



DOCUMENTATION ISG-kernel

Manual Zero offsets

Short Description:
ZERO

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Preface

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Personnel qualifications

This description is solely intended for skilled technicians who were trained in control, automation and drive systems and who are familiar with the applicable standards, the relevant documentation and the machining application.

It is absolutely vital to refer to this documentation, the instructions below and the explanations to carry out installation and commissioning work. Skilled technicians are under the obligation to use the documentation duly published for every installation and commissioning operation.

Skilled technicians must ensure that the application or use of the products described fulfil all safety requirements including all applicable laws, regulations, provisions and standards.

Further information

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or (EN)

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contains further information on messages generated in the NC kernel, online help, PLC libraries, tools, etc. in addition to the current documentation.

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General and safety instructions

Icons used and their meanings

This documentation uses the following icons next to the safety instruction and the associated text. Please read the (safety) instructions carefully and comply with them at all times.

Icons in explanatory text

- Indicates an action.
- ⇒ Indicates an action statement.



DANGER

Acute danger to life!

If you fail to comply with the safety instruction next to this icon, there is immediate danger to human life and health.



CAUTION

Personal injury and damage to machines!

If you fail to comply with the safety instruction next to this icon, it may result in personal injury or damage to machines.



Attention

Restriction or error

This icon describes restrictions or warns of errors.



Notice

Tips and other notes

This icon indicates information to assist in general understanding or to provide additional information.



Example

General example

Example that clarifies the text.



Programming Example

NC programming example

Programming example (complete NC program or program sequence) of the described function or NC command.



Release Note

Specific version information

Optional or restricted function. The availability of this function depends on the configuration and the scope of the version.

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Overview of zero offsets

The overview of zero offsets is sorted into a 4-column table.

- Column 1 contains the unambiguous identifier of the axis parameter called the “ID” which consists of the prefix “P-ZERO” and a unique 5-digit number, e.g. P-ZERO-00003.
- Column 2 represents the data structure which defines the parameters, e.g. np_grp[i].achse[j].
The structure is a categorisation aid and is described in the following section. If an entry is missing in ‘structure’, this is not an error. The parameter in column 3 is then only valid on its own.
- Column 3 contains the “parameter” with its exact name, e.g. versch
The important thing is that “structure”+“parameter” always belong together and must be configured in exactly the same way in the axis parameter list, e.g. np_grp[i].achse[j].versch
- Column 4 contains the “functionality” in a summarised term/short description, e.g. Zero offset.

ID	Structure	Parameter	Functionality/short description
P-ZERO-00001 [▶ 9]		g53_verfuegbar	Deselecting zero offsets
P-ZERO-00002 [▶ 9]		default_index	Default setting of zero offsets
P-ZERO-00003 [▶ 11]	np_grp[i].achse[j].	versch	Zero offset
P-ZERO-00004 [▶ 11]	np_grp[i].achse[j].	inaktiv	Axis-specific activation

1 General description

1.1 Links to other documents

For the sake of clarity, links to other documents and parameters are abbreviated, e.g. [PROG] for the Programming Manual or P-AXIS-00001 for an axis parameter.

For technical reasons these links only function in the Online Help (HTML5, CHM) but not in pdf files since pdfs do not support cross-linking.

1.2 Structure and classification of zero point data

Various zero offset groups can be specified and selected in the NC program by the G commands 'G53' to 'G59' and 'G159'. Specify an offset parameter for each axis in each of these groups. The axis index corresponds to the channel-internal axis index. The initial axis configuration of the NC channel is defined in the channel parameter list [CHAN].

As required, value ranges of parameters are also defined by specifying a limit that results from the data format, e.g. MAX(UNS32), etc.

1.3 Syntax and interpretation of ASCII list file

An interpreter copies the entries in the ASCII list file into identical internal structures which are then checked for plausibility. To ensure reliable controller start-up every time, any defective entries found by the plausibility check are replaced by default values.

Unknown entries are not taken over. These irregularities are displayed by warning messages. We advise you to investigate the cause for these warning messages and remove defective entries from the ASCII list file.



Notice

The following agreement applies to BOOLEAN data:

Value	Meaning
0	Definition of FALSE
1	Definition of TRUE



Notice

The following agreement applies to STRING data:

If a character string containing characters with a special meaning in ASCII lists (e.g. comment characters, spaces [► 8]) is assigned to a STRING type list parameter, this character string must be defined in inverted commas `".."` (available as of V3.1.3081.0, V3.1.3108.0).

```
example[0].name "STRING_WITH_COMMENT( # /*) _CHARACTERS"
```

Trailing spaces are discarded on import. The entry..

```
example[0].name "STRING_WITH_POST_SPACES "
```

..has the same meaning as

```
example[0].name "STRING_WITH_POST_SPACES"
```

If the character string only contains characters without any special meaning, no inverted commas are required.

```
example[0].name STRING_WITH_STANDARD_CHARACTERS!
```

1.4 Comments in the ASCII list file

Comments can be in an entire line or can be added at the end of a line.

With a comment spanning an entire line, the comment character "#" must be placed at the start of the line and followed by a blank.

If a comment is to be inserted at the end of a line, only a blank is required before the comment. Blank lines are also possible.



Example

Comments in the ASCII list file

```
#
*****
# Data
#
*****
#
# List comments after numerical values

dummy[1] 1 Comment
dummy[2] 1 # Comment
dummy[3] 1 ( Comment
dummy[4] 1 /* Comment
...
...
```

However, if a character string was assigned to the list parameter as a value in the line, any following comment must be opened by a bracket '('. The comment characters space, # and /* are not permitted.

If a '(' itself is part of the character string, the character string must be defined in inverted commas ".." (available as of V3.1.3081.0, V3.1.3108.0).

```
# List comments after strings

beispiel[0].bezeichnung STRING_1 (comment requires a '(' bracket!)

beispiel[1].bezeichnung" STRING_(2)" (comment requires a '(' bracket!)
```


2 Description of elements

2.1 Deselecting zero offsets (P-ZERO-00001)

P-ZERO-00001	Deselecting zero offsets
Description	This parameter allows the use of the G53 data record to define an additional offset data record.
Parameter	g53_verfuegbar
Data type	BOOLEAN
Data range	0/1
Dimension	----
Default value	0
Remarks	<p>This datum controls the significance of zero offsets with the zero offset group index '0' which are selected by 'G53' or 'G159 = 0' in the NC program. If <i>g53_verfuegbar</i> is <u>not</u> assigned or is assigned with <u>zero</u>, all zero offsets are removed from the calculation (deselection) of the motion paths when 'G53' or 'G159 = 0' is programmed in the NC program.**</p> <p>On the other hand, when <i>g53_verfuegbar</i> = TRUE, the zero data record can also be used as a full zero offset with offset values not equal to zero. See also [PROG].</p> <p>** G53 is only active automatically in the basic state when P-ZERO-00002 [▶ 9] is <u>not</u> assigned or is assigned with <u>zero</u>.</p>

2.2 Default setting of zero offsets (P-ZERO-00002)

P-ZERO-00002	Default setting of zero offsets
Description	This parameter defines what zero offsets (index) should be automatically active after program start-up.
Parameter	default_index
Data type	UNS16
Data range	0 ... 96 (number of zero offset groups: 97, application-specific)
Dimension	----
Default value	0
Remarks	

2.3 Zero offset group (np_grp[i].*)

A zero offset group compiles zero offsets which are selected when one of the G functions 'G53' - 'G59' or 'G159' is programmed.

Structure name	Index
np_grp[i]	i = 0 ... 96 (number of zero offset groups: 97, application-specific)



Notice

The following relationship exists between the G function and zero offset group index 'i':

G function	Select using G159	Zero offset group index 'i'
G53 or	G159 = 0	0
G54 or	G159 = 1	1
G55 or	G159 = 2	2
G56 or	G159 = 3	3
G57 or	G159 = 4	4
G58 or	G159 = 5	5
G59 or	G159 = 6	6
	G159 = 7	7
	G159 = 8	8
	G159 = 9	9
	G159 = 10	10
	:	:

2.3.1 Axis assignment of data (np_grp[i].achse[j].*)

Zero offsets are assigned to path axes by channel-internal axis indexing.

Structure name	Index
achse[j]	j = 0 ... 31 (Maximum number of axes per channel: 32, application-specific)

2.3.1.1 Zero offset (P-ZERO-00003)

P-ZERO-00003	Zero offset
Description	An offset parameter is reserved for every axis in every zero offset group.
Parameter	np_grp[i].achse[j].versch
Data type	SGN32
Data range	MIN(SGN32) < versch < MAX(SGN32)
Dimension	0.1µm or 0.0001°
Default value	0
Remarks	Zero offsets are expected in the unit [0.1µm] for translatory axes and [0.0001°] for rotary axes.

2.3.1.2 Axis-specific activation (P-ZERO-00004)

P-ZERO-00004	Axis-specific activation
Description	<p>In every zero point data block, setting the <i>inactive</i> code defines the axes in which the offset is to be included in the calculation or not. As a result, individual axis offsets can be hidden in specific zero offsets.</p> <p>If the inactive code is <u>not</u> assigned or is assigned with <u>zero</u>, the axis offset continues to remain valid. If they are set to TRUE, they are inactive, see also [PROG// Zero offsets].</p>
Parameter	np_grp[i].achse[j].inaktiv
Data type	BOOLEAN
Data range	0/1
Dimension	----
Default value	0
Remarks	

3 Example assignment zero offsets with 3 axes

```
# *****
# Zero point data
# *****
# Important note : Behind the comment character `#`
# a blank (space) must be added.
# CAUTION: Zero offsets are expected in the unit
# 0.1 µm for linear axes and 0.0001° for rotary axes.
# *****
#
g53_verfuegbar 1 ( offsets unequal to 0 are evaluated )
default_index 2 ( G55 is automatically active after startup)
#
# =====
# Zero point data which are effective with 'G53' or 'G159 = 0'
# =====
np_grp[0].achse[0].inaktiv 80000 # Zero offset 8 mm
np_grp[0].achse[0].inaktiv 0 # Offset not valid
np_grp[0].achse[1].versatz 81000 # Zero offset 8.1 mm
np_grp[0].achse[1].inaktiv 0 # Offset not valid
np_grp[0].achse[2].versatz 82000 # Zero offset 8.2 mm
np_grp[0].achse[2].inaktiv 0 # Offset not valid
# =====
# Zero point data which are effective with 'G54' or 'G159 = 1'
# =====
np_grp[1].achse[0].versch 100000 # Zero offset by 10 mm
np_grp[1].achse[0].inaktiv 0 # Offset not valid
np_grp[1].achse[1].versch 200000 # Zero offset by 20 mm
np_grp[1].achse[1].inaktiv 1 # Offset not valid
np_grp[1].achse[2].versch 300000 # Zero offset by 30 mm
np_grp[1].achse[2].inaktiv 1 # Offset not valid
# =====
# Zero point data which are effective with 'G55' or 'G159 = 2'
# =====
np_grp[2].achse[0].versch -110000
np_grp[2].achse[0].inaktiv 0 # Offset not valid
np_grp[2].achse[1].versch 210000
np_grp[2].achse[1].inaktiv 0 # Offset not valid
np_grp[2].achse[2].versch 310000
np_grp[2].achse[2].inaktiv 0 # Offset not valid
# =====
# Zero point data which are effective with 'G56' or 'G159 = 3'
# =====
np_grp[3].achse[0].versch 120000
np_grp[3].achse[0].inaktiv 0 # Offset not valid
np_grp[3].achse[1].versch -220000
np_grp[3].achse[1].inaktiv 0 # Offset not valid
np_grp[3].achse[2].versch 320000
np_grp[3].achse[2].inaktiv 0 # Offset not valid
# =====
# Zero point data which are effective with 'G57' or 'G159 = 4'
# =====
np_grp[4].achse[0].versch 120000
np_grp[4].achse[0].inaktiv 0 # Offset not valid
np_grp[4].achse[1].versch 220000
np_grp[4].achse[1].inaktiv 1 # Offset not valid
np_grp[4].achse[2].versch 320000
np_grp[4].achse[2].inaktiv 0 # Offset not valid
# =====
# Zero point data which are effective with 'G58' or 'G159 = 5'
# =====
```

```
np_grp[5].achse[0].versch 130000
np_grp[5].achse[0].inaktiv 0 # Offset not valid
np_grp[5].achse[1].versch 230000
np_grp[5].achse[1].inaktiv 0 # Offset not valid
np_grp[5].achse[2].versch -330000
np_grp[5].achse[2].inaktiv 0 # Offset not valid
# =====
# Zero point data which are effective with 'G59' or 'G159 = 6'
# =====
np_grp[6].achse[0].versch 400000
np_grp[6].achse[0].inaktiv 0 # Offset not valid
np_grp[6].achse[1].versch 500000
np_grp[6].achse[1].inaktiv 0 # Offset not valid
np_grp[6].achse[2].versch -600000
np_grp[6].achse[2].inaktiv 0 # Offset not valid
# =====
# Zero point data which are effective with 'G159 = 7'
# =====
np_grp[7].achse[0].versch -450000
np_grp[7].achse[0].inaktiv 0 # Offset not valid
np_grp[7].achse[1].versch 340000
np_grp[7].achse[1].inaktiv 1 # Offset not valid
np_grp[7].achse[2].versch 670000
np_grp[7].achse[2].inaktiv 1 # Offset not valid
# =====
# Zero point data which are effective with 'G159 = 8'
# =====
np_grp[8].achse[0].versch -110000
np_grp[8].achse[0].inaktiv 0 # Offset not valid
np_grp[8].achse[1].versch 220000
np_grp[8].achse[1].inaktiv 0 # Offset not valid
np_grp[8].achse[2].versch 344500
np_grp[8].achse[2].inaktiv 0 # Offset not valid
```

4 Appendix

4.1 References

[CHAN] Documentation of channel parameters

[PROG] CNC programming manual

4.2 Suggestions, corrections and the latest documentation

Did you find any errors? Do you have any suggestions or constructive criticism? Then please contact us at documentation@isg-stuttgart.de. The latest documentation is posted in our Online Help (DE/EN):



QR code link: <https://www.isg-stuttgart.de/documentation-kernel/>

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Notice

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