velocity of the orientation motion is limited.
562	-	✓	No reaction	-	X6	-	-	• Programmed acceleration of the orientation motion is limited. • Programmed deceleration of the orientation motion is limited.
563	-	✓	No reaction	-	X6	-	-	Programmed jerk of the orientation motion is limited.

No.	Validity		Reaction	F	W	R	D	Alarm text
	TO	Kin						
601	✓	-	Stop with maximum dynamic values	X14	-	-	-	Leading axis is not assigned or defective.
603	✓	-	Remove enable	X14	-	-	-	Leading axis is not in position-controlled mode.
608	✓	-	Stop with maximum dynamic values	X14	-	-	-	Error during synchroniza-tion/desynchronization.
612	✓	-	Remove enable	X2	-	-	-	Specified cam has not been interpolated.
700	✓	-	Remove enable	X2	-	-	-	Error when calculating the switching position.
701	✓	-	Remove enable	X13	-	-	-	I/O output error.
702	✓	-	Remove enable	X2	-	-	-	Position value invalid.
703	✓	-	Remove enable	X2	-	-	-	Cam track data faulty.
704	✓	-	Remove enable	X2	-	-	-	Output cam data faulty.
750	✓	-	Remove enable	X2	-	-	-	Measuring job not possible during homing of assigned axis.
752	✓	-	No reaction	X2	-	-	-	Validity range of measuring job not recog-nized.
753	✓	-	Remove enable	X2	-	-	-	Only one measuring input can access an encoder at a time.
754	✓	-	Remove enable	X2	-	-	-	Measuring input configuration in external device is not correct.
755	✓	-	Remove enable	X13	-	-	-	Measuring job not possible.
758	✓	-	No reaction	X2	-	-	-	A measuring edge was not evaluated.
801	-	✓	Stop with maximum dynamic values of the axes	X2	-	-	-	Kinematics axis not ready.
802	-	✓	Stop with maximum dynamic values of the axes	X3	-	-	-	Cannot calculate the geometry element.
803	-	✓	Stop with maximum dynamic values of the axes	X4	-	-	-	Error in the calculation of the transformation.
804	-	✓	Stop with maximum dynamic values of the axes	X2	-	-	-	Kinematics motion cannot be stopped at end.
805	-	✓	Stop with maximum dynamic values of the axes	X2	-	-	-	Limitation of path dynamics by axis dynamics incorrect.
806	-	✓	Stop without leaving the path	X2	-	-	-	Zone violation of work or blocked zones
807	-	✓	No reaction	-	X2	-	-	Zone violation of signal zones
808	-	✓	Stop with maximum dynamic values of the axes	X2	-	-	-	Ambiguity due to multiple active work zones.
809	-	✓	Stop with maximum dynamic values of the axes	X2	-	-	-	Path dynamic limit through dynamic of the orientation motion faulty.
810	-	✓	Stop with maximum dynamic values of the axes	X7	-	-	-	Conveyor belt not assigned or faulty (OCS <number>).
811	-	✓	Stop with maximum dynamic values of the axes	X7	-	-	-	Error when approaching the TCP to an object coordinate system (OCS <number>).
900	✓	-	Set leading value invalid	X2	-	-	✓	Leading values invalid.
901	✓	-	Set leading value invalid	X2	-	-	✓	Data transmission error
902	✓	-	No reaction	-	X2	-	-	Leading value accuracy limited.
903	✓	-	Set leading value invalid	X2	-	✓	✓	Modulo settings of the leading axis changed in cyclic operation.

3.2 Technology alarms 101 - 114 (S7-1500, S7-1500T)

3.2.1 Technology alarm 101 (S7-1500, S7-1500T)

Alarm response TO[1)]: Remove enable

Alarm response Kin[2)]: Stop with maximum dynamic values of the axes

Restart: Required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Configuration error.	✓	✓	
Value in <tag> not allowed.	✓	✓	Adjust the specified value.
Faulty load gear factors.	✓	-	Adjust the load gear factors in the "<TO>.LoadGear.Numerator" and/or "<TO>.LoadGear.Denominator" parameters.
At least one encoder required. Sensor[].existent	✓	-	Configure at least one encoder.
Sensor[1] must be configured for DSC.	✓	-	Configure Sensor[1].
Values in Sensor[1..4].Parameter.FineResolutionXist1 and p979 are not equal.	✓	-	Set the identical fine resolution on the technology as on the drive.
Encoder position cannot be displayed due to the encoder configuration/mechanics.	✓	-	Check the configuration of the encoder and mechanics.
Linear encoder in not permitted on rotary drive system (Sensor.System).	✓	-	
Backlash compensation not permitted with encoder on load side.	✓	-	
Controller parameter incorrect.	✓	-	Adjust the value of the "<TO>.PositionController.Kv" parameter.
PROFIBUS parameter assignment inconsistent. Sum of Ti and To greater than send clock.	✓	-	Adjust the send clock in the hardware configuration.
Drive or drive telegram type or encoder not suitable for DSC.	✓	-	Check whether the drive can be operated with DSC and adjust the drive telegram if required.
Technology data block is only possible with digital drive coupling.	✓	-	Check the drive coupling.
The VREF of the analog output or the bit drivers are assigned multiple times.	✓	-	Make sure that different addresses are assigned for all technology objects in the project.
TimeOut parameter outside of limits.	✓	-	Set the monitoring time of the axis control panel to a valid value.
Telegram in Actor.Interface.AddressIn and AddressOut not equal.	✓	-	Set the identical drive telegram type for sending and receiving direction.
Illegal combination for homing data with incremental encoder. encoder.	✓	-	Check the active and passive homing settings.
Telegram in Sensor[1..4].Interface.AddressIn and AddressOut not equal.	✓	-	Set the identical encoder telegram type for sending and receiving direction.
Interconnection of the kinematics axis <no.> is missing.	-	✓	Interconnect the axis.
Interconnection of orientation axis A4 is missing.	-	✓	
Delta picker 2D: No formation of a closed parallel structure.	-	✓	Adjust the geometry data of the mechanics.

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Delta picker 3D: No formation of a closed parallel structure.	-	✓	
Delta picker 3D: Angular offset does not permit a third arm.	-	✓	
Invalid arm distances.	-	✓	
Tripod: Angular offset does not permit a third arm.	-	✓	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.2 Technology alarm 102 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Drive configuration adaptation error.	✓	-	
Drive is not assigned to a SINAMICS device.	✓	-	The drive adaptation is only available for SINAMICS drives.
Parameter does not exist, value unreadable or invalid.	✓	-	Check whether your device supports acyclic data communication according to PROFIdrive.
Maximum speed.	✓	-	
Maximum torque (p1520).	✓	-	
Maximum torque (p1521)	✓	-	
Fine resolution torque.	✓	-	
Rated speed.	✓	-	
Rated torque.	✓	-	
Motor type.	✓	-	
Unspecified.	✓	-	
Adaptation canceled due to insufficient resources.	✓	-	
Drive is not interconnected directly to I/O area.	✓	-	In the configuration of the axis, the logical addresses were placed, for example, in a data block. The adaptation is only possible when the encoder has been directly interconnected to an I/O area.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.3 Technology alarm 103 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Encoder configuration adaptation error.	✓	-	
Encoder is not assigned to a SINAMICS device.	✓	-	The encoder adaptation is only available for SINAMICS devices and external Siemens encoders.
Parameter does not exist, value unreadable or invalid.	✓	-	Check whether your device supports acyclic data communication according to PROFIdrive.
Encoder system	✓	-	
Encoder resolution	✓	-	
Encoder fine resolution Gx_XIST1	✓	-	
Encoder fine resolution Gx_XIST2	✓	-	
Encoder revolutions	✓	-	
Unspecified	✓	-	
Adaptation canceled due to insufficient resources.	✓	-	
Encoder is not interconnected directly to I/O area.	✓	-	In the configuration of the axis, the logical addresses were placed, for example, in a data block. The adaptation is only possible when the encoder has been directly interconnected to an I/O area.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.4 Technology alarm 104 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with maximum dynamic values

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
SW limit switch specification error.	✓	-	
Neg. SW limit switch greater than pos. SW limit switch.	✓	-	Change the position of the software limit switches.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.5 Technology alarm 105 (S7-1500, S7-1500T)

Alarm response TO[1)]: Remove enable

Alarm response Kin[2)]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Drive configuration error.	✓	-	
HW Configuration.	✓	-	• Connect a suitable device. • Check the device (I/Os). • Check the topology of the project. • Compare the device configuration and the configuration of the technology object. • Contact customer support.
The TO needs a smaller servo cycle clock.	✓	-	
Error in internal communication.	✓	-	• Check the project for consistency and reload the project into the controller. • Contact customer support.
Address for drive data does not exist in project.	✓	-	Check the project for consistency and reload the project into the controller.
Error during the parameter assignment of the frame for the torque data.	✓	-	Check the interconnection of the SIEMENS additional telegram 750 (torque data).
Address overlap during drive interconnection.	✓	-	Make sure that different addresses are assigned for all technology objects in the project.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.6 Technology alarm 106 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Drive connection configuration error.	✓	-	
System has no communication with drive.	✓	-	Internal system error. • Check the project for consistency and reload the project into the controller. • Contact customer support.
Drive not initialized during ramp-up.	✓	-	• Ensure that the communication between the controller and drive is established. To do this, evaluate the "<TO>.StatusDrive.CommunicationOK" parameter before enabling the axis. • To enable a technology object, the drive initialization must be complete. Trigger the job again later.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.7 Technology alarm 107 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Encoder configuration error.	✓	-	
HW Configuration.	✓	-	• Connect a suitable device. • Check the device (I/Os). • Check the topology of the project. • Compare the device configuration and the configuration of the technology object. • Contact customer support.
The TO needs a smaller servo cycle clock.	✓	-	
Error in internal communication.	✓	-	• Check the project for consistency and reload the project into the controller. • Contact customer support.
Address overlap during encoder interconnection.	✓	-	Make sure that different addresses are assigned for all technology objects in the project.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.8 Technology alarm 108 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Encoder connection configuration error.	✓	-	
System without communication to encoder.	✓	-	Internal system error. • Check the project for consistency and reload the project into the controller. • Contact customer support.
Encoder not initialized during ramp-up.	✓	-	• Ensure that the communication between the controller and encoder is established. To do this, evaluate the "<TO>.StatusSensor[1..4].CommunicationOK" parameter before enabling the axis and also check if the status of the encoder actual value is "<TO>.StatusSensor[1..4].State" = VALID (2). • To enable a technology object, the encoder initialization must be complete. Trigger the job again later.
Encoder data address missing in project.	✓	-	Check the project for consistency and reload the project into the controller.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.9 Technology alarm 109 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Configuration error.	✓	-	
Neg. HW limit switch.	✓	-	• Connect a suitable device. • Check the device (I/Os). • Check the topology of the project. • Compare the device configuration and the configuration of the technology object. • Contact customer support.
Pos. HW limit switch	✓	-	
Reference cam "Active homing".	✓	-	
Reference cam "Passive homing".	✓	-	
Enable bit for the analog drive interface.	✓	-	
DriveReady bit of the analog drive interface.	✓	-	
Input for measuring input faulty.	✓	-	
Output cam output faulty.	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.10 Technology alarm 110 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Configuration is adjusted internally.	✓	-	
Actor.DriveParameter.MaxSpeed is limited.	✓	-	• Correct the reference speed in the drive and in the technology object "<TO>.Actor.DriveParameter.ReferenceSpeed". The reference speed (parameter p2000) must be at least half the maximum speed (parameter p1082) "<TO>.Actor.DriveParameter.ReferenceSpeed" ≥ 0.5 "<TO>.Actor.DriveParameter.MaxSpeed". • During the automatic transfer of the drive parameters to the technology object during runtime (online), slight accuracy deviations may occur from the reference speed and maximum speed configured in the drive. • With analog drive connection, correct the reference value in the drive and in the configuration of the technology object to "<TO>.Actor.MaxSpeed" / 1.17.
PositioningMonitoring.ToleranceTime is limited.	✓	-	Change the configuration data.
DynamicDefaults.EmergencyDeceleration is limited.	✓	-	
DriveParameter.ReferenceTorque too low.	✓	-	
Sensor[].Backlash.Size is limited.	✓	-	
Sensor[].Backlash.Velocity is limited.	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.11 Technology alarm 111 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
TO and drive configuration inconsistent.	✓	-	
Different telegram.	✓	-	Match the telegram configuration for the technology object with the telegram configuration in the drive (p922 in the drive).
Incompatible torque resolution.	✓	-	Adjust the high torque resolution for the drive.
Application cycle of the drive and servo cycle are different.	✓	-	Adjust the application cycle of the drive in the device configuration for the PROFIBUS drive.
Application cycle of the drive and processing cycle of the TO are different.	✓	-	
Linear motor configured.	✓	-	Set round-frame motor (P300) in the drive.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.12 Technology alarm 112 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
TO and encoder configuration inconsistent.	✓	-	
Different telegram type.	✓	-	Match the telegram configuration for the technology object with the telegram configuration in the encoder.
Encoder is not an absolute encoder.	✓	-	Configure the encoder for the technology object as absolute encoder.
Application cycle of the encoder and servo cycle are different.	✓	-	Adjust the application cycle of the encoder in the device configuration for the PROFIBUS encoder.
Application cycle of the encoder and processing cycle of the TO are different.	✓	-	
Encoder is not an incremental encoder.	✓	-	Configure the encoder for the technology object as an incremental encoder.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.13 Technology alarm 113 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Isochronous mode not possible.	✓	-	• The configured output for the cam or cam track technology object or the input for the technology object measuring input cannot be used in isochronous mode. Configure the I/O in the device configuration as isochronous I/O. • The maximum permissible bus clock cycle T_{Send} has been exceeded. The maximum bus clock cycle for the use of SINAMICS measuring inputs is up to 8 ms. • Make sure that the organization block MC-Servo [OB91] is called synchronously with the bus system.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.2.14 Technology alarm 114 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Cross-PLC synchronous operation configuration error.	✓	-	
Configuration error.	✓	-	Check the configuration of the interconnected leading and following axes. Make sure that all relevant tags are correctly configured for cross-PLC synchronous operation.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.3 Technology alarms 201 - 204 (S7-1500, S7-1500T)

3.3.1 Technology alarm 201 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Internal error.	✓	✓	Contact customer support.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.3.2 Technology alarm 202 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Internal configuration error.	✓	✓	Contact customer support.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.3.3 Technology alarm 203 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Internal error.	✓	✓	Contact customer support.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.3.4 Technology alarm 204 (S7-1500, S7-1500T)

Alarm response TO[1)]: Remove enable

Alarm response Kin[2)]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Commissioning error.	✓	✓	
Connection to the TIA Portal interrupted.	✓	✓	Check the connection properties.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4 Technology alarms 304 - 343 (S7-1500, S7-1500T)

3.4.1 Technology alarm 304 (S7-1500, S7-1500T)

Alarm response TO[1)]: Stop with emergency stop ramp

Alarm response Kin[2)]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Velocity limit is zero.	✓	-	Enter a non-zero value for the maximum velocity (DynamicLimits.MaxVelocity) in the dynamic limits.
	-	✓	Enter a value for the velocity (DynamicLimits.Path.Velocity) that does not equal zero in the dynamic limits.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.2 Technology alarm 305 (S7-1500, S7-1500T)

Alarm response TO[1)]: Stop with emergency stop ramp

Alarm response Kin[2)]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Acceleration/deceleration limit is zero.	✓	✓	
Acceleration	✓	-	Enter a non-zero value for the maximum acceleration (DynamicLimits.MaxAcceleration) in the dynamic limits.
	-	✓	Enter a value for the acceleration (DynamicLimits.Path.Acceleration) that does not equal zero in the dynamic limits.
Deceleration	✓	-	Enter a non-zero value for the maximum deceleration (DynamicLimits.MaxDeceleration) in the dynamic limits.
	-	✓	Enter a value for the deceleration (DynamicLimits.Path.Deceleration) that does not equal zero in the dynamic limits.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.3 Technology alarm 306 (S7-1500, S7-1500T)

Alarm response TO[1)]: Stop with emergency stop ramp

Alarm response Kin[2)]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Jerk limit is zero.	✓	-	Enter a non-zero value for the maximum jerk (DynamicLimits.MaxJerk) in the dynamic limits.
	-	✓	Enter a value for the JERK (DynamicLimits.Path.Jerk) that does not equal zero in the dynamic limits.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.4 Technology alarm 307 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with maximum dynamic values

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Negative/positive numerical value range of the position reached.	✓	-	
Negative	✓	-	Enable the "Modulo" setting for the technology object.
Positive	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.5 Technology alarm 308 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Negative/positive numerical value range of the position exceeded.	✓	-	
Negative	✓	-	Enable the "Modulo" setting for the technology object.
Positive	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.6 Technology alarm 321 (S7-1500, S7-1500T)

Alarm response TO[1)]: Stop with emergency stop ramp

Alarm response Kin[2)]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Axis is not homed.	✓	-	To perform an absolute positioning motion, you must home the technology object.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.7 Technology alarm 322 (S7-1500, S7-1500T)

Alarm response TO[1)]: No reaction

Alarm response Kin[2)]: -

Restart: Not required

Alarm text		Validity		Remedy
		TO[1)]	Kin[2)]	
Restart not executed.		✓	-	
	TO is not ready for restart.	✓	-	Download the project again.
	Condition for TO restart not satisfied.	✓	-	Disable the technology object.
				Cam technology object: Make sure that the cam is not in use.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.8 Technology alarm 323 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
MC_Home could not be executed.	✓	-	• Enable the "Modulo" setting for the technology object. • Adjust the position value for use of the Motion Control instruction "MC_Home".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.9 Technology alarm 341 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with maximum dynamic values

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Homing data faulty.	✓	-	
Approach velocity is zero.	✓	-	Check the configuration for homing (Homing.ApproachVelocity).
Homing velocity is zero.	✓	-	Check the configuration for homing (Homing.ReferencingVelocity).

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.10 Technology alarm 342 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with emergency stop ramp

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Reference cam/encoder zero mark not found.	✓	-	The reference cam configured for homing was not found in the traversing range of the axis.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.4.11 Technology alarm 343 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Homing function not supported by device.	✓	-	Configure a reference switch input for the pulse generator output used in the properties of the C-CPU. ("Pulse generators (PTO/PWM) > PTO[n]/PWN[n] > Hardware inputs/outputs") When homing across a zero mark, the CPU transfers the reference switch input as zero mark.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.5 Technology alarms 401 - 431 (S7-1500, S7-1500T)

3.5.1 Technology alarm 401 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Error accessing logical address.	✓	-	
Address is invalid.	✓	-	• Connect a suitable device. • Check the device (I/Os). • Check the topology of the project. • Compare the device configuration and the configuration of the technology object. • Configure the valid hardware limit switch. • Contact customer support.
Input address is invalid.	✓	-	
Output address is invalid.	✓	-	
Error during parameter assignment of the address area.	✓	-	Make sure that different addresses are assigned for all technology objects in the project.
Address overlap during drive interconnection.	✓	-	
Address overlap during encoder interconnection.	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

See also

Interplay of the various documents (Page 13)

3.5.2 Technology alarm 411 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Encoder at the logical address disrupted.	✓	-	
Alarm message from encoder.	✓	-	Check the function, connections and I/Os of the encoder.
HW error encoder.	✓	-	
Encoder dirty.	✓	-	
Read error encoder absolute value.	✓	-	Compare the encoder type in the drive or encoder parameter P979 with the configuration data of the technology object.
Zero mark monitoring encoder.	✓	-	Encoder signals error in zero mark monitoring (fault code 0x0002 in Gx_XIST2, see PROFIdrive profile).
Encoder in Parking state.	✓	-	• Search for the cause of the error in the connected drive or encoder. • Check whether the alarm was possibly triggered by a commissioning action involving the drive or encoder.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.5.3 Technology alarm 412 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Permitted actual value range exceeded.	✓	-	
Positive.	✓	-	Home the axis/encoder in a valid actual value range.
Negative.	✓	-	
Modulo length.	✓	-	Note the maximum permissible velocity for modulo axes. • Modulo axis is not configured as a possible leading value for a TO following axis: The maximum permissible velocity is limited to the modulo length/cycle time MC servo. • Modulo axis is configured as a possible leading value for a TO following axis: The maximum permissible velocity is limited to ½ modulo length/cycle time MC servo. Reduce the cycle time of the MC servo. Configure the maximum velocity DynamicLimits.MaxVelocity to the maximum permissible velocity of the modulo axis. This limits the velocity of the axis to the maximum permissible velocity. The axis remains enabled.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.5.4 Technology alarm 421 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Drive disrupted at the logical address.	✓	-	
Alarm message from drive.	✓	-	• Check the functions and connections of the drive. • Enable and acknowledge safety function in the drive. You can find more information in the section "Safety functions in the drive" of the documentation "S7-1500/S7-1500T Axis functions (Page 13)". • In the case of analog connected axes, check if the "<TO>.StatusDrive.InOperation" tag = TRUE.
No drive control required.	✓	-	
Drive has shut down.	✓	-	
Drive enable not possible.	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.5.5 Technology alarm 431 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Communication to the device under logical address is disturbed.	✓	-	
Drive failed.	✓	-	Check the function, connections and I/Os of the drive.
Signs of life of drive faulty.	✓	-	• Check the function, connections and I/Os of the drive. • Compare the cycle times in the device configuration (PROFINET sync master, PROFINET sync slave or PROFIBUS DP master system, PROFIBUS slave) and in the MC-Servo [OB91]. The cycle of the master application and the application cycle of the MC-Servo must be parameterized with the same cycle time. (An incorrect parameter assignment is indicated with 0x0080.) • If you call the application cycle of the MC-Servo [OB91] reduced to the send clock of a PROFINET IO system and the technology alarm 431 (Signs of life of drive faulty) is repeatedly shown, increase the update time of the send clock.
Encoder failed.	✓	-	Check the function, connections and I/Os of the encoder.
Signs of life of encoder faulty.	✓	-	• Check the function, connections and I/Os of the encoder. • Compare the cycle times in the device configuration (PROFINET sync master, PROFINET sync slave or PROFIBUS DP master system, PROFIBUS slave) and in the MC-Servo [OB91]. The cycle of the master application and the application cycle of the MC-Servo must be parameterized with the same cycle time.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6 Technology alarms 501 - 563 (S7-1500, S7-1500T)

3.6.1 Technology alarm 501 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Programmed velocity is limited.	✓	✓	• Check the value for the velocity of the Motion Control instruction. • Check the configuration of the dynamic limits.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

See also

Interplay of the various documents (Page 13)

3.6.2 Technology alarm 502 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text		Validity		Remedy
		TO[1]	Kin[2]	
Programmed acceleration/deceleration is being limited.		✓	✓	
	Acceleration	✓	✓	• Check the value for the acceleration of the Motion Control instruction. • Check the configuration of the dynamic limits.
	Deceleration	✓	✓	• Check the value for the deceleration of the Motion Control instruction. • Check the configuration of the dynamic limits.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.3 Technology alarm 503 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Programmed jerk is limited.	✓	✓	• Check the value for the velocity of the Motion Control instruction. • Check the configuration of the dynamic limits.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.4 Technology alarm 504 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Speed setpoint monitoring active.	✓	-	• Check the mechanical configuration. • Check the encoder connection. • Check the configuration of the speed setpoint interface. • Check the configuration of the control loop. • Check the value for the maximum velocity (<TO>.DynamicLimits.MaxVelocity).

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.5 Technology alarm 511 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Dynamic limit is violated by kinematics motion.	✓	-	
Velocity.	✓	-	Reduce the velocity of the kinematics motion.
Acceleration.	✓	-	Reduce the acceleration of the kinematics motion.
Deceleration.	✓	-	Reduce the deceleration of the kinematics motion.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.6 Technology alarm 521 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Following error.	✓	-	• Check the configuration of the control loop. • Check the direction signal of the encoder. • Check the configuration of the following error monitoring.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.7 Technology alarm 522 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Warning following error tolerance.	✓	-	• Check the configuration of the control loop. • Check the direction signal of the encoder. • Check the configuration of the following error monitoring.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.8 Technology alarm 531 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Positive HW limit switch approached.	✓	-	Acknowledge the alarm. After the acknowledgment, motions in the negative direction are allowed.
Negative HW limit switch approached.	✓	-	Acknowledge the alarm. After the acknowledgment, motions in the positive direction are allowed.
Invalid retraction direction of active hardware limit switch	✓	-	The programmed direction of movement is disabled due to the active hardware limit switch. Retract the axis in the opposite direction.

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
HW limit switch polarity reversed, retraction not possible.	✓	-	• Check the mechanical configuration of the hardware limit switch. • Check the limit switches. • Make sure that only one of the two tags is "TRUE": – <TO>.StatusWord.X17 (HWLimitMinActive) – <TO>.StatusWord.X18 (HWLimitMaxActive) • To enable retraction, you can temporarily disable the hardware limit switches with the Motion Control instruction "MC_WriteParameter" via the parameter "PositionLimits_HW.Active" = FALSE. • Acknowledge the alarm by switching the controller off and on or by executing an "MC_Reset" job with "Restart" = TRUE.
Both hardware limit switches active, retraction not possible.	✓	-	
Encoder error with triggered HW limit switch, no retraction possible.	✓	-	Correct the fault at the encoder. Acknowledge the alarm by switching the controller off and on or by executing an "MC_Reset" job with "Restart" = TRUE.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.9 Technology alarm 533 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with maximum dynamic values

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Software limit switch is approached.	✓	-	
Negative	✓	-	With the current dynamic values, the axis will approach the negative software limit switch. For positioning axes, check the position setpoint. For following axes, check whether the current dynamics violates the configured dynamic limits. Move the axis in positive direction away from the negative software limit switch.
Positive	✓	-	With the current dynamic values, the axis will approach the positive software limit switch. For positioning axes, check the position setpoint. For following axes, check whether the current dynamics violates the configured dynamic limits. Move the axis in negative direction away from the positive software limit switch

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.10 Technology alarm 534 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Software limit switch was overshot.	✓	-	
Negative	✓	-	The software limit switch was overtraveled. Acknowledge the alarm. After the acknowledgment, motions in the positive direction are allowed.
Positive	✓	-	The software limit switch was overtraveled. Acknowledge the alarm. After the acknowledgment, motions in the negative direction are allowed.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.11 Technology alarm 541 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Position monitoring error.	✓	-	
Target range not reached.	✓	-	The target range was not reached within the tolerance time. • Check the configuration of the position monitoring. • Check the configuration of the control loop.
Exit target range again.	✓	-	The target range was exited within the minimum dwell time. • Check the configuration of the position monitoring. • Check the configuration of the control loop.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.12 Technology alarm 542 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Clamping monitoring error: Axis leaving clamping tolerance window.	✓	-	The axis has executed a motion greater than the permissible tolerance at the fixed stop. Check whether the fixed stop has broken away.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.13 Technology alarm 550 (S7-1500, S7-1500T)

Alarm response TO[1]: Track setpoints

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Drive-autonomous motion is being executed.	✓	-	The drive is performing a motion that was not specified by the technology object. Check if a safety function is active in the drive. You can find more information in the section "Safety functions in the drive" of the documentation "S7-1500/S7-1500T Axis functions (Page 13)".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.14 Technology alarm 551 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Maximum velocity cannot be reached with drive/axis parameters.	✓	-	The configured maximum velocity cannot be reached with the configured mechanics of the axis. Check the configuration of the mechanics and the set reference speed. Check the adapted reference speed "<TO>.Actor.DriveParameter.ReferenceSpeed" during automatic transfer of the drive parameters during runtime (online). During the automatic transfer of the drive parameters in runtime (online), slight accuracy deviations may occur from the reference speed configured in the drive.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.15 Technology alarm 552 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Encoder adaptation error during ramp-up.	✓	-	
Encoder is not assigned to a SINAMICS device.	✓	-	• The operationally active encoder could not be adapted. Other encoders that can be used are configured. Use the encoder switch (MC_SetSensor). • The encoder set as the operationally active encoder could not be adapted. • Specify a different sensor for the initialization of the technology object.
Encoder system.	✓	-	
Encoder resolution.	✓	-	
Encoder fine resolution.	✓	-	
Encoder revolutions.	✓	-	
Unspecified.	✓	-	
Reference value NACT.	✓	-	
Parameter does not exist, value unreadable or invalid.	✓	-	Check whether your device supports acyclic data communication according to PROFIdrive.
Encoder system.	✓	-	
Encoder resolution.	✓	-	
Encoder fine resolution.	✓	-	
Encoder revolutions.	✓	-	
Unspecified.	✓	-	
Reference value NACT.	✓	-	
Adaptation canceled due to insufficient resources.	✓	-	
Encoder system.	✓	-	
Encoder resolution.	✓	-	
Encoder fine resolution.	✓	-	
Encoder revolutions.	✓	-	
Unspecified.	✓	-	
Reference value NACT	✓	-	
Encoder is not interconnected directly to I/O area.	✓	-	During the configuration of the axis, the logical addresses were set to a data block or bit memory address area, for example. The adaptation is only possible when the encoder has been directly interconnected to an I/O area.
Encoder system.	✓	-	
Encoder resolution.	✓	-	
Encoder fine resolution.	✓	-	
Encoder revolutions.	✓	-	
Unspecified.	✓	-	
Reference value NACT.	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.16 Technology alarm 561 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Programmed velocity of the orientation motion is limited.	-	✓	Check the configuration of the velocity of the orientation motion.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.17 Technology alarm 562 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text		Validity		Remedy
		TO[1]	Kin[2]	
Programmed velocity of the orientation motion is limited.		-	✓	
	Acceleration	-	✓	Check the configuration of the acceleration of the orientation motion.
	Deceleration	-	✓	Check the configuration of the deceleration of the orientation motion.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.6.18 Technology alarm 563 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Programmed jerk of the orientation motion is limited.	-	✓	Check the configuration of the jerk of the orientation motion.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.7 Technology alarms 601 - 612 (S7-1500, S7-1500T)

3.7.1 Technology alarm 601 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with maximum dynamic values

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Leading axis is not assigned or defective.	✓	-	Configure the possible leading value axes for the following axis under "Configuration > Leading value interconnections". For a cross-PLC synchronous operation make sure that the option "Synchronous to the bus" is selected for the MC-SERVO OBs of all connected CPUs under "Properties > General > Cycle time".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.7.2 Technology alarm 603 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Leading axis is not in position-controlled mode.	✓	-	During synchronization/desynchronization, the leading axis must be operated in position-controlled mode.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.7.3 Technology alarm 608 (S7-1500, S7-1500T)

Alarm response TO[1]: Stop with maximum dynamic values

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Error during synchronization/desynchronization.	✓	-	Prevent a reversing leading value motion during the synchronization/desynchronization.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.7.4 Technology alarm 612 (S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Specified cam has not been interpolated.	✓	-	Interpolate the cam used for camming with the Motion Control instruction "MC_InterpolateCam".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8 Technology alarms 700 - 758 (S7-1500, S7-1500T)

3.8.1 Technology alarm 700 (S7-1500, S7-1500T)

Alarm response TO[1)]: Remove enable

Alarm response Kin[2)]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
Error when calculating the switching position.	✓	-	
Cam position: OnPosition	✓	-	The position for the "OnPosition" parameter could not be calculated. Invalid positions (e.g. "OnPosition" > "OffPosition") were calculated due to lead times. The output cam cannot be switched due to the axis dynamics and compensation times.
Cam position: OffPosition	✓	-	The position for the "OffPosition" parameter could not be calculated. Invalid positions (e.g. "OffPosition" > "OnPosition") were calculated due to lead times. The output cam cannot be switched due to the axis dynamics and compensation times.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.2 Technology alarm 701 (S7-1500, S7-1500T)

Alarm response TO[1)]: Remove enable

Alarm response Kin[2)]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1)]	Kin[2)]	
I/O output error.	✓	-	The digital output for the output cam or cam track technology object cannot be addressed. Download the device configuration again.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.3 Technology alarm 702 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Position value invalid.	✓	-	• A Motion Control job "MC_Reset" is being executed on the axis. Wait until the technology object restart is complete. • The encoder values are invalid due to an encoder error. Check the encoder and adjust the configuration if necessary.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.4 Technology alarm 703 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Output cam data faulty.	✓	-	
Output cam: Output cam number	✓	-	Check the configuration of the relevant output cam in the cam track and adjust the values if necessary. Examples of a correct configuration: • "<TO>.Parameter.Cam[1..32].OnPosition" < "<TO>.Parameter.Cam[1..32].OffPosition" • "<TO>.Parameter.Cam[1..32].Duration" > "<TO>.Parameter.OffCompensation" - "<TO>.Parameter.OnCompensation"

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.5 Technology alarm 704 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Output cam data faulty.	✓	-	Check the configuration of the output cam and adjust the values if necessary. Examples of a correct configuration: • "MC_OutputCam.OnPosition" < "MC_OutputCam.OffPosition" • "MC_OutputCam.Duration" > "<TO>.Parameter.OffCompensation" - "<TO>.Parameter.OnCompensation"

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.6 Technology alarm 750 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Measuring job not possible during homing of assigned axis.	✓	-	Do not use the Motion Control instructions "MC_Home" and "MC_MeasuringInput" simultaneously.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.7 Technology alarm 752 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Validity range of measuring job not recognized.	✓	-	The measuring range specified in Motion Control instruction "MC_MeasuringInput" was not recognized. Adjust the measuring range.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.8 Technology alarm 753 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Only one measuring input can access an encoder at a time.	✓	-	Use only one Motion Control instruction "MC_MeasuringInput" for an encoder.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.9 Technology alarm 754 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Measuring input configuration in external device is not correct.	✓	-	Check the configuration of the measuring inputs on the external device.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.10 Technology alarm 755 (S7-1500, S7-1500T)

Alarm response TO[1]: Remove enable

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Measuring job not possible.	✓	-	
Device has reported an error.	✓	-	The measurement was aborted with error. Check the measuring input functionality in the utilized device
Cyclic measuring is not possible with telegram 39x.	✓	-	• Use the Motion Control instruction "MC_MeasuringInput" for starting a one-time measurement. • Cyclic measuring is only possible when measuring using TM Timer DIDQ. Change the configuration of the measuring input type to "TM Timer DIDQ".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.8.11 Technology alarm 758 (S7-1500, S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
A measuring edge was not evaluated.	✓	-	An edge was already detected at the input of the measuring input even though the module was not yet ready. The measured value is provided at the next edge.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9 Technology alarms 801 - 811 (S7-1500T)

3.9.1 Technology alarm 801 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Kinematics axis <no.> not ready.	-	✓	
Axis not released.	-	✓	Enable the technology object.
Axis job programmed.	-	✓	To be able to transmit another kinematics job, set the specified axis to a standstill.
Axis alarm.	-	✓	Check and acknowledge the technology alarms of the specified kinematics axis.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.2 Technology alarm 802 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Cannot calculate the geometry element.	-	✓	
Radius for "CircMode" = 2 is less than half the distance.	-	✓	Adjust the radius.
Starting, intermediate, or end point identical with "CircMode" = 0.	-	✓	Specify different values for starting point, intermediate point and end point.
Intermediate point cannot be reached with "CircMode" = 0.	-	✓	Adjust the intermediate point.
Start and end point identical with "CircMode" = 2 and "PathChoice" = 2, 3.	-	✓	Define different start and end points.
Unable to execute dynamic adaptation.	-	✓	Switch off the dynamic adaptation.
Movement is outside the transformation area.	-	✓	Define the motions within the transformation area
Transformation only works with sPTP motions.	-	✓	Select an "MC_MoveDirectAbsolute" instruction or "MC_MoveDirectRelative" instruction for the transformation.

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Not possible to approach tracked OCS.	-	✓	• Use the instructions "MC_MoveLinearAbsolute" or "MC_MoveCircularAbsolute". • At "MC_MoveCircularAbsolute" use the "CircMode" = 0. • Switch off the dynamic adaptation. • Use a route > 0 for the instructions. An orientation motion without kinematics motion is not possible.
Kinematics motion in the coupled OCS cannot be terminated by job configuration.			• Use the instructions "MC_MoveLinearAbsolute" or "MC_MoveCircularAbsolute". • At "MC_MoveCircularAbsolute" use the "CircMode" = 0. • Switch off the dynamic adaptation. • Use a route > 0 for the instructions. An orientation motion without kinematics motion is not possible.
Change of the coordinate system is not possible with coupled OCS.	-	✓	It is not possible to directly change from one coupled OCS into another coupled OCS with a motion command. First transmit an instruction in the WCS or a non-tracked OCS to complete the process of the kinematics with the tracked OCS.
sPTP motion not possible with coupled OCS.	-	✓	A "MC_MoveDirectRelative" or "MC_MoveDirectAbsolute" instruction cannot be used in a moved OCS. To move the kinematics in a coupled ocs, use the following instructions: • "MC_MoveLinearAbsolute" and "MC_MoveLinearRelative" • "MC_MoveCircularAbsolute" and "MC_MoveCircularRelative"
Active coordinate system cannot be changed with coupled OCS.	-	✓	The following instructions can only be performed with the status "TrackingState" = 0 or 1: • "MC_DefineTool" • "MC_SetTool" • "MC_TrackConveyorBelt" The instruction "MC_SetOCSFrame" can only be performed with the status "TrackingState" = 0. First transmit an instruction in the WCS or a non-tracked OCS to complete the process of the kinematics with the tracked OCS.
Dynamic values of the user transformation not correctly specified.	-	✓	Check the calculation of the speeds and accelerations in the user transformation in the MC-Transformation [OB98].

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.3 Technology alarm 803 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text			Validity		Remedy
			TO[1]	Kin[2]	
Error in the calculation of the transformation.			-	✓	
Error during transformation of the axis coordinates into Cartesian coordinates.			-	✓	• Correct your specified motion with regard to the joint positioning space and the transformation areas: • Position the kinematics axes with single-axis motions in a permitted transformation area. • For user transformation: Check the calculation in the MC-transformation [OB98].
	With user-defined kinematics systems: "FunctionResult" of the MC transformation [OB 98]		-	✓	
Error during transformation of the Cartesian coordinates into axis coordinates.			-	✓	
	With predefined kinematics systems: Additional info:		-	✓	
	0	Cartesian position cannot be reached	-	✓	
	1	Singularity	-	✓	
	With user-defined kinematics systems: "FunctionResult" of the MC transformation [OB 98]		-	✓	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.4 Technology alarm 804 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Kinematics motion cannot be stopped at end.	-	✓	Ensure that the path is sufficiently long.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.5 Technology alarm 805 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Limitation of path dynamics by axis dynamics incorrect.	-	✓	
Path velocity is limited to zero.	-	✓	Configure a higher "Maximum velocity" on the kinematics axes.
Acceleration/deceleration is limited to zero.	-	✓	Configure a larger "Maximum acceleration" or "Maximum deceleration" on the kinematics axes.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.6 Technology alarm 806 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop without leaving the path

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Zone violation of work or blocked zones	-	✓	Move the kinematics into the work zone or out of the blocked zone.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.7 Technology alarm 807 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: No reaction

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Zone violation of signal zones	-	✓	-

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.8 Technology alarm 808 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Ambiguity due to multiple active work zones.	-	✓	
<Number of current active work zones>	-	✓	Activate only one work zone.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.9 Technology alarm 809 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Path dynamic limit through dynamic of the orientation motion faulty.	-	✓	
Velocity is limited to zero.	-	✓	Configure a higher maximum velocity for the axes involved in the orientation motion.
Acceleration/deceleration is limited to zero.	-	✓	Configure a higher maximum acceleration or deceleration for the axes involved in the orientation motion.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.10 Technology alarm 810 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Conveyor belt not assigned or faulty (OCS <number>).	-	✓	• Check the parameters of the "MC_TrackConveyorBelt" job. • Check the configuration of the leading-value-capable technology object which represents the conveyor belt.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.9.11 Technology alarm 811 (S7-1500T)

Alarm response TO[1]: -

Alarm response Kin[2]: Stop with maximum dynamic values of the axes

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Error when approaching the TCP to an object coordinate system (OCS <number>).	-	✓	Use an "MC_MoveLinearAbsolute" or an "MC_MoveCircularAbsolute" job.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.10 Technology alarms 900 - 903 (S7-1500T)

3.10.1 Technology alarm 900 (S7-1500T)

Alarm response TO[1]: Set leading value invalid

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Leading values invalid.	✓	-	Set a higher tolerance time (<TO>.Parameter.ToleranceTimeExternalLeadingValueInvalid). Check the connection of the interconnected components. Make sure that there is no communication interference. Make sure that the CPUs involved are in RUN operating state.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.10.2 Technology alarm 901 (S7-1500T)

Alarm response TO[1]: Set leading value invalid

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Data transmission error	✓	-	
Reason: Invalid version	✓	-	Check the communication.
Reason: Invalid modulo start value	✓	-	
Reason: Invalid modulo length	✓	-	
Reason: Sign-of-life error	✓	-	
Reason: Invalid position	✓	-	Check the leading value of the leading axis on the other CPU.
Reason: Invalid velocity	✓	-	
Reason: Invalid acceleration	✓	-	

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.10.3 Technology alarm 902 (S7-1500T)

Alarm response TO[1]: No reaction

Alarm response Kin[2]: -

Restart: Not required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Leading value accuracy limited.	✓	-	Decrease the configured delay time.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

3.10.4 Technology alarm 903 (S7-1500T)

Alarm response TO[1]: Set leading value invalid

Alarm response Kin[2]: -

Restart: Required

Alarm text	Validity		Remedy
	TO[1]	Kin[2]	
Modulo settings of the leading axis changed in cyclic operation.	✓	-	The changed modulo settings of the leading axis are only adopted by the leading axis proxy after a restart and a change in the operating state of the CPU. Confirm the alarm by switching the controller off and on and by executing a "MC_Reset" job with "Restart" = TRUE.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

Error IDs in Motion Control instructions (S7-1500, S7-1500T)

4

Errors in Motion Control instructions are indicated by the "Error" and "ErrorID" output parameters.

Under the following conditions, "Error" = TRUE and "ErrorID" = 16#8xxx are indicated for the Motion Control instruction:

- Illegal status of the technology object, which prevents the execution of the job.
- Invalid parameter assignment of the Motion Control instruction, which prevents the execution of the job.
- As a result of the alarm response for a technology object error.

Error display

If there is a Motion Control instruction error, the "Error" parameter shows the value "TRUE". The cause of the error is given in the "ErrorID" parameter.

Jobs to the technology object are rejected when "Error" = TRUE. Running jobs are not influenced by rejected jobs.

If "Error" = TRUE and "ErrorID" = 16#8001 is indicated during job execution, a technology alarm has occurred. In this case, evaluate the indication of the technology alarm.

If "Error" = "TRUE " is displayed during execution of a "MC_MoveJog" job, the axis is braked and brought to a standstill. In this case, the deceleration configured for the "MC_MoveJog" instruction takes effect.

Acknowledge error

Acknowledging errors in Motion Control instructions is not required.

Restart a job after resolving the error.

4.1 Error IDs 16#0000 - 16#800F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#0000	✓	✓	No error	-
16#8001	✓	✓	A technology alarm (technology object error) occurred while processing the Motion Control instruction.	In the technology data block, an error message is output at the "ErrorDetail.Number" tag. You can find a list of the technology alarms and alarm responses in the section "Overview of the technology alarms (Page 20)".
16#8002	✓	-	Illegal specification of the technology object	• Check the specification of the technology object for the "Axis", "Master", "SlaveOutputCam-CamTrackMeasuringInput" or "Cam" parameter. • With "MC_MeasuringInputCyclic": Specify a valid measuring input type for parameter "MeasuringInputType".
	-	✓		Check the specification of the technology object for the "Axis" or "AxesGroup" parameter. You can use a kinematics technology object only for the "AxesGroup" parameter.
16#8003	✓	✓	Illegal velocity specification	Specify a permissible value for the velocity for parameter "Velocity".
16#8004	✓	✓	Illegal acceleration specification	Specify a permissible value for the acceleration for parameter "Acceleration".
16#8005	✓	✓	Illegal deceleration specification	Specify a permissible value for the deceleration for parameter "Deceleration".
16#8006	✓	✓	Illegal jerk specification	Specify a permissible value for the jerk for parameter "Jerk".
16#8007	✓	-	Invalid entry Both the "JogForward" and "JogBackward" parameters are set to TRUE at the same time. The axis is braked at the last valid deceleration.	Reset both the "JogForward" parameter and the "JogBackward" parameter.
	✓	-	Illegal direction specification	Specify a permissible value for the direction at the parameter "Direction" or "SyncDirection".
	-	✓		Specify a permissible value for the motion direction for the "DirectionA" parameter.
16#8008	✓	-	Invalid distance specification	Set a valid distance value at parameter "Distance".
	-	✓	Illegal specification of the relative target coordinate	Specify permissible values for the relative target coordinate for the "Distance" parameter.
16#8009	✓	-	Invalid position specification	Set a valid position value at parameter "Position".
	-	✓	Illegal specification of the absolute target coordinate	Specify a permissible value for the absolute target coordinate in the "Position" parameter.
16#800A	✓	-	Illegal operating mode	Specify a permissible operating mode for parameter "Mode".
	-	✓	Illegal mode specification	Specify a permissible value for the mode for the "Mode" parameter.
16#800B	✓	-	Illegal stop mode specifications	Specify a permissible value for the stop mode at the "StopMode" parameter.

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#800C	✓	-	Only one instance of the instruction per technology object is allowed.	• The instruction is called at multiple points in the user program with identical value for parameter "Axis", "Master", "Slave" or "Cam". Ensure that only one instruction with the value for parameter "Axis", "Master", "Slave" or "Cam" is called. • The error message can occur through the DB editor functions "Load snapshot as actual values" or "Load start values as actual values". Correct the error of the affected data block technology object by switching the CPU to STOP, re-compiling the affected data block, and loading it into the device. You can find more information in the "Diagnostics" section of the "S7-1500/S7-1500T Motion Control Overview" documentation (Page 13).
16#800D	✓	-	The job is not permitted in the current state. "Restart" is executed.	While a "Restart" is being performed, the technology object cannot perform any jobs. Active jobs on the cam, output cam, cam track or measuring input technology objects were canceled. Wait until the "Restart" of the technology object is complete.
	-	✓		While a restart is being performed, the technology object cannot perform any jobs. Active jobs were canceled. Restarting the kinematics technology object can take up to one second. Wait until the technology object restart is complete.
16#800E	✓	-	If the technology object is enabled, a "Restart" is not possible.	Before a "Restart", deactivate the technology object with "MC_Power.Enable" = FALSE.
16#800F	✓	✓	The job cannot be executed because the technology object is locked.	• Enable the technology object with "MC_Power.Enable" = TRUE. Restart the job. • A "MC_Stop" job is active with "Execute" = TRUE. Reset the job with the parameter "Execute" = FALSE.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.2 Error IDs 16#8010 - 16#801F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8010	✓	-	Invalid homing mode for incremental encoder	Absolute encoder adjustment is not possible with an incremental encoder ("Mode" = 6, 7). Start a homing process for an incremental encoder using parameter "Mode" = 0, 1, 2, 3, 5, 8, 10, 11, 12.
16#8011	✓	-	Invalid homing mode for absolute encoder	Passive and active homing ("Mode" = 2, 3, 5, 8, 10) are not possible for an absolute value encoder. Start a homing process for an absolute encoder using parameter "Mode" = 0, 1, 6, 7, 11, 12.
16#8012	✓	-	The job cannot be executed because the axis control panel is active.	Return master control to your user program. Restart the job.
	-	✓	The job cannot be executed because the kinematics control panel is active.	
16#8013	✓	-	The online connection between the CPU and the TIA Portal is down.	Check the online connection to the CPU.
16#8014	✓	✓	No internal job memory available.	The maximum possible number of Motion Control job has been reached. Reduce the number of jobs to be executed (parameter "Execute" = FALSE).
16#8015	✓	✓	Error acknowledgment with "MC_Reset" is not possible. Error in the configuration of the technology object.	Check the configuration of the technology object.
16#8016	✓	-	The actual values are not valid.	To execute a "MC_Home" or positioning job, the actual values must be valid. Check the status of the actual values. The "<TO>.StatusSensor[1..4].State" tag of the technology object must show the value 2 (valid).
16#8017	✓	-	Illegal value for gear ratio numerator	Specify a permissible value for the gear ratio numerator for parameter "RatioNumerator". Permitted integer values: -2147483648 to 2147483647 (value 0 not permitted)
16#8018	✓	-	Illegal value for gear ratio denominator	Specify a permissible value for the gear ratio denominator for parameter "RatioDenominator". Permitted integer values: 1 to 2147483647
16#8019	✓	-	Job cannot be executed. The specified following axis is the original leading value for the synchronous operation chain.	Recursive interconnections are not possible. A leading axis cannot be interconnected as a following axis to its own leading value. Specify a permissible following axis for parameter "Slave".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.3 Error IDs 16#8020 - 16#802F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8021	✓	-	Illegal value for shift of the leading value range	Specify a permissible value for the shift of the leading value range for parameter "MasterOffset".
16#8022	✓	-	Illegal value for shift of the following value range	Specify a permissible value for the shift of the leading value range for parameter "SlaveOffset".
16#8023	✓	-	Illegal value for scaling of the leading value range	Specify a permissible value for the scaling of the leading value range for parameter "MasterScaling".
16#8024	✓	-	Illegal value for scaling of the following value range	Specify a permissible value for the scaling of the following value range for parameter "SlaveScaling".
16#8026	✓	-	Illegal value for leading value distance	Specify a permissible value for the leading value distance for parameter "MasterStartDistance".
16#8027	✓	-	Illegal value for use of cam	Specify a permissible value for cyclic/acyclic use of the cam for parameter "ApplicationMode".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.4 Error IDs 16#0030 - 16#803F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8034	✓	-	Illegal value for synchronous position of the leading axis	Specify a permissible value for the synchronous position of the leading axis for parameter "MasterSyncPosition".
16#8035	✓	-	Illegal value for synchronous position of the following axis	Specify a permissible value for the synchronous position of the following axis for parameter "SlaveSyncPosition".
16#8036	✓	-	Invalid value for type of synchronization/desynchronization	Specify a permissible value for the type of synchronization/desynchronization for the "SyncProfileReference" parameter.
16#8037	✓	-	Invalid value for stop position of the following axis	Specify a permissible value for the stop position of the following axis for the "SlavePosition" parameter.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.5 Error IDs 16#8040 - 16#804F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8040	✓	-	Illegal value for start position of output cam	Specify a permissible value for the start position of the output cam for parameter "OnPosition".
16#8041	✓	-	Illegal value for end position of distance output cam	Specify a permissible value for the end position of the distance output cam for parameter "OffPosition".
16#8042	✓	-	Illegal value for switch-on duration of time-based output cam	Specify a permissible value for the switch-on duration of the time-based output cam for parameter "Duration".
16#8043	✓	-	Illegal value for force/torque limiting	Specify a value within the permissible range at the "Limit" parameter. Permitted integer values: -2147483648 to 2147483648
16#8044	✓	-	The axis is not configured for torque reduction.	Select drive telegram 102, 103, 105 or 106
16#8045	✓	-	The job cannot be executed because a job for traveling to fixed stop is active.	Switchover to non-position-controlled mode is not possible during active travel to fixed stop.
16#8046	✓	-	The "MC_TorqueLimiting" job cannot be deactivated in the "InClamping" state.	Retract the axis and deactivate "MC_TorqueLimiting".
16#8047	✓	-	The motion results in a fixed stop.	Only motions away from the fixed stop are permitted.
16#804A	✓	-	Illegal value for additive torque setpoint	Specify a permissible value for the additive torque setpoint at the "Value" parameter.
16#804B	✓	-	Illegal value for torque high limit	Specify a permissible value for the high limit of the torque at the "UpperLimit" parameter.
16#804C	✓	-	Illegal value for torque low limit	Specify a permissible value for the low limit of the torque at the "LowerLimit" parameter.
16#804D	✓	-	The value of the high limit of the torque is less than or equal to the value of the low limit of the torque.	Adapt the values of the "UpperLimit" and "LowerLimit" parameters so that the high limit of the torque is greater than the value of the low limit of the torque.
16#804E	✓	-	The job cannot be executed because a "MC_TorqueLimiting" job is active.	Exit the setting of the high and low torque limits. Restart the "MC_TorqueLimiting" job.
			The job cannot be executed because a "MC_TorqueRange" job is active.	Stop the force/torque limit or fixed stop detection. Restart the "MC_TorqueRange" job.
16#804F	✓	-	The axis is not configured for additional torque values.	Use supplemental telegram 750.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.6 Error IDs 16#8050 - 16#805F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8050	✓	-	Illegal encoder number	Specify a permissible number of the new encoder (1 to 4) for parameter "MC_SetSensor.Sensor".
16#8051	✓	-	Illegal number of the reference encoder	Specify a permissible number of the reference encoder for parameter "MC_SetSensor.ReferenceSensor". If you call the instruction "MC_SetSensor" with parameter "Mode" = 0, enter a different number for the parameter "ReferenceSensor" than for the parameter "Sensor".
16#8055	✓	-	Bit masking not permitted at "MC_SetAxisSTW"	Non-controllable bits are selected in the "STW1 BitMask" and "STW2 BitMask" bit masks. Only control permissible bits.
16#805A	✓	-	Illegal value of the parameter to be changed	At parameter "ParameterNumber", enter a permissible value for the index of the parameter to be changed.
16#805B	✓	-	Error in the configuration of the hardware limit switch.	Specify a valid tag at the input of the positive/negative HW limit switch.
16#805C	✓	-	Illegal data type of the value to be written.	Specify a valid data type at the parameter "Value".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.7 Error IDs 16#8060 - 16#806F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8062	✓	-	Illegal approach value	Specify a permissible approach value for the searched for leading value for parameter "ApproachLeadingValue".
16#8063	✓	-	A valid mapping to the definition range (leading values) does not exist for the specified following value.	Specify a permissible following value for parameter "FollowingValue".
16#8064	✓	-	A valid mapping to the range of the function (following values) does not exist for the specified leading value.	Specify a permissible leading value for parameter "LeadingValue".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.8 Error IDs 16#8070 - 16#807F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8070	✓	-	Illegal value for leading value shift	Specify a permissible value for the leading value shift for parameter "PhaseShift".
16#8071	✓	-	The job cannot be executed because the axis is not in position-controlled mode.	Activate position-controlled mode.
16#8074	✓	-	The job cannot be executed because a "MC_Home" job is active.	During active or passive homing, an encoder switchover is rejected. Wait until the "MC_Home" job is complete. Restart the job.
16#8075	✓	-	The job cannot be executed because no synchronization operation is active on the axis.	Switch on the synchronous operation function. Restart the job.
16#8076	✓	-	The job cannot be executed because synchronization is being simulated at the specified axis.	End the simulation of the synchronous operation. Restart the job.
16#8077	✓	-	The job cannot be executed because no "MC_GearInPos" or "MC_GearIn" job is waiting or active.	Switch on the synchronous operation function. Restart the job. To desynchronize a camming, use the Motion Control instruction "MC_CamOut".
16#8078	✓	-	The job cannot be executed because no "MC_CamIn" job is waiting or active.	Switch on the camming function. Restart the job. To desynchronize gearing, use the Motion Control instruction "MC_GearOut".

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.9 Error IDs 16#8080 - 16#808F (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8080	✓	-	Invalid value for the following value offset	Specify a permissible value for the following value offset for the "Offset" parameter.
16#8081	✓	-	Invalid value for leading value distance	Specify a permissible value for the following value offset for the "OffsetDistance" parameter.
16#8082	✓	-	Invalid value for leading value distance	Specify a permissible value for the leading value offffset for parameter "PhasingDistance".
16#8083	✓	-	Invalid value for the type of traversing of the leading/following value offset	Specify a permissible value for the leading value/following value offset shift for parameter "ProfileReference".
16#8084	✓	-	Invalid value for start position	Specify a permissible value for the leading value/following value offset shift for parameter "StartPosition".
16#808A	✓	-	The job for the leading value offset cannot be executed because a following value offset is active on the axis.	Exit the active following value offset via "MC_OffsetAbsolute" or "MC_OffsetRelative". Restart the job.
			The job for the following value offset cannot be executed because a leading value offset is active on the axis.	Exit the active leading value offset via "MC_PhasingAbsolute" or "MC_PhasingRelative". Restart the job.
16#808B	✓	-	The job cannot be executed because no camming is active on the axis.	A "MC_CamIn" job with "SyncProfileReference" = 5 can only be used if the camming is already active.
16#808C	✓	-	Reversing the leading value is not permitted during an active leading value offset or following value offset.	Start the job again after reversing the leading value.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.10 Error IDs 16#80A0 - 16#80AF (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1)]	Kin[2)]		
16#80A1	✓	-	The order cannot be executed because a synchronous operation job is active.	A "MC_Home" job on a following axis is not executed when a "MC_CamIn" or "MC_GearInPos" job is active. Exit the synchronous operation job. Restart the job.
16#80A2	✓	-	• For one-time measuring with measuring range, the measuring range was run without a measuring edge being detected. • The measuring range is invalid with the configured modulo axis settings.	Check and adjust the measuring input and adjust the measuring range positions, if necessary.
16#80A3	✓	-	The measuring input job via PROFIdrive telegram could not be started because a homing job is active.	Simultaneous execution of a homing job and a measuring input job via PROFIdrive telegram is not possible. Wait until the homing job has ended. Restart the measuring job via PROFIdrive telegram.
16#80A5	✓	-	Illegal value for start position of measuring range	Specify a permissible value for the start position of the measuring range for parameter "MC_MeasuringInput.StartPosition" or MC_MeasuringInputCyclic.StartPosition.
16#80A6	✓	-	Illegal value for end position of measuring range	Specify a permissible value for the end position of the measuring range for parameter "MC_MeasuringInput.EndPosition" or MC_MeasuringInputCyclic.EndPosition.
16#80A7	✓	-	A measurement is performed when measuring with the measuring range, but the calculated position is outside the specified measuring range. The measured value is discarded.	Check and adjust the measuring input and adjust the measuring range positions, if necessary.
16#80A8	✓	-	The job cannot be executed because camming is active on the axis.	An "MC_PhasingRelative" or "MC_PhasingAbsolute" job with "ProfileReference" = 0 can only be used on an active gearing with "MC_GearIn" or "MC_GearInPos" in the "synchronous" status ("MC_GearIn.InGear" = TRUE or "MC_GearInPos.InSync" = TRUE).
16#80A9	✓	-	The job cannot be executed because no synchronous gearing or camming is active on the axis.	A job for leading/following value offset is only applicable to up an active gearing or camming in "synchronous" status ("MC_GearIn.InGear" = TRUE, "MC_GearInPos.InSync" = TRUE or "MC_CamIn.InSync" = TRUE).
16#80AA	✓	-	The cam contains no points or segments and cannot be interpolated.	Fill the cam with points/segments. Restart the job.
16#80AB	✓	-	The cam is currently being used and cannot be interpolated.	End the current use of the cam. Restart the job.
16#80AC	✓	-	The cam contains incorrect points or segments and cannot be interpolated. (for example, the cam contains only one point.)	Fill the cam with permissible points/segments. Restart the job.

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#80AD	✓	-	The specified synchronous position is outside the definition range of the cam.	Specify a permissible synchronous position for parameter "MasterSyncPosition". Restart the job.
16#80AE	✓	-	The job cannot be executed because a kinematic motion is active.	End the current kinematic motion. Restart the job.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.11 Error IDs 16#80B0 - 16#80BF (S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#80B1	-	✓	Illegal specification of the coordinate system	Specify a permissible value for the coordinate system for the "CoordSystem" parameter.
16#80B2	-	✓	Illegal specification of the motion transition	Specify a permissible value for the motion transition for the "BufferMode" parameter.
16#80B3	-	✓	Illegal specification of the rounding clearance	Specify a permissible value for the rounding clearance for the "TransitionParameter" parameter.
16#80B5	-	✓	Illegal specification of the dynamic adaptation	Specify a permissible value for the dynamic adaptation for the "DynamicAdaption" parameter.
16#80B6	-	✓	Illegal specification for the definition of the circular path	Specify a permissible value for the definition of the circular path for the "CircMode" parameter.
16#80B7	-	✓	Illegal specification for the circular path auxiliary point	Specify a permissible value for the circular path auxiliary point for the "AuxPoint" parameter.
16#80B8	-	✓	Illegal specification of the target position	Specify a permissible value for the target position for the "EndPoint" parameter.
16#80B9	-	✓	Illegal specification of the orientation of the circular path	Specify a permissible value for the orientation of the circular path for the "PathChoice" parameter.
16#80BA	-	✓	Illegal specification for the main plane of the circular path	Specify a permissible value for the main plane of the circular path for the "CirclePlane" parameter.
16#80BB	-	✓	Illegal radius specification	Specify a permissible value for the radius of the circular path for the "Radius" parameter.
16#80BC	-	✓	Illegal angle specification	Specify a permissible value for the angle of the circular path for the "Arc" parameter.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.12 Error IDs 16#80C0 - 16#80CF (S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#80C1	-	✓	Illegal specification of the zone type	Specify a permissible value for the zone type for the "ZoneType" parameter.
16#80C2	-	✓	Illegal specification of the zone position	Specify a permissible value for the zone number for the "ZoneNumber" parameter.
16#80C3	-	✓	Illegal specification of the reference system	Specify a permissible value for the reference system for the "ReferenceSystem" parameter.
16#80C4	-	✓	Illegal coordinate specification	Specify permissible values for the coordinates for the "Frame" parameter.
16#80C5	-	✓	Illegal specification of the zone geometry	Specify a permissible value for the zone geometry for the "GeometryType" parameter.
16#80C6	-	✓	Illegal specification of the geometric parameters	Specify permissible values for the geometric parameters for the "GeometryParameter" parameter.
16#80C7	-	✓	The zone is not defined.	Define a workspace zone using the "MC_DefineWorkspaceZone" job or a kinematics zone using the "MC_DefineKinematicsZone" job.
16#80C8	-	✓	A tool cannot be redefined during a motion.	Exit the active motion. Restart the "MC_DefineTool" job.
	-	✓	An active tool cannot be changed during a motion.	Exit the active motion. Restart the "MC_SetTool" job.
16#80CA	-	✓	Illegal specification of the tool number	Specify a permissible value for the tool number for the "ToolNumber" parameter.
16#80CB	-	✓	Illegal specification of the object coordinate system	Specify a permissible value for the object coordinate system for the "OcsNumber" parameter.
16#80CC	-	✓	The job cannot be executed because a single-axis motion is active at a kinematics axis.	Exit the current single-axis motion. Restart the job.
16#80CD	-	✓	The job cannot be executed because a "MC_GroupStop" job is active.	Set the "MC_GroupStop.Execute" parameter to FALSE. Restart the job.
16#80CE	-	✓	The job sequence is used to capacity.	The maximum possible Motion Control jobs have been transmitted.

[1] Applies to all technology objects with the exception of the Kinematics technology object.

[2] Applies to the Kinematics technology object only.

4.13 Error IDs 16#80D0 - 16#80DF (S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#80D1	-	✓	Invalid value for the use of the parameter "Position"	At the "PositionMode"parameter, specify a valid value for the use of the "Position" parameter.
16#80D2	-	✓	Illegal value for the target arm positioning space	Enter a permissible value for the target arm positioning space in the "LinkConstellation" parameter.
16#80D3	-	✓	Illegal value for the positions of the kinematics axes	Enter a permissible value for the positions of the kinematics axes at the parameter "AxesPosition".
16#80D4	-	✓	Illegal value for the velocity of the kinematics axes	Specify a permissible value for the velocity of the kinematics axes for the "AxesVelocity" parameter.
16#80D5	-	✓	Illegal value for the acceleration of the kinematics axes	Specify a permissible value for the acceleration of the kinematics axes for the "AxesAcceleration" parameter.
16#80D6	-	✓	An error occurred during the transformation.	Specify permissible values for the transformation.
16#80D7	-	✓	The job on the kinematics transformation cannot be executed.	A "MC_KinematicsTransformation" or "MC_InverseKinematicsTransformation" instruction cannot perform a calculation, when the kinematics moves a tracked OCS or the moving of a tracked OCS is completed. Wait until the current job for the conveyor tracking has been completed and restart the job for the kinematics transformation.
16#80DA	-	✓	Invalid value parameter "InitialObjectPosition"	Enter permissible values for the frame at the parameter "InitialObjectPosition".
16#80DB	-	✓	Simulation mode of kinematics cannot be ended	Ensure that when you end the simulation, the setpoints of the axis positions on the kinematics technology object match the setpoints of the axis positions on the assigned axes. If you use a modulo axis, make sure that the axis is in the same modulo cycle as at the start time of the simulation.
16#80DC	-	✓	The job cannot be executed, because only one job of this type can be active at the technology object.	Wait until the active job is finished or finish the active job. Restart the job.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.14 Error IDs 16#80E0 - 16#80EF (S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#80E1	✓	-	Invalid value for the index of the starting point in the cam	At the "StartPointCam" parameter, specify a valid value for the index of the starting point in the cam.
16#80E2	✓	-	Invalid value for the index of the starting segment in the cam	At the "StartSegmentCam" parameter, specify a valid value for the index of the starting segment in the cam.
16#80E3	✓	-	Invalid value for the index of the starting point in the "ArrayOfPoints".	At the "StartPointArray" parameter, specify a valid value for the index of the starting point in the "ArrayOfPoints".
16#80E4	✓	-	Invalid value for the index of the starting segment in the "ArrayOfSegments".	At the "StartSegmentArray" parameter, specify a valid value for the index of the starting segment in the "ArrayOfSegments".
16#80E5	✓	-	Invalid value for the number of points to be copied	At the "NumberOfPoints" parameter, specify a valid value for the number of points to be copied.
16#80E6	✓	-	Invalid value for the number of segments to be copied	At the "NumberOfSegments"parameter, specify a valid value for the number of segments to be copied.
16#80E7	✓	-	The job cannot be executed because a copy operation is active.	Wait until the active copy operation is completed via "MC_CopyCamData". Restart the job.
16#80E8	✓	-	The job cannot be executed because the cam is being interpolated.	Wait until the interpolation of the cam is completed via "MC_InterpolateCam". Restart the job.
16#80E9	✓	-	Invalid array of points to be copied	At the "ArrayOfPoints" parameter, specify an array of the data type "ARRAY[*] OF TO_Cam_Struct_PointData". Ensure that the "Optimized block access" option is activated under "General > Attributes" in the properties of the data block that contains the array.
16#80EA	✓	-	Invalid array of segments to be copied	At the "ArrayOfSegments" parameter, specify an array of the data type "ARRAY[*] OF TO_Cam_Struct_SegmentData". Ensure that the "Optimized block access" option is activated under "General > Attributes" in the properties of the data block that contains the array.

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

4.15 Error IDs 16#8FF0 - 16#8FFF (S7-1500, S7-1500T)

ErrorID	Validity		Description	Remedy
	TO[1]	Kin[2]		
16#8FFF	✓	✓	Unspecified error	Contact your local Siemens representative or support center. You will find your contact information for digital industries at: https://www.siemens.com/automation/partner (https://www.siemens.com/automation/partner)

1) Applies to all technology objects with the exception of the Kinematics technology object.

2) Applies to the Kinematics technology object only.

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