DOCUMENTATION ISG-kernel

Manual
Axis parameter

Short Description:
AXIS

Documentation version: 1.171
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Preface

Legal information

This documentation was produced with utmost care. The products and scope of functions described are under continuous development. We reserve the right to revise and amend the documentation at any time and without prior notice.

No claims may be made for products which have already been delivered if such claims are based on the specifications, figures and descriptions contained in this documentation.

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

This link

https://www.isg-stuttgart.de/de/isg-kernel/kernel-downloads.html

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

Disclaimer

It is forbidden to make any changes to the software configuration which are not contained in the options described in this documentation.

Trade marks and patents

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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.

Programing 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.

Contents

List of figures

Overview of axis-specific parameters

The axis parameter overview 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-AXIS” and a unique 5-digit number,
  e.g. P-AXIS-00001.
- Column 2 represents the data structure which defines the parameters,
  e.g. getriebe[i].slope_profil.
  The structure is a categorisation aid and is described in the following section.
- Column 3 contains the “parameter” with its exact description,
  e.g. a_beschl. The important thing is that “structure”+”parameter” always belong together and must therefore be configured in exactly the same way in the axis parameter list,
  e.g. getriebe[i].slope_profil.a_beschl.
- Column 4 contains the “functionality” in a summarised term/short description,
  e.g. dynamic variable for non-linear slope.

ID	Structure	Parameter	Functionality/short description
P-AXIS-00001 [▸ 236]	getriebe[i].slope_profil.	a_beschl	Acceleration at machining feed (non-linear slope)
P-AXIS-00002 [▸ 236]	getriebe[i].slope_profil.	a_brems	Deceleration at machining feed (non-linear slope)
P-AXIS-00003 [▸ 246]	getriebe[i].dynamik.	a_emergency	Deceleration for an emergency stop
P-AXIS-00004 [▸ 239]	getriebe[i].slope_profil.	a_grenz	Acceleration at rapid movement (non-linear slope)
P-AXIS-00005 [▸ 231]	getriebe[i].slope_profil.	a_grenz_stufe_1	Acceleration of step 1 in rapid mode (linear slope)
P-AXIS-00006 [▸ 232]	getriebe[i].slope_profil.	a_grenz_stufe_2	Acceleration of step 2 in rapid mode (linear slope)
P-AXIS-00007 [▸ 258]	getriebe[i].beschl_kennlinie.	a_konst	Constant acceleration in the range n<ngrenz
P-AXIS-00008 [▸ 246]	getriebe[i].dynamik.	a_max	Maximum permissible axis acceleration
P-AXIS-00009 [▸ 474]	handbetrieb.hb.	a_max	Maximum acceleration for manual operation without parallel interpolation
P-AXIS-00010 [▸ 259]	getriebe[i].beschl_kennlinie.	a_min	Minimum acceleration which may not be undershot.
P-AXIS-00011 [▸ 229]	getriebe[i].slope_profil.	a_stufe_1	Acceleration of step 1 (linear slope)
P-AXIS-00012 [▸ 229]	getriebe[i].slope_profil.	a_stufe_2	Acceleration of step 2 (linear slope)
P-AXIS-00013 [▸ 248]	getriebe[i].dynamik.	a_trans_weight	Weighting of acceleration at motion block transition

ID	Structure	Parameter	Functionality/short description
P-AXIS-00014 [▸ 290]	kenngr.	abs_pos_gueltig	Identification code for absolute path measurement system
P-AXIS-00015 [▸ 71]	kenngr.	achs_mode	Axis operation mode
P-AXIS-00016 [▸ 64]	kopf.	achs_nr	Logical axis number
P-AXIS-00018 [▸ 69]	kenngr.	achs_typ	Axis type (linear axis, rotary axes, spindle)
P-AXIS-00019 [▸ 381]	antr.sercos.	antr_adr	Drive address (SERCOS)
P-AXIS-00020 [▸ 68]	kenngr.	antr_typ	Drive type
P-AXIS-00021 [▸ 273]	lr_param.	anwahl_losekomp	Selection of backlash compensation
P-AXIS-00023 [▸ 266]	kenngr.	anzeige	Activation of display function
P-AXIS-00024 [▸ 234]	getriebe[i].slope_profil.	a_feedh	Dynamic variable for linear slope
P-AXIS-00025 [▸ 466]	handbetrieb.hr.	aufl[i]	Handwheel resolutions
P-AXIS-00026 [▸ 259]	getriebe[i].beschl_kennlinie.	b1	Parameter of the a(n) polynomial (B1)
P-AXIS-00027 [▸ 260]	getriebe[i].beschl_kennlinie.	b2	Parameter of the a(n) polynomial (B2)
P-AXIS-00028 [▸ 260]	getriebe[i].beschl_kennlinie.	b3	Parameter of the a(n) polynomial (B3)
P-AXIS-00030 [▸ 198]	getriebe[i].	vb_max_red_zone	Maximum permissible axis velocity in security zone
P-AXIS-00031 [▸ 78]	kenngr.	beweg_richt	Definition of preferred direction of spindle rotation
P-AXIS-00036 [▸ 333]	lr_hw[i].	cam_direct_access	Access to cam signals
P-AXIS-00037 [▸ 332]	lr_hw[i].	cam_hw_id_string	Name of hardware
P-AXIS-00038 [▸ 333]	lr_hw[i].	cam_level	Level of cam signals
P-AXIS-00039 [▸ 332]	lr_hw[i].	cam_mask	Bit variable for cam signals
P-AXIS-00040 [▸ 67]	kopf.	clone_of	Mapping of parameters of an existing axis for default configuration
P-AXIS-00041 [▸ 330]	lr_hw[i].	cntr_channel	Channel identifier for counter
P-AXIS-00042 [▸ 330]	lr_hw[i].	cntr_hw_id_string	Name of counter hardware
P-AXIS-00043 [▸ 165]	kenngr.	coll_check_ax_nr	Monitoring of axis collision: Logical axis number
P-AXIS-00044 [▸ 166]	kenngr.	coll_decelerate_chan	Monitoring of axis collision: Stopping in all channels during drive faults

ID	Structure	Parameter	Functionality/short description
P-AXIS-00045 [▷ 165]	kenngr.	coll_offset	Monitoring of axis collision: Security distance
P-AXIS-00046 [▷ 461]	handbetrieb.default.	control_element	Logical control element number
P-AXIS-00047 [▷ 292]	lr_param.	crosscomp	Activation of cross compensation
P-AXIS-00048 [▷ 331]	lr_hw[i].	da_channel	D/A-channel number
P-AXIS-00049 [▷ 331]	lr_hw[i].	da_hw_id_string	Name of D/A-hardware
P-AXIS-00050 [▷ 377]	antr.simu.	daempfung_n	Axis simulation attenuation (numerator)
P-AXIS-00051 [▷ 376]	antr.simu.	daempfung_z	Axis simulation attenuation (numerator)
P-AXIS-00052 [▷ 171]	kenngr.	def_cax_gear_st	Default gear step number for C-axis mode
P-AXIS-00053 [▷ 240]	getriebe[i].slope_profil.	a_feedh	Deceleration at feedhold (non-linear slope)
P-AXIS-00054 [▷ 227]	getriebe[i].	default_lr_hw_nbr	Number of selected hardware specific parameter set of the gear step
P-AXIS-00056 [▷ 168]	kenngr.	diff_pos_tracking	Tracking mode: Maximum difference after deactivation
P-AXIS-00057 [▷ 326]	lr_hw[i].	drift_wert	Value of drift compensation
P-AXIS-00058 [▷ 87]	kenngr.	durchm_prog_abs	Diameter programming absolute
P-AXIS-00059 [▷ 87]	kenngr.	durchm_prog_rel	Diameter programming relative
P-AXIS-00060 [▷ 139]	kenngr.	echtzeit_bit_nr	SERCOS status/define control bit for measurement
P-AXIS-00061 [▷ 378]	antr.simu.	eigenfrequenz_n	Axis simulation natural frequency (numerator)
P-AXIS-00062 [▷ 377]	antr.simu.	eigenfrequenz_z	Axis simulation natural frequency (numerator)
P-AXIS-00063 [▷ 381]	antr.sercos.	eval_calc_slot	Time slot calculation (SERCOS)
P-AXIS-00064 [▷ 91]	kenngr.	fast_from_cam	Slow / fast movement down from cam
P-AXIS-00065 [▷ 406]	antr.profibus.	feinaufloesung	Factor for calculation of the position values (PROFIDRIVE)
P-AXIS-00067 [▷ 487]	filter[i].	fg_f0	Characteristic frequency of the axis-specific command value filter

ID	Structure	Parameter	Functionality/short description
P-AXIS-00068 [▸ 399]	antr.sercos.ident[i].	file	Filename (SERCOS)
P-AXIS-00069 [▸ 466]	handbetrieb.hr.	filter_zeit	Filter time constant for hand wheel increments
P-AXIS-00070 [▸ 157]	kenngr.	gantry_ax_nr	Axis number of the master axis
P-AXIS-00071 [▸ 158]	kenngr.	gantry_max_diff_reset_locked	Non resettable path distance between master- and slave axis
P-AXIS-00072 [▸ 157]	kenngr.	gantry_max_diff_resetable	Resettable path distance
P-AXIS-00073 [▸ 158]	kenngr.	gantry_offset	Static offset between master and slave axis
P-AXIS-00074 [▸ 162]	kenngr.	gantry_slave_no_homing	Suppress homing for gantry slave axis
P-AXIS-00075 [▸ 159]	kenngr.	gantry_vb_korr	Velocity of correction for compensation of gantry difference
P-AXIS-00076 [▸ 468]	handbetrieb.jog.	geschw[i]	Incremental jog velocities
P-AXIS-00077 [▸ 467]	handbetrieb.tipp.	geschw[i]	Velocity for the continuous jog mode
P-AXIS-00078 [▸ 226]	getriebe[i].	getr_schalt_pos	Gear change position
P-AXIS-00079 [▸ 170]	kenngr.	getriebe_stufe	Default gear step number
P-AXIS-00080 [▸ 488]	filter[i].	guete	Bandwidth of axis specific command value filter
P-AXIS-00081 [▸ 240]	getriebe[i].slope_profil.	tr_feedh	Ramp time at feedhold (non-linear slope)
P-AXIS-00082 [▸ 471]	handbetrieb.ipo.	hb_proz_a_max	Acceleration part of manual operation with parallel interpolation
P-AXIS-00083 [▸ 470]	handbetrieb.ipo.	hb_proz_v_max	Velocity part of manual operation with parallel interpolation
P-AXIS-00084 [▸ 91]	kenngr.	homing_without_zero_pulse	Homing only with cam (without zero pulse)
P-AXIS-00085 [▸ 196]	kenngr.	red_speed_zone_pos	Upper limit of security zone 1
P-AXIS-00086 [▸ 127]	kenngr.	hub_messtaster	Probe stroke for measurement types 2 and 4
P-AXIS-00087 [▸ 392]	antr.sercos.at[i].	ident_len	Length of ID (SERCOS)
P-AXIS-00088 [▸ 388]	antr.sercos.mdt[i].	ident_len	Length of ID (SERCOS)
P-AXIS-00089 [▸ 392]	antr.sercos.at[i].	ident_nr	AT ID number (SERCOS)

ID	Structure	Parameter	Functionality/short description
P-AXIS-00090 [▷ 388]	antr.sercos.mdt[i].	ident_nr	MDT ID number (SERCOS)
P-AXIS-00091 [▷ 542]	kenngr.	in_add_interface	Activation of (additional) interface for loading application-specific command values
P-AXIS-00092 [▷ 347]	getriebe[i].	incr_per_rev	Position controller increments per revolution
P-AXIS-00093 [▷ 197]	kenngr.	red_speed_zone_neg	Lower limit of security zone 1
P-AXIS-00094 [▷ 472]	handbetrieb.ipo.	ipo_proz_a_max	Acceleration part of interpolation
P-AXIS-00095 [▷ 471]	handbetrieb.ipo.	ipo_proz_v_max	Velocity part of interpolation
P-AXIS-00096 [▷ 379]	antr.simu.	ist_gleich_soll	Set actual position equal to command position for drive simulation
P-AXIS-00097 [▷ 197]	kenngr.	red_speed_zone_2_pos	Upper limit of security zone 2
P-AXIS-00098 [▷ 155]	kenngr.	kasto_achse	Activation of edge banding
P-AXIS-00099 [▷ 264]	getriebe[i].	kv	Proportional factor kv for P-positional control
P-AXIS-00100 [▷ 396]	antr.sercos.ident[i].	laenge	Length of ID (SERCOS)
P-AXIS-00101 [▷ 67]	kopf.	link_to	Linking an interpolator output to a specific physical axis
P-AXIS-00102 [▷ 399]	antr.sercos.ident[i].	liste	ID as list (SERCOS)
P-AXIS-00103 [▷ 272]	getriebe[i].	lose	Size of backlash
P-AXIS-00105 [▷ 198]	kenngr.	red_speed_zone_2_neg	Lower limit of security zone 2
P-AXIS-00106 [▷ 140]	lr_hw[i].	mask_mess_1	SERCOS-status bit for measurement
P-AXIS-00108 [▷ 187]	kenngr.	max_diff_soll_ist	Maximum permissible position difference when setting the enables of the drive controller
P-AXIS-00109 [▷ 191]	kenngr.	max_vb_override	Maximum permissible velocity override
P-AXIS-00110 [▷ 64]	kopf.	mds_ident	Enable the reconfiguration of axis machine data
P-AXIS-00112 [▷ 478]	meas_simu.	meas_simu_mode	Methods for measurement simulation
P-AXIS-00113 [▷ 135]	kenngr.	mess_neg_flanke	Probing signal edge

ID	Structure	Parameter	Functionality/short description
P-AXIS-00114 [▷ 128]	kenngr.	mess_offset	Measurement travel offset for measurement type 2
P-AXIS-00115 [▷ 136]	kenngr.	mess_signal_achs_steuer	Measurement signal via axis specific control bit mask
P-AXIS-00116 [▷ 136]	kenngr.	mess_signal_sercos	Measurement with SERCOS drives
P-AXIS-00117 [▷ 135]	kenngr.	mess_signal_taster	Measurement signal from hardware interface
P-AXIS-00118 [▷ 126]	kenngr.	messachse	Define axis as measurement axis
P-AXIS-00119 [▷ 397]	antr.sercos.ident[i].	mod	Modifier of ID (SERCOS)
P-AXIS-00120 [▷ 76]	lr_param.	mod_komp	Activation of modulo compensation
P-AXIS-00122 [▷ 351]	antr.	mode_act_pos	Handling of drive actual position
P-AXIS-00123 [▷ 350]	antr.	mode_cmd_pos	Handling of drive command position
P-AXIS-00124 [▷ 76]	getriebe[i].	modulo_fehler	Error in modulo circle
P-AXIS-00125 [▷ 75]	getriebe[i].	modulo_umdreh	Number of rotations in case of modulo error compensation
P-AXIS-00126 [▷ 74]	getriebe[i].	moduloo	Upper modulo limit
P-AXIS-00127 [▷ 75]	getriebe[i].	modulou	Lower modulo limit
P-AXIS-00128 [▷ 287]	getriebe[i].	multi_gain_n	Adapting the drive command value to the drive format (denominator)
P-AXIS-00129 [▷ 288]	getriebe[i].	multi_gain_z	Adaptation of command value of drive to the drive format (numerator)
P-AXIS-00130 [▷ 258]	getriebe[i].beschl_kennlinie.	n_grenz	Limit speed of the acceleration curve
P-AXIS-00131 [▷ 393]	antr.sercos.at[i].	nc_ref	Assigning the input process data to CNC-internal characteristics (SERCOS)
P-AXIS-00132 [▷ 389]	antr.sercos.mdt[i].	nc_ref	Assigning the output process data to CNC-internal characteristics (SERCOS)
P-AXIS-00134 [▷ 396]	antr.sercos.ident[i].	nr	SERCOS-Ident-No (SERCOS)
P-AXIS-00135 [▷ 226]	getriebe[i].	nummer	Gear step number
P-AXIS-00136 [▷ 327]	lr_hw[i].	nummer	Identifier for hardware specific parameter set

ID	Structure	Parameter	Functionality/short description
P-AXIS-00137 [▷ 462]	handbetrieb.	offsetgrenze_neg	Relative negative offset limit in manual mode
P-AXIS-00138 [▷ 462]	handbetrieb.	offsetgrenze_pos	Relative positive offset limit in manual mode
P-AXIS-00139 [▷ 460]	handbetrieb.default.	operation_mode	Operation mode of manual mode
P-AXIS-00140 [▷ 484]	filter[i].	order	Order of axis specific command value filter
P-AXIS-00141 [▷ 542]	kenngr.	out_add_interface	Activation of (additional) interface for loading of command and actual values
P-AXIS-00145 [▷ 479]	meas_simu.	parameter1	Setting parameter 1 for measurement simulation
P-AXIS-00146 [▷ 482]	meas_simu.	parameter2	Setting parameter 2 for measurement simulation
P-AXIS-00147 [▷ 482]	meas_simu.	parameter3	Setting parameter 3 for measurement simulation
P-AXIS-00148 [▷ 483]	meas_simu.	parameter4	Setting parameter 4 for measurement simulation
P-AXIS-00150 [▷ 397]	antr.sercos.ident[i].	phase	Phase for ID-processing (SERCOS)
P-AXIS-00151 [▷ 283]	getriebe[i].	pos_einschw_zeit	Maximum permissible settling time for exact stop window
P-AXIS-00152 [▷ 89]	getriebe[i].	pos_refpkt	Position of the reference point
P-AXIS-00153 [▷ 485]	filter[i].	prototype	Characteristic of axis specific command value filter
P-AXIS-00154 [▷ 251]	getriebe[i].dynamik.	r_trans_weight	Dynamic variable for non-linear slope
P-AXIS-00155 [▷ 195]	getriebe[i].	rapid_speed_red	Safety zone monitoring
P-AXIS-00156 [▷ 88]	kenngr.	ref_ohne_nocken	Homing without cam
P-AXIS-00157 [▷ 89]	kenngr.	ref_ohne_rev	Homing without reverting
P-AXIS-00158 [▷ 88]	kenngr.	ref_richt	Preferred direction of axis for homing
P-AXIS-00159 [▷ 80]	getriebe[i].	reverse	Reverse of sign for setpoint and actual value
P-AXIS-00160 [▷ 380]	antr.sercos.	ring_nr	Ring number (SERCOS)
P-AXIS-00161 [▷ 379]	antr.simu.	rpf_weg_bis_nip	Tool path up to zero pulse during homing simulation
P-AXIS-00162 [▷ 406]	antr.profibus.	s_ls_limit	Slave-life sign limit (PROFIDRIVE)

ID	Structure	Parameter	Functionality/short description
P-AXIS-00164 [▸ 489]	filter[i].	share_percent	Signal share of axis specific command value filter
P-AXIS-00165 [▸ 347]	vorsteuer.	shift_time	Time offset of feed forward control setpoints
P-AXIS-00166 [▸ 282]	getriebe[i].	slep_abw	Remaining deviation for non-linear position lag monitoring
P-AXIS-00167 [▸ 282]	getriebe[i].	slep_dyn	Factor for dynamic position lag monitoring
P-AXIS-00168 [▸ 281]	getriebe[i].	slep_max	Maximum position lag
P-AXIS-00169 [▸ 280]	getriebe[i].	slep_min	Minimum position lag
P-AXIS-00170 [▸ 284]	getriebe[i].	slep_time_const	Time constant for position lag monitoring
P-AXIS-00172 [▸ 279]	getriebe[i].	slep_ueberw_typ	Type of position lag monitoring
P-AXIS-00173 [▸ 404]	antr.sercos.times.	slkn	Slave identifier
P-AXIS-00174 [▸ 292]	lr_param.	crosscomp2	Activation of plane compensation
P-AXIS-00175 [▸ 293]	lr_param.	ssfk	Activation of SSFK
P-AXIS-00176 [▸ 285]	lr_param.	suppress_pos_lag_error	Suppression of position lag
P-AXIS-00177 [▸ 121]	kenngr.	swe_neg	Negative software limit switch
P-AXIS-00178 [▸ 121]	kenngr.	swe_pos	Positive software limit switch
P-AXIS-00179 [▸ 120]	kenngr.	swe_toleranz	Tolerance range for software limit switch
P-AXIS-00180 [▸ 400]	antr.sercos.times.	t1	Transmission moment of drive telegram
P-AXIS-00181 [▸ 402]	antr.sercos.times.	t1min	Earliest transmission moment for drive telegrams
P-AXIS-00182 [▸ 400]	antr.sercos.times.	t2	Transmission moment of MDT
P-AXIS-00183 [▸ 401]	antr.sercos.times.	t3	Validation moment for command values
P-AXIS-00184 [▸ 401]	antr.sercos.times.	t4	Latch moment of actual values
P-AXIS-00185 [▸ 403]	antr.sercos.times.	t4min	Latch moment of actual values
P-AXIS-00186 [▸ 405]	antr.sercos.times.	tatat	Transmitter recovery time
P-AXIS-00187 [▸ 402]	antr.sercos.times.	tatmt	Switch over moment between transmission and reception

ID	Structure	Parameter	Functionality/short description
P-AXIS-00188 [▸ 380]	antr.sercos.	telegramm_typ	Telegram type (SERCOS)
P-AXIS-00189 [▸ 286]	kenngr.	tendenz_pruef	Activation of tendency test
P-AXIS-00190 [▸ 348]	vorsteuer.	timeconst_cmd_filter	Time constant low-pass filter position lag
P-AXIS-00191 [▸ 354]	antr.	nbr_delay_cycles	Delay between command value and actual value
P-AXIS-00192 [▸ 404]	antr.sercos.times.	tmtsg	Processing time for command values
P-AXIS-00193 [▸ 403]	antr.sercos.times.	tmtsy	Recovery time in slave
P-AXIS-00194 [▸ 378]	antr.simu.	totzeit	Dead time for drive simulation
P-AXIS-00195 [▸ 237]	getriebe[i].slope_profil.	tr_beschl_ab	Ramp time for acceleration down-gradation (non-linear slope)
P-AXIS-00196 [▸ 237]	getriebe[i].slope_profil.	tr_beschl_zu	Ramp time for acceleration up-gradation (non-linear slope)
P-AXIS-00197 [▸ 238]	getriebe[i].slope_profil.	tr_brems_ab	Ramp time for deceleration down-gradation (non-linear slope)
P-AXIS-00198 [▸ 238]	getriebe[i].slope_profil.	tr_brems_zu	Ramp time for deceleration up-gradation (non-linear slope)
P-AXIS-00199 [▸ 247]	getriebe[i].dynamik.	tr_geom	Geometric ramp time
P-AXIS-00200 [▸ 239]	getriebe[i].slope_profil.	tr_grenz	Ramp time at rapid movement (non-linear slope)
P-AXIS-00201 [▸ 247]	getriebe[i].dynamik.	tr_min	Minimum permissible ramp time
P-AXIS-00202 [▸ 257]	getriebe[i].beschl_kennlinie.	typ	Type of the characteristic acceleration curve
P-AXIS-00203 [▸ 398]	antr.sercos.ident[i].	type	Type of ID (SERCOS)
P-AXIS-00204 [▸ 486]	filter[i].	type	Type of axis specific command value filter
P-AXIS-00205 [▸ 352]	antr.	v_reso_denom	Velocity normalisation (denominator)
P-AXIS-00206 [▸ 352]	antr.	v_reso_num	Normalisation of command velocity (numerator)
P-AXIS-00207 [▸ 351]	antr.	v_time_base	Time base for normalisation of velocity
P-AXIS-00208 [▸ 168]	kenngr.	vb_corr_tracking	Tracking mode: Maximum feed of compensation movement after deselection

ID	Structure	Parameter	Functionality/short description
P-AXIS-00209 [▸ 242]	getriebe[i].	vb_eilgang	Rapid traverse velocity
P-AXIS-00210 [▸ 467]	handbetrieb.tipp.	vb_eilgang	Rapid mode velocity for continuous jog mode
P-AXIS-00211 [▸ 233]	getriebe[i].slope_profil.	vb_grenz_stufe_1_2	Changeover speed in rapid mode (linear slope)
P-AXIS-00212 [▸ 245]	getriebe[i].dynamik.	vb_max	Maximum permissible axis velocity
P-AXIS-00213 [▸ 474]	handbetrieb.hb.	vb_max	Maximum velocity for manual operation without parallel interpolation
P-AXIS-00214 [▸ 194]	getriebe[i].	vb_max_red	Reduced maximum speed with active G01
P-AXIS-00215 [▸ 127]	kenngr.	vb_messen	Measurement speed for measurement type 2
P-AXIS-00216 [▸ 80]	getriebe[i].	vb_min_null	Limit for spindle speed 'zero'
P-AXIS-00217 [▸ 79]	kenngr.	vb_prozent	Speed-value attained - tolerance band
P-AXIS-00218 [▸ 90]	getriebe[i].	vb_reflow	Slow velocity for exact detection of reference position
P-AXIS-00219 [▸ 90]	getriebe[i].	vb_refmax	Fast velocity for detection of reference cam
P-AXIS-00220 [▸ 79]	getriebe[i].	vb_regelgrenze	Limiting velocity for the measurement system
P-AXIS-00221 [▸ 231]	getriebe[i].slope_profil.	vb_stufe_1_2	Changeover speed (linear slope)
P-AXIS-00223 [▸ 336]	vorsteuer.	vorsteuerung	Feedforward control mode
P-AXIS-00224 [▸ 78]	kenngr.	vorz_richtung	Restriction of direction of spindle rotation
P-AXIS-00225 [▸ 340]	vorsteuer.	vs_a_faktor	Numerator equivalent time constant for feedforward control of acceleration
P-AXIS-00226 [▸ 341]	vorsteuer.	vs_a_nenner	Denominator equivalent time constant for feedforward control of acceleration
P-AXIS-00228 [▸ 341]	vorsteuer.	vs_v_faktor	Numerator weighting factor for feedforward control
P-AXIS-00229 [▸ 342]	vorsteuer.	vs_v_nenner	Denominator weighting factor for feedforward control
P-AXIS-00230 [▸ 327]	lr_hw[i].	vz_istw	Sign reversal of actual value
P-AXIS-00231 [▸ 326]	lr_hw[i].	vz_stellgr	Sign reversal of command value

ID	Structure	Parameter	Functionality/short description
P-AXIS-00232 [▸ 468]	handbetrieb.jog.	weg[i]	Jog incremental widths
P-AXIS-00233 [▸ 289]	getriebe[i].	wegaufn	Distance resolution of measurement (denominator)
P-AXIS-00234 [▸ 290]	getriebe[i].	wegaufz	Distance resolution of measurement (numerator)
P-AXIS-00235 [▸ 398]	antr.sercos.ident[].	wert	Value of ID (SERCOS)
P-AXIS-00236 [▸ 265]	getriebe[i].	window	Position window for exact stop
P-AXIS-00237 [▸ 291]	getriebe[i].	wsi_meldung	Definition of traverse distance between lubrication pulses
P-AXIS-00238 [▸ 376]	antr.simu.	zeitkonstante_n	Sampling time constant for axis simulation (numerator)
P-AXIS-00239 [▸ 375]	antr.simu.	zeitkonstante_z	Sampling time constant for axis simulation (numerator)
P-AXIS-00240 [▸ 261]	getriebe[i].beschl_kennlinie.	a_max	Maximum acceleration for acceleration curve of type 3
P-AXIS-00241 [▸ 262]	getriebe[i].beschl_kennlinie.	n1	Speed limit 1 for acceleration curve of type 3
P-AXIS-00242 [▸ 262]	getriebe[i].beschl_kennlinie.	n2	Speed limit 2 for acceleration curve of type 3
P-AXIS-00243 [▸ 273]	lr_param.	n_backlash_cyc	Distribution of the backlash on multiple cycles
P-AXIS-00244 [▸ 296]	getriebe[i].dyn_kv.	dyn_kv_active	Activation of dynamic kv adjustment
P-AXIS-00245 [▸ 296]	getriebe[i].dyn_kv.	kv1	Parameter of dynamic kv adjustment (kv1)
P-AXIS-00246 [▸ 298]	getriebe[i].dyn_kv.	v1	Parameter of dynamic kv adjustment (v1)
P-AXIS-00247 [▸ 297]	getriebe[i].dyn_kv.	kv2	Parameter of dynamic kv adjustment (kv2)
P-AXIS-00248 [▸ 299]	getriebe[i].dyn_kv.	v2	Parameter of dynamic kv adjustment (v2)
P-AXIS-00249 [▸ 159]	kenngr.	gantry_diff_check_without_homing	Gantry difference monitoring before homing
P-AXIS-00250 [▸ 172]	kenngr.	configure_sai	Configuration of a SAI axis for PLCopen
P-AXIS-00251 [▸ 172]	kenngr.	auto_call_ax	Requesting of a SAI axis at RESET
P-AXIS-00252 [▸ 173]	kenngr.	consider_total_brake_dist	Moving to a target position after reversal of direction for PLCopen

ID	Structure	Parameter	Functionality/short description
P-AXIS-00253 [▷ 160]	kenngr.	gantry_synchronous_slave_homing	Drive-controlled homing of gantry axis (SERCOS)
P-AXIS-00254 [▷ 160]	kenngr.	cnc_controlled_stop_after_error	CNC-controlled error reaction for gantry axes
P-AXIS-00255 [▷ 342]	vorsteuer.	default_active	Permanent activation of feedforward control
P-AXIS-00256 [▷ 343]	vorsteuer.	global_disable	Permanent deactivation of feedforward control
P-AXIS-00257 [▷ 137]	kenngr.	probing_signal_via_plc	Measurement signal via HLI Control Unit
P-AXIS-00258 [▷ 169]	kenngr.	tracking_offset_remain	Tracking mode: Keep position offset after tracking
P-AXIS-00259 [▷ 475]	handbetrieb.hb.	a_feedh	Feedhold acceleration for manual operation without parallel interpolation
P-AXIS-00260 [▷ 407]	antr.profibus.	velocity_command_control	Activation of velocity command interface (PROFIDRIVE)
P-AXIS-00261 [▷ 164]	kenngr.	gantry_deskew_trigger	Edge detection GantryOn signal
P-AXIS-00262 [▷ 166]	kenngr.	coll_moving_dir_inverted	Monitoring of axis collision: Inverting of moving directions
P-AXIS-00263 [▷ 167]	kenngr.	coll_zero_position_offset	Monitoring of axis collision: Offset of zero positions
P-AXIS-00264 [▷ 382]	antr.sercos.	op_mode_for_velocity_control	Operation mode for velocity control (SERCOS)
P-AXIS-00265 [▷ 81]	antr.	velocity_position_control_on	Velocity limit for switching to speed-controlled mode
P-AXIS-00266 [▷ 81]	antr.	velocity_position_control_off	Velocity limit for switching back to position control
P-AXIS-00267 [▷ 167]	kenngr.	coll_use_a_emergency	Monitoring of axis collision: Effective deceleration
P-AXIS-00268 [▷ 92]	getriebe[i].	vb_not_referenced	Maximum velocity for unreferenced axes
P-AXIS-00269 [▷ 137]	kenngr.	meas_signal_drive	Measurement signal from drive
P-AXIS-00270 [▷ 241]	getriebe[i].	slope_type	Effective acceleration profile
P-AXIS-00271 [▷ 274]	lr_param.	temp_comp	Selection of temperature compensation
P-AXIS-00272 [▷ 275]	lr_param.	temp_comp_position_0	Parameterisation of temperature compensation (Basic position)

ID	Structure	Parameter	Functionality/short description
P-AXIS-00273 [▹ 275]	lr_param.	temp_comp_offset_0	Parameterisation of temperature compensation (Offset)
P-AXIS-00274 [▹ 276]	lr_param.	temp_comp_coefficient	Parameterisation of temperature compensation (Geometrical pitch)
P-AXIS-00275 [▹ 276]	lr_param.	temp_comp_n_cycles	Distribution of the temperature compensation on several cycles
P-AXIS-00276 [▹ 266]	lr_param.	field_bus_allows_optimized_schedule	Optimized bus access
P-AXIS-00277 [▹ 92]	kenngr.	prog_move_requires_homing	Lock moving of unreferenced axes
P-AXIS-00278 [▹ 93]	kenngr.	set_refpos_mode	Modes for setting the homing position
P-AXIS-00279 [▹ 94]	kenngr.	set_refpos_offset	Offset to the homing position
P-AXIS-00280 [▹ 232]	getriebe[i].slope_profil.	d_grenz_stufe_1	Deceleration of step 1 in rapid mode (linear slope)
P-AXIS-00281 [▹ 233]	getriebe[i].slope_profil.	d_grenz_stufe_2	Deceleration of step 2 in rapid mode (linear slope)
P-AXIS-00282 [▹ 230]	getriebe[i].slope_profil.	d_stufe_1	Deceleration of step 1 (linear slope)
P-AXIS-00283 [▹ 230]	getriebe[i].slope_profil.	d_stufe_2	Deceleration of step 2 (linear slope)
P-AXIS-00284 [▹ 162]	kenngr.	gantry_max_homing_dist	Maximum path for a gantry slave axis during homing
P-AXIS-00285 [▹ 97]	getriebe[i].	a_ref	Acceleration during homing
P-AXIS-00286 [▹ 97]	getriebe[i].	tr_ref	Ramp time during homing
P-AXIS-00287 [▹ 173]	kenngr.	disable_super_imposed	Switching off superimposed interpolator for PLCopen
P-AXIS-00288 [▹ 175]	cam_gear.	is_master	Define axis as camming / gearing master
P-AXIS-00289 [▹ 175]	cam_gear.	v_diff_percent	Velocity tolerance range for camming / gearing
P-AXIS-00290 [▹ 176]	cam_gear.	time_in_window	Minimum time in tolerance range for speed synchronisation for camming / gearing
P-AXIS-00291 [▹ 176]	cam_gear.	time_out_in_window	Maximum time for velocity synchronisation for camming / gearing
P-AXIS-00292 [▹ 255]	getriebe[i].dynamik.	a_w_max	Maximum acceleration at weighting

ID	Structure	Parameter	Functionality/short description
P-AXIS-00293 [▸ 256]	getriebe[i].dynamik.	tr_w_min	Minimum ramp time at weighting
P-AXIS-00294 [▸ 95]	kenngr.	homing_overflow_evaluation	Selection of the homing method 'Evaluation of encoder overflow'
P-AXIS-00295 [▸ 417]	antr.canopen.	probing_input_number	Number of probing input (CANopen)
P-AXIS-00296 [▸ 334]	lr_hw[i].	encoder_range	Encoder value range for EtherCAT drives
P-AXIS-00297 [▸ 65]	kopf.	log_achs_name	Default name of an axis
P-AXIS-00298 [▸ 100]	getriebe[i].	max_reference_position_offset	Gantry monitoring during drive controlled homing
P-AXIS-00299 [▸ 98]	kenngr. or kenngr.homing.	homing_type	Homing type
P-AXIS-00300 [▸ 177]	cam_gear.	mv_type	Average value filter for current master velocity for camming / gearing
P-AXIS-00301 [▸ 177]	cam_gear.	mv_nbr_cycles	Number of scanning cycles for average value filter for camming / gearing
P-AXIS-00302 [▸ 178]	cam_gear.	delay_time	Delay time on gearing with current master velocity for camming / gearing
P-AXIS-00303 [▸ 178]	cam_gear.	v_max_slave	Maximum commanded velocity for slave axis for camming / gearing
P-AXIS-00304 [▸ 179]	cam_gear.	a_max_slave	Maximum commanded acceleration for slave axis for camming / gearing
P-AXIS-00305 [▸ 179]	cam_gear.	v_phasing	Velocity for phase synchronisation for camming / gearing
P-AXIS-00306 [▸ 180]	cam_gear.	a_phasing	Acceleration for phase synchronisation for camming / gearing
P-AXIS-00307 [▸ 180]	cam_gear.	d_phasing	Deceleration for phase synchronisation for camming / gearing
P-AXIS-00308 [▸ 182]	cam_gear.	keep_coupling_on_lr_error	Coupling behaviour on error from position control for camming / gearing
P-AXIS-00309 [▸ 182]	cam_gear.	keep_coupling_on_fe_drop	Coupling behaviour on feed enable drop for camming / gearing

ID	Structure	Parameter	Functionality/short description
P-AXIS-00311 [▷ 185]	getriebe[i].	vb_monitor	Velocity limit during active monitoring of current velocity
P-AXIS-00312 [▷ 185]	kenngr.	enable_speed_monitoring	Activation of speed monitoring
P-AXIS-00313 [▷ 186]	kenngr.	enable_feed_enable	Activation of feed enable via PLC
P-AXIS-00314 [▷ 186]	getriebe[i].	vb_torq_limit_max	Speed monitoring during torque limitation
P-AXIS-00315 [▷ 407]	antr.profibus.	read_abs_pos_from_drive	Reading absolute position from drive (PROFIDRIVE)
P-AXIS-00316 [▷ 408]	antr.profibus.	p1042	Shift factor for G1_XIST1 (PROFIDRIVE)
P-AXIS-00317 [▷ 408]	antr.profibus.	p1043	Offset factor for absolute value in G1_XIST2 (PROFIDRIVE)
P-AXIS-00318 [▷ 409]	antr.profibus.	read_abs_pos_mode	Calculation mode for actual position (PROFIDRIVE)
P-AXIS-00319 [▷ 489]	filter[i].	enable	Activate the axis-specific command value filter (for standard filters)
P-AXIS-00320 [▷ 355]	antr.	operation_mode	Positioning operation mode of an axis
P-AXIS-00321 [▷ 101]	antr.	reference_cam_signal	Input interface for reference cam signal
P-AXIS-00322 [▷ 544]	kenngr.	in_add_interface_pos_as_offset	Handling the loaded position command values as offset
P-AXIS-00323 [▷ 291]	lr_param.	incr_quant	Quantisation of the measuring system increments
P-AXIS-00324 [▷ 201]	getriebe[i].	torque_offset	Torque offset
P-AXIS-00325 [▷ 201]	antr.	torque_scale_num	Numerator scaling factor for torque
P-AXIS-00326 [▷ 202]	antr.	torque_scale_denom	Denominator scaling factor for torque
P-AXIS-00327 [▷ 188]	kenngr.	pos_corr_drive_enable	Relieve position difference when enabling drive controller
P-AXIS-00328 [▷ 300]	lr_param.	distance_control_on	Enabling of distance control (spindle with touch probe)
P-AXIS-00329 [▷ 102]	kenngr.	ref_cam_is_limit_switch	Use of hardware limit switch as reference switch
P-AXIS-00330 [▷ 138]	kenngr.	meas_signal_fixed_stop	Measurement with motion to a fixed stop

ID	Structure	Parameter	Functionality/short description
P-AXIS-00331 [▷ 150]	kenngr.	fixed_stop_pos_lag_limit	Limit for position lag during movement to a fixed stop
P-AXIS-00332 [▷ 150]	kenngr.	fixed_stop_nbr_cycles	Number of position control cycles during movement to a fixed stop
P-AXIS-00333 [▷ 107]	getriebe[i].homing.	torq_move_velocity	Velocity during homing to a fixed stop
P-AXIS-00334 [▷ 108]	getriebe[i].homing.	torq_move_acceleration	Acceleration during homing to a fixed stop
P-AXIS-00335 [▷ 108]	getriebe[i].homing.	torq_move_jerk	Jerk during homing to a fixed stop
P-AXIS-00336 [▷ 411]	antr.profibus.	abs_pos_revolutions	Number of detectable motor revolutions (PROFIDRIVE)
P-AXIS-00337 [▷ 343]	vorsteuer.	jerk_fact_num	Numerator of scaling factor for jerk feedforward
P-AXIS-00338 [▷ 344]	vorsteuer.	jerk_fact_denom	Denominator of scaling factor for jerk feedforward
P-AXIS-00339 [▷ 254]	getriebe[i].dynamik.	j_trans_c0	Jerk at block transition (non-tangent continuous block transitions)
P-AXIS-00340 [▷ 254]	getriebe[i].dynamik.	j_trans_c1	Jerk at block transition (tangent continuous block transitions)
P-AXIS-00341 [▷ 410]	antr.profibus.	read_abs_pos_offset	Offset to the read absolute position of the drive (PROFIDRIVE)
P-AXIS-00342 [▷ 545]	getriebe[i].homing.	torq_move_torque_limit	Torque limit value during homing to a fixed stop
P-AXIS-00343 [▷ 546]	getriebe[i].homing.	torq_detect_torque_limit	Torque limit for detection during homing to a fixed stop
P-AXIS-00344 [▷ 109]	kenngr.homing.	torq_min_distance	Minimum distance during homing to a fixed stop
P-AXIS-00345 [▷ 109]	kenngr.homing.	torq_max_distance	Maximum distance during homing to a fixed stop
P-AXIS-00346 [▷ 110]	kenngr.homing.	torq_homing_dir	Direction during homing to a fixed stop
P-AXIS-00347 [▷ 110]	kenngr.homing.	torq_detect_velocity_limit	Velocity limit value during homing to a fixed stop
P-AXIS-00348 [▷ 111]	kenngr.homing.	torq_retraction_distance	Retraction distance during homing to a fixed stop
P-AXIS-00349 [▷ 111]	kenngr.homing.	torq_homing_position	Reference position during homing to a fixed stop

ID	Structure	Parameter	Functionality/short description
P-AXIS-00350 [▹ 112]	kenngr.homing.	torq_detect_time	Minimum time during homing to a fixed stop
P-AXIS-00351 [▹ 189]	kenngr.	filter_position_window	Tolerance window for axis filter
P-AXIS-00352 [▹ 410]	antr.profibus.	disable_auto_tracking	Automatic follow up mode for disabled drive (PROFIDRIVE)
P-AXIS-00353 [▹ 357]	antr.	edge_banding_input_nbr	Number of the latch input used for edge banding
P-AXIS-00354 [▹ 96]	antr.	encoder_overflow_offset	Shifting of encoder overflow
P-AXIS-00355 [▹ 96]	antr.	encoder_bit_range	Number of bits for evaluation of encoder overflow
P-AXIS-00356 [▹ 188]	kenngr.	pos_corr_ignore_feedhold	Ignore feedhold at position correction after drive enable
P-AXIS-00357 [▹ 490]	filter[i].	time_constant	Time constant of axis specific command value filter
P-AXIS-00358 [▹ 358]	antr.	ignore_unknown_telegram_elements	Ramp time during maximum acceleration for manual operation without parallel interpolation
P-AXIS-00359 [▹ 475]	handbetrieb.hb.	tr	Ramp time during maximum acceleration for manual operation without parallel interpolation
P-AXIS-00360 [▹ 476]	handbetrieb.hb.	tr_feedh	Ramp time at feedhold for manual operation without parallel interpolation
P-AXIS-00361 [▹ 348]	vorsteuer.	timeconst_sym_filter	Time constant of command position filter for feedforward balancing
P-AXIS-00362 [▹ 361]	antr.	feed_const_num	Encoder resolution via feed constant (numerator)
P-AXIS-00363 [▹ 362]	antr.	feed_const_denom	Encoder resolution via feed constant (denominator)
P-AXIS-00364 [▹ 417]	antr.canopen.	zero_pulse_input_number	Number of digital input for latching zero pulse (CANopen)
P-AXIS-00365 [▹ 472]	handbetrieb.ipo.	hb_v_max_track	Velocity during position correction
P-AXIS-00366 [▹ 473]	handbetrieb.ipo.	hb_a_max_track	Acceleration during position correction
P-AXIS-00367 [▹ 358]	antr.	plc_watchdog_disable_drive_delay_time	Maximum time delay for disabling drive after a PLC watchdog error

ID	Structure	Parameter	Functionality/short description
P-AXIS-00368 [▸ 501]	trafo.command_pos.	enable	Activation of axis specific command value transformation
P-AXIS-00369 [▸ 501]	trafo.command_pos.	id	Transformation ID of axis specific command value transformation
P-AXIS-00370 [▸ 502]	trafo.command_pos.	param[i]	Transformation parameters of axis specific command value transformation
P-AXIS-00371 [▸ 500]	trafo.actual_pos.input[i].	nr	Additional input axes of axis specific actual value transformation
P-AXIS-00372 [▸ 359]	antr.	ethercat_master_name	Name of the EtherCAT master process
P-AXIS-00373 [▸ 429]	antr.dse.	brake_open_delay_time	Time delay for brake opening
P-AXIS-00374 [▸ 430]	antr.dse.	brake_open_time	Brake opening time
P-AXIS-00375 [▸ 430]	antr.dse.	brake_close_premature_time	Brake premature time
P-AXIS-00376 [▸ 181]	cam_gear.	j_phasing	Jerk for phase synchronisation for camming / gearing
P-AXIS-00377 [▸ 181]	cam_gear.	j_vel_sync	Jerk for velocity synchronisation for camming / gearing
P-AXIS-00378 [▸ 154]	kenngr.	keep_tp_over_reset	Abortion of measuring order at reset
P-AXIS-00379 [▸ 412]	antr.profibus.	drive_velocity_base_value	Velocity scaling factor (PROFIDRIVE)
P-AXIS-00380 [▸ 499]	trafo.actual_pos.	enable	Activation of axis specific actual value transformation
P-AXIS-00381 [▸ 499]	trafo.actual_pos.	id	Transformation ID of axis specific actual value transformation
P-AXIS-00382 [▸ 500]	trafo.actual_pos.	param[i]	Transformation parameters of axis specific actual value transformation
P-AXIS-00383 [▸ 203]	kenngr.multi_link[i].	lead_axis	Logical axis number of lead or master axis
P-AXIS-00384 [▸ 203]	kenngr.multi_link[i].	factor_numerator	Numerator of gear coupling factor
P-AXIS-00385 [▸ 204]	kenngr.multi_link[i].	factor_denominator	Denominator of gear coupling factor

ID	Structure	Parameter	Functionality/short description
P-AXIS-00386 [▸ 383]	antr.sercos.	drive_supports_cnc_homing	Drive supported execution of the CNC based homing (SERCOS)
P-AXIS-00387 [▸ 383]	antr.sercos.	cnc_homing_rt_bit_layout	Assignment of control and status bits for CNC based homing (SERCOS)
P-AXIS-00388 [▸ 359]	antr.	cnc_homing_encoder	Encoder, used for CNC controlled homing (SERCOS)
P-AXIS-00389 [▸ 345]	vorsteuer.	velocity_delay_time	Delay time for velocity feedforward
P-AXIS-00390 [▸ 345]	vorsteuer.	acceleration_delay_time	Delay time for acceleration feedforward
P-AXIS-00391 [▸ 227]	getriebe[i].	load	Load inertia
P-AXIS-00392 [▸ 360]	antr.	acc_reference_value	Reference value for converting torque values to the motor format.
P-AXIS-00393 [▸ 163]	kenngr.	gantry_slave_relative_homing	Home gantry slave axis relative to encoder overflow
P-AXIS-00394 [▸ 255]	getriebe[i].dynamik.	a_overload_max	Maximum permissible exceeding of acceleration
P-AXIS-00395 [▸ 315]	getriebe[i].	pos_control_deadband	Position controller dead band
P-AXIS-00396 [▸ 432]	antr.function[i].	id	Name of drive functions in NC program
P-AXIS-00397 [▸ 433]	antr.function[i].	commu	Type of communication with drive controller
P-AXIS-00398 [▸ 433]	antr.function[i].	wr_ident[j]	Name of the parameter or telegram element
P-AXIS-00399 [▸ 434]	antr.function[i].	data_type	Data type of the data to be transmitted
P-AXIS-00400 [▸ 434]	antr.function[i].	startup_value	Value of data element after start-up of control
P-AXIS-00401 [▸ 435]	antr.function[i].	scaling_type	Scaling of the data to be transmitted
P-AXIS-00403 [▸ 363]	antr.	abs_pos_offset	Offset between drive position and CNC position for absolute encoders
P-AXIS-00404 [▸ 103]	lr_hw[i].	zero_pulse_search_max_dist	Maximum distance for zero pulse search
P-AXIS-00405 [▸ 364]	antr.	encoder_coarsening_factor	Factor to coarse encoder resolution

ID	Structure	Parameter	Functionality/short description
P-AXIS-00406 [▷ 364]	antr.	permissible_telegram_failures	EtherCAT-Fieldbus: Number of permissible telegram failures
P-AXIS-00407 [▷ 286]	lr_param.	dyn_monitoring_v_err	Error level for permissible axis velocity for dynamic monitoring function in the position controller
P-AXIS-00408 [▷ 436]	antr.function[i].	min_limit	Minimum permissible output value
P-AXIS-00409 [▷ 436]	antr.function[i].	max_limit	Maximum permissible output value
P-AXIS-00410 [▷ 365]	antr.	dc_brake_control_bit	Bit number for control of a DC brake
P-AXIS-00411 [▷ 387]	antr.sercos.	evaluate_drive_follows_cmd	Evaluation of SERCOS state bit drive follows command (SERCOS)
P-AXIS-00412 [▷ 106]	kenngr.	homing_max_movement_dist	Maximum distance during homing
P-AXIS-00413 [▷ 300]	kenngr.distc.	n_cycles	Distance control - filtering of sensor values
P-AXIS-00414 [▷ 301]	kenngr.distc.	max_deviation (old: max_abweichung)	Distance control - maximum position offset
P-AXIS-00415 [▷ 301]	kenngr.distc.	v_max	Distance control - maximum velocity
P-AXIS-00416 [▷ 302]	kenngr.distc.	a_max	Distance control - maximum acceleration
P-AXIS-00417 [▷ 302]	kenngr.distc.	max_act_value_change (old: max_istw_sprung)	Distance control - maximum velocity change of measured distance
P-AXIS-00418 [▷ 303]	kenngr.distc.	ref_offset	Distance control - reference point offset for measuring system
P-AXIS-00419 [▷ 303]	kenngr.distc.	max_pos	Distance control - upper limit for measuring system
P-AXIS-00420 [▷ 304]	kenngr.distc.	min_pos	Distance control - lower limit for measuring system
P-AXIS-00421 [▷ 304]	kenngr.distc.	tolerance	Distance control - tolerance band for limits
P-AXIS-00422 [▷ 328]	lr_hw[i].	encoder_resolution_num	Numerator distance resolution of the additive sensor measuring system
P-AXIS-00423 [▷ 328]	lr_hw[i].	encoder_resolution_denom	Denominator distance resolution of the additive sensor measuring system

ID	Structure	Parameter	Functionality/short description
P-AXIS-00424 [▷ 329]	lr_hw[i].	mode_act_pos	Handling of the additive sensor values
P-AXIS-00425 [▷ 114]	antr.reference_check.	bit_nr	Bit number of signal 'Drive is referenced' during reference monitoring
P-AXIS-00426 [▷ 115]	antr.reference_check.	element_name	Element name of signal 'Drive is referenced' during reference monitoring
P-AXIS-00427 [▷ 208]	kenngr.	cax_output_with_generated_nc_block	Interpolation of tracked axes in inserted TRC blocks
P-AXIS-00428 [▷ 305]	kenngr.distc.	check_sw_limit_switch	Distance control - consideration of offset in software limit switch monitoring
P-AXIS-00429 [▷ 437]	antr.function[i].	mask	Writing of drive values by bit mask
P-AXIS-00430 [▷ 366]	antr.	probing_input_nbr	Number of probing input in drive
P-AXIS-00431 [▷ 518]	dynamic_weighting.	enable	Activation of dynamic weighting
P-AXIS-00432 [▷ 519]	dynamic_weighting.param[i].	path_limit	Path distance limit (dynamic weighting)
P-AXIS-00433 [▷ 520]	dynamic_weighting.param[i].	velocity_fact	Weighting factor for rapid feed velocity (dynamic weighting)
P-AXIS-00434 [▷ 520]	dynamic_weighting.param[i].	acceleration_fact	Weighting factor for rapid feed acceleration (dynamic weighting)
P-AXIS-00435 [▷ 521]	dynamic_weighting.param[i].	ramp_time_fact	Weighting factor for rapid feed ramp time (dynamic weighting)
P-AXIS-00436 [▷ 205]	kenngr.	recalc_link_main_input_position	Forward mapping of drive position
P-AXIS-00437 [▷ 183]	cam_gear.	fact_a_max_correction	Permissible acceleration of master actual position for camming / gearing
P-AXIS-00438 [▷ 543]	kenngr.	in_add_interface_filter_time	Time constant of the PT2-Filter for the additive command value interface
P-AXIS-00439 [▷ 214]	kenngr.	dyn_monitoring_v_warn	Warning level for velocity for dynamic monitoring
P-AXIS-00440 [▷ 214]	kenngr.	dyn_monitoring_v_err	Error level for velocity for dynamic monitoring
P-AXIS-00441 [▷ 215]	kenngr.	dyn_monitoring_a_warn	Warning level for acceleration for dynamic monitoring

ID	Structure	Parameter	Functionality/short description
P-AXIS-00442 [▹ 215]	kenngr.	dyn_monitoring_a_err	Error level for acceleration for dynamic monitoring
P-AXIS-00443 [▹ 216]	kenngr.	dyn_monitoring_j_warn	Warning level for jerk for dynamic monitoring
P-AXIS-00444 [▹ 216]	kenngr.	dyn_monitoring_j_err	Error level for jerk for dynamic monitoring
P-AXIS-00445 [▹ 163]	kenngr.	gantry_independent_set_refpos	Behaviour on setting the homing position
P-AXIS-00446 [▹ 463]	handbetrieb.default.	after_g200_g201	Setting of default values after G200 or G201
P-AXIS-00447 [▹ 413]	antr.profibus.encoder[i].	read_abs_pos_from_drive	Reading the encoder's absolute position out of the drive for additive encoder (PROFIDRIVE)
P-AXIS-00448 [▹ 413]	antr.profibus.encoder[i].	read_abs_pos_mode	Calculation mode for encoder actual position for additive encoder (PROFIDRIVE)
P-AXIS-00449 [▹ 414]	antr.profibus.encoder[i].	abs_position_offset	Offset from the read absolute position of the encoder for additive encoder (PROFIDRIVE)
P-AXIS-00450 [▹ 415]	antr.profibus.encoder[i].	shift_abs_pos	Offset factor for absolute value in GX_XIST2 for additive encoder (PROFIDRIVE)
P-AXIS-00451 [▹ 415]	antr.profibus.encoder[i].	shift_xist1	Offset factor for GX_XIST1 for additive encoder (PROFIDRIVE)
P-AXIS-00452 [▹ 416]	antr.profibus.encoder[i].	abs_pos_offset_crc	CRC checksum for P-AXIS-00449 for additive encoder (PROFIDRIVE)
P-AXIS-00454 [▹ 279]	lr_param.	allow_comp_movement_while_feedhold	Treatment of axis movement from axis compensation while active feedhold
P-AXIS-00455 [▹ 217]	kenngr.	no_stop_by_channel_reset	Suppress stop of spindle axis during channel reset
P-AXIS-00456 [▹ 420]	antr.canopen.	f_probe_status_inverse_edge	Swap evaluation of probe status word (0x60B9) with respect to positive and negative edge
P-AXIS-00457 [▹ 218]	kenngr.	enable_single_axis	Enable PLCopen interface of a channel axis
P-AXIS-00458 [▹ 221]	kenngr.	set_in_pos_at_pos_corr	Setting of 'in position' for position controller generated axis movements

ID	Structure	Parameter	Functionality/short description
P-AXIS-00459 [▷ 370]	antr.	add_movement_range	Mechanical movement distance outside the software limit switches
P-AXIS-00460 [▷ 206]	kenngr.	recalc_input_position_absolute	Forward mapping of drive position with absolute coordinates
P-AXIS-00461 [▷ 207]	kenngr.	activate_coupled_axes_homing_check	Homing check for coupled axes
P-AXIS-00462 [▷ 412]	antr.profibus.	suppress_life_sign_warning	Suppress ‘slave life sign’ warning (PROFIDRIVE)
P-AXIS-00463 [▷ 418]	antr.canopen.	cyclic_position_op_mode	Operation mode for drive position control (CANopen)
P-AXIS-00464 [▷ 418]	antr.canopen.	cyclic_velocity_op_mode	Operation mode for drive velocity control (CANopen)
P-AXIS-00465 [▷ 278]	lr_param.	prog_movement_requires_compensations	Monitoring of effectiveness of axis compensations in automatic mode
P-AXIS-00466 [▷ 366]	antr.	use_drive_following_error	Use of position lag calculated in drive
P-AXIS-00467 [▷ 128]	kenngr.	probing_offset	Measurement travel offset for all measurement types
P-AXIS-00472 [▷ 265]	getriebe[i].	in_position_window_rapid	Position window for rapid movements
P-AXIS-00474 [▷ 83]	kenngr.	check_spindle_speed_in_tool_range	Checking commanded spindle speed versus permissible tool speed limits
P-AXIS-00475 [▷ 423]	antr.canopen.in[i].	nc_ref	Assign the input process data item to CNC-internal nomenclature
P-AXIS-00476 [▷ 421]	antr.canopen.in[i].	memory_ident	Memory name of input process data item
P-AXIS-00478 [▷ 426]	antr.canopen.out[i].	nc_ref	Assign the output process data item to CNC-internal nomenclature
P-AXIS-00479 [▷ 425]	antr.canopen.out[i].	memory_ident	Memory name of output process data item
P-AXIS-00481 [▷ 431]	antr.terminal.	stepper_motor_reduce_torque	Torque reduction at standstill
P-AXIS-00482 [▷ 277]	lr_param.	temp_comp_manual_activation	Manual activation of the temperature compensation
P-AXIS-00483 [▷ 220]	kenngr.	auto_release_of_axis_link	Enabling of IPO-LR interface after axis release

ID	Structure	Parameter	Functionality/short description
P-AXIS-00484 [▷ 367]	antr.	reset_timeout	Maximum time for drive reset
P-AXIS-00485 [▷ 218]	kenngr.	oscillation_collision_check_mode	Collision monitoring during oscillation
P-AXIS-00486 [▷ 207]	kenngr.	copy_master_gantry_coupling_to_slave	Copy HLI gantry master axis coupling to slave
P-AXIS-00487 [▷ 155]	kenngr.	probe_actuation_time_delay	Actuation time delay of measuring probe
P-AXIS-00488 [▷ 285]	getriebe[i].	pos_lag_mon_error_delay_time	Delayed generation of position lag error message
P-AXIS-00489 [▷ 174]	kenngr.	enable_decouple	Enable decoupling of the drive of an axis for PLCopen
P-AXIS-00490 [▷ 219]	kenngr.	inverse_rotation_direction	Inversion of spindle rotation direction for spindle M-functions M3/M4
P-AXIS-00491 [▷ 191]	kenngr.	indp_override_mode	Velocity override mode to select active override interface
P-AXIS-00492 [▷ 465]	handbetrieb.	acs_limit_neg	Absolute negative ACS movement limit in manual mode
P-AXIS-00493 [▷ 464]	handbetrieb.	acs_limit_pos	Absolute positive ACS movement limit in manual mode
P-AXIS-00494 [▷ 104]	kenngr.	shift_offset_zero_pulse_activation	Delayed activation of zero pulse logic
P-AXIS-00495 [▷ 316]	getriebe[i].	integral_time	Integral time Tn for I-position control
P-AXIS-00496 [▷ 316]	getriebe[i].	integral_limit	Control value limit of I position controller
P-AXIS-00497 [▷ 317]	lr_param.	i_control_on_delay	Switch on delay for I-positional control
P-AXIS-00498 [▷ 317]	lr_param.	i_control_output_clear_disable	Clear Integrator if drive is switched off
P-AXIS-00499 [▷ 544]	kenngr.	in_add_interface_init_on_enable	Reinitialisation of additional position interface after enable
P-AXIS-00500 [▷ 305]	kenngr.distc.	mode_dist_use_both_encoder	Distance control option: coupling of distance sensor and motor encoder
P-AXIS-00501 [▷ 306]	kenngr.distc.	use_adaptive_acceleration	Distance control option: Adaptive weighting of acceleration

ID	Structure	Parameter	Functionality/short description
P-AXIS-00502 [▷ 307]	kenngr.distc.	a_min	Distance control - minimum acceleration
P-AXIS-00503 [▷ 200]	getriebe[i].	vb_max_red_zone_2	Maximum permissible axis velocity in security zone 2
P-AXIS-00504 [▷ 307]	kenngr.distc.	dist_error_a_min	Distance control - minimum distance error
P-AXIS-00505 [▷ 308]	kenngr.distc.	dist_error_a_max	Distance control - maximum distance error
P-AXIS-00506 [▷ 308]	kenngr.distc.	low_pass_filter_enable	Distance control option: Low-pass filter
P-AXIS-00507 [▷ 309]	kenngr.distc.	low_pass_filter_order	Distance control - filter order
P-AXIS-00508 [▷ 309]	kenngr.distc.	low_pass_filter_fg_f0	Distance control - filter cut-off frequency
P-AXIS-00509 [▷ 310]	kenngr.distc.	optimized_scheduling	Distance control option: dead time reduction
P-AXIS-00510 [▷ 524]	customer.	val[i]	Free user-defined values
P-AXIS-00511 [▷ 243]	getriebe[i].	gear_fact_num	Gearbox ratio numerator
P-AXIS-00512 [▷ 244]	getriebe[i].	gear_fact_denom	Gear ratio denominator
P-AXIS-00513 [▷ 220]	kenngr.	delay_filter_only_position	Delay filter acts only on command positions
P-AXIS-00514 [▷ 346]	vorsteuer.	feedforward_v_add_num	Numerator weighting factor for velocity feedforward
P-AXIS-00515 [▷ 346]	vorsteuer.	feedforward_v_add_denom	Denominator weighting factor for velocity feedforward
P-AXIS-00516 [▷ 129]	kenngr.measure.	signal	Measurement methods
P-AXIS-00517 [▷ 132]	kenngr.measure.	input	Number of probing input
P-AXIS-00518 [▷ 133]	kenngr.measure.	edge	Probing signal edge
P-AXIS-00519 [▷ 82]	antr.	revolution_monitoring_use_act_velocity	Use actual speed for speed monitoring
P-AXIS-00520 [▷ 122]	lr_param.	check_pos_command_limit	Activation of limit switch monitoring of the positive limit switch.
P-AXIS-00521 [▷ 123]	lr_param.	check_neg_command_limit	Activation of limit switch monitoring of the negative limit switch.
P-AXIS-00522 [▷ 293]	lr_param.	frict_comp	Activation of friction compensation
P-AXIS-00523 [▷ 82]	kenngr.	spindle_m19_output_standard	Output time M19 for positioning the spindle

ID	Structure	Parameter	Functionality/short description
P-AXIS-00524 [▷ 367]	antr.	no_probe_state_support	Drive without support for probing state
P-AXIS-00525 [▷ 294]	lr_param.vol_comp.	s_limit	Maximum permissible correction value (volumetric compensation)
P-AXIS-00526 [▷ 294]	lr_param.vol_comp.	v_limit	Maximum permissible velocity (volumetric compensation)
P-AXIS-00527 [▷ 368]	antr.	use_encoder_submask	Activate evaluation of encoder position with additional mask.
P-AXIS-00528 [▷ 369]	antr.	drive_encoder_modulo_range	Drive encoder modulo range
P-AXIS-00529 [▷ 465]	handbetrieb.	feedhold_mode	Effect of feedhold control signals in manual mode
P-AXIS-00530 [▷ 469]	handbetrieb.jog.	rapid_velocity	Rapid mode velocity for jog mode
P-AXIS-00531 [▷ 107]	lr_hw[i].	move_from_cam_max_dist	Maximum distance when moving from the reference cam
P-AXIS-00532 [▷ 283]	getriebe[i].	position_settling_time	Maximum permissible position settling time for exact stop window
P-AXIS-00533 [▷ 310]	kenngr.distc.	v_weight_down	Distance control - weighting factor for velocity of lowering movement
P-AXIS-00534 [▷ 311]	kenngr.distc.	a_weight_down	Distance control - weighting factor for acceleration of lowering movement
P-AXIS-00535 [▷ 222]	kenngr.	vendor_id	Select specific manufacturer-specific procedures for drive controllers
P-AXIS-00536 [▷ 223]	kenngr.	device_id	Select specific device-specific procedures for drive controllers
P-AXIS-00537 [▷ 373]	antr.	position_lag_drive_disable	Disable drive controller on position lag error
P-AXIS-00538 [▷ 116]	kenngr.	no_unhome_on_resolution_change	Axis remains referenced after resolution change
P-AXIS-00539 [▷ 133]	kenngr.measure.	input_edge_banding	Probing input for edge banding
P-AXIS-00540 [▷ 192]	kenngr.	indp_feedhold_mode	Feedhold mode to select the active feedhold interface

ID	Structure	Parameter	Functionality/short description
P-AXIS-00541 [▸ 476]	handbetrieb.hb.	d_max	Maximum delay for manual operation without parallel interpolation
P-AXIS-00542 [▸ 374]	antr.	bus_error_drive_disable	Disabling drive controller in case of field bus error
P-AXIS-00545 [▸ 477]	handbetrieb.hb.	a_max_red	Reduced maximum acceleration for manual operation without parallel interpolation
P-AXIS-00546 [▸ 416]	antr.profibus.	add_movement_range	Mechanical axis motion path beyond the software limit switches (PROFIDRIVE)
P-AXIS-00547 [▸ 344]	vorsteuer	jerk_delay_time	Delay time for jerk feedforward
P-AXIS-00548 [▸ 217]	kenngr.	allow_dir_change_at_stop	Suppressing reversal of speed at stop
P-AXIS-00554 [▸ 124]	kenngr.	swe_behaviour	Behaviour of software limit switches
P-AXIS-00555 [▸ 537]	kenngr.	conv_sync_optim	Selecting the process for monitoring the workspace of throughfeed machines
P-AXIS-00556 [▸ 193]	kenngr.	feedhold_deceleration_mode	Effective deceleration value with feedhold
P-AXIS-00557 [▸ 77]	getriebe[i].	modulo_calculation	Switching modulo calculation range off / on
P-AXIS-00564 [▸ 184]	cam_gear.	error_stop_master	Error response of the master axis on camming or gearing
P-AXIS-00565 [▸ 184]	cam_gear.	error_stop_slave	Error response of the slave axis on camming or gearing
P-AXIS-00566 [▸ 349]	vorsteuer	feedforward_without_delay	Output of velocity feedforward control value without IPO-LR delay
P-AXIS-00567 [▸ 335]	lr_hw[i].	delay_tracking	Delay reading of actual position after field bus start
P-AXIS-00568 [▸ 498]	vib_guard	damping	Damping factor of natural frequency
P-AXIS-00571 [▸ 496]	vib_guard	mode	Vibration Guard mode
P-AXIS-00573 [▸ 491]	filter_fir	enable	Enable axis-specific FIR filter
P-AXIS-00580 [▸ 457]	antr.addroffs	output	Address offset output
P-AXIS-00583 [▸ 134]	kenngr.measure.probe[i].	input	Number of the drive-specific probing input assigned to the keyword PROBE0 or PROBE1 in the command #MEAS[INPUT=..]

ID	Structure	Parameter	Functionality/short description
P-AXIS-00584 [▸ 118]	kenngr	write_reference_position_to_drive	Transfer reference position for drive-controlled homing to the drive
P-AXIS-00585 [▸ 494]	filter_fir	fcut	Cut-off frequency of the FIR filter
P-AXIS-00586 [▸ 492]	filter_fir	type	Type of axis-specific FIR filter
P-AXIS-00587 [▸ 492]	filter_fir	order	Order of axis-specific FIR filter
P-AXIS-00588 [▸ 495]	vib_guard	active	Activating the Vibration Guard
P-AXIS-00589 [▸ 497]	vib_guard	freq	Machine natural frequency
P-AXIS-00590 [▸ 493]	filter_fir	share	FIR filter share factor
P-AXIS-00591 [▸ 493]	filter_fir	order_time	Order of axis-specific FIR filter in time
P-AXIS-00593 [▸ 494]	filter_fir	quality	FIR filter quality
P-AXIS-00618 [▸ 419]	antr.canopen.	zero_pulse_latch_neg_edge	Zero pulse search for negative edge of zero pulse signal for CANopen drives
P-AXIS-00620 [▸ 534]	conv_sync.	enable_filter	Actual position value filter for the master axis (throughfeed machining)
P-AXIS-00621 [▸ 534]	conv_sync.	type_pos_filter	Type of the actual position value filter of the master axis (throughfeed machining)
P-AXIS-00622 [▸ 535]	conv_sync.	order_pos_filter	Order of the actual position value filter of the master axis (throughfeed machining)
P-AXIS-00623 [▸ 535]	conv_sync.	order_v_filter	Order of the actual speed value filter of the master axis (throughfeed machining)
P-AXIS-00624 [▸ 536]	conv_sync.	order_post_v_filter	Order of the subsequent actual velocity filter in the case of feedhold on the master axis (throughfeed machining)
P-AXIS-00625 [▸ 536]	conv_sync.	order_v_filter_dyn	Order of the actual speed filter in the case of feedhold on the master axis (throughfeed machining)
P-AXIS-00626 [▸ 537]	conv_sync.	delay_time	Delay time between master and slave axes (throughfeed machining)
P-AXIS-00627 [▸ 525]	error_filter[i].	reason	Cause of error (filtering of axis error messages)

ID	Structure	Parameter	Functionality/short description
P-AXIS-00628 [▷ 526]	error_filter[i].	action	Error action (filtering of axis error messages)
P-AXIS-00629 [▷ 527]	error_filter[i].	conditional_activation	Conditional activation (filtering of axis error messages)
P-AXIS-00630 [▷ 528]	error_filter[i].	conditional_action	Conditional action (filtering of axis error messages)
P-AXIS-00631 [▷ 529]	error_filter[i].	conditional_param	Conditional filter activation (filtering of axis error messages)
P-AXIS-00632 [▷ 529]	error_filter[i].	conditional_output	Output of additional error information (filtering of axis error messages)
P-AXIS-00645 [▷ 421]	antr.canopen.in[i].	signal_nr	Signal ID in (CANopen)
P-AXIS-00646 [▷ 422]	antr.canopen.in[i].	signal_len	Length of process data item in (CANopen)
P-AXIS-00648 [▷ 425]	antr.canopen.out[i].	signal_nr	Signal ID out (CANopen)
P-AXIS-00649 [▷ 426]	antr.canopen.out[i].	signal_len	Length of process data item out (CANopen)
P-AXIS-00675 [▷ 140]	antr.sercos.probe_1_realtime_bits. start_probing.	element_name	Name process data item 'enable probe 1'
P-AXIS-00676 [▷ 141]	antr.sercos.probe_1_realtime_bits. start_probing.	bit_nr	Bit number of process data item 'enable probe 1'
P-AXIS-00677 [▷ 141]	antr.sercos.probe_1_realtime_bits. value_latched.	element_name	Name of process data item 'meas value latched probe 1'
P-AXIS-00678 [▷ 142]	antr.sercos.probe_1_realtime_bits. value_latched.	bit_nr	Bit number of process data item 'value latched probe 1'
P-AXIS-00679 [▷ 143]	antr.sercos.probe_1_realtime_bits. probe_actuated.	element_name	Name of process data item 'probe 1 actuated'
P-AXIS-00680 [▷ 143]	antr.sercos.probe_1_realtime_bits. probe_actuated.	bit_nr	Bit number of process data item 'probe 1 actuated'
P-AXIS-00681 [▷ 144]	antr.sercos.probe_2_realtime_bits. start_probing.	element_name	Name process data item 'enable probe 2'
P-AXIS-00682 [▷ 145]	antr.sercos.probe_2_realtime_bits. start_probing.	bit_nr	Bit number of process data item 'enable probe 2'
P-AXIS-00683 [▷ 145]	antr.sercos.probe_2_realtime_bits. value_latched.	element_name	Name of process data item 'meas value latched probe 2'

ID	Structure	Parameter	Functionality/short description
P-AXIS-00684 [▸ 146]	antr.sercos.probe_2 _realtime_bits. value_latched.	bit_nr	Bit number of process data item 'value latched probe 2'
P-AXIS-00685 [▸ 147]	antr.sercos.probe_2 _realtime_bits. probe_actuated.	element_name	Name of process data item 'probe 2 actuated'
P-AXIS-00686 [▸ 147]	antr.sercos.probe_2 _realtime_bits. probe_actuated.	bit_nr	Bit number of process data item 'probe 2 actuated'
P-AXIS-00699 [▸ 148]	antr.sercos.probing _command_start.	element_name	Name of process data item 'start measurement command'
P-AXIS-00700 [▸ 149]	antr.sercos.probing _command_start.	bit_nr	Bit number of process data item 'start measurement command'
P-AXIS-00701 [▸ 419]	antr.canopen.	zero_pulse_trigger_source	Select the trigger source for zero pulse search by the drive parameter 0x60D0
P-AXIS-00702 [▸ 420]	antr.canopen.	probing_trigger_source	Select the trigger source for probing by the drive parameter 0x60D0
P-AXIS-00703 [▸ 164]	kenngr.	gantry_on_with_drive_enable	Clearing the gantry difference when drive is enabled
P-AXIS-00704 [▸ 161]	kenngr.	gantry_on_mode	Conditions for clearing the gantry difference
P-AXIS-00705 [▸ 124]	kenngr.	swe_check	Switching software limit monitoring off / on
P-AXIS-00707 [▸ 456]	antr.addroffs	input	Address offset input
P-AXIS-00708 [▸ 533]	conv_sync.	is_master	Definition of the master axis of conveyor belt synchronisation
P-AXIS-00709 [▸ 371]	antr.add_ready_for_operation.	bit_nr	Bit number of additional information for calculation of HLI signal 'power_state_r'
P-AXIS-00710 [▸ 372]	antr.add_ready_for_operation.	inverted	Inverting 'Ready for Power' signal
P-AXIS-00711 [▸ 372]	antr.add_ready_for_operation.	element_name	Element name of additional information for calculation of HLI signal 'power_state_r'
P-AXIS-00712 [▸ 438]	antr.fixed_stop.	pos_lag_limit	Position lag limit to detect the fixed stop
P-AXIS-00713 [▸ 439]	antr.fixed_stop.	window	Monitoring window for the fixed stop

ID	Structure	Parameter	Functionality/short description
P-AXIS-00714 [▸ 439]	antr.fixed_stop.	nbr_cycles	Number of position controller cycles to detect the fixed stop
P-AXIS-00715 [▸ 440]	antr.fixed_stop.	error_on_abort	Error output on abort by reset
P-AXIS-00716 [▸ 440]	antr.fixed_stop.	error_not_detected	Error message if fixed stop is not detected
P-AXIS-00717 [▸ 441]	antr.fixed_stop.	warning_reset_while_detected	Warning message on reset and detected fixed stop
P-AXIS-00718 [▸ 441]	antr.fixed_stop.	max_torque	Motor torque at maximum axis acceleration
P-AXIS-00719 [▸ 442]	antr.fixed_stop.	drive_ident[i].id	CNC-internal identifier for the drive object
P-AXIS-00720 [▸ 442]	antr.fixed_stop.	drive_ident[i].commu	Type of communication with drive controller
P-AXIS-00721 [▸ 443]	antr.fixed_stop.	drive_ident[i].wr_ident	Name of the drive object in the driver amplifier
P-AXIS-00722 [▸ 443]	antr.fixed_stop.	drive_ident[i].data_type	Data type of the data to be transmitted
P-AXIS-00723 [▸ 444]	antr.fixed_stop.	drive_ident[i].data_type	Default value of data element after controller start-up
P-AXIS-00724 [▸ 445]	antr.fixed_stop.	drive_ident[i].scaling_type	Scaling type of the data element
P-AXIS-00725 [▸ 446]	antr.fixed_stop.	drive_ident[i].max_limit	Maximum permissible output value
P-AXIS-00726 [▸ 446]	antr.fixed_stop.	drive_ident[i].min_limit	Minimum permissible output value
P-AXIS-00727 [▸ 447]	antr.fixed_stop.	drive_ident[i].mask	Writing/reading drive values by bit mask
P-AXIS-00728 [▸ 448]	antr.fixed_stop.	drive_ident[i].scaling_factor	Scaling factor
P-AXIS-00729 [▸ 448]	antr.fixed_stop.	drive_ident[i].active_value	Value of data element during Move to fixed stop
P-AXIS-00730 [▸ 438]	antr.fixed_stop.	drive_ident[i].use_startup_value	Use of default value
P-AXIS-00731 [▸ 449]	antr.fixed_stop.	drive_ident[i].rd_ident	Name of the drive object to be read in the driver amplifier
P-AXIS-00732 [▸ 267]	lr_param.add_interface.	enable	Enable additional interface
P-AXIS-00733 [▸ 267]	lr_param.add_interface.	pos_as_offset	Handling the loaded position command values as offset

ID	Structure	Parameter	Functionality/short description
P-AXIS-00734 [▷ 268]	lr_param.add_interface.	init_on_enable	Reinitialisation of additional position interface after enable
P-AXIS-00735 [▷ 268]	lr_param.add_interface.filter[i].	enable	Enable the additional interface filter
P-AXIS-00736 [▷ 270]	lr_param.add_interface.filter[i]	order	Order of the additional interface filter
P-AXIS-00737 [▷ 270]	lr_param.add_interface.filter[i]	prototype	Characteristic of the additional interface filter
P-AXIS-00738 [▷ 271]	lr_param.add_interface.filter[i]	type	Type of the additional interface filter
P-AXIS-00739 [▷ 269]	lr_param.add_interface.filter[i]	fg_f0	Frequency range of the additional interface filter
P-AXIS-00740 [▷ 269]	lr_param.add_interface.filter[i]	guete	Bandwidth of the additional interface filter
P-AXIS-00741 [▷ 271]	lr_param.add_interface.filter[i]	share_percent	Signal share of the additional interface filter
P-AXIS-00742 [▷ 272]	lr_param.add_interface.filter[i]	time_constant	Time constant of the additional interface filter
P-AXIS-00743 [▷ 530]	lr_param.ext_comp.	warn_limit	External compensation - warning limit
P-AXIS-00744 [▷ 530]	lr_param.ext_comp.	err_limit	External compensation - error limit
P-AXIS-00745 [▷ 531]	lr_param.ext_comp.	max_a	External compensation – max. acceleration
P-AXIS-00750 [▷ 321]	lr_param.improved_position_control.stage[i].filter	order	Order of bandpass filter
P-AXIS-00751 [▷ 321]	lr_param.improved_position_control.stage[i].filter	fg_f0	Damped frequency
P-AXIS-00752 [▷ 322]	lr_param.improved_position_control.stage[i].filter.	q_factor	Quality factor of the bandpass filter
P-AXIS-00753 [▷ 319]	lr_param.improved_position_control.stage[i].	mode	Mode for the “Improved Position Control” function
P-AXIS-00754 [▷ 320]	lr_param.improved_position_control.stage[i].	weight_fact_num	Mode for the “Improved Position Control” function
P-AXIS-00755 [▷ 320]	lr_param.improved_position_control.stage[i].	weight_fact_denom	Weighting factor denominator
P-AXIS-00756 [▷ 322]	lr_param.improved_position_control.stage[i].filter.	damping	Damping the simulated mechanical vibration
P-AXIS-00757 [▷ 318]	lr_param.improved_position_control.	v_add_max_fact	Factor for the maximum permissible additive velocity

ID	Structure	Parameter	Functionality/short description
P-AXIS-00758 [▸ 318]	lr_param.improved_position_control.	enable	Activating the Improved Position Control function
P-AXIS-00759 [▸ 311]	kenngr.distc.	kp	Distance control - weighting of output values
P-AXIS-00760 [▸ 170]	getriebe[].	a_pos_corr_tracking	Acceleration for back-interpolation after tracking mode
P-AXIS-00761 [▸ 323]	lr_param.	restore_axis_position	Position control
P-AXIS-00762 [▸ 450]	antr.fixed_stop.	quick_stop_after_detection	Quick stop after detecting the fixed stop
P-AXIS-00763 [▸ 450]	antr.fixed_stop.	error_missing_drive_releases	Error reaction for missing drive releases
P-AXIS-00764 [▸ 312]	kenngr.distc.	i_tn	Distance control: Integral action time of PID controller
P-AXIS-00765 [▸ 312]	kenngr.distc.	d_tv	Distance control: Derivative action time of PID controller
P-AXIS-00766 [▸ 83]	antr.sai_op_mode_change.	feed_forward_v_weighting	Weighting of velocity feedforward control
P-AXIS-00767 [▸ 83]	antr.sai_op_mode_change.	v_velocity_control_on	Velocity limit for switching to speed-controlled mode
P-AXIS-00768 [▸ 84]	antr.sai_op_mode_change.	v_position_control_on	Velocity limit for switching back to position control
P-AXIS-00769 [▸ 451]	antr.fixed_stop.detect.	pos_lag_limit	Position lag limit for fixed stop detection
P-AXIS-00770 [▸ 452]	antr.fixed_stop.detect.	min_time	Minimum time for fixed stop detection
P-AXIS-00771 [▸ 453]	antr.fixed_stop.detect.	start_distance	Minimum path to activate fixed stop detection
P-AXIS-00772 [▸ 454]	antr.fixed_stop.detect.	start_distance_per_mille	Minimum path for fixed stop detection
P-AXIS-00773 [▸ 455]	antr.fixed_stop.detect.	max_delta_position_window	Maximum position change for fixed stop detection
P-AXIS-00774 [▸ 151]	kenngr.measure.fixed_stop_detect.	pos_lag_limit	Measuring travel to fixed stop
P-AXIS-00775 [▸ 151]	kenngr.measure.fixed_stop_detect.	min_time	Measuring travel to fixed stop
P-AXIS-00776 [▸ 152]	kenngr.measure.fixed_stop_detect.	start_distance	Measuring travel to fixed stop
P-AXIS-00777 [▸ 153]	kenngr.measure.fixed_stop_detect.	start_distance_per_mille	Measuring travel to fixed stop
P-AXIS-00778 [▸ 154]	kenngr.measure.fixed_stop_detect.	max_delta_position_window	Measuring travel to fixed stop

ID	Structure	Parameter	Functionality/short de- scription
P-AXIS-00779 [▸ 457]	antr.	velocity_monitor- ing_use_act_velocity	Actual speed for speed monitoring
P-AXIS-00780 [▸ 190]	kenngr.	filter_position_win- dow_feedhold	Tolerance window for axis filter after feedhold
P-AXIS-00782 [▸ 313]	kenngr.distc.	filter_type	Distance control - smoothing filter type
P-AXIS-00783 [▸ 314]	kenngr.distc.	kalman_sigma	Distance control - uncer- tainty of measured values
P-AXIS-00784 [▸ 314]	kenngr.distc.	smoothing_factor	Distance control - smoothing factor
P-AXIS-00785 [▸ 524]	customer.	string[]	User-specific character string
P-AXIS-00786 [▸ 224]	kenngr.	dynamic_lim- its_with_tool_gear	Dynamic limits with tool gear
P-AXIS-00787 [▸ 85]	kenngr.	v_limit_delay_time	Delay time for error mes- sage suppression with spindle tool revolution monit- oring
P-AXIS-00788 [▸ 86]	kenngr.	v_limit_delay_max_velo- city	Limit velocity for delay with spindle tool revolution monit- oring
P-AXIS-00789 [▸ 277]	lr_param.	crosstalk	Activate crosstalk compens- ation
P-AXIS-00790 [▸ 324]	kenngr.	drive_simulation	Switch over drive type to simulation
P-AXIS-00791 [▸ 324]	antr.simu.	use_initial_position	Use initial position for simu- lation drive
P-AXIS-00792 [▸ 325]	antr.simu.	initial_position	Initial position for simulation drive
P-AXIS-00798 [▸ 263]	getriebe[].	torque	Maximum axis torque
P-AXIS-00803 [▸ 119]	kenngr.	hom- ing_without_drive_en- able	Allow drive-controlled hom- ing without controller enable
P-AXIS-00804 [▸ 263]	getriebe[].	first_friction_model_coef- ficient	First coefficient of the friction model
P-AXIS-00813 [▸ 405]	antr.sercos.	delay_display_cmd_pos	Delay of display command values
P-AXIS-00814 [▸ 119]	kenngr.	ref_on_limit_switch_with _tracking	Referencing to limit switch with tracking
P-AXIS-00816 [▸ 225]	kenngr.	bit_range_comand_valu e	Number of bits for command value
P-AXIS-00817 [▸ 455]	antr.fixed_stop.detect.	detect_velocity_limit	Velocity limit for fixed stop detection

ID	Structure	Parameter	Functionality/short description
P-AXIS-00818 [▸ 456]	antr.fixed_stop.detect.	detect_torque_limit	Torque limit for fixed stop detection
P-AXIS-00819 [▸ 112]	kenngr.homing.	torq_detect_pos_lag_limit	Position lag limit during homing to a fixed stop
P-AXIS-00820 [▸ 113]	kenngr.homing.	torq_detect_torque_limit	Residual torque during homing to a fixed stop
P-AXIS-00821 [▸ 449]	antr.fixed_stop.drive_ident[i].	default_ident	Use default parameterisation of drive objects
P-AXIS-00822 [▸ 113]	kenngr.homing.	torq_distance_to_block	Distance to fixed stop for simulation
P-AXIS-00823 [▸ 458]	antr.	main_encoder	Signal for main encoder
P-AXIS-00824 [▸ 459]	antr.	secondary_encoder	Signal for secondary encoder
P-AXIS-00825 [▸ 116]	lr_param.	suppress_reference_lost_error	Suppress error message on lost reference

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 axis parameters

The parameters of the **axis**-**M**achine**D**ata**B**lock (short axis parameters) contain the axes data axis that are axis-specifically assigned. The parameters are defined in the following structures:

Structure names in the ASCII file	Contents
kopf	Machine axis data header
getriebe	Gear step-dependent data
kenngr	General characteristic values
lr_param	General position controller parameters
lr_hw	Hardware-dependent position controller parameters
vorsteuer	Feedforward parameters
antr	Parameter for drives
handbetrieb	Parameter for manual operation
cam_gear	Configuration Single Axis Interpolator

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vorsteuer	Feedforward parameters
antr	Parameter for drives
handbetrieb	Parameter for manual operation
twincat	TwinCAT system manager
cam_gear	Configuration Single Axis Interpolator

The following abbreviations are used in this document for the different axis types:

Axis type	Translatory axis	Rotary axis	
Abbreviation	T	R	
Axis type definition **'kenngr.achs_typ'**	ACHSTYP_- **TRANSLATOR** (Linear axis)	ACHSTYP_- ROTATOR (Rotary axis)	ACHSTYP_- **SPINDLE** (Spindle)

Notice

The abbreviations 'T' and 'R' in this documentation only determine the dimension of the parameters in the ASCII file.

The assignment of the axis type definition 'kenngr.achs_typ' influences the data block to be assigned in the axis parameter list. The description of possible axis types, axis operating modes and drive types is given in Section General axis data (kenngr.*) [▸ 68].

The field indices to be stated for the axis parameters list correspond to the internal indexing of the NC kernel. The value ranges of parameters are also defined, if necessary, by specifying a limit arising from the data format, e.g. MAX(UNS32) etc.

1.3 List interpretation at start-up

The interpretation of all axis machine data lists is carried out on CNC start-up in a multi step way depending on axis configuration and the internal default setting. Internal default setting of the machine data set can be overwritten by values which results in interpretation of machine data axis list. Internal machine data may be overwritten as a result of list interpretation whereas entries missing in the interpreted list are retained.

The involved lists are:

- Default list (default settings identical for all axes in one list)
- Axis-specific list

The name of the used default list must be specified in the file hochlauf.lis in the entry P-STUP-00035 (*default_achs_mds*). Entries in the default list are identical for all axes.

The sequence of list interpretation is:

1. Basic initialisation of lists with internal default initialisation setting.
2. Overwriting of default initialisation with default list entries.
3. Overwriting with entries of the axis-specific list of each axis.

The drawing below shows this process again:

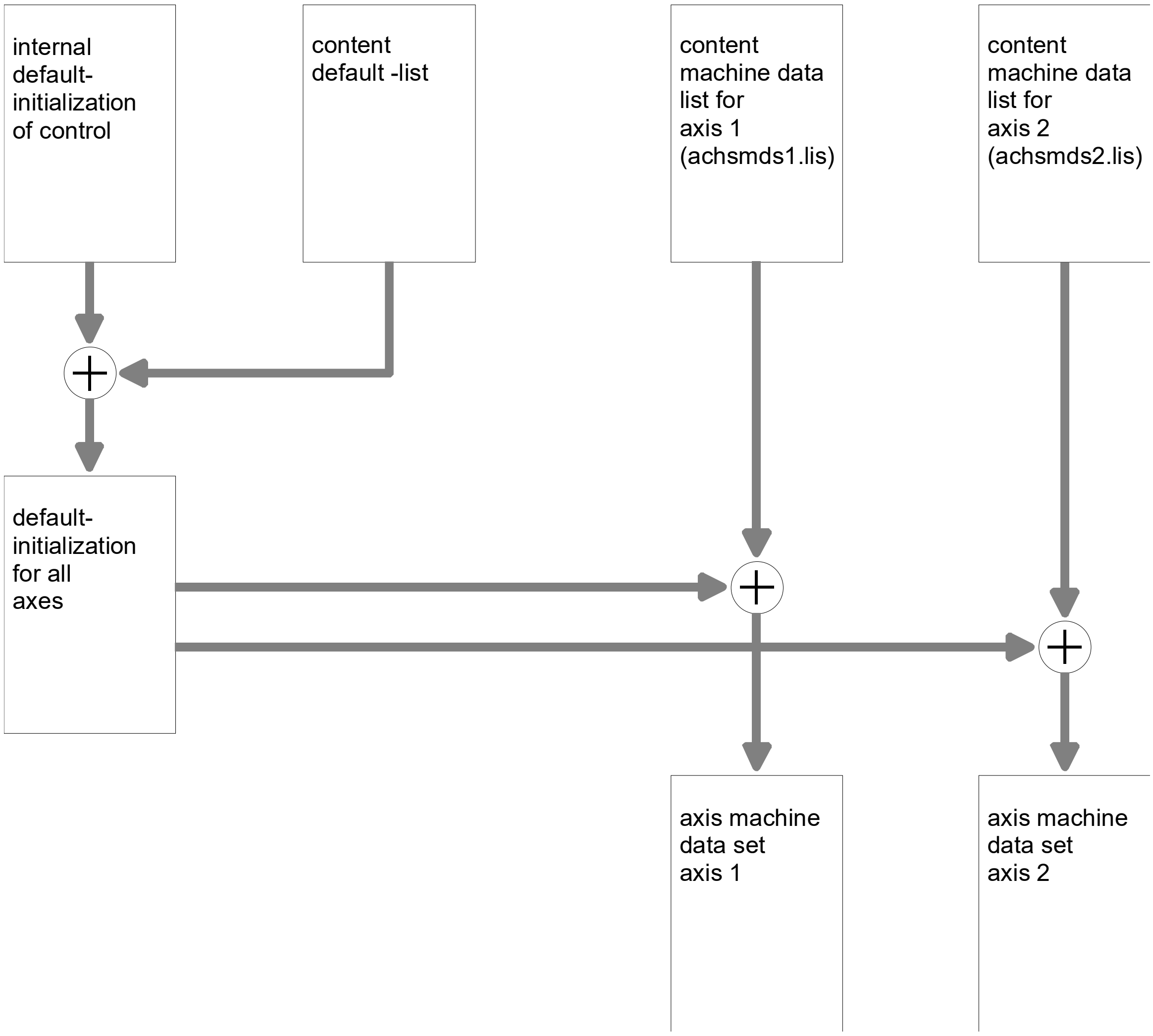


Fig. 1: List interpretation process on controller start-up

1.4 Referencing parameters

The purpose of parameter references is to reduce the number of parameters required to configure the CNC. They also simplify parameter dependencies.

If there is a change, the function shows only the reference parameter that needs to be changed for a dependency.

Advantages

- The number of parameters to be set is reduced
- Parameter dependencies are easier to identify
- No need to change a dependent parameter from another one
- References can be concatenated

Restrictions

- The number of possible references is fixed and not adjustable.
- Reference direction is predefined
- It is not possible to calculate with references

Reference direction

References can only be made within a file, e.g. within an axis. A reference can be used several times within an axis.
Reference parameters can also be placed in the standard parameter list. References are also possible within the standard parameter list.

Standard parameter lists are only provided for axes and channels.

1.4.1 Application examples for parameter references

Example

Parameter reference within a file

(Excerpt from an axis parameter list)

```
getriebe[0].dynamik.a_max           2000 ( P-AXIS-00008 )
getriebe[1].dynamik.a_max           2000 ( P-AXIS-00008 )

(Reference to a_max of the entry getriebe[0] )
getriebe[1].dynamik.a_emergency     P-AXIS-00008.0
(Reference to a_max of the entry getriebe[1] )
getriebe[1].dynamik.a_emergency     P-AXIS-00008.1
```

Example

Use of parameter reference in standard axis parameter list

(Excerpt from an axis parameter list)

```
getriebe[0].dynamik.a_max             2000 ( P-AXIS-00008 )
getriebe[1].dynamik.a_max             2000 ( P-AXIS-00008 )
```

(Excerpt of axis parameter list Axis 1)

```
(Reference to a_max of the standard parameter list)
getriebe[0].dynamik.a_emergency      P-AXIS-00008.0
getriebe[1].dynamik.a_emergency      P-AXIS-00008.1
```

(Excerpt of axis parameter list Axis 2)

```
(Reference to a_max of the standard parameter list)
getriebe[0].dynamik.a_emergency      P-AXIS-00008.1
getriebe[1].dynamik.a_emergency      P-AXIS-00008.1
```

It is also possible to overwrite the values assigned in the individual axis parameter lists. However, this value is then only valid within this list.

```
getriebe[0].dynamik.a_max             2500 ( P-AXIS-00008 )
```

2 Axis data header (kopf.*)

2.1 Logical axis number (P-AXIS-00016)

P-AXIS-00016	**Logical axis number**	
Description	The logical axis number is a system-wide unique identifier for each axis. The entire management of axis data in the NC kernel takes place using the logical axis number.	
Parameter	kopf.achs_nr	
Data type	UNS16	
Data range	0 < achs_nr < MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
drive types.	----	
Remarks	It is not allowed to use the same logical axis number more than once. The logical axis number "0" is not allowed. The assignment of an axis designation in the NC program to a logical axis (axis number) takes place in the channel parameters [CHAN]. This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.	

Identifying axis machine data (P-AXIS-00110)

P-AXIS-00110	**Identifying axis machine data**	
Description	The parameter controls enabling the reconfiguration of the axis machine data.	
Parameter	kopf.mds_ident	
Data type	UNS16	
Data range	0: Reconfiguration not permitted 1: Reconfiguration permitted (default)	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	1	
Drive types	----	
Remarks		

2.2 Default name of an axis (P-AXIS-00297)

P-AXIS-00297	Default name of an axis	
Description	The parameter defines the default name of the axis in the system and should therefore be unique system-wide in the same way as the logical axis number. It is used for: • Name conflicts in connection with extended axis exchange operations [PROG//Section - Axis exchange commands]. • In robotics in connection with the programming of axis-specific movements (P-CHAN-00253). Besides this, the default name has no meaning because the axis name is defined in the channel configuration (P-CHAN-00006).	
Parameter	kopf.log_achs_name	
Data type	STRING	
Data range	Maximum 16 characters (length of axis designation, application-specific)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	X_Achse	
Drive types	----	
Remarks	The axis designations must begin with the letters A, B, C, U, V, W, X, Y, Z or Q. After that, all letters and digits are possible. Caution: If the parameter P-CHAN-00253 is set, only the names ‘A1’ and ‘A32’ may be used.	

2.3 Multiple instantiation of an axis

To command ,the same drive by two different channels (one after the other) without axis change, the following elements in the axis list are available:

- Link interpolator output to a specific physical axis (link_to).
- Take parameter data of a given axis as default values and modify parts of it (clone_of).

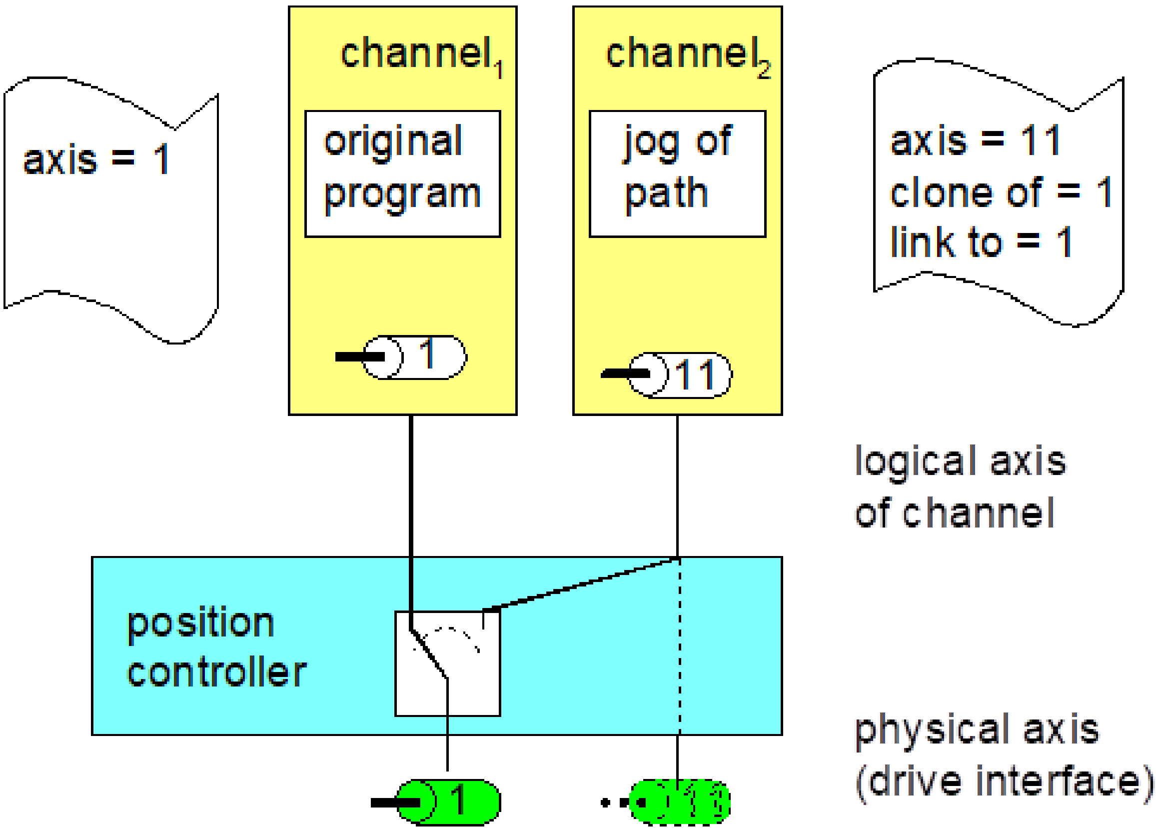


Fig. 2: Configuration of physical and logical axes

2.3.1 Multiple instantiation of an axis - linked axis (P-AXIS-00101)

P-AXIS-00101	**Linking an interpolator output to a specific physical axis.**	
Description	The parameter requests a link between the logical axis of the interpolator and the axis of the position controller (drive). If you attempt to link more than one logical axis to the same drive, all the other axes must wait until this link is temporarily interrupted by a command and released for a new connection.	
Parameter	kopf.link_to	
Data type	UNS16	
Data range	0 < link_to < MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks		

2.3.2 Multiple instantiation of an axis - existing axis (P-AXIS-00040)

P-AXIS-00040	**Mapping of parameters of an existing axis for default configuration.**	
Description	For easier configuration, an axis could be a copy (clone) of another axis. This means, when the axis is initialised, the clone just uses the data of its master as template. The clone merely has to specify the differences to its master in the parameter list.	
Parameter	kopf.clone_of	
Data type	UNS16	
Data range	0 < clone_of < MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks		

3 General axis data (kenngr.*)

This section contains the axis-specific machine data which is required in several instances in the NC channel.

3.1 Drive type and axis type

3.1.1 Drive type (P-AXIS-00020)

P-AXIS-00020	**Drive type**	
Description	This parameter defines the drive type for each axis. A choice of drive types can be made for each axis:	
Parameter	kenngr.antr_typ	
Data type	UNS16	
Data range	1 : Conventional drive interface 2 : SERCOS drive interface 3 : PROFIDRIVE MC drive interface 4 : Drive simulation 5 : Beckhoff Lightbus drive interface 6 : Drive interface +-10V over field bus (terminal) 7 : RT Ethernet drive interface 8 : CANopen drive interface 16 : Virtual axis 32 : CAN bus	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0x0004	
Drive types	----	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted. Axis parameter block data can be divided into drive type dependent and drive type independent parameters.	

3.1.2 Axis type (P-AXIS-00018)

Notice

To determine the dimension of parameters, a first distinction is made in this documentation between translatory axes (T) and rotary axes (R).

A further distinction is made with rotary axes between

- spindles and
- rotary axes

Translatory axes have only the option of

- linear axes (see figure below).

This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.

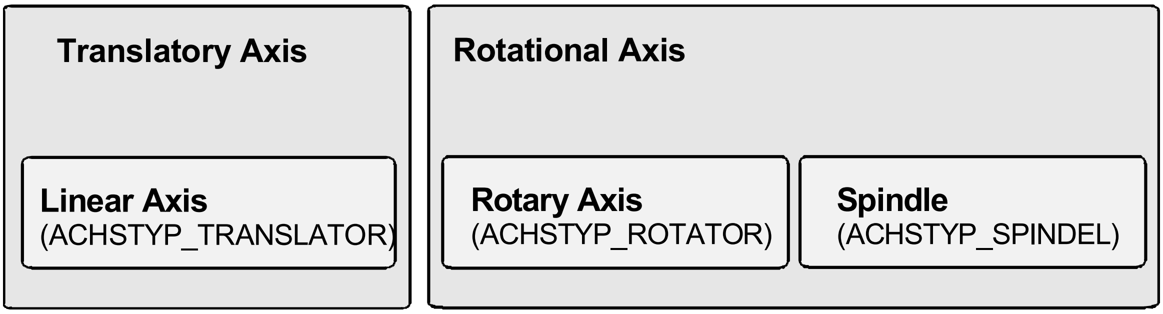


Fig. 3: Overview of axis types

Notice

The data in the axis parameter list can be divided into parameters which are either dependent or independent of the axis type (see figure below).

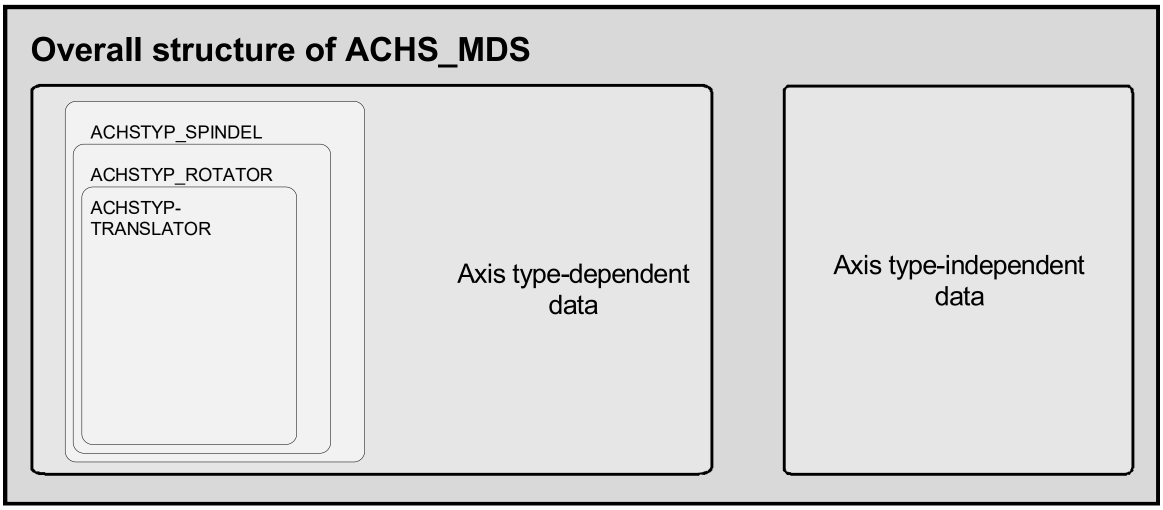


Fig. 4: Correlation between axis type and axis data

Attention

As you can see in the figure above, additional special parameters must be assigned in the axis parameter list for rotary axes compared to translatory axes.

Additional settings are required for spindles compared to rotary axes.

Axes are assigned to to interpolators by channel parameters [CHAN] or by NC commands [PROG]. Below are the possible assignments for axis types and interpolator types:

Permissible assignments	Translatory axis	Rotary axis	
Between axis type and interpolator type	Linear axis ACHSTYP_ TRANSLATOR	ACHSTYP_ ROTATOR rotary axis	Spindle ACHSTYP_ SPINDEL
Path interpolation	X	X	X
Spindle interpolation			X

Attention

Axes of the 'ACHSTYP_TRANSLATOR' and 'ACHSTYP_ROTATOR' types may not be assigned to a spindle interpolator. Important: 'ACHSTYP_SPINDEL' does not mean that this axis must be forcibly interpolated in a spindle interpolator. For example, a turn machining axis can be interpolated as a rotary axis in the path interpolator.

P-AXIS-00018	**Axis type (linear axis, rotary axes, spindle)**	
Description	This parameter specifies the axis type of an axis.	
Parameter	kenngr.achs_typ	
Data type	STRING	
Data range	Linear axis (ACHSTYP_TRANSLATOR) : 0x0001 Rotary axis (ACHSTYP_ROTATOR) : 0x0002 Spindle (ACHSTYP_SPINDEL): : 0x0004	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	ACHSTYP_TRANSLATOR	
Drive types	----	
Remarks	Depending on the axis type that is set, special functionalities are addressed in the NC kernel. Examples: - modulo calculation for rotary axes, - speed monitoring for spindles	

3.1.3 Operating mode of an axis (P-AXIS-00015)

P-AXIS-00015	**Axis mode**	
Description	Axes can be traversed in different operating modes.	
Parameter	kenngr.achs_mode	
Data type	UNS32	
Data range	0x00000001 - 0x10000000	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0x00000001	
Drive types	----	
Remarks		

The following operation modes can be parameterised[(1)]:

Value	**Meaning**		**Axis type**	**Interpolator type**	
	Description	**ACHSMODE_**		**Path**	**Spindle**
0x00000001	The axis is operated as a linear axis; no modulo calculation is executed in the channel. For example, rotary axis with restricted motion range; must be set as default for linear axes.	..LINEAR[(1)]	T, R	X	
0x00000004	A modulo calculation always takes place after the destination position has been reached. Regardless of the operation mode selected for rotary axes, a modulo calculation is always executed in the position controller. In this way, modulo circle compensation can be executed if required.	..MODULO[(1)]	R	X	X
0x00000040	Axis is used as a face turning axis (turning functions).	..PLANDREHEN	T	X	
0x00000080	Axis is used as a longitudinal turning axis (turning functions).	..LAENGSDREHEN	T	X	
0x00000100	For a spindle an automatic homing before positioning the spindle can be prevented. This is only relevant if the axis is not referenced. The function is drive-dependent.	..KEINE_AUTO_RPF	R		X
0x00000200	Axis for kinematic 'C axis' transformation.	..CAX	R	X	X
0x00000400	Modulo calculation for linear axis. (Example: conveyor belt with drive motor where the position on the belt is programmed in mm).	..MODULO_LINEAR	R	X	

Value	Meaning		Axis type	Interpolator type	
0x00000800	Axis is released for mechanical blocking by the PLC. This axis mode is not available for TwinCAT systems.	..CLAMPABLE	T, R	X	
0x00001000	Axis carries a rotary workpiece table.	..ROT_TABLE	T, R	X	
0x00008000	Monitoring of axis collision.	..COLL_CHECK	T	X	
0x00010000	Master axis of gantry coupling.	..GANTRY_MASTER	T, R	X	
0x00020000	Slave axis of gantry coupling.	..GANTRY_SLAVE	T, R	X	
0x00040000	Identifier for PLC spindle with axis interface	..SPINDLE_EXT_CTRL	R		X
0x00080000	Input axis for additional external position command values (e.g. distance control).	..EXT_CTRL_INPUT	T	X	
0x00100000	Pure encoder axis, only to display actual values (e.g. conveyor belt).	..COUNTER	T, R	X	X
0x00200000	Lead axis in combination with single feed axis and G194 (contouring with DIST_MASTER)	..LEAD_AXIS	T, R	X	
0x00400000	The resolution (wegaufz/wegaufn) of this axis can be changed.	..ALLOW_RESOLUTION_CHANGE(2)	T, R	X	X
0x00800000	Path-dependent dynamic weighting for this axis is possible.	..DYNAMIC_WEIGHTING	T, R	X	
0x02000000	Path axis for tool centre point path	..PATH_LENGTH_TCP	R	X	
0x04000000	Path axis for contour path	..PATH_LENGTH_CONTOUR	R	X	
0x08000000	Virtual lead axis for path interpolation	..VIRT_LEAD_AXIS	R	X	
0x10000000	Axis carries the pressure roller for edge bending.	..LAH_OFFSET_AXIS	R	X	

Notice

(1) One of the two following axis modes **must** always be specified:

- ACHSMODE_LINEAR or
- ACHSMODE_MODULO

All other bits of the parameter *achs_mode* are additional specifications. For example, the ACHSMODE_MODULO_LINEAR bit is only useful if combined with the ACHSMODE_MODULO bit.

Notice

(2) Changing certain axis parameters while the controller is running may be critical, e.g. path resolution. Therefore, this parameter can be enabled by setting the bit ALLOW_RESOLUTION_CHANGE in axis mode. Otherwise these parameters (P-AXIS-00234 [290], P-AXIS-00233 [289]) can no longer be changed after the controller is started.

When the bit ALLOW_RESOLUTION_CHANGE is set, a check is first made whether the axis is interpolated, also when other critical parameters change. If the axis is currently in motion, this parameter update is rejected.

4 Functional settings

4.1 Special settings for rotary axes

This section describes the elements in the axis parameter list which must only be assigned for rotary axes.

Notice

The term 'rotary axis' includes rotary axes and spindles.

In addition, the parameters for spindles described in Section Special settings for spindles [▸ 78] must be assigned.

4.1.1 Settings for modulo calculation for rotary axis

4.1.1.1 Upper modulo limit (P-AXIS-00126)

P-AXIS-00126	**Upper modulo limit**	
Description	For modulo calculation for rotary axes, an upper modulo limit' (e.g. 360°) should be set.	
Parameter	getriebe[i].moduloo	
Data type	SGN32	
Data range	modulou < moduloo ≤ MAX(SGN32)	
Axis types	R, S	
Dimension		R,S: 0.0001°
Default value	3600000	
Drive types	----	
Remarks	Modulo calculation is activated automatically for rotary axes and spindles (axis types [▸ 69] 0x2 and 0x4).	

4.1.1.2 Lower modulo limit (P-AXIS-00127)

P-AXIS-00127	**Lower modulo limit**	
Description	For modulo calculation for rotary axes, a lower modulo limit (e.g. 0°) should be set.	
Parameter	getriebe[i].modulou	
Data type	SGN32	
Data range	MIN(SGN32) ≤ modulou < moduloo	
Axis types	R, S	
Dimension		R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks	Modulo calculation is activated automatically for rotary axes and spindles (axis types [69] 0x2 and 0x4).	

4.1.1.3 Number of rotations in case of modulo error compensation (P-AXIS-00125)

P-AXIS-00125	**Number of rotations in case of modulo error compensation**	
Description	When a rotary axis is operated, in certain circumstances the modulo circle of the command variables cannot be converted to the modulo circle of the increments without errors. The modulo circle of the increments is less by the rounding error. This is compensated by the modulo compensation in the position controller so that the missing increments per modulo rotation can be preset as integers in the machine data P-AXIS-00124 [76] .	
Parameter	getriebe[i].modulo_umdreh	
Data type	SGN16	
Data range	0 ≤ modulo_umdreh ≤ MAX(SGN16)	
Axis types	R, S	
Dimension		R,S: ----
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks	This function is activated via the parameter P-AXIS-00120 [76].	

4.1.1.4 Error in modulo circle (P-AXIS-00124)

P-AXIS-00124	**Error in modulo circle**	
Description	See also P-AXIS-00125 [▸ 75]	
Parameter	getriebe[i].modulo_fehler	
Data type	SGN16	
Data range	MIN(SGN16) ... MAX(SGN16)	
Axis types	R, S	
Dimension		R,S: increments
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.1.1.5 Activation of modulo compensation (P-AXIS-00120)

P-AXIS-00120	**Activation of modulo compensation**	
Description	This parameter activates the modulo compensation in position controller.	
Parameter	lr_param.mod_komp	
Data type	BOOLEAN	
Data range	0/1	
Axis types	R, S	
Dimension		R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.1.1.6 Switching modulo calculation range off / on (P-AXIS-00557)

P-AXIS-00557	**Switching modulo calculation range off / on**	
Description	The modulo calculation for rotary axes is automatically switched on by default by the set bit ACHSMODE_MODULO (see P-AXIS-00015 [▸ 71]. With linear axes, modulo calculation is automatically switched off by default. This parameter switches on/off the modulo calculation independently of the axis type [▸ 69] and axis mode (P-AXIS-00015) [▸ 71] . The modulo range is defined by the parameters P-AXIS-00126 [▸ 74] and P-AXIS-00127 [▸ 75] .	
Parameter	getriebe[i].modulo_calculation	
Data type	SGN08	
Data range	-1: Effectiveness of modulo calculation dependent on axis type [▸ 69] and axis mode [▸ 71] (default) 0 : Switch off modulo calculation 1 : Switch on modulo calculation	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	-1	
Drive types	----	
Remarks		

4.1.2 Special settings for spindles

Notice

The parameters described in this section are required for axes of axis type 'ACHSTYP_SPINDEL' interpolated by a spindle interpolator.

4.1.2.1 Restriction of direction of rotation (P-AXIS-00224)

P-AXIS-00224	**Restriction of direction of spindle rotation**	
Description	If a spindle may only be operated in one direction, then the parameter should be set to 1.	
Parameter	kenngr.vorz_richtung	
Data type	BOOLEAN	
Data range	0/1	
Axis types	R, S	
Dimension		R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.1.2.2 Definition of preferred direction of spindle rotation (P-AXIS-00031)

P-AXIS-00031	**Definition of preferred direction of spindle rotation**	
Description	If only one direction of rotation is permitted for spindles (P-AXIS-00224 [▸ 78]), this parameter defines the direction of rotation.	
Parameter	kenngr.beweg_richt	
Data type	BOOLEAN	
Data range	0: Negative direction of rotation 1: Positive direction of rotation	
Axis types	R, S	
Dimension		R,S: ----
Default value	0	
Drive types	----	
Remarks	Positive direction of rotation signifies that coordinate values increase. Negative direction of rotation signifies that coordinate values decrease. This parameter is used only if the parameter P-AXIS-00224 [▸ 78] is assigned the value 1.	

4.1.2.3 Speed-value attained - tolerance band (P-AXIS-00217)

P-AXIS-00217	**Speed-value attained - tolerance band**	
Description	This parameter defines the actual speed value at which the status 'speed-value attained' is declared.	
Parameter	kenngr.vb_prozent	
Data type	UNS16	
Data range	0 ... 1000	
Axis types	S	
Dimension		S: 0.1%
Default value	100	
Drive types	----	
Remarks	**Configuration example:** For 'kenngr.vb_prozent = 100' the message 'speed-value attained' appears when '1.1 * commanded speed ≥ actual speed-value ≥ 0.9 * commanded speed '.	

4.1.2.4 Limiting velocity for the measurement system (P-AXIS-00220)

P-AXIS-00220	**Limiting velocity for the measurement system**	
Description	Especially with spindles, the limit at which the measuring system supplies erroneous signals at higher rotation speeds can be exceeded. The parameter describes the velocity value at which the position controller has to switch over to open-loop controlled operation mode.	
Parameter	getriebe[i].vb_regelgrenze	
Data type	UNS32	
Data range	0 ≤ vb_regelgrenze ≤ MAX(UNS32)	
Axis types	S	
Dimension		S: 0.001°/s
Default value	200000	
drive types.	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.1.2.5 Limit for spindle speed 'zero' (P-AXIS-00216)

P-AXIS-00216	**Limit for spindle speed 'zero'**	
Description	Especially in the case of spindles, the barrier should be given below which rotational speed monitoring in the position controller shows the state 'speed zero'.	
Parameter	getriebe[i].vb_min_null	
Data type	UNS32	
Data range	0 ≤ vb_min_null ≤ MAX(UNS32)	
Axis types	S	
Dimension		S: 0.001°/s
Default value	100	
drive types.	----	
Remarks		

4.1.2.6 Reverse of sign for setpoint and actual value (P-AXIS-00159)

P-AXIS-00159	**Reverse of sign for setpoint and actual value**	
Description	The turning direction of a spindle is defined in this parameter. If reverse is TRUE, the signs of the output and input data are changed. This is an option for keeping the signs of setpoint and actual values.	
Parameter	getriebe[i].reverse	
Data type	BOOLEAN	
Data range	0/1	
Axis types	S	
Dimension		S: ----
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.1.2.7 Switch to velocity controlled mode (P-AXIS-00265)

P-AXIS-00265	**Velocity limit for switching to velocity controlled mode**	
Description	If any spindle revolution higher than the given limit is commanded, the operation mode is switched to velocity control automatically.	
Parameter	antr.velocity_position_control_on	
Data type	SGN32	
Data range	0 ≤ velocity_position_control_on ≤ MAX(SGN32)	
Axis types	S	
Dimension		S: 0.001°/s
Default value	2000000000	
Drive types	SERCOS	
Remarks	For a sensorless spindle only a velocity of 0 is useful. Therefore the command velocity of the interpolator is always output and not the setpoint velocity of the position controller.	

4.1.2.8 Switch back to position control (P-AXIS-00266)

P-AXIS-00266	**Velocity limit for switching back to position control**	
Description	If the actual revolution during any positioning via M19 is higher than the given limit, the spindle is first decelerated to the limit. Afterwards the operation mode is switched back to position control.	
Parameter	antr.velocity_position_control_off	
Data type	SGN32	
Data range	0 ≤ velocity_position_control_off ≤ MAX(SGN32)	
Axis types	S	
Dimension		S: 0.001°/s
Default value	0	
Drive types	SERCOS	
Remarks	For a sensorless spindle only a velocity of 0 is useful Therefore the command velocity of the interpolator is always output and not the setpoint velocity of the position controller.	

4.1.2.9 Use actual velocity for revolution monitoring (P-AXIS-00519)

P-AXIS-00519	Use actual velocity for revolution monitoring	
Description	By default the actual position is used for the calculation of the actual velocity of a spindle when an actual velocity and an actual position is configured in the process data. Because the position values are modulo calculated, the maximum velocity is limited to 180°/cycle. To obtain a correct actual velocity of the spindles at velocities > 180°/cycle, this parameter defines that the actual velocity value must be used for speed monitoring even if an actual position value is configured in the process data. When this parameter is used, the velocity scaling (see P-AXIS-00205 [352], P-AXIS-00206 [352] and P-AXIS-00207 [351]) must be correctly set.	
Parameter	antr.revolution_monitoring_use_act_velocity	
Data type	BOOLEAN	
Data range	0/1	
Axis types	S	
Dimension		S: ----
Default value	0	
Drive types	----	
Remarks	This parameter can only be used for spindles. If it is used for a different axis type (see P-AXIS-00018) [69] , it is corrected to the value 0 and the warning P-ERR-110589 is output. When this parameter is used, an actual velocity has to be set up in the process data. If this is not the case, the warning P-ERR-70480 is output and the parameter value is set to 0.	

4.1.2.10 Output time M19 for positioning the spindle (P-AXIS-00523)

P-AXIS-00523	Output time M19 for positioning the spindle	
Description	The output time point of the spindle M-functions M03 and M04 for rotation is the start of the movement. On the other hand, when the spindle position moves, the CNC only outputs the M function M19 when the spindle reaches the target position. When the value is set to 1, the M19 M function is output at the start of the spindle positioning analogue to the other spindle M functions. The M19 M function is acknowledged when the spindle reaches the target position.	
Parameter	kenngr.spindle_m19_output_standard	
Data type	BOOLEAN	
Data range	0/1	
Axis types	S	
Dimension		S: ----
Default value	0	
Drive types	----	
Remarks		

4.1.2.11 Checking commanded spindle speed versus permissible tool speed limits (P-AXIS-00474)

P-AXIS-00474	**Checking commanded spindle speed versus permissible tool speed limits**	
Description	When the values P-TOOL-00013 (vb_min) and P-TOOL-00014 (vb_max) are entered in the tool-specific data record, the real spindle speed is limited to the defined tool speed range during endless turning. There is only a limitation of spindle speed but no output of an error message. If the spindle speed is outside the speed range and the parameter is set to 1, the error message 60312P-ERR-60312) is output.	
Parameter	kenngr.check_spindle_speed_in_tool_range	
Data type	BOOLEAN	
Data range	0/1	
Axis types	S	
Dimension		S: ----
Default value	0	
Drive types	----	
Remarks		

4.1.2.12 Weighting of velocity feedforward control (P-AXIS-00766)

P-AXIS-00766	**Weighting of velocity feedforward control**	
Description	To allow smooth switching between position- and speed-controlled mode, the weighting of the velocity feedforward control set in the drive must be considered. This weighting can be set with this parameter.	
Parameter	antr.sai_op_mode_change.feed_forward_v_weighting	
Data type	UNS16	
Data range	0 <= P-AXIS-00766 <= 1200	
Axis types	S	
Dimension		S:0.1%
Default value	0	
drive types.	SERCOS, CANopen	
Remarks	The weighting of velocity feedforward control is configured for CANopen drives by the object 3062h. With SERCOS drives, velocity feedforward control is weighted by the parameter S-0-0296.	

4.1.2.13 Velocity limit for switching to velocity controlled mode (P-AXIS-00767)

P-AXIS-00767	Velocity limit for switching to velocity controlled mode	
Description	This parameter specifies a limit speed. The limit speed only acts if a speed greater than the changeover speed is specified. It is then switched over to speed-controlled mode.	
Parameter	antr.sai_op_mode_change.v_velocity_control_on	
Data type	SGN32	
Data range	0 ≤ P-AXIS-00767 ≤ MAX(SGN32)	
Axis types	S	
Dimension		S: 0.001°/s
Default value	2000000000	
drive types.	SERCOS, CANopen	
Remarks	Only a speed of 0 is practical for a sensorless spindle. Therefore the command velocity of the interpolator is always output and not the setpoint velocity of the position controller. P-AXIS-00767 replaces the parameter P-AXIS-00265 as of v3.1.3079.13. However, the latter retains its functionality.	

4.1.2.14 Velocity limit for switching back to position control (P-AXIS-00768)

P-AXIS-00768	Velocity limit for switching back to position control	
Description	This parameter specifies the limit speed for switching back to position control. The limit speed P-AXIS-00768 only acts if the current speed is greater than P-AXIS-00768 for positioning with M19. It is first decelerated to P-AXIS-00768 before position control is switched on.	
Parameter	antr.sai_op_mode_change.v_position_control_on	
Data type	SGN32	
Data range	0 ≤ P-AXIS-00768 ≤ MAX(SGN32)	
Axis types	S	
Dimension		S: 0.001°/s
Default value	0	
drive types.	SERCOS, CANopen	
Remarks	Only a speed of 0 is practical for a sensorless spindle. Therefore the command velocity of the interpolator is always output and not the setpoint velocity of the position controller. P-AXIS-00768 replaces the parameter P-AXIS-00265 as of v3.1.3079.13. However, the latter retains its functionality.	

4.1.2.15 Delay time for error message suppression with spindle tool revolution monitoring (P-AXIS-00787)

P-AXIS-00787	Delay time for error message suppression with spindle tool revolution monitoring	
Description	For spindles, the axis parameters P-AXIS-00549/P-AXIS-00550 can activate a monitor for spindle actual speed against a parameterisable limit. If the limit is exceeded by ten percent, an error ERR-70376 is triggered and the spindle runs out. At low speeds, it may occur that the 10% limit is undershot. The parameter P-AXIS-00787 specifies a delay time to delay the output of the error message if the spindle speed is lower than the speed set in P-AXIS-00788 [▸ 86] . If the actual speed of the spindle drops below the limit within the time specified in P-AXIS-00787, no error message is output. Above the limit speed specified in P-AXIS-00788 [▸ 86] , an error message is output immediately. If a value greater than the permissible delay time is configured in P-AXIS-00787, the warning ERR-110666 is output and P-AXIS-00787 is limited to the permissible maximum value.	
Parameter	kenngr.v_limit_delay_time	
Data type	UNS32	
Data range	0 < P-AXIS-00787 < 500000	
Axis types	S	
Dimension	T: ----	S: **µs**
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	This parameter is not available under TwinCAT.	

4.1.2.16 Limit velocity for delay with spindle tool revolution monitoring (P-AXIS-00788)

P-AXIS-00788	Limit velocity for delay with spindle tool revolution monitoring	
Description	For spindles, the axis parameters P-AXIS-00549/P-AXIS-00550 can activate a monitor for spindle actual speed against a parameterisable limit. If the limit is exceeded by ten percent, an error ID 70376 is triggered and the spindle runs out. At low speeds, it may occur that the 10% limit is undershot. The parameter P-AXIS-00788 can be used to specify a limit speed for the spindle below which the output of the error message is reduced by the time specified in P-AXIS-00787 [▸ 85] . If the actual speed of the spindle is below the limit within the time set in P-AXIS-00787 [▸ 85] , no error message is output. An error message is output immediately when the limit speed exceeds the one specified in P-AXIS-00788. If a value greater than the permissible limit speed is configured in P-AXIS-00788, the warning ID110667 is output and P-AXIS-00788 is limited to the permissible maximum value.	
Parameter	kenngr.v_limit_delay_max_velocity	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00788 ≤ 18000000	
Axis types	S	
Dimension	T: ----	S: 10^-3 °/s
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	This parameter is not available under TwinCAT.	

4.1.3 Settings for turning functionality

Notice

The diameter programming and the turning functionality are described in [PROG] in greater detail.

4.1.3.1 Absolute diameter programming (P-AXIS-00058)

P-AXIS-00058	**Diameter programming absolute**	
Description	If diameter programming is to occur with active absolute programming (G90), the parameter must be set to TRUE.	
Parameter	kenngr.durchm_prog_abs	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.1.3.2 Relative diameter programming (P-AXIS-00059)

P-AXIS-00059	**Diameter programming relative**	
Description	If diameter programming is to occur with active incremental programming (G91), the parameter must be set to TRUE.	
Parameter	kenngr.durchm_prog_rel	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.2 Settings for homing

4.2.1 Preferred direction of axis for homing (P-AXIS-00158)

P-AXIS-00158	**Preferred direction of axis for homing**	
Description	The parameter P-AXIS-00158 specifies the direction of travel if the axis does not remain on a cam. The declaration of the signal level when the reference switch is actuated is given by the axis parameter P-AXIS-00038 [▹ 333].	
Parameter	kenngr.ref_richt	
Data type	BOOLEAN	
Data range	0: Negative direction 1: Positive direction	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks	Positive direction signifies that the coordinate values increase. Negative direction signifies that the coordinate values decrease.	

4.2.2 Homing without cam (P-AXIS-00156)

P-AXIS-00156	**Homing without cam**	
Description	A changeover of homing strategy can be carried out so that homing is done without cam (e.g. only with zero pulse), i.e. without reverting. In this case the parameter P-AXIS-00156 should be set to TRUE.	
Parameter	kenngr.ref_ohne_nocken	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Conventional, Terminal, Lightbus, Profidrive	
Remarks	To be assigned for analogue spindles only. If P-AXIS-00156 is assigned with 1 (TRUE), then it is **imperative that** P-AXIS-00157 [▹ 89] is assigned with 1 (TRUE).	

4.2.3 Homing without reverting (P-AXIS-00157)

P-AXIS-00157	**Homing without reverting**	
Description	Via parameter P-AXIS-00157 a restriction of homing can occur that will prohibit any reverting.	
Parameter	kenngr.ref_ohne_rev	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Conventional, Terminal, Lightbus, Profidrive	
Remarks	The speed during reversing is set with the parameter P-AXIS-00064 [91] (fast_from_cam). By reverting, it is possible to repeatedly move to the reference cam at slow speed. To be assigned for analogue spindles only. P-AXIS-00157 **must** be assigned with 1 (TRUE) if P-AXIS-00156 [88] is assigned with 1 (TRUE).	

4.2.4 Position of the reference point (P-AXIS-00152)

P-AXIS-00152	**Position of the reference point**	
Description	If homing is completed, the value from the parameter P-AXIS-00152 is taken as the absolute position for the axis	
Parameter	getriebe[i].pos_refpkt	
Data type	SGN32	
Data range	swe_neg < pos_refpkt < swe_pos	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001 °
Default value	0	
drive types.	Simulation, Conventional, Terminal, Lightbus, Profidrive, CANopen	
Remarks		

4.2.5 Fast velocity for detection of reference cam (P-AXIS-00219)

P-AXIS-00219	**Fast velocity for detection of reference cam**	
Description	At start of homing, if the axis is not on the cam, then travel on the cam takes place at the velocity defined in P-AXIS-00219.	
Parameter	getriebe[i].vb_refmax	
Data type	UNS32	
Data range	P-AXIS-00218 [▸ 90] ≤ vb_refmax ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	83333	
drive types.	Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.2.6 Slow velocity for exact detection of reference position (P-AXIS-00218)

P-AXIS-00218	**Slow velocity for exact detection of reference position**	
Description	Not only the traverse downwards of cam but also the traverse on cam with homing takes place at the velocity P-AXIS-00218.	
Parameter	getriebe[i].vb_reflow	
Data type	UNS32	
Data range	1 ≤ vb_reflow ≤ P-AXIS-00219 [▸ 90]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	16666	
drive types.	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.2.7 Homing only with cam (without zero pulse) (P-AXIS-00084)

P-AXIS-00084	**Homing only with cam (without zero pulse)**	
Description	The homing position is detected by travel on the cam.	
Parameter	kenngr.homing_without_zero_pulse	
Data type	BOOLEAN	
Data range	0: Homing with zero pulse of rotary transducer (default value). 1: Homing without zero pulse of rotary transducer (low accuracy).	
Axis types	T, R	
Dimension	T: ----	R:----
Default value	0	
drive types.	----	
Remarks	For further hardware-specific parameters relating to homing with cam, see P-AXIS-00036 [▹ 333] - P-AXIS-00039 [▹ 332].	

4.2.8 Slow / fast movement down from cam (P-AXIS-00064)

P-AXIS-00064	**Slow / fast movement down from cam**	
Description	This parameter sets the velocity during reversion down from cam.	
Parameter	kenngr.fast_from_cam	
Data type	BOOLEAN	
Data range	0: Slow movement down from cam 1: Fast movement down from cam (default)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	1	
drive types.	----	
Remarks	For further hardware-specific parameters relating to homing with cam, see P-AXIS-00036 [▹ 333] - P-AXIS-00039 [▹ 332].	

4.2.9 Maximum velocity for unreferenced axes (P-AXIS-00268)

P-AXIS-00268	**Maximum velocity for unreferenced axes**	
Description	This parameter defines the maximum velocity of unreferenced axes for relative and endless movements.	
Parameter	getriebe[i].vb_not_referenced	
Data type	UNS32	
Data range	0 … P-AXIS-00212 [▹ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	0	
Drive types	----	
Remarks	At the moment this parameter is only effective for spindle axes and SAI axes (P-AXIS-00250 [▹ 172]). P-AXIS-00268 is not relevant for path axes (axes in NC channel).	

4.2.10 Lock moving of unreferenced axes (P-AXIS-00277)

P-AXIS-00277	**Lock moving of unreferenced axes**	
Description	This parameter defines whether an axis can be moved without previous homing.	
Parameter	kenngr.prog_move_requires_homing	
Data type	BOOLEAN	
Data range	0: Moving of the axis is possible without previous homing (default). 1: Before a programmed movement the axis has to be homed. If an axis is moved unreferenced, an error message is output.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.2.11 Modes for setting the homing position (P-AXIS-00278)

P-AXIS-00278	**Modes for setting the homing position**	
Description	The MCControlBoolUnit_SetReferencePosition control unit initiates the setting of an axis position as reference position. For more information, see the documentation [HLI// Axis control commands]. There are two possibilities how the adopted axis position can be calculated. After the homing position is adopted, the axis is considered as referenced. Setting the homing position is triggered on the rising edge of the command element of the set_reference_position control unit. The homing position is calculated from the values of the involved axis parameters or control units at that instant.	
Parameter	kenngr.set_refpos_mode	
Data type	STRING	
Data range	ABSOLUT: The axis position is set to the position defined in the axis parameter P-AXIS-00152 [89]. OFFSET: The new axis position is defined by the encoder position + P-AXIS-00279 [94]. PLC: The reference position is set to the value of the axis-specific refpos_position control unit. PLC_OFFSET: The new axis position is determined by the encoder position + value of the axis-specific refpos_position control unit.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	ABSOLUT	
Drive types	----	
Remarks	The modes OFFSET and PLC_OFFSET are only practical if the encoder delivers an absolute position. The homing position can only be adopted if no program is active. If an attempt is made to set the homing position while a program is active, an error message ID 70194 is output.	

4.2.12 Offset to the homing position (P-AXIS-00279)

P-AXIS-00279	Offset to the homing position	
Description	If ‘OFFSET’ mode was selected to adopt the homing position in the parameter P-AXIS-00278 [▸ 93] , enter the offset between the encoder position and the homing position in this parameter. The homing position to be set is calculated by: Homing position (axis position) = Encoder position + P-AXIS-00279. Setting the homing position is triggered on the rising edge of the command element of the set_reference_position control unit. The value of P-AXIS-00279 at this instant is used to calculate the reference position.	
Parameter	kenngr.set_refpos_offset	
Data type	SGN32	
Data range	MIN(SGN32) ≤ set_refpos_offset ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks	Use of this parameter is only practical if the encoder delivers an absolute position.	

4.2.13 Homing method ‘evaluation of encoder overflow’

For encoder types that don’t provide a zero pulse but provide an absolute position within an certain range, for example resolvers, it is possible to use the overflow of the encoder position value as zero pulse replacement. In this case the axis is homed as soon as an overflow or underflow of the encoder position is recognised.

An overflow of the position value occurs when the position delivered by the encoder while moving in a positive direction jumps from the maximum value (e. g. 65535) to 0. Analogously an underflow occurs when the encoder position value of the axis moving in a negative direction jumps from zero to the maximum value. An overflow or underflow of the encoder position values is handled automatically by the NC kernel.

4.2.13.1 Selection of the homing method (P-AXIS-00294)

P-AXIS-00294	**Selection of the homing method 'Evaluation of encoder overflow'**	
Description	This homing method is selected with the parameter P-AXIS-00294. To use this option, the parameter P-AXIS-00084 [▸ 91] must be assigned the value 0. The number of bits used to detect encoder overflow has to be set in parameter P-AXIS-00355 [▸ 96] .	
Parameter	kenngr.homing_overflow_evaluation	
Data type	BOOLEAN	
Data range	0: No evaluation of encoder overflow (default). 1: Evaluation of encoder overflow.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Lightbus	
Remarks	This homing method only leads to a repeatable homing position of the axis when encoder overflow occurs every time at the same mechanical position of the axis. This is true for example for resolver encoders.	

4.2.13.2 Shifting of encoder overflow (P-AXIS-00354)

P-AXIS-00354	**Shifting of encoder overflow**	
Description	When homing with encoder overflow this parameter can shift the reference position. A positive value for P-AXIS-00354 [▸ 96] will shift the reference position in the positive movement direction of the axis.	
Parameter	antr.encoder_overflow_offset	
Data type	SGN32	
Data range	application-specific	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.1 µm
Default value	0	
drive types.	SERCOS, Lightbus,CANopen	
Remarks	The reference position can only be shifted within one encoder revolution. If larger values for P-AXIS-00354 [▸ 96] are defined, the error message P-ERR-70310 is output and P-AXIS-00354 [▸ 96] is corrected to 0.	

4.2.13.3 Number of bits for evaluation of encoder overflow (P-AXIS-00355)

P-AXIS-00355	**Number of bits for evaluation of encoder overflow**	
Description	When homing on encoder overflow, this parameter defines the number of bits of the drive's actual position value that are taken into account to detect encoder overflow. The actual position value of the drive system is AND-combined with the value ($2^{P\text{-}AXIS\text{-}00355}$ -1) and the underflow or overflow of the resulting value is considered as encoder overflow.	
Parameter	antr.encoder_bit_range	
Data type	UNS08	
Data range	1 … 31	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	SERCOS, Lightbus,CANopen	
Remarks		

4.2.14 Acceleration during homing (P-AXIS-00285)

P-AXIS-00285	**Acceleration during homing**	
Description	The parameter includes the axis acceleration during CNC-controlled homing procedure. If the parameter is unassigned, the values of the parameters P-AXIS-00005 [▸ 231], P-AXIS-00006 [▸ 232]are adopted.	
Parameter	getriebe[i].a_ref	
Data type	UNS32	
Data range	0 ≤ a_ref ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks	When the parameter has the value 0, it is assigned the minimum of the values of P-AXIS-00005 [▸ 231] (a_grenz-stufe_1) and P-AXIS-00006 [▸ 232] .	

4.2.15 Ramp time during homing (P-AXIS-00286)

P-AXIS-00286	**Ramp time during homing**	
Description	The parameter includes the ramp time during CNC-controlled homing and active non-linear slope profile (see P-AXIS-00270 [▸ 241]). If the parameter is 0 or too small, the value of P-AXIS-00201 [▸ 247](tr_min) is adopted.	
Parameter	getriebe[i].tr_ref	
Data type	UNS32	
Data range	P-AXIS-00201 [▸ 247] ≤ tr_ref ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: μs	R: μs
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks	If the parameter is assigned the value 0, the value in P-AXIS-00201 [▸ 247](tr_min) is adopted.	

4.2.16 Homing type (P-AXIS-00299)

P-AXIS-00299	**Homing type**	
Description	There are two different homing methods: 1. NC-controlled homing 2. Drive-controlled homing With NC-controlled homing, the generation of command values and sequence control (evaluation of reference cams and zero pulses) are handled in the CNC. With drive-controlled homing, motion generation and the evaluation of cam signals and zero pulses are handled in the drive. The homing method can be set up for drives types (P-AXIS-00018) [▸ 69] for which both homing methods are implemented with this parameter.	
Parameter	kenngr.homing.homing_type * (Note: see *-note below)	
Data type	STRING	
Data range	CNC_CONTROLLED: CNC-controlled homing is done. DRIVE_CONROLLED: Drive-controlled homing is done. DISABLED: This axis cannot be homed. The CNC generates the error message P-ERR-50685 or P-ERR-60313 if homing is commanded for the axis (e.g. G74). This setting is only intended for axes with an absolute measuring system (see P-AXIS-00014 [▸ 290]). IGNORE_ABS_POS: Axes with this setting are ignored during homing, i.e. the axis is not homed even if G74 <axis_name> is programmed. In this case the CNC generates no error message contrary to the setting DISABLED. The mode IGNORE_ABS_POS is only permitted for axis with an absolute position measuring system, meaning the parameter kenngr.abs_pos_gueltig (see P-AXIS-00014 [▸ 290]) must be set to 1. Otherwise, the CNC generates the error warning P-ERR-110584.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	CNC_CONTROLLED	
Drive types	----	
Remarks	** alternative: kenngr.homing_type (old syntax)* If the homing command G74 involves multiple axes with different homing type setting e.g. G74 X1 Y1 Z2, the axis with kenngr.homing_type != IGNORE_ABS_POS/ DISABLED will move and try to find the homing switch while there is no movement on the homing suppressed axes. Therefore it must be ensured that no collision can occur. If a homing type which is not supported by the drive type is set up, an error P-ERR-110384 is generated and default homing type is corrected. If this entry is not present in the parameter list, the default homing type is used according to the drive type:	

Drive type	**CNC_CONTROLLED**	**DRIVE_CONTROLLED**
Simulation	X*	
SERCOS	X	X*
Terminal	X*	
Lightbus	X*	
RT-Ethernet	X*	
PROFIDRIVE	X*	

	CANopen	X*	X
	* Default homing type		

4.2.17 Gantry monitoring during drive-controlled homing (P-AXIS-00298)

P-AXIS-00298	**Gantry monitoring during drive-controlled homing**	
Description	With a gantry configuration, if the gantry distance monitoring before homing is activated (P-AXIS-00249 [▶ 159]), a gantry error occurs during drive-guided homing (e. g. for SERCOS drives) when the drive sets its actual position to the reference position at the end of the homing cycle. In this case the gantry error occurs near the homing position of either the master or the slave drive. In order to activate gantry distance monitoring during homing it is possible to suppress this gantry error and trigger a new calculation of the offset between the master and slave axis if a gantry error occurs within a certain range around the reference position. This range of tolerance can be set up with this parameter.	
Parameter	getriebe[i].max_reference_position_offset	
Data type	SGN32	
Data range	0 … MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 μm	R,S: 0.1 mdeg
Default value	1000	
drive types.	SERCOS, CANopen	
Remarks	Using P-AXIS-00298 is only practical for drive-controlled homing with SERCOS or CANopen drives.	

4.2.18 Input interface for reference cam signal (P-AXIS-00321)

P-AXIS-00321	**Input interface for reference cam signal**
Description	In the default setting with CNC-controlled homing, the reference cam signal is read from the HLI [HLI]. For some drive types it is possible to use the drive digital inputs as reference cam input. In this case the appropriate input has to be configured in P-AXIS-00321. If this parameter is not set, the reference cam signal is read from the PLC interface.
Parameter	antr.reference_cam_signal
Data type	STRING
Data range	Dependent on the drive type the following different names for the digital inputs are possible: **Drive type SERCOS:** PLC Read reference cam signal from HLI (default) RT_STATUS_BIT_1 Read reference cam signal from real time status bit 1 RT_STATUS_BIT_2 Read reference cam signal from real time status bit 2 **Drive type CANopen:** PLC Read reference cam signal from HLI (default) STATUS_DIG_INPUTS (*) Reference cam signal from object 0x60FD : Digital inputs
Axis types	T, R, S
Dimension	T: ---- R,S: ----
Default value	PLC
drive types.	SERCOS, Lightbus,CANopen
Remarks	**Caution:** It is **only** possible to use real-time status bits with NC-controlled homing, see also [CMS-A1]. If the drive digital inputs are used, they must also be parameterised using the drive manufacturer's set-up tool. The transmission of the digital inputs in the cyclic telegram must also be configured. (*) For the transmission of the reference cam state, the object 0x60FD: Digital inputs must be configured (see DS402 drive profile). Otherwise, the error message with error code P-ERR-70292 is output.

Drive type CANopen (AX2000)

DIG_INPUT_1 Read reference cam signal from digital input 1

DIG_INPUT_2 Read reference cam signal from digital input 2

DIG_INPUT_3 Read reference cam signal from digital input 3

DIG_INPUT_4 Read reference cam signal from digital input 4

Drive type Lightbus/ RT-Ethernet (AX2000)

PLC Read reference cam signal from HLI (default)

DIG_INPUT_1 Read reference cam signal from digital input 1

DIG_INPUT_2 Read reference cam signal from digital input 2

DIG_INPUT_3 Read reference cam signal from digital input 3

DIG_INPUT_4 Read reference cam signal from digital input 4

To transmit digital inputs, they must be configured in the cyclic telegram. If they are not configured, an error message with error code P-ERR-70292is output.

4.2.19 Use of hardware limit switch as reference switch (P-AXIS-00329)

P-AXIS-00329	**Use of hardware limit switch as reference switch**	
Description	If a hardware limit switch of an axis is used as reference switch, this parameter has to be set to 1. The state of the hardware limit switch can either be transferred to the CNC via the PLC interface with the control unit “lr_mc_control.reference_cam“ (see [HLI]) or by reading the drive digital inputs directly if the used drive type supports this (see also P-AXIS-00321 [▸ 101]) is inactive.	
Parameter	kenngr.ref_cam_is_limit_switch	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	Using a hardware limit switch as reference switch is only possible if the drive amplifier does not go into an error state if the hardware limit switch is actuated.	

When the hardware limit switch is actuated, the drive stops automatically and only accepts command values which move away from the limit switch. The deceleration used to brake the drive must be set in the drive. Since the drive only executes CNC motion commands conditionally when a hardware limit switch is operated, position lag and window monitoring are deactivated for NC-controlled homing to the hardware limit switch.

The sequence is then as follows:

1. Motion to hardware limit switch
2. Reversal
3. Referencing the axis either on the falling edge of the limit switch or the falling edge of the limit switch followed by the zero pulse of the encoder (see also P-AXIS-00084 [▸ 91]).

Homing to hardware limit switch with gantry axes

Attention

Homing to hardware limit switch with gantry axes is only possible if the hardware limit switches of all gantry axes (master and slave axes) are mechanically located at the same position.

In other words, if the gantry system was aligned straight and moved to the hardware limit switches, they would operate all the switches simultaneously.

As opposed to NC-controlled homing to homing switches, homing to hardware limit switches causes a relative motion of the axes to each other during the homing operation. This is because the axes stop automatically when the hardware limit switch is operated and no longer execute the controller motion commands. The relative motion of the axes to each other increases proportionally to the difference in the positions of the hardware limit switches of the individual axes.

The sequence described above for a single axis is executed for each gantry system axis. In addition, the gantry system moves away from the hardware limit switches at the end of homing until all the switches are no longer actuated.

4.2.20 Maximum distance for zero pulse search (P-AXIS-00404)

P-AXIS-00404	**Maximum distance for zero pulse search**	
Description	This parameter defines the maximum movement distance that can be moved during zero pulse search if defined. If no zero pulse is latched within the distance defined, homing is aborted and an error message (P-ERR-70380) is output. If this parameter is not present or set to zero this monitoring is not active. This parameter can also be used with homing on encoder overflow (see P-AXIS-00294 [▸ 95]).	
Parameter	lr_hw[i].zero_pulse_search_max_dist	
Data type	UNS32	
Data range	0 ≤ zero_pulse_search_max_dist ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.2.21 Delayed activation of zero pulse logic (P-AXIS-00494)

P-AXIS-00494	**Delayed activation of zero pulse logic**	
Description	For CNC-controlled homing (see P-AXIS-00299 [▸ 98]) the parameter delays the activation of the zero pulse logic after the actuation of the reference switch. This can be useful if the reference cam and the zero pulse are situated closely together and the detection of the zero pulse is therefore not reliably possible. In this case the next or the next but one zero pulse after the reference cam could be detected depending on the actuation speed of the reference cam.	
Parameter	kenngr.shift_offset_zero_pulse_activation	
Data type	UNS32	
Data range	0 ≤ shift_offset_zero_pulse_activation ≤ MAX_UNS32	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001 °
Default value	0	
drive types.	Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen	
Remarks		

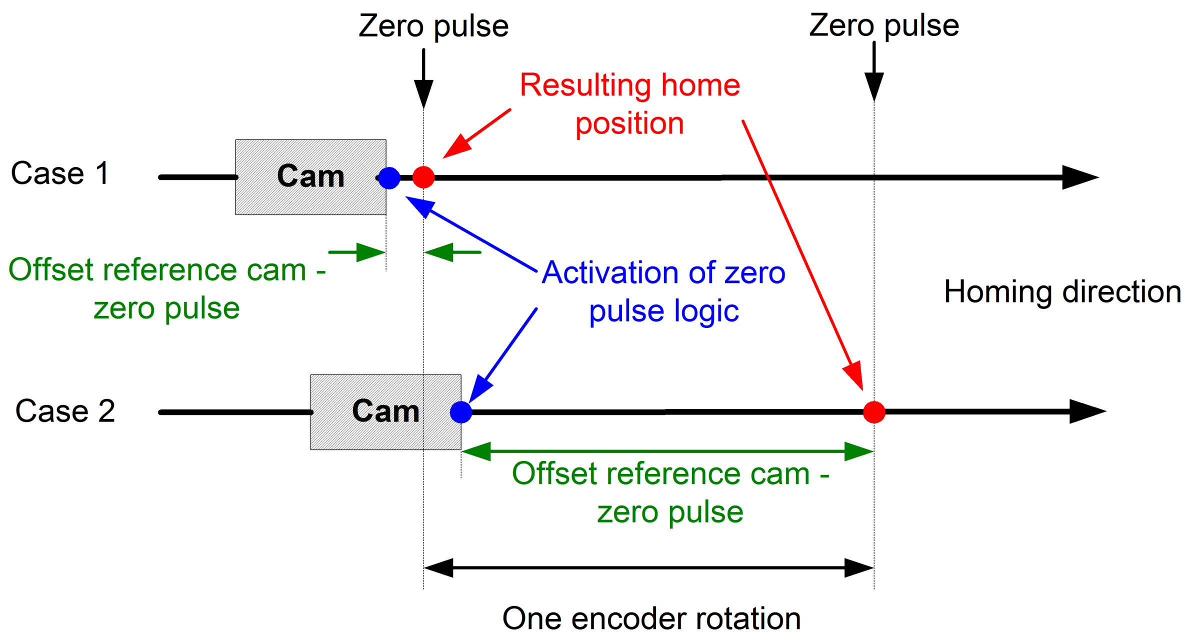


Fig. 5: Detection of different zero impulse positions possible

In this case a shift of the activation point for the zero pulse logic ensures that the equal zero pulse is always detected:

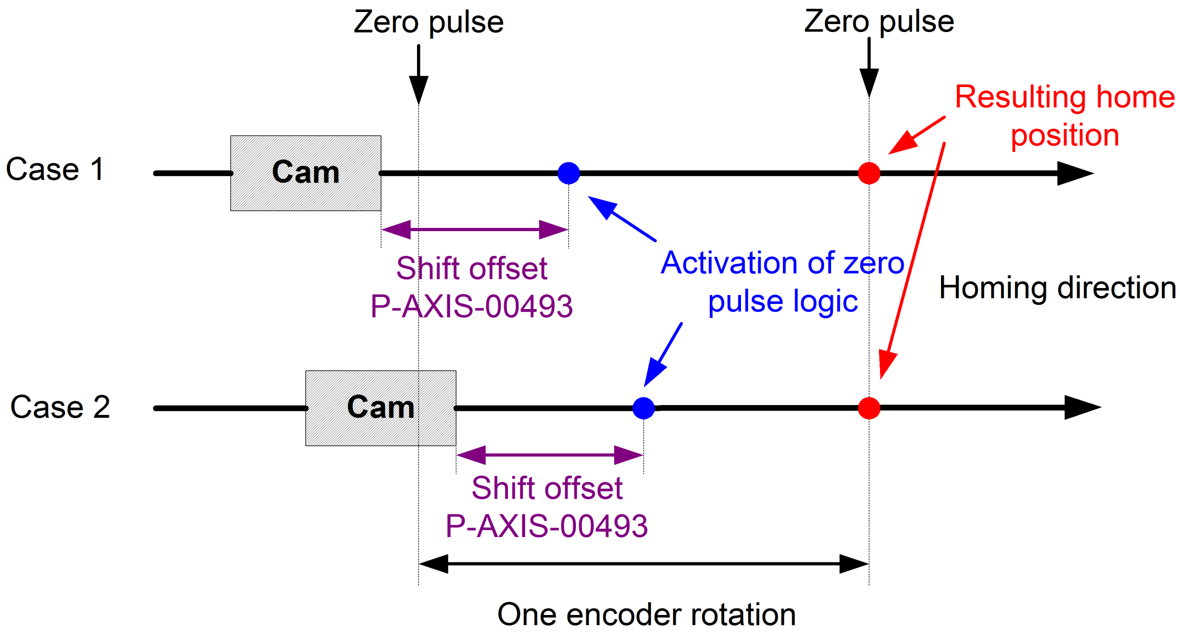


Fig. 6: Reliable detection of identical zero impulse positions

The position offset between operating the reference cam and detecting the zero pulse can be read out after homing using the CNC object 'reference cam - zero pulse offset'.

Example

Read position offset after homing under TwinCAT

Port: 551 (GEO),

Index group: 0x20300

Index-Offset: 0x10000 * (axis_index + 1) + 0x11C

(Examples: 1. Axis -> Index Offset 0x1011C, 3. Axis -> Index-Offset 0x3011C)

4.2.22 Maximum distance during homing (P-AXIS-00412)

P-AXIS-00412	**Maximum distance during homing**	
Description	This parameter defines a maximum distance for homing for spindles and rotary axes. If the maximum permissible homing distance is exceeded, homing is aborted and error message P-ERR-70394 is output. It achieves that homing is aborted if, for example, the reference cam is not found due to a wiring error. This parameter works only for spindles and rotary axes, see P-AXIS-00018 [▸ 69]. If this parameter is set for linear axes to a value unequal to zero, the error message P-ERR-110545 is output and the parameter is corrected to 0. A value of 0 disables distance monitoring during homing.	
Parameter	kenngr.distc.a_max	
Data type	UNS32	
Data range	0 ≤ homing_max_movement_dist ≤ MAX(UNS32)	
Axis types	R, S	
Dimension		R,S: 0.0001 °
Default value	0	
drive types.	----	
Remarks	This parameter has to be set to a value which is at least equal to the modulo range of the axis in order to complete homing successfully.	

4.2.23 Maximum distance when moving from reference cam (P-AXIS-00531)

P-AXIS-00531	**Maximum distance when moving from the reference cam**	
Description	This parameter limits the maximum movement distance when moving from the reference cam. Setting this parameter to a value > 0 enables this monitoring. If the set distance is exceeded, the error message P-ERR-70523 is output and homing is aborted. This prevents the movement of the reference cam from being stopped in case of a 'hanging' reference switch. With modulo axes (see P-AXIS-00018 [▸ 69], ACHS_TYP_ROTATOR or ACHS_TYP_SPINDEL) the set maximum distance must be less than the modulo range, otherwise the error message P-ERR-110600 is output and the value is limited to the modulo range. If a negative value is set, the error message P-ERR-110600 is also output and the value is set to zero.	
Parameter	lr_hw[i].move_from_cam_max_dist	
Data type	SGN32	
Data range	0 < P-AXIS-00531 < MAX(SGN32) for translatory axes 0 < P-AXIS-00531 < (P-AXIS-00126 [▸ 74] - P-AXIS-00127 [▸ 75]for rotary axes and spindles	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.2.24 Homing to fixed stop

4.2.24.1 Velocity (P-AXIS-00333)

P-AXIS-00333	**Velocity during homing to a fixed stop**	
Description	This parameter specifies the velocity of the homing travel during the search for the fixed stop.	
Parameter	getriebe[i].homing.torq_move_velocity	
Data type	UNS32	
Data range	1 ≤ torq_move_velocity < P-AXIS-00212 [▸ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.2 Acceleration (P-AXIS-00334)

P-AXIS-00334	**Acceleration during homing to a fixed stop**	
Description	This parameter specifies the acceleration of the homing travel during the search for the fixed stop.	
Parameter	getriebe[i].homing.torq_move_acceleration	
Data type	UNS32	
Data range	1 ≤ torq_move_acceleration < P-AXIS-00008 [▸ 246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.3 Jerk (P-AXIS-00335)

P-AXIS-00335	**Jerk during homing to a fixed stop**	
Description	This parameter specifies the jerk of the homing travel during the search for the fixed stop.	
Parameter	getriebe[i].homing.torq_move_jerk	
Data type	UNS32	
Data range	1 ≤ torq_move_jerk < (P-AXIS-00008 [▸ 246] / P-AXIS-00196 [▸ 237])	
Axis types	T, R, S	
Dimension	T: mm/s³	R,S: °/s³
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.4 Minimum distance (P-AXIS-00344)

P-AXIS-00344	**Minimum distance during homing to a fixed stop**	
Description	This parameter specifies the minimum distance up to the detection of the reference position (fixed stop).	
Parameter	kenngr.homing.torq_min_distance	
Data type	SGN32	
Data range	0 ≤ torq_min_distance ≤ P-AXIS-00345 [▸ 109]	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.1 µm
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.5 Maximum distance (P-AXIS-00345)

P-AXIS-00345	**Maximum distance during homing to a fixed stop**	
Description	This parameter specifies the maximum distance up to the detection of the reference position (fixed stop).	
Parameter	kenngr.homing.torq_max_distance	
Data type	SGN32	
Data range	0 ≤ torq_max_distance ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.1 µm
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.6 Direction (P-AXIS-00346)

P-AXIS-00346	**Direction during homing to a fixed stop**	
Description	This parameter specifies the direction of the homing travel during the search for the fixed stop.	
Parameter	kenngr.homing.torq_homing_dir	
Data type	STRING	
Data range	NEGATIVE: Negative direction POSITIVE: Positive direction	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	NEGATIVE	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.7 Velocity limit value (P-AXIS-00347)

P-AXIS-00347	**Velocity limit value during homing to a fixed stop**	
Description	This parameter specifies the residual velocity percentage for the detection of the reference position to a fixed stop. The velocity for homing is defined by *getriebe[i].homing.torq_move_velocity* (P-AXIS-00333 [107]).	
Parameter	kenngr.homing.torq_detect_velocity_limit	
Data type	UNS16	
Data range	0 ≤ torq_detect_velocity_limit ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.8 Retraction distance (P-AXIS-00348)

P-AXIS-00348	**Retraction distance during homing to a fixed stop**	
Description	This parameter specifies the retraction distance after detection of the reference position (fixed stop).	
Parameter	kenngr.homing.torq_retraction_distance	
Data type	SGN32	
Data range	0 ≤ torq_retraction_distance ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 μm	R,S: 0.1 μm
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.9 Reference position (P-AXIS-00349)

P-AXIS-00349	**Reference position during homing to a fixed stop**	
Description	This parameter specifies the reference position (fixed stop).	
Parameter	kenngr.homing.torq_homing_position	
Data type	SGN32	
Data range	0 ≤ torq_homing_position ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 μm	R,S: 0.1 μm
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.10 Minimum time (P-AXIS-00350)

P-AXIS-00350	Minimum time during homing to a fixed stop	
Description	This parameter specifies the minimum time for exceeding the torque limit, so the reference position (fixed stop) can be detected.	
Parameter	kenngr.homing.torq_detect_time	
Data type	UNS32	
Data range	0 ≤ torq_detect_time ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS, KUKA	
Remarks		

4.2.24.11 Position lag limit for fixed stop detection when homing to a fixed stop (P-AXIS-00819)

P-AXIS-00819	Position lag limit for fixed stop detection during homing to a fixed stop	
Description	This parameter defines the position lag that must be exceeded to detect a fixed stop during homing to a fixed stop. If this parameter is unassigned, the parameter P-AXIS-00769 [451] is used. If this parameter is also unassigned, the position lag is not used for detection.	
Parameter	kenngr.homing.torq_detect_pos_lag_limit	
Data type	SGN32	
Data range	0 ≤ P-AXIS-00819 ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.1 * 10-4 °
Default value	0	
Drive types	Simulation, SERCOS, CANopen	
Remarks	Parameter available as of V3.1.3080.11	

4.2.24.12 Residual torque to detect a fixed stop during homing to a fixed stop (P-AXIS-00820)

P-AXIS-00820	Residual torque to detect a fixed stop during homing to a fixed stop	
Description	This parameter defines the percentage torque to detect a fixed stop. It refers to the reduced torque that is written to the drive using the drive identifier for moving to a fixed stop. P-AXIS-00719 [▸ 442]. If this parameter is zero, the general parameter P-AXIS-00818 [▸ 456] is used. If this is also zero, torque is not used to detect a fixed stop.	
Parameter	kenngr.homing.torq_detect_torque_limit	
Data type	UNS16	
Data range	0 ≤ P-AXIS-00820 ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0	
Drive types	Simulation, SERCOS, CANopen	
Remarks	This parameter replaces the parameter P-AXIS-00343 [▸ 546]. Parameter available as of V3.1.3080.11	

4.2.24.13 Distance to fixed stop for simulation (P-AXIS-00822)

P-AXIS-00822	Distance to fixed stop for simulation	
Description	When a simulation is made for homing to a fixed stop, this parameter specifies the distance to the fixed stop. After the specified distance is travelled, the velocity is reduced in simulation, a position lag is generated and a drive torque is calculated for use in detecting the fixed stop..	
Parameter	kenngr.homing.torq_distance_to_block	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00822 ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1 μm	R,S: 0.1 * 10-4 °
Default value	0	
Drive types	Simulation	
Remarks	If a hard gantry configuration is simulated, make sure that the distance to the fixed stop of the slave axis is set equal to the retraction distance of the master axis (P-AXIS-00348 [▸ 111]). Parameter available as of V3.1.3080.11	

4.2.25 Reference monitoring (antr.reference_check.*)

4.2.25.1 Bit number (P-AXIS-00425)

P-AXIS-00425	**Bit number of signal 'Drive is referenced' during reference monitoring**	
Description	In this parameter enter the number of the bit which is used for transmission of the signal 'Drive is referenced' from the drive to the controller during active reference monitoring. The least significant bit has bit number 0. The maximum value depends on the length of the configured telegram element which is used for transmission.	
	Length of telegram element	Max. bit number
	-1	No reference monitoring
	2	15
	4	31
	Setting the parameter to an invalid bit number leads to the output of error message P-ERR-110549.	
Parameter	antr.reference_check.bit_nr	
Data type	SGN16	
Data range	0 ≤ bit_nr ≤ Max. bit number	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
drive types.	SERCOS	
Remarks	This parameter is supported for SERCOS drive types only.	

4.2.25.2 Element name (P-AXIS-00426)

P-AXIS-00426	**Element name of signal 'Drive is referenced' during reference monitoring**	
Description	In this parameter enter the name of the element of the cyclic input process data which is used for transmission of the signal 'Drive is referenced' from the drive. When the set-up value of P-AXIS-00426 is not found within the cyclic process, the error message P-ERR-70401 is output.	
Parameter	antr.reference_check.element_name	
Data type	STRING	
Data range	<*Empty string*>: Reference monitoring is disabled S-0-0135: When the SERCOS state word is used for transmission of the reference signal, the parameter has to be set to 'S-0-0135'… <*Telegram_element_Name*>: ...or, alternatively, the name of a telegram element configured in the cyclic process data.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	* Note: The default value of variables is a blank string. Reference monitoring is activated by assigning a value to this parameter. When reference monitoring is activated, the parameter P-AXIS-00425 [▸ 114] must also be assigned a valid value. At the moment, this parameter is supported for drive type SERCOS only. Changing this parameter by a list update is not possible (P-ERR-110550).	

4.2.25.3 Error message suppression on reference loss of non-interpolated axes (P-AXIS-00825)

P-AXIS-00825	Suppress error message on reference loss of non-interpolated axes	
Description	When reference monitoring [▸ 114] (antr.reference_check) is active, the error ID 70400 is output on loss of the reference position.. When P-AXIS-00825 is activated, this error can be suppressed. If the affected axes are interpolated when P-AXIS-00825 is set, the error ID 51082 is output.	
Parameter	lr_param.suppress_reference_lost_error	
Data type	BOOLEAN	
Data range	0: Error is not suppressed 1: Error is suppressed	
Axis types	T, R, S	
Dimension	T: ---	R,S: ---
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	Parameter available as of Builds V2.11.2070, V2.11.2841, V3.1.3080.17 or V3.1.3107.51	

4.2.26 Axis remains referenced after resolution change (P-AXIS-00538)

P-AXIS-00538	Axis remains referenced after resolution change	
Description	By default the 'referenced' flag of an axis is cleared when the encoder resolution changes, e.g. caused by a gear change. The reason for this behaviour is that, depending on the mechanical design of the axis (mounting place of encoder, mechanical structure of the gearbox, sequence of gearbox switching, etc.), the mechanical axis position can be shifted compared to the position used in the controller. For axis set-ups where it is guaranteed that no such shift can occur during gear switching, this parameter can suppress the reset of the 'referenced' flag when the gear is switched.	
Parameter	kenngr.no_unhome_on_resolution_change	
Data type	BOOLEAN	
Data range	0: 'Referenced' flag is reset at resolution changes (default). 1: 'Referenced' flag is not reset at resolution changes.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	This parameter is available as of CNC Build V3.01.3052.11 or higher. **CAUTION:** Using this parameter with axis configurations not suitable for such an application, an offset may occur between the mechanical axis position and the axis position used in the controller. It is the responsibility of the user to check if the conditions for using this parameter are fulfilled.	

4.2.27 Transfer reference position for drive-controlled homing to the drive (P-AXIS-00584)

P-AXIS-00584	**Transfer reference position for drive-controlled homing to the drive**	
Description	When the parameter is set, the reference position saved in axis parameter P-AXIS-00152 [▸ 89] is transferred to the drive before the start of drive-controlled homing. The sequence is as follows: 1. Read reference position saved in drive. 2. If the reference position read in and P-AXIS-00152 [▸ 89] are not identical, P-AXIS-00152 [▸ 89] is written to the drive, otherwise no action is taken. 3. The reference position is again read from the drive and compared to P-AXIS-00152 [▸ 89] .. If the reference position read is different from P-AXIS-00152 [▸ 89] , an error message P-ERR-70561 is output.	
Parameter	kenngr.write_reference_position_to_drive	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T:----	R,S:----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	With SERCOS drives, the encoder used for homing is defined by reading SERCOS parameter S-0-0147. When Bit 0x08 is set in S-0-0147, the external encoder is used for homing. Consequently, S-0-0054 is used to write the reference position; otherwise (homing to motor encoder) S-0-0052. The parameter is available as of Build V3.1.3068.11.	

4.2.28 Allow drive-controlled homing without controller enable (P-AXIS-00803)

P-AXIS-00803	Allow drive-controlled homing without controller enable	
Description	When homing, the CNC checks whether the controller enables are set since the axis normally moves while homing. In special cases an axis movement is not required, and so no setting of the controller enable is required; for example, if only the axis positions are set to a specified value during drive-controlled homing. This parameter sets the function that no message is output in these special cases if homing is started without setting controller enables.	
Parameter	kenngr.homing_without_drive_enable	
Data type	BOOLEAN	
Data range	0 /1	
Axis types		
Dimension	T:	S: ----
Default value	0	
drive types.	SERCOS, CANopen	
Remarks	Parameter available as of Builds V2.11.2057.00, V2.11.2828.00, V3.01.3079.41, V3.1.3107.30	

4.2.29 Referencing to limit switch with tracking (P-AXIS-00814)

P-AXIS-00814	Referencing to limit switch with tracking	
Description	When referencing to limit switch with tracking, a positive lag occur between the command and actual positions as soon as the referencing the limit switch function is actuated. When the axis moves away from the limit switch, it is therefore “dragged along” for a short time. This parameter prevents this by making the CNC track the setpoints for one cycle after the actual values before moving away from the limit switch.	
Parameter	kenngr.ref_on_limit_switch_with_tracking	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	0	
Drive types		
Remarks	This parameter can only be used practically in combination with P-AXIS-00329 [▸ 102] (kenngr.ref_cam_is_limit_switch 1). This parameter is available as of CNC Build V3.1.3080.03 or V3.1.3107.36.	

4.3 Settings for software limit switch (SLS) monitoring

A differentiation is made between the command value and the actual value software limit switch monitoring.

The command value software limit switch monitoring takes place in automatic operating mode in the look-ahead function and in manual operating mode in path operation.

The actual value software limit switch monitoring is carried out in the position controller. The figure below shows the parameters for software limit switch monitoring.

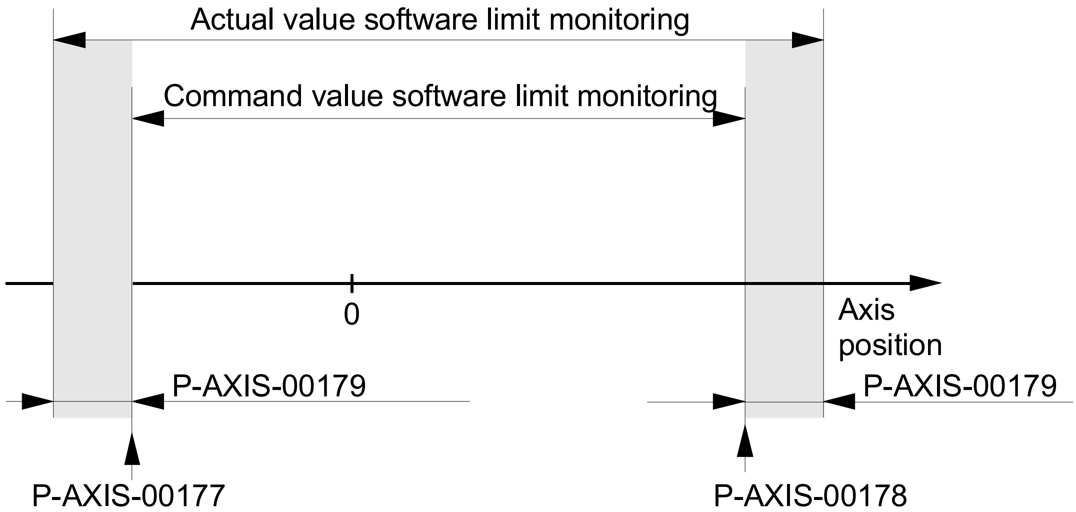


Fig. 7: Monitoring of command and actual values for software limit switch.

4.3.1 Tolerance range for software limit switch (P-AXIS-00179)

P-AXIS-00179	**Tolerance range for software limit switch**	
Description	In order to prevent the actual value software limit switch monitoring in the position controller from responding when there is a slight oscillation of an axis (e.g. programmed command position = position of positive software limit switch, actual position > position of positive software limit switch), the software limit switch range in the positive and the negative directions is extended respectively by the parameter. The actual positions must lie within this extended range.	
Parameter	kenngr.swe_toleranz	
Data type	UNS32	
Data range	0 ≤ swe_toleranz ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	1000	
drive types.	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.3.2 Positive software limit switch (P-AXIS-00178)

P-AXIS-00178	**Positive software limit switch**	
Description	The parameter defines the possible traverse range in the positive direction (positive software limit switch position). The programmed command positions are always checked on 'kenngr.swe_pos', the actual positions on 'kenngr.swe_pos + kenngr.swe_toleranz'.	
Parameter	kenngr.swe_pos	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] < swe_pos < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R,S: 0.0001 °
Default value	100000000	
drive types.	----	
Remarks	The value of the parameter is adopted on reset, mode change and axis replacement from the axis record.	

4.3.3 Negative software limit switch (P-AXIS-00177)

P-AXIS-00177	**Negative software limit switch**	
Description	The parameter defines the possible traverse range in the negative direction (negative software limit switch position). The programmed command positions are always checked on 'kenngr.swe_neg', the actual positions on 'kenngr.swe_neg - kenngr.swe_toleranz'.	
Parameter	kenngr.swe_neg	
Data type	SGN32	
Data range	MIN(SGN32) < swe_neg < P-AXIS-00178 [▸ 121]	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	-100000000	
drive types.	----	
Remarks	The value of the parameter is adopted on reset, mode change and axis replacement from the axis record.	

4.3.4 Activate command position software limit switch monitoring in position controller

4.3.4.1 Monitoring for positive software limit switch (P-AXIS-00520)

P-AXIS-00520	**Activation of limit switch monitoring of the positive limit switch.**	
Description	Command position related software limit switch monitoring is executed during path preparation. This ensures that a programmed movement that crosses a software limit switch is not executed. In certain situations the command position is influenced by circumstances that are not known in the path preparation process and can thus not be detected in the software limit switch operation of the path planning process. Examples of this are the use of the external command position interface on the HLI or axis couplings via the HLI (see HLI or [FCT-A9]). With both these parameters, a command side software limit switch monitoring can be activated. When monitoring is active it is checked in every interpolation cycle that the axis can stop from their current velocity before the software limit switch when it is decelerated with P-AXIS-00003 [▸ 246]. The software limits used are the actual values of the software limit switches without considering the software limit switch tolerance (P-AXIS-00179 [▸ 120]). If the software limit switch is crossed, error message P-ERR-70195 is output and the axis is stopped.	
Parameter	lr_param.check_pos_command_limit	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.3.4.2 Monitoring for negative software limit switch (P-AXIS-00521)

P-AXIS-00521	**Monitoring of limit switch monitoring of the negative limit switch.**
Description	Command position related software limit switch monitoring is executed during path preparation. This ensures that a programmed movement that crosses a software limit switch is not executed. In certain situations the command position is influenced by circumstances that are not known in the path preparation process and can thus not be detected in the software limit switch operation of the path planning process. Examples for this are the use of the external command position interface on the HLI or axis couplings via the HLI (see HLI or [FCT-A9]). With both these parameters, a command side software limit switch monitoring can be activated. When monitoring is active it is checked in every interpolation cycle that the axis can stop from their current velocity before the software limit switch when it is decelerated with P-AXIS-00003 [▸ 246]. The software limits used are the actual values of the software limit switches without considering the software limit switch tolerance (P-AXIS-00179 [▸ 120]). If the software limit switch is crossed, error message P-ERR-70195 is output and the axis is stopped.
Parameter	lr_param.check_neg_command_limit
Data type	BOOLEAN
Data range	0/1
Axis types	T
Dimension	T: ----
Default value	0
drive types.	----
Remarks	

4.3.5 Behaviour of software limit switches (P-AXIS-00554)

P-AXIS-00554	**Behaviour of software limit switches**		
Description	The axis parameter P-AXIS-00554 can influence the error response of the NC kernel if software limit switches are crossed. The software limit switch monitor can output only warnings instead of errors.		
Parameter	kenngr.swe_behaviour		
Data type	STRING		
Data range	ERROR	Crossing software limit switches results in an error already in path preparation.	
	ERROR_LR	Crossing software limit switches results in a warning during path preparation. An error is output in the position controller when software limit switches are crossed and this triggers the associated error response.	
	WARNING	When software limit switches are crossed, only warnings are output in path preparation and in the position controller.	
Axis types	T, R		
Dimension	T: ----		R: ----
Default value	ERROR		
drive types.	----		
Remarks	Parameter available as of V3.01.3066		

4.3.6 Switching software limit monitoring off / on (P-AXIS-00705)

P-AXIS-00705	**Switching software limit monitoring off / on**	
Description	By default, software limit monitoring is active for translatory axes after completion of homing. The same applies to a rotary axis if the bit ACHSMODE_MODULO is not set in the parameter axis mode (P-AXIS-00015) [▸ 71] . This parameter switches the software limit switch monitor on or off independent of the axis type (P-AXIS-00018) [▸ 69] and axis mode [▸ 71] . The software limit switches are defined by the parameters P-AXIS-00177 [▸ 121] and P-AXIS-00178 [▸ 121] .	
Parameter	kenngr.swe_check	
Data type	SGN08	
Data range	-1: The effectiveness of the software limit switch monitor is dependent on the axis type [▸ 69] and axis mode [▸ 71] (default) 0 : Switch off software limit monitoring 1 : Switch on software limit monitoring	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	-1	
Drive types	----	
Remarks	Parameter available as of V3.1.3066	

4.4 Settings for measurement

This section summarises the axis-specific parameters for measurement.

Notice

The measurement parameters are used for a specific application. The measurement functions are described in [PROG] in greater detail.

4.4.1 Define axis as measurement axis (P-AXIS-00118)

P-AXIS-00118	**Define axis as measurement axis**	
Description	The parameter must be assigned to TRUE for all axes that participate in a measurement traverse.	
Parameter	kenngr.messachse	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

4.4.2 Probe stroke for measurement types 2 and 4 (P-AXIS-00086)

P-AXIS-00086	**Probe stroke for measurement types 2 and 4**	
Description	Some types of mechanical measuring probes have a limited stroke. After activating the probe, the axis continues to travel by the braking distance which is dependent on the axis speed and the allowed axis deceleration. In order to avoid damage to the probe, the maximum permitted stroke can be parametrised. This parameter is only effective for measurement types 2 and 4 (see P-CHAN-00057). When using these types, the measurement speed is limited in such a way that the braking distance is less than the probe stroke. If measurement speed correction is executed, a warning is output.	
Parameter	kenngr.hub_messtaster	
Data type	UNS32	
Data range	0 ≤ hub_messtaster ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	50000	
Drive types	----	
Remarks	A buffer exists between the interpolator and the position controller to calculate the parameters for feedforward control of axes. This results in a dead time between calculating a command value by the interpolator and its execution in the position controller. In the worst case, an error may occur during measurement travel because the interpolator, which monitors the stroke of the measuring probe, ignores the distance components in the buffer. This can be prevented by enlarging the actual measurement probe stroke.	

4.4.3 Measurement speed for measurement type 2 (P-AXIS-00215)

P-AXIS-00215	**Measurement speed for measurement type 2**	
Description	Depending on the application, measurement travel does not take place with the programmed feed, but with the feed defined by this parameter.	
Parameter	kenngr.vb_messen	
Data type	UNS32	
Data range	1 ≤ vb_messen ≤ P-AXIS-00212 [245]	
Axis types	T, R	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	16666	
Drive types	----	
Remarks	This parameter is only used for measurement type 2 [PROG], [[CHAN].	

4.4.4 Measurement travel offset for measurement type 2 (P-AXIS-00114)

P-AXIS-00114	**Measurement travel offset for measurement type 2**	
Description	The measurement travel offset specifies how much further the axis is allowed to move past the programmed target position if the probe was not yet actuated up to the programmed point of time.	
Parameter	kenngr.mess_offset	
Data type	UNS32	
Data range	0 ≤ mess_offset ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Drive types	----	
Remarks	As of CNC Build **V2.11.2010.09** the parameter P-AXIS-00467 [▸ 128] replaces the parameter P-AXIS-00114. For compatibility reasons, the parameter continues to be available, but it should not be used in new applications because it only has an influence on measurement travels with measurement type 2 (see P-CHAN-00057). The function of P-AXIS-00467 [▸ 128] is more extensive; it can be used for all measurement types P-CHAN-00057 with the exception of measurement type 3 (optional continue motion up to the target point).	

4.4.5 Measurement travel offset for all measurement types (P-AXIS-00467)

P-AXIS-00467	**Measurement travel offset for all measurement types**	
Description	The measurement travel offset defines how much further the axis is allowed to move past the programmed target position if the probe was not yet actuated and the target point is already reached. The parameter is not effective in measurement type 3 (see P-CHAN-00057 [▸ 128]with optional continue to the target point!	
Parameter	kenngr.probing_offset	
Data type	UNS32	
Data range	0 ≤ probing_offset ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Drive types	----	
Remarks	As of CNC Build **V2.11.2010.09** P-AXIS-00467 replaces the parameter P-AXIS-00114 [▸ 128]. For compatibility reasons, the parameter continues to be available, but it should not be used in new applications because it only has an influence on measurement travels with measurement type 2 (see P-CHAN-00057). The function of P-AXIS-00467 is more extensive; it can be used for all measurement types P-CHAN-00057 with the exception of measurement type 3 (optional continue motion up to the target point).	

4.4.6 Measurement signal parameters (kenngr.measure.*)

Release Note

As of CNC Build **V2.11.2019.15** the measurement signal parameters P-AXIS-00516/P-AXIS-00517 and P-AXIS-00518 replace some of the previously used measurement parameters. For compatibility reasons, the parameters continue to be available but they should not be used in new applications.

4.4.6.1 Measurement methods (P-AXIS-00516)

P-AXIS-00516	**Measurement methods**	
Description	The parameter defines the source of the probing signal during a measuring travel, e.g. the probing position can be latched in the drive or the probing signal can be provided by the PLC. This setting can also be changed in the NC program by the #MEAS command (see [PROG//Extended programming]. This parameter replaces the following old configuration parameters: • kenngr.mess_signal_taster (P-AXIS-00117 [135]) • kenngr.mess_signal_sercos (P-AXIS-00116 [136]) • kenngr.mess_signal_achs_steuer (P-AXIS-00115 [136]) • kenngr.probing_signal_via_plc (P-AXIS-00257 [137]) • kenngr.meas_signal_drive (P-AXIS-00269 [137]) • kenngr.meas_signal_fixed_stop (P-AXIS-00330 [138])	
Parameter	kenngr.measure.signal	
Data type	STRING	
Data range	DRIVE_TYPE_DEFAULT PLC FIXED_STOP DRIVE PLC_EXT_LATCH_CONTROL PLC_FIRST_EVENT PLC_TIMESTAMP EXT_PROBE_WITH_DRIVE (as of V3.1.3080.05)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	----	
Remarks	If the parameter P-AXIS-00516 is not defined, the measurement method resulting from previous parameters is used for backward compatibility reasons. * Note: The default value of variables is a blank string.	

The meaning of the parameter settings is described in the following table:

Value	Meaning
DRIVE_TYPE_DEFAULT	The CNC uses the default measuring method of the given drive type (see table below /*/)
PLC	This parameter setting reads the probing signal via the Control Unit lr_mc_control.probing_signal on the HLI [HLI]. The probing value is the actual value at the moment of the occurrence of the probing signal. As an alternative, the probing position can be specified directly via the control unit lr_mc_control.probing_position. **NOTE:** Due to the scanning of the probing signal in the cycle time of the PLC, the accuracy of the probed value is less than the accuracy achieved by using drive-internal probing latches. This setting corresponds to the old parameter kenngr.probing_signal_via_plc (P-AXIS-00257 [137])
FIXED_STOP	This setting searches for a fixed stop during the measuring traverse. In addition, the measurement type 7 (see P-CHAN-00057) must be selected. **CAUTION:** The user has to ensure that, during the movement to a fixed stop in the drives affected, a torque limitation is active and that the velocity is low enough. This setting corresponds to the old parameter kenngr.meas_signal_fixed_stop (P-AXIS-00330 [138])
DRIVE	This parameter defines that the probing signal is supplied by the drive. Additional settings in the drive are required (see [FCT-C4]). This setting corresponds to the old parameters kenngr.mess_signal_taster (P-AXIS-00117 [135]), kenngr.mess_signal_sercos (P-AXIS-00116 [136]), kenngr.meas_signal_drive (P-AXIS-00269 [137])
PLC_EXT_LATCH_-CONTROL	This setting defines that operation requires an external hardware for the measurement travel. Therefore the CNC informs the PLC via the external measuring interface about the start and end of a measuring travel so that the PLC can enable or disable the measurement hardware accordingly (see [HLI//Measuring with external probing hardware]). This method specifies the probing signal and the measured position via the control units lr_mc_control.probing_signal and lr_mc_control.probing_position.
PLC_FIRST_EVENT	This setting corresponds to the value “PLC“. However, the measuring travel stops as soon as the measurement event is detected at **an** axis measured with this setting. In “PLC mode, however, a measurement event must occur in the control unit lr_mc_control.probing_signal at **every** measured axis. This setting corresponds to the old parameter kenngr.mess_signal_achs_steuer (P-AXIS-00115 [136])

/*/ Drive type dependent default setting for probing signal source (DRIVE_TYPE_DEFAULT):

Drive type (see P-AXIS-00020 [68])	**Probing signal source default setting**
Conventional Sercos Profidrive Beckhoff Lightbus +-10V via field bus (terminal) RT-Ethernet CANopen CAN-Bus	DRIVE
Drive simulation Virtual axis	PLC_FIRST_EVENT

Permissible measurement methods dependent on drive type:

Drive type (see P-AXIS-00020 [68])	**PLC**	**FIXED_ STOP**	**DRIVE**	**PLC_EXT_ LATCH_- CONTROL**	**PLC_- FIRST_- EVENT**
Conventional	X	X	X	X	X
Sercos	X	X	X	X	X
Profidrive	X	X	X	X	-
Beckhoff Lightbus	X	X	X	X	-
+-10V via fieldbus (terminal)	X	X	X	X	-
RT-Ethernet	X	X	X	X	-
CANopen	X	X	X	X	-
CAN-Bus	X	X	X	X	-
Drive simulation	X	X	(X)*	X	X
Virtual axis	X	X	(X)*	X	X

(*) Using the measurement simulation (see P-AXIS-00112 [478], [PROG//Extended programming])

4.4.6.2 Number of probing input (P-AXIS-00517)

<table>
<tr><th>P-AXIS-00517</th><th colspan="3">Number of probing input</th></tr>
<tr><td>Description</td><td colspan="3">The parameter defines the measuring channel which is used during a measurement travel. When the DRIVE measurement method is set (see P-AXIS-00516 [▸ 129]), it must also be parameterised in the drive (see [FCT-C4]).
The parameter replaces the setting antr.probing_input_nbr (P-AXIS-00430 [▸ 366]).</td></tr>
<tr><td>Parameter</td><td colspan="3">kenngr.measure.input</td></tr>
<tr><td>Data type</td><td colspan="3">UNS08</td></tr>
<tr><td rowspan="6">Data range</td><td colspan="3">Valid probing inputs dependent on drive type and probing signal source (see table below):</td></tr>
<tr><td>Measurement methods
P-AXIS-00516 [▸ 129]</td><td>Drive type
P-AXIS-00020</td><td>Probing inputs</td></tr>
<tr><td>PLC_EXT_LATCH_CONTROL</td><td>all</td><td>1 to 255</td></tr>
<tr><td>EXT_PROBE_WITH_DRIVE</td><td>all</td><td>1 to 2</td></tr>
<tr><td rowspan="2">DRIVE</td><td>SERCOS
CANopen
PROFIDRIVE MC</td><td>1 to 2</td></tr>
<tr><td>Conventional
Beckhoff Lightbus
+-10V via Feldbus
Real-time (RT)-Ethernet
CAN-Bus</td><td>1</td></tr>
<tr><td>Axis types</td><td colspan="3">T, R, S</td></tr>
<tr><td>Dimension</td><td colspan="2">T: ----</td><td>R,S: ----</td></tr>
<tr><td>Default value</td><td colspan="3">0 **</td></tr>
<tr><td>Drive types</td><td colspan="3">----</td></tr>
<tr><td>Remarks</td><td colspan="3">*All probing signals which are not listed in the table above do not use the parameter 'Input' for the probing input.
**If the parameter P-AXIS-00517 is not specified, the setting in P-AXIS-00430 [▸ 366]is used for reasons of backward compatibility.</td></tr>
</table>

4.4.6.3 Pulse edge (P-AXIS-00518)

P-AXIS-00518	**Probing signal edge**	
Description	The axis parameter defines the edge of the probing signal which is used to latch the position value. The parameter replaces the setting kenngr.mess_neg_flanke (P-AXIS-00113 [▸ 135]).	
Parameter	kenngr.measure.edge	
Data type	STRING	
Data range	POS: Latching if positive measured signal edge NEG: Latching if negative measured signal edge	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	----	
Remarks	If the parameter P-AXIS-00518 is not specified, the setting in P-AXIS-00113 [▸ 135]is output. * Note: The default value of variables is a blank string.	

4.4.6.4 Probing input for edge banding (P-AXIS-00539)

P-AXIS-00539	**Probing input for edge banding**	
Description	By default the same probing input used for probing is also used for edge banding. This parameter configures an alternative probing input for edge banding. When this parameter has no value assigned or is assigned the value 0, the default behaviour applies. The admissible range of the parameter depends on the drive type. The parameter replaces the setting antr.edge_banding_input_nbr (P-AXIS-00353 [▸ 357]).	
Parameter	kenngr.measure.input_edge_banding	
Data type	UNS08	
Data range	0 .. MAX(UNS08)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0 *	
Drive types	SERCOS, Profidrive	
Remarks	This parameter is available from CNC-version V3.1.ff onwards. If the parameter is assigned a value unequal to zero for drive types other than SERCOS and Profidrive, an error message (P-ERR-110614) is output and the parameter is set to zero. If the parameter is assigned an invalid value, an error message P-ERR-110615) is also output and the parameter is set to zero. *If the parameter P-AXIS-00539 is not specified, the setting in P-AXIS-00353 [▸ 357]is effective for reasons of downward compatibility.	

4.4.6.5 Drive probing input for PROBE0/1 Keyword (P-AXIS-00583)

P-AXIS-00583	**Number of the drive-specific probing input assigned to the keyword PROBE0 or PROBE1 in the command #MEAS[INPUT=..].**	
Description	This parameter defines which drive probing input is assigned to the keywords INPUT=PROBE0 and INPUT=PROBE1 in the command #MEAS. Assign parameters to the keywords as follows:	
	Keyword	Parameter
	'PROBE0'	kenngr.measure.probe[0].input
	'PROBE1'	kenngr.measure.probe[1].input
	Example: When kenngr.measure.probe[0].input has the value 1, probing input 1 of the drive is used by the NC command #MEAS [AX=X INPUT=PROBE0] on receipt of the next probing command on the X axis. The permissible value range depends on the drive type. If the parameterised value is invalid, the error message ERR-110622 is output and the value is corrected. If no value is parameterised for this parameter, the following default values are used:	
	Parameter	Default value
	kenngr.measure.probe[0].input	P-AXIS-00517 [▸ 132]
	kenngr.measure.probe[1].input	P-AXIS-00539 [▸ 133] (If P-AXIS-00059 [▸ 87] has the value 0, the value of P-AXIS-00517 [▸ 132] is used).
Parameter	kenngr.measure.probe[i].input	
Data type	SGN16	
Data range	----	
Axis types	T, R	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Simulation, Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen	
Remarks	This parameter is available as of V2.11.2808.00 and higher.	

4.4.6.6 Old probing signal parameters (up to CNC Build V2.11.2019.14)

To supply the probing signals, **one** of the following measurement methods can be defined.

- a signal of a probe is read in via the hardware interface of the NC kernel (conventional method),
- the SERCOS interface outputs a message when the probe signal arrives,
- a bit of the axis-specific control bit mask of the position controller is set,
- a probe signal is read in via a special HLI control unit,
- an internal probing signal is generated if the specified position lag limit is exceeded (fixed stop)..

Attention

If a measurement method is selected, all other measurement methods must be deselected!

4.4.6.6.1 Measurement signal from hardware interface (P-AXIS-00117)

P-AXIS-00117	**Measurement signal from hardware interface**	
Description	This parameter selects the use of the NC kernel hardware interface.	
Parameter	kenngr.mess_signal_taster	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

4.4.6.6.2 Pulse edge (P-AXIS-00113)

P-AXIS-00113	**Pulse edge**	
Description	This parameter defines the measurement signal edge at which the actual value counter executes the latch point.	
Parameter	kenngr.mess_neg_flanke	
Data type	BOOLEAN	
Data range	0: Latch at positive edge of pulse 1: Latch at negative edge of pulse	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

4.4.6.6.3 Measurement with SERCOS drives (P-AXIS-00116)

P-AXIS-00116	**Measurement with SERCOS drives**	
Description	Measurement with SERCOS drives can be performed with two different methods. The flag defines the measurement signal to be read in via the SERCOS interface.	
Parameter	kenngr.mess_signal_sercos	
Data type	BOOLEAN	
Data range	0: Request from a measurement probe 1: Usage of measurement function supplied by the drive (SERCOS measurement)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	SERCOS	
Remarks	For the measurement with SERCOS drives, the parameters P-AXIS-00060 [▸ 139] or P-AXIS-00106 [▸ 140] are also required.	

4.4.6.6.4 Measurement signal via axis-specific control bit mask (P-AXIS-00115)

<table>
<tr><td>P-AXIS-00115</td><td colspan="2">Measurement signal via axis specific control bit mask</td></tr>
<tr><td>Description</td><td colspan="2">To allow external measurement signals to be taken into account as well, one bit in the axis-specific control bit mask is treated as the measurement signal. This possibility is defined by this parameter.</td></tr>
<tr><td>Parameter</td><td colspan="2">kenngr.mess_signal_achs_steuer</td></tr>
<tr><td>Data type</td><td colspan="2">BOOLEAN</td></tr>
<tr><td>Data range</td><td colspan="2">0/1</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R</td></tr>
<tr><td>Dimension</td><td>T: ----</td><td>R: ----</td></tr>
<tr><td>Default value</td><td colspan="2">0</td></tr>
<tr><td>Drive types</td><td colspan="2">----</td></tr>
<tr><td>Remarks</td><td colspan="2">
<table>
<tr><td></td><td colspan="3">Measurement method</td></tr>
<tr><td></td><td>P-AXIS-00117 [▸ 135] (mess_signal_taster)</td><td>P-AXIS-00116 [▸ 136] (mess_signal_sercos)</td><td>P-AXIS-00115 [▸ 136] (mess_signal_achs_steuer)</td></tr>
<tr><td>Drive simulation</td><td>X</td><td>-</td><td>X</td></tr>
<tr><td>Conventional drive interface</td><td>X</td><td>-</td><td>X</td></tr>
<tr><td>SERCOS drive interface</td><td>X</td><td>X</td><td>X</td></tr>
</table>
</td></tr>
</table>

4.4.6.6.5 Measurement signal via HLI Control Unit (P-AXIS-00257)

P-AXIS-00257	**Measurement signal via HLI Control Unit**	
Description	This parameter can determine that the probing signal is read from the HLI via the control unit lr_mc_control.probing_signal and not via the cyclical drive interface. The probing value is the actual value at the moment of the occurrence of the probing signal.	
Parameter	kenngr.probing_signal_via_plc	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	Due to the scanning of the probing signal in the cycle time of the PLC, the accuracy of the probed value is less than the accuracy achieved by using drive-internal probing latches.	

4.4.6.6.6 Measurement signal from drive (P-AXIS-00269)

P-AXIS-00269	**Measurement signal from drive**	
Description	This parameter determines if the measurement signal is provided by the drive.	
Parameter	kenngr.meas_signal_drive	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

4.4.6.6.7 Measurement with movement to a fixed stop (P-AXIS-00330)

P-AXIS-00330	**Measurement with movement to a fixed stop**	
Description	This parameter enables the measurement signal source 'Fixed stop'.	
Parameter	kenngr.meas_signal_fixed_stop	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen	
Remarks	The user must ensure that, during movement to a fixed stop in the drives affected, a torque limitation is active and the velocity is low enough. All other measurement signal sources (e.g. P-AXIS-00116 [▸ 136]) must be deselected. For measurement with movement to a fixed stop, the parameters P-AXIS-00331 [▸ 150] or P-AXIS-00332 [▸ 150] are also required.	

4.4.7 Measurement parameters for SERCOS drives

4.4.7.1 SERCOS-status/control bit for measurement (P-AXIS-00060)

<table>
<tr><th>P-AXIS-00060</th><th colspan="4">SERCOS status/define control bit for measurement</th></tr>
<tr><td>Description</td><td colspan="4">This entry defines the real time state/control bits used for probing.</td></tr>
<tr><td>Parameter</td><td colspan="4">kenngr.echtzeit_bit_nr</td></tr>
<tr><td>Data type</td><td colspan="4">UNS08</td></tr>
<tr><td rowspan="6">Data range</td><td colspan="4">0 ≤ echtzeit_bit_nr ≤ 2
The real-time status and control bits are assigned according to the table below:</td></tr>
<tr><td rowspan="2">P-AXIS-00060</td><td>Control bits</td><td colspan="2">Status bits</td></tr>
<tr><td>Measurement Enable</td><td>measurement done</td><td>Measuring probe activated</td></tr>
<tr><td>0,
no entry</td><td>1</td><td>P-AXIS-00106 [▹ 140]</td><td>2</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>2</td></tr>
<tr><td>2</td><td>2</td><td>2</td><td>1</td></tr>
<tr><td>Axis types</td><td colspan="4">T, R</td></tr>
<tr><td>Dimension</td><td colspan="2">T: ----</td><td colspan="2">R: ----</td></tr>
<tr><td>Default value</td><td colspan="4">0</td></tr>
<tr><td>Drive types</td><td colspan="4">SERCOS</td></tr>
<tr><td>Remarks</td><td colspan="4">It is recommended to set P-AXIS-00060 to either 1 or 2. The value 0 is only for backward compatibility with older version and requires additional settings (P-AXIS-00106 [▹ 140]).
If P-AXIS-00060 is assigned 1 or 2, the entry in P-AXIS-00106 [▹ 140] is not used.</td></tr>
</table>

4.4.7.2 SERCOS-status bit for measurement (P-AXIS-00106)

P-AXIS-00106	**SERCOS-status bit for measurement**	
Description	This bit coded parameter (f. e. 0x0040) defines the status bit for SERCOS measurement which monitors the status of measuring probe activated/not activated.	
Parameter	lr_hw[i].mask_mess_1	
Data type	UNS16	
Data range	0x0040: Status bit 1 0x0080: Status bit 2	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0x0080	
Drive types	SERCOS	
Remarks		

4.4.7.3 Real-time bits for probe 1

4.4.7.3.1 Name process data 'enable probe 1' (P-AXIS-00675)

P-AXIS-00675	**Name process data 'enable probe 1'**	
Description	This parameter defines the bit that is transferred to a specific cyclical process data element to enable probe 1 to drive SERCOS drives. When one of the real-time control bits of the SERCOS control word is used, this parameter has to be set to 'S-0-0134' or 'S_0_0134'. In all other cases enter the name of the process data element in the process data configuration. If this parameter is used, enter the number of the bit used in P-AXIS-00676 [▸ 141] .	
Parameter	antr.sercos.probe_1_realtime_bits.start_probing.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data, an error message P-ERR-110612is output. The axis parameters P-AXIS-00118 [▸ 126] (messachse) and P-AXIS-00098 [▸ 155] (kasto_axis) are then reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.3.2 Bit number process data 'enable probe 1' (P-AXIS-00676)

P-AXIS-00676	**Bit number process data 'enable probe 1'**	
Description	This parameter defines which bit in the process data configured with P-AXIS-00675 [▸ 140] is used to transfer the 'enable probe 1' bit to the drive. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS control word is used for transmission of the 'enable probe 1' bit, only bit numbers 6 and 7 can be used (real-time control bits 1 and 2).	
Parameter	antr.sercos.probe_1_realtime_bits.start_probing.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110613 is output and the axis parameters P-AXIS-00118 [▸ 126] (messachse) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes.	

4.4.7.3.3 Name process data 'value latched probe 1' (P-AXIS-00677)

P-AXIS-00677	**Name process data 'meas value latched probe 1'**	
Description	This parameter defines the cyclical process data element in which the drive signals that probe 1 latches a value. When one of the real-time status bits of the SERCOS status is used, this parameter must be set to 'S-0-0135' or 'S_0_135'; in all other cases it must be set to the name of the process data in the process data configuration. If this parameter is used, enter the number of the bit used for transmission in P-AXIS-00678 [▸ 142] .	
Parameter	antr.sercos.probe_1_realtime_bits.value_latched.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data configuration, the error message P-ERR-110608 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement run or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.3.4 Bit number process data 'value latched probe 1' (P-AXIS-00678)

P-AXIS-00678	Bit number process data 'value latched probe 1'	
Description	This parameter defines which bit of the process data set up in P-AXIS-00677 [▸ 141] is used to transfer the information that the drive has latched a value with probe 1. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS status word is used for transmission of the 'value latched probe 1' bit, only bit numbers 6 and 7 can be used (real-time status bits 1 and 2).	
Parameter	antr.sercos.probe_1_realtime_bits.value_latched.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110609 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement run or edge banding with incompletely configured probes.	

4.4.7.3.5 Name process data 'probe 1 actuated' (P-AXIS-00679)

P-AXIS-00679	**Name process data 'probe 1 actuated'**	
Description	This parameter defines the cyclical process data in which the drive signals in a bit that probe 1 is actuated. When one of the real-time status bits of the SERCOS status is used, this parameter must be set to 'S-0-0135' or 'S_0_135'; in all other cases it must be set to the name of the process data in the process data configuration. If this parameter is used, enter the number of the bit used for transmission in P-AXIS-00680 [143] .	
Parameter	antr.sercos.probe_1_realtime_bits.probe_actuated.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data configuration, the error message P-ERR-110610 and the axis parameters P-AXIS-00118 [126] (messachse) and P-AXIS-00098 [155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.3.6 Bit number process data 'probe 1 actuated' (P-AXIS-00680)

P-AXIS-00680	**Bit number process data 'probe 1 actuated'**	
Description	This parameter defines which bit of the process data set up in P-AXIS-00679 [143] is used to transfer the information that probe 1 is actuated. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS status word is used for transmission of the 'probe 1 actuated' bit, only bit numbers 6 and 7 can be used (real-time status bits 1 and 2).	
Parameter	antr.sercos.probe_1_realtime_bits.probe_actuated.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110611 and the axis parameters P-AXIS-00118 [126] (measuring axis) and P-AXIS-00098 [155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes.	

4.4.7.4 Real-time bits for probe 2

4.4.7.4.1 Name process data 'enable probe 2' (P-AXIS-00681)

P-AXIS-00681	**Name process data 'enable probe 2'**	
Description	This parameter defines the bit that is transferred to a specific cyclical process data element to enable probe 2 to drive SERCOS drives. When one of the real-time control bits of the SERCOS control word is used, this parameter has to be set to 'S-0-0134' or 'S_0_0134' and in all other cases to the name of the process data element in the process data configuration. If this parameter is used, enter the number of the bit used in P-AXIS-00682 [▸ 145] .	
Parameter	antr.sercos.probe_2_realtime_bits.start_probing.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data configuration, the error message P-ERR-110612 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.4.2 Bit number process data 'enable probe 2' (P-AXIS-00682)

P-AXIS-00682	**Bit number process data 'enable probe 2'**	
Description	This parameter defines which bit in the process data configured with P-AXIS-00681 [▸ 144] is used to transfer the 'enable probe 2' bit to the drive. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS control word is used for transmission of the 'enable probe 2' bit, only bit numbers 6 and 7 can be used (real-time control bits 1 and 2).	
Parameter	antr.sercos.probe_2_realtime_bits.start_probing.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110613 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes.	

4.4.7.4.3 Name process data 'value latched probe 2' (P-AXIS-00683)

P-AXIS-00683	**Name process data 'value latched probe 2'**	
Description	This parameter defines the cyclical process data element in which the drive signals that probe 2 latches a value. When one of the real-time status bits of the SERCOS status is used, this parameter must be set to 'S-0-0135' or 'S_0_135'; in all other cases it must be set to the name of the process data in the process data configuration. If this parameter is used, enter the number of the bit used for transmission in P-AXIS-00684 [▸ 146] .	
Parameter	antr.sercos.probe_2_realtime_bits.value_latched.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data configuration, the error message P-ERR-110608 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.4.4 Bit number process data 'value latched probe 2' (P-AXIS-00684)

P-AXIS-00684	**Bit number process data 'value latched probe 2'**	
Description	This parameter defines which bit of the process data set up in P-AXIS-00683 [▸ 145] is used to transfer the information that the drive has latched a value with probe 2. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS status word is used for transmission of the 'value latched probe 2' bit only bit numbers 6 and 7 can be used (real-time status bits 1 and 2).	
Parameter	antr.sercos.probe_2_realtime_bits.value_latched.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110609 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes.	

4.4.7.4.5 Name process data 'probe 2 actuated' (P-AXIS-00685)

P-AXIS-00685	**Name process data 'probe 2 actuated'**	
Description	This parameter defines the cyclical process data in which the drive signals in a bit that probe 2 is actuated. When one of the real-time status bits of the SERCOS status is used, this parameter must be set to 'S-0-0135' or 'S_0_135'; in all other cases it must be set to the name of the process data in the process data configuration. If this parameter is used, enter the number of the bit used for transmission in P-AXIS-00686 [147] .	
Parameter	antr.sercos.probe_2_realtime_bits.probe_actuated.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data configuration, the error message P-ERR-110610 and the axis parameters P-AXIS-00118 [126] (measuring axis) and P-AXIS-00098 [155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.4.6 Bit number process data 'probe 2 actuated' (P-AXIS-00686)

P-AXIS-00686	**Bit number process data 'probe 2 actuated'**	
Description	This parameter defines which bit of the process data set up in P-AXIS-00685 [147] is used to transfer the information that probe 2 is actuated. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS status word is used for transmission of the 'probe 2 actuated' bit, only bit numbers 6 and 7 can be used (real-time status bits 1 and 2).	
Parameter	antr.sercos.probe_2_realtime_bits.probe_actuated.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110611 and the axis parameters P-AXIS-00118 [126] (measuring axis) and P-AXIS-00098 [155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes.	

4.4.7.5 Real-time bits for start measurement command

4.4.7.5.1 Name of process data element 'start measurement command' (P-AXIS-00699)

P-AXIS-00699	**Name of process data element 'start measurement command'**	
Description	This parameter defines the cyclical process data in which the bit to start the measurement command 1 for SERCOS drives is transferred to the drive. When one of the real-time control bits of the SERCOS control word is used, this parameter has to be set to 'S-0-0134' or 'S_0_0134' and in all other cases to the name of the process data element in the process data configuration. If this parameter is used, enter the number of the bit used for transmission in P-AXIS-00700 [149] .	
Parameter	antr.sercos.probing_command_start.element_name	
Data type	STRING	
Data range	-	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	If the configured element name is not found in the process data configuration, the error message P-ERR-110617 and the axis parameters P-AXIS-00118 [126] (measuring axis) and P-AXIS-00098 [155] (kasto_axis) are reset to prevent the execution of a measurement travel or edge banding with incompletely configured probes. * Note: The default value of variables is a blank string.	

4.4.7.5.2 Bit number of process data element 'start measurement command' (P-AXIS-00700)

P-AXIS-00700	**Bit number of process data element 'start measurement command'**	
Description	This parameter defines which bit in the process data configured with P-AXIS-00699 [▸ 148] is uxed to transfer the bit to start the measurement command to the drive. The last significant bit has number 0, the maximum value depends on the size of the process data used. When the SERCOS control word is used for transmission of the 'start measurement command'' it, only bit numbers 6 and 7 can be used (real-time control bits 1 and 2).	
Parameter	antr.sercos.probing_command_start.bit_nr	
Data type	SGN16	
Data range	-1 … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	SERCOS	
Remarks	If the bit number configured here is invalid, the error message P-ERR-110618 and the axis parameters P-AXIS-00118 [▸ 126] (measuring axis) and P-AXIS-00098 [▸ 155] (kasto_axis) are reset to prevent the execution of a measurement run or edge banding with incompletely configured probes.	

4.4.8 Parameters for measuring travel on fixed stop

4.4.8.1 Limit for position lag (P-AXIS-00331)

P-AXIS-00331	**Limit for position lag during movement to a fixed stop**	
Description	This parameter specifies the limit for the position lag. After exceeding this limit, the fixed stop is detected and the measuring position is taken over.	
Parameter	kenngr.fixed_stop_pos_lag_limit	
Data type	UNS32	
Data range	0 ≤ fixed_stop_pos_lag_limit ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Drive types	Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen	
Remarks		

4.4.8.2 Number of position control cycles (P-AXIS-00332)

P-AXIS-00332	**Number of position control cycles during movement to a fixed stop**	
Description	This parameter defines the number of position control cycles for the waiting time after exceeding the specified position lag limit P-AXIS-00331 [▸ 150] before the measured value is determined. If the limit is again exceeded after this time, counting starts from the beginning.	
Parameter	kenngr.fixed_stop_nbr_cycles	
Data type	UNS16	
Data range	0 < fixed_stop_nbr_cycles < MAX(UNS16)	
Axis types	T, R	
Dimension	T: Number of interpolation cycles	R: Number of interpolation cycles
Default value	0	
Drive types	Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen	
Remarks		

4.4.8.3 Position lag limit for fixed stop detection when measuring travel on fixed stop (P-AXIS-00774)

P-AXIS-00774	**Position lag limit for fixed stop detection when measuring travel on fixed stop**	
Description	This parameter defines the position lag that must be exceeded to detect a fixed stop when measuring on a fixed stop. When set to the value 0, the system check of the position lag to detect a fixed stop is deactivated. If this parameter has the value < 0 (default assignment), a check is made whether P-AXIS-00769 [▸ 451] has the value > 0 and this is used if necessary. If P-AXIS-00769 [▸ 451] is also < 0, the value of P-AXIS-00331 [▸ 150] is used to detect the fixed stop.	
Parameter	kenngr.measure.fixed_stop_detect.pos_lag_limit	
Data type	SGN32	
Data range	MIN(SGN32) < P-AXIS-00774 < MAX(SGN32)	
Axis types	<T, R>	
Dimension	T: 0.1 µm	R: .1* 10- 4 °
Default value	-1	
Drive types	SERCOS, Terminal, Lightbus, Profidrive, CANopen*	
Remarks	*Delete axis types that do not apply! Parameter available as of CNC Build V2.11.2810.01 and higher	

4.4.8.4 Minimum time for fixed stop detection when measuring travel on fixed stop (P-AXIS-00775)

P-AXIS-00775	**Minimum time for fixed stop detection when measuring travel to fixed stop**	
Description	This parameter defines the length of time that the test conditions for detection of the fixed stop must be fulfilled when measuring to fixed stop so that the fixed stop is considered to be detected. If this parameter has the value zero (default), the system checks whether P-AXIS-00770 [▸ 452] has a value > 0 and, if so, this is used. If P-AXIS-00770 [▸ 452] is also 0, the value of P-AXIS-00332 [▸ 150] is used as the time limit for fixed stop detection.	
Parameter	kenngr.measure.fixed_stop_detect.min_time	
Data type	UNS32	
Data range	0 < P-AXIS-00775 < MAX(UNS32)	
Axis types	<T, R>	
Dimension	T: µs	R: µs
Default value	0	
Drive types	----	
Remarks	Parameter available as of CNC Build V2.11.2810.01 and higher	

4.4.8.5 Minimum path to activate fixed stop detection when measuring travel on fixed stop (P-AXIS-00776)

P-AXIS-00776	**Minimum path to activate fixed stop detection when measuring travel to fixed stop**	
Description	This parameter defines how far to travel in the measuring block before fixed stop detection is activated. The value specified is a distance within the measuring block. If the value is less than 0, the system checks whether the parameter P-AXIS-00771 [▸ 452] has a value greater than or equal to zero and, if necessary, this is used; otherwise, the value zero is used for this parameter. A value of zero activates fixed stop detection immediately at the start of the block. If P-AXIS-00777 [▸ 153] is parameterised at the same time, the smaller block motion path defined by the two parameters is used as the minimum path. When measuring with several axes, the smallest block motion path of all axes involved in the measurement is used as the minimum path.	
Parameter	kenngr.measure.fixed_stop_detect.start_distance	
Data type	SGN32	
Data range	MIN(SGN32) < P-AXIS-00776 < MAX(UNS32)	
Axis types	<T, R>	
Dimension	T: 0.1 µm	R: 10-4 °
Default value	0	
Drive types	----	
Remarks	Parameter available as of CNC Build V2.11.2810.01 and higher	

4.4.8.6 Percentage minimum path for fixed stop detection when measuring travel on fixed stop (P-AXIS-00777)

P-AXIS-00777	**Minimum path to activate fixed stop detection when measuring travel to fixed stop, specified in per mill of block length**	
Description	This parameter defines the distance per mill of the measuring block that must be travelled before fixed stop detection is activated. If the value is less than 0, the system checks whether P-AXIS-00772 [▸ 454] has a value greater than or equal to zero and, if necessary, this is used; otherwise, fixed stop detection is activated at the start of the block. A value of zero activates fixed stop detection immediately at the start of the block. If P-AXIS-00776 [▸ 152] is parameterised at the same time, the smaller block motion path defined by the two parameters is used as the minimum path. When measuring with several axes, the smallest block motion path of all axes involved in the measurement is used as the minimum path. The permitted maximum value is 1000. If this value is exceeded at controller start, the warning ID 110757 is output but the value is not automatically corrected. If the parameter is still greater than 1000 at the start of a measuring travel, the error message ID 51026 is output and the program is aborted.	
Parameter	kenngr.measure.fixed_stop_detect.start_distance_per_mille	
Data type	SGN16	
Data range	MIN(SGN16) < P-AXIS-00777 ≤ 1000	
Axis types	<T, R>	
Dimension	T: 0.1 %	R: 0.1 %
Default value	-1	
Drive types	----	
Remarks	If the error message ID 51026 is output at the start of a measuring travel and this parameter has a value less than 0, the value of the parameter P-AXIS-00772 [▸ 454] must be checked. Parameter available as of CNC Build V2.11.2810.xx ??	

4.4.8.7 Maximum position change for fixed stop detection when measuring travel on fixed stop (P-AXIS-00778)

P-AXIS-00778	**Maximum permitted position change during fixed stop detection when measuring travel to fixed stop**	
Description	This parameter defines the maximum path which may be travelled in the time defined by P-AXIS-00775 [▸ 151] to detect the fixed stop. Together with P-AXIS-00775 [▸ 151] , an average velocity is defined but this may not be exceeded to detect the fixed stop. If the value is less than 0, the system checks whether P-AXIS-00773 [▸ 455] has a value greater than or equal to zero and, if necessary, this is used; otherwise, velocity monitoring for fixed stop detection is deactivated.	
Parameter	kenngr.measure.fixed_stop_detect.max_delta_position_window	
Data type	SGN32	
Data range	MIN(SGN32) < P-AXIS-00778 ≤ MAX(UNS32)	
Axis types	<T, R>	
Dimension	T: 0.1 μ	R: 10e-4 °
Default value	-1	
Drive types	----	
Remarks	Parameter available as of CNC Build V2.11.2810.xx ??	

4.4.9 Abortion of measuring order at reset (P-AXIS-00378)

P-AXIS-00378	**Abortion of measuring order at reset**	
Description	This parameter defines whether a measurement order is aborted (e.g. MC_TouchProbe) at reset. When a PLC is cold-started, the ISG motion control platform always aborts all outstanding measurement orders (MC_AbortTrigger).	
Parameter	kenngr.keep_tp_over_reset	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	KUKA	
Remarks		

4.4.10 Actuation time delay of probe (P-AXIS-00487)

P-AXIS-00487	**Actuation time delay of probe**	
Description	This parameter sets the actuation time delay of the probe. When the probe is actuated, the CNC corrects the measured position to compensate for the actuation time delay of the probe. The axis velocity during measurement is considered to be constant. Velocity changes due to acceleration or deceleration processes are not accounted for.	
Parameter	kenngr.probe_actuation_time_delay	
Data type	UNS32	
Data range	0 ≤ probe_actuation_time_delay ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks		

4.5 Activation of edge banding (P-AXIS-00098)

P-AXIS-00098	**Activation of edge banding**	
Description	The parameter serves as a flag to mark physical measurement axes to use the functionality 'edge banding' in freely defined coordinate systems.	
Parameter	kenngr.kasto_achse	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	This parameter is only used for certain applications [PROG].	

4.6 Gantry mode

Additional monitoring mechanisms apply to gantry axes with regard to the deviation of axis positions and special strategies for compensating these deviations. Static (also mechanical) gantry mode is defined by configuration because the axes are firmly coupled to one another due to the machine structure. Dynamic (also programmable) gantry mode can be defined in the NC program. The axis parameters listed in the following table must be assigned depending on the type of gantry mode:

Parameter	**Static gantry mode ***	**Dynamic gantry operation**
gantry_ax_nr [▷ 157]	**X**	
gantry_max_diff_resetable [▷ 157]	**X**	**X**
gantry_max_diff_reset_locked [▷ 158]	**X**	**X**
gantry_offset [▷ 158]	**X**	
gantry_vb_korr [▷ 159]	**X**	**X**
gantry_diff_check_without_homing [▷ 159]	X	
gantry_synchronous_slave_homing [▷ 160] (only for SERCOS drives)	X	
cnc_controlled_stop_after_error [▷ 160]	X	
gantry_on_mode [▷ 161]	X	
gantry_max_homing_dist [▷ 162]	X	
gantry_slave_no_homing [▷ 162]	X	
gantry_independent_set_refpos [▷ 163]	X	
gantry_slave_relative_homing [▷ 163]	X	

*In static gantry mode the corresponding axis mode bit must additionally be set for the master and slave axes (P-AXIS-00018 [▷ 69]).

4.6.1 Axis number of master axis (P-AXIS-00070)

P-AXIS-00070	**Axis number of master axis**	
Description	In the axis parameter list of the slave axis the logical number of its master axis is entered. If this parameter is assigned, the master and slave axes are assigned to one another during start-up. This so-called static gantry coupling exists at the position controller level. The slave axis is not known in the channel. A movement is only executed by programming their master axis.	
Parameter	kenngr.gantry_ax_nr	
Data type	UNS16	
Data range	1 ≤ gantry_ax_nr ≤ MAX (UNS16)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.	

4.6.2 Resettable path distance (P-AXIS-00072)

P-AXIS-00072	**Resettable path distance**	
Description	Maximum permissible path distance between master and slave gantry axes. Error that can be remedied by NC reset.	
Parameter	kenngr.gantry_max_diff_resetable	
Data type	UNS32	
Data range	0 < gantry_max_diff_resetable < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.6.3 Non resettable path distance (P-AXIS-00071)

P-AXIS-00071	**Non resettable path distance between master and slave axes**	
Description	Maximum permissible path distance between master and slave gantry axes. Error that cannot be remedied by NC reset.	
Parameter	kenngr.gantry_max_diff_reset_locked	
Data type	UNS32	
Data range	0 < gantry_max_diff_resetable < gantry_ max_diff_reset_locked < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.6.4 Static offset (P-AXIS-00073)

P-AXIS-00073	**Static offset between master and slave axes**	
Description	Static difference between the master and slave axes in the event of differences between the master and slave axes. The offset sign results from the calculation instruction: OFFSET = SLAVE - MASTER	
Parameter	kenngr.gantry_offset	
Data type	SGN32	
Data range	MIN(SGN32) < gantry_offset < MAX(UNS3	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.6.5 Velocity of correction (P-AXIS-00075)

P-AXIS-00075	**Velocity of correction for compensation of gantry difference**	
Description	The parameter defines the velocity at which the axis position of the slave axis is corrected until the distance between master and slave is less than P-AXIS-00073 [▸ 158] .	
Parameter	kenngr.gantry_vb_korr	
Data type	UNS32	
Data range	0 < gantry_vb_korr < P-AXIS-00212 [▸ 245]	
Axis types	T, R	
Dimension	T: 1µm/s	R: 0.001°/s
Default value	0	
Drive types	----	
Remarks		

4.6.6 Gantry difference monitoring before homing (P-AXIS-00249)

P-AXIS-00249	**Gantry difference monitoring before homing**	
Description	By default, the position difference between the gantry master and the slave axis is not monitored until both the master and the slave axes have been homed. This parameter activates gantry difference monitoring before homing (*gantry_diff_check_without_homing = 1*). The parameters P-AXIS-00072 [▸ 157] and P-AXIS-00071 [▸ 158] are used as limits during monitoring. The offset between master and slave axis at the time of controller start-up is used for position offset instead of P-AXIS-00073 [▸ 158] . On completion of homing, the parameter P-AXIS-00073 [▸ 158] is used as position offset.	
Parameter	kenngr.gantry_diff_check_without_homing	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

4.6.7 Drive-controlled homing of gantry axis (SERCOS) (P-AXIS-00253)

P-AXIS-00253	**Drive-controlled homing of gantry axis (SERCOS)**	
Description	With drive-controlled homing (digital drives, SERCOS) the homing procedure is started synchronously for all gantry axes. The user must also ensure that the homing parameter settings are the same for all drives.	
Parameter	kenngr.gantry_synchronous_slave_homing	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	SERCOS	
Remarks	Drive-controlled homing must run identically for both drives (e.g. without cam and distance-coded measurement system). This must be initiated by corresponding parameters. For safety reasons, torque can be reduced during the homing procedure.	

4.6.8 CNC-controlled error reaction (P-AXIS-00254)

P-AXIS-00254	**CNC-controlled error reaction for gantry axes**	
Description	In case of an error, an intelligent drive executes an error reaction independently in most cases and reports this to the CNC. The CNC can then stop other axes in the gantry system running with an incorrect axis. With gantry axes it is not allowed for one axis in the gantry system to stop independently. For this reason the CNC can execute a controlled stop of the complete gantry system in the event of an axis error. The function must be set for the master and the slave axes. A check is made whether the settings for master and slave axes are identical and as required, they are corrected in the slave axes.	
Parameter	kenngr.cnc_controlled_stop_after_error	
Data type	BOOLEAN	
Data range	0: Drive-internal error reaction 1: CNC-controlled error reaction	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	In the case of a CNC-controlled error response, the axis is stopped at the specified emergency stop acceleration P-AXIS-00003 [▸ 246] (a_emergency). This parameter can be used with SERCOS and CANopen drives. In addition a SERCOS drive must be parameterised so that it does not execute any independent (or only delayed) error response (see EcoDrive P-0-0117).	

4.6.9 Conditions for clearing the gantry difference (P-AXIS-00704)

P-AXIS-00704	**Conditions for clearing the gantry difference**	
Description	This parameter determines the conditions for the clearance of the gantry difference.	
Parameter	kenngr.gantry_on_mode	
Data type	STRING	
Data range	**Mode**	**Meaning**
	DEFAULT	The gantry difference is cleared at reset or when the control unit 'gantry_on' ([HLI]) is set.
	ONLY_CONTROL_UNIT	The gantry difference is only cleared when the drive enables are set, the drive status is 'ready' and the control unit 'gantry_on' is set.
	EDGE_TRIGGERED	The gantry difference is cleared on a rising edge of the control unit 'gantry_on'. The behaviour of this setting is equivalent to the behaviour of a set axis parameter P-AXIS-00261 [▸ 164].
	CONFIG :	Deactivates gantry control and prevents the clearing of a gantry difference.
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	DEFAULT	
Drive types	----	
Remarks	When the axis parameter P-AXIS-00261 [▸ 164] is set, only DEFAULT or EDGE_TRIGGERED are used for P-AXIS-00704, otherwise the error message P-ERR-110606 is output. The parameter is available as of V2.11.2034.02.	

Programing Example

Gantry difference with mode CONFIG

```
; Activate config mode
#MACHINE DATA [AXNR=4 AXPARAM="kenngr.gantry_on_mode CONFIG"]
; Torque homing of the gantry axes,
; Determination of offset by the user/program
; Deactivate config mode
#MACHINE DATA [AXNR=4 AXPARAM="kenngr.gantry_on_mode DEFAULT"]
```

4.6.10 Maximum path for a gantry slave axis during homing (P-AXIS-00284)

P-AXIS-00284	**Maximum path for a gantry slave axis during homing**	
Description	This parameter limits the permissible movement range of a gantry slave axis during homing. This parameter defines the maximum movement distance of the axis in positive and negative direction relative to the axis position at the start of the axis homing cycle. If the permitted range is exceeded, an error message with ID P-ERR-70229 is output and homing is aborted. Setting this value to 0 deactivates distance monitoring (default).	
Parameter	kenngr.gantry_max_homing_dist	
Data type	SGN32	
Data range	0 < gantry_max_homing_dist < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

4.6.11 Suppress homing for gantry slave axis (P-AXIS-00074)

P-AXIS-00074	**Suppress homing for gantry slave axis**	
Description	This parameter can suppress the homing of gantry slave axes. When homing of the master axis is completed, the reference positions entered in the axis parameter lists of the slave axes are also adopted and monitoring of the gantry difference is started.	
Parameter	kenngr.gantry_slave_no_homing	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	----	
Remarks	This parameter is not supported in the case of spindle axes.	

4.6.12 Home gantry slave axis relative to encoder overflow (P-AXIS-00393)

P-AXIS-00393	Home gantry slave axis relative to encoder overflow	
Description	When this parameter is set to 1, a gantry slave axis is homed with the following method: At the moment when the master axis position is set, the offset of the slave axis relative to the encoder overflow is determined and the slave axis position is set to P-AXIS-00152 [89] + 'distance to encoder overflow'. No homing movement takes place for this axis. The mechanical axis position of the slave axis can be shifted by P-AXIS-00354 [96] .	
Parameter	kenngr.gantry_slave_relative_homing	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	This parameter can only be used if the following conditions are fulfilled: • The slave axis encoder delivers an absolute position within one motor revolution. • The slave axis can never be moved more than half a motor revolution in positive or negative direction with respect to the master axis. If these conditions are not fulfilled, the machine may be damaged!	

4.6.13 Behaviour on setting the homing position (P-AXIS-00445)

P-AXIS-00445	Behaviour on setting the homing position	
Description	This parameter defines the behaviour on setting the homing position for a gantry slave axis (see [HLI//Control commands of an axis].	
Parameter	kenngr.gantry_independent_set_refpos	
Data type	BOOLEAN	
Data range	0: If the home position is set for the master axis, the home position is also set in the same cycle for all gantry slave axes belonging to this master axis. 1: If the parameter is set to 1 for a gantry slave axis, the homing position can be set independently of its master axis. Setting the homing position on the gantry master axis has no influence for this slave axis.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.6.14 Clearing the gantry difference when drive is enabled (P-AXIS-00703)

P-AXIS-00703	**Clearing the gantry difference when drive is enabled**	
Description	By default, clearing the gantry difference is controlled by the control unit gantry_on ([HLI:]) and the axis parameter P-AXIS-00704 [▸ 161] (gantry_on_mode). Independent of the mode set in P-AXIS-00704 [▸ 161] , this parameter sets the conditions for clearing the gantry difference when the drive controller is enabled by the PLC and reports the “ready for operation’ state.	
Parameter	kenngr.gantry_on_with_drive_enable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	This parameter is not available under TwinCAT., but currently only for HMG-PC85 and HMG-PC87.	

4.6.15 Edge detection GantryOn-signal (P-AXIS-00261)

P-AXIS-00261	**Edge detection GantryOn signal**	
Description	This parameter activates edge detection for the HLI signal MCControlBoolUnit_GantryOn. Further information about MCControlBoolUnit_GantryOn is contained in [HLI]. When the parameter is assigned a value of 1, the gantry difference is only cleared independently of the set correction speed P-AXIS-00075 [▸ 159] after a rising edge of the signal MCControlBoolUnit_GantryOn. Clearing the gantry difference after a CNC reset is also suppressed.	
Parameter	kenngr.gantry_deskew_trigger	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	The functionality of this parameter is contained in P-AXIS-00704 [▸ 161] . For this, P-AXIS-00704 [▸ 161] (gantry_on_mode) must be set with EDGE_TRIGGERED.	

4.7 Monitoring of axis collision

4.7.1 Logical axis number (P-AXIS-00043)

P-AXIS-00043	Monitoring of axis collision: Logical axis number	
Description	Logical axis number of the monitored axis. For this axis, the axis mode (P-AXIS-00015) [▸ 71]) must be set to bit 0x8000.	
Parameter	kenngr.coll_check_ax_nr	
Data type	UNS32	
Data range	1 ≤ coll_check_ax_nr < MAX(UNS32)	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.7.2 Security distance (P-AXIS-00045)

P-AXIS-00045	Monitoring of axis collision: Security distance	
Description	Minimum distance between two collision axes.	
Parameter	kenngr.coll_offset	
Data type	UNS32	
Data range	1< coll_offset < MAX(UNS32)	
Axis types	T	
Dimension	T: 0.1µm	
Default value	0	
drive types.	----	
Remarks		

4.7.3 Stopping in all channels in case of drive errors (P-AXIS-00044)

P-AXIS-00044	**Monitoring of axis collision: Stopping in all channels during drive faults**	
Description	If collision axes are assigned to different channels, a stop in all channels can be forced by this parameter if one collision axis reports a drive error. This ensures that an error in the measurement system of an axis does not result in an axis collision.	
Parameter	kenngr.coll_decelerate_chan	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.7.4 Inverting of moving directions (P-AXIS-00262)

P-AXIS-00262	**Monitoring of axis collision: Inverting of moving directions**	
Description	If the axes of a collision pair at a programmed movement in the same direction move mechanically in different directions, this parameter must be set to 1.	
Parameter	kenngr.coll_moving_dir_inverted	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.7.5 Offset of zero positions (P-AXIS-00263)

P-AXIS-00263	Monitoring of axis collision: Offset of zero positions	
Description	Enter a possible offset between the zero positions of the collision pair in this parameter. The offset value describes the position of the zero position of the collision partner in the axis co-ordinate system of the master axis.	
Parameter	kenngr.coll_zero_position_offset	
Data type	SGN32	
Data range	MIN(SGN32)<coll_zero_position_offset<MAX(SGN32)	
Axis types	T	
Dimension	T: 0.1µm	
Default value	0	
drive types.	----	
Remarks		

4.7.6 Valid deceleration (P-AXIS-00267)

P-AXIS-00267	Monitoring of axis collision: Valid deceleration	
Description	By default, for collision monitoring P-AXIS-00008 [▸ 246] (a_max) is used to calculate the braking distance and to decelerate the axis if a collision is detected. The parameter P-AXIS-00267 can determine that collision monitoring must be carried out with P-AXIS-00003 [▸ 246] (a_emergency).	
Parameter	kenngr.coll_use_a_emergency	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
drive types.	----	
Remarks		

4.8 Tracking mode

4.8.1 Maximum feed of compensation movement after deselection (P-AXIS-00208)

P-AXIS-00208	Tracking mode: Maximum feed of compensation movement after deselection	
Description	During active tracking, the axis can be moved out of its command position manually. This leads to a difference between the original command position and the current position. If tracking is activated while a program is executed or when manual mode is active, when tracking is deactivated, the axis is moved back to the position where tracking was selected. This can be performed step-shaped (vb_corr_tracking = 0) or with interpolation (vb_corr_tracking != 0). The parameter P-AXIS-00258 [▹ 169] can suppress this movement.	
Parameter	kenngr.vb_corr_tracking	
Data type	UNS32	
Data range	0 ≤ vb_corr_tracking ≤ P-AXIS-00212 [▹ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	0	
Drive types	----	
Remarks		

4.8.2 Maximum difference after deactivation (P-AXIS-00056)

P-AXIS-00056	Tracking mode: Maximum difference after deactivation	
Description	After deactivating the tracking operation, the command position of the axis usually deviates from the command position when tracking mode is activated. Before interpolation is continued for an active NC program, this difference in position is reduced in order to be able to process the N program within any offsets. The parameter defines an upper limit for this deviation. If the deviation exceeds this limit, an error message is generated, while deviations lower than this parameter lead to a move back to the stored command position (see P-AXIS-00208 [▹ 168]).	
Parameter	kenngr.diff_pos_tracking	
Data type	UNS32	
Data range	0 ≤ diff_pos_tracking ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	10000	
Drive types	----	
Remarks	Setting the value to 4294967295 (in version V2.11.20xx) or to a value >= 4000000000 (from CNC version V2.11.2800 onwards) deactivates monitoring of the position difference and moving back to the saved command position.	

4.8.3 Keep position offset after tracking (P-AXIS-00258)

P-AXIS-00258	Tracking mode: Keep position offset after tracking	
Description	If tracking is activated and deactivated while executing a program or while manual mode is active, the axis is moved back to the position where tracking was selected. This movement can be suppressed with this parameter.	
Parameter	kenngr.tracking_offset_remain	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.8.4 Acceleration for back-interpolation after tracking mode (P-AXIS-00760)

P-AXIS-00760	Acceleration for back-interpolation after tracking mode	
Description	This parameter sets the acceleration which is used to back-interpolate to the selection position on completion of tracking mode. If this parameter is not assigned or the value is zero, the value in P-AXIS-00011 [229] is used as acceleration value. If a value is set greater than P-AXIS-00008, [246] a warning is output with ID 110651 and the value to limited to P-AXIS-00008 [246] .	
Parameter	getriebe[i].a_pos_corr_tracking	
Data type	UNS32	
Data range	[0 … P-AXIS-00008 [246]]	
Axis types	T, R	
Dimension	T: mm/s^2	R: °/s^2
Default value	0	
Drive types	----	
Remarks		

4.9 Gear data

The data of the axis parameter list can be classified into gear step-dependent and gear step-independent data.

This section describes the parameters for the definition of the gear steps and the gear change positions.

4.9.1 Default gear step number (P-AXIS-00079)

P-AXIS-00079	Default gear step number	
Description	This parameter defines the gear step number which is supposed to be active at the time of controller start-up.	
Parameter	kenngr.getriebe_stufe	
Data type	UNS16	
Data range	1 ≤ getriebe_stufe < MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks		

4.9.2 Default gear step number for C-axis mode (P-AXIS-00052)

P-AXIS-00052	**Default gear step number for C-axis mode**	
Description	This parameter defines the gear step number for C-axis mode. In C-axis mode the axis changes from the spindle interpolator into the path interpolator. In the path interpolator the gear step for the axis changes automatically to the corresponding gear step.. See Tapping (G63)	
Parameter	kenngr.def_cax_gear_st	
Data type	UNS08	
Data range	1 ≤ def_cax_gear_st < MAX(UNS16)	
Axis types	R, S	
Dimension		R,S: ----
Default value	1	
drive types.	----	
Remarks		

4.10 Settings for SAI (Single Axis Interpolation)

The following parameters are only necessary if the axis is operated as SAI-axis.

4.10.1 Configuration of a SAI-axis (P-AXIS-00250)

P-AXIS-00250	**Configuration of a SAI axis for PLCopen**	
Description	For the PLCopen specific axis characteristic, the SAI must not only be configured for spindle axes but also for translatory and rotary axes. This is controlled by the parameter.	
Parameter	kenngr.configure_sai	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.2 Requesting of a SAI axis at RESET (P-AXIS-00251)

P-AXIS-00251	**Requesting of a SAI axis at RESET**	
Description	An SAI (or spindle) can be commanded via #PUTAX by a channel to release its axis. If the SAI receives a RESET from the same channel and it has no axis under control, this SAI requests the axis again automatically.	
Parameter	kenngr.auto_call_ax	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.3 Moving to a target position after reversal of direction (P-AXIS-00252)

P-AXIS-00252	**Moving to a target position after reversal of direction for PLCOpen**	
Description	For PLCopen axes this parameter defines the mode of movement to a new target position after reversal of direction.	
Parameter	kenngr.consider_total_brake_dist	
Data type	BOOLEAN	
Data range	0: Determining of the new target position by modulo calculation after reversal of direction. 1: On reversal of the turning direction the target position is reached by travelling back the whole braking distance and then moving to the target position.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.4 Switching off superimposed interpolator (P-AXIS-00287)

P-AXIS-00287	**Switching off superimposed interpolator for PLCOpen**	
Description	For PLCOpen functionality 'superimposed movement' in a Single Axis Interpolator, a second interpolator is supplied for the superimposed movement. If this functionality is not needed, the second interpolator can be disabled in order to save calculation time. By default the second interpolator is switched off.	
Parameter	kenngr.disable_super_imposed	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.5 Enable decoupling of the drive of an axis (P-AXIS-00489)

P-AXIS-00489	**Enable decoupling of the drive of an axis for PLCopen**	
Description	As part of PLCopen, P-AXIS-00489 allows the setting whether the drive of an axis can be decoupled for a mechanical drive exchange. If decoupling is commanded, although this is not allowed, an error message is generated.	
Parameter	kenngr.enable_decouple	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.6 Camming/Gearing (cam_gear.*)

With camming or gearing is used, a movement is synchronised between two axes. The movement relation between the two axes is defined either by a constant factor (gearing) or by a table which defines the slave axis positions dependent on the master axis positions (camming).

To generate this synchronous movement, the axes must first be speed-synchronised. The following parameters define the conditions when speed synchronisation is finished.

4.10.6.1 Define axis as Camming / Gearing -Master (P-AXIS-00288)

P-AXIS-00288	**Define axis as Camming / Gearing -Master**	
Description	If the spindle or the SAI is used as master axis of a synchronous movement, this parameter has to be set to 1.	
Parameter	cam_gear.is_master	
Data type	BOOLEAN	
Data range	0: Axis is not master 1: Axis is master	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.6.2 Velocity tolerance range (P-AXIS-00289)

P-AXIS-00289	**Velocity tolerance range for camming / gearing**	
Description	This parameter defines the permissible velocity difference for considering the axes as synchronous in velocity.	
Parameter	cam_gear.v_diff_percent	
Data type	UNS16	
Data range	0 ... 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	100	
Drive types	----	
Remarks		

4.10.6.3 Minimum time in tolerance range for speed synchronisation (P-AXIS-00290)

P-AXIS-00290	**Minimum time in tolerance range for speed synchronisation for camming / gearing**	
Description	Time wchih the axis must be in the tolerance range defined in P-AXIS-00289 [175] Until it is considered speed-synchronous.	
Parameter	cam_gear.time_in_window	
Data type	UNS32	
Data range	0 ... MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	8000	
Drive types	----	
Remarks		

4.10.6.4 Maximum time for velocity synchronisation (P-AXIS-00291)

P-AXIS-00291	**Maximum time for velocity synchronisation for camming / gearing**	
Description	Maximum permissible time for synchronisation. If synchronisation is not reached within the time set in this parameter, synchronisation is stopped and an error message is output.	
Parameter	cam_gear.time_out_in_window	
Data type	UNS32	
Data range	0 ... MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	1000000	
Drive types	----	
Remarks		

4.10.6.5 Average value filter for current master velocity (P-AXIS-00300)

P-AXIS-00300	**Average value filter for current master velocity for camming / gearing**	
Description	This parameter activates the arithmetic average value filter for the mast actual velocity. 0 – inactive 1 – active This parameter is used for gearing at the current master velocity.	
Parameter	cam_gear.mv_type	
Data type	UNS16	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.6.6 Number of scanning cycles for average value filter (P-AXIS-00301)

P-AXIS-00301	**Number of scanning cycles for average value filter for camming / gearing**	
Description	Number of scanning cycles for filtering of the current master velocity. This parameter is used for gearing at the current master velocity.	
Parameter	cam_gear.mv_nbr_cycles	
Data type	UNS32	
Data range	1 ... 100	
Axis types	T, R, S	
Dimension	T: Number of interpolation cycles	R,S: Number of interpolation cycles
Default value	0	
Drive types	----	
Remarks		

4.10.6.7 Delay time on gearing with current master velocity (P-AXIS-00302)

P-AXIS-00302	**Delay time on gearing with current master velocity for camming / gearing**	
Description	Parameter of delay time compensation for gearing with current master velocity. This parameter must be determined for a specific system because it depends on axis filters and delay times in the (digital) drive. This parameter is used for gearing with the current master velocity.	
Parameter	cam_gear.delay_time	
Data type	UNS32	
Data range	0 ... 1E+7	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks		

4.10.6.8 Maximum commanded velocity for slave axis (P-AXIS-00303)

P-AXIS-00303	**Maximum commanded velocity for slave axis for camming / gearing**	
Description	Limit of commanded velocity for a slave axis during velocity synchronisation (for camming and gearing) and during synchronous camming.	
Parameter	cam_gear.v_max_slave	
Data type	UNS32	
Data range	1 ... MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: µm/s
Default value	1	
Drive types	----	
Remarks		

4.10.6.9 Maximum commanded acceleration for slave axis (P-AXIS-00304)

P-AXIS-00304	**Maximum commanded acceleration for slave axis for camming / gearing**	
Description	Maximum permitted commanded acceleration for a slave axis during synchronous gearing.	
Parameter	cam_gear.a_max_slave	
Data type	UNS32	
Data range	1 ... MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: mm/s²
Default value	1	
Drive types	----	
Remarks		

4.10.6.10 Velocity for phase synchronisation (P-AXIS-00305)

P-AXIS-00305	**Velocity for phase synchronisation for camming / gearing**	
Description	Velocity for phase synchronisation at camming.	
Parameter	cam_gear.v_phasing	
Data type	UNS32	
Data range	1 ... P-AXIS-00212 [▸ 245] / 2	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: µm/s
Default value	1	
Drive types	----	
Remarks		

4.10.6.11 Acceleration for phase synchronisation (P-AXIS-00306)

P-AXIS-00306	**Acceleration for phase synchronisation for camming / gearing**	
Description	Acceleration for phase synchronisation at camming.	
Parameter	cam_gear.a_phasing	
Data type	UNS32	
Data range	1 ... P-AXIS-00008, [246] / 2	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: mm/s²
Default value	1	
Drive types	----	
Remarks		

4.10.6.12 Deceleration for phase synchronisation (P-AXIS-00307)

P-AXIS-00307	**Deceleration for phase synchronisation for camming / gearing**	
Description	Deceleration for phase synchronisation at camming.	
Parameter	cam_gear.d_phasing	
Data type	UNS32	
Data range	1 ... P-AXIS-00008, [246] / 2	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: mm/s²
Default value	1	
Drive types	----	
Remarks		

4.10.6.13 Jerk for phase synchronisation (P-AXIS-00376)

P-AXIS-00376	**Jerk for phase synchronisation for camming / gearing**	
Description	Jerk for phase synchronisation at camming.	
Parameter	cam_gear.j_phasing	
Data type	UNS32	
Data range	1 ... (P-AXIS-00008, [246] / 2) / P-AXIS-00201 [247])	
Axis types	T, R, S	
Dimension	T: mm/s³	R,S: mm/s²
Default value	10	
Drive types	----	
Remarks		

4.10.6.14 Jerk for velocity synchronisation (P-AXIS-00377)

P-AXIS-00377	**Jerk for velocity synchronisation for camming / gearing**	
Description	Jerk for velocity synchronisation at camming.	
Parameter	cam_gear.j_vel_sync	
Data type	UNS32	
Data range	1 ... (P-AXIS-00008 [246] / 2) / P-AXIS-00201 [247])	
Axis types	T, R, S	
Dimension	T: mm/s³	R,S: mm/s²
Default value	1000	
Drive types	----	
Remarks		

4.10.6.15 Coupling behaviour on error from position control (P-AXIS-00308)

P-AXIS-00308	**Coupling behaviour on error from position control for camming / gearing**	
Description	Handling of cam/gear coupling on emergency stop.	
Parameter	cam_gear.keep_coupling_on_lr_error	
Data type	BOOLEAN	
Data range	0: The camming/gearing coupling in the slave axis is detached on emergency stop. The axis is decelerated with the current limit parameter. 1: The camming/gearing coupling in the slave axis is maintained on emergency stop.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.6.16 Coupling behaviour on feed enable drop (P-AXIS-00309)

P-AXIS-00309	**Coupling behaviour on feed enable drop for camming / gearing**	
Description	Handling of camming/gearing coupling when 'Feed_enable' drops.	
Parameter	cam_gear.keep_coupling_on_fe_drop	
Data type	BOOLEAN	
Data range	0: The camming/gearing coupling in the slave axis is detached when ‘feed enable’ watchdog drops. The axis is decelerated with the current limit parameter and switched to error state. 1: The camming/gearing coupling in the slave axis is maintained when ‘feed enable’ watch-dog drops. The safety state has to be reached by stopping the master axis.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.10.6.17 Permissible acceleration of master actual position (P-AXIS-00437)

P-AXIS-00437	**Permissible acceleration of master actual position for camming / gearing**	
Description	This parameter specifies the permissible acceleration limit for a gear coupling based on actual values (MC_GearIn, see [MCP-P1]). The master actual position is extrapolated if the given acceleration is exceeded. The acceleration limit is specified for the slave axis as a factor related to its maximum axis acceleration (see P-AXIS-00008 [246]).	
Parameter	cam_gear.fact_a_max_correction	
Data type	UNS32	
Data range	0 < fact_a_max_correction < MAX(UNS32) Default value: 1500 (150%)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	1500	
Drive types	----	
Remarks		

4.10.6.18 Error response of the master axis when the coupling is active (P-AXIS-00564)

P-AXIS-00564	Error response of the master axis on camming or gearing	
Description	This parameter defines whether the master axis stops with the same error response on occurrence of an error on the slave axis when a coupling is active.	
Parameter	cam_gear.error_stop_master	
Data type	BOOLEAN	
Data range	0: The master axis is not stopped on occurrence of an error on the slave axis 1: The master axis stops with the same error response on occurrence of an error on the slave axis	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	If this parameter is set to the value 1, the master and slave axes must use the same emergency stop deceleration (see P-AXIS-00254 [▷ 160], P-AXIS-00002 [▷ 236], P-AXIS-00197 [▷ 238], P-AXIS-00198 [▷ 238])	

4.10.6.19 Error response of the slave axis when the coupling is active (P-AXIS-00565)

P-AXIS-00565	Error response of the slave axis on camming or gearing	
Description	This parameter defines whether the slave axis also stops with the same error response on occurrence of an error on the master axis when a coupling is active.	
Parameter	cam_gear.error_stop_slave	
Data type	BOOLEAN	
Data range	0: The slave axis does not stop by itself if there is an error on the master axis The coupling to the master axis is retained. 1: The slave axis stops with the same error response on occurrence of an error on the master axis	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	If this parameter is set to the value 1, the master and slave axes must use the same emergency stop deceleration (see P-AXIS-00254 [▷ 160], P-AXIS-00002 [▷ 236], P-AXIS-00197 [▷ 238], P-AXIS-00198 [▷ 238])	

4.11 Velocity monitoring

4.11.1 Velocity limit during active monitoring of current velocity (P-AXIS-00311)

P-AXIS-00311	**Velocity limit during active monitoring of current velocity**	
Description	If velocity monitoring is activated by P-AXIS-00312 [185] (enable_speed_monitoring), then the current velocity of rotary axes is monitored at this limit. Translator axes are monitored according to EN775 at a fixed limit of 250 mm/s. If the parameter is 0 or does not exist, then monitoring is carried out with P-AXIS-00268 [92] (vb_not_referenced). If the limit is exceeded, movement is stopped with emergency stop ramp.	
Parameter	getriebe[i].vb_monitor	
Data type	UNS32	
Data range	1 ≤ vb_monitor < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	0	
Drive types	----	
Remarks		

4.11.2 Activation of speed monitoring (P-AXIS-00312)

P-AXIS-00312	**Activation of speed monitoring**	
Description	Monitoring of current speed can be activated with this parameter. The maximum permissible speed is set with P-AXIS-00311 [185] (vb_monitor).	
Parameter	kenngr.enable_speed_monitoring	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.11.3 Activation of feed enable via PLC (P-AXIS-00313)

P-AXIS-00313	**Activation of feed enable via PLC**	
Description	If feed enable is controlled via PLC, then this parameter must be activated. If this parameter is set, the feed enable watchdog of the PLC-interface is evaluated. If this watchdog is not triggered, the interpolator stops on the path via feedhold.	
Parameter	kenngr.enable_feed_enable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.11.4 Speed monitoring during torque limitation (P-AXIS-00314)

P-AXIS-00314	**Speed monitoring during torque limitation**	
Description	In torque limit mode the current velocity is monitored with this parameter. If the parameter is 0 or does not exist, then monitoring is carried out with P-AXIS-00212 [▸ 245] (vb_max).	
Parameter	getriebe[i].vb_torq_limit_max	
Data type	UNS32	
Data range	1 ≤ vb_torq_limit_max < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: μm/s	R,S: 0.001°/s
Default value	0	
Drive types	SERCOS	
Remarks	When this parameter is set to 0, P-AXIS-00212 [▸ 245] (vb_max) is used for monitoring.	

4.12 Behaviour when enabling the drive controller

4.12.1 Max. allow. relieve position difference when enabling drive controller (P-AXIS-00108)

P-AXIS-00108	**Maximum permissible position difference when setting the enables of the drive controller**	
Description	By setting the enables of the drive controller, the position control circuit of the axis is closed and the axis attempts to approach the currently set command value as soon as possible. If this command value differs from the actual value, an abrupt stimulation of the drive occurs. In order to limit the resulting axis movement, the position difference is monitored for compliance with a limit value. If the actual difference between command and actual position is greater than the specified value when setting the drive enables, an error message is generated. The difference is not cleared. The difference is cleared depending on P-AXIS-00327 [▸ 188] either in a step-shaped (P-AXIS-00327 [▸ 188] = 0) or an interpolated fashion (P-AXIS-00327 [▸ 188] = 1) with the dynamic parameters set in P-AXIS-00208 [▸ 168] and P-AXIS-00011 [▸ 229] .	
Parameter	kenngr.max_diff_soll_ist	
Data type	SGN32	
Data range	0 < max_diff_soll_ist < MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.0001 °
Default value	10000	
Drive types	----	
Remarks		

4.12.2 Relieve position difference when enabling drive controller (P-AXIS-00327)

P-AXIS-00327	**Relieve position difference when enabling drive controller**	
Description	If a drive is enabled, it moves from its actual position to the command position. If the difference between actual and command position is less than P-AXIS-00108 [▸ 187] , this position difference is cleared in one single set. The parameter P-AXIS-00327 can achieve that the position difference is cleared on a linear slope profile. Here the following dynamic parameters are used: - Velocity of the movement: P-AXIS-00208 [▸ 168] - Acceleration of the movement: P-AXIS-00011 [▸ 229] A reset during the correction movement aborts this movement in compliance with the dynamic parameters mentioned above. A channel specific feedhold leads to a stop of the correction movement if the axis is attached to a channel. If the axis is not attached to a channel, an axis-specific feedhold or an axis-specific override 0 leads to an interruption of the correction movement Program start or continuation of a program takes place after the correction movement is finished.	
Parameter	kenngr.pos_corr_drive_enable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, CANopen, KUKA, Profidrive	
Remarks		

4.12.3 Ignore feedhold at position correction after drive enable (P-AXIS-00356)

P-AXIS-00356	**Ignore feedhold at position correction after drive enable**	
Description	This parameter determines if a position correction after drive enable (see also P-AXIS-00327 [▸ 188]) can be interrupted with axis- or channel-specific feedhold. If this parameter has the value 1, a position correction can not be stopped with feedhold.	
Parameter	kenngr.pos_corr_ignore_feedhold	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, Lightbus	
Remarks		

4.13 Tolerance window for IIR axis filter (P-AXIS-00351)

P-AXIS-00351	**Tolerance window for IIR axis filter**	
Description	This parameter defines the position tolerance within which the IIR axis filters (infinite impulse response axis filter) are treated as 'position reached': Abs(unfiltered command value - filtered command value) < P-AXIS-00351 If IIR axis filters are activated, the system waits for the filters to reach the tolerance window during reset, axis position request or exact stop.	
Parameter	kenngr.filter_position_window	
Data type	REAL64	
Data range	0.01 ≤ filter_position_window	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0.4	
Drive types	----	
Remarks		

4.14 Tolerance window for IIR axis filter after feedhold (P-AXIS-00780)

P-AXIS-00780	**Tolerance window for stopping the IIR axis filter after feedhold**	
Description	This parameter specifies the position tolerance within which the starting position of the IIR axis filter (infinite impulse response axis filter) is treated as “position reached”. The filter state is then more or less “frozen”. In this state the following applies: Abs(unfiltered command value - filtered command value) < P-AXIS-00780 **The parameter is only effective in combination with feedhold.** The CNC ensures at the transition point that the maximum permissible axis acceleration is not exceeded. When IIR axis filters are activated and feedhold is commanded, i.e. also at CNC reset, the system checks whether the tolerance window is reached and and if so, the filter state is “frozen”. **Important** The existing position difference between filter output and filter input is then reduced when the axis makes its next movement. If P-AXIS-00780 is assigned the value 0, the function is inactive.	
Parameter	kenngr.filter_position_window_feedhold	
Data type	REAL64	
Data range	0.01 <= P-AXIS-00780	
Axis types	T, R	
Dimension	T: 0.1 μm	R: 0.0001°
Default value	0.4	
Drive types	----	
Remarks	Possible application: Depending on the parameterisation, certain filter types, e.g. band stops, tend to post-oscillate and this can lead to undesired axis movements. For example, safety functions may disable drive release at a specific time after feedhold is commanded. If there are still movements after this time due to post-oscillating axis filters, the result may be axis-specific errors from the CNC. Parameter available as of CNC Build V3.1.3079.17 or V3.1.3107.10.	

4.15 Settings for velocity override

4.15.1 Maximum permissible velocity override (P-AXIS-00109)

P-AXIS-00109	**Maximum permissible velocity override**	
Description	This parameter is used for axis-specific override limitation. It is used for independent axes and for spindles.	
Parameter	kenngr.max_vb_override	
Data type	UNS16	
Data range	1 ≤ max_vb_override ≤ 2000 (Maximum velocity override in axis, Plausibility limit, applica-tion-specific)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	1000	
Drive types	----	
Remarks	The term independent axes covers all functions comprising single axis interpolators (INDP, SAI) except for manual mode.	

4.15.2 Mode of velocity override (P-AXIS-00491)

P-AXIS-00491	**Velocity override mode to select active override interface**	
Description	This parameter enables the selection of the effective override interface(s) of independent axes.	
Parameter	kenngr.indp_override_mode	
Data type	UNS16	
Data range	0: Feed override from channel interface (default). 1: Minimum feed override from channel and axis interface 2: Feed override from axis interface	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	The term independent axes covers all functions comprising single axis interpolators (INDP, SAI) except for manual mode.	

4.16 Settings for feed rate influencing

4.16.1 Feedhold mode (P-AXIS-00540)

P-AXIS-00540	**Feedhold mode to select the active feedhold interface**	
Description	This parameter enables the selection of the effective feedhold interface(s) of independent axes.	
Parameter	kenngr.indp_feedhold_mode	
Data type	UNS16	
Data range	0: Feedhold from channel and axis interface (default). 1: Feedhold from axis interface	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	The term independent axes covers all functions comprising single axis interpolators (INDP, SAI) except for manual mode. This does not affect the function of internal feedhold interfaces (e.g. CNC reset). For manual mode, the effect of feedhold control signals can be defined by the parameter P-AXIS-00529 [465] .	

4.16.2 Effective deceleration value with feedhold (P-AXIS-00556)

P-AXIS-00556	**Effective deceleration value with feedhold**	
Description	This parameter is used to select the effective deceleration when feedhold is active for spindles and independent axes. With spindles, the acceleration/deceleration values are always parameterised under the parameters for the jerk-limited slope profile. The effect on single axes in the channel is dependent on P-CHAN-00097.	
Parameter	kenngr.feedhold_deceleration_mode	
Data type	STRING	
Data range	DEFAULT_DECELERATION: Deceleration takes place at the default deceleration value (defaults). Related parameters: - P-AXIS-00282 [▸ 230], P-AXIS-00283 [▸ 230], step-shaped profile - P-AXIS-00002 [▸ 236], jerk-limited profile FEEDHOLD_DECELERATION: Deceleration takes place at the feedhold deceleration value. Related parameters: - P-AXIS-00024 [▸ 234], step-shaped profile - P-AXIS-00053 [▸ 240], jerk-limited profile MIN_TOOL_ACC_FEEDHOLD_DECELERATION: This value is only effective with spindle axes. Deceleration takes place at the minimum of the maximum permissible acceleration of the active tool and the feedhold deceleration. Related parameters: - P-TOOL-00015, P-AXIS-00053 [▸ 240]	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	DEFAULT_DECELERATION:	
Drive types	----	
Remarks	The term single axes here comprises the functions with single axis interpolators. This includes independent axes and manual mode axes. If there is no spindle axis, this axis-specific parameter is only effective if the channel-specific parameter P-CHAN-00097 is set to 0.	

4.17 Reduced speed

For safety functionalities or setup operations. the PLC can command a switchover to a reduced axis feed to the CNC.

4.17.1 Reduced maximum speed at active G01 (P-AXIS-00214)

P-AXIS-00214	Reduced maximum speed with active G01	
Description	The PLC uses a control signal to command the CNC to switch over to a reduced axis feed. The control signal is sent by the “Reduced speed“ control unit. The reaction is in real time. After a deceleration which may be required, none of the moved axes moves faster than the parameter input. The active G01 deceleration value is used for the braking operation. If the deceleration value is changed in the NC program (#VECTOR LIMIT, G130, G131), it affects the braking operation. This parameter defines the reduced axis speed, even if manual mode is active.	
Parameter	getriebe[i].vb_max_red	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00214 ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	0	
Drive types	----	
Remarks		

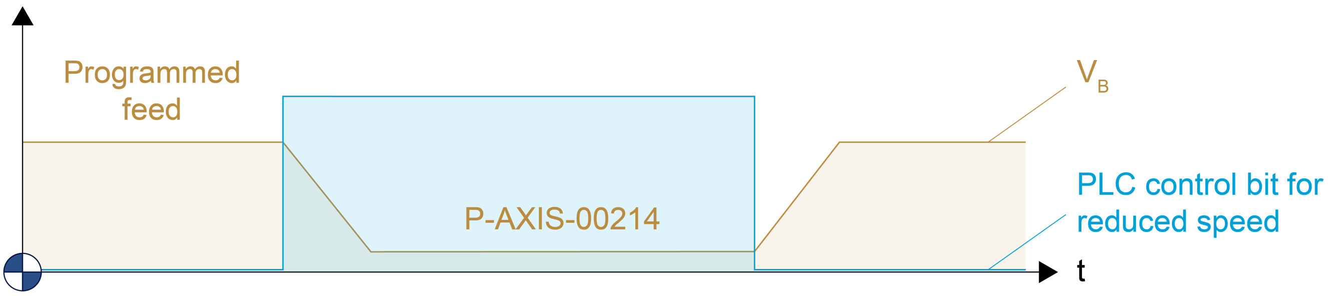


Fig. 8: Reduced maximum speed with active G01

4.17.2 Reduced maximum speed with active G00 (P-AXIS-00155)

P-AXIS-00155	**Reduced maximum speed with active G00**	
Description	When G00 is active, the PLC can command the CNC by a control signal to switch over to a reduced axis feed. The control signal is sent by the “Reduced speed“ control unit. The reaction is in real time. After a deceleration which may be required, none of the moved axes moves faster than the parameter input.	
Parameter	getriebe[i].rapid_speed_red	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00155 ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	0	
Drive types	----	
Remarks		

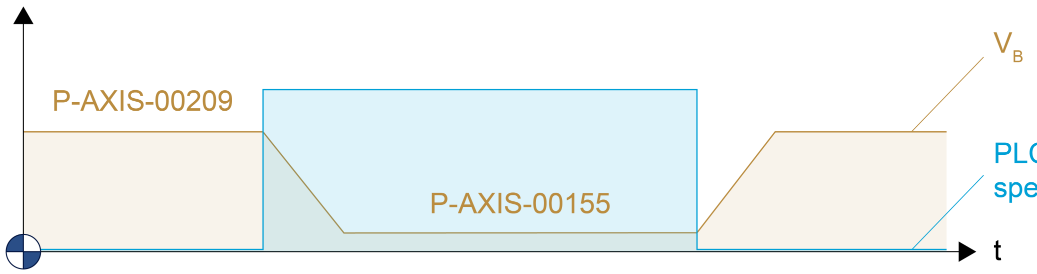


Fig. 9: Reduced maximum speed with active G00

4.17.3 Reduced maximum speed in security zone

In combination with the security zone of an axis the PLC can command a switchover to a reduced maximum path feed to the CNC. This value is independent of current active moving mode (G00 or G01). The security zone is defined within an upper and lower limit of the axis position. The reduced speed function is activated by the PLC signal if one axis is inside the security zone or moves into this zone. The reaction takes place in real time. This means that after an typically required deceleration phase, none of the axes moves faster than the maximum velocity (P-AXIS-00030 [198] or P-AXIS-00503 [200]) of the corresponding security zone. Two security zones can be defined for each axis. These zones can overlap each other.

The deceleration ramp for adapting to the reduced speed is independent from the active path condition. If the axis is already in the security zone when the activation signal is received from the SPS, the CNC brakes at feedhold acceleration (P-AXIS-00024 [234]) is inactive. If the SPS signal is activated outside the zone, the CNC brakes at the G00 value (P-AXIS-00004 [239]) is inactive.

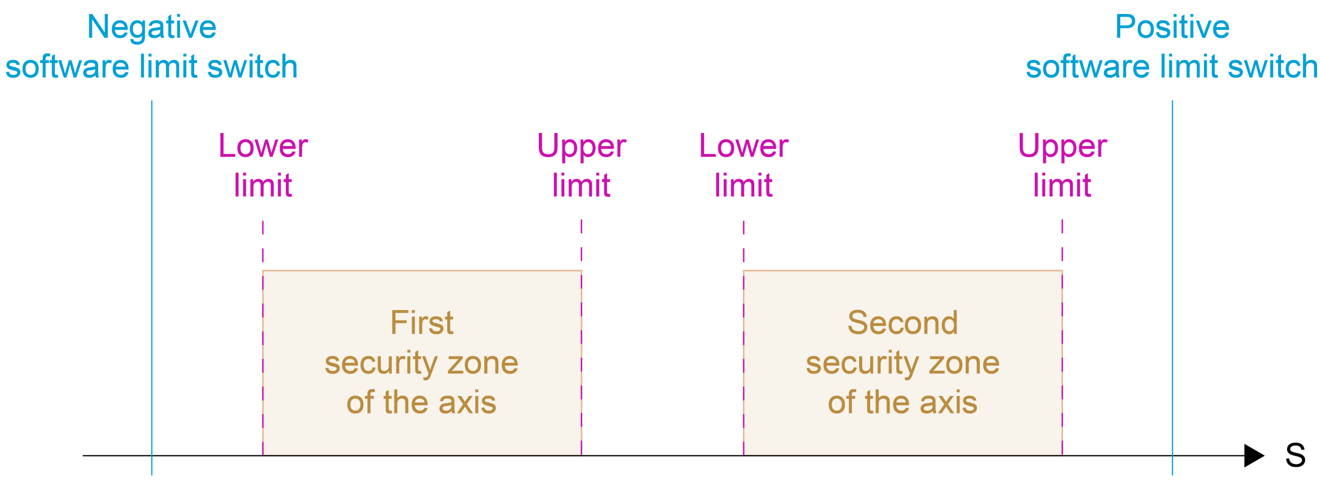


Fig. 10: Representation of 2 security zones and limits of an axis

4.17.3.1 Upper limit of security zone 1 (P-AXIS-00085)

P-AXIS-00085	**Upper limit of security zone 1**	
Description	This parameter defines the upper limit of security zone 1. The lower limit of the security zone must be smaller than the upper limit. P-AXIS-00093 [197] < P-AXIS-00085 This position is limited by the software limit switches (P-AXIS-00177 [121] and P-AXIS-00178 [121]).	
Parameter	kenngr.red_speed_zone_pos	
Data type	SGN32	
Data range	P-AXIS-00177 [121] < P-AXIS-00085 < P-AXIS-00178 [121]	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001°
Default value	0	
drive types.	----	
Remarks		

4.17.3.2 Lower limit of security zone 1 (P-AXIS-00093)

P-AXIS-00093	**Lower limit of security zone 1**	
Description	This parameter defines the lower limit of security zone 1. The lower limit of the security zone must be smaller than the upper limit. P-AXIS-00093 < P-AXIS-00085 [▸ 196] This position is limited by the software limit switches (P-AXIS-00177 [▸ 121] and P-AXIS-00178 [▸ 121]).	
Parameter	kenngr.red_speed_zone_neg	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] < P-AXIS-00093 < P-AXIS-00178 [▸ 121]	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.17.3.3 Upper limit of security zone 2 (P-AXIS-00097)

P-AXIS-00097	**Upper limit of security zone 2**	
Description	This parameter defines the upper limit of security zone 2. The lower limit of the security zone must be smaller than the upper limit. P-AXIS-00105 [▸ 198] < P-AXIS-00097 This position is limited by the software limit switches (P-AXIS-00177 [▸ 121] and P-AXIS-00178 [▸ 121]).	
Parameter	kenngr.red_speed_zone_2_pos	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] < P-AXIS-00097 < P-AXIS-00178 [▸ 121]	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.17.3.4 Lower limit of security zone 2 (P-AXIS-00105)

P-AXIS-00105	**Lower limit of security zone 2**	
Description	This parameter defines the lower limit of security zone 2. The lower limit of the security zone must be smaller than the upper limit. P-AXIS-00105 < P-AXIS-00097 [▸ 197] This position is limited by the software limit switches (P-AXIS-00177 [▸ 121] and P-AXIS-00178 [▸ 121]).	
Parameter	kenngr.red_speed_zone_2_neg	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] < P-AXIS-00105 < P-AXIS-00178 [▸ 121]	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks		

4.17.3.5 Maximum permissible axis velocity in security zone (P-AXIS-00030)

P-AXIS-00030	**Maximum permissible axis velocity in security zone**	
Description	The parameter defines the maximum permissible axis velocity inside the security zones 1 and 2 if the control signal is active. Activation for security zone 1 is executed by the “Reduced velocity in zone 1“ control unit. This security zone is limited by the position limits given by P-AXIS-00093 [▸ 197] and P-AXIS-00085 [▸ 196]. Activation for security zone 2 is executed by the “Reduced velocity in zone 2“ control unit. This security zone is limited by the position limits given by P-AXIS-00105 and P-AXIS-00097 [▸ 197].	
Parameter	getriebe[i].vb_max_red_zone	
Data type	UNS32	
Data range	0 ≤ P.AXIS-00030 ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0.001°/s
Default value	0	
drive types.	----	
Remarks	When P-AXIS-00503 [▸ 200] is 0 (default), this parameter is always effective for both zones.	

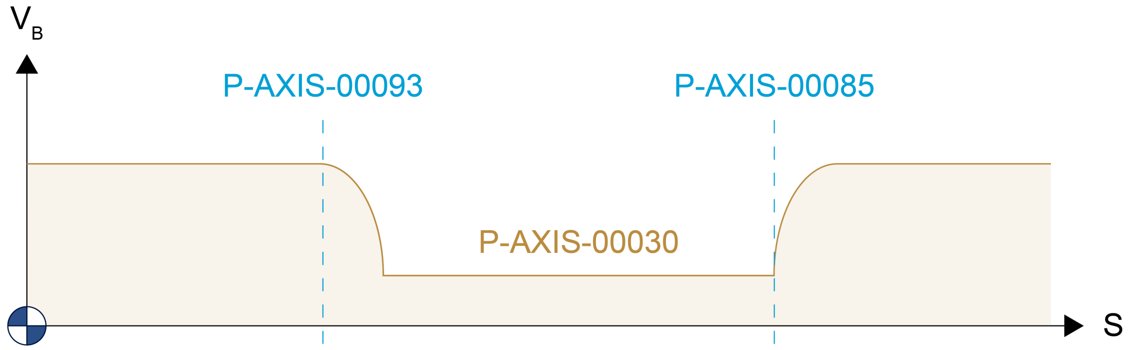


Fig. 11: Parameters of permissible axis velocities inside the security zone 1

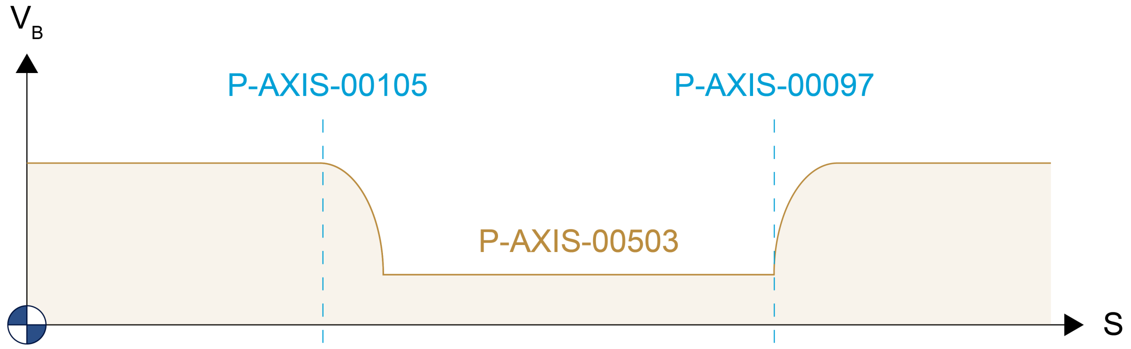


Fig. 12: Parameters of permissible axis velocities inside the second security zone

Remark on active acceleration during the deceleration phase:

The effective acceleration during deceleration depends on the following factors:

- the channel parameter P-CHAN-00097
- the time of activation of a particular security zone signal in the PLC
  ("Reduced velocity in zone 1"/ " control unitReduced velocity in zone 2") control unit
- the current axis position at this time in relation to the zone.

If the axis is outside the zone at the time of signal activation, the axis decelerates at the acceleration value of P-AXIS-00004 [▹ 239] . If the axis is inside the zone, the axis decelerates at the acceleration value of P-AXIS-00024 [▹ 234] .

4.17.3.6 Maximum permissible axis velocity in security zone 2 (P-AXIS-00503)

P-AXIS-00503	**Maximum permissible axis velocity in security zone 2**	
Description	The parameter defines the maximum permissible axis velocity inside the security zones 1 and 2 if the control signal is active. Activation for security zone 2 is executed by the “Reduced velocity in zone 2“ control unit. This security zone is limited by the position limits given by P-AXIS-00105 [▸ 198] and P-AXIS-00097 [▸ 197].	
Parameter	getriebe[i].vb_max_red_zone_2	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00503 ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0.001°/s
Default value	0	
Drive types	----	
Remarks	This parameter is available as of CNC Build V3.1.3052.05 or higher. When the parameter value is not set or has the value 0, vb_max_red_zone_2 is not active, i.e. the identical value of P-AXIS-00030 [▸ 198].	

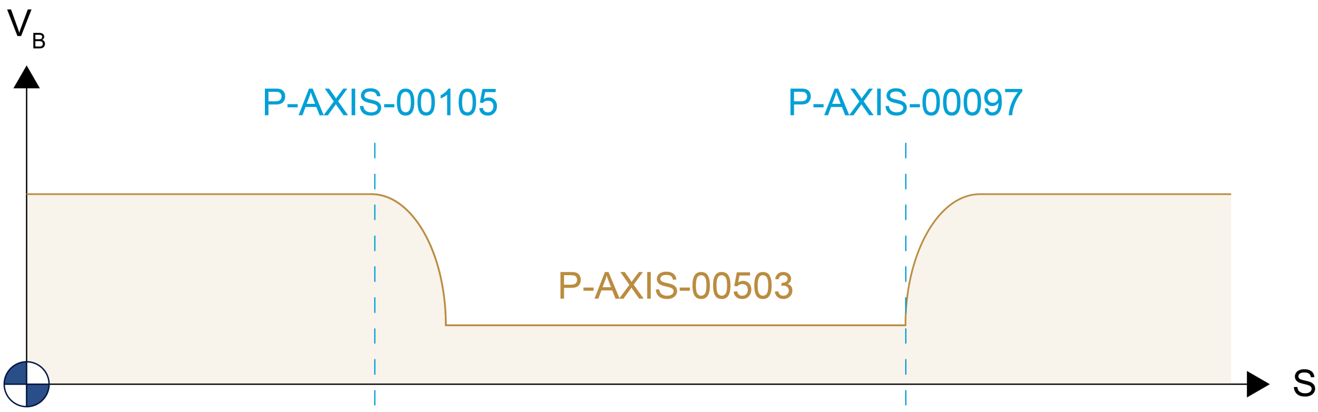


Fig. 13: Parameters of permissible axis velocities inside the second security zone

Remark on active acceleration during the deceleration phase:

The effective acceleration during deceleration depends on the following factors:

- the channel parameter P-CHAN-00097
- the time of activation of the signal for the “Reduced velocity in zone 2“ in the PLC
- the current axis position at this time in relation to the zone.

If the axis is outside the zone at the time of signal activation, the axis decelerates at the acceleration value of P-AXIS-00004 [▸ 239] . If the axis is inside the zone, the axis decelerates at the acceleration value of P-AXIS-00024 [▸ 234] .

4.18 Torque configuration

4.18.1 Torque offset (P-AXIS-00324)

P-AXIS-00324	**Torque offset**	
Description	If this function is supported by the drive used, the CNC can output an additive torque command value statically . It is added to the drive-internal current command value of the speed controller at the input of the current controller. This additive torque command value can be used for weight compensation, for example. The definition of the additive torque command value depends on the torque or current scaling of the drive (see also P-AXIS-00325 [▸ 201], P-AXIS-00326 [▸ 202]).	
Parameter	getriebe[i].torque_offset	
Data type	SGN16	
Data range	0 .... MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, Lightbus,CANopen	
Remarks	The output of an additive torque command value is not supported by all drive types. If this parameter has a value greater then 0 and the drive type does not support this function, an error message with the ID number P-ERR-110464 is output.	

4.18.2 Numerator scaling factor for torque (P-AXIS-00325)

P-AXIS-00325	**Numerator scaling factor for torque**	
Description	Numerator of the scaling factor for the commanded torque to the drive. The factor is specified as a quotient. This quotient is the value which must be output to the motor to reach the nominal torque.	
Parameter	antr.torque_scale_num	
Data type	UNS32	
Data range	0 < torque_scale_num < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	SERCOS, Lightbus,CANopen	
Remarks		

4.18.3 Denominator scaling factor for torque (P-AXIS-00326)

P-AXIS-00326	**Denominator scaling factor for torque**	
Description	Denominator of the scaling factor for the commanded torque to the drive. The factor is specified as a quotient. This quotient is the value which must be output to the motor to reach the nominal torque.	
Parameter	antr.torque_scale_denom	
Data type	UNS32	
Data range	1 < torque_scale_denom < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	SERCOS, Lightbus,CANopen	
Remarks	If the value 0 is set for P-AXIS-00326, an error message with the ID number P-ERR-110465 is output and the internal scaling factor is set to 0 In this case no output of the additive torque command value to the drive is sent.	

4.19 Gear couplings

4.19.1 Axis specific definition (kenngr.multi_link[i].*)

The parameters of this structure offer the possibility to define axis-specific gear couplings. The settings always are assigned to the axis to be coupled. The maximum allowable number of couplings per axis is 10. This function is assigned to the axes group of the channel. For multiple instantiation of an axis (P-AXIS-00101 [▸ 67], P-AXIS-00040 [▸ 67]), the function cannot be used in conjunction with the parameter P-AXIS-00436 [▸ 205]).

Structure name	**Index**
multi_link[i]	0 ≤ i < 10

4.19.1.1 Lead or master axis (P-AXIS-00383)

P-AXIS-00383	**Logical axis number of lead or master axis**	
Description	Logical axis number of the lead axis to which the coupling axis is linked by the coupling factor.	
Parameter	kenngr.multi_link[i].lead_axis	
Data type	UNS16	
Data range	1 < lead_axis < MAX(UNS16)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	The relative position of the coupling axis results from the multiplication of the coupling factor with the relative position of the lead axis. The coupling factor itself results from the definition of signed even numerator and denominator.	

4.19.1.2 Numerator of coupling factor (P-AXIS-00384)

P-AXIS-00384	**Numerator of gear coupling factor**	
Description	Numerator of the coupling factor	
Parameter	kenngr.multi_link[i].factor_numerator	
Data type	SGN32	
Data range	MIN(SGN32) < factor_numerator < MAX(SGN32)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

4.19.1.3 Denominator of coupling factor (P-AXIS-00385)

P-AXIS-00385	**Denominator of gear coupling factor**	
Description	Denominator of the coupling factor.	
Parameter	kenngr.multi_link[i].factor_denominator	
Data type	SGN32	
Data range	MIN(SGN32) < factor_denominator < MAX(SGN32)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	

Remarks	Example: 1:1-coupling to the lead axis with the logical axis number 1
	
	`kenngr.multi_link[0].lead_axis                 1`
	`kenngr.multi_link[0].factor_numerator          1`
	`kenngr.multi_link[0].factor_denominator        1`	

4.19.2 Forward mapping of drive position (P-AXIS-00436)

P-AXIS-00436	Forward mapping of drive position
Description	Corresponding to the coupling instructions at drive level, an active gear coupling leads to an offset of the axis positions compared to the programmed command positions in NC channel. The gear coupling can be activated either by configuration in the axis parameters (see multi_link[i] [▸ 203]) or via the HLI interface of the axis (see [FCT-A9]). In the event of a program restart or an explicitly programmed request of axis positions (#CHANNEL INIT [CMDPOS]), the axis positions and the channel program coordinates are re-initialised. The parameter must be set to 1 if the input coordinates of the gear coupling (e.g. absolute program coordinates) are to be recalculated by forward mapping. See also P-AXIS-00460 [▸ 206].
Parameter	kenngr.recalc_link_main_input_position
Data type	BOOLEAN
Data range	0: No forward mapping of drive position (default). 1: Forward mapping is executed.
Axis types	T, R
Dimension	T: ---- R: ----
Default value	0
Drive types	----
Remarks	Configuration example: Forward mapping is active during gear coupling *kenngr.multi_link[0].lead_axis 4* *kenngr.multi_link[0].factor_numerator 1* *kenngr.multi_link[0].factor_denominator 2* *kenngr.recalc_link_main_input_position 1* Configuration example: Forward mapping with active gear coupling via the HLI *kenngr.recalc_link_main_input_position 1*

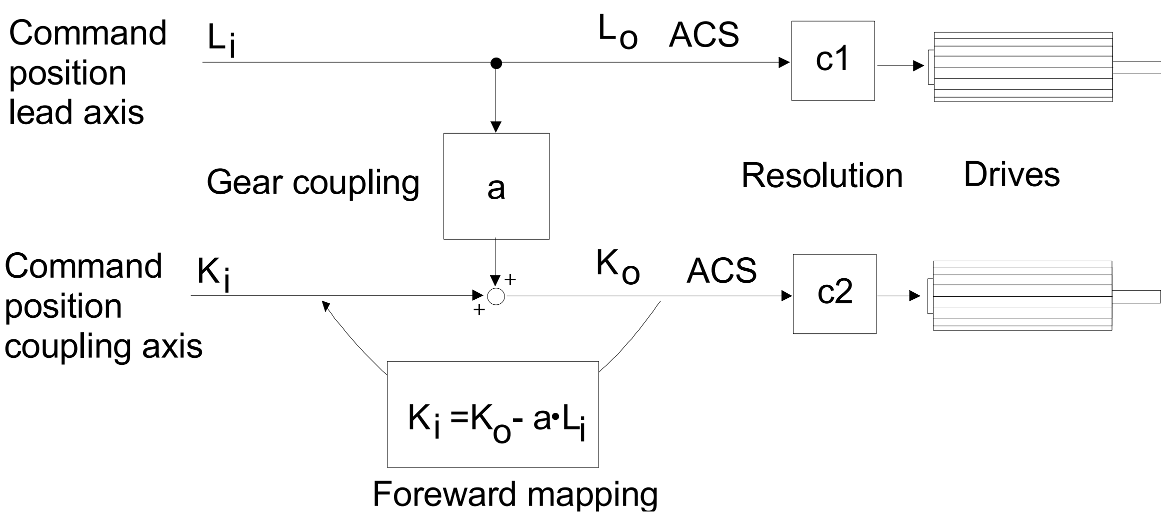


Fig. 14: Principle of electronic gear coupling

4.19.3 Forward mapping of drive position with absolute coordinates (P-AXIS-00460)

P-AXIS-00460	Forward mapping of drive position with absolute coordinates	
Description	If forward mapping of drive positions is activated with parameter P-AXIS-00436 [205] , the mapping is calculated by default relative to the activation position of the axis coupling.. This means that if immediately after the activation of an axis coupling the command positions are requested, the command position according to the mechanical axis position is returned. With parameter P-AXIS-00460 the axis positions are considered as absolute coordinates. This means the mapping is calculated as if the axes were coupled at position 0 for the master as well as for the slave axes. **Example:** At position X=40 mm and X1=50 mm the X1 axis is coupled each with a coupling factor of 1:1 to the X-axis and to itself. When P-AXIS-00460 is not set, the returned position for axis X1 is X1 = 50 mm on receipt of a command position request directly after activation of a coupling When P-AXIS-00460 is set, the returned axis position for the X1 axis is X1 = 10 mm.	
Parameter	kenngr.recalc_input_position_absolute	
Data type	BOOLEAN	
Data range	0: Forward mapping relative to activation position (default). 1: Forward mapping with absolute positions.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	This parameter is only effective for axis couplings that are activated via the HLI. This parameter is only practical for use with axes that deliver an absolute position.	

4.19.4 Homing check for coupled axes (P-AXIS-00461)

P-AXIS-00461	**Homing check for coupled axes**	
Description	This parameter can force all axes in this axis coupling group to be rehomed if an error occurs with an active axis coupling via the HLI when the parameter P-AXIS-00436 [205] is set. If an attempt is made to move one of the axes involved before homing, the error message P-ERR-70434 is output.	
Parameter	kenngr.activate_coupled_axes_homing_check	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.19.5 Copy HLI gantry master axis coupling to slave (P-AXIS-00486)

P-AXIS-00486	**Copy HLI gantry master axis coupling to slave**	
Description	If this parameter is set for a gantry master axis, HLI axis coupling definitions for the gantry master axis are mirrored automatically to the gantry slave axes. No coupling definitions are allowed for the gantry slave axes. However, if a coupling definition for a gantry slave axis is set, the error message P-ERR-70454 is output.	
Parameter	kenngr.copy_master_gantry_coupling_to_slave	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.20 Interpolation of tracked axes in inserted TRC blocks (P-AXIS-00427)

P-AXIS-00427	**Interpolation of tracked axes in inserted TRC blocks**	
Description	The active TRC generates new additional motion blocks in the NC program for motion in corner areas. If motions of (several) tracked axes are also programmed in the corners, the motions of these tracked axes can be executed in combination with new inserted motion blocks when the parameter P-AXIS-00427 is active.	
Parameter	kenngr.cax_output_with_generated_nc_block	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

Excerpt from NC program:

```
N10 G26
N20 G41 (TRC selection)
…
N110 G01 X100
N120 G01 C90
N130 G01 Y0
…
N200 G40 (TRC deselection)
```

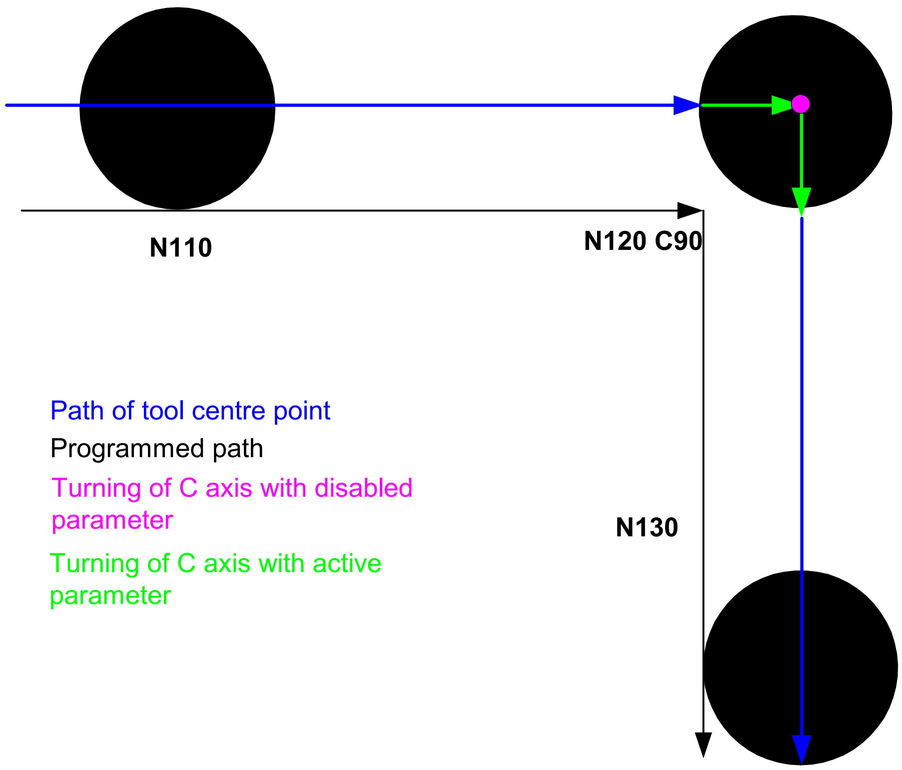


Fig. 15: Principle motion sequence of a C axis with G26

Excerpt from NC program:

```
N10 G25
N20 G41 (TRC selection)
…
N110 G01 X100
N120 G01 C90
N130 G01 Y0
…
N200 G40 (TRC deselection)
```

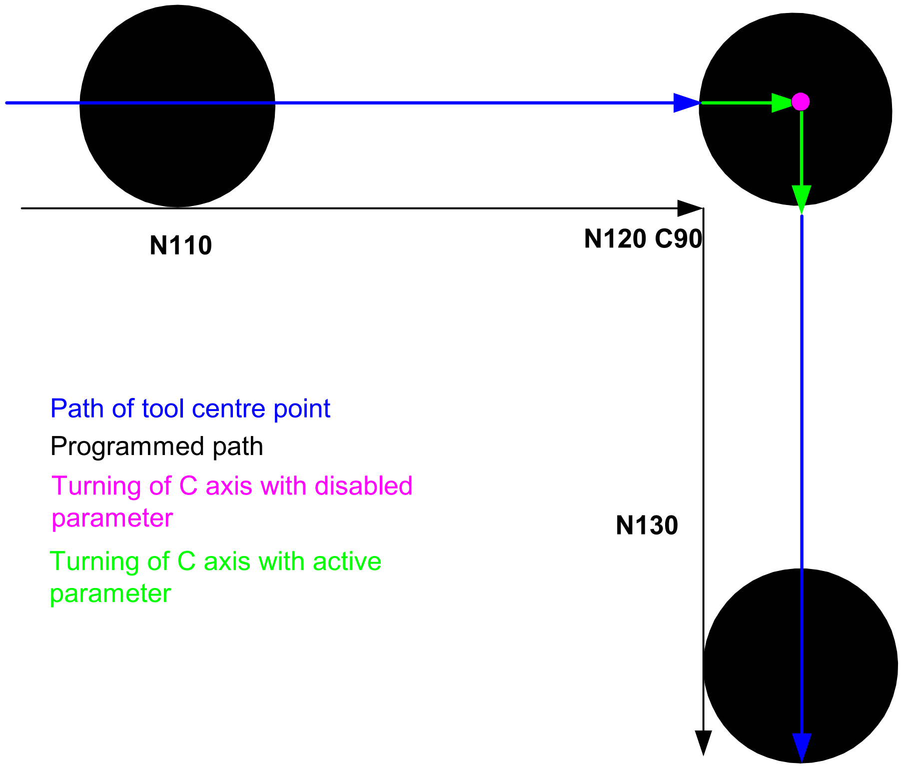
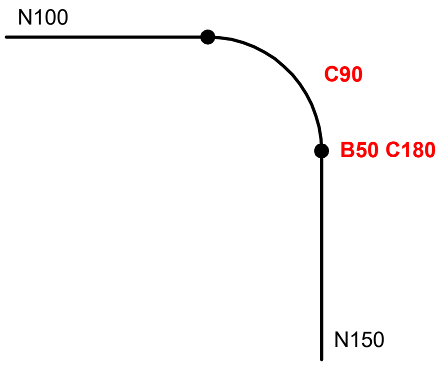
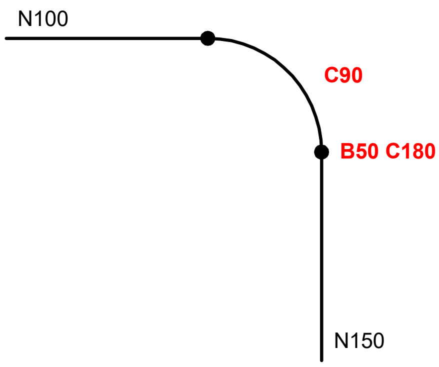


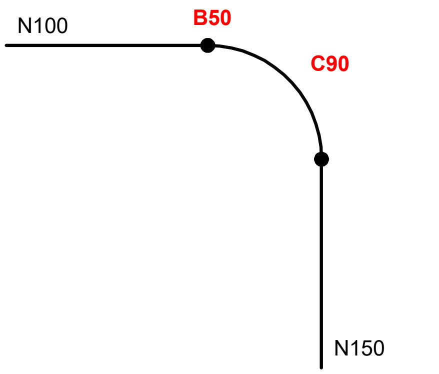
Fig. 16: Principle motion sequence of a C axis with G25

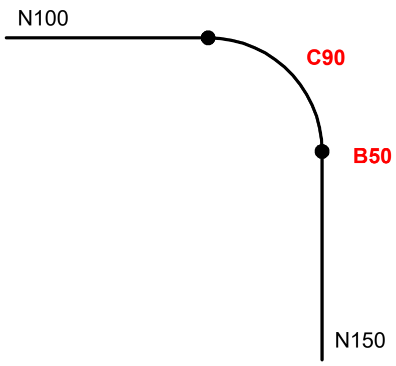
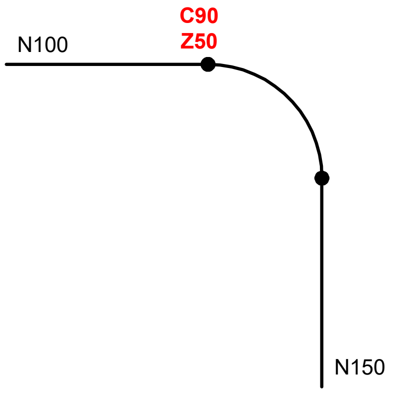
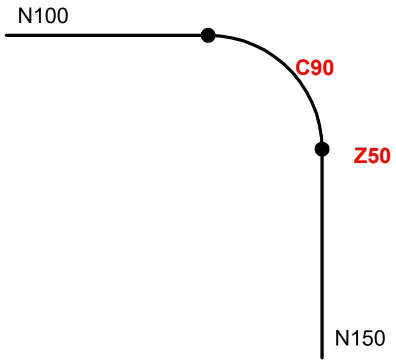
Programing Example

Results

<u>Case 1:</u>
 	
`N100 X100`
`N110 C90`
`N120 B50`
`N130 C180`
`N150 Y0`
	

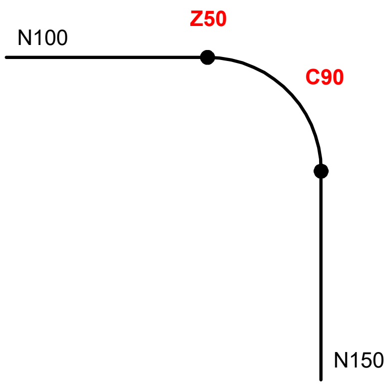
<u>Case 2:</u>
 	
`N100 X100`
`N110 C90 B100 A23`
`N150 Y0`
	

<u>Case 3:</u>
 	
`N100 X100`
`N120 B50`
`N130 C90`
`N150 Y0`
	

<u>Case 4:</u> N100 X100 N110 C90 N120 B50 N150 Y0	
<u>Case 5:</u> N90 Z0 N100 X100 N110 C90 **N120 Z50 (relevant motion)** N150 Y0	
<u>Case 6:</u> N90 **Z50** N100 X100 N110 C90 **N120 Z50 (non relevant)** **(motion)** N150 Y0	

Case 7:

```
N90 Z0
N100 X100
N110 Z50 (relevant motion)
N120 C90
N150 Y0
```



4.21 Axis specific dynamic monitoring during interpolation

Monitoring of the cyclically generated axis command values (interpolation) is activated and set with the following parameters. Monitoring can be activated for both single axes (e.g. spindles) and contouring axes.

The parameters define the levels for the output of a warning or an error, if the maximum permissible values of the axis parameters list are exceeded. The velocity limit value used here is *vb_max (*P-AXIS-00212 [245]); the acceleration limit used is *a_max* (P-AXIS-00008 [246]) and the jerk limit value results from *a_max (*P-AXIS-00008 [246]) */ tr_min (*P-AXIS-00201 [247]).

The velocity monitoring is active all the time. The acceleration and jerk monitoring can be enabled or disabled.

4.21.1 Warning level for velocity (P-AXIS-00439)

P-AXIS-00439	**Warning level for velocity for dynamic monitoring**	
Description	This parameter specifies the amount by which the axis velocity command value may exceed the maximum permissible axis velocity (see P-AXIS-00212 [245]) before the dynamic monitor in the interpolator generates a warning. The default value of the parameter is 50 (5%), i.e. command velocities greater than 1.05 * P-AXIS-00212 [245] generate a warning.	
Parameter	kenngr.dyn_monitoring_v_warn	
Data type	UNS32	
Data range	0 ≤ dyn_monitoring_v_warn ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	50 (5%)	
Drive types	----	
Remarks		

4.21.2 Error level for velocity (P-AXIS-00440)

P-AXIS-00440	**Error level for velocity for dynamic monitoring**	
Description	This parameter specifies the amount by which the axis velocity command value may exceed the maximum permissible axis velocity (see P-AXIS-00212 [245]) before the dynamic monitor in the interpolator generates a warning. The default value of the parameter is 90 (9%), i.e. command velocities greater than 1.09 * P-AXIS-00212 [245] generate a warning.	
Parameter	kenngr.dyn_monitoring_v_err	
Data type	UNS32	
Data range	0 ≤ dyn_monitoring_v_err ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	90 (9%)	
Drive types	----	
Remarks		

4.21.3 Warning level for acceleration (P-AXIS-00441)

P-AXIS-00441	**Warning level for acceleration for dynamic monitoring**	
Description	This parameter specifies the amount by which the axis velocity command value may exceed the maximum permissible axis velocity (see P-AXIS-00008 [▸ 246]) before the dynamic monitor in the interpolator generates a warning. The default value of the parameter is 500 (50%), i.e. command velocities greater than 1.5 * P-AXIS-00008 [▸ 246] generate a warning.	
Parameter	kenngr.dyn_monitoring_a_warn	
Data type	UNS32	
Data range	0 ≤ dyn_monitoring_a_warn ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	500 (50%)	
Drive types	----	
Remarks		

4.21.4 Error level for acceleration (P-AXIS-00442)

P-AXIS-00442	**Error level for acceleration for dynamic monitoring**	
Description	This parameter specifies the amount by which the axis velocity command value may exceed the maximum permissible axis velocity (see P-AXIS-00008 [▸ 246]) before the dynamic monitor in the interpolator generates a warning. The default value of the parameter is 1000 (100%), i.e. command velocities greater than 2.0 * P-AXIS-00008 [▸ 246] generate a warning. This factor limits the overall acceleration for the contouring feed rate and the LIFT motion.	
Parameter	kenngr.dyn_monitoring_a_err	
Data type	UNS32	
Data range	0 ≤ dyn_monitoring_a_err ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	1000 (100%)	
Drive types	----	
Remarks	With dyn_monitoring_a_warn = 0 and dyn_monitoring_a_err = 0 the acceleration monitoring for the axis command values is deactivated!	

4.21.5 Warning level for jerk (P-AXIS-00443)

P-AXIS-00443	Warning level for jerk for dynamic monitoring	
Description	This parameter defines the tolerance level for exceeding the maximum permissible axis jerk value (P-AXIS-00008 [▸ 246] / P-AXIS-00201 [▸ 247]) before the dynamic monitor in the interpolator generates a warning.	
Parameter	kenngr.dyn_monitoring_j_warn	
Data type	UNS32	
Data range	0 ≤ dyn_monitoring_j_warn ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0 (0%)	
Drive types	----	
Remarks		

4.21.6 Error level for jerk (P-AXIS-00444)

P-AXIS-00444	Error level for jerk for dynamic monitoring	
Description	This parameter defines the tolerance level for exceeding the maximum permissible axis jerk value (P-AXIS-00008 [▸ 246] / (P-AXIS-00201 [▸ 247]) before the dynamic monitor in the interpolator generates a warning.	
Parameter	kenngr.dyn_monitoring_j_err	
Data type	UNS32	
Data range	0 ≤ dyn_ monitoring _j_err ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0 (0%)	
Drive types	----	
Remarks	The parameter dyn_monitoring_j_warn = 0 and dyn_monitoring_j_err = 0 deactivates jerk monitoring for the axis command values!	

4.21.7 Suppressing reversal of speed at stop (P-AXIS-00548)

P-AXIS-00548	**Suppressing reversal of speed at stop**	
Description	When a spindle or single axis stops with a very slight jerk in deceleration phases, the direction of movement also changes when all boundary values are closely considered. In these cases, the control may increase the jerk in order to minimise the undesirable effect.	
Parameter	kenngr.allow_dir_change_at_stop	
Data type	BOOLEAN	
Data range	0: The jerk is also increased to prevent the axis from reversing. 1: No change in programmed jerk	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0 *	
Drive types	----	
Remarks	* The basic setting is recommended for positioning software limit switches.	

4.22 Suppress stop of spindle axis during channel reset (P-AXIS-00455)

P-AXIS-00455	**Suppress stop of spindle axis during channel reset**	
Description	By default a spindle axis which is commanded by M3, M4 or M19 is stopped during channel reset. The stop of the spindle axis can be suppressed by setting this parameter to 1 (TRUE).	
Parameter	kenngr.no_stop_by_channel_reset	
Data type	BOOLEAN	
Data range	0/1	
Axis types	S	
Dimension		S: ----
Default value	0	
Drive types	----	
Remarks		

4.23 Enabling PLCopen interface of a channel axis (P-AXIS-00457)

P-AXIS-00457	**Enable PLCopen interface of a channel axis**	
Description	This parameter enables the PLCopen interface of a channel axis. The axis can then be commanded by the PLC or by the NC program (see PROG//PLCopen programming) with motion commands (absolute and relative positioning, path motions with velocity, and stopping). The following arrays are supported: • MC_MoveAbsolute • MC_MoveRelative • MC_MoveVelocity • MC_Halt	
Parameter	kenngr.enable_single_axis	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	Commands are possible for linear axes and rotary axes (modulo axes), see P-AXIS-00015 [▸ 71].	

4.24 Collision monitoring during oscillation (P-AXIS-00485)

P-AXIS-00485	**Collision monitoring during oscillation**	
Description	During oscillation, an axis moves between two predefined positions independent from path motion. The 3D collision monitoring normally checks the given path position and not the complete motion band of the oscillation.	
Parameter	kenngr.oscillation_collision_check_mode	
Data type	SGN16	
Data range	0: 2ND_POS is monitored for collision (default) -1 : The smaller of the two positions 1ST_POS, 2ND_POS is monitored for collision. +1: The larger of the two positions 1ST_POS, 2ND_POS is monitored for collision. 2: 1ST_POS is monitored for collision.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

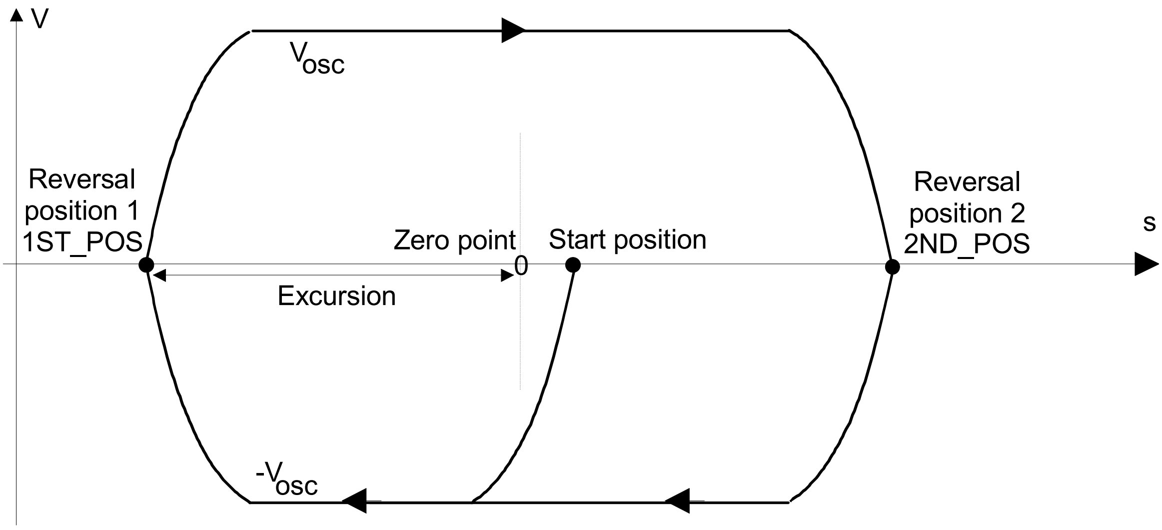


Fig. 17: Positioning procedure with pendulum movement

Parameter P-AXIS-00485 specifies which of the programmed oscillation positions should be monitored for collision.

4.25 Inversion of spindle rotation direction for spindle M-functions M3/M4 (P-AXIS-00490)

P-AXIS-00490	**Inversion of spindle rotation direction for spindle M-functions M3/M4**		
Description	The parameter inverts the direction of rotation of various spindle functions. For example, this may be helpful if a spindle is also used as C axis and if the spindle orientation does not correspond to the C axis orientation. The spindle function to be inverted is defined as a string constant or a hexadecimal value		
Parameter	kenngr.inverse_rotation_direction		
Data type	STRING		
Data range	**Constant**	**Value**	**Meaning**
	FALSE	0x0000	No rotation direction inversion
	MOVE_CMD	0x0001	In the case of a spindle, the rotation direction is inverted with M functions M03/M04. The direction of spindle rotation is therefore reversed for M03 and M04 (M03 anti-clockwise, M04 clockwise).
	TAPPING	0x0002	The inversion is also active for spindle positioning M19 with explicitly programmed rotation direction.
Axis types	S		
Dimension			S: ----
Default value	0		
Drive types	----		
Remarks	Change in the data type of the parameter as of CNC Build V2.11.2836 (from BOOLEAN to STRING). Downward compatibility is ensured.		

4.26 Delay filter acts only on command positions (P-AXIS-00513)

P-AXIS-00513	**Delay filter acts only on command positions**	
Description	If axis filters (see [FCT-A7]) are used, the feedforward values are calculated by default from the filtered command position values. This parameter sets the calculation of the feedforward values from the unfiltered command positions while the command positions are delayed by the filter. This achieves the situation that the feedforward values lead the command position.	
Parameter	kenngr.delay_filter_only_position	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	The delay of the commands position against the feedforward values only works when the delay filter is configured as **last** filter in a filter chain. When P-AXIS-00513 is set and another filter is configured after the delay filter, the error message P-ERR-110583 is output and the delay filter is deactivated.	

4.27 Enabling of IPO-LR interface after axis release (P-AXIS-00483)

P-AXIS-00483	**Enabling of IPO-LR interface after axis release**	
Description	A drive can be connected as part of the functionality 'Jog of Path' with more than one axis (link_to, P-AXIS-00101 [▸ 67]). Here the drive is supplied via the axis-specific interface between interpolator and position controller (see [FCT-C15]). If this type of linked axis leaves the interpolator after an axis release, and a SUSPEND command is executed in this channel, the interface is not enabled. Another channel that possibly requests this axis has no access to this interface and stops. By setting the parameter 'kenngr.auto_release_of_axis_link' this interface is automatically enabled when the axis is released and a system stop can be avoided.	
Parameter	kenngr.auto_release_of_axis_link	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks		

4.28 Setting of 'in position' for position controller generated axis movements (P-AXIS-00458)

P-AXIS-00458	**Setting of 'in position' for position controller generated axis movements**	
Description	When the position controller autonomously generates an axis movement, the HLI signal gpAx[axis_idx]^.lr_state.in_position_r (see {HLI:]) is set to FALSE in order to indicate that the axis is moving. If that behaviour is not wanted, this parameter can be set to TRUE. The position controller autonomously generates an axis movement under the following circumstances: 1. An NC program is active and tracking was set and reset for an axis. In this case the axis is interpolated back to the activation position in order to continue the NC program without offsets. 2. Axis arameter P-AXIS-00327 [▸ 188] is set. If the axis is enabled via the drive enable commands of the HLI, the axis is interpolated back to the position where the drives were disabled.	
Parameter	kenngr.set_in_pos_at_pos_corr	
Data type	BOOLEAN	
Data range	0: Reset of HLI signal lr_state.in_position_r during axis is moved by position controller. 1: HLI signal lr_state.in_position_r remains during axis is moved by position controller.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.29 Settings for drive controllers

4.29.1 Select specific manufacturer-specific procedures for drive controllers (P-AXIS-00535)

P-AXIS-00535	**Select specific manufacturer-specific procedures for drive controllers**	
Description	Many drive controllers do not always conform completely to the interface specifications. In conjunction with P-AXIS-00536 [▸ 223] this parameter can activate manufacturer- and device-specific special procedures to still operate the drive controller in the CNC.	
Parameter	kenngr.vendor_id	
Data type	UNS32	
Data range	0: No special procedures active 100: Specify the activated special procedures in P-AXIS-00536 [▸ 223] in the form of a bit string. The purpose of values 1 to 9 are to enable a manufacturer-specific set of special procedures and they only exist for the purpose of downward compatibility.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

4.29.2 Select specific device-specific procedures for drive controllers (P-AXIS-00536)

P-AXIS-00536	Select specific device-specific procedures for drive controllers	
Description	Many drive controllers do not always conform completely to the interface specifications. This parameter in conjunction with P-AXIS-00535 [▸ 222] enables manufacturer and device-specific special procedures to operate the drive controller on the CNC. The special procedures to be applied are specified by a bit field.	
Parameter	kenngr.device_id	
Data type	UNS32	
Data range	Bit:	Function
	0x4:	Drive type CANopen: According to CiA DS402 the size of CANopen objects 0x6060 (Modes of operation) and 0x6061 (Modes of operation display) is 1 byte. This bit setting indicates that these objects are handled as 2-byte values.
	0x8:	Drive type CANopen: In its basic setting, the CNC checks whether bit 0x400 (Target reached) is set in the drive status word when a drive-controlled homing is started. If drives do not supply this status bit, the check can be suppressed by setting bit 0x8.
	0x20:	Drive type CANopen: If a drive error occurs during the drive-controlled homing, the CNC checks at reset in its basic setting whether bit 0x0400 (Target reached) is set in the drive status word. If the drive does not supply this bit, the check can be suppressed by setting bit 0x20.
	0x40:	Drive type CANopen: If a drive error occurs during the drive-controlled homing, the operation mode active in the drive before the start of homing is restored at a CNC reset. A drive reset can be triggered before resetting the operation mode by setting bit 0x40. This is necessary if the drive does not permit an operation mode change in error state.
	0x400:	Drive type CANopen: When the controller is started, a check is made in the basic setting whether CANopen drives have reached the “Switch on disabled” state before values from the fieldbus are read. This check can be disabled by setting bit 0x400 so that an evaluation of the actual values can be started in the initial state “Not ready to switch on”. It must be ensured that the drive supplies valid actual values in this state.
	0x800:	Drive type CANopen: In the basic setting, the actual drive position must be known before switching to the “Ready to switch on” state. If the drive fails to supply any valid actual position values in the “Switch on disabled” basic setting, this check can be disabled by setting bit 0x800.
	0x1000:	All drives: If no valid actual values were transferred after a fieldbus start (e.g. WcState = 0) and drive initialisation (valid status word), the evaluation of the actual drive position in the CNC can be delayed by setting bit 0x1000. The number of delay cycles is specified in the parameter P-AXIS-00567 [▸ 335] lr_hw[<i>].delay_tracking.
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	See bit description	
Remarks		

4.30 Dynamic limits with tool gear (P-AXIS-00786)

P-AXIS-00786	**Dynamic limits with tool gear**	
Description	Tools can have an additional gear. When this type of tool is changed, the CNC automatically includes the additional gear ratio in the spindle (see P-TOOL-00016, P-TOOL-00017). By default, the maximum speed and acceleration of the spindle axis is limited to the dynamic limits of P-AXIS-00212 [▸ 245] and P-AXIS-00008 [▸ 246] . If P-AXIS-00786 is set, the CNC includes the current gear step in the speed limitation and in the maximum acccerlation. The maximum dynamics result from: $\frac{P-AXIS-00212}{P-TOOL-00016/P-TOOL-00017}$ or $\frac{P-AXIS-00008}{P-TOOL-00016/P-TOOL-00017}$ High revolutions can therefore be programmed if the tool ratio is small than one. The maximum dynamic limits P-AXIS-00212 [▸ 245] and P-AXIS-00008 [▸ 246] from the axis parameter list therefore always refer to a tool ratio of 1:1. Irrespective of the settin gof this parameter, the maximum tool speed and acceleration can be additionally limited in the tool parameters P-TOOL-00014 and P-TOOL-00015 .	
Parameter	kenngr.dynamic_limits_with_tool_gear	
Data type	BOOLEAN	
Data range	0: The maximum axis velocity P-AXIS-00212 [▸ 245] and the axis acceleration P-AXIS-00008 [▸ 246] limit the maximum dynamics irrespedtice of the tool gear ratio. 1: The tool gear ration is included in the calculation. The maximum dynamics result from P-AXIS-00212 [▸ 245] or P-AXIS-00008 [▸ 246] due to the gear ratio of the currently changed tool	
Axis types	S	
Dimension		S: ----
Default value	0	
Drive types	----	
Remarks	This parameter can only be used for spindle axes. Parameter available as of CNC Build V3.1.3079.27 and higher	

4.31 Number of bits for command value (P-AXIS-00816)

P-AXIS-00816	**Number of bits for command value**	
Description	This parameter limits the command value output by the position controller to the value range that can be used by the drive or terminal.	
Parameter	kenngr.bit_range_comand_value	
Data type	UNS16	
Data range	8…32	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	32	
Drive types	Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen, DSE	
Remarks	Available as of CNC Build V3.1.3080.06	

5 Gear step dependent parameters (getriebe[i].*)

In this structure all gear step dependent parameters are defined.

Structure name	Index
getriebe[i].	0 ≤ i ≤ 5 (Maximum number of gear steps: 6, application-specific)

5.1 Gear step number (P-AXIS-00135)

P-AXIS-00135	Gear step number	
Description	The gear step-specific machine data are identified with the help of the gear number. The first gear step (getriebe[0]) is automatically assigned gear step number 1, the other gear steps are set to 0 by default.	
Parameter	getriebe[i].nummer	
Data type	UNS16	
Data range	1 ≤ number < MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	When the controller is started, the gear with the number P-AXIS-00079 [▸ 170] is active.	

5.2 Gear change position (P-AXIS-00078)

P-AXIS-00078	Gear change position	
Description	The gear change position is given by this parameter for every gear step.	
Parameter	getriebe[i].getr_schalt_pos	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] < getr_schalt_pos < P-AXIS-00178 [▸ 121]	
Axis types	T, R, S	
Dimension	T: 0.1 μm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks	The definition of this parameter becomes significant when several gear steps are present.	

5.3 Identifier for hardware specific parameter set (P-AXIS-00054)

P-AXIS-00054	Number of selected hardware specific parameter set of the gear step	
Description	A hardware-specific parameter set can be selected for all gear steps. For example, this parameter can select the rotary transducer of spindle axes because of different necessary resolutions caused by different maximum velocities in modes 'endless turning' and 'position controlled moving' of spindle. The parameter refers to the selected hardware-specific parameter set.	
Parameter	getriebe[i].default_lr_hw_nbr	
Data type	SGN16	
Data range	0 ≤ default_lr_hw_nbr < 2 (Number of hardware-specific parameter sets, application-specific)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

5.4 Load inertia (P-AXIS-00391)

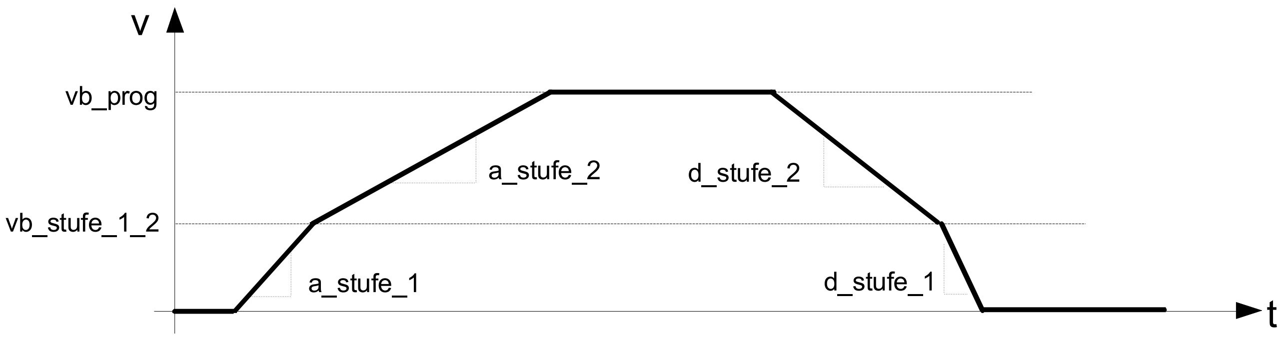
P-AXIS-00391	Load inertia	
Description	To set up acceleration feedforward with additive torque command value, the total load inertia of the motor must be configured here. The total load inertia is the inertia of the motor itself and the inertia of the load related to the motor shaft. In case of a translatory moved axis, the moved masses must be converted to an equivalent inertia related to the motor shaft.	
Parameter	getriebe[i].load	
Data type	REAL64	
Data range	0 ≤ load ≤ MAX(REAL64)	
Axis types	T, R, S	
Dimension	T: kg	R,S: kg*m²
Default value	1.000000e-006	
Drive types	SERCOS	
Remarks		

5.5 Dynamic characteristic values

This section describes the parameters for the acceleration and deceleration profile of the axes as well as the maximum axis velocities and axis accelerations.

5.5.1 Parameter for linear velocity profile (getriebe[i].lslope_profil.*)

This structure compiles the parameters for the linear velocity profile.



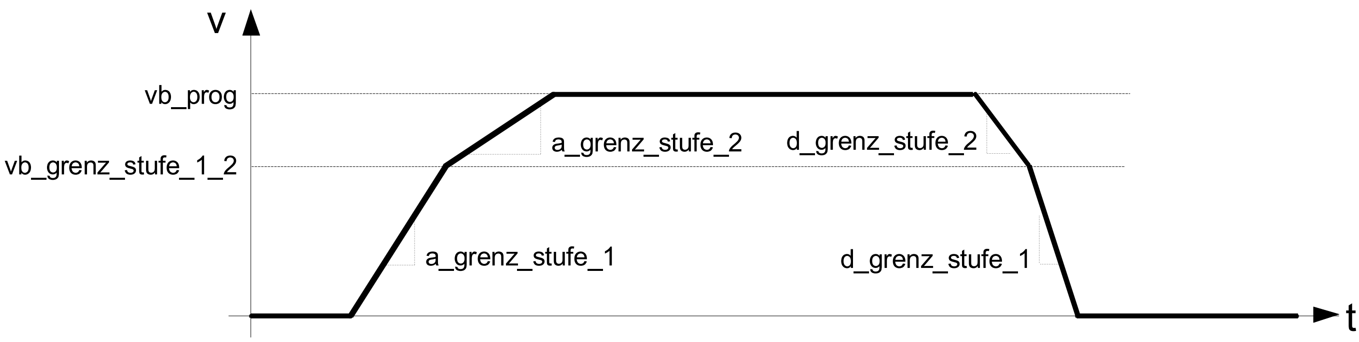


Fig. 18: Acceleration and deceleration parameters of the linear velocity profile

Release Note

From CNC version 2.11.2022.08 the following applies:

The deceleration parameters are also effective for path movements. For SAI movements only one value can be defined to initialise deceleration ramps 1 and 2.

Release Note

As of CNC Build 2.10.2800.00 the following applies:

For SAI movements the parameters of the non-linear slope profile (getriebe[i].slope_profil.*) are effective. They are used **when the axis is assigned by an NC channel or by the PLC** (via the HLI). It can be declared inside the control unit whether the deceleration is used from the axis parameters list [AXIS] or from the control unit itself.

The value inside the control unit is only valid for this single assignment. This means the parameter of the axis parameters list is not overwritten and can be used again in a following assignment.

Notice

The acceleration and deceleration ramp settings for path movements can be changed in NC program. These commands are described in detail in [PROG//G130/ G131/ G231]. The weightings are not effective for SAI movements.

5.5.1.1 Acceleration of step 1 (P-AXIS-00011)

P-AXIS-00011	**Acceleration of step 1 (linear slope)**	
Description	The parameter only becomes active during the deceleration phases. It defines the acceleration in step 1.	
Parameter	getriebe[i].lslope_profil.a_stufe_1	
Data type	UNS32	
Data range	1 ≤ a_stufe_1 ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in detail in [PROG//G130, G131] in greater detail.	

5.5.1.2 Acceleration of step 2 (P-AXIS-00012)

P-AXIS-00012	**Acceleration of step 2 (linear slope)**	
Description	The parameter only becomes active during the deceleration phases. It defines the acceleration in step 2.	
Parameter	getriebe[i].lslope_profil.a_stufe_2	
Data type	UNS32	
Data range	1 ≤ a_stufe_2 ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in detail in [PROG//G130, G131] in greater detail.	

5.5.1.3 Deceleration of step 1 (P-AXIS-00282)

P-AXIS-00282	**Deceleration of step 1 (linear slope)**	
Description	The parameter is used during the deceleration phase. It defines the deceleration of step 1. When initialisation takes place with value 0, the value of P-AXIS-00011 [▸ 229] is automatically used. It is limited to the maximum acceleration P-AXIS-00008 [▸ 246] .	
Parameter	getriebe[i].lslope_profil.d_stufe_1	
Data type	UNS32	
Data range	1 ≤ d_stufe_1 ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R, S (version-specific)	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in detail in [PROG//G130, G131] in greater detail. For SAI the deceleration of step 1 is also valid for step 2 (P-AXIS-00283 [▸ 230])! When the parameter has the value 0, it is assigned the value of P-AXIS-00011 [▸ 229] (a_stufe_1).	

5.5.1.4 Deceleration of step 2 (P-AXIS-00283)

P-AXIS-00283	**Deceleration of step 2 (linear slope)**	
Description	The parameter is used during the deceleration phase. It defines the deceleration of step 2. When initialisation takes place with value 0, the value of P-AXIS-00012 [▸ 229] is automatically used. It is limited to the maximum acceleration P-AXIS-00008 [▸ 246] (a_max).	
Parameter	getriebe[i].lslope_profil.d_stufe_2	
Data type	UNS32	
Data range	1 ≤ d_stufe_2 ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R, S (version-specific)	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in detail in [PROG//G130, G131] in greater detail. When the parameter has the value 0, it is assigned the value of P-AXIS-00012 [▸ 229] (a_stufe_2).	

5.5.1.5 Changeover speed (P-AXIS-00221)

P-AXIS-00221	**Changeover speed (linear slope)**	
Description	The parameter becomes active during the acceleration and deceleration phases. It defines the changeover speed between step 1 and step 2 (P-AXIS-00011 [▸ 229] and P-AXIS-00012 [▸ 229] or P-AXIS-00283 [▸ 230] and P-AXIS-00282 [▸ 230]).	
Parameter	getriebe[i].lslope_profil.vb_stufe_1_2	
Data type	UNS32	
Data range	1 ≤ vb_stufe_1_2 ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	100000	
Drive types	----	
Remarks		

5.5.1.6 Acceleration of step 1 in rapid mode (P-AXIS-00005)

P-AXIS-00005	**Acceleration of step 1 in rapid mode (linear slope)**	
Description	The parameter defines the step 1 rapid traverse acceleration (G00). For positioning in rapid traverse (G00), ramps are often chosen steeper than for the linear and circular interpolation (G01, G02, G03).	
Parameter	getriebe[i].lslope_profil.a_grenz_stufe_1	
Data type	UNS32	
Data range	1 ≤ a_grenz_stufe_1 ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	This limit acceleration is generally set close to the current limit to achieve fast positioning and fast deceleration values. The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in [PROG//G231] in greater detail.	

5.5.1.7 Acceleration of step 2 in rapid mode (P-AXIS-00006)

P-AXIS-00006	**Acceleration of step 2 in rapid mode (linear slope)**	
Description	The parameter defines the step 2 rapid traverse acceleration (G00). For positioning in rapid traverse (G00), ramps are often chosen steeper than for the linear and circular interpolation (G01, G02, G03).	
Parameter	getriebe[i].lslope_profil.a_grenz_stufe_2	
Data type	UNS32	
Data range	1 ≤ a_grenz_stufe_2 ≤ P-AXIS-00008 [▹ 246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	This limit acceleration is generally set close to the current limit to achieve fast positioning and fast deceleration values. The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in [PROG//G231] in greater detail.	

5.5.1.8 Deceleration of step 1 in rapid mode (P-AXIS-00280)

P-AXIS-00280	**Deceleration of step 1 in rapid mode (linear slope)**	
Description	The parameter becomes only active during the deceleration phase in G00. When initialisation takes place with value 0, the value of P-AXIS-00005 [▹ 231] is automatically used. It is limited to the maximum acceleration P-AXIS-00008 [▹ 246] (a_max).	
Parameter	getriebe[i].lslope_profil.d_grenz_stufe_1	
Data type	UNS32	
Data range	1 ≤ d_grenz_stufe_1 ≤ P-AXIS-00008 [▹ 246]	
Axis types	T, R, S (version-specific)	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
Drive types	----	
Remarks	For SAI during rapid traverse the deceleration of step 1 is also valid for step 2 (P-AXIS-00281 [▹ 233])! When the parameter has the value 0, it is assigned the value of P-AXIS-00005 [▹ 231] (a_grenz_stufe_1).	

5.5.1.9 Deceleration of step 2 in rapid mode (P-AXIS-00281)

P-AXIS-00281	Deceleration of step 2 in rapid mode (linear slope)	
Description	The parameter becomes only active during the deceleration phase in G00. When initialisation takes place with value 0, the value of P-AXIS-00006 [232] to read and write the name. It is limited to the maximum acceleration P-AXIS-00008 [246] (a_max).	
Parameter	getriebe[i].lslope_profil.d_grenz_stufe_2	
Data type	UNS32	
Data range	1 ≤ d_grenz_stufe_2 ≤ P-AXIS-00008 [246]	
Axis types	T, R, S (version-specific)	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
Drive types	----	
Remarks	When the parameter has the value 0, it is assigned the value of P-AXIS-00006 [232] (a_grenz_stufe_2).	

5.5.1.10 Changeover speed in rapid mode (P-AXIS-00211)

P-AXIS-00211	Changeover speed in rapid mode (linear slope)	
Description	For positioning in rapid traverse (G00), ramps are often chosen steeper than for the linear and circular interpolation (G01, G02, G03). The parameter defines the acceleration and deceleration phases for these cases. It defines the changeover speed between step 1 and step 2 (P-AXIS-00005 [231] and P-AXIS-00006 [232] orP-AXIS-00281 [233] and P-AXIS-00280 [232]).	
Parameter	getriebe[i].lslope_profil.vb_grenz_stufe_1_2	
Data type	UNS32	
Data range	1 ≤ vb_grenz_stufe_1_2 ≤ P-AXIS-00212 [245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	100000	
Drive types	----	
Remarks		

5.5.1.11 Deceleration at feedhold (P-AXIS-00024)

P-AXIS-00024	**Deceleration for feedhold (linear slope)**	
Description	When feedhold is active because of user reaction, measurement travel or homing, steeper ramps are often required than for positioning (G00) or workpiece machining (e.g. G01, G02, G03). The parameter defines the deceleration value for these cases. When the feed stop (e_feedhold) control unit is used, the value of this parameter is always used. If the entry is missing or assigned the value 0, the minimum of the values of P-AXIS-00005 [▸ 231] (a_grenz_stufe_1 and P-AXIS-00006 [▸ 232] (a_grenz_stufe_2) is used for deceleration.	
Parameter	getriebe[i].lslope_profil.a_feedh	
Data type	UNS32	
Data range	0 ≤ a_feedh ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	0	
Drive types	----	
Remarks	P-AXIS-00024 is only used with feedhold if the parameter P-CHAN-00097 in the channel parameter list is assigned the value 1. If P-AXIS-00024 is assigned the value 0, the minimum of the values P-AXIS-00005 [▸ 231] (a_grenz_stufe_1 and P-AXIS-00006 [▸ 232] (a_grenz_stufe_2) is used.	

5.5.2 Parameter for non-linear velocity profile (getriebe[i].slope_profil.*)

This structure compiles the parameters for non-linear velocity profile. In the figure below, the parameters of the non-linear velocity profile are drawn. The speed profile can be shown over 7 phases.

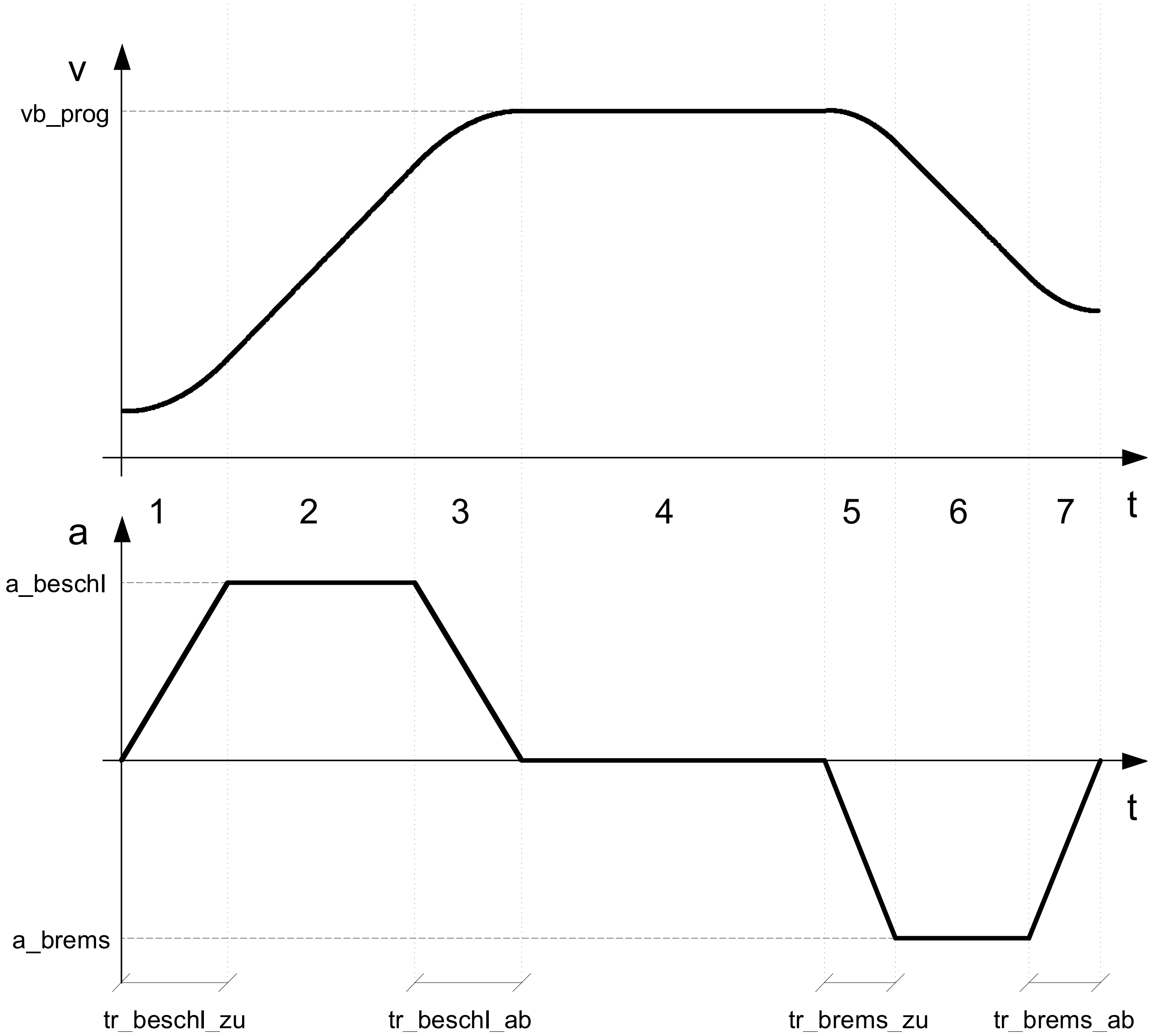


Fig. 19: Non-linear velocity profile

The parameter values corresponding to these phases are:

1.	$tr_{beschl, zu}$	In this time interval, acceleration increases from value 0 to value a_{beschl}
2nd	a_{beschl}	In this time interval, acceleration is constant a_{beschl}
3rd	$tr_{beschl, ab}$	In this time interval, acceleration decreases from the value a_{beschl} to the value 0
4th	vb_{prog}	In this time interval, acceleration is 0 (target speed is reached and constant).
5.	$tr_{brems, zu}$	In this time interval, the absolute value of deceleration increases from the value 0 to the value a_{brems}
6.	a_{brems}	in this time interval, the absolute value of deceleration is constant a_{brems}
7.	$tr_{brems, ab}$	In this time interval, the acceleration decreases from a_{brems} to the value 0

5.5.2.1 Acceleration at machining feed (P-AXIS-00001)

P-AXIS-00001	**Acceleration at machining feed (non-linear slope)**	
Description	The parameter represents the axis acceleration with increasing velocity.	
Parameter	getriebe[i].slope_profil.a_beschl	
Data type	UNS32	
Data range	1 ≤ a_beschl ≤ P-AXIS-00008 [246]	
Axis types	T, R	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in [PROG//G130/G131] in greater detail.	

5.5.2.2 Deceleration at machining feed (P-AXIS-00002)

P-AXIS-00002	**Deceleration at machining feed (non-linear slope)**	
Description	The parameter represents the axis deceleration with decreasing velocity.	
Parameter	getriebe[i].slope_profil.a_brems	
Data type	UNS32	
Data range	1 ≤ a_brems ≤ P-AXIS-00008 [246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in [PROG//G130/G131] in greater detail.	

5.5.2.3 Ramp time for acceleration up-gradation (P-AXIS-00196)

P-AXIS-00196	**Ramp time for acceleration up-gradation (non-linear slope)**	
Description	The parameter defines the acceleration ramp time for the up-gradation of the acceleration P-AXIS-00001 [▸ 236].	
Parameter	getriebe[i].slope_profil.tr_beschl_zu	
Data type	UNS32	
Data range	P-AXIS-00201 [▸ 247] ≤ tr_beschl_zu ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	50000	
drive types.	----	
Remarks	The ramp time can be changed in the NC program. The appropriate NC commands are described in [PROG//Ramp time weighting (G132/G133/G134/G233/G338/G339)] in greater detail. The default value for ramp time weighting can be defined in P-CHAN-00073.	

5.5.2.4 Ramp time for acceleration down-gradation (P-AXIS-00195)

P-AXIS-00195	**Ramp time for acceleration down-gradation (non-linear slope)**	
Description	The parameter defines the acceleration ramp time for the down-gradation of acceleration P-AXIS-00001 [▸ 236].	
Parameter	getriebe[i].slope_profil.tr_beschl_ab	
Data type	UNS32	
Data range	P-AXIS-00201 [▸ 247] ≤ tr_beschl_ab ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	50000	
drive types.	----	
Remarks	The ramp time can be changed in the NC program. The appropriate NC commands are described in [PROG//Ramp time weighting (G132/G133/G134/G233/G338/G339)] in greater detail.	

5.5.2.5 Ramp time for deceleration up-gradation (P-AXIS-00198)

P-AXIS-00198	**Ramp time for deceleration up-gradation (non-linear slope)**	
Description	The parameter defines the acceleration ramp time for the up-gradation of deceleration P-AXIS-00002 [▷ 236].	
Parameter	getriebe[i].slope_profil.tr_brems_zu	
Data type	UNS32	
Data range	P-AXIS-00201 [▷ 247] ≤ tr_brems_zu ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	50000	
drive types.	----	
Remarks	The ramp time can be changed in the NC program. The appropriate NC commands are described in [PROG//Ramp time weighting (G132/G133/G134/G233/G338/G339)] in greater detail.	

5.5.2.6 Ramp time for deceleration down-gradation (P-AXIS-00197)

P-AXIS-00197	**Ramp time for deceleration down-gradation (non-linear slope)**	
Description	The parameter defines the acceleration ramp time for the down-gradation of deceleration P-AXIS-00002 [▷ 236].	
Parameter	getriebe[i].slope_profil.tr_brems_ab	
Data type	UNS32	
Data range	P-AXIS-00201 [▷ 247] ≤ tr_brems_ab ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	50000	
drive types.	----	
Remarks	The ramp time can be changed in the NC program. The appropriate NC commands are described in [PROG//Ramp time weighting (G132/G133/G134/G233/G338/G339)] in greater detail.	

5.5.2.7 Acceleration at rapid movement (P-AXIS-00004)

P-AXIS-00004	**Acceleration at rapid movement (non-linear slope)**	
Description	This acceleration parameter is active for deceleration and acceleration with rapid traverse movements (G00).	
Parameter	getriebe[i].slope_profil.a_grenz	
Data type	UNS32	
Data range	1 ≤ a_grenz ≤ P-AXIS-00008 [246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks	The acceleration ramps can be changed in the NC program. The appropriate NC commands are described in [PROG//G231] in greater detail.	

5.5.2.8 Ramp time at rapid movement (P-AXIS-00200)

P-AXIS-00200	**Ramp time at rapid movement (non-linear slope)**	
Description	This ramp time parameter is active at programmed rapid traverse (G00) for acceleration and deceleration. In this case, it replaces the 2 ramp times for acceleration (P-AXIS-00195 [237], P-AXIS-00196 [237]) or the 2 ramp times for deceleration (P-AXIS-00197 [238], P-AXIS-00198 [238]).	
Parameter	getriebe[i].slope_profil.tr_grenz	
Data type	UNS32	
Data range	P-AXIS-00201 [247] ≤ tr_grenz ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	10000	
Drive types	----	
Remarks	The ramp time can be changed in the NC program. The appropriate NC commands are described in [PROG//G233] in greater detail.	

5.5.2.9 Deceleration at feedhold (P-AXIS-00053)

P-AXIS-00053	**Deceleration at feedhold (non-linear slope)**	
Description	When feedhold is active because of user reaction, measurement travel or homing, ramps are often chosen steeper than for positioning (G00) or workpiece machining (e.g. G01, G02, G03). The parameter defines the deceleration value for these cases. If an entry is not made, the same deceleration as for G00 is used (P-AXIS-00005 [231], P-AXIS-00006 [232] or P-AXIS-00280 [232], P-AXIS-00281 [233]).	
Parameter	getriebe[i].slope_profil.a_feedh	
Data type	UNS32	
Data range	1 ≤ a_feedh ≤ P-AXIS-00008 [246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	0	
Drive types	----	
Remarks	P-AXIS-00053 is only used if parameter P-CHAN-00097 in the channel parameter list is assigned the value 1. When the parameter has the value 0, it is assigned the value of P-AXIS-00004 [239] (a_grenz).	

5.5.2.10 Ramp time at feedhold (P-AXIS-00081)

P-AXIS-00081	**Ramp time at feedhold (non-linear slope)**	
Description	When feedhold is active, ramps are often chosen steeper than for positioning and for workpiece machining (e.g. G01, G02, G03). The parameter defines the ramp time value for these cases. If the entry is missing, acceleration is set up and cancelled using the rapid motion ramp time (P-AXIS-00005 [231], P-AXIS-00006 [232] or P-AXIS-00280 [232], P-AXIS-00281 [233]).	
Parameter	getriebe[i].slope_profil.tr_feedh	
Data type	UNS32	
Data range	P-AXIS-00201 [247] ≤ tr_feedh ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: µs	R: µs
Default value	0	
Drive types	----	
Remarks	P-AXIS-00081 is only used if parameter P-CHAN-00097 in the channel parameter list is assigned the value 1. When the parameter has the value 0, it is assigned the value of P-AXIS-00200 [239] (tr_grenz).	

5.5.3 Effective acceleration profile (P-AXIS-00270)

P-AXIS-00270	**Effective acceleration profile**	
Description	The parameter determines the effective acceleration profile. It is valid for: • Path axes during CNC-controlled homing • Spindle axes	
Parameter	getriebe[i].slope_type	
Data type	UNS16	
Data range	0 ≤ slope_type ≤ 3 where: 0: Step-shaped acceleration profile 1: Trapezoidal acceleration profile 2: Sine-square acceleration profile	
Axis types	T, R, S	
Dimension	T: -	R,S: -
Default value	0	
Drive types	----	
Remarks	**The following applies to contouring axes during reference point travel in all CNC versions:** Slope type: Relevant dynamic characteristic values: 0 Linear Velocity Profile getriebe[i].a_ref 1, 2 Non-linear velocity profile getriebe[i].a_ref and getriebe[i].tr_ref	
	The following applies to spindle axes in CNC versions before V2.11.2800: Slope type: Relevant dynamic characteristic values: 0 Linear Velocity Profile getriebe[i].lslope_profil.* 1, 2 Non-linear velocity profile getriebe[i].slope_profil.*	
	As of CNC Build **V2.11.2800** the parameter for spindle axes has no more significance. The profile curve results from parametrising the dynamic characteristics in getriebe[i].slope_profil.*	
	For ramp times < CNC cycle time, this applies: Linear velocity profile For ramp times ≥ CNC cycle time, this applies: Non-linear velocity profile	

5.5.4 Rapid mode velocity (P-AXIS-00209)

P-AXIS-00209	Rapid mode velocity	
Description	The rapid traverse velocity is specified for positioning in rapid traverse (G00).	
Parameter	getriebe[i].vb_eilgang	
Data type	UNS32	
Data range	1 ≤ vb_eilgang ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	166666	
Drive types	----	
Remarks		

5.5.5 Gearbox ratio numerator/denominator

The gearbox ratio is defined as the ratio of input revolutions (n_1) to output revolutions (n_2).

$$i = \frac{n_1}{n_2}$$

The resulting resolution is given by:

$$= \frac{wegaufz}{wegaufn} * \frac{gear\_fact\_num}{gear\_fact\_denom}$$

Fig. 20:

Attention

If the gearbox ratio is used, the speed scaling must also be set related to the motor side (for example, for open-loop speed-controlled spindles). The resulting speed scaling is:

$$= \frac{v\_reso\_num}{v\_reso\_denom} * \frac{gear\_fact\_num}{gear\_fact\_denom}$$

Notice

The gear ratio cannot be changed by list download. However, if an attempt is made, error message P-ERR-110581 is output.

5.5.5.1 Gearbox ratio numerator (P-AXIS-00511)

P-AXIS-00511	**Gearbox ratio numerator**	
Description	By default, the path resolution of an axis is set with axis parameters P-AXIS-00233 [289] and P-AXIS-00234 [290] , where an eventually present gearbox must be considered (load-side scaling). If the parameters P-AXIS-00511/ P-AXIS-00512 [244] and P-AXIS-00092 [347], P-AXIS-00362 [361]/ P-AXIS-00363 [362] are used, the resolution of the axis can be specified related to the motor side. The resulting resolution (R) related to the load side is calculated automatically according to the equation below: $R = P\text{-}AXIS\text{-}00092 * \frac{P\text{-}AXIS\text{-}00511}{P\text{-}AXIS\text{-}00512} * \frac{P\text{-}AXIS\text{-}00363}{P\text{-}AXIS\text{-}00362}$	
Parameter	getriebe[i].gear_fact_num	
Data type	UNS32	
Data range	1 ... MAX (UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	For possible applications, see Settings of position scaling [538]	

5.5.5.2 Gearbox ratio denominator (P-AXIS-00512)

P-AXIS-00512	**Gearbox ratio denominator**	
Description	By default, the path resolution of an axis is specified with axis parameters P-AXIS-00233 [▸ 289] and P-AXIS-00234 [▸ 290] , where an eventually present gearbox must be considered (load-side scaling). If the parameters P-AXIS-00511 [▸ 243]/ P-AXIS-00512 and P-AXIS-00092 [▸ 347], P-AXIS-00362 [▸ 361]/ P-AXIS-00363 [▸ 362] are used, the resolution of the axis can be specified related to the motor side. The resulting resolution (R) related to the load side is calculated automatically according to the equation below: $R = P\text{-}AXIS\text{-}00092 * \frac{P\text{-}AXIS\text{-}00511}{P\text{-}AXIS\text{-}00512} * \frac{P\text{-}AXIS\text{-}00363}{P\text{-}AXIS\text{-}00362}$	
Parameter	getriebe[i].gear_fact_denom	
Data type	UNS32	
Data range	1 ... MAX (UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	A value of zero is not permitted for P-AXIS-00512. If this value is set, the error message P-ERR-110579 is output. For possible applications, see Settings of position scaling [▸ 538]	

5.6 Permissible axis dynamics (getriebe[i].dynamik.*)

5.6.1 Maximum permissible axis velocity (P-AXIS-00212)

<table>
<tr><th>P-AXIS-00212</th><th colspan="2">Maximum permissible axis velocity</th></tr>
<tr><td>Description</td><td colspan="2">The parameter defines the maximum permissible axis velocity.</td></tr>
<tr><td>Parameter</td><td colspan="2">getriebe[i].dynamik.vb_max</td></tr>
<tr><td>Data type</td><td colspan="2">UNS32</td></tr>
<tr><td>Data range</td><td colspan="2">1 < hb_v_max_track ≤ 2000000000 (Presetting of maximum axis velocity,
plausibility limit, application-specific)</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R, S</td></tr>
<tr><td>Dimension</td><td>T: µm/s</td><td>R,S: 0,001°/s</td></tr>
<tr><td>Default value</td><td colspan="2">200000</td></tr>
<tr><td>Drive types</td><td colspan="2">----</td></tr>
<tr><td>Remarks</td><td colspan="2">In the case of axes of the type 'ACHSTYP_TRANSLATOR' and 'ACHSTYP_ROTATOR' it is presumed that while setting the maximum permissible axis velocity the resolution limits of the measuring system will also be taken into consideration.
In the case of axes of the type 'ACHSTYP_SPINDEL' which are controlled by a spindle interpolator, the limit at which the measuring system delivers no valid values is set using the parameter P-AXIS-00220 [▸ 79] .

Examples:
Spindle speed at 10000 rpm
value = 10000 * 6 * 1000 = 60000000 (unit 0.001 °/s)
With units
(10000 [rpm] * 360 [°/rev] * 1000 [0.001 °/°]) / 60 [s/min]
= 60000000 [0.001 °/s]

Translator at 1000 mm/min
value = 1000 * 1000 / 60 = 16666 (unit 0.001 µm/s)
With units
(1000 [rpm] * 1000 [0.001 µm/mm]) / 60 [s/min]
= 16666 [0.001 µm/s]</td></tr>
</table>

5.6.2 Maximum permissible axis acceleration (P-AXIS-00008)

P-AXIS-00008	**Maximum permissible axis acceleration**	
Description	The parameter defines the maximum permissible axis acceleration.	
Parameter	getriebe[i].dynamik.a_max	
Data type	UNS32	
Data range	1 ≤ a_max ≤ 100000000 (Presetting of maximum axis acceleration, plausibility limit, application-specific)	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	1000	
Drive types	----	
Remarks		

5.6.3 Deceleration for an emergency stop (P-AXIS-00003)

P-AXIS-00003	**Deceleration for an emergency stop**	
Description	The parameter defines the used deceleration for an emergency stop. If errors of error reaction class 4 occur, the NC decelerates at the rate for specific axes. The path then leaves the trajectory.	
Parameter	getriebe[i].dynamik.a_emergency	
Data type	UNS32	
Data range	1 ≤ a_emergency ≤ 2*P-AXIS-00008 [▸ 246]	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
drive types.	----	
Remarks	When the parameter has the value 0, the value of P-AXIS-00008 [▸ 246] (a_max) is used.	

5.6.4 Minimum permissible ramp time (P-AXIS-00201)

P-AXIS-00201	**Minimum permissible ramp time**	
Description	The parameter defines the minimum permissible ramp time of the drive. This parameter limits the axis jerk arising due to velocity profile.	
Parameter	getriebe[i].dynamik.tr_min	
Data type	UNS32	
Data range	0 (Preset of minimum ramp time, application-specific) ≤ tr_min ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	10000	
Drive types	----	
Remarks		

5.6.5 Geometric ramp time (P-AXIS-00199)

P-AXIS-00199	**Geometric ramp time**	
Description	The parameter defines the permissible geometric ramp time. This parameter limits axis jerk caused by the programmed contour.	
Parameter	getriebe[i].dynamik.tr_geom	
Data type	UNS32	
Data range	0 (Preset of minimum ramp time, application-specific) ≤ tr_geom ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	10000	
drive types.	----	
Remarks	The ramp time can be changed in the NC program. The appropriate NC commands are described in [PROG//Ramp time weighting (G132/G133/G134/G233/G338/G339)] in greater detail.	

5.6.6 Weighting of acceleration at motion block transition (P-AXIS-00013)

P-AXIS-00013	**Weighting of acceleration at motion block transition**	
Description	This parameter weights the permissible acceleration at a motion block transition. If the value 0 is not specified in the parameter list, the weighting of the permissible acceleration with the cycle time/ramp time factor is valid (default setting).	
Parameter	getriebe[i].dynamik.a_trans_weight	
Data type	UNS32	
Data range	1 ≤ a_trans_weight ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0	
drive types.	----	
Remarks	This parameter is only considered if the non-linear slope is used as soon as the contour has a kink angle.	

The example below generates an acceleration depending on the trajectory velocity at the block transitions of N10 - N20 because of the change of direction.

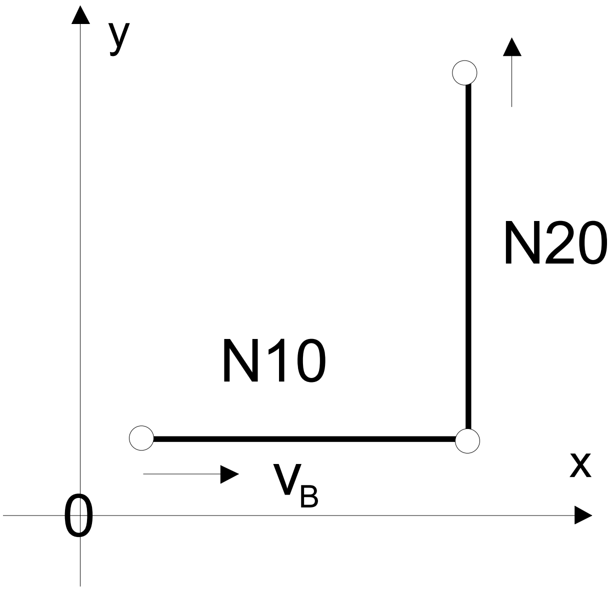


Fig. 21: Acceleration by block transitions N10 to N20 due to a direction change

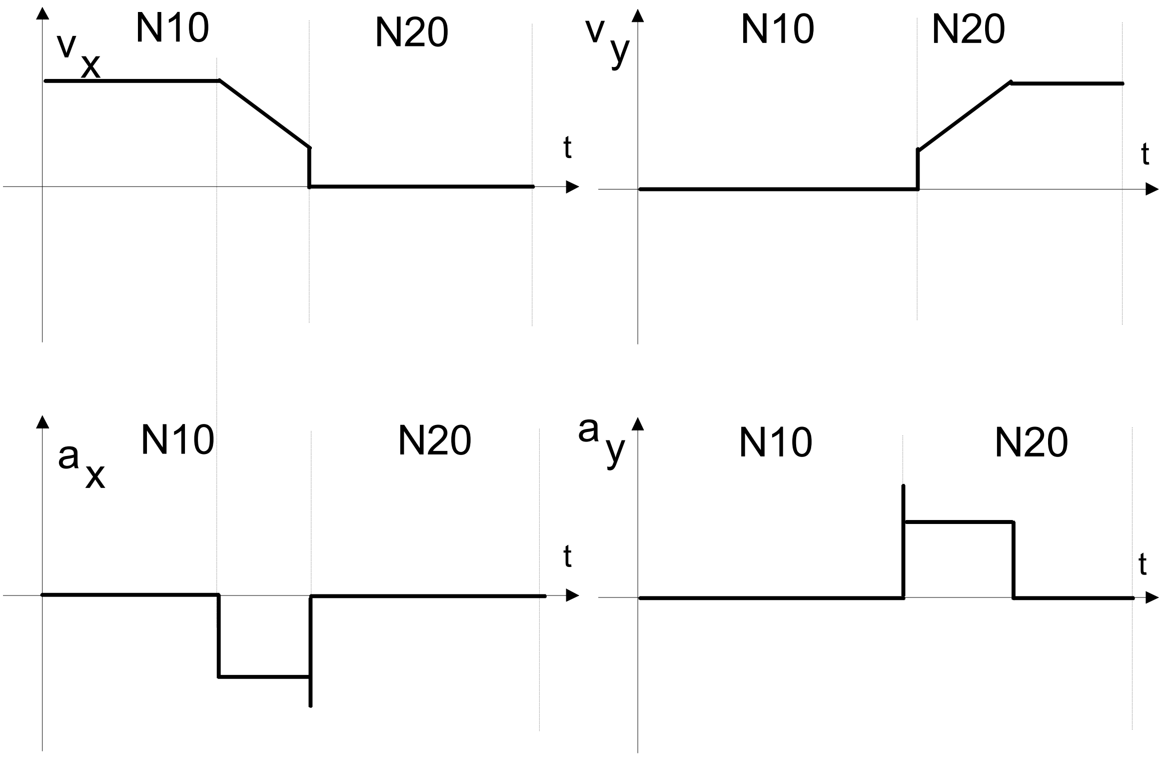


Fig. 22: Acceleration at linear-linear block transition

A factor can be defined by the parameter a_trans_weight, by which the maximum acceleration and therefore the velocity at the block transition can be weighted. The permissible acceleration at the block transition depends on the currently active velocity mode G00 or G01.

$$a_{active} = factor_a * a_{G00/G01}$$

$$factor_a = \frac{a\_trans\_weight}{1000} \in [0.001; 1]$$

Notice

By default the acceleration is considered at the block transition. This means that P-AXIS-00013 is set to 0.

If set to 0 (a_trans_weight = 0), then the weighting of the permissible acceleration is executed at the factor cycle time / ramp time (default setting). This results in a very low speed at the motion block transition.

$$factor_a = \frac{T_{IPO}}{T_{Ramp}}$$

$$a_{active} = factor_a * a_{G00/G01} = \frac{T_{IPO}}{T_{Ramp}} * a_{G00/G01}$$

$$j_{active} = \frac{a_{active}}{T_{IPO}} = \frac{a_{G00/G01}}{T_{Ramp}}$$

If the axis is to move at higher speeds with an accordingly higher jerk at motion block transitions, a_trans_weight is adjusted high accordingly. At a value of 1000 (upper limit), the acceleration at motion block transitions is retained but the jerk is greater than the adjusted limits.

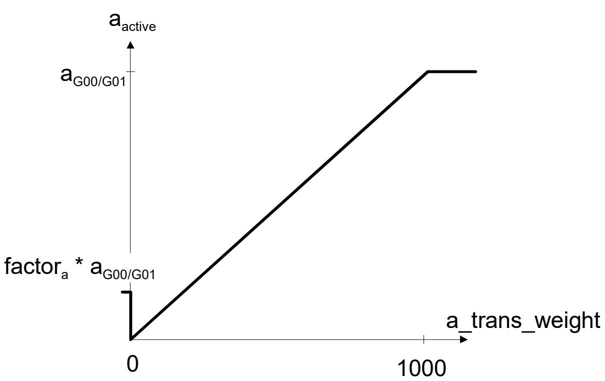


Fig. 23: Factor range for acceleration weighting at block transition

Maximum jerk for a_trans_weight = 1000:

$$a_{active} = factor_a * a_{G00/G01} = a_{G00/G01}$$

$$j_{active} = \frac{a_{active}}{T_{IPO}} = \frac{a_{G00/G01}}{T_{IPO}}$$

5.6.7 Weighting of jerk at block transition (P-AXIS-00154)

P-AXIS-00154	**Weighting of jerk at block transition**	
Description	At the block transition from linear to circular block or vice versa, a jump in acceleration occurs, even if there is a tangential transition. The parameter weights the permissible jerk at these types of movement transitions. Jerk is only considered if P-CHAN-00009 is set. If P-AXIS-00154 is not set in the parameter list, the velocity is reduced to such an extent that the permissible jerk at the block transition is maintained.	
Parameter	getriebe[i].dynamik.r_trans_weight	
Data type	UNS32	
Data range	0 ≤ r_trans_weight ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	1000	
drive types.	----	
Remarks	This parameter is only considered if the non-linear slope is used and for circular - linear, circular - circular or linear - circular transitions.	

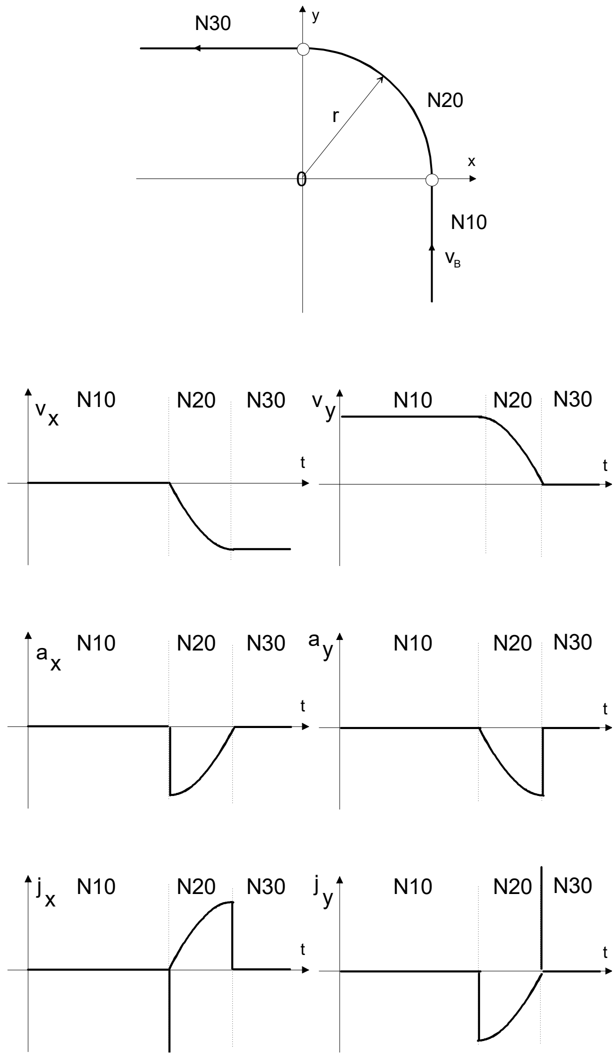
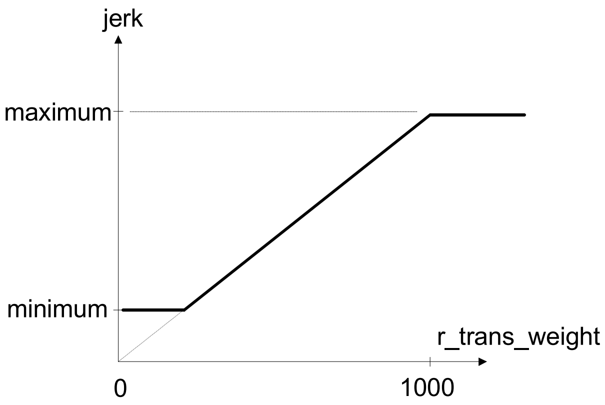


Fig. 24: Acceleration and jerk at linear-circular block transition

The permissible jerk at such movement transition types is weighted.

$$j_{active} = factor_j * j_{max} = factor_j * \frac{a_{G00/G01}}{T_{IPO}}$$

$$factor_j = \frac{r\_trans\_weight}{1000} \in [0.001; 1]$$



$$\text{maximum: } \frac{a_{G00/G01}}{T_{IPO}}$$

$$\text{minimum: } \frac{a_{G00/G01}}{T_{IPO}} * \frac{\text{a\_trans\_weight}}{1000}$$

Fig. 25: Factor for jerk weighting at block transition

Notice

By default jerk is not considered at block transition. If jerk is to be considered at block transition, it must first be enabled in the channel parameter P-CHAN-00009 (corr_v_trans_jerk).

The permissible jerk at block transition results from the active acceleration depending on the block type (G0, G1), and associated ramp time tr:

(a_aktiv /tr_aktiv) r_trans_weight / 1000.*

Notice

The minimum value is defined by the weighting of the maximum acceleration at block transition P-AXIS-00013 [▸ 248] (a_trans_weight).

If the setting is not to be limited, this can be set to 1 using channel parameter P-CHAN-00117 (mode_trans_jerk).

If set to 1000 the parameter has no influence. The result is that no speed reduction at block transition because of jerk will occur. Smaller value than 1000 leads to reduction of velocity because of jerk at block transition. Value 0 leads to velocity reduction depending on jerk setting of the non-linear slope (see parameter P-AXIS-00024 [▸ 234]).

5.6.8 Jerk at block transition

5.6.8.1 Jerk at non-tangent continuous block transition (P-AXIS-00339)

P-AXIS-00339	Jerk at block transition (non-tangent continuous block transitions)	
Description	As an alternative to the weighting of acceleration and jerk with the parameters P-AXIS-00013 [▸ 248] and P-AXIS-00154 [▸ 251] , the jerk at block transition also can be adjusted directly with the parameters P-AXIS-00340 [▸ 254] . The mode for jerk limiting at block transition must therefore be set to 2 in the channel parameter P-CHAN-00117 . P-AXIS-00339 works at non-tangent continuous block transitions. This corresponds to the effect of P-AXIS-00013 [▸ 248]is output.	
Parameter	getriebe[i].dynamik.j_trans_c0	
Data type	REAL64	
Data range	0 ≤ j_trans_c0 ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: m/s³	R: 1000°/s³
Default value	0	
Drive types	----	
Remarks	The values P-AXIS-00339 and P-AXIS-00340 [▸ 254] are limited internally to the permissible jerk. It is differentiated from the effective acceleration and the cycle time.	

5.6.8.2 Jerk at tangent continuous block transition (P-AXIS-00340)

P-AXIS-00340	Jerk at block transition (tangent continuous block transitions)	
Description	As an alternative to the weighting of acceleration and jerk with the parameters P-AXIS-00013 [▸ 248] and P-AXIS-00154 [▸ 251] , the jerk at block transition also can be adjusted directly with the parameters P-AXIS-00339 [▸ 254] and P-AXIS-00340. The mode for jerk limiting at block transition must therefore be set to 2 in the channel parameter P-CHAN-00117 . P-AXIS-00340 works at tangent continuous, non-curvature continuous block transitions. This corresponds to the effect of P-AXIS-00154 [▸ 251].	
Parameter	getriebe[i].dynamik.j_trans_c1	
Data type	REAL64	
Data range	0 ≤ j_trans_c1 ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: m/s³	R: 1000°/s³
Default value	0	
Drive types	----	
Remarks	The values P-AXIS-00339 [▸ 254] and P-AXIS-00340 are limited internally to the permissible jerk. It is differentiated from the effective acceleration and the cycle time.	

5.6.9 Maximum permissible exceeding of acceleration (P-AXIS-00394)

P-AXIS-00394	**Maximum permissible exceeding of acceleration**	
Description	The parameter defines the maximum permissible exceeding of acceleration in connection with the weighting of the axis acceleration via the CNC function [PROG//Section - Programmable acceleration overload] (<*Achsname*> **[DYNAMIC** …**]**). The parameter P-AXIS-00394 is an overload factor, this means it is set greater or equal to 100 percent. An axis-specific weighting of the acceleration by the CNC command is only effective in the range [100%, P-AXIS-00394].	
Parameter	getriebe[i].dynamik.a_overload_max	
Data type	UNS32	
Data range	1000 ≤ a_overload_max ≤ UNS32	
Axis types	T, R	
Dimension	T: 0.1%	R: 0.1%
Default value	1000	
Drive types	----	
Remarks	Currently, the function can be used to weight acceleration in combination with the polynomial smoothing-over process 6.	

5.6.10 Maximum acceleration at weighting (P-AXIS-00292)

P-AXIS-00292	**Maximum acceleration at weighting**	
Description	The parameter defines the maximum acceleration for weighting via G130, G131. Depending on the selected slope type, the value can not be defined smaller than the specific acceleration of feed rate blocks (G01, G02/G03) and not greater than the maximum permissible axis acceleration.	
Parameter	getriebe[i].dynamik.a_w_max	
Data type	UNS32	
Data range	A_F ≤ a_w_max ≤ P-AXIS-00008 [▸ 246] Non-linear slope: Value A_F: MAX[P-AXIS-00001 [▸ 236], P-AXIS-00002 [▸ 236]] Linear slope: Value A_F: MAX[P-AXIS-00011 [▸ 229], P-AXIS-00012 [▸ 229]]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	-	
Drive types	----	
Remarks		

5.6.11 Minimum ramp time at weighting (P-AXIS-00293)

P-AXIS-00293	Minimum ramp time at weighting	
Description	The parameter defines the minimum ramp time for weighting via G132, G133. The value can not be defined smaller than the minimum permissible ramp time and not greater than the specific ramp times of feed rate blocks (G01, G02/G03).	
Parameter	getriebe[i].dynamik.tr_w_min	
Data type	UNS32	
Data range	P-AXIS-00201 [▸ 247] ≤ tr_w_min ≤ TR_F Value TR_F: MIN [P-AXIS-00195 [▸ 237], P-AXIS-00196 [▸ 237], P-AXIS-00197 [▸ 238], P-AXIS-00198 [▸ 238]]	
Axis types	T, R	
Dimension	T: µs	R: µs
Default value	0	
Drive types	----	
Remarks		

5.7 Characteristic curve-controlled acceleration (getriebe[i].beschl_kennlinie.*)

A gear step-specific acceleration characteristic is defined using the following parameters.

Notice

The functionality 'Characteristic curve-controlled acceleration' is only possible for axes of the spindle type.

The slope profile type 0 is mandatory for use of the function. (see [P-AXIS-00270 [▸ 241])

5.7.1 Type of the characteristic acceleration curve (P-AXIS-00202)

P-AXIS-00202	**Type of the characteristic acceleration curve**
Description	The parameter defines the type of the characteristic acceleration curve.
Parameter	getriebe[i].beschl_kennlinie.typ
Data type	UNS32
Data range	0: No characteristic curve acceleration is active, acceleration profile acc. to P-AXIS-00270 [▸ 241] 1: Hyperbola 2: Polynomial 3: Asynchronous drive
Axis types	S
Dimension	S: ----
Default value	0
Drive types	----
Remarks	

5.7.1.1 Characteristic a(n) in polynomial or hyperbolic form

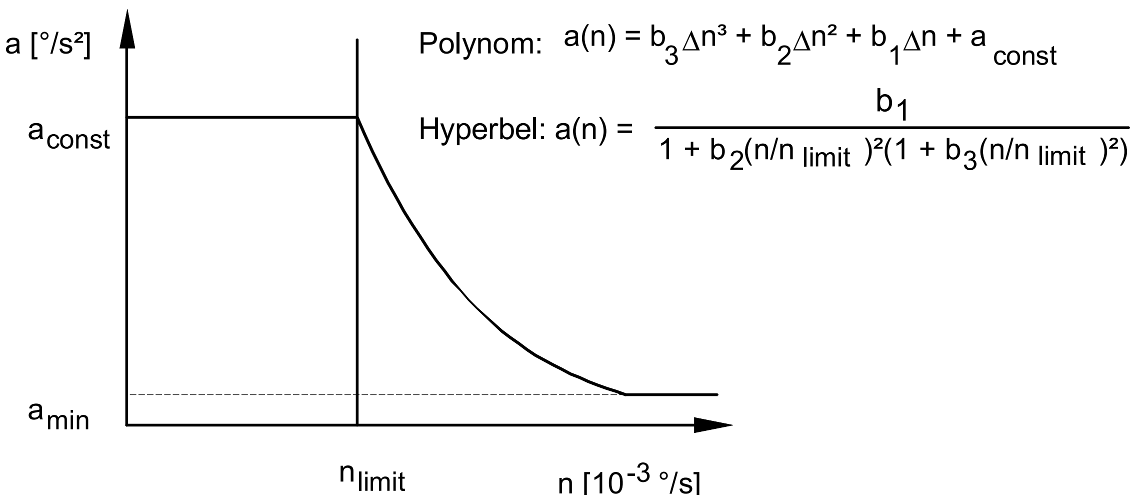


Fig. 26: Characteristic a(n) in polynomial or hyperbolic form

5.7.1.1.1 Limit speed of the acceleration curve (P-AXIS-00130)

P-AXIS-00130	**Limit speed of the acceleration curve**	
Description	The parameter defines the limit speed from which onwards the acceleration is specified in a polynomial or hyperbolic form (see P-AXIS-00202 [▸ 257]).	
Parameter	getriebe[i].beschl_kennlinie.n_grenz	
Data type	UNS32	
Data range	0 < n_grenz ≤ MAX(UNS32)	
Axis types	S	
Dimension		S: 10^{-3} °/s
Default value	0	
Drive types	----	
Remarks		

5.7.1.1.2 Constant acceleration in the range n<ngrenz (P-AXIS-00007)

P-AXIS-00007	**Constant acceleration in the range n<ngrenz**	
Description	The parameter defines a constant acceleration in the range $n<n_{grenz}$	
Parameter	getriebe[i].beschl_kennlinie.a_konst	
Data type	UNS32	
Data range	0 ≤ a_konst ≤ MAX(UNS32)	
Axis types	S	
Dimension		S: °/s²
Default value	0	
Drive types	----	
Remarks		

5.7.1.1.3 Minimum value of acceleration for high speed (P-AXIS-00010)

P-AXIS-00010	**Minimum value of acceleration which may not be undershot.**	
Description	The parameter defines the minimum value of acceleration, which may not be undershot.	
Parameter	getriebe[i].beschl_kennlinie.a_min	
Data type	UNS32	
Data range	0 ≤ a_min ≤ MAX(UNS32	
Axis types	S	
Dimension		S: °/s²
Default value	0	
Drive types	----	
Remarks		

5.7.1.1.4 Parameters of the a(n) Polynomial (P-AXIS-00026/-00027/-00028)

5.7.1.1.4.1 Parameter of the a(n) polynomial b1 (P-AXIS-00026)

P-AXIS-00026	**Parameter of the a(n) Polynomial (B1)**	
Description	B1 parameter of the a(n) polynomial	
Parameter	getriebe[i].beschl_kennlinie.b1	
Data type	REAL64	
Data range	REAL64 range	
Axis types	S	
Dimension		S: 1/s
Default value	0	
Drive types	----	

5.7.1.1.4.2 Parameter of the a(n) polynomial b2 (P-AXIS-00027)

P-AXIS-00027	Parameter of the a(n) Polynomial (B2)	
Description	B2 parameter of the a(n) polynomial	
Parameter	getriebe[i].beschl_kennlinie.b2	
Data type	REAL64	
Data range	REAL64 range	
Axis types	S	
Dimension		S: 1/°
Default value	0	
Drive types	----	

5.7.1.1.4.3 Parameter of the a(n) polynomial b3 (P-AXIS-00028)

P-AXIS-00028	Parameter of the a(n) Polynomial (B3)	
Description	B3 parameter of the a(n) polynomial	
Parameter	getriebe[i].beschl_kennlinie.b3	
Data type	REAL64	
Data range	REAL64 range	
Axis types	S	
Dimension		S: s/°²
Default value	0	
Drive types	----	

Example of a parameter setting:

```
getriebe[0].beschl_kennlinie.typ         2          # type identifier
                                                    # 0: no curve
                                                    # 1: Hyperbola
                                                    # 2: Polynomial
                                                    # 3: Asynchronous
drive
getriebe[0].beschl_kennlinie.n_grenz     12000000          [10-3°/s]
getriebe[0].beschl_kennlinie.a_konst     16000             [°/s*s]
getriebe[0].beschl_kennlinie.a_min       2000              [°/s*s]
getriebe[0].beschl_kennlinie.b1          -0.88888888       [1/s]
getriebe[0].beschl_kennlinie.b2          2.08333333E-5     [1/deg]
getriebe[0].beschl_kennlinie.b3          -1.92901234E-10   [s/deg]
```

5.7.1.2 Characteristic curve for asynchronous drives

Asynchronous motors are often used for spindle drives. You can achieve optimised adaptation to typical characteristic of such spindle drives using the speed-dependent spindle acceleration curve a=f(n) shown in the figure below.

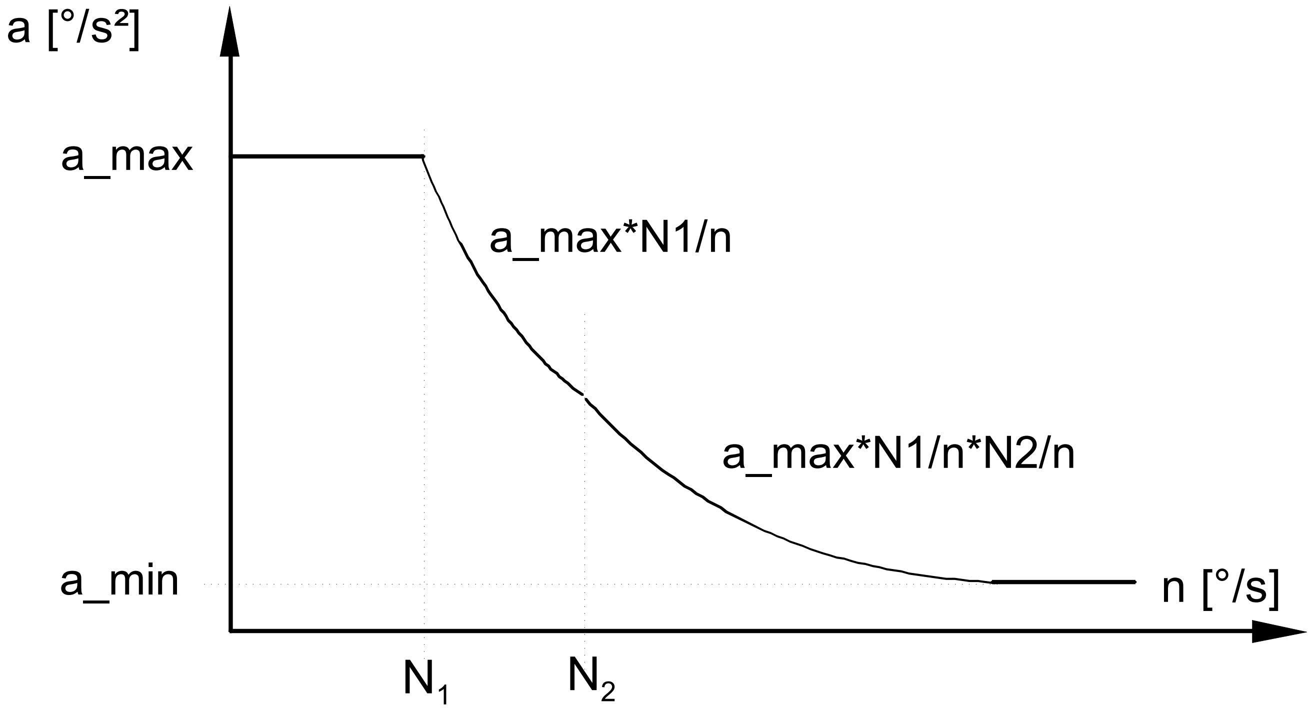


Fig. 27: Characteristic curve for asynchronous drives

In addition to maximal permissible acceleration a_max and speed N1 in constant range of acceleration curvature only setting to the speed N2 has to be done. Above speed value N1 the acceleration curve has a proportional characteristic to 1/n, above speed value N2 it is proportional to 1/ n^2.

5.7.1.2.1 Maximum acceleration (P-AXIS-00240)

P-AXIS-00240	**Maximum acceleration for acceleration curve of type 3 (**P-AXIS-00202 [▸ 257]**)**	
Description	This acceleration value is used in constant range with n < N1.	
Parameter	getriebe[i].beschl_kennlinie.a_max	
Data type	REAL64	
Data range	0 ≤ a_max ≤ P-AXIS-00008 [▸ 246]	
Axis types	S	
Dimension		S: °/s²
Default value	0	
Drive types	----	
Remarks		

5.7.1.2.2 Speed limit 1 (P-AXIS-00241)

P-AXIS-00241	**Speed limit 1 for acceleration curve of type 3** (P-AXIS-00202 [▸ 257])	
Description	Above this speed the transition to curve characteristic becomes proportional to 1/n.	
Parameter	getriebe[i].beschl_kennlinie.n1	
Data type	REAL64	
Data range	0 ≤ n1 ≤ P-AXIS-00242 [▸ 262]	
Axis types	S	
Dimension		S: 10^{-3} °/s
Default value	0	
Drive types	----	
Remarks		

5.7.1.2.3 Speed limit 2 (P-AXIS-00242)

P-AXIS-00242	**Speed limit 2 for acceleration curve of type 3** (P-AXIS-00202 [▸ 257])	
Description	Above this speed the transition to curve characteristic becomes proportional to $1/n^2$.	
Parameter	getriebe[i].beschl_kennlinie.n2	
Data type	REAL64	
Data range	0 ≤ n2 ≤ P-AXIS-00212 [▸ 245]	
Axis types	S	
Dimension		S: 10^{-3} °/s
Default value	0	
Drive types	----	
Remarks		

Example of a parameter setting:

```
getriebe[0].beschl_kennlinie.typ         3         # type identification
                                                    # 3: Asynchronous
drive
getriebe[0].beschl_kennlinie.a_min       500        [°/s²]
getriebe[0].beschl_kennlinie.a_max       25000      [°/s²]
getriebe[0].beschl_kennlinie.n1          10000000   [10⁻³ °/s]
getriebe[0].beschl_kennlinie.n2          200000000  [10⁻³ °/s]
```

5.8 Maximum axis torque (P-AXIS-00798)

P-AXIS-00798	**Maximum axis torque**	
Description	This parameter defines the maximum torque of the axis.	
Parameter	getriebe[i].torque	
Data type	REAL64	
Data range	0 … MAX(REAL64)	
Axis types	R	
Dimension	T: ---	R: 1 Nm
Default value	0.0	
Drive types	----	
Remarks	Parameter available as of V3.1.3108.5 When the load model is active, the parameter must be greater than zero.	

5.9 First coefficient of the friction model (P-AXIS-00804)

P-AXIS-00804	**First coefficient of the friction model**	
Description	This parameter defines the first coefficient of the friction model. It includes the static friction in the gear, among other things:	
Parameter	getriebe[i].first_friction_model_coefficient	
Data type	REAL64	
Data range	0 <= P-AXIS-00804 <= 1000	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	50	
Drive types	----	
Remarks		

6 Parameters for position control

This section describes the hardware-independent parameters for the position controller The hardware-dependent parameters are described in the section Parameters for drives (antr.*) [▸ 350].

Notice

The following parameters are dependent on the set **drive type** 'kenngr.antr_typ'. The data are independent of the set **axis type** 'kenngr.achs_typ'. They must be allocated for all axis types.

6.1 Proportional factor kv for P-positional control (P-AXIS-00099)

P-AXIS-00099	**Proportional factor kv for P-positional control**	
Description	The P-positional controller has the amplification factor k_v. The parameter is only effective if the CNC internal position control is used. With drive amplifiers with integrated position control, the amplification must be defined in the drive. The parameter P-AXIS-00320 [▸ 355] determines the manner how an axis moves to its commanded position.	
Parameter	getriebe[i].kv	
Data type	UNS32	
Data range	0 < kv ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.01/s	R,S: 0.01/s
Default value	1000	
Drive types	----	
Remarks		

6.2 Position window for exact stop (P-AXIS-00236)

P-AXIS-00236	**Position window for exact stop**	
Description	A range is defined for the function 'Exact Stop' and contains the axis 'in Position' (|window| ≥ |position lag|). (The related NC command G60 is described in [PROG]. This monitoring is done in position controller if the axis is not interpolated.	
Parameter	getriebe[i].window	
Data type	SGN32	
Data range	0 ≤ window ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.0001 °
Default value	500	
drive types.	----	
Remarks		

6.3 Position window for rapid movements (P-AXIS-00472)

P-AXIS-00472	**Position window for rapid movements**	
Description	This parameter sets the position window for rapid traverse movements. This parameter becomes active with a value > 0. When the value is ≤ 0 (default) the parameter P-AXIS-00236 [▸ 265] is used. At the end of rapid traverse movements and at a programmed exact stop (G60) the position window set in this parameter is checked before the HLI signals lr_state.in_window_r and lr_state.in_position_r (see [HLI]) are generated or the movement is continued.	
Parameter	getriebe[i].in_position_window_rapid	
Data type	SGN32	
Data range	0 … MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.1 mdeg
Default value	0	
drive types.	----	
Remarks	This parameter can not be used for spindles. If this parameter is used nevertheless, a warning (ID 110560) is output and the value is corrected. The parameter P-AXIS-00395 [▸ 315] must be less than this parameter. If P-AXIS-00395 [▸ 315] is greater than P-AXIS-00472, the value of P-AXIS-00395 [▸ 315] is corrected and a warning is output (ID 110561).	

6.4 Activation of position controller-interfaces

6.4.1 Activation of display function (P-AXIS-00023)

P-AXIS-00023	**Activation of display function**	
Description	The parameter is only used in the position controller and indicates the number of calls sent by the position controller for one call of the position controller display function. The position controller display data are updated by the position controller display function. Example: P-AXIS-00023 = 2 : Position controller display data are updated every second call of the position controller.	
Parameter	kenngr.anzeige	
Data type	UNS08	
Data range	0 < display ≤ 5	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks		

6.4.2 Optimized bus access (P-AXIS-00276)

P-AXIS-00276	**Optimized bus access**	
Description	To avoid the jitter of the command value output, normally the command value is output right at the beginning of the next cycle of the position controller. This especially is not necessary, if a subordinate driver ensures the synchronized access on the drive (e.g. at digital drives, SERCOS). The element 'lr_param.field_bus_allows_optimized_schedule' defines whether the access on the drive can be executed in such an optimised way. In this case, the new command values are made available in the same cycle and the actual values of the axes are read in. To ensure consistency in time during access to all axes, this adjustment must be activated for all axes to take effect. If this adjustment is not selected for at least one axis, it is deselected automatically for all axes!	
Parameter	lr_param.field_bus_allows_optimized_schedule	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.4.3 Additional interface parameters

6.4.3.1 Enable interface (P-AXIS-00732)

P-AXIS-00732	**Enable additional interface**	
Description	This value enables or disables the additional interface.	
Parameter	lr_param.add_interface.enable	
Data type	BOOLEAN	
Data range	0: Additional interface is disabled 1: Additional interface is enabled	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks		

6.4.3.2 Handling – position command values as offset (P-AXIS-00733)

P-AXIS-00733	**Handling the loaded position command values as offset**	
Description	Assign this parameter with TRUE if the external position command values commanded via the additional interface are to be handled as a compensation value (offset, permanently active). If the parameter is FALSE, the additional correction values are moved again at each internal channel synchronization (Program start, axes exchange, reset, requesting of command values etc.).	
Parameter	lr_param.add_interface.pos_as_offset	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T,R,S	
Dimension	T: ----	R, S: ----
Default value	0	
Drive types	----	
Remarks		

6.4.3.3 Reinitialisation after enable (P-AXIS-00734)

P-AXIS-00734	**Reinitialisation of additional position interface after enable**	
Description	The PLC can apply additional position command values to an axis via the HLI (see [HLI]) using the position controller additional interface. These additional values are passed as absolute values via the HLI and are output to the axis if the interface is enabled. When the value in that interface is changed while it is disabled, that change becomes efficient the next time the interface is enabled, which can cause unexpected axis movements. This parameter can set that changes in the additional position interface while the interface is disabled do not cause an axis movement on reactivation, but only changes while the interface is enabled.	
Parameter	lr_param.add_interface.init_on_enable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T:----	R, S: ----
Default value	0	
Drive types	----	
Remarks		

6.4.3.4 Enable filter (P-AXIS-00735)

P-AXIS-00735	**Enable the additional interface filter**	
Description	This parameter controls the general enabling/disabling of the filter function.	
Parameter	lr_param.add_interface.filter[i].enable	
Data type	BOOLEAN	
Data range	0: Filter is disabled 1: Filter is enabled	
Axis types	T, R, S	
Dimension	T:----	R,S: ----
Default value	0	
Drive types	----	
Remarks	The filter function is only enabled for filter order > 0 (filter[i].order).	

6.4.3.5 Filter - frequency (P-AXIS-00739)

P-AXIS-00739	**Frequency range of the additional interface filter**	
Description	The parameter defines the frequency range for: • Low-pass: Beginning of cut-off frequency range (ideal filter) • High-pass: Beginning of cut-off frequency range (ideal filter) • Band-pass and band-stop filters: middle frequency	
Parameter	lr_param.add_interface.filter[i].fg_f0	
Data type	REAL64	
Data range	0 < FG_F= > 0.5/T_{fall} (where T_{fall} is the NC cycle time)	
Axis types	T, R, S	
Dimension	T: Hz	R,S: Hz
Default value	30	
Drive types	----	
Remarks		

6.4.3.6 Filter - bandwidth (P-AXIS-00740)

P-AXIS-00740	**Bandwidth of the additional interface filter**	
Description	Definition of reciprocal of bandwidth for band-pass and band-stop filter types. The behaviour is similar to parameter P-AXIS-00080 [488].	
Parameter	lr_param.add_interface.filter[i].guete	
Data type	REAL64	
Data range	1 < guete < 10	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1.0	
Drive types	----	
Remarks		

6.4.3.7 Filter – order (P-AXIS-00736)

P-AXIS-00736	**Order of the additional interface filter**	
Description	This parameter defines the filter order. In addition, this parameter is a value which expresses the fall of frequency response (fall = -order x 20 dB/decade). The value order = 0 means: no filter connected.	
Parameter	lr_param.add_interface.filter[i].order	
Data type	UNS32	
Data range	0 < order < 6 for low-pass, high-pass and all-pass filters 0 < order < 3 for band-pass and band-stop filters order = 0 or <= 1 for PT1 filters order = 0 or <= 1 for PT2 filters	
Axis types	T, R, S	
Dimension	T:----	R,S: ----
Default value	2	
Drive types	----	
Remarks	An order of < 1 need only be specified for filters types PT1, PT2 and TIME_DELAY to activate the filter. The corresponding order is calculated internally.	

6.4.3.8 Filter - characteristic (P-AXIS-00737)

P-AXIS-00737	**Characteristic of the additional interface filter**	
Description	This parameter defines the filter characteristic.	
Parameter	lr_param.add_interface.filter[i].prototype	
Data type	STRING	
Data range	CRIT_DAMPING: ‘Critical damping’ filter characteristic BUTTERWORTH: ‘Butterworth’ filter characteristic BESSEL: ‘Bessel’ filter characteristic	
Axis types	T	
Dimension	T:----	
Default value	CRIT_DAMPING	
Drive types	----	
Remarks		

6.4.3.9 Filter – signal share (P-AXIS-00741)

P-AXIS-00741	**Signal share of the additional interface filter**	
Description	The parameter defines the signal share in percent which is processed by the filter.	
Parameter	lr_param.add_interface.filter[i].share_percent	
Data type	REAL64	
Data range	0 < share_percent < 100	
Axis types	T	
Dimension	T:----	R, S: ----
Default value	1.000000e+002	
Drive types	----	
Remarks		

6.4.3.10 Filter - type (P-AXIS-00738)

P-AXIS-00738	**Type of the additional interface filter**	
Description	This parameter defines the filter type.	
Parameter	lr_param.add_interface.filter[i].type	
Data type	STRING	
Data range	LOWPASS	Low-pass filter
	HIGHPASS	High-pass filter
	BANDPASS	Band-pass filter
	BANDSTOP	Band-stop filter
	ALLPASS	All-pass filter
	PT1	PT1 filter
	HSC_SINE	HSC Sine
	HSC_MEAN	HSC mean
	HSC_GAUSS	HSC Gauss
	PT2	PT2 filter
	TIME_DELAY	Time delay filter (as of CNC Build 3013 and higher)
Axis types	T, R, S	
Dimension	T:----	R,S: ----
Default value	PT2	
Drive types	----	
Remarks		

6.4.3.11 Filter – time constant (P-AXIS-00742)

P-AXIS-00742	**Time constant of the additional interface filter**	
Description	The parameter defines the time constants of the PT1, PT2 and time delay filters.	
Parameter	lr_param.add_interface.filter[i].time_constant	
Data type	UNS32	
Data range	For PT1 / PT2 filters: TAb ≤ filter[i].time_constant ≤ MAX(UNS32) (with TAb ->NC cycle time) For time-delay filter: 0 ≤ filter[i].time_constant < 6 * TAb (Where TAb ->NC cycle time)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks		

6.5 Settings for backlash compensation

6.5.1 Size of backlash (P-AXIS-00103)

P-AXIS-00103	**Size of backlash**	
Description	The parameter defines the size of backlash.	
Parameter	getriebe[i].lose	
Data type	SGN16	
Data range	SGN16 range 0 < backlash: backlash betw. drive and slide	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.0001 °
Default value	0	
drive types.	----	
Remarks		

6.5.2 Selection of backlash compensation (P-AXIS-00021)

P-AXIS-00021	**Selection of backlash compensation**	
Description	The selection of backlash compensation is done using this parameter. The type of backlash (the backlash between the table and the drive or the backlash between the drive and the measuring system) depends on the mathematical sign of P-AXIS-00103 [▸ 272] (getriebe[i].lose).	
Parameter	lr_param.anwahl_losekomp	
Data type	UNS16	
Data range	0: No backlash compensation 1: Last axis motion occurred in pos. direction. 2: Last axis motion occurred in neg. direction.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks		

6.5.3 Distribution of the backlash on multiple cycles (P-AXIS-00243)

P-AXIS-00243	**Distribution of the backlash on multiple cycles**	
Description	The parameter defines a number of position control cycles on which the backlash is distributed. The distribution is done according to a $\sin^2$ function. The parameter is also used for bi-directional lead screw error compensation if a change of direction is executed.	
Parameter	lr_param.n_backlash_cyc	
Data type	UNS16	
Data range	0 < n_backlash_cyc < 20	
Axis types	T, R, S	
Dimension	T: Number of interpolation cycles	R,S: Number of interpolation cycles
Default value	0	
Drive types	----	
Remarks	For the values 0 or 1 the output of the backlash to the drive is done abruptly within one cycle. A value larger than 1 creates a distribution according to the $\sin^2$function The use of this feature avoids increasing errors at the workpiece, because for large backlash the machine excitation is reduced.	

6.6 Settings for temperature compensation

6.6.1 Selection of temperature compensation (P-AXIS-00271)

P-AXIS-00271	**Selection of temperature compensation**	
Description	The parameter selects the temperature compensation.	
Parameter	lr_param.temp_comp	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.6.2 Parametrisation of temperature compensation

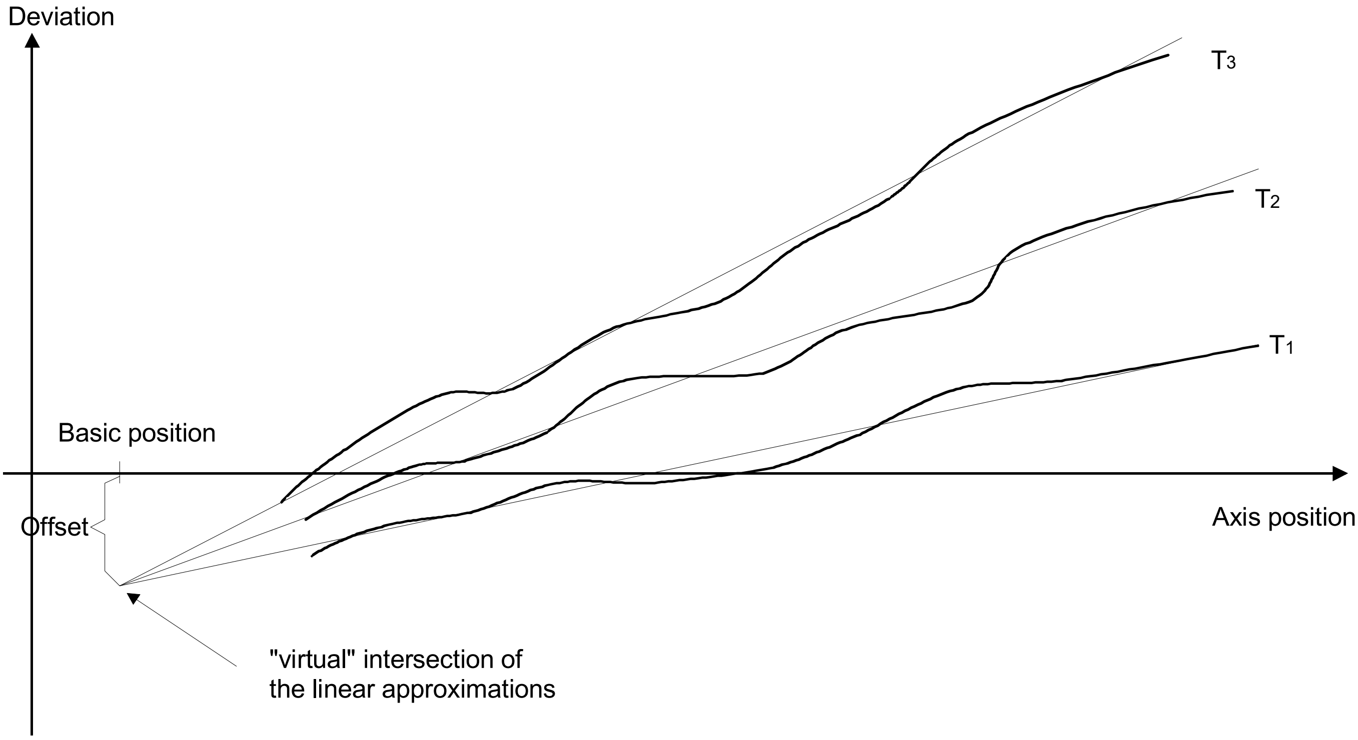


Fig. 28: Reference measurement at different temperatures

6.6.2.1 Reference position of temperature compensation (P-AXIS-00272)

P-AXIS-00272	Parameterisation of temperature compensation (Basic position)	
Description	The compensation values are approximated by a linear straight line. This straight line is defined by a basic position, an offset at this position and a geometrical pitch. Depending on the temperature, these parameters can be adjusted e.g. by the PLC.	
Parameter	lr_param.temp_comp_position_0	
Data type	SGN32	
Data range	MIN(SGN32) < temp_comp_position_0 < MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks		

6.6.2.2 Offset of temperature compensation (P-AXIS-00273)

P-AXIS-00273	Parameterisation of temperature compensation (Offset)	
Description	The compensation values are approximated by a linear straight line. This straight line is defined by a basic position, an offset at this position and a geometrical pitch. Depending on the temperature, these parameters can be adjusted e.g. by the PLC.	
Parameter	lr_param.temp_comp_offset_0	
Data type	SGN32	
Data range	MIN(SGN32) < temp_comp_offset_0 < MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	----	
Remarks		

6.6.2.3 Offset of temperature compensation (P-AXIS-00274)

P-AXIS-00274	**Parameterisation of temperature compensation (Geometrical pitch)**	
Description	The compensation values are approximated by a straight line. This straight line is defined by a basic position, an offset at this position and a geometrical pitch. Depending on the temperature these parameters can be adjusted e.g. by the PLC.	
Parameter	lr_param.temp_comp_coefficient	
Data type	REAL64	
Data range	-10000 ≤ temp_comp_coefficient ≤ 10000	
Axis types	T, R, S	
Dimension	T: µm/m	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.6.3 Distribution of the temperature compensation on several cycles (P-AXIS-00275)

P-AXIS-00275	**Distribution of the temperature compensation on several cycles**	
Description	The compensation values are recalculated for each interpolation cycle. If the change per cycle exceeds the given maximum axis acceleration, this change can be output filtered over multiple cycles. For this the number of cycles of the sin² filter can be defined in the axis parameter list.	
Parameter	lr_param.temp_comp_n_cycles	
Data type	UNS16	
Data range	0 < temp_comp_n_cycles < 20	
Axis types	T, R, S	
Dimension	T: Number of interpolation cycles	R,S: Number of interpolation cycles
Default value	0	
Drive types	----	
Remarks		

6.6.4 Manual activation of temperature compensation (P-AXIS-00482)

P-AXIS-00482	**Manual activation of the temperature compensation**	
Description	The CNC turns the temperature compensation on when it is selected in the axis parameter list (P-AXIS-00271 [274]) and the required preconditions are met (e.g. the axis is homed). If the parameter is set to 1, the temperature compensation must be manually turned on in the NC program via an NC command (see [PROG//Switching axis compensation on/off in the NC program]). In addition, the compensation is turned off at the end of the NC program, during CNC reset and axis release.	
Parameter	lr_param.temp_comp_manual_activation	
Data type	BOOLEAN	
Data range	0: Automatic activation (default). 1: Manual activation in NC program.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.7 Activate crosstalk compensation (P-AXIS-00789)

P-AXIS-00789	**Activate crosstalk compensation**	
Description	This parameter activates the crosstalk compensation function.	
Parameter	lr_param.crosstalk	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
Drive types		
Remarks	Parameter available as of CNC Build V3.1.3079.32 and higher	

6.8 Monitoring of axis compensations

6.8.1 Effectiveness in automatic mode (P-AXIS-00465)

<table>
<tr><th>P-AXIS-00465</th><th colspan="2">Monitoring of effectiveness of axis compensations in automatic mode</th></tr>
<tr><td>Description</td><td colspan="2">Some axis compensations must fulfil certain preconditions before they can be active. To ensure that the selected axis compensations are operative in automatic mode, the required compensations for processing the NC program can be specified bit-encoded in the parameter 'lr_param.prog_movement_requires_compensations'. The CNC then outputs the error message P-ERR-70435if the axis is moved in automatic mode and if the specified axis compensations are not active. However, in manual mode or during homing the axis can be moved without compensations.</td></tr>
<tr><td>Parameter</td><td colspan="2">lr_param.prog_movement_requires_compensations</td></tr>
<tr><td>Data type</td><td colspan="2">STRING</td></tr>
<tr><td>Data range</td><td colspan="2">BACKLASH
LEAD
TEMP
CROSS
PLANE
FRICT
CROSSTALK</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R</td></tr>
<tr><td>Dimension</td><td>T: ----</td><td>R: ----</td></tr>
<tr><td>Default value</td><td colspan="2">*</td></tr>
<tr><td>Drive types</td><td colspan="2">----</td></tr>
<tr><td>Remarks</td><td colspan="2">* Note: The default value of variables is a blank string.
The CNC outputs only the error message only for compensations which are selected in the axis parameter list (see [FCT-C5]).
For reasons of downward compatibility, it is also possible to bit-encode axis compensations. The following bit identifiers can be used to specify the required compensations:
<table>
<tr><th>Bit</th><th>Identifier</th><th>Axis compensation</th></tr>
<tr><td>0x1</td><td>BACKLASH</td><td>Backlash compensation, [FCT-A5]</td></tr>
<tr><td>0x2</td><td>LEAD</td><td>Lead screw error compensation, [FCT-A5]</td></tr>
<tr><td>0x4</td><td>TEMP</td><td>Temperature compensation, [FCT-A5]</td></tr>
<tr><td>0x8</td><td>CROSS</td><td>Cross compensation [FCT-A5]</td></tr>
<tr><td>0x10</td><td>PLANE</td><td>Plane compensation, [FCT-A5]</td></tr>
<tr><td>0x20</td><td>FRICT</td><td>Friction compensation, [FCT-C5]</td></tr>
<tr><td>0x40</td><td>CROSSTALK</td><td>Crosstalk compensation, [FCT-C5]</td></tr>
</table>
Example of monitoring lead screw error compensation and cross compensation:
lr_param.prog_movement_requires_compensations LEAD | CROSS</td></tr>
</table>

6.8.2 Treatment of axis movement from axis compensation while active feedhold (P-AXIS-00454)

P-AXIS-00454	**Treatment of axis movement from axis compensation while active feedhold**	
Description	If feedhold is activated, the generated correction values of the cross and plane compensations are also monitored. The error message P-ERR-70255 is generated if a position change of a master axis leads to an axis movement of the slave axis. This error message can be suppressed, if the parameter is set to value 1.	
Parameter	lr_param.allow_comp_movement_while_feedhold	
Data type	BOOLEAN	
Data range	0: If feedhold is set, the axis compensations generate no axis movement (default). 1: Output of correction value changes from axis compensation although feedhold is active.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	If the parameter is set to 1, the axis can move during feedhold in the range of the given compensation values!	

6.9 Settings for position lag monitoring

6.9.1 Type of position lag monitoring (P-AXIS-00172)

P-AXIS-00172	**Type of position lag monitoring**	
Description	The parameter defines the type of position lag monitoring.	
Parameter	getriebe[i].slep_ueberw_typ	
Data type	UNS32	
Data range	0 ≤ slep_ueberw_typ ≤ MAX(UNS32) 1: Standard position lag monitoring 2: Linear position lag monitoring 3: Non linear position lag monitoring (no longer supported!) 4: Velocity independent position lag monitoring For all other values the position lag monitoring is disabled.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.9.2 Minimum position lag (P-AXIS-00169)

P-AXIS-00169	Minimum position lag	
Description	The parameter defines the minimum position lag.	
Parameter	getriebe[i].slep_min	
Data type	SGN32	
Data range	1 ≤ slep_min ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	20000	
Drive types	----	
Remarks	Standard position lag monitoring: The parameter is used for plausibility test for the dynamic position lag monitoring. Since large position lags can arise in the case of non-high dynamic systems and under certain circumstances and these position lags are recognized as position lag in rare cases, even in the case of P-AXIS-00167 [▸ 282] = 1023 (dynamic position lag monitoring as if switched off), a useful value must be determined empirically in this case. The dynamic position lag monitoring uses a digital filter which estimates the position lag on the basis of the reference variable (command value). Usually, a value from some of a few 'mm' or ' ° ' can be used here. Linear position lag monitoring: The parameter defines the maximum permissible position lag on axis standstill. Non linear position lag monitoring: For this type of position lag monitoring the parameter is without significance. Velocity independent position lag monitoring: The parameter defines the maximum permissible position lag at axis standstill.	

6.9.3 Maximum position lag (P-AXIS-00168)

P-AXIS-00168	**Maximum position lag**	
Description	The parameter defines the maximum position lag.	
Parameter	getriebe[i].slep_max	
Data type	SGN32	
Data range	MAX(SGN32) > slep_max > 10* position lag at P-AXIS-00212 [245]	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	100000	
Drive types	----	
Remarks	Standard position lag monitoring: The parameter is made use of for limiting the estimated position lag in the position controller. Especially in the case of oscillating systems an internal range overshooting of the operating data in the position controller would be quite conceivable. Linear position lag monitoring: The parameter defines the maximum permissible position lag. This helps to avoid a reaction of the position lag monitoring (adhesive friction), for example, when the axis starts moving from standstill. Non-linear position lag monitoring: For this type of position lag monitoring the parameter is without significance. Velocity-independent position lag monitoring: This parameter sets the position lag limit when the axis is moving.	

6.9.4 Factor for dynamic position lag monitoring (P-AXIS-00167)

P-AXIS-00167	Factor for dynamic position lag monitoring	
Parameter	getriebe[i].slep_dyn	
Description	For standard and non-linear position lag monitoring the following is valid: The factor determines the time constant of an estimation filter for the dynamic position lag monitoring in the position controller. This parameter must be determined empirically.	
Data range	700 ≤ slep_dyn ≤ 1024	
Description	Linear position lag monitoring: The parameter defines the slope within the estimation of the dynamic position lag using the following equation: $\frac{(1.0 + \frac{slep\_dyn}{1024.0}) * v_{akt}[m/min]}{k_v[m/min/mm]}$ Non linear position lag monitoring: The factor determines the time constant of an estimation filter for the dynamic position lag monitoring in the position controller. This parameter must be determined empirically.	
Data range	0 ≤ slep_dyn ≤ 1024	
Data type	SGN16	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1000	
Drive types	----	
Remarks	**CAUTION:** The position lag monitoring is disabled if the parameter has the value ≥ '1024'.	

6.9.5 Remaining deviation for non linear position lag monitoring (P-AXIS-00166)

P-AXIS-00166	Remaining deviation for non-linear position lag monitoring	
Description	The parameter defines the remaining deviation for non linear position lag monitoring. This parameter must be determined empirically.	
Parameter	getriebe[i].slep_abw	
Data type	UNS32	
Data range	0 ≤ slep_abw ≤ 1024	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	512	
Drive types	----	
Remarks		

6.9.6 Maximum settling time (P-AXIS-00151)

P-AXIS-00151	**Maximum permissible settling time for exact stop window**	
Description	The parameter defines the maximum permissible settling time. If the window for exact stop has not been reached within this time an error message will be output. If the parameter is 0, the time monitoring is disabled.	
Parameter	getriebe[i].pos_einschw_zeit	
Data type	UNS32	
Data range	0 ≤ pos_einschw_zeit ≤ MAX(UNS32)/1000	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	1000000	
drive types.	----	
Remarks		

6.9.7 Maximum position settling time (P-AXIS-00532)

P-AXIS-00532	**Maximum permissible position settling time for exact stop window**	
Description	The parameter defines the maximum permissible settling time. If the window for accuracy stop for not interpolated axes has not been reached within this time an error message will be output. If the parameter is 0, the time monitoring is disabled. With a negative value for this parameter the value of P-AXIS-00151 [283] is used for transient time monitoring (backward compatibility).	
Parameter	getriebe[i].position_settling_time	
Data type	SGN32	
Data range	MIN(SGN32) ≤ position_settling_time ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	-1	
drive types.	----	
Remarks	This parameter replaces P-AXIS-00151 [283].	

6.9.8 Time constant for position lag monitoring (P-AXIS-00170)

P-AXIS-00170	**Time constant for position lag monitoring**	
Description	This parameter defines the compensation of time delays during the feedback of the actual values. By this method, the monitoring curve is shifted in time so that the real position lag can be monitored. This time constant is used for all types of position lag monitoring.	
Parameter	getriebe[i].slep_time_const	
Data type	UNS32	
Data range	0 ≤ slep_time_const ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks	Recommended setting: slep_time_const = 0	

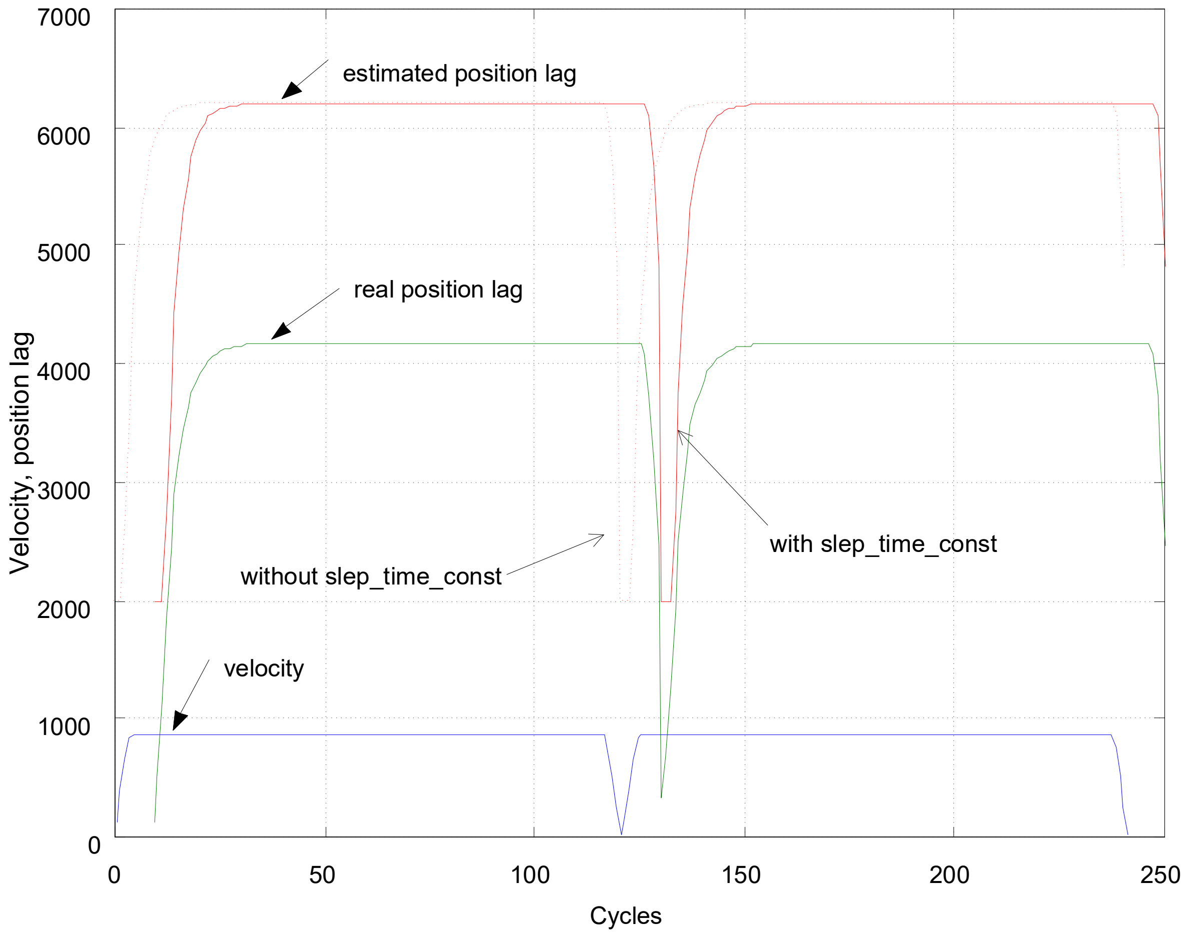


Fig. 29: Time constant to shift monitoring curve

6.9.9 Suppression of position lag (P-AXIS-00176)

P-AXIS-00176	**Suppression of position lag**	
Description	To adjust the position lag monitoring the creation of position lag errors can be suppressed. But the dynamical calculation continues. By this method it is possible to record position lag and position lag monitoring limits and set the corresponding parameters.	
Parameter	lr_param.suppress_pos_lag_error	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	Recommended setting: suppress_pos_lag_error = 0 'suppress_pos_lag_error = 1' suppresses the monitoring and output of an error message if the permissible position lag is exceeded. May only be TRUE during commissioning.	

6.9.10 Delayed generation of position lag error message (P-AXIS-00488)

P-AXIS-00488	**Delayed generation of position lag error message**	
Description	The parameter specifies a time delay for the position lag monitoring function from type 4 (velocity independent mode) used to delay the generation of the position lag error message, if the actual position lag exceeds the maximum permissible position lag. This permits a reduction in the maximum permissible position lag error limits (see P-AXIS-00168 [281], P-AXIS-00169 [280]) since an exceedance in dynamical phases does not immediately lead to an error message..	
Parameter	getriebe[i].pos_lag_mon_error_delay_time	
Data type	UNS32	
Data range	0 ≤ pos_lag_mon_error_delay_time ≤ 250000	
Axis types	T, R, S	
Dimension	T: μs	R,S: μs
Default value	0	
Drive types	----	
Remarks	Specifying a time delay > 0 leads to a delayed error message generation and delayed stopping of the drives, when the permitted position lag is exceeded.	

6.10 Tendency test (P-AXIS-00189)

P-AXIS-00189	**Activation of tendency test**	
Description	To monitor the mathematical sign of the command signal and measuring encoder signal, it makes sense to activate trend monitoring on commissioning (parameter=1).	
Parameter	kenngr.tendenz_pruef	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.11 Settings for dynamic monitoring in position controller

6.11.1 Factor for permissible axis velocity (P-AXIS-00407)

P-AXIS-00407	**Factor for permissible axis velocity for dynamic monitoring function in the position controller**	
Description	This parameter specifies the permissible exceedance of the maximum permissible axis velocity (see P-AXIS-00212 [▸ 245]) before the dynamic monitoring function in the interpolator generates an error. The default value of the parameter is 1000 (100%), i.e. for axis velocisties greater then 2 * P-AXIS-00212 [▸ 245] generate a warning. The velocity monitoring is disabled for gantry slave axes and axes with axis specific transformations (see [AXIS//Parameters for axis-specific transformation [▸ 499]].	
Parameter	lr_param.dyn_monitoring_v_err	
Data type	UNS32	
Data range	0 ≤ dyn_monitoring_v_err ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	1000 (100%)	
Drive types	----	
Remarks	**ATTENTION:** Setting the parameter = 0 turns the velocity monitoring function in the position controller off! This setting is not recommended!	

6.12 Adaptation of command values

Attention

With drives whose position controller loop is closed in the CNC (see P-AXIS-00320 [355]), the velocity scaling is used during error reaction after an error in the controller loop. Therefore the velocity scaling must be set correctly.

Plausibility check:

If the velocity scaling is correct, a constant axis velocity is adjusts to the following position lag error (without feedforward control) at the set proportional gain getriebe[i].kv (see P-AXIS-00099 [264]).

$$Schleppabstand\ [mm\ oder\ °] = \frac{Geschwindigkeit\ [mm\ oder\ °\ /\ Sekunde]}{P - AXIS - 00099 * 0.01\ [1\ /\ Sekunde]}$$

6.12.1 Adaptation of command value of drive to the drive format (denominator, P-AXIS-00128)

P-AXIS-00128	**Adapting the drive command value to the drive format (denominator)**	
Description	The speed setpoint calculated in the position controller must be adapted to the D/A format of the D/A converter. The digital value at the D/A converter input (getriebe[i].multi_gain_z/ getriebe[i].mulit_gain_n) must be specified at which the axis travels at the velocity of [1m/ min] or at the speed [1000°/min]. Numerator: P-AXIS-00129 [288]	
Parameter	getriebe[i].multi_gain_n	
Data type	UNS32	
Data range	1 ≤ multi_gain_n ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.12.2 Adaptation of command value of drive to the drive format (numerator, P-AXIS-00129)

P-AXIS-00129	**Adaptation of command value of drive to the drive format (numerator)**	
Description	The speed setpoint calculated in the position controller must be adapted to the D/A format of the D/A converter. The digital value at the D/A converter input (getriebe[i].multi_gain_z/ getriebe[i].mulit_gain_n) must be specified at which the axis travels at the velocity of [1m/ min] or at the speed [1000°/min]. Denominator : P-AXIS-00128 [287]	
Parameter	getriebe[i].multi_gain_z	
Data type	UNS32	
Data range	1 ≤ multi_gain_z ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: Bit	R,S: Bit
Default value	2000	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.13 Measurement value adaptation

6.13.1 Distance resolution of measurement (denominator, P-AXIS-00233)

P-AXIS-00233	**Distance resolution of measurement (denominator)**	
Description	The distance resolution of the measuring system is entered in the dimension [increment/0.1 µm] for translatory axes or [increment/0.0001°] for rotary axes. The number of increments must be entered in 'getriebe[i].wegaufz' (numerator), the size of the motion path in [0.1µm] for translatory axes or in [0.0001°] for rotary axes in 'getriebe[i].wegaufn' (denominator).	
Parameter	getriebe[i].wegaufn	
Data type	UNS32	
Data range	1 ≤ wegaufn ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	1	
Drive types	----	
Remarks	These entries are not adopted when updating the axis parameter list. For updating to take effect, the control system must be restarted. Note that when a distance resolution is greater than 1, the motion range is restricted to less than (-MAX(UNS32)… +MAX(UNS32)) [µm/10^{-3} °]. If wegaufn is 0, the CNC generates the warning 110086 and corrects the parameter to the value 1. If P-AXIS-00234 [290]/ P-AXIS-00233 are used, the parameters P-AXIS-00362 [361] and P-AXIS-00363 [362] must be set to 1. **Recommendation:** It is recommended to set the path resolution using the parameters P-AXIS-00362 [361] and P-AXIS-00363 [362] . For possible applications, see Settings of position scaling [538]	

6.13.2 Distance resolution of measurement system (numerator, P-AXIS-00234)

P-AXIS-00234	**Distance resolution of measurement (numerator)**	
Description	The distance resolution of the measuring system is entered in the dimension [increment/0.1 µm] for translatory axes or [increment/0.0001°] for rotary axes. The number of increments must be entered in 'getriebe[i].wegaufz' (numerator), the size of the motion path in [0.1µm] for translatory axes or in [0.0001°] for rotary axes in 'getriebe[i].wegaufn' (denominator).	
Parameter	getriebe[i].wegaufz	
Data type	UNS32	
Data range	1 ≤ wegaufz ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: increments	R,S: increments
Default value	1	
Drive types	----	
Remarks	These entries are not taken over when the axis parameter list is updated. A controller reboot is required to update. Note that when a distance resolution is greater than 1, the motion range is restricted to less than (-MAX(UNS32)… +MAX(UNS32)) [µm/10^{-3} °]. If wegaufz is 0, the CNC generates the warning 110386 and corrects the parameter to the value 1. If P-AXIS-00234/ P-AXIS-00233 [▸ 289] are used, the parameters P-AXIS-00362 [▸ 361] and P-AXIS-00363 [▸ 362] must be set to 1. **Recommendation:** It is recommended to set the path resolution using the parameters P-AXIS-00362 [▸ 361] and P-AXIS-00363 [▸ 362] . For possible applications, see Settings of position scaling [▸ 538]	

6.13.3 Identification code for absolute path measurement system (P-AXIS-00014)

P-AXIS-00014	**Identification code for absolute path measurement system**	
Description	If an absolute path measurement system is used, then the parameter must be set to 1. So no homing is necessary.	
Parameter	kenngr.abs_pos_gueltig	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Simulation, SERCOS,	
Remarks		

6.14 Quantisation of the measuring system increments (P-AXIS-00323)

P-AXIS-00323	**Quantisation of the measuring system increments**	
Description	The control window (see P-AXIS-00236 [▸ 265]) and the tolerance limits of the revolution monitoring function (see P-AXIS-00217 [▸ 79]) are converted in the controller into the resolution of the measuring system. The parameter P-AXIS-00323 represents the minimal size of the tolerance region after this conversion (default value: 1 increment).	
Parameter	lr_param.incr_quant	
Data type	UNS32	
Data range	1 ≤ incr_quant ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: increments	R,S: increments
Default value	1	
Drive types	----	
Remarks		

6.15 Definition of traverse distance between lubrication pulses (P-AXIS-00237)

P-AXIS-00237	**Definition of traverse distance between lubrication pulses**	
Description	This parameter is used to test for “travel distance exceeded”. If the axis travels the distance defined by the parameter again since the last lubrication pulse, the message 'Trigger lubrication pulse' is output in the form of a PDU. If no distance is set in the machine axis data (wsi_meldung = 0), then no PDU is output.	
Parameter	getriebe[i].wsi_meldung	
Data type	SGN32	
Data range	0 ≤ wsi_meldung ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: mm	R,S: °, rev
Default value	0	
Drive types	----	
Remarks	The resolution between the positions and WSI units is determined by the following constants which the user can still adapt. Default setting:	

Axis type	Specified in	Constant	Value
T	mm	WSI_AUFLOESUNG_TRANSLATOR	10000 [0.1µm / mm]
R	° (degree)	WSI_AUFLOESUNG_ROTATOR	10000 [0.0001° / °]
SPINDLE	Rev.	WSI_AUFLOESUNG_SPINDEL	10000*360 [0.0001° / rev]

6.16 Settings for axis compensations

6.16.1 Activation of cross compensation (P-AXIS-00047)

P-AXIS-00047	**Activation of cross compensation**	
Description	This parameter activates the cross compensation.	
Parameter	lr_param.crosscomp	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
Drive types	----	
Remarks		

6.16.2 Activation of plane compensation (P-AXIS-00174)

P-AXIS-00174	**Activation of plane compensation**	
Description	This parameter activates the plane compensation (2-dimensional cross compensation).	
Parameter	lr_param.crosscomp2	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T	
Dimension	T: ----	
Default value	0	
Drive types	----	
Remarks		

6.16.3 Activation of SSFK (P-AXIS-00175)

P-AXIS-00175	**Activation of SSFK**	
Description	This parameter activates the lead screw error compensation.	
Parameter	lr_param.ssfk	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

6.16.4 Activation of friction compensation (P-AXIS-00522)

P-AXIS-00522	**Activation of friction compensation**	
Description	This parameter activates the friction compensation.	
Parameter	lr_param.frict_comp	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	If friction compensation must be activated with the COMP command but it was not activated by the parameter P-AXIS-00522, the error message P-ERR-70495 is output.	

6.17 Settings for the volumetric compensation (lr_param.vol_comp.*)

6.17.1 Maximum permissible correction value (P-AXIS-00525)

P-AXIS-00525	**Maximum permissible correction value (volumetric compensation)**	
Description	This parameter defines the maximum permissible correction value which can be included by the volumetric compensation in the axis. If this limit is exceeded, an error message is generated and the axis is stopped in a controlled way. This parameter should be configured for all Cartesian axes (including gantry slaves) involved in a volumetric compensation. Otherwise a warning is output during start-up.	
Parameter	lr_param.vol_comp.s_limit	
Data type	REAL64	
Data range	0 ≤ s_limit < MAX(REAL64)	
Axis types	T	
Dimension	T: 0.1 µm	
Default value	0	
Drive types	----	
Remarks		

6.17.2 Maximum permissible velocity (P-AXIS-00526)

P-AXIS-00526	**Maximum permissible velocity (volumetric compensation)**	
Description	This parameter defines the maximum permissible velocity by which the compensation values can be cleared out of the volumetric compensation. The position controller ensures by filter that this limit is never exceeded. This parameter should be configured for all Cartesian axes (including gantry slaves) involved in a volumetric compensation. Otherwise a warning is output during start-up.	
Parameter	lr_param.vol_comp.v_limit	
Data type	REAL64	
Data range	0 ≤ v_limit < MAX(REAL64)	
Axis types	T	
Dimension	T: µm/s	
Default value	0	
Drive types	----	
Remarks		

6.18 Settings for dynamic kv adjustment (getriebe[i].dyn_kv.*)

With dynamic 'kv' adjustment the position controller gain can be altered dependent on the axis velocity.

The required position control loop gain for two axis velocities must be defined. Position loop gain is linear interpolated between these two velocities. The figure below shows some examples of dependencies between position control loop gain and axis velocity.

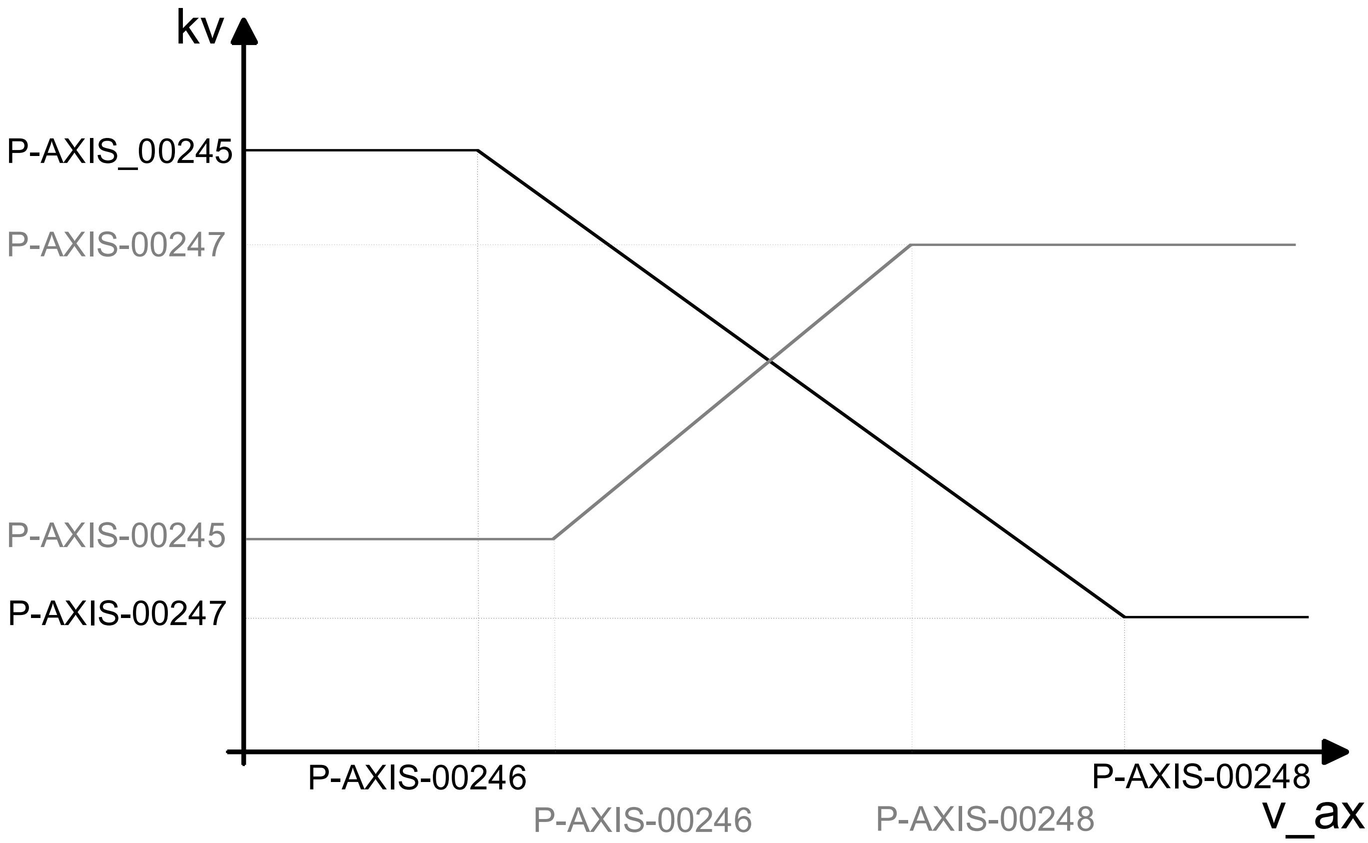


Fig. 30: Parameters of dynamic kv adjustment

Notice

In SERCOS and CANopen drives, a velocity-dependent kv adjustment is only possible in CNC position control mode (P-AXIS-00320 [▸ 355] = CNC_POSITION_CONTROL).

6.18.1 Activation of dynamic kv adjustment (P-AXIS-00244)

P-AXIS-00244	**Activation of dynamic kv adjustment**	
Description	Dynamic kv adjustment is activated with this parameter. Since this functionality is not available for SERCOS and CANOPEN drives, a warning is output and the functionality is automatically deselected for these drives.	
Parameter	getriebe[i].dyn_kv.dyn_kv_active	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.18.2 Parameters of dynamic kv adjustment - kv1 (P-AXIS-00245)

P-AXIS-00245	**Parameter of dynamic kv adjustment (kv1)**	
Description	With active kv adjustment, position loop gain is interpolated linear between the values P-AXIS-00245 (kv1) and P-AXIS-00247 (kv2) depending on the axis velocity. In combination with the axis velocities P-AXIS-00246 (v1) and P-AXIS-00248 (v2) between the value pairs P-AXIS-00246/P-AXIS-00245 and P-AXIS-00248/P-AXIS-00247, a straight line is defined which is used to calculate the actual position control loop gain kv_act. The following conditions for the parameters are active: P-AXIS-00248 > P-AXIS-00246 For axis velocities < P-AXIS-00246 and > P-AXIS-00248: kv_act_max = max(P-AXIS-00245, P-AXIS-00247) kv_act_min = min(P-AXIS-00245, P-AXIS-00247)	
Parameter	getriebe[i].dyn_kv.kv1	
Data type	UNS32	
Data range	1 < kv1 ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.01/s	R,S: 0.01/s
Default value	1000	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.18.3 Parameters of dynamic kv adjustment - kv2 (P-AXIS-00247)

P-AXIS-00247	**Parameter of dynamic kv adjustment (kv2)**	
Description	With active kv adjustment, position loop gain is interpolated linear between the values P-AXIS-00245 (kv1) and P-AXIS-00247 (kv2) depending on the axis velocity. In combination with the axis velocities P-AXIS-00246 (v1) and P-AXIS-00248 (v2) between the value pairs P-AXIS-00246/P-AXIS-00245 and P-AXIS-00248/P-AXIS-00247, a straight line is defined which is used to calculate the actual position control loop gain kv_act. The following conditions for the parameters are active: P-AXIS-00248 > P-AXIS-00246 For axis velocities < P-AXIS-00246 and > P-AXIS-00248: kv_act_max = max(P-AXIS-00245, P-AXIS-00247) kv_act_min = min(P-AXIS-00245, P-AXIS-00247)	
Parameter	getriebe[i].dyn_kv.kv2	
Data type	UNS32	
Data range	1 < kv2 ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.01/s	R,S: 0.01/s
Default value	1000	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.18.4 Parameters of dynamic kv adjustment - v1 (P-AXIS-00246)

P-AXIS-00246	**Parameter of dynamic kv adjustment (v1)**	
Description	With active kv adjustment, position loop gain is interpolated linear between the values P-AXIS-00245 (kv1) and P-AXIS-00247 (kv2) depending on the axis velocity. In combination with the axis velocities P-AXIS-00246 (v1) and P-AXIS-00248 (v2) between the value pairs P-AXIS-00246/P-AXIS-00245 and P-AXIS-00248/P-AXIS-00247, a straight line is defined which is used to calculate the actual position control loop gain kv_act. The following conditions for the parameters are active: P-AXIS-00248 > P-AXIS-00246 For axis velocities < P-AXIS-00246 and > P-AXIS-00248: kv_act_max = max(P-AXIS-00245, P-AXIS-00247) kv_act_min = min(P-AXIS-00245, P-AXIS-00247)	
Parameter	getriebe[i].dyn_kv.v1	
Data type	UNS32	
Data range	0 < v1 ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: μm/s	R,S:0.001°/s
Default value	1000	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.18.5 Parameters of dynamic kv adjustment - v2 (P-AXIS-00248)

P-AXIS-00248	**Parameter of dynamic kv adjustment (v2)**	
Description	With active kv adjustment, position loop gain is interpolated linear between the values P-AXIS-00245 (kv1) and P-AXIS-00247 (kv2) depending on the axis velocity. In combination with the axis velocities P-AXIS-00246 (v1) and P-AXIS-00248 (v2) between the value pairs P-AXIS-00246/P-AXIS-00245 and P-AXIS-00248/P-AXIS-00247, a straight line is defined which is used to calculate the actual position control loop gain kv_act. The following conditions for the parameters are active: P-AXIS-00248 > P-AXIS-00246 For axis velocities < P-AXIS-00246 and > P-AXIS-00248: kv_act_max = max(P-AXIS-00245, P-AXIS-00247) kv_act_min = min(P-AXIS-00245, P-AXIS-00247)	
Parameter	getriebe[i].dyn_kv.kv2	
Data type	UNS32	
Data range	v1 < v2 ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0.001°/s
Default value	2000	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks		

6.19 Parameters for distance control

When electronic probe systems or sensors are used, the distance control (e.g. touching a curved surface of a plate) or height control (e.g. compensation for thickness tolerances of the workpiece) permits, for example, movements in a Z axis that superimpose the programmed positions of the axes for interpolation of an NC program.

Notice

Distance control is currently only available for SERCOS, Profidrive or CANopen drives.

Settings relevant to distance control can be defined using the following axis parameters. For more information, see in [FCT-M3].

6.19.1 Enabling of distance control (P-AXIS-00328)

P-AXIS-00328	**Enabling of distance control (spindle with touch probe)**	
Description	The distance control for a spindle with touch probe is enabled with this parameter. The activation is done by a special command in the NC program [PROG//section 'Distance controlled spindles'].	
Parameter	lr_param.distance_control_on	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.2 Filtering of sensor values (P-AXIS-00413)

P-AXIS-00413	**Filtering of sensor values**	
Description	Sensor values may be noisy. To keep excitation of the machine low, the setpoints for distance control can be smoothed by a filter. The parameter specified the number of values that are used for filtering.	
Parameter	kenngr.distc.n_cycles	
Data type	SGN32	
Data range	0 ≤ n_cycles < 100	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	4	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.3 Maximum position offset (P-AXIS-00414)

P-AXIS-00414	**Maximum position offset**	
Description	The correction value of the axis that was calculated via distance control may not exceed this machine data item. An error message is issued if this value is exceeded. The correction value is limited.	
Parameter	kenngr.distc.max_deviation	
Data type	SGN32	
Data range	0 ≤ max_deviation < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	50000	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.4 Maximum velocity (P-AXIS-00415)

P-AXIS-00415	**Maximum velocity**	
Description	The parameter defines the maximum speed at which a position offset is cleared. Distance compensation is dynamically limited to maximum speed to limit any resulting excitation.	
Parameter	kenngr.distc.v_max	
Data type	SGN32	
Data range	0 ≤ v_max < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.001 mm/s	R: 0,001°/s
Default value	5000	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.19.5 Maximum acceleration (P-AXIS-00416)

P-AXIS-00416	**Maximum acceleration**	
Description	The parameter defines the maximum acceleration with which a position offset is extended. Correction of the distance is limited dynamically with respect to the maximum acceleration to limit the resulting excitation. If no acceleration is specified, the maximum axis acceleration is used automatically (see P-AXIS-00008 [246]).	
Parameter	kenngr.distc.a_max	
Data type	SGN32	
Data range	0 ≤ a_max < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 1 mm/s²	R: 1°/s²
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	Then this parameter is 0, the maximum axis acceleration P-AXIS-00008 [246] is used.	

6.19.6 Maximum permissible change speed of measured distance (P-AXIS-00417)

P-AXIS-00417	**Maximum permissible change speed of measured distance**	
Description	The parameter defines the maximum permissible change in speed of the measured distance within one cycle. After activation of distance control, the sensor's actual values are monitored for change. When the maximum permissible change speed is exceeded, the error message ID 70329 is output. This detects problems with actual value detection.	
Parameter	kenngr.distc.max_act_value_change	
Data type	SGN32	
Data range	0 ≤ max_act_value_change < MAX(SGN32)	
Axis types	T, R	
Dimension	T: µm/s	R: 0.0001°/s
Default value	5000	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.7 Reference point offset for control measuring system (P-AXIS-00418)

P-AXIS-00418	**Reference point offset for measuring system**	
Description	The value range of the sensor measuring system can be moved by an offset via this machine data item. This is necessary in the case of absolute position sensors, for example, to define the reference point, i.e. the sensor position that is adjusted if the spindle touches the ideal workpiece surface.	
Parameter	kenngr.distc.ref_offset	
Data type	SGN32	
Data range	MIN(SGN32) ≤ ref_offset < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	0 (No offset)	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.19.8 Upper limit for measuring system (P-AXIS-00419)

P-AXIS-00419	**Upper limit for measuring system**	
Description	The following parameter defines the upper limit of the sensor. An error message is generated if it is exceeded while distance control is active.	
Parameter	kenngr.distc.max_pos	
Data type	SGN32	
Data range	0 ≤ max_pos < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	50000	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.9 Lower limit for measuring system (P-AXIS-00420)

P-AXIS-00420	**Lower limit for measuring system**	
Description	The following value defines the lower limit of the sensor. An error message is generated if it is exceeded while distance control is active.	
Parameter	kenngr.distc.min_pos	
Data type	SGN32	
Data range	0 ≤ min_pos < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	-50000	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.10 Tolerance band for limits (P-AXIS-00421)

P-AXIS-00421	**Tolerance band for limits**	
Description	This parameter defines a minimum distance from the minimum and maximum sensor positions. If this distance is undershot, the CNC generates the error messages ID 70330 or ID 70576. If the tolerance band is specified by zero, the limits of the minimum and maximum sensor positions from the axis parameters P-AXIS-00419 [▸ 303] and P-AXIS-00420 [▸ 304] have a direct effect.	
Parameter	kenngr.distc.tolerance	
Data type	SGN32	
Data range	0 ≤ tolerance < MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.11 Consideration of distance control in software limit switch monitoring (P-AXIS-00428)

P-AXIS-00428	Consideration of distance control in software limit switch monitoring	
Description	This parameter defines whether the calculated distance control offset is included in the software limit switch monitor (see [FCT-A2]).	
Parameter	kenngr.distc.check_sw_limit_switch	
Data type	BOOLEAN	
Data range	0: Offset of distance control is not considered in software limit switch monitoring (Standard). 1: Offset of distance control is considered in software limit switch monitoring.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.12 Option: Coupling of distance sensor and motor encoder (P-AXIS-00500)

P-AXIS-00500	Option: Coupling of distance sensor and motor encoder	
Description	As an extension, both the distance sensor and the Z actual value sensor can be used. The inverse coupling of the two sensors can reduce an oscillation tendency.	
Parameter	kenngr.distc.mode_dist_use_both_encoder	
Data type	BOOLEAN	
Data range	0: No coupling 1: Coupling of motor encoder and distance sensor active	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.13 Option: Adaptive weighting of acceleration (P-AXIS-00501)

P-AXIS-00501	**Option: Adaptive weighting of acceleration**	
Description	To reduce a possible oscillation the acceleration can be reduced for small deviations.	
Parameter	kenngr.distc.use_adaptive_acceleration	
Data type	BOOLEAN	
Data range	0: No adaptive weighting of acceleration 1: Adaptive weighting of acceleration active	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	In addition the following limits for acceleration and distance error must be configured: P-AXIS-00502 [▸ 307] or P-AXIS-00416 [▸ 302] and P-AXIS-00504 [▸ 307] or P-AXIS-00505 [▸ 308]	

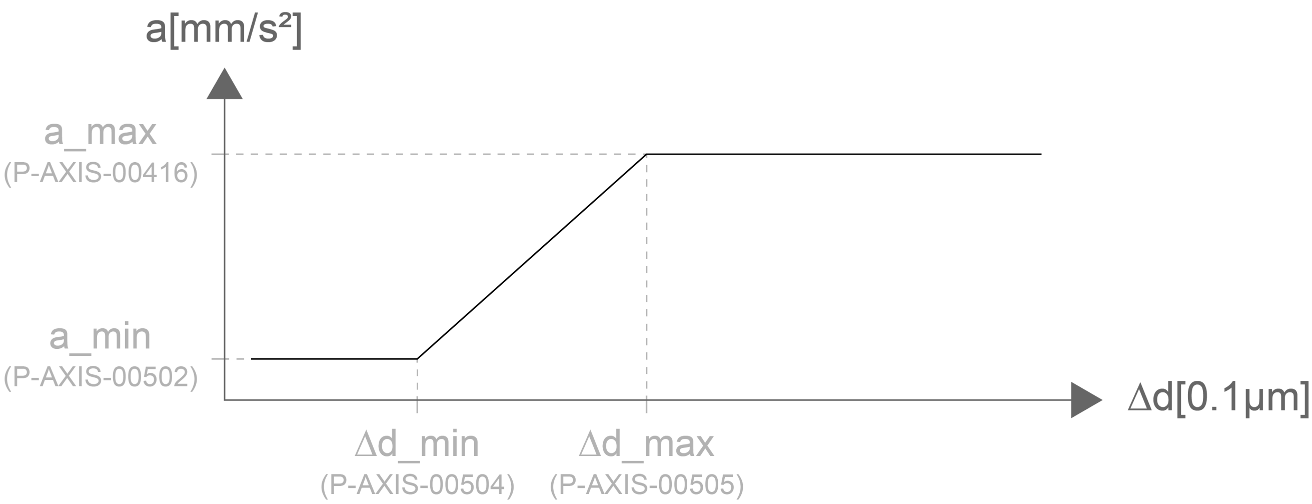


Fig. 31: Parameters for acceleration and distance error

6.19.13.1 Minimum acceleration (P-AXIS-00502)

P-AXIS-00502	**Minimum acceleration**	
Description	The parameter defines the minimal acceleration of distance control.	
Parameter	kenngr.distc.a_min	
Data type	UNS32	
Data range	1 ... MAX (UNS32)	
Axis types	T, R	
Dimension	T: mm/s²	R: mm/s²
Default value	500	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	.	

Notice

The maximum acceleration of distance control is defined in parameter P-AXIS-00416 [▸ 302] .

6.19.13.2 Minimum distance error (P-AXIS-00504)

P-AXIS-00504	**Minimum distance error**	
Description	The parameter defines the minimum distance error for distance control up to which minimum acceleration (P-AXIS-00502 [▸ 307]) is used.	
Parameter	kenngr.distc.dist_error_a_min	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00504 < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	1000	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.19.13.3 Maximum distance error (P-AXIS-00505)

P-AXIS-00505	**Maximum distance error**	
Description	The parameter defines the maximum distance error for distance control up to which maximum acceleration (P-AXIS-00416 [▸ 302]) is used.	
Parameter	kenngr.distc.dist_error_a_max	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00505 < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	5000	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.19.14 Option: Low pass filter (P-AXIS-00506)

P-AXIS-00506	**Option: Low-pass filters**	
Description	The tendency for oscillation can be better suppressed by using a low-pass filter. For more information see [FCT-A7].	
Parameter	kenngr.distc.low_pass_filter_enable	
Data type	BOOLEAN	
Data range	0: Without low pass filter 1: Low pass filter active	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	In addition the following filter parameters for order and limit frequency must be configured: P-AXIS-00507 [▸ 309] and P-AXIS-00508 [▸ 309]	

6.19.14.1 Order of the filter (P-AXIS-00507)

P-AXIS-00507	**Order of the filter**	
Description	The filter's order describes its behaviour with regard to the drop in the frequency response. The following applies: Frequency drop = - P-AXIS-00507 * 20 dB/decade	
Parameter	kenngr.distc.low_pass_filter_order	
Data type	UNS32	
Data range	0 … 6	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	4	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.14.2 Characteristic frequency of a filter (P-AXIS-00508)

P-AXIS-00508	**Characteristic frequency of a filter**	
Description	The parameter defines the value of a filter's characteristic frequency.	
Parameter	kenngr.distc.low_pass_filter_fg_f0	
Data type	REAL64	
Data range	0 ≤ low_pass_filter_fg_f0 < MAX(REAL64)	
Axis types	T, R	
Dimension	T: Hz	R: Hz
Default value	25	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.15 Option: Dead time reduction (P-AXIS-00509)

P-AXIS-00509	**Option: Dead time reduction**	
Description	The dead time of distance control can be reduced by an optimized schedule of the CNC.	
Parameter	kenngr.distc.optimized_scheduling	
Data type	BOOLEAN	
Data range	0: Without optimized scheduling 1: Optimized scheduling active	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks		

6.19.16 Velocity weighting for the lowering movement (P-AXIS-00533)

P-AXIS-00533	**Weighting factor for velocity of lowering movement**	
Description	This parameter weights the velocity (see P-AXIS-00415 [301]) of the lowering movement (towards the workpiece). This can be useful since the lifting movement is normally highly dynamic in order to avoid an obstacle or elevation quickly. With the weighting factor it is possible to use a reduced velocity for the lowering movement towards the workpiece.	
Parameter	kenngr.distc.v_weight_down	
Data type	UNS32	
Data range	0 ≤ v_weight_down < 2000	
Axis types	T, R	
Dimension	T: 0.1%	R: 0.1%
Default value	0 *	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	* The weighting is deactivated, lifting and lowering movement use the identical velocity P-AXIS-00415 [301]. This parameter is available from CNC version V2.11.2807.13 onwards.	

6.19.17 Weighting the distance control output values (P-AXIS-00759)

P-AXIS-00759	**Weighting the distance control output values**	
Description	The parameter weights the cyclic output value of the distance control. This may affect the distance control dynamics. For kp values less than 1.0, the distance control dynamics are reduced; for kp value greater than 1.0, the dynamics are increased.	
Parameter	kenngr.distc.kp	
Data type	REAL64	
Data range	0.0 < kp <= 2.0	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	1.0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	A kp factor less than 1.0 reduces a possible distance control oscillation and steadies the control in the event of minor distance errors. This parameter is available as of CNC Build V2.11.2809.06 or V3.1.3079.06.	

6.19.18 Acceleration weighting for the lowering movement (P-AXIS-00534)

P-AXIS-00534	**Weighting factor for acceleration of lowering movement**	
Description	This parameter weights the velocity (see P-AXIS-00416 [302]) of the lowering movement (towards the workpiece). This can be useful since the lifting movement is normally highly dynamic in order to avoid an obstacle or elevation quickly. With the weighting factor it is possible to use a reduced acceleration for the lowering movement towards the workpiece.	
Parameter	kenngr.distc.a_weight_down	
Data type	UNS32	
Data range	0 ≤ a_weight_down < 2000	
Axis types	T, R	
Dimension	T: 0.1%	R: 0.1%
Default value	0 *	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	* The weighting is deactivated, lifting and lowering movement use the identical acceleration P-AXIS-00416 [302]. This parameter is available from CNC version V2.11.2807.13 onwards.	

6.19.19 Integral action time of PID controller (P-AXIS-00764)

P-AXIS-00764	**Integral (I) action time of the PID controller**	
Description	This parameter weights the I component of the PID controller. The integral action time defines the time after which the P and I components of the manipulated variable are equal. A large integral action time produces greater control stability. The shorter the integration action time, the greater the I component and the faster the control. Disable the I component by i_tn = 0.	
Parameter	kenngr.distc.i_tn	
Data type	REAL64	
Data range	0.0 <= i_tn <= 50.0	
Axis types	T, R	
Dimension	T: s	R: s
Default value	0.0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	To begin with, it is advisable to select a high initial value for the integral action time setting (e.g. 5) to avoid instability in the control loop. You can then reduce the integral action time step by step to obtain the effect you require. If there are no permanent control deviations, do not use the I component at first. This parameter is available as from Build 2809.06 or 3079.06.	

6.19.20 Derivative action time of PID controller (P-AXIS-00765)

P-AXIS-00765	**Derivative (D) action time of the PID controller**	
Description	This parameter weights the D component of the PID controller. The derivative action time defines the time after which the P and D components of the manipulated variable are equal. The derivative action time stabilises controller behaviour and reduces oscillations. The larger the derivative action time, the stronger the D component. Disable the D component by d_tv=0.	
Parameter	kenngr.distc.d_tv	
Data type	REAL64	
Data range	0.0 <= d_tv <= 2.0	
Axis types	T, R	
Dimension	T: s	R: s
Default value	0.0	
drive types.	SERCOS, Profidrive, CANopen	
Remarks	To begin with, it is advisable to select a low initial value for the derivative action time setting to avoid instability in the control loop (e.g.: 0.01). You can then reduce the derivative action time step by step to obtain the effect you require. This parameter is available as from Build 2809.06 or 3079.06.	

6.19.21 Filter type for smoothing sensor values (P-AXIS-00782)

P-AXIS-00782	Filter type for smoothing sensor values	
Description	In some cases, the sensor values are noisy. The oscillation tendency can be possibly suppressed by using a suitable filter . The following filter types can be selected for distance control: • DEFAULT: Moving average filter where P-AXIS-00413 [300] = 4 • MOVING_AVERAGE: Moving average filter • LOWPASS Low-pass filter • KALMAN_MA: Kalman filter with prediction from average filter • EXPO_MEAN: Exponential weighted average filter • KALMAN_EXPO: Kalman filter with prediction from exponentially weighted average filter	
Parameter	kenngr.distc.filter_type	
Data type	STRING	
Data range	DEFAULT MOVING_AVERAGE LOWPASS KALMAN_MA EXPO_MEAN KALMAN_EXPO	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	DEFAULT	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	The following filter parameters are still required for each of the filter types:: • MOVING_AVERAGE: P-AXIS-00413 [300] • LOWPASS: P-AXIS-00507 [309], P-AXIS-00508 [309] (As of v3.1.3079.21 this setting replace the parameter P-AXIS-00506 [308]) • KALMAN_MA: P-AXIS-00413 [300], P-AXIS-00783 [314] • EXPO_MEAN: P-AXIS-00413 [300], P-AXIS-00784 [314] • KALMAN_EXPO: P-AXIS-00413 [300], P-AXIS-00784 [314], P-AXIS-00783 [314]	

6.19.22 Uncertainty of measurement values (P-AXIS-00783)

P-AXIS-00783	**Uncertainty of measurement values**	
Description	The parameter indicates the degree of deviation of measurement values from actual values. The higher this value, the better the filter effect. However, any overshoots are amplified.	
Parameter	kenngr.distc.kalman_sigma	
Data type	REAL64	
Data range	1.0 ≤ P-AXIS-00783 ≤ 10000.0	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	4	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.19.23 Smoothing factor (P-AXIS-00784)

P-AXIS-00784	**Smoothing factor**	
Description	The parameter indicates the weighting of the current measurement value. Example: At a smoothing factor of 0.5, 50% of the current value is included in the average value.	
Parameter	kenngr.distc.smoothing_factor	
Data type	REAL64	
Data range	0 < P-AXIS-00784 ≤ 1.0	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0.7	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.20 Position controller dead band (P-AXIS-00395)

P-AXIS-00395	**Position controller dead band**	
Description	In order to prevent the position controller from continuously outputting a setpoint value at standstill, this parameter defines a minimal position lag and, if this limit is undershot, the output of a setpoint value is suppressed.	
Parameter	getriebe[i].pos_control_deadband	
Data type	UNS32	
Data range	[0 ... MIN(P-AXIS-00236 [▸ 265], P-AXIS-00472 [▸ 265])]	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.1 mdeg
Default value	0	
drive types.	----	
Remarks	The dead band may not be bigger than the position windows defined for the axis (P-AXIS-00236 [▸ 265], P-AXIS-00472 [▸ 265]) (see also ID 110528, ID 110561). A setpoint value is output continuously with a value of 0 (default) . The value of P-AXIS-00395 scaled in encoder increments (see P-AXIS-00233 [▸ 289], P-AXIS-00234 [▸ 290]) must be ≥ 1 (see also ID 110529). This parameter is only effective with CNC position control.	

6.21 Settings for I (Integral) -position control

6.21.1 Integral time Tn for I-position control (P-AXIS-00495)

P-AXIS-00495	Integral time Tn for I-position control	
Description	The I-position controller has the integral time Tn. The parameter is only effective if the CNC-internal position controller is used. For drive amplifiers with integrated position control, the integral time must be defined inside the drive. When this value range is undershot, the error message P-ERR-110575 is output and the I-position controller is switched off. When the permissible value range is overshot, the error message P-ERR-110574 is output and the I-position controller is switched off.	
Parameter	getriebe[i].integral_time	
Data type	UNS32	
Data range	1000 ≤ integral_time ≤ 60000000	
Axis types	T, R, S	
Dimension	T: μs	R,S: μs
Default value	0 *	
Drive types	----	
Remarks	*(I-Regler off)	

6.21.2 Maximum output for I-position control (P-AXIS-00496)

P-AXIS-00496	Maximum output for I-position control	
Description	The actuating value output by the I-position controller can be limited. The limit value is specified in 0.1% of the maximum permissible axis velocity (P-AXIS-00212 [▸ 245]). When the maximum value is overshot, the error message P-ERR-110576 is output and the value is corrected to 1000.	
Parameter	getriebe[i].integral_limit	
Data type	UNS16	
Data range	0 ≤ integral_linit ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	100	
Drive types	----	
Remarks		

6.21.3 Switch on delay for I-position control (P-AXIS-00497)

P-AXIS-00497	**Switch on delay for I-position control**	
Description	I-position control is only activated when the drive signals that it is ready to follow the command values. This is detected by the controller which evaluated the status bits provided by the drive. When the drive does not follow the command values despite the signalled state, an output value may occur at the I-controller output and this leads to a beat on the axis. This parameter defines a delay for activation of the I-controller. When the maximum value is overshot, the error message P-ERR-110573 is output and the value is corrected to 500'000.	
Parameter	lr_param.i_control_on_delay	
Data type	UNS32	
Data range	0 ≤ i_control_on_delay ≤ 500'000	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks		

6.21.4 Clear Integrator if drive is switched off (P-AXIS-00498)

P-AXIS-00498	**Clear Integrator if drive is switched off**	
Description	By default the I-position controller is stopped when the drive is disabled and the currently enabled actual output value continues to be output. This parameter defines that the I-position controller outputs the manipulated variable 0 when the drive is disabled.	
Parameter	lr_param.i_control_output_clear_disable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

6.22 Improved Position Control (lr_param.improved_position_control.*)

6.22.1 activation (P-AXIS-00758)

P-AXIS-00758	Enabling the "Improved Position Control" function	
Description	This parameter enables or disables the "Improved Position Control" function.	
Parameter	lr_param.improved_position_control.enable	
Data type	BOOLEAN	
Data range	0: Improved Position Control is not active 1: Improved Position Control is active	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	Parameter available as of CNC Build V3.1.3077.08 and higher	

6.22.2 Factor for permissible additive velocity (P-AXIS-00757)

P-AXIS-00757	Factor for the maximum permissible additive velocity	
Description	This parameter limits the maximum permissible additive velocity of the "Improved Position Control" function. The additive velocity is limited in proportion to the maximum axis velocity. max. additive velocity = P-AXIS-00757 / 1000 x P-AXIS-00212 [▸ 245] If the additive velocity exceeds the calculated value, the limit value continues to be output as the additive velocity.	
Parameter	lr_param.improved_position_control.v_add_max_fact	
Data type	UNS16	
Data range	0 <= v_add_max_fact <= 2000	
Axis types	T, R, S	
Dimension	T: 0.1%	R, S: 0.1%
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	No warning is output if the maximum velocity is exceeded. Parameter available as of CNC Build V3.1.3077.08 and higher	

6.22.3 Mode (P-AXIS-00753)

P-AXIS-00753	**Mode for the "Improved Position Control" function**	
Description	The following modes are provided for the "Improved Position Control" function and they are applicable simultaneously to various stages. • NOT_ACTIVE: IPC is not active. • DIRECT: IPC uses direct measured values. Direct measured values can either come from a direct measuring system or originate from a motor encoder as the actual velocity. • INDIRECT: IPC uses values that are based on the simulation of the mechanical vibration by the measured actual motor velocity. • SET_POINT: IPC uses values that are based on the simulation of the mechanical vibration by the command velocity.	
Parameter	lr_param.improved_position_control.stage[i].mode	
Data type	UNS32	
Data range	0 - NOT_ACTIVE 1 - DIRECT 2 - INDIRECT 3 - SET_POINT	
Axis types	T, R, S	
Dimension	T: —-	R, S: —-
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	Parameter available as of CNC Build V3.1.3077.08 and higher	

6.22.4 Weighting factor numerator (P-AXIS-00754)

P-AXIS-00754	**Weighting factor numerator**	
Description	Weighting factor numerator. The weighting is calculated from P-AXIS-00754 and P-AXIS-00755 [▹ 320]: Weighting factor = P-AXIS-00754 / P-AXIS-00755 [▹ 320] The weighting factor affects the output additive velocity per stage. The weighting factor is limited to a maximum value of 7.0. A weighting factor of <1 reduces the output additive velocity. A weighting factor of >1 increases the output additive velocity.	
Parameter	lr_param.improved_position_control.stage[i].weight_fact_num	
Data type	UNS32	
Data range	0 < weight_fact_num < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: —-	R, S: —-
Default value	1	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	To ensure the reliable activation of the "Improved Position Control" function, it is advisable to raise the additive velocity slowly via the weighting factor. Parameter available as of CNC Build V3.1.3077.08 and higher	

6.22.5 Weighting factor denominator (P-AXIS-00755)

P-AXIS-00755	**Weighting factor denominator**	
Description	Weighting factor denominator. The weighting factor is calculated from P-AXIS-00754 [▹ 320] and P-AXIS-00755. Weighting factor = P-AXIS-00754 [▹ 320] / P-AXIS-00755 The weighting factor affects the output additive velocity per stage. The weighting factor is limited to a maximum value of 7.0. A weighting factor of <1 reduces the output additive velocity; a weighting factor of >1 increases the output additive velocity.	
Parameter	lr_param.improved_position_control.stage[i].weight_fact_denom	
Data type	UNS32	
Data range	0 < weight_fact_denom < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: —-	R, S: —-
Default value	1	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	To ensure the reliable activation of the Improved Position Control function, it is advisable to raise the additive velocity slowly via the weighting factor.	

6.22.6 Order of the bandpass filter (P-AXIS-00750)

P-AXIS-00750	**Order of band-pass filter**	
Description	This parameter defines the order of the band-pass filter for all modes (P-AXIS-00753 [319]). In addition, this parameter is a value which expresses the fall of frequency response (fall = -order x 20 dB/decade).	
Parameter	lr_param.improved_position_control.stage[i].filter.order	
Data type	UNS32	
Data range	1 <= order <= 3	
Axis types	T, R, S	
Dimension	T: —-	R, S: —-
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

6.22.7 Damped frequency (P-AXIS-00751)

P-AXIS-00751	**Damped frequency**	
Description	The parameter defines the frequency that is to be actively damped by the "Improved Position Control" function. The middle frequency is specified for all modes P-AXIS-00753 [319] for the band-pass frequency. For the “INDIRECT” and SET_POINT modes, the simulation of the mechanical vibration is based on the same frequency.	
Parameter	lr_param.improved_position_control.stage[i].filter.fg_f0	
Data type	REAL64	
Data range	0.0 < fg_f0 <= 500.0	
Axis types	T, R, S	
Dimension	T: Hz	R, S: Hz
Default value	-1	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	The "Improved Position Control" function achieves the best results when the dominant frequency of the mechanical vibration is precisely met. The measured frequency may deviate from the actual frequency due to measurement inaccuracies. In many cases, the performance of the function can be enhanced by varying the parameter fg_f0 within a narrow range. Parameter available as of CNC Build V3.1.3077.08 and higher	

6.22.8 Quality factor of the bandpass filter (P-AXIS-00752)

P-AXIS-00752	**Quality factor of the band-pass filter**	
Description	Specifies the inverse value of the bandwidth for the band-pass filter for all modes (P-AXIS-00753 [▹ 319]). P-AXIS-00752 = P-AXIS-00751 [▹ 321] / bandwidth	
Parameter	lr_param.improved_position_control.stage[i].filter.q_factor	
Data type	REAL64	
Data range	1.0 <= q_factor <= 10.0	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	-1	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	A high filter quality limits the bandwidth of the filtering frequencies. To avoid cutting off any relevant frequencies, it is advisable to raise the filter quality step by step. The filter quality is limited by changing the frequency dependent on machine position and mass inertia. Among other things, a higher filter quality leads to improved damping of the required frequency, whereas a lower quality results in a more robust behaviour of frequency damping. Parameter available as of CNC Build V3.1.3077.08 and higher	

6.22.9 Damping of simulated mech. vibration (P-AXIS-00756)

P-AXIS-00756	**Damping the simulated mechanical vibration**	
Description	The parameter specifies the damping of the simulated mechanical vibration for the modes (P-AXIS-00753 [▹ 319]) INDIRECT and SET_POINT. The parameter has no influence on the DIRECT mode.	
Parameter	lr_param.improved_position_control.stage[i].filter.damping	
Data type	REAL64	
Data range	0.0 < damping < 1.0	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	-1	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	The lower the damping, the more the simulation of the mechanical vibration and the higher the specified additive velocity. To ensure the reliable start of the "Improved Position Control" function, it is advisable to decrease damping slowly. Parameter available as of CNC Build V3.1.3077.08 and higher	

6.23 Restoring axis position at controller start (P-AXIS-00761)

P-AXIS-00761	**Restoring axis position at controller start**	
Description	When the controller is terminated, the axis position in the position controller is saved remanently. This parameter is used at controller start to automatically restore the last position saved for an axis. This assumes that the drive encoder supplies an absolute position within at least one motor revolution and that the axis was referenced when it was switched off. By restoring the last axis position, homing can be dispensed with after a controller restart. This can also be helpful for axes with a large motion range if their absolute encoder overflows once or several times. If the axis has an absolute encoder, the ON_ABSOLUT mode can be used. If the encoder only provides an absolute position within one motor revolution (no remanent revolution counter), the ON_RANGE mode should be used. The number of relevant encoder bits per motor revolution must also be specified in parameter P-AXIS-00355 [▸ 96] for this mode. Between switching off and switching on the controller, the axis may not move by more than half the absolute range. If necessary, this must be ensured by using a suitable motor brake Otherwise, the restored position is shifted by one or more absolute intervals.	
Parameter	lr_param.restore_axis_position	
Data type	STRING	
Data range	OFF - At controller start, the last axis position is not restored ON_RANGE - Restore the axis position within a restricted absolute range of the drive encoder ON_ ABSOLUTE - Restore the axis position for axis with absolute encoder	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	OFF	
Drive types	Simulation, SERCOS, Terminal, Lightbus, CANopen, Profidrive*	
Remarks	This function is available as of CNC Build V3.1.3080 *Profidrive available as of V3.1.3081.4. The parameter P-AXIS-00315 [▸ 407] (antr.profibus.read_abs_pos_from_drive) must be set with Profidrive drives.	

6.24 Switch over drive type to simulation

6.24.1 Switching over drive type to simulation (P-AXIS-00790)

P-AXIS-00790	**Switch over drive type to simulation**	
Description	This parameter allows the drive type of an axis to be switched over to simulation without making any changes to the configuration. If the parameter is deactivated, it is no longer necessary to link the axes back to the drives. When the parameter is activated in the standard axis parameter list, all axes are set to simulation. Individual axes can be excluded from this by deactivating the parameter in the relevant axis parameter list.	
Parameter	kenngr.drive_simulation	
Data type	BOOLEAN	
Data range	1: Drive type is switched to simulation. 0: The configured drive type is used.	
Axis types	<T, R, S>	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	Simulation, Conventional, SERCOS, Terminal, Lightbus, Profidrive, CANopen, DSE	
Remarks	A change in the parameter only takes effect after a controller restart. Parameter available as of CNC Build V2.11.2055 ; V2.11.2827 ; V3.1.3079.39 ; V3.1.3107.28	

6.24.2 Setting the initial position for simulation drives (P-AXIS-00791)

P-AXIS-00791	**Set the initial position for simulation drive**	
Description	This parameter activates the adoption of the initial position from parameter P-AXIS-00792 [▸ 325] at controller start for simulation drives. This may be practical, for example, for configurations with absolute encoders which can switch over between real and simulation drive (see P-AXIS-00790 [▸ 324]). A position offset specified for a real drive P-AXIS-00403 [▸ 363] in relation to the encoder absolute position is not considered when the initial position for simulation drives is set.	
Parameter	antr.simu.use_initial_position	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R, S	
Dimension	T: ----	R: ----
Default value	0	
drive types.	Simulation	
Remarks	This parameter is available as of CNC Build V2.11.2055.00	

6.24.3 Initial position for simulation drives at controller start (P-AXIS-00792)

P-AXIS-00792	Initial position for simulation drives at controller start	
Description	This position defines the initial position which simulation drives assume at controller start. This position is only adopted if the parameter P-AXIS-00791 [▸ 324] is activated.	
Parameter	antr.simu.initial_position	
Data type	SGN32	
Data range	MIN_SGN32 ≤ P-AXIS-00792 ≤ MAX_SGN32	
Axis types	T, R, S	
Dimension	T: 0.1 μm	R,S: 0.0001 °
Default value	0	
drive types.	Simulation	
Remarks	This parameter is available as of CNC Build V2.11.2055.00	

7 Parameters of the axis peripheral interfaces for position control (lr_hw[i].*)

This section describes the parameters for the axis peripheral interfaces in the position controller (lr_hw[i].*).

Notice

The hardware-independent parameters for position control are described in the section Parameters for position control [▸ 264].

The following parameters are dependent on the set **Drive type** 'kenngr.antr_typ' abhängig. The data are dependent on the set **axis type** 'kenngr.achs_typ'. They must be allocated for all axis types.

7.1 Value of drift compensation (P-AXIS-00057)

P-AXIS-00057	**Value of drift compensation**	
Description	The value for compensation of the D/A converter degradation is specified by the mathematical sign attached in the parameter.	
Parameter	lr_hw[i].drift_wert	
Data type	SGN16	
Data range	SGN16 Range	
Axis types	T, R, S	
Dimension	T: Bit	R,S: Bit
Default value	0	
Drive types	Conventional, Terminal, Lightbus, Profidrive, CANopen	
Remarks		

7.2 Sign reversal of command value (P-AXIS-00231)

P-AXIS-00231	**Sign reversal of command value**	
Description	This parameter defines the sign reversal of the command value.	
Parameter	lr_hw[i].vz_stellgr	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.	

7.3 Sign reversal of actual value (P-AXIS-00230)

P-AXIS-00230	**Sign reversal of actual value**	
Description	This parameter defines the sign reversal of the actual value.	
Parameter	lr_hw[i].vz_istw	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	These entries are not taken over when the axis parameters list is updated. Updates only become effective when the controller is rebooted.	

7.4 Identifier for hardware specific parameter set (P-AXIS-00136)

P-AXIS-00136	**Identifier for hardware specific parameter set**	
Description	Each of the hardware-specific parameter sets has a logical identifier to identify which of the available hardware -pecific parameter lists is valid. The active parameter set is selected by the gear-specific parameter P-AXIS-00054 [227] in the gear-specific parameter set. The first parameter set is automatically assigned the identifier 1.	
Parameter	lr_hw[i].nummer	
Data type	SGN16	
Data range	0 ≤≤ 2 (Number of hardware-specific parameter sets, application-specific)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	Simulation, Conventional, Terminal, Lightbus, Profidrive	
Remarks	These entries are not taken over when the axis parameters list is actualized, to change them a reboot is necessary.	

7.5 Numerator distance resolution of the additive sensor measuring system (P-AXIS-00422)

P-AXIS-00422	**Numerator distance resolution of the additive sensor measuring system**	
Description	The distance resolution of the sensor measuring system is specified as the quotient P-AXIS-00423 [▹ 328] in the dimension [increments/0.1 µm] for translatory axes or [increments/10^-4°] for rotary axes. The number of sensor increments must be specified in P-AXIS-00422.	
Parameter	lr_hw[i].encoder_resolution_num	
Data type	UNS32	
Data range	0 < encoder_resolution_num < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: increments	R,S: increments
Default value	1	
Drive types	----	
Remarks	This entry is valid for 'lr_hw[i].*' with i ≥ 1! The resolution of the motor sensor 'lr_hw[0].*' is defined by P-AXIS-00233 [▹ 289] and P-AXIS-00234 [▹ 290].	

7.6 Denominator distance resolution of the additive sensor measuring system (P-AXIS-00423)

P-AXIS-00423	**Denominator distance resolution of the additive sensor measuring system**	
Description	The distance resolution of the sensor measuring system is specified as the quotient P-AXIS-00422 [▹ 328] / P-AXIS-00423 in the dimension [increments/0.1 µm] for translatory axes or [increments/10^-4°] for rotary axes. The amount of the travel range must be specified in this parameter.	
Parameter	lr_hw[i].encoder_resolution_denom	
Data type	UNS32	
Data range	0 ≤ encoder_resolution_denom < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	1	
Drive types	----	
Remarks	This entry is valid for 'lr_hw[i].*' with i ≥ 1! The resolution of the motor sensor 'lr_hw[0].*' is defined by P-AXIS-00233 [▹ 289] and P-AXIS-00234 [▹ 290].	

7.7 Handling of the additive sensor values (P-AXIS-00424)

P-AXIS-00424	**Handling of the additive sensor values**	
Description	This parameter defines whether the sensor positions are to be considered as linear or modulo values. By default, it can be handled according to the axis type or an individual default can be defined. When sensor values are handled according to the set axis type (see P-AXIS-00018 [▸ 69]), values are considered linear for the TRANSLATOR axis type, while modulo handling applies to the ROTATOR axis type.	
Parameter	lr_hw[i].mode_act_pos	
Data type	UNS16	
Data range	0, 1, 2 where: 0: depending on axis type (default) 1 : linear 2 : modulo	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks	This entry is valid for 'lr_hw[i].*' with i ≥ 1! The setting of the sensor value range for the motor sensor 'lr_hw[0].*' is defined by P-AXIS-00122.	

7.8 Parameters for counter interface

One physical counter channel is defined clearly by the system-wide distinctive hardware name (name of I/O interface card) in the CNC system 'cntr_hw_id_string' and one channel identifier 'cntr_channel'. The selected hardware must be defined in the configuration list of hardware.

7.8.1 Name of counter hardware (P-AXIS-00042)

P-AXIS-00042	**Name of counter hardware**	
Description	The parameter defines the name of counter hardware.	
Parameter	lr_hw[i].cntr_hw_id_string	
Data type	STRING	
Data range	Maximum 16 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	ISG_8ACHS	
Drive types	Conventional, Terminal, Lightbus, Profidrive	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted. The declared string for the hardware name must correspond to the entry of the hardware name of a specific I/O card (hardware unit) in the hardware configuration list (entry: *device[i].name* in hwconf.lis [HWCF]). Otherwise during initialisation, the position controller reports an error because it cannot detect ‘its’ hardware.	

7.8.2 Channel identifier for counter (P-AXIS-00041)

P-AXIS-00041	**Channel identifier for counter**	
Description	The parameter defines the channel identifier for counter.	
Parameter	lr_hw[i].cntr_channel	
Data type	UNS32	
Data range	0 ≤ cntr_channel < depending on hardware	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Conventional, Terminal, Lightbus, Profidrive	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.	

7.9 Parameters of D/A interface

One physical analogue channel (D/A-channel) is defined clearly by the system-wide distinctive name of the hardware (name of I/O interface card) 'da_hw_id_string' and the channel number 'da_channel'. The selected hardware must be defined in a hardware configuration list [HWCF].

7.9.1 Name of D/A-hardware (P-AXIS-00049)

P-AXIS-00049	**Name of D/A-hardware**	
Description	The parameter defines the name of the D/A hardware.	
Parameter	lr_hw[i].da_hw_id_string	
Data type	STRING	
Data range	Maximum 16 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	ISG_8ACHS	
Drive types	Conventional, Terminal, Lightbus, Profidrive	
Remarks	These entries are not taken over when the axis parameters list is updated. Updates only become effective when the controller is rebooted. The declared string for the hardware name must correspond to the entry of the hardware name of a specific I/O card (hardware unit) in the hardware configuration list (entry: *device[i].name* in hwconf.lis [HWCF]). Otherwise during initialisation, the position controller reports an error because it cannot detect ‘its’ hardware.	

7.9.2 D/A-channel number (P-AXIS-00048)

P-AXIS-00048	**D/A-channel number**	
Description	The parameter defines the D/A-channel number.	
Parameter	lr_hw[i].da_channel	
Data type	UNS32	
Data range	0 ≤ da_channel < depending on hardware	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Conventional, Terminal, Lightbus, Profidrive	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.	

7.10 Parameters of digital input interface for homing cams

With the system-wide distinctive name of hardware (name of I/O-interface card) 'cam_hw_id_string' and the bit variable 'cam_mask'' one physical digital input is defined clearly. With 'cam_level' the signal level is defined. The selected hardware must be defined in a hardware configuration list [Both parameters are important onl, if direct access via driver functions is required. In this case the parameter 'cam_direkt_access' has to be set to value TRUE. Otherwise, the cam signals are read via the PLC interface (HLI interface or the axis-specific control interface of the path interpolator).

7.10.1 Name of hardware (P-AXIS-00037)

P-AXIS-00037	**Name of hardware**	
Description	The parameter defines the name of the hardware.	
Parameter	lr_hw[i].cam_hw_id_string	
Data type	STRING	
Data range	Maximum 16 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	ISG_8ACHS	
Drive types	Conventional, Terminal, Lightbus, Profidrive	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted. This parameter is not available under TwinCAT. The declared string for the hardware name must correspond to the entry of the hardware name of a specific I/O card (hardware unit) in the hardware configuration list (entry: *device[i].name* in hwconf.lis [HWCF]). Otherwise during initialisation, the position controller reports an error because it cannot detect 'its' hardware.	

7.10.2 Bit variable for cam signals (P-AXIS-00039)

P-AXIS-00039	**Bit variable for cam signals**	
Description	The parameter defines the bit variable for cam signals.	
Parameter	lr_hw[i].cam_mask	
Data type	UNS16	
Data range	Bit coded, 0x	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0x0001	
Drive types	Conventional, Terminal, Lightbus, Profidrive	
Remarks	This parameter is not available under TwinCAT.	

7.10.3 Level of cam signals (P-AXIS-00038)

P-AXIS-00038	**Level of cam signals**	
Description	The parameter defines the level of cam signals.	
Parameter	lr_hw[i].cam_level	
Data type	BOOLEAN	
Data range	0: 0-signal is active level. When the reference cam switch is actuated, the value of the control unit element pAC[axis_idx]^.addr^.McControlLr_Data.MCControlBoolUnit_ReferenceCam.X_Command on the HLI is FALSE (see [HLI]). 1: 1-signal is active level (default). When the reference cam switch is actuated, the value of the control unit element pAC[axis_idx]^.addr^.McControlLr_Data.MCControlBoolUnit_ReferenceCam.X_Command on the HLI is TRUE (see [HLI]).	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
drive types.	Conventional, Terminal, Lightbus, Profidrive	
Remarks		

7.10.4 Access to cam signals (P-AXIS-00036)

P-AXIS-00036	**Access to cam signals**	
Description	The parameter defines the access to cam signals.	
Parameter	lr_hw[i].cam_direct_access	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
drive types.	Conventional, Terminal, Lightbus, Profidrive	
Remarks	This entry is not adopted when the axis parameter list is updated. Updates only become effective when the controller is rebooted.	

7.11 Encoder value range for EtherCAT drives(P-AXIS-00296)

P-AXIS-00296	**Encoder value range for EtherCAT drives**	
Description	If a position encoder is connected to the drive that delivers a modulo position, the NC kernel has to handle the encoder overflow. The value range of the encoder used must therefore be set in this parameter. The value range indicates the number of different position values supplied by the encoder. If the parameter is not assigned, the value range of the encoder is defined by modulo limits (P-AXIS-00127 [▸ 75] and P-AXIS-00126 [▸ 74]).	
Parameter	lr_hw[i].encoder_range	
Data type	UNS32	
Data range	512 … MAX(SGN32)+1	
Axis types	T, R, S	
Dimension	T: increments	R,S: increments
Default value	0	
Drive types	CANopen	
Remarks	This parameter is used only for EtherCAT drives. Example: Encoder with 16-bit resolution The encoder delivers 2^{16} = 65536 different positions (0… 65535), therefore, the parameter encoder_range must be set to 65536. This parameter only has an effect if value 2 (modulo) is set for P-AXIS-00122 [▸ 351] (mode_act_pos).	

7.12 Delay reading of actual position after field bus start (P-AXIS-00567)

P-AXIS-00567	Delay reading of actual position after field bus start	
Description	As soon as the drive field bus connected to the controller delivers cyclic values after controller start-up, the controller reads the actual positions delivered by the drive. During the transition into the cyclic processing it is assumed, that the drive controller already delivers a valid actual position. However, this may not be the case with some drives and this may cause position lag errors or incorrectly initialised axis positions at controller start-up. This parameter permits the delayed reading of the actual position for a definable number of bus cycles after field bus start. The exact parameter value must be determined by "trial and error".	
Parameter	lr_hw[i].delay_tracking	
Data type	UNS16	
Data range	0 … MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

8 Parameters for feedforward control

8.1 Feedforward control mode (P-AXIS-00223)

<table>
<tr><td>P-AXIS-00223</td><td colspan="4">Feedforward control mode</td></tr>
<tr><td>Description</td><td colspan="4">This parameter specifies bit-coded which reference variables (velocity, acceleration and jerk) are to be active during feedforward control.</td></tr>
<tr><td>Parameter</td><td colspan="4">vorsteuer.vorsteuerung (feedforward)</td></tr>
<tr><td>Data type</td><td colspan="4">STRING</td></tr>
<tr><td rowspan="8">Data range</td><td>Flag</td><td colspan="2">Meaning</td><td>Value</td></tr>
<tr><td>NONE</td><td colspan="2">No feedforward control</td><td>0x0000</td></tr>
<tr><td>VEL</td><td colspan="2">Velocity feedforward control</td><td>0x0001</td></tr>
<tr><td>ACC</td><td colspan="2">Acceleration feedforward control</td><td>0x0002</td></tr>
<tr><td>JERK</td><td colspan="2">Jerk feedforward control</td><td>0x0004</td></tr>
<tr><td>ADD_VEL</td><td colspan="2">Velocity feedforward control by output of an additive velocity command value ()

PROFIdrive: In PROFIdrive telegram 5, the calculated feedforward control value is calculated as the velocity in the velocity command value (NSOLL_B - Signal No.7); as opposed to VEL, the feedforward value is calculated here as a position lag in the control deviation ((XERR - Signal No.25).</td><td>0x0101</td></tr>
<tr><td>ADD_ACC</td><td colspan="2">Acceleration feedforward control by output of an additive torque/current command value</td><td>0x0202</td></tr>
<tr><td>ADD_JERK</td><td colspan="2">Jerk feedforward control by output of an additive torque/current command value</td><td>0x0804</td></tr>
<tr><td>Axis types</td><td colspan="4">T, R, S</td></tr>
<tr><td>Dimension</td><td colspan="2">T: ----</td><td colspan="2">R,S: ----</td></tr>
<tr><td>Default value</td><td colspan="4">NONE</td></tr>
<tr><td>Drive types</td><td colspan="4">----</td></tr>
<tr><td>Remarks</td><td colspan="4">This function is available for all types of axes and types of drives.
Jerk feedforward is only available when a jerk-limited velocity profile is used.
For details on defining the acceleration profile, see P-CHAN-00071 and [PROG//Command #SLOPE [TYPE…]].

The specification of values by codes is possible as of CNC Builds
• V2.11.2034.6
• V2.11.2808.03
• V3.1.3065.04 and
• V3.1.3102.00
.

Examples:
Velocity and acceleration feedforward control:
vorsteuer.vorsteuerung VEL | ACC

Velocity and acceleration feedforward control by additive command values:</td></tr>
</table>

	vorsteuer.vorsteuerung (feedforward) ADD_VEL | ADD_ACC In **previous CNC Builds** values had to be specified bit-coded for the UNS16 variable. Default value: 0

8.2 Conventional feedforward control

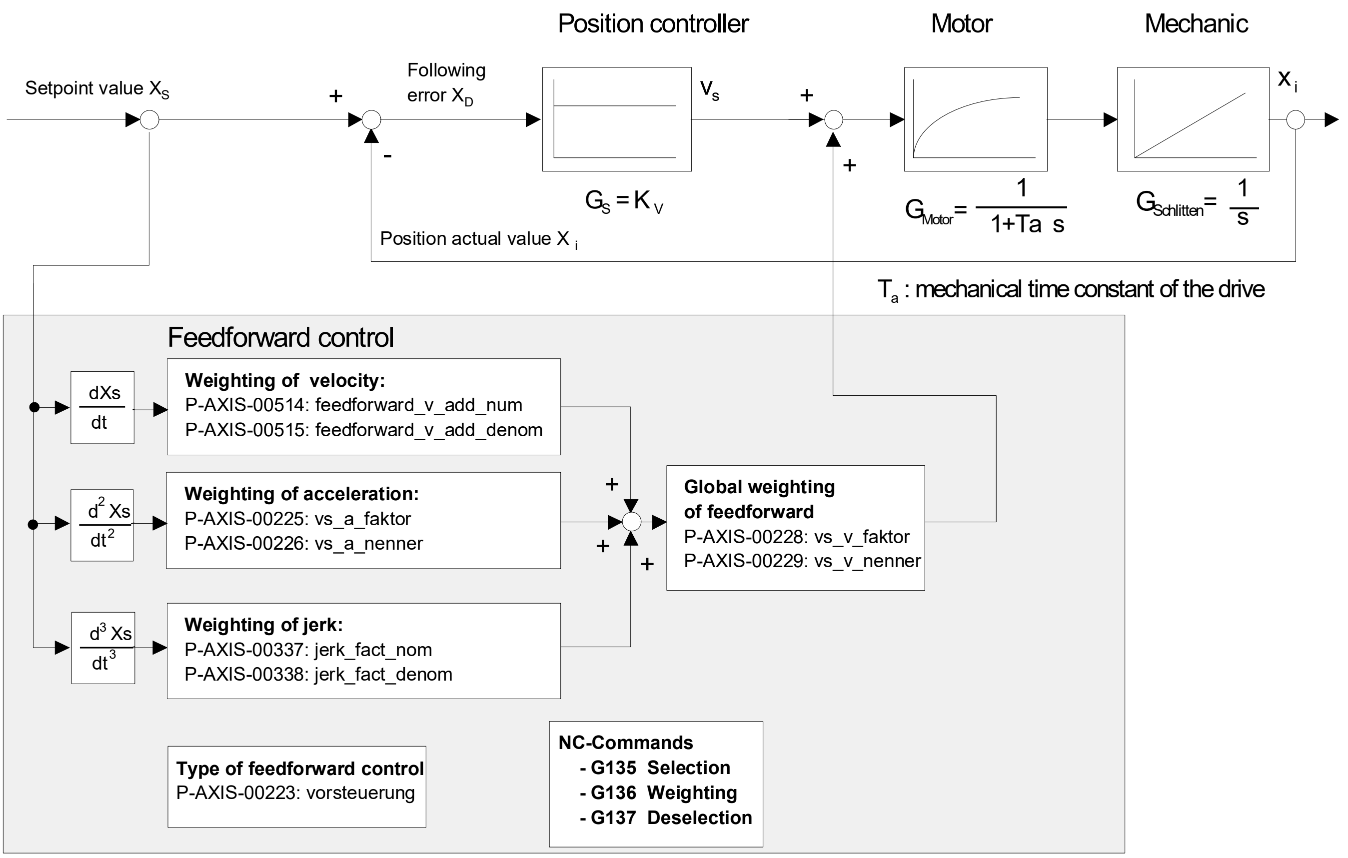


Fig. 32: Block diagram of feedforward control

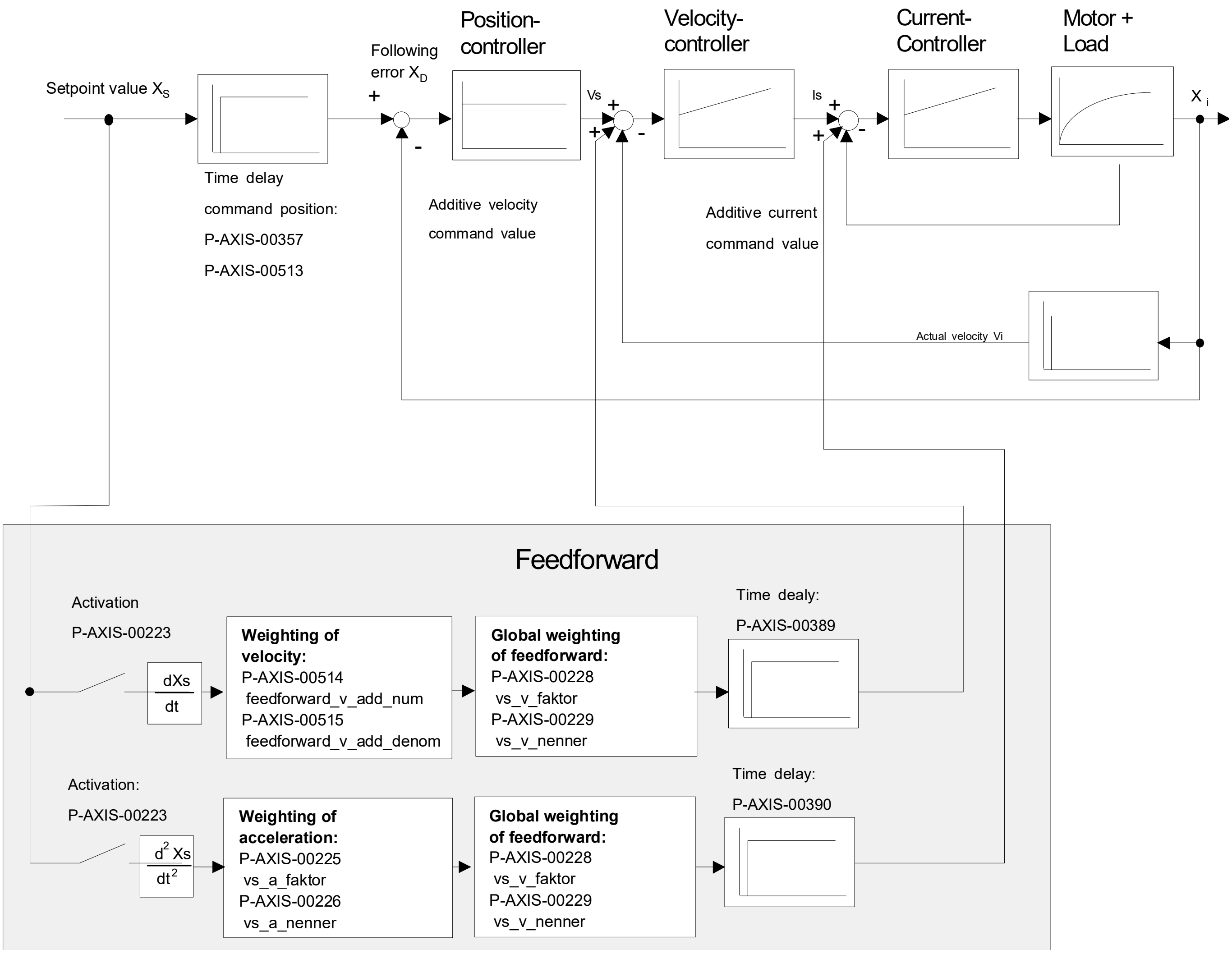


Fig. 33: Block diagram of feedforward control with additive setpoints

8.2.1 Numerator equivalent time constant for feedforward control of acceleration (P-AXIS-00225)

P-AXIS-00225	**Numerator equivalent time constant for feedforward control of acceleration**	
Description	The acceleration command variable is weighted by the mechanical time constant of the drive. The drive is modelled here as a first-order time delay element (see figure of the conventional feedforward control [▸ 338]). The following transfer function in the Laplace range is obtained: $G_{Drive} = \frac{1}{1 + T_a * s}$ with $T_a = \frac{\text{P} - \text{AXIS} - 00225}{\text{P} - \text{AXIS} - 00226}$ P-AXIS-00226 [▸ 341]: time constant denominator.	
Parameter	vorsteuer.vs_a_faktor	
Data type	SGN32	
Data range	0 ≤ vs_a_faktor ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	1	
Drive types	----	
Remarks		

8.2.2 Denominator equivalent time constant for feedforward control of acceleration (P-AXIS-00226)

P-AXIS-00226	**Denominator equivalent time constant for feedforward control of acceleration**	
Description	The acceleration command variable is weighted by the mechanical time constant of the drive. The drive is modelled here as a first-order time delay element (see figure of the conventional feedforward control [▸ 338]]). In the Laplace range the following transfer function is obtained $G_{Drive} = \frac{1}{1 + T_a * s}$ with $T_a = \frac{\text{P-AXIS-00225}}{\text{P-AXIS-00226}}$ P-AXIS-00225 [▸ 340]: time constant numerator.	
Parameter	vorsteuer.vs_a_nenner	
Data type	SGN32	
Data range	0 ≤ vs_a_nenner ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks		

8.2.3 Numerator weighting factor for feedforward control (P-AXIS-00228)

P-AXIS-00228	**Numerator weighting factor for feedforward control**	
Description	This parameter describes the weighting factor for velocity and acceleration feedforward control. $Weighting_{feedforward control} = \frac{\text{P-AXIS-00228}}{\text{P-AXIS-00229}}$	
Parameter	vorsteuer.vs_v_faktor	
Data type	SGN32	
Data range	0 ≤ vs_v_faktor ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	We know from experience that the weighting factor should be in the range of 0.7 - 1. At values >1 the axis leads and impairs contour accuracy.	

8.2.4 Denominator weighting factor for feedforward control (P-AXIS-00229)

P-AXIS-00229	**Denominator weighting factor for feedforward control**	
Description	This parameter describes the weighting factor for velocity and acceleration feedforward control. $$Weighting_{feedforward\,control} = \frac{P-AXIS-00228}{P-AXIS-00229}$$	
Parameter	vorsteuer.vs_v_nenner	
Data type	SGN32	
Data range	0 ≤ vs_v_nenner ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	We know from experience that the weighting factor should be in the range of 0.7 - 1. At values >1 the axis leads and impairs contour accuracy.	

8.2.5 Permanent activation of feedforward control (P-AXIS-00255)

P-AXIS-00255	**Permanent activation of feedforward control**	
Description	This parameter activates feedforward control permanently for one axis. Feedforward control is active all the time, even if G137 is active in the channel (or NC program).	
Parameter	vorsteuer.default_active	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	This function is available for all types of axes and types of drives.	

8.2.6 Permanent deactivation of feedforward control (P-AXIS-00256)

P-AXIS-00256	**Permanent deactivation of feedforward control**	
Description	This parameter deactivates feedforward control permanently for one axis. Feedforward control is not active all the time, even if G135 is active in the channel (or NC program).	
Parameter	vorsteuer.global_disable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	This function is available for all types of axes and types of drives.	

8.2.7 Numerator of scaling factor for jerk feedforward (P-AXIS-00337)

P-AXIS-00337	**Numerator of scaling factor for jerk feedforward**	
Description	This parameter specifies the numerator of the scaling factor for jerk feedforward control. The scaling factor for jerk feedforward control is defined as: jerk_fact = P-AXIS-00337/P-AXIS-00338 [344] The output of the jerk feedforward control command value to the drive must be activated by setting bit 0x04 in axis parameter P-AXIS-00223 [336] .	
Parameter	vorsteuer.jerk_fact_num	
Data type	UNS32	
Data range	0 ≤ jerk_fact_num ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	Jerk feedforward control is only possible if a jerk-limited acceleration profile is used. For non jerk-limited acceleration profiles a jerk command value of 0 is output. For details on defining the acceleration profile, see P-CHAN-00071 and [PROG//Command #SLOPE [TYPE…]].	

8.2.8 Denominator of scaling factor for jerk feedforward (P-AXIS-00338)

P-AXIS-00338	**Denominator of scaling factor for jerk feedforward**	
Description	This parameter specifies the denominator of the scaling factor for jerk feedforward control. The scaling factor for jerk feedforward control is defined as: jerk_fact = P-AXIS-00337 [343]/ P-AXIS-00338 The output of the jerk feedforward control command value to the drive must be activated by setting bit 0x04 in axis parameter P-AXIS-00223 [336] .	
Parameter	vorsteuer.jerk_fact_denom	
Data type	UNS32	
Data range	0 < jerk_fact_denom ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	100	
Drive types	----	
Remarks	Jerk feedforward control is only possible if a jerk-limited acceleration profile is used. For non jerk limited acceleration profiles a jerk command value of 0 is output. For details on defining the acceleration profile, see P-CHAN-00071 and [PROG//Command #SLOPE [TYPE…]]. A value of 0 is inadmissible for this parameter. If this value is specified nevertheless, an error message with error code 110473 is output and the value is corrected to the default (100).	

8.2.9 Delay time for jerk feedforward (P-AXIS-00547)

P-AXIS-00547	**Delay time for jerk feedforward**	
Description	If jerk feedforward control activates an additive torque command value, this parameter can delay output of the feedforward control value with respect to the command position. The delay time unit is in µs. Maximum delay is six interpolator cycles.	
Parameter	vorsteuer.jerk_delay_time	
Data type	UNS16	
Data range	0 <= jerk_delay_time < 6*interpolator cycle time	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	If the permissible value for P-AXIS-00547 is exceeded, the error message P-ERR-70348 is generated and P-AXIS-00547 is set to 0.	

8.2.10 Delay time for velocity feedforward (P-AXIS-00389)

P-AXIS-00389	**Delay time for velocity feedforward**	
Description	If velocity feedforward control via an additive velocity command value is activated, this parameter can delay the output of the velocity feedforward control value with respect to the command position. The delay time unit is in µs. Maximum delay is six interpolator cycles.	
Parameter	vorsteuer.velocity_delay_time	
Data type	UNS16	
Data range	0 ≤ velocity_delay_time < 6*interpolator cycle time	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	If the permitted value of P-AXIS-00389 is exceeded, the error message P-ERR-70349 is output and P-AXIS-00389 is corrected to 0.	

8.2.11 Delay time for acceleration feedforward (P-AXIS-00390)

P-AXIS-00390	**Delay time for acceleration feedforward**	
Description	If acceleration feedforward control via an additive torque command value is activated, this parameter delays the output of the acceleration feedforward control value with respect to the command position. The delay time unit is in µs. Maximum delay is six interpolator cycles.	
Parameter	vorsteuer.acceleration_delay_time	
Data type	UNS16	
Data range	0 < acceleration_delay_time < 6*Interpolator cycle time	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS, Lightbus, Profidrive, CANopen	
Remarks	If the permitted value of P-AXIS-00390 is exceeded, the error message P-ERR-70348 is output and P-AXIS-00390 is corrected to 0.	

8.2.12 Numerator weighting factor for velocity feedforward (P-AXIS-00514)

P-AXIS-00514	**Numerator weighting factor for velocity feedforward**	
Description	The weighting factor for feedforward control defined by the parameters P-AXIS-00228 [▸ 341] and P-AXIS-00229 [▸ 342] is effective on the velocity and acceleration feedforward control values. The parameters P-AXIS-00514 and P-AXIS-00515 [▸ 346] define a weighting factor that only acts on velocity feedforward control.	
Parameter	vorsteuer.feedforward_v_add_num	
Data type	UNS32	
Data range	1 … MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	The value 0 for P-AXIS-00514 and P-AXIS-00515 [▸ 346] Is not admissible. If this value is configured, the error message P-ERR-110122 or P-ERR-110123 is output and the two parameters are set to the value 1 (default value).	

8.2.13 Denominator weighting factor for velocity feedforward (P-AXIS-00515)

P-AXIS-00515	**Denominator weighting factor for velocity feedforward**	
Description	The weighting factor for feedforward control defined by the parameters P-AXIS-00228 [▸ 341] and P-AXIS-00229 [▸ 342] is effective on the velocity and acceleration feedforward control values. The parameters P-AXIS-00514 [▸ 346] and P-AXIS-00515 define a weighting factor that only acts on velocity feedforward control.	
Parameter	vorsteuer.feedforward_v_add_denom	
Data type	UNS32	
Data range	1 … MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	The value 0 for P-AXIS-00514 [▸ 346] And P-AXIS-00515 is not admissible. If this value is configured, the error message P-ERR-110122 or P-ERR-110123 is output and the two parameters are set to the value 1 (default value).	

8.2.14 Parameters for PROFIDRIVE

8.2.14.1 Time offset of feed forward control setpoints (P-AXIS-00165)

P-AXIS-00165	**Time offset of feed forward control setpoints**	
Description	This parameter defines a time offset in NC cycles between the output of the setpoints and the output of the calculated feedforward control values. With a value > 0, the feedforward control values are output before the associated setpoint. This parameter optimises the behaviour of the feedforward control axis.	
Parameter	vorsteuer.shift_time	
Data type	UNS16	
Data range	0 ≤ shift_time ≤ 4	
Axis types	T, R, S	
Dimension	T: Number of interpolation cycles	R,S: Number of interpolation cycles
Default value	3	
Drive types	Profidrive	
Remarks		

8.2.14.2 Position controller increments per revolution (P-AXIS-00092)

P-AXIS-00092	**Position controller increments per revolution**	
Description	This parameter contains the number of position controller increments per revolution of the motor axis. The internal value used in the CNC kernel (value after assessing the value transmitted in the bus telegram) is output with the parameters P-AXIS-00405 [▸ 364] (SERCOS and CANopen drives), or P-AXIS-00065 [▸ 406] (PROFIDRIVE drives). When this parameter is used, the parameters P-AXIS-00362 [▸ 361]/P-AXIS-00363 [▸ 362] and P-AXIS-00511 [▸ 243]/P-AXIS-00512 [▸ 244]) must be used.	
Parameter	getriebe[i].incr_per_rev	
Data type	UNS32	
Data range	0 ≤ incr_per_rev ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: Increments/ rev.	R,S: Increments/ rev.
Default value	1024	
Drive types	----	
Remarks	For possible applications, see. Settings of position scaling [▸ 538]	

8.2.14.3 Time constant of command position filter for feedforward balancing (P-AXIS-00361)

P-AXIS-00361	Time constant of command position filter for feedforward balancing	
Description	This parameter sets the time constant of a command position filter for feedforward balancing. Setting this parameter to 0 switches off feedforward balancing.	
Parameter	vorsteuer.timeconst_sym_filter	
Data type	UNS32	
Data range	0 ≤ timeconst_sym_filter ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	Profidrive	
Remarks	Feedforward balancing is only available for Profidrive drives with absolute encoder.	

8.2.14.4 Time constant low-pass filter position lag (P-AXIS-00190)

P-AXIS-00190	Time constant low-pass filter position lag	
Description	This parameter activates a low-pass filter for the calculated position lag. At the moment, this filter is only effective for Profidrive drives in DSC mode. For these drives the position lag calculated is filtered with a first-order low-pass filter of the given time constant before it is transmitted to the drive.	
Parameter	vorsteuer.timeconst_cmd_filter	
Data type	UNS32	
Data range	0 … MAX_UNS32	
Axis types	T, R	
Dimension	T: µs	R: µs
Default value	4000	
Drive types	Profidrive	
Remarks	Only effective for PROFIDRIVE drives in DSC mode.	

8.2.15 Output of velocity feedforward control value (P-AXIS-00566)

P-AXIS-00566	**Output of velocity feedforward control value without IPO-LR delay**	
Description	When feedforward control is used, a delay of 5 interpolator cycles occurs between the path interpolator and the position controller. If this delay is not required and only velocity feedforward control is to be used, this parameter can force the immediate output of the position command value and the velocity feedforward control value to the position controller.	
Parameter	vorsteuer.feedforward_without_delay	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	If this parameter is set and a different feedforward control type is activated (acceleration or jerk feedforward control) in the parameter P-AXIS-00223 [▸ 336] , the error message P-ERR-110624 is output and P-AXIS-00223 [▸ 336] is corrected.	

9 Parameters for drives (antr.*)

This structure contains the possibility of defining union structures for the various drives.

Notice

The data described in the following are independent of the axis type 'kenngr.achs_typ'. They must be allocated for all axis types.

9.1 General drive parameters

9.1.1 Handling of drive command position (P-AXIS-00123)

P-AXIS-00123	**Handling of drive command position**	
Description	Both the command position and the actual position of a drive can be handled by the CNC as a drive with linear or modulo coordinate system. By default, processing can be executed depending on the axis type [69] or a specific presetting can be selected. The following settings are available for this. Default processing of values depending on the selected axis type [69] TRANSLATOR -> linear processing of command/actual values, ROTATOR -> modulo processing of command/actual values. When P-AXIS-00123 (mode_cmd_pos) is used with modulo, the permissible encoder range must be parameterised in P-AXIS-00528 [369].	
Parameter	antr.mode_cmd_pos	
Data type	UNS16	
Data range	0: depending on axis type 1: linear 2: modulo	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks		

9.1.2 Handling of drive actual position (P-AXIS-00122)

P-AXIS-00122	**Handling of drive actual position**	
Description	Both command position and actual position of drive can be handled by CNC as drive with linear or modulo coordinate system. By default processing can be executed depending on the axis type [▸ 69] or a specific presetting can be selected. For this purpose also settings which leads to mixed processing of command/actual position are possible: Default processing of value depending on the selected axis type [▸ 69] (TRANSLATOR -> linear processing of command/actual values, ROTATOR -> modulo processing of command/actual values).	
Parameter	antr.mode_act_pos	
Data type	UNS16	
Data range	0: depending on axis type 1: linear 2: modulo	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks		

9.1.3 Time base for normalisation of velocity (P-AXIS-00207)

P-AXIS-00207	**Time base for normalisation of velocity**	
Description	The time base for adapting the velocity interface to the unit used in the drive can be specified as value per minute, second or sampling interval. If normalisation per sampling interval is selected, the output value changes proportionally depending on the CNC cycle time at constant velocity. This may be essential depending on the drive.	
Parameter	antr.v_time_base	
Data type	UNS16	
Data range	0: per minute 1: per second 2: per sampling interval	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks		

9.1.4 Normalisation of the velocity

9.1.4.1 Normalisation of the velocity numerator (P-AXIS-00206)

P-AXIS-00206	**Normalisation of command velocity (numerator)**	
Description	The conversion factor of the command velocity to drive format is defined by specifying the value output to the drive and the related distance covered in the time specified in P-AXIS-00207 [▸ 351] . This parameter specifies the conversion factor numerator. (P-AXIS-00205 [▸ 352] is the denominator) The factor indicates the number of velocity increments output.	
Parameter	antr.v_reso_num	
Data type	UNS32	
Data range	0 ≤ v_reso_num ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: increments	R,S: increments
Default value	1	
Drive types	All drive types	
Remarks		

9.1.4.2 Normalisation of the velocity denominator (P-AXIS-00205)

P-AXIS-00205	**Normalisation of the velocity (denominator)**	
Description	The conversion factor of the set velocity to drive format is obtained by specifying the value output to the drive and the related path distance covered in the time specified in P-AXIS-00207 [▸ 351]. This parameter specifies the conversion factor numerator. (P-AXIS-00206 [▸ 352] is the numerator) This parameter indicates the path covered in the time specified in P-AXIS-00207 [▸ 351], provided the value in P-AXIS-00206 [▸ 352] is output to the drive. The path is specified in 1 µm or 0.001°.	
Parameter	antr.v_reso_denom	
Data type	UNS32	
Data range	1 ≤ v_reso_denom ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 1µm	R,S: 0,001°
Default value	36	
Drive types	All drive types	
Remarks		

9.1.4.3 Normalisation of the velocity

Example 1:

The drive expects 10E-4 revolutions/minute at the velocity interface (SERCOS preferred scaling).

P-AXIS-00207 [351]	0	(v_time_base [minutes]
P-AXIS-00206 [352]	10000	(v_reso_num [increments]
P-AXIS-00205 [352]	360000	([0.001 °]

Example 2:

The drive expects mm/minute at the velocity interface.

P-AXIS-00207 [351]	0	(v_time_base [minutes]
P-AXIS-00206 [352]	1	(v_reso_num [increments]
P-AXIS-00205 [352]	1000	([1 µm]

Example 3:

The settings of SECOS parameters S-0-0044, S-0-0045 and S-0-0046 and an existing gear must be considered to determine the velocity scaling of a SERCOS spindle. As an example, the drive is to use the following scaling and the gear ratio is to be 1:1:

```
Velocity data scaling S-0-0044 = 00000000 00001010
Velocity data scaling factor S-0-0045 = 55880
Velocity data scaling exponent S-0-0046 = -9
```

The velocity scaling S-0-0044 is therefore rotational referred to revolutions/minute. With a 1 increment in the velocity interface S-0-0040, the drive therefore rotates at a velocity of

```
v = S-0-0045 * 10^(S-0-0046) rpm
  = 55880*10^-9 rpm
```

when referred to 10^-3° this is

```
v = 55880 * 360000 * 10^-9 * 10^-3°/min
  = 20.1168 * 10^-3°/min
```

Possible values for the parameters P-AXIS-00205 and P-AXIS-00206 are therefore:

P-AXIS-00207 [351]	0	(v_time_base [minutes]
P-AXIS-00206 [352]	201168	(distance covered in the time unit specified in P-AXIS-00207
P-AXIS-00205 [352]	10000	(velocity increments output [1 µm]

To consider a possible gear ratio, this must be entered in the axis parameters P-AXIS-00511 [243] and P-AXIS-00512 [244].

9.1.5 Delay between command value and actual value (P-AXIS-00191)

P-AXIS-00191	**Delay between command value and actual value**	
Description	This parameter is only active for digital drives (e.g. SERCOS). It defines the number of cycles between the output of the command values and the read-in of the actual values. The parameter is only used to calculate the position lag.	
Parameter	antr.nbr_delay_cycles	
Data type	UNS16	
Data range	0 ≤ nbr_delay_cycles ≤ 10	
Axis types	T, R, S	
Dimension	T: Number of interpolation cycles	R,S: Number of interpolation cycles
Default value	4	
Drive types	SERCOS, CANopen, KUKA	
Remarks		

9.1.6 Positioning operation mode of an axis (P-AXIS-00320)

P-AXIS-00320	**Positioning operation mode of an axis**	
Description	This parameter determines the manner how an axis moves to its commanded position. The operation modes are described in greater detail in the following table.	
Parameter	antr.operation_mode	
Data type	STRING	
Data range	DRIVE_DEFAULT DRIVE_POSITION_CONTROL CNC_POSITION_CONTROL DSC_POSITION_CONTROL OPEN_POSITION_LOOP_MODE OPEN_POSITION_LOOP_POS_FEEDBACK OPEN_POSITION_LOOP_VEL_FEEDBACK OPEN_POSITION_LOOP_NO_FEEDBACK	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	DRIVE_DEFAULT	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	For the position control in the numerical control (Operation mode CNC_POSITION_CONTROL) the active operation mode in the SERCOS drive must be 'velocity control”. Furthermore command velocity and actual position must be configured and transmitted in the cyclic telegram. In the operation mode CNC_POSITON_CONTROL only a NC-controlled homing without zero pulse search can be performed for SERCOS drives. The necessary parameter settings can be taken from [FCT-M1]. In addition to setting the positioning method, the cyclic process data and the operation mode in the drive must be set accordingly.	

String	**Meaning**
DRIVE_DEFAULT	Default setting for all drive types. The operation mode used (position control in the drive, position control in the controller, velocity control, etc.) is determined automatically. It depends e.g. on the drive type P-AXIS-00020 and on the configured telegram.
DRIVE_POSITION_CONTROL	Transmission of command position to the axis controller, position control takes place in the axis controller
CNC_POSITION_CONTROL	Position control takes place in the controller. The path resolution of the measuring system P-AXIS-00234 [▸ 290]/ P-AXIS-00233 [▸ 289], the proportional factor k_v of the P position control P-AXIS-00099 [▸ 264] and the scaling factor of the manipulated variable P-AXIS-00129 [▸ 288]/ P-AXIS-00128 [▸ 287] must also be set. Transmission of a velocity command value to the axis controller, the velocity command value is calculated in CNC dependent on the position error of the axis.
DSC_POSITION_CONTROL	Drive type specific positioning method for PROFIDRIVE (DSC mode).

OPEN_POSITION_LOOP_MODE	Operation without position control (open loop mode). In this case only the programmed command velocity is transferred. This operation mode is possible only for spindles. A position or velocity eventually transferred from the drive controller is only used for the calculation of the 'revolution speed reached' signal. The actual velocity value for velocity monitoring is chosen as follows: If an actual position is configured, it is used for velocity monitoring. If no actual position but an actual revolution is configured, this is used for velocity monitoring. If neither an actual position nor an actual revolution is configured, the command velocity is used for velocity monitoring (sensorless spindle) The command velocity output to the spindle is scaled by the parameters P-AXIS-00205 [▸ 352], P-AXIS-00206 [▸ 352] and P-AXIS-00207 [▸ 351]. Use the parameter P-AXIS-00379 [▸ 412] for Profidrive drives.
OPEN_POSITION_LOOP_POS_FEEDBACK	Operation without position control (open loop mode). The command velocity calculated by the interpolator is output. This operation mode is possible only for spindles. The actual velocity is calculated from the actual position delivered from the spindle. If no actual position is configured an error message is output. The command velocity output to the spindle is scaled by the parameters P-AXIS-00205 [▸ 352], P-AXIS-00206 [▸ 352] and P-AXIS-00207 [▸ 351]. Use the parameter P-AXIS-00379 [▸ 412] for Profidrive drives.
OPEN_POSITION_LOOP_VEL_FEEDBACK	Operation without position control (open loop mode). The command velocity calculated by the interpolator is output. This operation mode is possible only for spindles. The actual velocity is calculated from the actual revolution supplied by the spindle. If no actual revolution is configured, an error message is output. The command velocity output to the spindle is scaled by the parameters P-AXIS-00205 [▸ 352], P-AXIS-00206 [▸ 352] and P-AXIS-00207 [▸ 351]. Use the parameter P-AXIS-00379 [▸ 412] for Profidrive drives.
OPEN_POSITION_LOOP_NO_FEEDBACK	Operation without position control (open loop mode). The command velocity calculated by the interpolator is output. This operation mode is possible only for spindles. The actual velocity for velocity monitoring is calculated from the internal command velocity. The command velocity output to the spindle is scaled by the parameters P-AXIS-00205 [▸ 352], P-AXIS-00206 [▸ 352] and P-AXIS-00207 [▸ 351]. Use the parameter P-AXIS-00379 [▸ 412] for Profidrive drives.

9.1.7 Number of the latch input used for edge banding (P-AXIS-00353)

<table>
<tr><th>P-AXIS-00353</th><th colspan="3">Number of the latch input used for edge banding</th></tr>
<tr><td>Description</td><td colspan="3">This parameter defines the number of the drive latch input used for edge banding.</td></tr>
<tr><td>Parameter</td><td colspan="3">antr.edge_bending_input_nbr</td></tr>
<tr><td>Data type</td><td colspan="3">UNS08</td></tr>
<tr><td>Data range</td><td colspan="3">Depending on drive type</td></tr>
<tr><td>Axis types</td><td colspan="3">T, R</td></tr>
<tr><td>Dimension</td><td colspan="2">T: ----</td><td>R: ----</td></tr>
<tr><td>Default value</td><td colspan="3">1</td></tr>
<tr><td>Drive types</td><td colspan="3">Profidrive</td></tr>
<tr><td rowspan="12">Remarks</td><td colspan="3">This parameter is not supported for all drive types. If a latch input number which is not suitable for the drive type (P-AXIS-00020) [▸ 68] used is defined, an error message P-ERR-110489 is output and the parameter is automatically corrected.
Valid values for the different drive types are shown in the following table.</td></tr>
<tr><td>Drive type</td><td>P-AXIS-00020</td><td>Valid values for P-AXIS-00353</td></tr>
<tr><td>Conventional (+/-10 V)</td><td>1</td><td>1</td></tr>
<tr><td>SERCOS</td><td>2</td><td>1</td></tr>
<tr><td>PROFIDRIVE</td><td>3</td><td>1, 2</td></tr>
<tr><td>Simulation</td><td>4</td><td>1</td></tr>
<tr><td>Lightbus</td><td>5</td><td>1</td></tr>
<tr><td>Terminal (+-10V via bus)</td><td>6</td><td>1</td></tr>
<tr><td>Real-time Ethernet</td><td>7</td><td>1</td></tr>
<tr><td>CANopen</td><td>8</td><td>1</td></tr>
<tr><td>Virtual</td><td>16</td><td>1</td></tr>
<tr><td>CAN</td><td>32</td><td>1</td></tr>
</table>

9.1.8 Ignore unknown entries in drive telegram (P-AXIS-00358)

P-AXIS-00358	**Ignore unknown entries in drive telegram**	
Description	By default unknown entries in the configuration of the cyclic drive telegram lead to an error message. This parameter suppresses the error message.	
Parameter	antr.ignore_unknown_telegram_elements	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

9.1.9 Maximum time delay for disabling drive after a PLC watchdog error (P-AXIS-00367)

P-AXIS-00367	**Maximum time delay for disabling drive after a PLC watchdog error**	
Description	After a PLC watchdog error, the CNC stops the axes. If a time period greater than zero is specified in this parameter, the drive releases of the axis are also removed after a PLC watchdog error as soon as the axis has stopped or at the latest after the specified time period expires.	
Parameter	antr.plc_watchdog_disable_drive_delay_time	
Data type	UNS32	
Data range	0 … MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks	If P-AXIS-00367 = 0, the CNC does not automatically remove the drive releases after a PLC watchdog error. For a suspended axis it must be ensured that their brakes are securely locked after removal of drive releases.	

9.1.10 Name of the EtherCAT master process (P-AXIS-00372)

P-AXIS-00372	**Name of the EtherCAT master process**	
Description	The name of the EtherCAT-Master process in the real-time operation system is dependent on the network interface used. The control needs the name in order to get access to the drive interface.	
Parameter	antr.ethercat_master_name	
Data type	STRING	
Data range	ECMeth0: EtherCAT Master uses network device 'eth0' ECMeth1: EtherCAT Master uses network device 'eth1'	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	CANopen	
Remarks	This parameter is only used for the real-time operation system Intime. * Note: The default value of variables is a blank string.	

9.1.11 Encoder, used for CNC controlled homing (P-AXIS-00388)

P-AXIS-00388	**Encoder, used for CNC controlled homing (SERCOS)**	
Description	Some drive types support the use of multiple encoders (motor encoder and external encoder). This parameter defines which encoder is used for homing.	
Parameter	antr.cnc_homing_encoder	
Data type	SGN16	
Data range	0: Value is not configured. If P-AXIS-00386 [383] is set to 1, set this parameter to a valid value (0, 1, 2). 1: The encoder used for homing is determined automatically, e.g. for SERCOS drives, by reading drive parameter S-0-147. 2: Motor encoder 3: External encoder	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	SERCOS	
Remarks	At the moment this parameter is supported only for SERCOS. With SERCOS drives, if the encoder set in S-0-147 does not fit to the value set in P-AXIS-00388, the error message error message P-ERR-70453 is output. This value is only effective when P-AXIS-00386 [383] has the value 1.	

9.1.12 Base value for scaling of acceleration feedforward (P-AXIS-00392)

P-AXIS-00392	**Reference value for converting torque values to the motor format.**	
Description	This parameter is used for the scaling of the additive torque command if acceleration feed-forward control is used with additive command values. The motor stall torque must be en-etered.	
Parameter	antr.acc_reference_value	
Data type	REAL64	
Data range	0 ≤ acc_reference_value ≤ MAX(REAL64)	
Axis types	T, R, S	
Dimension	T: N	R,S: Nm
Default value	1	
Drive types	SERCOS, CANopen	
Remarks		

9.1.13 Encoder resolution via feed constant numerator (P-AXIS-00362)

P-AXIS-00362	Encoder resolution via feed constant (numerator)	
Description	Parameter P-AXIS-00362 and parameter P-AXIS-00363 [362] enable anm alternative method to parameterise encoder resolution. If either parameter P-AXIS-00362 or P-AXIS-00363 [362] are assigned values unequal to 1 (default initialisation), encoder resolution is calculated based on the equation below: $R = r_{Motor} * \frac{i_{Getriebe}}{f}$ where: R: Resulting resolution (Increments / 0.1µm) r_{Motor}: Encoder increments per motor revolution (P-AXIS-00092 [347]) $i_{Getriebe}$; Gear transmission ratio (Revolutions gear input / Revolutions gear output (P-AXIS-00511 [243]/P-AXIS-00512 [244])). f: Feed constant (0.1µm / Revolution) (P-AXIS-00362/P-AXIS-00363 [362]). $R = P\text{-}AXIS\text{-}00092 * \frac{P\text{-}AXIS\text{-}00511}{P\text{-}AXIS\text{-}00512} * \frac{P\text{-}AXIS\text{-}00363}{P\text{-}AXIS\text{-}00362}$	
Parameter	antr.feed_const_num	
Data type	UNS32	
Data range	1 ≤ feed_const_num ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: 0.1 µm	R,S: 0.1 µm
Default value	1	
Drive types	---	
Remarks	If P-AXIS-00362/ P-AXIS-000363 [362] are used, the parameters P-AXIS-00233 [289] and P-AXIS-00234 [290] must be set to 1. For possible applications, see Settings of position scaling [538]	

9.1.14 Encoder resolution via feed constant denominator (P-AXIS-00363)

P-AXIS-00363	Encoder resolution via feed constant (denominator)	
Description	Parameter P-AXIS-00362 [▸ 361] and parameter P-AXIS-00363 enable an alternative method to parametrise encoder resolution. If either parameter P-AXIS-00362 [▸ 361] or P-AXIS-00363 are assigned values unequal to 1 (default initialisation), encoder resolution is calculated based on the equation below: $R = r_{Motor} * \frac{i_{Getriebe}}{f}$ where: R: Resulting resolution (Increments / 0.1µm) r_{Motor}: Encoder increments per motor revolution (P-AXIS-00092 [▸ 347]) $i_{Getriebe}$: Gear transmission ratio (Revolutions gear input / Revolutions gear output (P-AXIS-00511 [▸ 243]/P-AXIS-00512 [▸ 244])). f: Feed constant (0.1µm / Revolution) (P-AXIS-00362 [▸ 361]/ P-AXIS-00363). $R = P\text{-}AXIS\text{-}00092 * \frac{P\text{-}AXIS\text{-}00511}{P\text{-}AXIS\text{-}00512} * \frac{P\text{-}AXIS\text{-}00363}{P\text{-}AXIS\text{-}00362}$	
Parameter	antr.feed_const_denom	
Data type	UNS32	
Data range	1 ≤ feed_const_denom ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: U	R,S: U
Default value	1	
Drive types	---	
Remarks	If P-AXIS-00362 [▸ 361] / P-AXIS-000363 are used, the parameters P-AXIS-00233 [▸ 289] and P-AXIS-00234 [▸ 290] must be set to 1. For possible applications, see Settings of position scaling [▸ 538]	

9.1.15 Offset between drive position and CNC position for absolute encoders (P-AXIS-00403)

P-AXIS-00403	**Offset between drive position and CNC position for absolute encoders**	
Description	For drives with absolute encoder, this parameter can introduce an offset between the position supplied by the drive and the internal CNC position. The position of the CNC then results from: $P_{CNC} = P_{Drive} + P - AXIS - 00403$ As soon as the drive delivers valid positions, the CNC position is set according to the equation above and the axis is marked as referenced. When occasionally, due to external influences such as phase switching by the operator, the field bus or drive does not deliver valid actual positions, the CNC position is reinitialised as soon as the drive delivers valid positions.	
Parameter	antr.abs_pos_offset	
Data type	SGN64	
Data range	MIN_SGN32 ≤ abs_pos_offset ≤ MAX_SGN32	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.0001 °
Default value	0	
Drive types	Simulation, SERCOS, Lightbus, Profidrive, CANopen, Terminal *	
Remarks	Using this parameter is only reasonable if the drive has an absolute encoder. This parameter is only effective when P-AXIS-00014 [▸ 290] is assigned the value 1. When the used drive type does not support this parameter, a warning with number 110532 is output and P-AXIS-00403 is corrected to 0. If an offset is changed by updating a parameter list or by the #MACHINE DATA command, the changed offset only becomes effective at the next reinitialisation of the CNC position. *The parameter can only be used with terminal drives if the signal WC_STATE is configured in the cyclic process data. If this is not the case, warning ERR 110690 is output and P-AXIS-00403 is set to 0.	

9.1.16 Factor to coarse encoder resolution (P-AXIS-00405)

P-AXIS-00405	**Factor to coarse encoder resolution**	
Description	The parameter can be used to coarse the encoder resolution of the drive. This may be necessary, for example, if the resolution of the measurement system (seeP-AXIS-00234 [▸ 290]/ P-AXIS-00235 [▸ 398]) is greater than one since these resolutions reduce the possible movement range in the CNC. The value of the parameter specifies the number of the lowest significant encoder bits which are to be rejected. An encoder with 2^20 increments and a parameter value of 4 leads to an effective encoder resolution of 2^16 increments, meaning the path resolution is reduced by a factor of 16. The reduced encoder resolution (not the native encoder resolution!) must be used afterwards to set the path resolution (P-AXIS-00234 [▸ 290]/P-AXIS-00233 [▸ 289]) or to home with encoder overflow evaluation (P-AXIS-00355 [▸ 96]).	
Parameter	antr.encoder_coarsening_factor	
Data type	UNS16	
Data range	0 ≤ encoder_coarsening_factor ≤ 20	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	Actually, coarsening of encoder resolution is only possible for SERCOS and CANopen drives.	

9.1.17 EtherCAT-Fieldbus: Number of permissible telegram failures (P-AXIS-00406)

P-AXIS-00406	**EtherCAT-Fieldbus: Number of permissible telegram failures**	
Description	The parameter specifies how many drive telegrams can fail in sequence before the CNC considers an error in the drive bus. If a bus fails, the axes are marked without absolute encoder (see P-AXIS-00014 [▸ 290]). In addition an error message is generated for interpolated axes. The default setting of the parameter is 0, i.e. each lost telegram represents an error case.	
Parameter	antr.permissible_telegram_failures	
Data type	SGN08	
Data range	0 ≤ permissible_telegram_failures ≤ 10	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	This parameter is only used for drives with EtherCAT field bus (CANopen/SERCOS over EtherCAT).	

9.1.18 Bit number for control of a DC brake (P-AXIS-00410)

P-AXIS-00410	**Bit number for control of a DC brake**	
Description	This parameter assists the control of a DC brake for spindles. A control bit that enables DC braking is transferred to the motor controller. The value of the parameter describes the **bit number** of the drive control word that is used for transmission. A value of 0 for P-AXIS-00410 means for example that bit zero (bit mask 0x0001) of the drive control word is used for transmission. A value of -1 for this parameter disables this function, i.e. no control bit for DC braking is transferred to the drive controller. The control bit is 0 when: • The axis accelerates to its target velocity (in either positive or negative direction). • The axis reverses its movement direction (M3 -> M4, or M4 -> M3). In all other cases the control bit is set. The real control of the DC brake (e.g. monitoring of minimum velocities and magnetisation times) has to be implemented in the drive controller.	
Parameter	antr.dc_brake_control_bit	
Data type	SGN16	
Data range	-1 ≤ dc_brake_control_bit ≤ 15	
Axis types	S	
Dimension		S: ----
Default value	-1	
Drive types	Simulation, Profidrive	
Remarks	DC brake control is only implemented for drive types Simulation and PROFIDRIVE.	
	Drive type P-AXIS-00020 [68]	Valid values for P-AXIS-00410 (bit number)
	4 (Simulation)	-1 , 0 .. 15
	3 (Profidrive)	-1, 8, 9, 13, 15

9.1.19 Number of probing input in drive (P-AXIS-00430)

P-AXIS-00430	**Number of probing input in drive**	
Description	Number of the drive digital input which is used as probing input. The digital input used must also be parameterised as a probing input in the drive. See also [FCT-C4]. As of CNC Build V2.10.1505.26, this parameter is used for Profidrive, CANopen and SERCOS drives. If the parameter is specified as 0, the following default settings are valid apply due to downward compatibility: CANopen/Profidrive: Probing input 1 SERCOS: Last configured probing value in the cyclic telegram	
Parameter	antr.probing_input_nbr	
Data type	UNS08	
Data range	0, 1, 2	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.1.20 Use of position lag calculated in drive (P-AXIS-00466)

P-AXIS-00466	**Use of position lag calculated in drive**	
Description	If the position control loop is closed in the drive (seeP-AXIS-00320 [▸ 355]), the parameter can be used to specify that the CNC uses the position lag calculated in the drive (e.g. for display data or position lag monitoring). This presupposes that the actual position lag is configured in the cyclic process data and that the value is transmitted from the drive: - SERCOS-Ident S-0-0189 - CANopen Objekt 0x60F4	
Parameter	antr.use_drive_following_error	
Data type	BOOLEAN	
Data range	0: The calculation of the position lag error takes place in the CNC (default). 1: The CNC does not calculate the position lag error and uses the position lag transmitted from the drive instead.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	The CNC can use the drive position lag from SERCOS and CANopen drives only. The position control loop must be closed in the drive.	

9.1.21 Maximum time for drive reset (P-AXIS-00484)

P-AXIS-00484	**Maximum time for drive reset**	
Description	By default an error message is output when the reset of a drive amplifier takes longer than 20 seconds. During this time the CNC axis can not be used. This parameter defines the time until output of the error message. Here a minimum value of 100000 µs is allowed. If P-AXIS-00484 is less than this minimum value warning, P-ERR-110562 is output and the parameter is set to the minimum value.	
Parameter	antr.reset_timeout	
Data type	UNS32	
Data range	100000 ≤ reset_timeout ≤ MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks		

9.1.22 Drive without support for probing state (P-AXIS-00524)

P-AXIS-00524	**Drive without support for probing state**	
Description	Before starting a measurement travel (G100) or edge banding (G108), the CNC checks whether the probe is already actuated. If this is true, the CNC generates an error message. For SERCOS drives this check requires that the object S-0-0401 or S-0-0402 (probe state) is assigned to a real-time status bit. The parameter can be set to 1 if the drive cannot provide the probe state information in order to suppress this check.	
Parameter	antr.no_probe_state_support	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, Profidrive	
Remarks	This parameter is used only for SERCOS and Profibus drives.	

9.1.23 Activate evaluation of encoder position with additional mask (P-AXIS-00527)

P-AXIS-00527	**Activate evaluation of encoder position with additional mask.**	
Description	This parameter activates a bitwise AND operation between the position delivered by the drive and the bit mask defined by P-AXIS-00355 [▸ 96] . This achieves that only the bits specified in P-AXIS-00355 [▸ 96] are taken into account for position evaluation.	
Parameter	antr.use_encoder_submask	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	This parameter is used to handle peculiarities of certain drives and should only be used in exceptional cases.	

9.1.24 Drive encoder modulo range (P-AXIS-00528)

P-AXIS-00528	**Drive encoder modulo range**	
Description	If an encoder is connected to the drive which delivers a modulo position, the NC has to handle the encoder overflow. To do this the encoder range (number of different positions delivered by the encoder) of the encoder has to be set up in this parameter. Example of encoder with 16-bit resolution: The encoder delivers a total of 2^{16} = 65536 different positions (0… 65535), so the parameter antr.drive_encoder_modulo_range must be set to 65536. This parameter is inactive if set to 0. In this case the default setting is used for the specific drive type.	
Parameter	antr.drive_encoder_modulo_range	
Data type	UNS32	
Data range	0, 512 … MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: increments	R,S: increments
Default value	0	
Drive types	SERCOS, Lightbus,CANopen, RT-Ethernet, Terminal, Profidrive	
Remarks	This parameter is available as of Build V3.1.3039.02. As of CNC Build V3.1.3080.14, this parameter can be updated by a list update on condition that • the drive release is not set. • In P-AXIS-00015 [71] the value 0x00400000 must be set (ALLOW_RESOLUTION_CHANGE). The parameter is only effective with rotary axes P-AXIS-00018 [70] (achs_typ = 2). If, in addition to switching the modulo range of the drive encoder, the drive interface is to be switched from linear to modulo position or vice versa, the parameters P-AXIS-00122 [351] and P-AXIS-00123 [350] must also be set accordingly. For the modulo range of the metric representation of the CNC axis, the parameters P-AXIS-00126 [74] and P-AXIS-00127 [75] must be set. If position handling for an axis is to be switched from linear to modulo or vice versa, the corresponding bits (0x01(LINEAR) or 0x04(MODULO)) must be set in P-AXIS-00015 [71] (kenngr.achs_mode).	

9.1.25 Mechanical movement distance outside the software limit switches (P-AXIS-00459)

P-AXIS-00459	Mechanical movement distance outside the software limit switches	
Description	This parameter specifies the mechanical axis motion path beyond the software limit switches. It defines the mechanical axis motion path together with the position of the limit switches. This value is used to process an absolute encoder overflow automatically: If the position calculated from the absolute position of the drive and the set position offset lies outside of the mechanical motion range of the axis, it is assumed that an overflow of the absolute encoder occurred. To compensate for this overflow, the calculated position is corrected by the value range of the absolute encoder. The position offset is set by P-AXIS-00403 [▸ 363] (abs_pos_offset); for PROFIDRIVE drives, it is set by P-AXIS-00341 [▸ 410] (read_abs_pos_offset).	
Parameter	antr.add_movement_range	
Data type	UNS32	
Data range	0 … MAX(UNS32)	
Axis types	T	
Dimension	T: 0.1µm	R: ----
Default value	0	
Drive types	----	
Remarks	Automatic handling of the encoder overflow is only possible for linear axes.	

9.1.26 Additional datum to calculate power_state_r

In addition to the field bus and drive state words used for the calculation of the HLI signal power_state_r (see [HLI]), a freely configurable information from the process data can be taken into account in order to handle drive and manufacturer-specific features (additional 'Ready for Power' check).

This additional information is configured with the following three axis parameters.

9.1.26.1 Bit number of additional information for calculation of HLI signal 'power_state_e' (P-AXIS-00709)

P-AXIS-00709	**Bit number of additional information for calculation of HLI signal 'power_state_r'**	
Description	This parameter is set to the bit number that is used to transfer the additional information for the calculation of the drive state. The least significant bit has bit number 0. The additional 'Ready for Power' test is disabled with a value of -1. The maximum value depends on the length of the configured telegram element which is used for transmission. Length of the telegram element in bytes: Max. bit number: 2 15 4 31 When the parameter is set to a value other than -1 although the drive type used does not support the calculation of the power_state_r-signals (see [HLI]), error message P-ERR-110593 is output and the value is corrected to -1. If the parameter is set to an invalid bit number, the error message P-ERR-110594 is output.	
Parameter	antr.add_ready_for_operation.bit_nr	
Data type	SGN16	
Data range	-1 ≤ bit_nr ≤ Max. bit number	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	Simulation, SERCOS, Profidrive, CANopen. Terminal	
Remarks		

9.1.26.2 Inverting 'Ready for Power' signal (P-AXIS-00710)

P-AXIS-00710	**Inverting 'Ready for Power' signal**	
Description	This parameter inverts the result of the calculation of the 'Ready for Power' signal.	
Parameter	antr.add_ready_for_operation.inverted	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Simulation, SERCOS, Profidrive, CANopen, Terminal	
Remarks		

9.1.26.3 Element name of additional information for calculation of HLI signal 'power_state_e' (P-AXIS-00711)

P-AXIS-00711	**Element name of additional information for calculation of HLI signal 'power_state_r'**	
Description	This parameter is set up with the name of the element of the cyclic process data which is used to transfer the 'Ready for Power' signal from the drive. If the parameter entered in P-AXIS-00711 is not found within the cyclic process data of the drive, an error message P-ERR-70499is output.	
Parameter	antr.add_ready_for_operation.element_name	
Data type	STRING	
Data range	When no value is configured, the additional 'Ready for Power' signal is not calculated and is not taken into account in the calculation of the 'power_state_r' on the HLI. S-0-0135: When the SERCOS state word is used for transmission of the reference signal, the parameter has to be assigned the value 'S-0-0135' or ... <*Telegram_element_Name*>: ...otherwise the name of a telegram element configured in the cyclic process data.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	Simulation, SERCOS, Profidrive, CANopen, Terminal	
Remarks	The additional 'Ready for Power' test is activated when a value is assigned to this parameter. When reference monitoring is activated, also assign a valid value to the parameter P-AXIS-00709 [▸ 371] . * Note: The default value of variables is a blank string.	

9.1.27 Disabling drive controller for position lag error (P-AXIS-00537)

P-AXIS-00537	**Disable drive controller on position lag error**	
Description	By default, the CNC-internal error reaction is executed when a position lag error occurs (see also P-ERR-70020 and P-ERR-70081) in order to bring the axis to a standstill. The control bits to the drive controller are not changed. By setting this parameter to the value "ON", enable bits are reset in the control word for the supported drive types for a position lag error. In this case, drive-internal functionalities are activated and this leads to the fastest possible stop of the axis with subsequent torque cut-off. For the different drive types, they are: Drive type: Modifications in control word: SERCOS Resetting bit 15 (0x8000) control word CANopen Resetting bits 0, 3 and 4 (0x0019) in control word (Drive Shutdown) Profidrive Resetting bit 2 (0x0004) in STW1 Simulation Parameter is ignored	
Parameter	antr.position_lag_drive_disable	
Data type	STRING	
Data range	DEFAULT: Activation of function depends on drive type: Drive type: Modifications in control word: SERCOS ON CANopen* OFF Profidrive** OFF Simulation OFF *The default value of OFF for CANopen drives is based on the fact, that it is possible here to switch the drive immediately torque-free by setting object 0x605B (Shutdown option code) to 0 in response to the shutdown command. Otherwise the drive would then not braked when a tracking error occurs, which is not desired. **For Profidrive drives, the control word 1 must correspond to the Profidrive profile. ON: When a position lag error occurs, the control word is changed according to the above table. OFF: If a position lag error occurs, the control word is not changed.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	DEFAULT	
Drive types	SERCOS, CANopen, Profidrive, Simulation	
Remarks	Before using this parameter, it is essential to check with the manufacturer documentation, especially for CANopen and Profidrive drives, whether the above modification of the control word leads to ramp-down of the drive and a subsequent shutdown of the torque. It makes sense for this parameter to select the same setting as for P-AXIS-00542 [▸ 374] which defines the reaction to a bus error.	

9.1.28 Disabling drive controller in case of bus error (P-AXIS-00542)

P-AXIS-00542	**Disabling drive controller in case of field bus error**	
Description	By default, the CNC-internal error reaction is executed when a bus error occurs (see also P-ERR-70021) on CANopen drives in order to bring the axis to a standstill. The control bits to the drive controller are not changed. By setting this parameter to the value "ON", enable bits are also reset in the control word for CANopen drives in case of a bus error. In this case, drive-internal functionalities are activated and this leads to the fastest possible stop of the axis with subsequent torque cut-off: Drive type: Modifications in control word: CANopen: Resetting bits 0, 3 and 4 (0x0019) in control word (Drive Shutdown)	
Parameter	antr.bus_error_drive_disable	
Data type	STRING	
Data range	DEFAULT: Activation of function depends on drive type: Drive type: Modifications in control word: CANopen* OFF *The default value of OFF for CANopen drives is based on the fact, that it is possible here to switch the drive immediately torque-free by setting object 0x605B (Shutdown option code) to 0 in response to the shutdown command. Otherwise the drive would then not braked when a bus error occurs, which is not desired. ON: When a bus error occurs, the control word is changed according to the above table. OFF: If a bus error occurs, the control word is not changed.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	DEFAULT	
Drive types	CANopen	
Remarks	Before using this parameter, it is essential to check in the manufacturer documentation, especially for CANopen drives, whether the above modification of the control word leads to ramp-down of the drive and a subsequent shutdown of the torque. It makes sense for this parameter to select the same setting as for P-AXIS-00537 [▸ 373] which defines the reaction to a position lag error.	

9.2 Drive type simulation (antr.simu.*)

With the 'Simulation' drive type (see the parameter 'kenngr.antr_typ' Drive type (P-AXIS-00020) [▷ 68]), the axis time response can be simulated by a filter whose parameters are described in the sections below.

The filter transmit function is called:

$$G(s) = \frac{\omega_0^2}{s^2 + 2D\omega_0 s + \omega_0^2}$$

Fig. 34: Simulation drive transmit function of the filter

Here, D (attenuation) and ω_0 (natural frequency) are the transmit function parameters.

The transmit response of the overall system also results from the transmit response of the closed control loop consisting of axis simulation and position controller.

Additionally the command values calculation by the position controller can be delayed by an adjustable number of interpolator cycles in order to simulate control path dead time.

9.2.1 Numerator of sampling time constant of axis simulation (P-AXIS-00239)

P-AXIS-00239	**Sampling time constant for axis simulation (numerator)**	
Description	The parameter defines the numerator of the sampling time constant used to calculate the associated time-discrete axis model from the time-continuous axis model defined by the parameters P-AXIS-00051 [▷ 376], P-AXIS-00050 [▷ 377], P-AXIS-00062 [▷ 377] and P-AXIS-00061 [▷ 378]. Sampling time constant = P-AXIS-00239/ P-AXIS-00238 [▷ 376]	
Parameter	antr.simu.zeitkonstante_z	
Data type	UNS32	
Data range	MAX(UNS32) ≥ zeitkonstante_z ≥ 1	
Axis types	T, R, S	
Dimension	T: s	R,S: s
Default value	1	
Drive types	Simulation	
Remarks	This parameter should be set to the interpolator cycle time so that the time-discrete plant model behaves the same as the continuous plant model.	

9.2.2 Denominator of sampling time constant of axis simulation (P-AXIS-00238)

P-AXIS-00238	**Sampling time constant for axis simulation (numerator)**	
Description	The parameter defines the numerator of the sampling time constant used to calculate the associated time-discrete axis model from the time-continuous axis model defined by the parameters P-AXIS-00051 [▸ 376], P-AXIS-00050 [▸ 377], P-AXIS-00062 [▸ 377] and P-AXIS-00061 [▸ 378]. The parameter defines the drive time constant (denominator). Sampling time constant = P-AXIS-00239 [▸ 375]/ P-AXIS-00238	
Parameter	antr.simu.zeitkonstante_n	
Data type	UNS32	
Data range	MAX(UNS32) ≥ zeitkonstante_n ≥ 1	
Axis types	T, R, S	
Dimension	T: -	R,S: -
Default value	100	
Drive types	Simulation	
Remarks	This parameter should be set to the interpolator cycle time so that the time-discrete plant model behaves the same as the continuous plant model.	

9.2.3 Numerator of attenuation of axis simulation (P-AXIS-00051)

P-AXIS-00051	**Axis simulation attenuation (numerator)**	
Description	The parameter defines the axis simulation attenuation (numerator). Axis attenuation = P-AXIS-00051 / P-AXIS-00050 [▸ 377]	
Parameter	antr.simu.daempfung_z	
Data type	UNS32	
Data range	MAX(UNS32) ≥ daempfung_z ≥ 1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	6	
Drive types	Simulation	
Remarks	Attenuation = P-AXIS-00051 / P-AXIS-00050 [▸ 377] must be < 1, otherwise the warning ERR-80044 is output and attenuation is limited to 0.999.	

9.2.4 Denominator of attenuation of axis simulation (P-AXIS-00050)

P-AXIS-00050	**Axis simulation attenuation (numerator)**	
Description	The parameter defines the axis simulation attenuation (numerator). Axis attenuation = P-AXIS-00051 [▸ 376] / P-AXIS-00050	
Parameter	antr.simu.daempfung_n	
Data type	UNS32	
Data range	MAX(UNS32) ≥ daempfung_n ≥	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	10	
Drive types	Simulation	
Remarks	Attenuation = P-AXIS-00051 [▸ 376] /P-AXIS-00050 must be < 1, otherwise the warning ERR-80044 is output and attenuation is limited to 0.999.	

9.2.5 Numerator of natural frequency of axis simulation (P-AXIS-00062)

P-AXIS-00062	**Axis simulation natural frequency (numerator)**	
Description	The parameter defines the axis simulation natural frequency (numerator). Natural frequency = P-AXIS-00062 / P-AXIS-00061 [▸ 378]	
Parameter	antr.simu.eigenfrequenz_z	
Data type	UNS32	
Data range	MAX(UNS32) ≥ eigenfrequenz_z ≥ 1	
Axis types	T, R, S	
Dimension	T: 1	R,S: 1
Default value	100	
Drive types	Simulation	
Remarks	The value of ω0 is specified directly.	

9.2.6 Denominator of natural frequency of axis simulation (P-AXIS-00061)

P-AXIS-00061	**Axis simulation natural frequency (numerator)**	
Description	The parameter defines the axis simulation natural frequency (numerator). Natural frequency = P-AXIS-00062 [▸ 377] / P-AXIS-00061	
Parameter	antr.simu.eigenfrequenz_n	
Data type	UNS32	
Data range	MAX(UNS32) ≥ eigenfrequenz_n ≥ 1	
Axis types	T, R, S	
Dimension	T: s	R,S: s
Default value	1	
Drive types	Simulation	
Remarks	The value of ω_0 is specified directly.	

9.2.7 Dead time (P-AXIS-00194)

P-AXIS-00194	**Dead time for drive simulation**	
Description	The parameter defines the dead time.	
Parameter	antr.simu.totzeit	
Data type	UNS32	
Data range	5 (Maximum possible dead time, application-specific) ≥ totzeit ≥ 0	
Axis types	T, R, S	
Dimension	T: Number of interpolation cycles *	R,S: Number of interpolation cycles *
Default value	0	
Drive types	Simulation	
Remarks	* The dead time is defined as a multiple of cycle time T_{Ab} of geometry data processing of the NC kernel.	

9.2.8 Tool path up to zero pulse during homing simulation (P-AXIS-00161)

P-AXIS-00161	**Tool path up to zero pulse during homing simulation**	
Description	The parameter defines the tool path up to zero pulse during homing simulation.	
Parameter	antr.simu.rpf_weg_bis_nip	
Data type	SGN32	
Data range	MIN(SGN32) ≤ rpf_weg_bis_nip ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: 0.1µm	R,S: 0.0001 °
Default value	10	
drive types.	Simulation	
Remarks		

9.2.9 Set actual position equal to command position (P-AXIS-00096)

P-AXIS-00096	**Set actual position equal to command position for drive simulation**	
Description	This parameter turns off the axis simulation with a filter by setting the actual value equal to the command value. Due to the internal execution order of axis simulation and position controller, there is still a position lag which is equal to the distance the axis moves within one interpolator cycle.	
Parameter	antr.simu.ist_gleich_soll	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Simulation	
Remarks		

9.3 Drive type SERCOS (antr.sercos.*)

The data are dependent on the drive. These parameters must only be assigned when this axis is to be carried out as a SERCOS axis (see P-AXIS-00020 [▸ 68]).

Notice

SERCOS telegrams are described in greater detail in [SERC-S2].

9.3.1 Telegram type (P-AXIS-00188)

P-AXIS-00188	**Telegram type (SERCOS)**	
Description	This parameter defines the telegram type to the drive (see [SERC-S2//Master data telegram]).	
Parameter	antr.sercos.telegramm_typ	
Data type	UNS16	
Data range	0 < telegramm_typ ≤ 7	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	4	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems.	

9.3.2 Ring number (P-AXIS-00160)

P-AXIS-00160	**Ring number (SERCOS)**	
Description	The SERCOS ring number is entered here to denote the axis to which it is connected. This value must currently be set to 0 since multi-ring operation is not yet possible.	
Parameter	antr.sercos.ring_nr	
Data type	UNS16	
Data range	0, only this ring at present	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems.	

9.3.3 Drive address (P-AXIS-00019)

P-AXIS-00019	**Drive address (SERCOS)**	
Description	The drive address corresponds to the value which is selected at the SERCOS slave or the drive system.	
Parameter	antr.sercos.antr_adr	
Data type	UNS16	
Data range	1 < antr_adr ≤ 254	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.4 Time slot calculation (P-AXIS-00063)

P-AXIS-00063	**Time slot calculation (SERCOS)**	
Description	This value defines whether a time slot calculation is executed or the values defined in the axis machine data list are used directly.	
Parameter	antr.sercos.eval_calc_slot	
Data type	UNS16	
Data range	0: Parameter are calculated 1: Parameter in machine data list are used 2: Currently not used	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	The validity of the parameter P-AXIS-00063 depends on the setting of the parameter P-STUP-00005 . This parameter is not available under TwinCAT.	

9.3.5 Operation mode for velocity control (P-AXIS-00264)

P-AXIS-00264	**Operation mode for velocity control (SERCOS)**	
Description	This parameter defines the required operation mode during switching to velocity control.	
Parameter	antr.sercos.op_mode_for_velocity_control	
Data type	UNS16	
Data range	0 ≤ op_mode_for_velocity_control ≤ 3 where: 0: Main operation mode S-0-0032 1: Auxiliary operation mode 1, S-0-0033 2: Auxiliary operation mode 2, S-0-0034 3: Auxiliary operation mode 3, S-0-0035	
Axis types	S	
Dimension		S: ----
Default value	0	
drive types.	SERCOS	
Remarks	The main mode can also be used for speed control.	

9.3.6 Drive supported execution of the CNC based homing (P-AXIS-00386)

P-AXIS-00386	Drive supported execution of the CNC based homing (SERCOS)	
Description	By default CNC-controlled homing for SERCOS drives is only executed in the controller; the drive-internal positions are not altered. If the drive supports the SERCOS command S-0-146 (CNC-controlled homing), this parameter can enable the command S-0-146 for CNC-controlled homing. The advantage of this method is that, after homing is finished, the drive-internal positions are also referenced so that drive-internal software limit switches can be used, for example. The reference position used for homing is P-AXIS-00152 [▸ 89]. This value is transferred to the drive during homing	
Parameter	antr.sercos.drive_supports_cnc_homing	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	SERCOS	
Remarks	This parameter is currently not supported for spindles. In addition to command S-0-146 the drive must support the following commands: • S-0-171 (Calculate displacement) • S-0-172 (Displacement to referenced system) • S-0-191 (Cancel reference point procedure) For further information please refer to the drive manufacturer's documentation..	

9.3.7 Assignment of control and status bits for CNC based homing (P-AXIS-00387)

P-AXIS-00387	Assignment of control and status bits for CNC based homing (SERCOS)	
Description	To execute CNC-controlled homing with drive support, two control bits and two status bits are required. The real-time control and status bits can be used in the drive control and status word or alternatively as bits in the signal status and signal control word.	
Parameter	antr.sercos.cnc_homing_rt_bit_layout	
Data type	UNS16	
Data range	1 ≤ cnc_homing_rt_bit_layout ≤ 16	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	SERCOS	
Remarks	When the status and control bits are transferred in the signal status and control words, they must be configured in the cyclic process data, otherwise the error message P-ERR-70295 is output.	

The table below shows the assignment of the values in P-AXIS-00387 to the possible bit combinations.

Value	Process data	Bit number	Meaning	Ident
1	Control word	Real-time bit 1 (S-0-301)	Homing enable	S-0-407
		Real-time bit 2 (S-0-303)	Position setpoint referenced	S-0-404
	Status word	Real-time bit 1 (S-0-305)	Position marker pulse registered	S-0-408
		Real-time bit 2 (S-0-307)	Actual value referenced	S-0-403
2	Signal control word	Bit 0 (S-0-27[0])	Homing enable	S-0-407
		Bit 1 (S-0-27[1])	Position setpoint referenced	S-0-404
	Signal status word	Bit 0 (S-0-26[0])	Position marker pulse registered	S-0-408
		Bit 1 (S-0-26[1])	Actual value referenced	S-0-403
3	Signal control word	Bit 1 (S-0-27[1])	Homing enable	S-0-407
		Bit 2 (S-0-27[2])	Position setpoint referenced	S-0-404
	Signal status word	Bit 1 (S-0-26[1])	Position marker pulse registered	S-0-408
		Bit 2 (S-0-26[2])	Actual value referenced	S-0-403
4	Signal control word	Bit 2 (S-0-27[2])	Homing enable	S-0-407
		Bit 3 (S-0-27[3])	Position setpoint referenced	S-0-404
	Signal status word	Bit 2 (S-0-26[2])	Position marker pulse registered	S-0-408
		Bit 3 (S-0-26[3])	Actual value referenced	S-0-403
5	Signal control word	Bit 3 (S-0-27[3])	Homing enable	S-0-407
		Bit 4 (S-0-27[4])	Position setpoint referenced	S-0-404
	Signal status word	Bit 3 (S-0-26[3])	Position marker pulse registered	S-0-408
		Bit 4 (S-0-26[4])	Actual value referenced	S-0-403
6	Signal control word	Bit 4 (S-0-27[4])	Homing enable	S-0-407
		Bit 5 (S-0-27[5])	Position setpoint referenced	S-0-404
	Signal status word	Bit 4 (S-0-26[4])	Position marker pulse registered	S-0-408
		Bit 5 (S-0-26[5])	Actual value referenced	S-0-403
7	Signal control word	Bit 5 (S-0-27[5])	Homing enable	S-0-407
		Bit 6 (S-0-27[6])	Position setpoint referenced	S-0-404
	Signal status word	Bit 5 (S-0-26[5])	Position marker pulse registered	S-0-408
		Bit 6 (S-0-26[6])	Actual value referenced	S-0-403
8	Signal control word	Bit 6 (S-0-27[6])	Homing enable	S-0-407
		Bit 7 (S-0-27[7])	Position setpoint referenced	S-0-404
	Signal status word	Bit 6 (S-0-26[6])	Position marker pulse registered	S-0-408
		Bit 7 (S-0-26[7])	Actual value referenced	S-0-403
9	Signal control word	Bit 7 (S-0-27[7])	Homing enable	S-0-407

		Bit 8 (S-0-27[8])	Position setpoint referenced	S-0-404
	Signal status word	Bit 7 (S-0-26[7])	Position marker pulse registered	S-0-408
		Bit 8 (S-0-26[8])	Actual value referenced	S-0-403
10	Signal control word	Bit 8 (S-0-27[8])	Homing enable	S-0-407
		Bit 9 (S-0-27[9])	Position setpoint referenced	S-0-404
	Signal status word	Bit 8 (S-0-26[8])	Position marker pulse registered	S-0-408
		Bit 9 (S-0-26[9])	Actual value referenced	S-0-403
11	Signal control word	Bit 9 (S-0-27[9])	Homing enable	S-0-407
		Bit 10 (S-0-27[10])	Position setpoint referenced	S-0-404
	Signal status word	Bit 9 (S-0-26[9])	Position marker pulse registered	S-0-408
		Bit 10 (S-0-26[10])	Actual value referenced	S-0-403
12	Signal control word	Bit 10 (S-0-27[10])	Homing enable	S-0-407
		Bit 11 (S-0-27[11])	Position setpoint referenced	S-0-404
	Signal status word	Bit 10 (S-0-26[10])	Position marker pulse registered	S-0-408
		Bit 11 (S-0-26[11])	Actual value referenced	S-0-403
13	Signal control word	Bit 11 (S-0-27[11])	Homing enable	S-0-407
		Bit 12 (S-0-27[1]2)	Position setpoint referenced	S-0-404
	Signal status word	Bit 11 (S-0-26[11])	Position marker pulse registered	S-0-408
		Bit 12 (S-0-26[1]2)	Actual value referenced	S-0-403
14	Signal control word	Bit 12 (S-0-27[12])	Homing enable	S-0-407
		Bit 13 (S-0-27[13])	Position setpoint referenced	S-0-404
	Signal status word	Bit 12 (S-0-26[12])	Position marker pulse registered	S-0-408
		Bit 13 (S-0-26[13])	Actual value referenced	S-0-403
15	Signal control word	Bit 13 (S-0-27[13])	Homing enable	S-0-407
		Bit 14 (S-0-27[1]4)	Position setpoint referenced	S-0-404
	Signal status word	Bit 13 (S-0-26[13])	Position marker pulse registered	S-0-408
		Bit 14 (S-0-26[14])	Actual value referenced	S-0-403
16	Signal control word	Bit 14 (S-0-27[14])	Homing enable	S-0-407
		Bit 15 (S-0-27[15])	Position setpoint referenced	S-0-404
	Signal status word	Bit 14 (S-0-26[14])	Position marker pulse registered	S-0-408
		Bit 15 (S-0-26[15])	Actual value referenced	S-0-403

9.3.8 Evaluation of SERCOS state bit drive follows command (P-AXIS-00411)

P-AXIS-00411	**Evaluation of SERCOS state bit drive follows command (SERCOS)**	
Description	Many SERCOS drives supply the information “drive follows setpoints” in bit 3 of their status word (bit mask 0x0008). Parameter P-AXIS-00411 achieves that this bit is taken into account for the calculation of the HLI state signal StateLR_Data.X_ReadyPowerOn (see [HLI]). If this parameter is set, the HLI signal ReadyForPowerOn is set only when bits (0x4000 and 0x0008) are set in the SERCOS state word. In the following cases the HLI state signal StateLR_Data.X_ReadyPowerOn is derived only from SERCOS state bit 0x4000 regardless of the setting of P-AXIS-00411: • SERCOS control bit 0x2000 (Release feedhold, Control Unit McControlLr_Data.MCControlBoolUnit_ReleaseFeedhold (see [HLI]]) is not set. • The drive executes drive-controlled homing. SERCOS state bit 0x8000 (Ready for power on) is not set.	
Parameter	antr.sercos.evaluate_drive_follows_cmd	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	Using this parameter is only useful if the drive provides state bit 0x0008. This information has to be taken from the drive documentation.	

9.3.9 Master data telegram (antr.sercos.mdt[i].*)

Structure name	Index
mdt[i]	0 ≤ i ≤ 8 (Size of SERCOS-telegram)

9.3.9.1 MDT-Ident number (P-AXIS-00090)

P-AXIS-00090	**MDT ID number (SERCOS)**	
Description	The parameter defines the SERCOS ID number of telegram entry. It defines the sequence in the MDT telegram.	
Parameter	antr.sercos.mdt[i].ident_nr	
Data type	UNS16	
Data range	According to SERCOS specification + extensions	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems.	

9.3.9.2 Length of ID (P-AXIS-00088)

P-AXIS-00088	**Length of ID (SERCOS)**	
Description	The parameter defines the ID length.	
Parameter	antr.sercos.mdt[i].ident_len	
Data type	UNS08	
Data range		
Axis types	T, R, S	
Dimension	T: Number of bytes	R,S: Number of bytes
Default value	4	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems.	

9.3.9.3 Assigning the output process data to CNC-internal characteristics (P-AXIS-00132)

P-AXIS-00132	**Assigning the output process data to CNC-internal characteristics (SERCOS)**	
Description	This parameter assigns a CNC-internal meaning to the data element configured in the cyclical output process data. The following references are supported:	
Parameter	antr.sercos.mdt[i].nc_ref	
Data type	STRING	
Data range	String	Meaning
	LAGESOLL_WERT	Absolute position command value
	POSITION_COMMAND_VALUE	Absolute position command value
	S-0-0047	Absolute position command value
	S_0_0047	Absolute position command value
	VB_WERT	Velocity command value
	VELOCITY_COMMAND_VALUE	Velocity command value
	S-0-0036	Velocity command value
	S_0_0036	Velocity command value
	A_SOLL_WERT	Acceleration command value
	MOMENT_SOLL_WERT	Torque command value
	TORQUE_COMMAND_VALUE	Torque command value
	BSPLINE_VB_KOEFFIZIENT	Fine interpolation Bspline coeff. 1
	BSPLINE_A_KOEFFIZIENT	Fine interpolation Bspline coeff. 2
	BSPLINE_R_KOEFFIZIENT	Fine interpolation Bspline coeff. 3
	LR_VAR1_OUT_SGN32	Binary output data 1
	LR_VAR1_OUT	Binary output data 1
	LR_VAR2_OUT_SGN32	Binary output data 2
	LR_VAR2_OUT	Binary output data 2
	LR_VAR3_OUT_SGN32	Binary output data 3
	LR_VAR3_OUT	Binary output data 3
	LR_VAR4_OUT_SGN32	Binary output data 4
	LR_VAR4_OUT	Binary output data 4
	LR_VAR1_OUT_UNS16	Binary output data 1
	LR_VAR2_OUT_UNS16	Binary output data 2
	LR_VAR3_OUT_UNS16	Binary output data 3
	LR_VAR4_OUT_UNS16	Binary output data 4
Data range (continued)	LR_VAR1_OUT_SGN16	Binary output data 1
	LR_VAR2_OUT_SGN16	Binary output data 2
	LR_VAR3_OUT_SGN16	Binary output data 3

	LR_VAR4_OUT_SGN16	Binary output data 4
	CONTROL_WORD	Drive control word
	S-0-0134	Drive control word
	S_0_0134	Drive control word
	TORQUE_LIMIT_POS	Positive torque limit
	TORQUE_LIMIT_NEG	Negative torque limit
	TORQUE_LIMIT_BIPOLAR	Bipolar torque limit
	S-0-0145	Signal control word
	S_0_0145	Signal control word
	S-0-0037	Additive speed command value
	S_0_0037	Additive speed command value
	S-0-0081	Additive torque command value
	S_0_0081	Additive torque command value
	MASTER_LIFE_COUNTER	Master life sign
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems. If an unknown string is configured in the parameter, the error message P-ERR-260089 is output and the interpretation of process data is aborted. With drives whose process data contents are not freely configurable, the error message P-ERR-260089 can be suppressed by setting P-AXIS-00358 [358] . * Note: The default value of variables is a blank string.	

9.3.10 Drive telegram type 7 (antr.sercos.at[i].*)

This parameter defines the configurable telegram type number 7 of the drive (see [SERC-S2// Drive telegram AT]).

Structure name	Index
at[i]	0 ≤ i < 8 (telegram size for SERCOS telegrams)

9.3.10.1 AT-Ident number (P-AXIS-00089)

P-AXIS-00089	AT ID number (SERCOS)	
Description	The parameter defines the SERCOS ID number of telegram entry.	
Parameter	antr.sercos.at[i].ident_nr	
Data type	UNS16	
Data range	drive-dependent	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems.	

9.3.10.2 Length of ID (P-AXIS-00087)

P-AXIS-00087	Length of ID (SERCOS)	
Description	The parameter defines the ID length.	
Parameter	antr.sercos.at[i].ident_len	
Data type	UNS08	
Data range	Predefined by ID number	
Axis types	T, R, S	
Dimension	T: Number of bytes	R,S: Number of bytes
Default value	4	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems.	

9.3.10.3 Assigning the input process data to CNC-internal characteristics (P-AXIS-00131)

P-AXIS-00131	Assigning the input process data to CNC-internal characteristics (SERCOS)	
Description	This parameter assigns a CNC-internal sense to the data element configured in the cyclical input process data. Currently the following references are supported:	
Parameter	antr.sercos.at[i].nc_ref	
Data type	STRING	
Data range	String	Meaning
	LAGEIST_WERT	Actual value absolute position
	POSITION_FEEDBACK_VALUE_1	Actual value absolute position
	S-0-0051	Actual value absolute position
	S_0_0051	Actual value absolute position
	S-0-0053	Actual value absolute position
	S_0_0053	Actual value absolute position
	S-0-0386	Actual value absolute position
	S_0_0386	Actual value absolute position
	STROMIST_WERT	Data range
	VB_IST_WERT	Actual value velocity
	VELOCITY_FEEDBACK_VALUE_1	Actual value velocity
	S-0-0040	Actual value velocity
	S_0_0040	Actual value velocity
	A_IST_WERT	Actual value acceleration
	RUCK_IST_WERT	Actual value jerk
	MOMENT_IST_WERT	Actual value torque
	TORQUE_FEEDBACK	Actual value torque
	TORQUE_FEEDBACK_VALUE	Actual value torque
	S-0-0084	Actual value torque
	S_0_0084	Actual value torque
	POSITION LAG	Position lag
	S-0-0189	Position lag
	S_0_0189	Position lag
	MESSWERT_1	Measured value 1, positive edge
	S-0-0130	Measured value 1, positive edge
	S_0_0130	Measured value 1, positive edge
	MESSWERT_1_NEG	Measured value 1, negative edge
	S_0_0131	Measured value 1, negative edge
	MESSWERT_2	Measured value 2, positive edge

	S-0-0132	Measured value 2, positive edge
	S_0_0132	Measured value 2, positive edge
	MESSWERT_2_NEG	Measured value 2, negative edge
	S-0-0133	Measured value 2, negative edge
	S_0_0133	Measured value 2, negative edge
	MESSWERT_STATUS	Measured value status
	FEHLER_1	Error 1
	FEHLER_2	Error 2
	FEHLER_3	Error 3
	LR_VAR1_IN_UNS16	Binary input data 1
	LR_VAR2_IN_UNS16	Binary input data 2
	LR_VAR3_IN_UNS16	Binary input data 3
	LR_VAR4_IN_UNS16	Binary input data 4
	LR_VAR1_IN_SGN16	Binary input data 1
	LR_VAR2_IN_SGN16	Binary input data 2
	LR_VAR3_IN_SGN16	Binary input data 3
	LR_VAR4_IN_SGN16	Binary input data 4
	STATUS_WORD	Drive status word
	S-0-0135	Drive status word
	S-0-0144	Signal status word
	S_0_0144	Signal status word
	S-0-0390	Drive error code
	S-0-0390	Drive error code
	S-0-0084	Torque actual value
	S_0_0084	Torque actual value
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	This parameter is used automatically in TwinCAT systems. If an unknown string is configured in the parameter, the error message P-ERR-260090 is output and the interpretation of process data is aborted. With drives whose process data contents are not freely configurable, the error message P-ERR-260090 can be suppressed by setting P-AXIS-00358 [▸ 358] . * Note: The default value of variables is a blank string.	

9.3.11 Index of ID (antr.sercos.ident[i].*)

At CNC start-up, SERCOS IDs can be transferred to SERCOS drives. These IDs and their characteristics can be defined in the axis parameter list.

Structure name	Index
ident[i]	i = 0 (Maximum permissible number of ID entries: 1)

9.3.11.1 SERCOS-Ident-No (P-AXIS-00134)

P-AXIS-00134	SERCOS-Ident-No (SERCOS)	
Description	Number of SERCOS IDs, see also [SERC-S2] **Example:** 32 = S-0-0032	
Parameter	antr.sercos.ident[i].nr	
Data type	UNS16	
Data range	Partly depending on drives	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks		

9.3.11.2 Length of ID (P-AXIS-00100)

P-AXIS-00100	Length of ID (SERCOS)	
Description	The parameter defines the ID length.	
Parameter	antr.sercos.ident[i].laenge	
Data type	UNS16	
Data range	1, 2, 4	
Axis types	T, R, S	
Dimension	T: Number of bytes	R,S: Number of bytes
Default value	0	
Drive types	SERCOS	
Remarks		

9.3.11.3 Modifier of ID (P-AXIS-00119)

P-AXIS-00119	Modifier of ID (SERCOS)	
Description	The parameter defines the ID modifier.	
Parameter	antr.sercos.ident[i].mod	
Data type	UNS08	
Data range	0: no action 2: write ID to drive	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.11.4 Phase for ID-processing (P-AXIS-00150)

P-AXIS-00150	Phase for ID-processing (SERCOS)	
Description	This entry defines the phase in which the ID No must be processed. The following values are supported.	
Parameter	antr.sercos.ident[i].phase	
Data type	UNS16	
Data range	2: Processing of ident only in phase 2 4: Processing of ID only in phase 4	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.11.5 Type of ID (P-AXIS-00203)

P-AXIS-00203	**Type of ID (SERCOS)**	
Description	The type of ID value is defined; depending on the type, the ID values must be transferred to different variables. Currently the following types are supported:	
Parameter	antr.sercos.ident[i].type	
Data type	UNS08	
Data range	1: ID value has constant length ident[].wert 2: ID value has variable length ident[].liste 4: ID value is an external list iIdent[].file	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.11.6 Value of ID (P-AXIS-00235)

P-AXIS-00235	**Value of ID (SERCOS)**	
Description	If P-AXIS-00203 [▸ 398] = 1 is set, the value of the ID is entered here.	
Parameter	antr.sercos.ident[i].wert	
Data type	SGN32	
Data range	MIN(SGN32) ≤ wert ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.11.7 ID as List (P-AXIS-00102)

P-AXIS-00102	**ID as list (SERCOS)**	
Description	If P-AXIS-00203 [▸ 398] = 2 is set, enter the list string here.	
Parameter	antr.sercos.ident[i].liste	
Data type	STRING	
Data range	Maximum 64 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	* Note: The default value of variables is a blank string.	

9.3.11.8 Filename (P-AXIS-00068)

P-AXIS-00068	**Filename (SERCOS)**	
Description	If P-AXIS-00203 [▸ 398] = 4 is set, the name of file to be read in must be entered here.	
Parameter	antr.sercos.ident[i].file	
Data type	STRING	
Data range	Maximum 54 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS	
Remarks	* Note: The default value of variables is a blank string.	

9.3.12 Time slot parameters (antr.sercos.times.*)

This structure defines the time slot parameters of the SERCOS ring (see also [STUP]). When the parameter P-AXIS-00063 [▸ 381] (eval_calc_slot) is set, these parameters are used directly and not read from the drive and calculated.

9.3.12.1 Transmission moment of drive telegram (P-AXIS-00180)

P-AXIS-00180	**Transmission moment of drive telegram**	
Description	The parameter defines the transmission moment of the drive telegram.	
Parameter	antr.sercos.times.t1	
Data type	SGN16	
Data range	MIN(SGN16) ≤ t1 ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: μs	R,S: μs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.2 Transmission moment of MDT (P-AXIS-00182)

P-AXIS-00182	**Transmission moment of MDT**	
Description	The parameter defines the transmission moment of the MDT.	
Parameter	antr.sercos.times.t2	
Data type	SGN16	
Data range	MIN(SGN16) ≤ t2 ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: μs	R,S: μs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.3 Validation moment for command values (P-AXIS-00183)

P-AXIS-00183	**Validation moment for command values**	
Description	The parameter defines the validation moment for command values.	
Parameter	antr.sercos.times.t3	
Data type	SGN16	
Data range	MIN(SGN16) ≤ t3 ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.4 Latch moment of actual values (P-AXIS-00184)

P-AXIS-00184	**Latch moment of actual values**	
Description	The parameter defines the latch moment of actual values.	
Parameter	antr.sercos.times.t4	
Data type	SGN16	
Data range	MIN(SGN16) ≤ t4 ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.5 Earliest transmission moment for drive telegrams (P-AXIS-00181)

P-AXIS-00181	**Earliest transmission moment for drive telegrams**	
Description	The parameter defines the earliest transmission moment for drive telegrams.	
Parameter	antr.sercos.times.t1min	
Data type	SGN16	
Data range	MIN(SGN16) ≤ t1min ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.6 Switch over moment between transmission and reception (P-AXIS-00187)

P-AXIS-00187	**Switch over moment between transmission and reception**	
Description	The parameter defines the switch over moment between transmission and reception.	
Parameter	antr.sercos.times.tatmt	
Data type	SGN16	
Data range	MIN(SGN16) ≤ tatmt ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.7 Latch moment of actual values (P-AXIS-00185)

P-AXIS-00185	**Latch moment of actual values**	
Description	The parameter defines the earliest latch moment for actual values.	
Parameter	antr.sercos.times.t4min	
Data type	SGN16	
Data range	MIN(SGN16) ≤ t4min ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.8 Recovery time in slave (P-AXIS-00193)

P-AXIS-00193	**Recovery time in slave**	
Description	The parameter defines the recovery time in the slave.	
Parameter	antr.sercos.times.tmtsy	
Data type	SGN16	
Data range	MIN(SGN16) ≤ tmrsy ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.9 Processing time for command values (P-AXIS-00192)

P-AXIS-00192	**Processing time for command values**	
Description	The parameter defines the processing time for command values.	
Parameter	antr.sercos.times.tmtsg	
Data type	SGN16	
Data range	MIN(SGN16) ≤ tmtsg ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.10 Slave identifier (P-AXIS-00173)

P-AXIS-00173	**Slave identifier**	
Description	The parameter defines the slave identifier.	
Parameter	antr.sercos.times.slkn	
Data type	SGN16	
Data range	MIN(SGN16) ≤ slkn ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.12.11 Transmitter recovery time (P-AXIS-00186)

P-AXIS-00186	**Transmitter recovery time**	
Description	The parameter defines the transmitter recovery time of slaves with more than one drive.	
Parameter	antr.sercos.times.tatat	
Data type	SGN16	
Data range	MIN(SGN16) ≤ tatat ≤ MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	SERCOS	
Remarks	This parameter is not available under TwinCAT.	

9.3.13 Delay of display command values (P-AXIS-00813)

P-AXIS-00813	**Delay of display command values**	
Description	For SERCOS drives, the display value of the command position is delayed by the cycles set in P-AXIS-00191 [▸ 354]. This corresponds to the time after which the drive receives the signal. The display data therefore represent the command position of the drive. This parameter allows the display delay to be deactivated. The display data therefore show the command position currently calculated in the position controller.	
Parameter	antr.sercos.delay_display_cmd_pos	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,: ----
Default value		
Drive types	SERCOS	
Remarks	Parameter available as of CNC Build V3.1.3080.3 and higher	

9.4 Drive type PROFIDRIVE (antr.profibus.*)

9.4.1 Factor for calculation of the position value (P-AXIS-00065)

P-AXIS-00065	**Factor for calculation of the position values (PROFIDRIVE)**	
Description	This parameter is used to calculate the internally used actual position value from the value which is transferred over the bus. It is defined as the power of 2 by which the bus value is divided. Example: Feinaufloesung (fine resolution) = 4: Position value is divided by $2^4 = 16$. See also documentation of Profidrive parameters P1042 … P1045.	
Parameter	antr.profibus.feinaufloesung	
Data type	UNS16	
Data range	0 ≤ feinaufloesung ≤ 24	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	11	
Drive types	Profidrive	
Remarks		

9.4.2 Slave-life sign limit (P-AXIS-00162)

P-AXIS-00162	**Slave-life sign limit (PROFIDRIVE)**	
Description	Limit to monitor the slave life sign. In the Profidrive telegram a life sign is transmitted and this is implemented as a per cycle incremented counter. If the counter value from the telegram is not equal to the value expected from the NC kernel, an internal error counter is incremented by 10. Every time the transmitted counter value and the expected value are equal, the error counter is decremented by one. If the error counter exceeds the parameter limit, the error message P-ERR-70106 (Life sign from PROFIBUS slave missing) is output). (See also Profidrive Profile Drive Technology, Section 6.3 Save Data Values).	
Parameter	antr.profibus.s_ls_limit	
Data type	UNS16	
Data range	0 ≤ s_ls_limit ≤ MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	40	
Drive types	Profidrive	
Remarks		

9.4.3 Activation of velocity command interface (P-AXIS-00260)

P-AXIS-00260	**Activation of velocity command interface (PROFIDRIVE)**	
Description	For PROFIDRIVEs, position control can be achieved by transmitting the position lag to the drive (telegram 5) as well as by transmitting a velocity command (telegram 3) By default, if telegram 3 is used, the axis is operated not in a closed position control loop, but only the calculated command velocity of the interpolator is transmitted to the drive. In order to operate the drive in a closed position control loop, this parameter must be set to 1.	
Parameter	antr.profibus.velocity_command_control	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Profidrive	
Remarks		

9.4.4 Reading absolute position from drive (P-AXIS-00315)

P-AXIS-00315	**Reading absolute position from drive (PROFIDRIVE)**	
Description	At control start-up an absolute position stored in Profidrive drives can be read from the drive This functionality is activated with this parameter. After successful reading of the absolute position, the axis is considered as homed. The absolute position is requested in the following cases: • Controller start-up • After reset of an encoder error When functionality 'parked encoder' is deactivated	
Parameter	antr.profibus.read_abs_pos_from_drive	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Profidrive	
Remarks		

9.4.5 Offset factor for G1_XIST1 (P-AXIS-00316)

P-AXIS-00316	**Shift factor for G1_XIST1 (PROFIDRIVE)**	
Description	If parameter P-AXIS-00315 [▸ 407] is assigned the value 1, the shift factor for G1_XIST1 must be entered in this parameter (P-AXIS-00316). The value of drive parameter P1042 must be entered.	
Parameter	antr.profibus.p1042	
Data type	SGN16	
Data range	0 … 24	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	Profidrive	
Remarks		

9.4.6 Offset factor for absolute value in G1_XIST2 (P-AXIS-00317)

P-AXIS-00317	**Offset factor for absolute value in G1_XIST2 (PROFIDRIVE)**	
Description	If parameter P-AXIS-00315 [▸ 407] is assigned the value 1, the offset factor for the absolute factor in G1_XIST2 must be entered in this parameter (P-AXIS-00317). The value of drive parameter P1043 must be entered.	
Parameter	antr.profibus.p1043	
Data type	SGN16	
Data range	0 … 24	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	Profidrive	
Remarks		

9.4.7 Calculation mode for actual position (P-AXIS-00318)

P-AXIS-00318	**Calculation mode for actual position (PROFIDRIVE)**
Description	If parameter P-AXIS-00315 [▶ 407] is set to 1, this parameter (P-AXIS-00318) must specify the calculation mode for the actual position. There are two modes for this.
Parameter	antr.profibus.read_abs_pos_mode
Data type	STRING
Data range	DRIVE_POS: The absolute position transferred from the drive is used as actual position. If necessary a format conversion is made. (Default). COMBINED: Bits 31 ... p1042 are taken from the drives actual position, bits 0 … p1042 -1 are taken from the position value in G1_XIST1. See the figure below.
Axis types	T, R, S
Dimension	T: ---- R,S: ----
Default value	DRIVE_POS
Drive types	Profidrive
Remarks	Calculation mode COMBINED may only be used if the motor encoder delivers an absolute position within one motor revolution. This property of the encoder can be determined with the value of drive parameter P979 subindex 1. If bit 1 (bit mask 0x02) is set the encoder delivers an absolute position within one motor revolution. If applicable, consult the manufacturer's documentation.

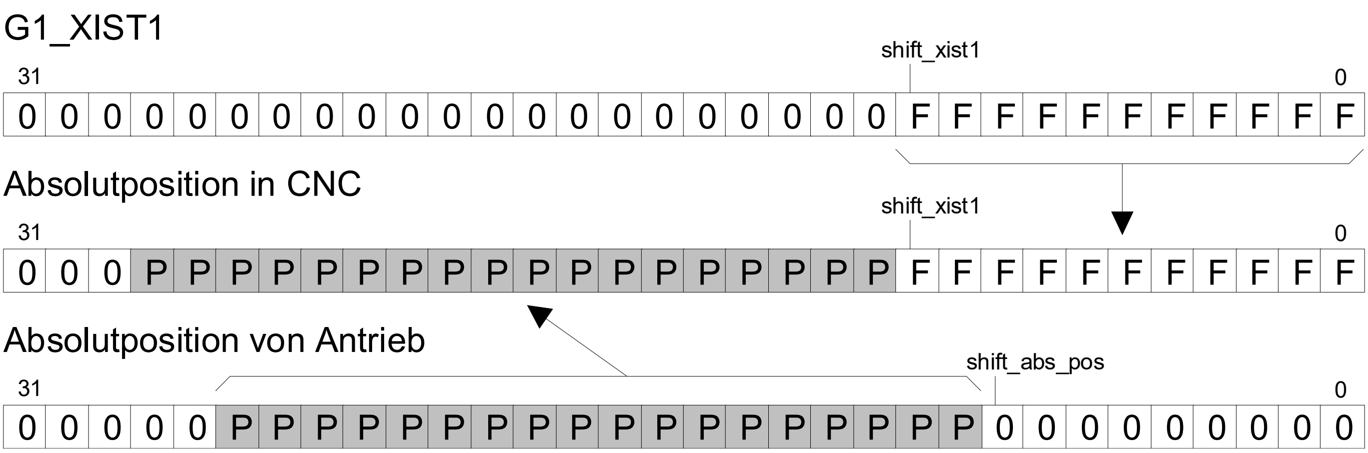


Fig. 35: Calculation mode for actual position

9.4.8 Offset to the read absolute position of the drive (P-AXIS-00341)

P-AXIS-00341	Offset to the read absolute position of the drive (PROFIDRIVE)	
Description	Each time the absolute position of the drive is read (see P-AXIS-00315 [▸ 407]), the homing position in the controller is shifted by the offset in P-AXIS-00341 in relation to the drive position. As a result, any point on the axis can be defined as the zero point, for example. The resulting axis position in the controller is calculated as follows: Homing position (axis position) = Absolute position from drive + P-AXIS-00341	
Parameter	antr.profibus.read_abs_pos_offset	
Data type	SGN64	
Data range	MIN(SGN64) ≤ read_abs_pos_offset ≤ MAX(SGN64)	
Axis types	T	
Dimension	T: 0.1 μm	
Default value	0	
Drive types	Profidrive	
Remarks		

9.4.9 Automatic follow up mode for disabled drive (P-AXIS-00352)

P-AXIS-00352	Automatic follow up mode for disabled drive (PROFIDRIVE)	
Description	By default, an axis is in follow-up mode if it is not ready for operation. This behaviour can be switched off if it is not required. If this parameter is set, the axis goes to tracking mode only under the following conditions: • The axis is in error. • The slave live counter of the axis does not work. Follow-up operation is set via the HLI interface (see [HLI// Control commands of an axis]).	
Parameter	antr.profibus.disable_auto_tracking	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Profidrive	
Remarks		

9.4.10 Number of detectable motor revolutions (P-AXIS-00336)

P-AXIS-00336	**Number of detectable motor revolutions (PROFIDRIVE)**	
Description	This parameter sets the number of revolutions that an absolute encoder can determine. The travering range of the axis which is defined by the software limits switches (P-AXIS-00177 [▸ 121] and P-AXIS-00178 [▸ 121]must be less than the value range of the absolute encoder because otherwise, the mapping of the encoder position to the mechanical axis position is not unique. Setting this value is also necessary if the absolute encoder overflow can occur within the traversing range of the axis. In order to do an automatic compensation of such an overflow, the value range of the absolute encoder, which is defined by P-AXIS-00092 [▸ 347] * P-AXIS-00336, must be known. If the traversing range of the axis is bigger than the unique value range of the absolute encoder, error message P-ERR-70297 is output.	
Parameter	antr.profibus.abs_pos_revolutions	
Data type	UNS32	
Data range	0, 1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Profidrive	
Remarks	This parameter is only evaluated when the functionality ‘reading of absolute position’ (see P-AXIS-00315 [▸ 407]) is activated. Setting P-AXIS-00336 to 0 suppresses the check of the traversing range of the axis against the encoder range and also the automatic correction on an encoder overflow. If an absolute encoder overflow can occur within the traversing range of the axis P-AXIS-00336 has to be set in order to enable an automatic correction of the encoder overflow. Otherwise the axis position can be set wrong dependent on the mechanical axis position where the absolute position is read. The value to be entered in P-AXIS-00336 must be taken from the corresponding drive documentation. It can also be read out from the drive parameters. (P979, Subindex 5).	

9.4.11 Velocity scaling factor (P-AXIS-00379)

P-AXIS-00379	Velocity scaling factor (PROFIDRIVE)	
Description	Thiss parameter supplies the velocity scaling factor set in the drive to the CNC. This value can be read with a drive set-up tool from the drive and has to be entered in this parameter. For SIMODRIVE 611 drives it is the parameter P880, for SINAMICS drives it is parameter P2000.	
Parameter	antr.profibus.drive_velocity_base_value	
Data type	UNS32	
Data range	1 … MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	16384	
Drive types	Profidrive	
Remarks		

9.4.12 Suppress slave life sign warning (P-AXIS-00462)

P-AXIS-00462	Suppress slave life‘ sign warning (PROFIRIVE)	
Description	This parameter suppresses the warning P-ERR-70395 (Slave life sign PROFIDUS slave).	
Parameter	antr.profibus.suppress_life_sign_warning	
Data type	BOOLEAN	
Data range	0: Warning is not suppressed (default). 1: Warning is suppressed.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Profidrive	
Remarks	This parameter should be used only temporarily, for example while commissioning a machine, because the warning P-ERR-70395 indicates a problem with field bus communication.	

9.4.13 Encoder settings for additive encoders (antr.profibus.encoder[i].*)

This structure defines data for PROVIDRIVE encoders.

Structure name	Index
encoder[i]	0 ≤ i ≤ 1 (Maximum number of encoders: 2)

9.4.13.1 Reading the encoder's absolute position out of the drive (P-AXIS-00447)

P-AXIS-00447	**Reading the encoder's absolute position out of the drive for additive encoder (PROFIDRIVE)**	
Description	In the case of PROFIDRIVE drives, a position stored internally in the drive can be read as the actual position during start-up of the controller. This functionality is activated with this parameter. The absolute position is requested in the following cases: Controller start-up After reset of an encoder error	
Parameter	antr.profibus.encoder[i].read_abs_pos_from_drive	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Profidrive	
Remarks		

9.4.13.2 Calculation mode for encoder's actual position (P-AXIS-00448)

P-AXIS-00448	**Calculation mode for encoder actual position for additive encoder (PROFIDRIVE)**	
Description	If parameter P-AXIS-00447 [▸ 413] is set to 1, this parameter (P-AXIS-00448) must specify the calculation mode for the encoder actual position. There are two modes for this.	
Parameter	antr.profibus.encoder[i].read_abs_pos_mode	
Data type	STRING	
Data range	DRIVE_POS: The absolute position transferred by the encoder is adopted as the actual position after any necessary format adjustment (default). COMBINED: Bits 31 … shift_xist1 are taken from the absolute position returned by the encoder, while bits 0 … shift_xist1 - 1 are taken from GX_XIST1. See also the figure below.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	DRIVE_POS	
Drive types	Profidrive	
Remarks	The COMBINED calculation mode may only be used if the drive's motor encoder returns an actual position that is absolute within one motor revolution. If applicable, consult the manufacturer's documentation.	

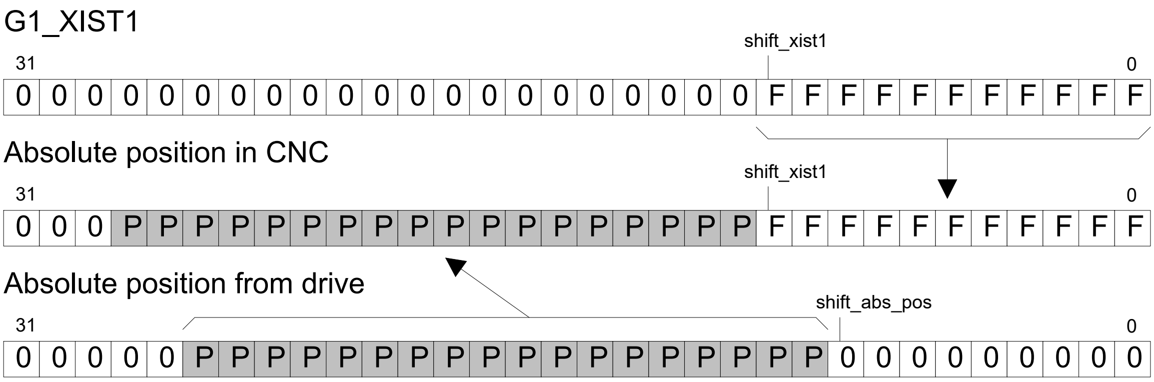


Fig. 36: Calculation mode for encoder actual position for additive encoder

9.4.13.3 Offset from the read absolute position of the encoder (P-AXIS-00449)

P-AXIS-00449	**Offset from the read absolute position of the encoder for additive encoder (PROFIDRIVE)**	
Description	Each time the absolute position of the additive encoder (encoders 2 to 4) is read (see P-AXIS-00447 [413]), the homing position in the controller is shifted by the offset in P-AXIS-00449 in relation to the drive position. As a result, any point on the axis can be defined as the zero point, for example. The resulting axis position in the controller is calculated as follows: Reference position (encoder) = absolute position of encoder + P-AXIS-00449	
Parameter	antr.profibus.encoder[i].abs_position_offset	
Data type	SGN64	
Data range	MIN(SGN64) ≤ abs_position_offset ≤ MAX(SGN64)	
Axis types	T, R	
Dimension	T: 0.1 µm	R,S: 0.0001°
Default value	0	
Drive types	Profidrive	
Remarks		

9.4.13.4 Offset factor for absolute value in GX_XIST2 (P-AXIS-00450)

P-AXIS-00450	**Offset factor for absolute value in GX_XIST2 for additive encoder (PROFIDRIVE)**	
Description	If parameter P-AXIS-00447 [▸ 413] is assigned the value 1, the offset factor for the absolute factor in GX_XIST2 must be entered in this parameter (P-AXIS-00450).	
Parameter	antr.profibus.encoder[i].shift_abs_pos	
Data type	SGN16	
Data range	0 … 24	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	Profidrive	
Remarks		

9.4.13.5 Offset factor for GX_XIST1 (P-AXIS-00451)

P-AXIS-00451	**Offset factor for GX_XIST1 for additive encoder (PROFIDRIVE)**	
Description	If parameter P-AXIS-00447 [▸ 413] is assigned the value 1, the shift factor for GX_XIST1 must be entered in this parameter (P-AXIS-00451).	
Parameter	antr.profibus.encoder[i].shift_xist1	
Data type	SGN16	
Data range	0 … 24	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	-1	
Drive types	Profidrive	
Remarks		

9.4.13.6 CRC checksum for P-AXIS-00449 (P-AXIS-00452)

P-AXIS-00452	**CRC checksum for P-AXIS-00449 for additive encoder (PROFIDRIVE)**	
Description	This parameter contains the CRC checksum of the parameter P-AXIS-00449 [414] abs_position_offset). When the controller is started or when lists are updated, the checksum calculated from P-AXIS-00449 [414] is compared against the value stored in this parameter and the error message ID 70408 or ID 70409 is output if there are differences. In this way, unintended changes in P-AXIS-00449 [414] can be detected.	
Parameter	antr.profibus.encoder[i].abs_pos_offset_crc	
Data type	UNS32	
Data range	0 … MAX(UNS32)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	Profidrive	
Remarks	This parameter is not available under TwinCAT., but currently only for HMG-PC85 and HMG-PC87.	

9.4.14 Mechanical movement distance outside the software limit switches (P-AXIS-00546)

P-AXIS-00546	**Mechanical axis motion path beyond the software limit switches (PROFIDRIVE)**	
Description	This parameter specifies the mechanical axis motion path beyond the software limit switches. It defines the mechanical axis motion path together with the position of the limit switches. This value is used to process an absolute encoder overflow automatically: If the overall position calculated from the absolute position of the drive and the set position offset P-AXIS-00341 [410] lie outside the mechanical motion range of the axis, an overflow of the absolute encoder has occurred. To compensate for this overflow, the calculated position is corrected by the value range of the absolute encoder.	
Parameter	antr.profibus.add_movement_range	
Data type	UNS32	
Data range	0 … MAX(UNS32)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	Profidrive	
Remarks		

9.5 Drive type CANopen (antr.canopen.*)

9.5.1 Number of probing input (P-AXIS-00295)

P-AXIS-00295	**Number of probing input (CANopen)**	
Description	Number of the drive digital input which is used as probing input. The input used must also be defined as probing input in the drive. See also (FCT-C4].	
Parameter	antr.canopen.probing_input_number	
Data type	UNS16	
Data range	1, 2	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	CANopen	
Remarks	From CNC version V2.10.1505.26 onwards, please use the parameter P-AXIS-00430 [▸ 366] as an alternative. It is generally valid for all drive types. [▸ 68].	

9.5.2 Number of digital input for latching zero pulse (P-AXIS-00364)

P-AXIS-00364	**Number of digital input for latching zero pulse (CANopen)**	
Description	This parameter defines which digital input is used as latch input for the zero pulse for homing. If an invalid value is entered, and error message with number P-ERR-110485 is output and the value is corrected to 1.	
Parameter	antr.canopen.zero_pulse_input_number	
Data type	UNS08	
Data range	1, 2	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	CANopen	
Remarks		

9.5.3 Operation mode for drive position control (P-AXIS-00463)

P-AXIS-00463	**Operation mode for drive position control (CANopen)**	
Description	Parameter is used if the transmission of the drive operation mode (CANopen object 0x6060) is configured in the cyclic process data. Enter the value to be transferred after controller and fieldbus start-up for the operation mode 'cyclic synchronous position mode'.	
Parameter	antr.canopen.cyclic_position_op_mode	
Data type	SGN16	
Data range	MIN(SGN16) … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	8	
drive types.	CANopen	
Remarks		

9.5.4 Operation mode for drive velocity control (P-AXIS-00464)

P-AXIS-00464	**Operation mode for drive velocity control (CANopen)**	
Description	Parameter is used if the transmission of the drive operation mode (CANopen object 0x6060) is configured in the cyclic process data. Enter the value to be transferred after controller and fieldbus start-up for the operation mode 'cyclic synchronous position mode'.	
Parameter	antr.canopen.cyclic_velocity_op_mode	
Data type	SGN16	
Data range	MIN(SGN16) … MAX(SGN16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	9	
drive types.	CANopen	
Remarks		

9.5.5 Zero pulse search for negative edge of zero pulse signal (P-AXIS-00618)

P-AXIS-00618	**Zero pulse search for negative edge of zero pulse signal for CANopen drives**	
Description	This parameter defines the detection of the reference position on the falling edge of the zero pulse signal for a reference point travel with zero pulse search with CANopen drives.	
Parameter	antr.canopen.zero_pulse_latch_neg_edge	
Data type	BOOLEAN	
Data range	0, 1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	CANopen	
Remarks		

9.5.6 Select trigger source for zero pulse search (P-AXIS-00701)

P-AXIS-00701	**Select the trigger source for zero pulse search by the drive parameter 0x60D0**	
Description	This parameter sets the trigger source which is to be used for homing. For homing with zero pulse search for CANopen drives, the following applies: In accordance with CiA DS402, the trigger source to detect the probing event is specified in the bit 0x4 or 0x400 of the latch control word (controller default response). Another variant is to set the trigger source in the drive in the drive object 0x60D0 subindices 1 and 2. In order to use this variant, this parameter must be set to the value "DRIVE_DEFINED". In this case, the bit 0x8 or 0x800 must be set in the latch control word of the drive when the latch function is active.	
Parameter	antr.canopen.zero_pulse_trigger_source	
Data type	STRING	
Data range	DEFAULT: Default value, corresponds to "CNC_DEFINED" CNC_DEFINED: The trigger source is specified by the CNC using latch control. DRIVE_DEFINED: The trigger source is set in the drive in the object 0x60D0.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	DEFAULT	
Drive types	CANopen	
Remarks	If the setting "DRIVE_DEFINED” is used, set the appropriate setting in the drive controller in the object 0x60D0.	

9.5.7 Select trigger source for probing (P-AXIS-00702)

P-AXIS-00702	**Select the trigger source for probing by the drive parameter 0x60D0**	
Description	This parameter sets the trigger source which is to be used for probing. For probing with measured value detection in the drive for CANopen drives, the following applies: In accordance with CiA DS402, the trigger source to detect the probing event is specified in the bit 0x4 or 0x400 of the latch control word (controller default response). One variant sets the trigger source in the drive in the drive object 0x60D0 subindices 1 and 2. In order to use this variant, this parameter must be set to the value "DRIVE_DEFINED". In this case, the bit 0x8 or 0x800 must be set in the latch control word of the drive when the latch function is active.	
Parameter	antr.canopen.probing_trigger_source	
Data type	STRING	
Data range	DEFAULT: Default value, corresponds to "CNC_DEFINED" CNC_DEFINED: The trigger source is specified by the CNC using latch control. DRIVE_DEFINED: The trigger source is set in the drive in the object 0x60D0.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	DEFAULT	
Drive types	CANopen	
Remarks	If the setting "DRIVE_DEFINED” is used, set the appropriate setting in the drive controller in the object 0x60D0.	

9.5.8 Inverting the swap evaluation of the probe status word (P-AXIS-00456)

P-AXIS-00456	**Swap evaluation of probe status word (0x60B9) with respect to positive and negative edges**	
Description	This parameter swaps the evaluation of the status bits ‘Value latched to positive edge’ and ‘Value latched to negative edge’. This may be necessary with older drives since, in older versions of the CiA DS402 specifications, the significance of these bits was specified imprecisely. This lead to faulty implementations by drive manufacturers. The parameter is included for reasons of backward compatibility to restore previous behaviour.	
Parameter	antr.canopen.f_probe_status_inverse_edge	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	CANopen	
Remarks		

9.5.9 Input process data item (antr.canopen.in[i].*)

This structure can be used to define various input process data.

Structure name	Index
antr.canopen.in[i].	0 ≤ i ≤ 15 (Maximum number of input process data: 16, application-specific)

9.5.9.1 Memory name (P-AXIS-00476)

P-AXIS-00476	Memory name of input process data item	
Description	With CANopen drives this parameter defines the memory section to read the process data item for the related input process data item.	
Parameter	antr.canopen.in[].memory_ident	
Data type	STRING	
Data range	Maximum 29 characters long	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	CANopen	
Remarks	This parameter is available as of CNC Build V3.01.3060.0. * Note: The default value of variables is a blank string.	

9.5.9.2 Signal number (P-AXIS-00645)

P-AXIS-00645	Signal ID in (CANopen)	
Description	Signal number	
Parameter	antr.canopen.in[i].signal_nr	
Data type	UNS16	
Data range		
Axis types		
Dimension		
Default value		
Drive types		
Remarks		

9.5.9.3 Signal length (P-AXIS-00646)

P-AXIS-00646	**Length of process data item in (CANopen)**	
Description	Length of process data item.	
Parameter	antr.canopen.in[i].signal_len	
Data type	UNS08	
Data range		
Axis types		
Dimension		
Default value	0	
Drive types		
Remarks		

9.5.9.4 CNC sense (P-AXIS-00475)

P-AXIS-00475	Assign the input process data item to CNC-internal nomenclature	
Description	This parameter assigns a CNC-internal meaning to the data element configured in the cyclical input process data.	
Parameter	antr.canopen.in[i].nc_ref	
Data type	STRING	
Data range	See figure below	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	CANopen	
Remarks	* Note: The default value of variables is a blank string.	

Identifier	Meaning
POS_ACT	Actual value absolute position
6063_00	Actual value absolute position
6064_00	Actual value absolute position
DRIVE_STATUS	Drive status word
6041_00	Drive status word
FOLLOW_ERR	Position lag
60F4_00	Position lag
TORQUE_ACT	Actual torque
6077_00	Actual torque
OP_MODE_ACT	Actual operation mode
6061_00	Actual operation mode
TP_STATUS	Touch probe status word
60B9_00	Touch probe status word
TP_POS1	Measured value 1, positive edge
60BA_00	Measured value 1, positive edge
TP_NEG1	Measured value 1, negative edge
60BB_00	Measured value 1, negative edge
TP_POS2	Measured value 2, positive edge
60BC_00	Measured value 2, positive edge
TP_NEG2	Measured value 2, negative edge
60BD_00	Measured value 2, negative edge

Identifier	Meaning
60FD_00	Digital inputs
VEL_ACT	Actual value velocity
606C_00	Actual value velocity
6043_00	Actual velocity value 16-bit
6044_00	Actual velocity value 16-bit
60E4_01	Additive actual position value 1
60E4_02	Additive actual position value 2
ERROR_CODE	Error code
603F_00	Error code
603E_01	Invalid actual velocity
603E_02	Invalid actual position value
603E_03	Additive actual position value 1 invalid
603E_04	Additive actual position value 2 invalid

Notice

With multichannel modules, the object number shifts by 0x800 per channel.

The object number of a module is included in the name of most identifiers.

With identifier 6063_00, the object number is 6063, which should be interpreted hexadecimally.

The object number for the actual position value of the standard channel 0 is 6063. The following then results for identifier 6063_00.

For channel 1: Object number 6**8**63 and identifier 6**8**63_00

For channel 2: Object number **70**63 and identifier **70**63_00

9.5.10 Output process data item (antr.canopen.out[i].*)

This structure can be used to define various output process data.

Structure name	Index
antr.can-open.out[i].	0 ≤ i ≤ 15 (Maximum number of output process data: 16, application-specific)

9.5.10.1 Memory name (P-AXIS-00479)

P-AXIS-00479	**Memory name of output process data item**	
Description	With CANopen drives this parameter defines the memory section to read the process data item for the related output process data item.	
Parameter	antr.canopen.out[i].memory_ident	
Data type	STRING	
Data range	Maximum 29 characters long	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	CANopen	
Remarks	This parameter is supported as of CNC Build V3.01.3060.00. * Note: The default value of variables is a blank string.	

9.5.10.2 Signal number (P-AXIS-00648)

P-AXIS-00648	**Signal ID out (CANopen)**	
Description	Signal number	
Parameter	antr.canopen.out[i].signal_nr	
Data type	UNS16	
Data range		
Axis types		
Dimension		
Default value		
Drive types		
Remarks		

9.5.10.3 Signal length (P-AXIS-00649)

P-AXIS-00649	**Length of process data item out (CANopen)**	
Description	Length of process data item.	
Parameter	antr.canopen.out[i].signal_len	
Data type	UNS08	
Data range		
Axis types		
Dimension		
Default value	0	
Drive types		
Remarks		

9.5.10.4 CNC meaning (P-AXIS-00478)

P-AXIS-00478	**Assign the output process data item to CNC-internal nomenclature**	
Description	This parameter assigns a CNC-internal meaning to the data element configured in the cyclical output process data.	
Parameter	antr.canopen.out[i].nc_ref	
Data type	STRING	
Data range	See figure below	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	CANopen	
Remarks	* Note: The default value of variables is a blank string.	

Identifier	Meaning
POS_NOM	Absolute position command value
607A_00	Absolute position command value
60C1_01	Absolute position command value
DRIVE_CTRL	Drive control word
6040_00	Drive control word
VELO_NOM	Velocity command value
60FF_00	Velocity command value
6042_00	Velocity command value 16-bit
60F6_01	Additive speed command value
TORQUE_MAX	Maximum torque value
6072_00	Maximum torque value
OP_MODE	Command operation mode
6060_00	Command operation mode
TP_CONTROL	Touch probe control word
60B8_00	Touch probe control word
60B1_00	Additive speed command value
60B2_00	Additive torque command value

Notice

With multichannel modules, the object number shifts by 0x800 per channel.

The object number of a module is included in the name of most identifiers.

With identifier 607A_00, the object number is 607A, which should be interpreted hexadecimally.

The object number for the actual position value of the standard channel 0 is 607A. The following then results for identifier 607A_00.

For channel 1: Object number 6**8**7A and identifier 6**8**63_00

For channel 2: Object number **70**7A and identifier 637A_00

9.6 Drive type KUKA (antr.dse.*)

9.6.1 Brake control

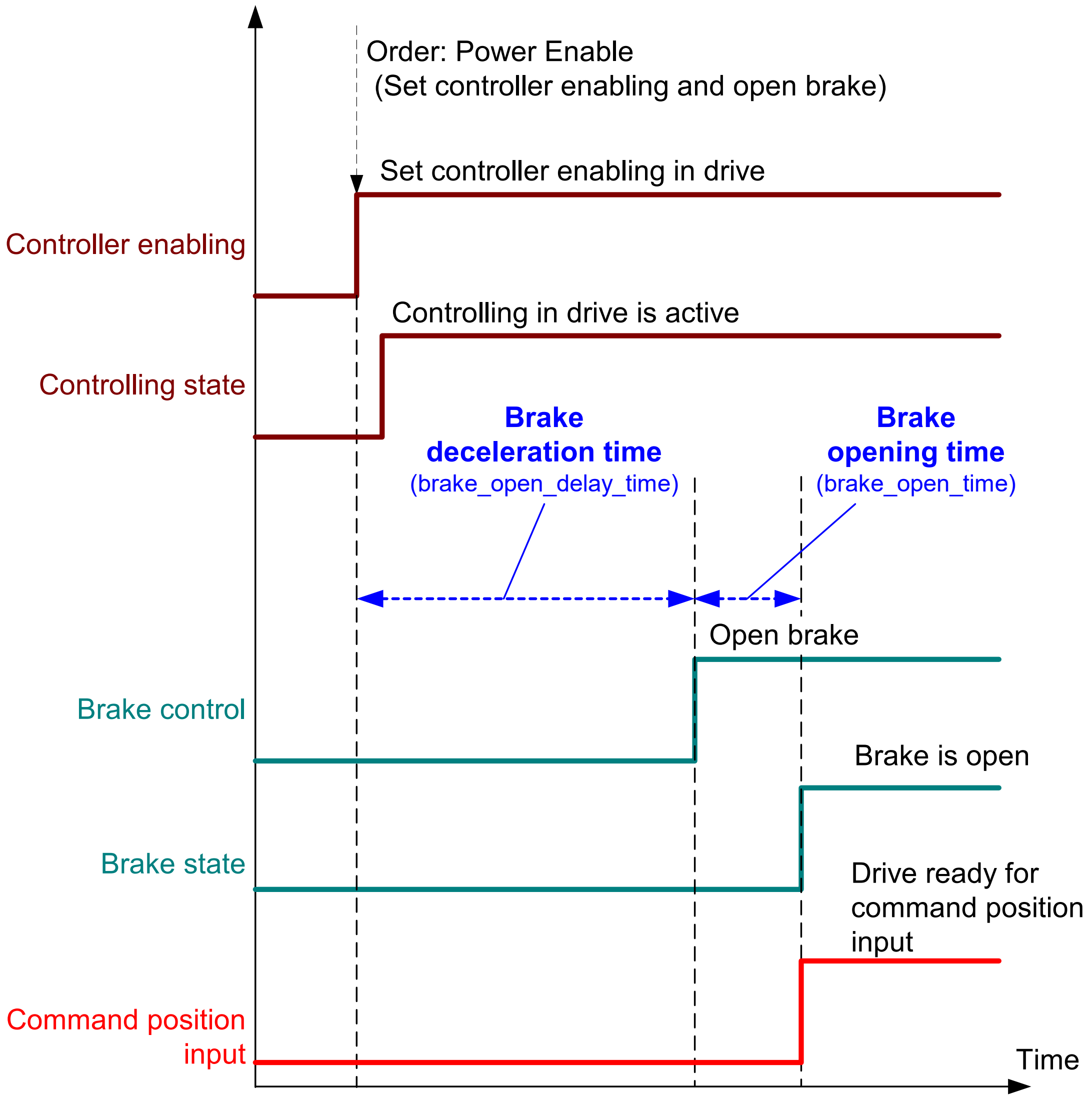


Fig. 37: Timing opening the brake

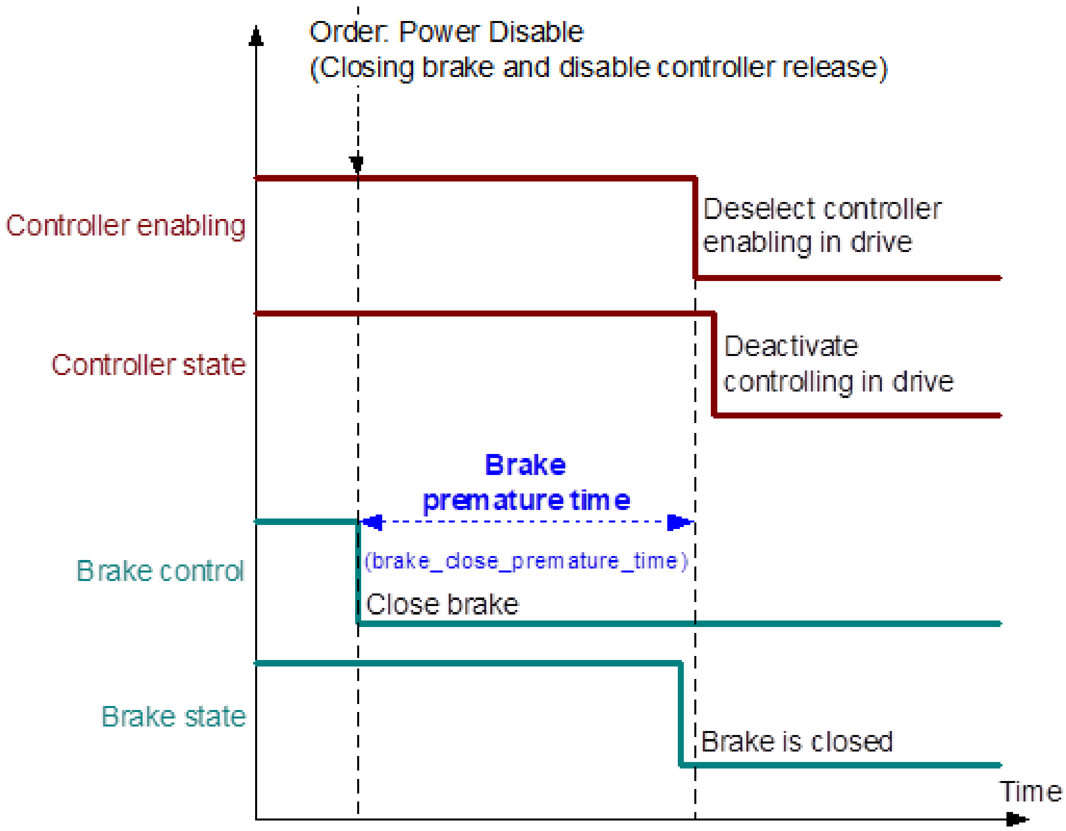


Fig. 38: Timing when closing the brake

9.6.1.1 Time delay for brake opening (P-AXIS-00373)

P-AXIS-00373	**Time delay for brake opening**	
Description	This parameter defines the time delay after which the brake opens during control activation (e.g. via PLC by MC_Power 'Enable').	
Parameter	antr.dse.brake_open_delay_time	
Data type	SGN32	
Data range	0 … MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	KUKA	
Remarks		

9.6.1.2 Brake opening time (P-AXIS-00374)

P-AXIS-00374	**Brake opening time**	
Description	This parameter defines the time which is required for the mechanical opening of the brake. After this time the drive is ready for the command position input.	
Parameter	antr.dse.brake_open_time	
Data type	SGN32	
Data range	0 … MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	KUKA	
Remarks		

9.6.1.3 Brake premature time (P-AXIS-00375)

P-AXIS-00375	**Brake premature time**	
Description	This parameter defines the time which is required for the mechanical closing of the brake during control deactivation (e.g. via PLC by MC_Power 'Disable'). After this time expires, controller enabling is deselected.	
Parameter	antr.dse.brake_close_premature_time	
Data type	SGN32	
Data range	0 … MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	KUKA	
Remarks	Make sure that the brake premature time is not too short for a vertical axis, otherwise there is a danger that the axis drops.	

9.7 Drive type Terminal (antr.terminal.*)

9.7.1 Torque reduction at standstill (P-AXIS-00481)

P-AXIS-00481	**Torque reduction at standstill**	
Description	If this parameter is set and a stepper motor is used, the motor torque is reduced on standstill of the axis by setting a bit in the control word of the stepper motor terminal. The condition for the reduction of the drive current is: The axis is not interpolated. The command velocity output to the terminal is zero	
Parameter	antr.terminal.stepper_motor_reduce_torque	
Data type	BOOLEAN	
Data range	0, 1 (Default : 0)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Terminal	
Remarks	This parameter is only effective in combination with stepper motor terminals of type KL2531, KL2541, EL7031 or 7041	

9.8 Parameters for drive functions (antr.function[i].*)

If the functionality drive-independent switching of drive functions is used ([FCT-A10]), the following parameters specify how the drive function in the NC program requested by the #DRIVE command ([PROG]) is addressed.

Structure name	**Permitted range**
function[i]	0 ≤ i ≤ 9 (Number of drive functions: 10, application-specific)

9.8.1 Name of drive functions in NC program (P-AXIS-00396)

<table>
<tr><th>P-AXIS-00396</th><th colspan="2">Name of drive functions in NC program</th></tr>
<tr><td>Description</td><td colspan="2">This parameter defines the name by which the drive function is activated by the keyword KEY in the #DRIVE command in the NC program ([PROG]).</td></tr>
<tr><td>Parameter</td><td colspan="2">antr.function[i].id</td></tr>
<tr><td>Data type</td><td colspan="2">STRING</td></tr>
<tr><td>Data range</td><td colspan="2">Maximum of 29 characters</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R, S</td></tr>
<tr><td>Dimension</td><td>T: ----</td><td>R,S: ----</td></tr>
<tr><td>Default value</td><td colspan="2">*</td></tr>
<tr><td>Drive types</td><td colspan="2">SERCOS, Profidrive, CANopen</td></tr>
<tr><td>Remarks</td><td colspan="2">Example:
The ID 'TORQLIMIT' is defined for a drive function.

<code>antr.function[0].id   TORQLIMIT</code>

In the NC program this drive function can then be addressed by the command…
#DRIVE WR SYN [AX=... KEY=TORQLIMIT VAL=…]
...
* Note: The default value of variables is a blank string.</td></tr>
</table>

9.8.2 Type of communication with drive controller (P-AXIS-00397)

P-AXIS-00397	**Type of communication with drive controller**	
Description	This parameter defines the type of communication by which the function in the drive is addressed.	
Parameter	antr.function[i].commu	
Data type	STRING	
Data range	CYCLIC: The drive function is switched by a telegram element that is configured in the cyclic drive telegram. The name of the telegram element is defined in P-AXIS-00398 [433] . ACYCLIC: The drive function is addressed by writing a drive parameter through the parameter channel. The name of the telegram element is defined in P-AXIS-00398 [433] . IGNORE: No value is transmitted to the drive.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	CYCLIC	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.8.3 Name of the parameter or telegram element (P-AXIS00398)

P-AXIS-00398	**Name of the parameter or telegram element**	
Description	This parameter defines which drive parameter or which telegram element of the cyclic telegram is to be used for to activate the drive function.	
Parameter	antr.function[i].wr_ident[j]	
Data type	STRING	
Data range	Maximum of 29 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	Dependent on the drive function to be activated, maximum 2 IDs (j=0/1) can be set. Parameterisation example: For a SERCOS drive the torque limit is defined by writing the parameter S-0-92: `antr.function[0].wr_ident[0] S-0-92` * Note: The default value of variables is a blank string.	

9.8.4 Data type of the data to be transmitted (P-AXIS-00399)

P-AXIS-00399	**Data type of the data to be transmitted**	
Description	This parameter defines the data type of the drive parameter or of the telegram element of the cyclic telegram which is used for the activation of the drive function.	
Parameter	antr.function[i].data_type	
Data type	STRING	
Data range	SGN16: Signed 16 bit integer. SGN32: Signed 32 bit integer. BITARRAY_16: Bit array 16 bit. BITARRAY_32: Bit array 32 bit.	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	SGN16	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.8.5 Value of data element after start-up of control (P-AXIS-00400)

P-AXIS-00400	**Value of data element after start-up of control**	
Description	This parameter defines the value of the cyclic telegram element after controller start-up.	
Parameter	antr.function[i].startup_value	
Data type	REAL64	
Data range	If P-AXIS-00399 [434] =' SGN16': MIN(SGN16) ≤ startup_value ≤ MAX(SGN16) If P-AXIS-00399 [434] =' SGN32': MIN(SGN32) ≤ startup_value ≤ MAX(SGN32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	SERCOS, Profidrive, CANopen	
Remarks	This parameter is used only if P-AXIS-00397 [433] has the vaue 'CYCLIC'.	

9.8.6 Scaling of the data to be transmitted (P-AXIS-00401)

P-AXIS-00401	**Scaling of the data to be transmitted**	
Description	This parameter defines the scaling of the value that has to be transmitted to the drive.	
Parameter	antr.function[i].scaling_type	
Data type	STRING	
Data range	UNSCALED:	Unscaled output of the value programmed in the NC program = 1 (default).
	TORQUE_DRIVE_SIDE:	The programmed value is a torque value related to the motor shaft and is scaled to the drive torque format by the parameters P-AXIS-00325 [▸ 201], P-AXIS-00326 [▸ 202] and P-AXIS-00392 [▸ 360] . The scaling factor does not change during gear change. Scaling factor f is: $f = \frac{1}{P-AXIS-00392} * \frac{P-AXIS-00325}{P-AXIS-00326}$
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	UNSCALED	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.8.7 Minimum permissible output value (P-AXIS-00408)

P-AXIS-00408	Minimum permissible output value	
Description	This parameter defines the minimum permissible output value. If the programmed value of the #DRIVE command goes below the minimum value, the drive output value is set automatically to the minimum value. No error message is then output. If parameter P-AXIS-00399 [▸ 434] is smaller than the smallest possible output value of the data type, the error message P-ERR-70384 is output and the parameter value is corrected. if P-AXIS-00409 [▸ 436] is configured, P-AXIS-00409 [▸ 436] must be greater than P-AXIS-00408. If this is not the case, the warning P-ERR-70385 is output and the values are swapped. If this parameter is not configured, no limitation is active.	
Parameter	antr.function[i].min_limit	
Data type	REAL64	
Data range	Depending on P-AXIS-00399 [▸ 434] and P-AXIS-00401 [▸ 435]	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1.000000e+199	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.8.8 Maximum permissible output value (P-AXIS-00409)

P-AXIS-00409	Maximum permissible output value	
Description	This parameter defines the maximum permissible output value. If the programmed value of the #DRIVE command exceeds the maximum value, the drive output value is set automatically to the maximum value. No error message is then output. If the parameter is greater than the maximum value of the set data type defined by P-AXIS-00399 [▸ 434] , the error message P-ERR-70383 is output and the parameter value is corrected. if P-AXIS-00408 [▸ 436] is configured, P-AXIS-00408 [▸ 436] must be less than this parameter. If this is not the case, the warning P-ERR-70385 is output and the- minimum and maximum values are swapped. If this parameter is not configured, no limitation is active.	
Parameter	antr.function[i].max_limit	
Data type	REAL64	
Data range	Depending on P-AXIS-00399 [▸ 434] and P-AXIS-00401 [▸ 435]	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1.000000e+199	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.8.9 Writing of drive values by bit mask (P-AXIS-00429)

P-AXIS-00429	**Writing of drive values by bit mask**	
Description	This parameter specifies the bit mask that must be used if bitwise writing is defined. If the value programmed in the #DRIVE command is greater than zero, the bits defined in the bit mask are set and for a programmed value of zero the bits are reset. This value is only used if the data type configured In P-AXIS-00399 [434] has the value 'BITARRAY_16' or 'BITARRAY_32'. The value of this parameter must be smaller than or equal to the maximum values defined by the setting in P-AXIS-00399 [434] , otherwise the error message P-ERR-70403 is output.	
Parameter	antr.function[i].mask	
Data type	STRING	
Data range	Depending on P-AXIS-00399 [434]: BITARRAY_16: Bit mask 16 Bit - 0 ... MAX(UNS16) BITARRAY_32: Bit mask 32 Bit - 0 ... MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	NOT_USED	
Drive types	SERCOS, Profidrive, CANopen	
Remarks		

9.9 Parameterise motion to fixed stop (antr.fixed_stop.*)

9.9.1 Use default value (P-AXIS-00730)

P-AXIS-00730	**Use of default value**	
Description	Normally, when moving to fixed stop is activated, the value of the drive object is read out before the object is changed by activating the function. After the function ends, the original settings are restored. If this parameter is set to 1, the start value P-AXIS-00723 [▸ 444] is transferred to the drive instead of at the end of motion to fixed stop. The read process on activation can then be omitted.	
Parameter	antr.fixed_stop.drive_ident[i].use_startup_value	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: -	R: -
Default value	0	
Drive types	SERCOS, CANopen	
Remarks	If the object is communicated in the cyclic process data (P-AXIS-00720 [▸ 442] = 'CYCLIC'), it is advisable to set this parameter to the value 1 since the start value in P-AXIS-00723 [▸ 444] is already transferred cyclically to the drive.	

9.9.2 Position lag limit for detection (P-AXIS-00712)

P-AXIS-00712	**Position lag limit to detect the fixed stop**	
Description	This parameter defines this limit for the position lag for the “Move to fixed stop” function after which an overshoot of the fixed stop is detected. Finally, the CNC stops the axis and discards the distance to go of the NC block.	
Parameter	antr.fixed_stop.pos_lag_limit	
Data type	UNS32	
Data range	0 ≤ pos_lag_limit ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	20000	
drive types.	SERCOS, CANopen	
Remarks	The measurement (G100, measurement type 7) with motion to a stop is also subject to the limit in the parameter P-AXIS-00331 [▸ 150]	

9.9.3 Monitoring window (P-AXIS-00713)

P-AXIS-00713	**Monitoring window for the fixed stop.**	
Description	This parameter defines a tolerance window for the fixed stop. If the actual position of the axis leaves the tolerance window after the fixed stop is detected, the CNC issues the error message P-ERR-70548. If this parameter is changed after the fixed stop is detected, the CNC assumes the current fixed stop position as the centre of the new tolerance window.	
Parameter	antr.fixed_stop.window	
Data type	UNS32	
Data range	0 ≤ pos_lag_limit ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	0	
drive types.	SERCOS, CANopen	
Remarks	The monitor is disabled with the value 0.	

9.9.4 Number of position control cycles (P-AXIS-00714)

P-AXIS-00714	**Number of position controller cycles to detect the fixed stop**	
Description	This parameter defines the number of position controller cycles which the position lag of the axis must overshoot the specified position lag limit P-AXIS-00712 [▸ 438] before the fixed stop is detected. Counting start from the beginning if the limit is again undershot during this time.	
Parameter	antr.fixed_stop.nbr_cycles	
Data type	UNS16	
Data range	0 < nbr_cycles < MAX(UNS32)	
Axis types	T, R	
Dimension	T: Number of interpolation cycles	R: Number of interpolation cycles
Default value	10	
drive types.	SECOS, CANopen	
Remarks	The measurement (G100, measurement type 7) with motion to a stop is also subject to the limit in the parameter P-AXIS-00332 [▸ 150]	

9.9.5 Error output on abort (P-AXIS-00715)

P-AXIS-00715	**Error output on abort by reset**	
Description	This parameter defines whether the error message P-ERR-70549 is output if a CNC reset occurs while moving to the fixed stop.	
Parameter	antr.fixed_stop.error_on_abort	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: -	R: -
Default value	1	
drive types.	SERCOS, CANopen	
Remarks		

9.9.6 Error message if fixed stop is not detected (P-AXIS-00716)

P-AXIS-00716	**Error message if fixed stop is not detected**	
Description	This parameter defines whether the error message P-ERR-50886 is output while moving to the fixed stop if the fixed stop was not detected in the approach block.	
Parameter	antr.fixed_stop.error_not_detected	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: -	R: -
Default value	1	
drive types.	SERCOS, CANopen	
Remarks		

9.9.7 Warning message on reset and detected fixed stop (P-AXIS-00717)

P-AXIS-00717	**Warning message on reset and detected fixed stop**	
Description	This parameter defines whether the warning message P-ERR-70550 is output at a CNC reset if the axis is stationary at the fixed stop.	
Parameter	antr.fixed_stop.warning_reset_while_detected	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: -	R: -
Default value	1	
drive types.	SERCOS, CANopen	
Remarks		

9.9.8 Motor torque at maximum axis acceleration (P-AXIS-00718)

P-AXIS-00718	**Motor torque at maximum axis acceleration**	
Description	This parameter defines the motor torque which the drive requires to accelerate at maximum axis acceleration P-AXIS-00008 [▸ 246]. This parameter uses the controller to compensate axis acceleration to the reduced drive torque when moving to fixed stop.	
Parameter	antr.fixed_stop.max_torque	
Data type	REAL64	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: Scaling dependent on P-AXIS-00724 [▸ 445]	R: Scaling dependent on P-AXIS-00724 [▸ 445]
Default value	P-AXIS-00726 [▸ 446] maximum torque limit if P-AXIS-00726 [▸ 446] is specified; otherwise 0.0 (acceleration reduction disabled)	
Drive types	SERCOS, CANopen	
Remarks	The value 0.0 disables acceleration reduction when moving to the fixed stop.	

Up to four drive objects can be configured for motion to the fixed stop and can be changed if the function is activated or deactivated in the drive:

Structure name	Permitted range
drive_ident[i]	0 ≤ i ≤ 3 (Number of drive functions: 4, application-specific)

9.9.9 CNC-internal identifier for the drive object (P-AXIS-00719)

P-AXIS-00719	**CNC-internal identifier for the drive object**	
Description	This parameter specifies a name for the drive object. The keyword TORQUE_LIMIT is reserved for the torque limit. When moving to the fixed stop, the controller checks whether a drive object is configured with the name TORQUE_LIMIT. Otherwise, the controller issues the error message P-ERR-70541.	
Parameter	antr.fixed_stop.drive_ident[i].id	
Data type	STRING	
Data range	Maximum of 29 characters	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	*	
Drive types	SERCOS, CANopen	

Remarks	**Example:**
	Defining the torque limit for a SERCOS drive:
	`antr.fixed_stop.drive_ident[0].id TORQUE_LIMIT`
	`antr.fixed_stop.drive_ident[0].wr_ident S_0_0092`
	* Note: The default value of variables is a blank string.	

9.9.10 Type of communication with drive controller (P-AXIS-00720)

P-AXIS-00720	**Type of communication with drive controller**	
Description	This parameter defines the type of communication by which the function in the drive is addressed. The value can be transferred both in the cyclic process data and in the service channel with SERCOS or SDO communication with CANopen.	
Parameter	antr.fixed_stop.drive_ident[i].commu	
Data type	STRING	
Data range	CYCLIC: The drive object is switched by a telegram element that is configured in the cyclic drive telegram. The name of the telegram element must then be parameterised in the P-AXIS-00721 [▸ 443] parameter. The telegram element must be configured in the cyclic process data. ACYCLIC: The drive function is activated by writing a drive parameter via the parameter channel. The name of the telegram element must then be parameterised in the P-AXIS-00721 [▸ 443] parameter. IGNORE: No value is exchanged with the drive.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	ACYCLIC	
drive types.	SERCOS, CANopen	
Remarks		

9.9.11 Name of the drive object in the driver amplifier (P-AXIS-00721)

P-AXIS-00721	**Name of the drive object in the driver amplifier**	
Description	This parameter defines which drive parameter or which telegram element is to be changed with Moving to fixed stop.	
Parameter	antr.fixed_stop.drive_ident[i].wr_ident	
Data type	STRING	
Data range	Maximum of 29 characters	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	*	
Drive types	SERCOS, CANopen	

Remarks	Example:
	Defining the torque limit for a SERCOS drive:
	`antr.fixed_stop.drive_ident[0].id` `TORQUE_LIMIT`
	`antr.fixed_stop.drive_ident[0]wr_ident` `S_0_0092`
	* Note: The default value of variables is a blank string.	

9.9.12 Data type of the data to be transmitted (P-AXIS-00722)

P-AXIS-00722	**Data type of the data to be transmitted**	
Description	This parameter defines the data type of the drive parameter or telegram element.	
Parameter	antr.fixed_stop.drive_ident[i].data_type	
Data type	STRING	
Data range	SGN16: Signed 16 bit integer SGN32: Signed 32 bit integer UNS16: Unsigned 16-bit integer UNS32: Unsigned 32-bit integer BITARRAY_16: Bit array 16 bit BITARRAY_32: Bit array 32 bit	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	SGN16	
Drive types	SERCOS, CANopen	
Remarks		

9.9.13 Default value of data element after controller start-up (P-AXIS-00723)

P-AXIS-00723	**Default value of data element after controller start-up**	
Description	When cyclic communication is used (see P-AXIS-00720 [▸ 442]), this parameter defines the value of the telegram element after controller start-up. This parameter is also used if reading the current value at the start of motion to fixed stop is not required (see P-AXIS-00730 [▸ 438]). At the end of the move to fixed stop function, the controller writes this value back to the drive.	
Parameter	antr.fixed_stop.drive_ident[i].startup_value	
Data type	REAL64	
Data range	Dependent on the data type P-AXIS-00722 [▸ 443] of the drive object SGN16: MIN(SGN16) ≤ startup_value ≤ MAX(SGN16) SGN32: MIN(SGN32) ≤ startup_value ≤ MAX(SGN32) UNS16: MIN(UNS16) ≤ startup_value ≤ MAX(UNS16) SGN32: MIN(SGN32) ≤ startup_value ≤ MAX(SGN32)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
drive types.	SERCOS, CANopen	
Remarks	This parameter must be assigned if the data item is transferred cyclically, i.e. the parameter P-AXIS-00720 [▸ 442] has the value CYCLIC or reading the active parameter value is suppressed, i.e. P-AXIS-00730 [▸ 438] has the value 1.	

9.9.14 Scaling type of the data element (P-AXIS-00724)

P-AXIS-00724	Scaling type of the data element	
Description	This parameter scales the transferred value before it is transferred to the drive or after the value was read by the drive. This parameter sets the unit of the data item in the NC program independently of the drive. The scaling type influences the values of the following parameters: • Torque at maximum acceleration P-AXIS-00718 [▸ 441] • Default value = P-AXIS-00723 [▸ 444] • Maximum permissible value P-AXIS-00725 [▸ 446] • Minimum permissible value P-AXIS-00726 [▸ 446] • Drive value while moving to fixed stop P-AXIS-00729 [▸ 448]	
Parameter	antr.fixed_stop.drive_ident[i].scaling_type	
Data type	STRING	
Data range	UNSCALED.	The value is not scaled, i.e. the value in the NC program directly corresponds to the value in the drive
	LINEAR.	The value is weighted by a linear scaling factor (see P-AXIS-00728 [▸ 448])
	TORQUE_DRIVE_SIDE.	The programmed value is a torque value related to the motor shaft and is scaled to the drive torque format with the parameters P-AXIS-00325 [▸ 201], P-AXIS-00326 [▸ 202] and P-AXIS-00392 [▸ 360]. The scaling factor does not change during gear change. The conversion factor is: $f = \frac{1}{P-AXIS-00392} * \frac{P-AXIS-00325}{P-AXIS-00326}$
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	UNSCALED	
drive types.	SERCOS, CANopen	

Remarks	Example:
	The torque limit in the SERCOS drive is specified in per mil of the maximum motor torque. However, the torque should be specified in percent in the NC program:
	`antr.fixed_stop.drive_ident[0].id TORQUE_LIMIT`
	`antr.fixed_stop.drive_ident[0].wr_ident S_0_0092`
	`antr.fixed_stop.drive_ident[0].scaling_type LINEAR`
	`antr.fixed_stop.drive_ident[0].scaling_factor 10`	

9.9.15 Maximum permissible output value (P-AXIS-00725)

P-AXIS-00725	**Maximum permissible output value**	
Description	This parameter defines the maximum permissible output value. If the value specified in the configuration lists or in the NC program overshoots the set limit, it is automatically limited to the maximum value. No error message is then output. If P-AXIS-00725 is configured, P-AXIS-00726 [446] must be less than this parameter, otherwise the warning P-ERR-70385 is output and the values are swapped. No value limit takes place by default. Irrespective of this parameter setting, a value range check always takes place with the specified data type P-AXIS-00722 [443]. If an overflow is detected, the controller outputs the error message P-ERR-70384.	
Parameter	antr.fixed_stop.drive_ident[i].max_limit	
Data type	REAL64	
Data range	Dependent on P-AXIS-00722 [443] and P-AXIS-00724 [445]	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	1.000000e+199	
Drive types	SERCOS, CANopen	
Remarks	By default no limit is active; the limit is disabled at a value of 1.000000e+199.	

9.9.16 Minimum permissible output value (P-AXIS-00726)

P-AXIS-00726	**Minimum permissible output value**	
Description	This parameter defines the minimum permissible output value. If the value specified in the configuration lists or in the NC program undershoots the set limit, it is automatically limited to the minimum value. No error message is then output. If P-AXIS-00726 is configured, the parameter value must be greater than P-AXIS-00725 [446], otherwise the warning P-ERR-70385 is output and the values are swapped. No value limit takes place by default. Irrespective of this parameter setting, a value range check always takes place with the specified data type P-AXIS-00722 [443]. If an overflow is detected, the controller outputs the error message P-ERR-70384.	
Parameter	antr.fixed_stop.drive_ident[i].min_limit	
Data type	REAL64	
Data range	Dependent on P-AXIS-00722 [443] and P-AXIS-00724 [445]	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	1.000000e+199	
Drive types	SERCOS, CANopen	
Remarks	By default no limit is active; the limit is disabled at a value of 1.000000e+199.	

9.9.17 Write/read drive values by bit mask (P-AXIS-00727)

P-AXIS-00727	**Writing/reading drive values by bit mask**	
Description	This parameter defines the bit mask to be used to read and write drive values bitwise. If the writing value (default value P-AXIS-00726 [▸ 446] or the value when motion to the fixed stop is active P-AXIS-00729 [▸ 448]) is greater than zero, the bit mask is set; when the value is zero, the bits in the bit mask are deleted from the value transferred to the drive. When read, the value of a bit is returned if all the bits in the bit mask are set in the read drive object. Otherwise the return value is 0. This parameter is only used if the data type configured in P-AXIS-00722 [▸ 443] has either the value 'BITARRAY_16' or 'BITARRAY_32'. The value of the bit mask must fit in the data type of the drive object P-AXIS-00722 [▸ 443], otherwise the controller issues the error message P-ERR-70403.	
Parameter	antr.fixed_stop.drive_ident[i].mask	
Data type	STRING	
Data range	Dependent on P-AXIS-00722 [▸ 443]: BITARRAY_16: Bit mask 16 Bit - 0 ... MAX(UNS16) BITARRAY_32: Bit mask 32 Bit - 0 ... MAX(UNS32)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	NOT_USED	
Drive types	SERCOS, CANopen	
Remarks		

9.9.18 Scaling factor (P-AXIS-00728)

P-AXIS-00728	Scaling factor	
Description	This parameter executes a scaling for reading and writing the drive object. This parameter only acts if the scaling type P-AXIS-00724 [▸ 445] is set to 'LINEAR'.	
Parameter	antr.fixed_stop.drive_ident[i].scaling_factor	
Data type	REAL64	
Data range	Unequal to 0	
Axis types	T, R	
Dimension	T: -	R: -
Default value	1.0	
drive types.	SERCOS, CANopen	

Remarks	**Example:**
	The torque limit in the SERCOS drive is specified in per mil of the maximum motor torque. However, the torque should be specified in percent in the NC program:
	`antr.fixed_stop.drive_ident[0].id TORQUE_LIMIT`
	`antr.fixed_stop.drive_ident[0].wr_ident S_0_0092`
	`antr.fixed_stop.drive_ident[0].scaling_type LINEAR`
	`antr.fixed_stop.drive_ident[0].scaling_factor 10`	

9.9.19 Value of data element during Move to fixed stop (P-AXIS-00729)

P-AXIS-00729	Value of data element during Move to fixed stop	
Description	This parameter specifies the value which the drive object must assume while moving to fixed stop. The specified value may also be scaled before output to the drive (see P-AXIS-00728 [▸ 448]).	
Parameter	antr.fixed_stop.drive_ident[i].active_value	
Data type	REAL64	
Data range	Unequal to 0	
Axis types	T, R	
Dimension	T: - , dependent on P-AXIS-00728 [▸ 448]	R: - , dependent on P-AXIS-00728 [▸ 448]
Default value	0.0	
drive types.	SERCOS, CANopen	

Remarks	**Example:**
	When moving to fixed stop, the torque should be limited to 10% of maximum torque:
	`antr.fixed_stop.drive_ident[0].id TORQUE_LIMIT`
	`antr.fixed_stop.drive_ident[0].wr_ident S_0_0092`
	`antr.fixed_stop.drive_ident[0].scaling_type LINEAR`
	`antr.fixed_stop.drive_ident[0].scaling_factor 10`
	`antr.fixed_stop.drive_ident[0].active_value 10`	

9.9.20 Name of the drive object to be read in the driver amplifier (P-AXIS-00731)

P-AXIS-00731	**Name of the drive object to be read in the driver amplifier**	
Description	If the name of the drive object is different for read and write access, the name of the drive object to be read can also be specified here. If no value is specified here, the controller uses the name of the object in P-AXIS-00721 [443] for read and write.	
Parameter	antr.fixed_stop.drive_ident[i].rd_ident	
Data type	STRING	
Data range	Maximum of 29 characters	
Axis types	T, R	
Dimension	T: -	R: -
Default value	*	
Drive types	SERCOS, CANopen	
Remarks	* Note: The default value of variables is a blank string.	

9.9.21 Use default parameterisation of drive objects (P-AXIS-00821)

P-AXIS-00821	**Use default parameterisation of drive objects**	
Description	By default, drive objects for moving to a fixed stop are preconfigured for each drive type at controller start-up and this overwrites any assignment made in the default axis parameter list. All parameters required to change drive objects are affected by pre-initialisation, i.e. those assigned in in the structure antr.fixed_stop.drive_ident[i].*. However, it a parameterisation is used from the default list, this parameter can be set to the value 0. In this case, no default initialisation of the drive object takes place.	
Parameter	antr.fixed_stop.drive_ident[i].default_ident	
Data type	SGN08	
Data range	0/1	
Axis types	T, R	
Dimension	T: -	R: -
Default value	-1	
Drive types	Simulation, SERCOS, CANopen, Terminal	
Remarks	This parameter replaces the previous parameter P-AXIS-00746 [545].	

9.9.22 Quick stop after detecting the fixed stop (P-AXIS-00762)

P-AXIS-00762	Quick stop after detecting the fixed stop.	
Description	This parameter is used to force an immediate stop when the fixed stop is detected. Normally, after the fixed stop is detected, the axes are stopped at the feedhold acceleration P-AXIS-00024 [▸ 234] set for this axis. For time reasons, an immediate stop can be forced by the axis parameter "quick_stop_after_detection". The condition for this is that all axes involved in the approach movement detected a stop as, in this case, all moving axes are already at a standstill due to the stop. If other axes are also involved in the approach movement, the CNC therefore stops the axes at their normal deceleration rates P-AXIS-00024 [▸ 234] despite the fact that the "quick_stop_after_detection" parameter is set.	
Parameter	antr.fixed_stop.quick_stop_after_detection	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	SERCOS, CANopen	
Remarks		

9.9.23 Error reaction for missing drive releases (P-AXIS-00763)

P-AXIS-00763	Error reaction for missing drive releases.	
Description	If the drive releases are reset after the fixed stop is detected, the CNC generates the error message P-ERR-70546 and aborts the function "Move to fixed stop". This behaviour can be changed by the parameter "error_missing_drive_releases". In any case, missing releases result in the abortion of the function "Move to fixed stop".	
Parameter	antr.fixed_stop.error_missing_drive_releases	
Data type	STRING	
Data range	ERROR: Output of error message P-ERR-70546 and the Move to fixed stop function is aborted WARNING: Output of warning P-ERR-70546 and the Move to fixed stop function is aborted NONE: Abort the Move to fixed stop function	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	ERROR	
Drive types	SERCOS, CANopen	
Remarks	Check the motion range of the axis before you set each release again. The stop obstacle must be removed.	

9.9.24 Position lag limit for fixed stop detection (P-AXIS-00769)

P-AXIS-00769	**Position lag limit for fixed stop detection**	
Description	This parameter defines the position lag that must be exceeded to detect a fixed stop. When set to the value 0, the system deactivates the check for position lag to detect a fixed stop. If this parameter has a value < 0 (default), fixed stop detection uses the value in P-AXIS-00331 [▸ 150] .	
Parameter	antr.fixed_stop.detect.pos_lag_limit	
Data type	SGN32	
Data range	MIN(SGN32) < P-AXIS-00769 < MAX(SGN32)	
Axis types	<T, R>	
Dimension	T: 0.1 µm	R: .1* 10- 4 °
Default value	-1	
Drive types	----	
Remarks	If the function ‘Measuring travel to fixed stop’ is used and the value of parameter P-AXIS-00774 [▸ 151] is less than 0, this parameter is used as the limit value for fixed stop detection. Currently this parameter only acts with measuring travel to fixed stop if P-AXIS-00774 [▸ 151] is not parameterised. Parameter available as of CNC Build V2.11.2810.01 and higher	

9.9.25 Minimum time for fixed stop detection (P-AXIS-00770)

P-AXIS-00770	**Minimum time for fixed stop detection**	
Description	This parameter defines the length of time that the check conditions for detection of the fixed stop must be fulfilled when measuring travel to fixed stop so that the fixed stop is considered to be detected. If this parameter has the value 0 (default), the value P-AXIS-00332 [▸ 150] is used as the time limit for fixed stop detection.	
Parameter	antr.fixed_stop.detect.min_time	
Data type	UNS32	
Data range	0 < P-AXIS-00770 < MAX(UNS32)	
Axis types	<T, R>	
Dimension	T: µs	R: µs
Default value	0	
Drive types	----	
Remarks	If the function ‘Measuring travel to fixed stop’ is used and the value of parameter P-AXIS-00775 [▸ 151] is less than 0, the parameter is used as the limit value for fixed stop detection. Currently this parameter only acts with measuring travel to fixed stop if P-AXIS-00775 [▸ 151] is not parameterised. Parameter available as of CNC Build V2.11.2810.01 and higher	

9.9.26 Minimum path to activate fixed stop detection (P-AXIS-00771)

P-AXIS-00771	**Minimum path to activate fixed stop detection**	
Description	This parameter defines how far to travel in the motion block before fixed stop detection is activated. The value specified is a distance within the motion block. If the value is less than 0, this parameter is set to 0 so that fixed stop detection is activated at the start of the block. A value of zero activates fixed stop detection immediately at the start of the block. If P-AXIS-00772 [▸ 454] is parameterised at the same time, the smaller block motion path defined by the two parameters is used as the minimum path. When measuring with several axes, the smallest block motion path of all axes involved in the measurement is used as the minimum path.	
Parameter	antr.fixed_stop.detect.start_distance	
Data type	SGN32	
Data range	0 < P-AXIS-00771 < MAX(SGN32)	
Axis types	<T, R>	
Dimension	T: 0.1 µm	R: 10-4 °
Default value	-1	
Drive types	----	
Remarks	If the function ‘Measuring travel to fixed stop’ is used and the value of parameter P-AXIS-00776 [▸ 152] is less than 0, the parameter is used as the limit value for fixed stop detection. Currently this parameter only acts with measuring travel to fixed stop if P-AXIS-00776 [▸ 152] is not parameterised. Parameter available as of CNC Build V2.11.2810.01 and higher	

9.9.27 Percentage minimum path for fixed stop detection (P-AXIS-00772)

P-AXIS-00772	**Minimum path to activate fixed stop detection specified in per mill of block length**	
Description	This parameter defines the distance per mill of the motion block that must be travelled before fixed stop detection is activated. A value of less than zero activates fixed stop detection immediately at the start of the block. A value of zero activates fixed stop detection immediately at the start of the block. If P-AXIS-00771 [▸ 453] is parameterised at the same time, the smaller block motion path defined by the two parameters is used as the minimum path. When measuring with several axes, the smallest block motion path of all axes involved in the measurement is used as the minimum path. The permitted maximum value is 1000. If this value is exceeded at controller start, the warning ID 110658 is output but the value is not automatically corrected.	
Parameter	antr.fixed_stop.detect.start_distance_per_mille	
Data type	SGN16	
Data range	MIN(SGN16) < P-AXIS-00772 ≤ 1000	
Axis types	<T, R>	
Dimension	T: 0.1 %	R: 0.1 %
Default value	-1	
Drive types	----	
Remarks	Currently this parameter only acts with ‘Measuring travel to fixed stop’ if P-AXIS-00777 [▸ 153] is not parameterised. If the function ‘Measuring travel to fixed stop’ is used and the value of parameter P-AXIS-00777 [▸ 153] is less than 0, the parameter is used as the limit value for fixed stop detection. This parameter must be checked if an error message with ID 51026 appears. Parameter available as of CNC Build V2.11.2810.01 and higher	

9.9.28 Maximum position change for fixed stop detection (P-AXIS-00773)

P-AXIS-00773	**Maximum permitted position change for fixed stop detection**	
Description	This parameter defines the maximum path which may be travelled in the time defined by P-AXIS-00770 [452] to detect the fixed stop. Together with P-AXIS-00770 [452] , an average velocity is defined but this may not be exceeded to detect the fixed stop. If the value is less than or equal to zero, velocity monitoring is deactivated for fixed stop detection.	
Parameter	antr.fixed_stop.detect.max_delta_position_window	
Data type	SGN32	
Data range	MIN(SGN32) < P-AXIS-00773 ≤ MAX(SGN32)	
Axis types	<T, R>	
Dimension	T: 0.1 μ	R: 10e-4 °
Default value	-1	
Drive types	----	
Remarks	If the function 'Measuring travel to fixed stop' is used and the value of parameter P-AXIS-00778 [154] is less than 0, the parameter is used as the limit value for fixed stop detection. Currently this parameter only acts with measuring travel to fixed stop if P-AXIS-00778 [154] is not parameterised. Parameter available as of CNC Build V2.11.2810.01 and higher	

9.9.29 Velocity limit for fixed stop detection (P-AXIS-00817)

P-AXIS-00817	**Velocity limit for fixed stop detection**	
Description	This parameter specifies the residual velocity percentage for detection of a fixed stop. The default value 1000*0.1% means that the stop is detected at every reduction in velocity. Here, the velocity limit does not contribute to detection and can be regarded as deactivated.	
Parameter	antr.fixed_stop.detect.detect_velocity_limit	
Data type	UNS16	
Data range	0 ≤ P-AXIS-00769 ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	1000	
Drive types	---	
Remarks	This parameter can be used as default to detect a fixed stop. All functions that require this (measuring, homing and moving to a fixed stop) access this parameter if it is not explicitly parameterised. *Currently only for homing to a fixed stop.	

9.9.30 Default value for torque limit for fixed stop detection (P-AXIS-00818)

P-AXIS-00818	**Default value for torque limit for fixed stop detection**	
Description	This parameter defines the default value for the percentage torque to detect a fixed stop. It refers to the reduced torque that is written to the drive using the drive identifier for moving to a fixed stop P-AXIS-00719 [442]. A value of zero means that the torque is not used to detect a fixed stop.	
Parameter	antr.fixed_stop.detect.detect_torque_limit	
Data type	UNS16	
Data range	0 ≤ P-AXIS-00818 ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0	
Drive types	Simulation, SERCOS, CANopen	
Remarks	This parameter can be used as default to detect a fixed stop. All functions that require this (measuring, homing and moving to a fixed stop) access this parameter if it is not explicitly parameterised. *Currently only for homing to a fixed stop.	

9.10 Address offset for digital drive types

9.10.1 Address offset input (P-AXIS-00707)

P-AXIS-00707	**Address offset input**	
Description	Input address offset for digital drive types	
Parameter	antr.addroffs.input	
Data type	UNS32	
Data range		
Axis types		
Dimension	----	
Default value		
Drive types		
Remarks		

9.10.2 Address offset output (P-AXIS-00580)

P-AXIS-00580	**Address offset output**	
Description	Output address offset for digital drive types	
Parameter	antr.addroffs.output	
Data type	UNS32	
Data range		
Axis types		
Dimension		
Default value		
Drive types		
Remarks	Index of the axis at the drive actual value interface.	

9.11 Use actual speed for speed monitoring (P-AXIS-00779)

P-AXIS-00779	**Use configured actual speed for speed monitoring and display data**	
Description	By default the actual position value is used to calculate the actual speed when the actual position value and the actual speed value are configured in the process data. This parameter sets the configured actual speed value that is used to determine the actual speed. With path axes, the parameter only acts on the display data. Since the position values are also modulo calculated, the maximum speed is limited to 180°/cycle. To obtain a correct actual speed of spindles at speeds > 180°/cycle, this parameter defines that the actual speed value must be used for speed monitoring even if an actual position value is configured in the process data. When this parameter is used, the speed scaling (see P-AXIS-00205 [352], P-AXIS-00206 [352] and P-AXIS-00207 [351]) must be correctly set.	
Parameter	antr.velocity_monitoring_use_act_velocity	
Data type	BOOLEAN	
Data range	0: Calculate the actual speed from the actual position value. 1: The configured actual speed of the drive is used for speed monitoring and display data.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types		
Remarks	As of V3.1.3079.14, parameter P-AXIS-00779 replaces P-AXIS-00519 [82]. When the parameter P-AXIS-00779 is used, an actual speed must be configured in the process data. If this is not the case, the warning ID 70480 is output and the parameter value is set to 0.	

9.12 Signal for main encoder (P-AXIS-00823)

<table>
<tr><th>P-AXIS-00823</th><th colspan="2">Signal for main encoder</th></tr>
<tr><td>Description</td><td colspan="2">This parameter defines any signal as the main encoder signal.
This signal is used to execute functions such as tracking mode and position lag monitoring. Normally, the motor encoder is used. This parameter is required in order to use an external encoder as actual position value.</td></tr>
<tr><td>Parameter</td><td colspan="2">antr.main_encoder</td></tr>
<tr><td>Data type</td><td colspan="2">STRING</td></tr>
<tr><td rowspan="3">Data range</td><td colspan="2">Possible signals of each drive</td></tr>
<tr><td>SERCOS</td><td>CANopen</td></tr>
<tr><td>LAGEIST_WERT, S_0_0053, S_0_0386</td><td>POS_ACT, 60E4_01</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R, S</td></tr>
<tr><td>Dimension</td><td>T: -</td><td>R,S: -</td></tr>
<tr><td>Default value</td><td colspan="2">*</td></tr>
<tr><td>Drive types</td><td colspan="2">SERCOS, CANopen</td></tr>
<tr><td>Remarks</td><td colspan="2">* Note: The default value of variables is a blank string.
Parameter available as of CNC Build V3.1.3080.13 or V3.1.3107.45.

When specifying P-AXIS-00823, it must contain the identical character string as in P-AXIS-00131 [▸ 394] or P-AXIS-00475 [▸ 423].

Example for SERCOS<pre>
antr.main_encoder   LAGEIST_WERT
antr.sercos.at[0].nc_ref   LAGEIST_WERT
antr.secondary_encoder   S-0-0053
antr.sercos.at[1].nc_ref   S-0-0053 (P-AXIS-00131)
</pre>Example for CANopen:<pre>
antr.main_encoder   POS_ACT
antr.canopen.in[0].nc_ref   POS_ACT
antr.secondary_encoder   60E4_01
antr.canopen.in[1].nc_ref   60E4_01 (P-AXIS-00475)
</pre></td></tr>
</table>

9.13 Signal for secondary encoder (P-AXIS-00824)

<table>
<tr><th>P-AXIS-00824</th><th colspan="2">Signal for secondary encoder</th></tr>
<tr><td>Description</td><td colspan="2">This parameter defines any signal as the secondary encoder.
This signal is used to execute functions such as reading in sensor data for distance control.
By default, the second encoder found by the controller is used.</td></tr>
<tr><td>Parameter</td><td colspan="2">antr.secondary_encoder</td></tr>
<tr><td>Data type</td><td colspan="2">STRING</td></tr>
<tr><td rowspan="3">Data range</td><td colspan="2">Possible signals of each drive</td></tr>
<tr><td>SERCOS</td><td>CANopen</td></tr>
<tr><td>S_0_0053, S_0_0386</td><td>60E4_01</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R, S</td></tr>
<tr><td>Dimension</td><td>T: -</td><td>R,S: -</td></tr>
<tr><td>Default value</td><td colspan="2">*</td></tr>
<tr><td>Drive types</td><td colspan="2">SERCOS, CANopen</td></tr>
<tr><td>Remarks</td><td colspan="2">* Note: The default value of variables is a blank string.
Parameter available as of CNC Build V3.1.3080.13 or V3.1.3107.45.

This parameter can only be used in combination with P-AXIS-00823 [▸ 458]).
When specifying P-AXIS-00824, it must contain the identical character string as in P-AXIS-00131 [▸ 394] or P-AXIS-00475 [▸ 423].

Example for SERCOS
<code>antr.main_encoder   LAGEIST_WERT</code>
<code>antr.sercos.at[0].nc_ref   LAGEIST_WERT</code>
<code>antr.secondary_encoder   S-0-0053</code>
<code>antr.sercos.at[1].nc_ref   S-0-0053 (P-AXIS-00131)</code>

Example for CANopen:
<code>antr.main_encoder   POS_ACT</code>
<code>antr.canopen.in[0].nc_ref   POS_ACT</code>
<code>antr.secondary_encoder   60E4_01</code>
<code>antr.canopen.in[1].nc_ref   60E4_01 (P-AXIS-00475)</code></td></tr>
</table>

10 Parameters for manual operation (handbetrieb.*)

This structure permits the definition of parameters for manual mode. The axis-specific manual mode parameters are summarised here. These parameters should not be confused with the manual mode-specific parameters which are documented in [MANU].

Notice

The parameters described in this section are independent of the drive and axis type settings.

Attention

Manual mode is only possible for axes which are assigned to a path interpolator. Axes are assigned to interpolators by channel parameters [CHAN].

10.1 Settings for default parameters (handbetrieb.default.*)

10.1.1 Operation mode (P-AXIS-00139)

P-AXIS-00139	**Operation mode of manual mode**	
Description	The parameter defines the manual operation mode.	
Parameter	handbetrieb.default.operation_mode	
Data type	UNS16	
Data range	1: Handwheel 2: Continuous (continuous movement until new command) 3: Incremental (fixed path movement)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

10.1.2 Logical identifier of control element (P-AXIS-00046)

P-AXIS-00046	**Logical identifier of control element**	
Description	The parameter defines the logical identifier of control element.	
Parameter	handbetrieb.default.control_element	
Data type	UNS16	
Data range	0 < control_element < MAX(UNS16)	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

10.2 Setting of offset limits

These parameters can specify the movement range axis-specifically in manual operation. This traverse range is preset to the current interpolation position as **relative** offset. Therefore the positive offset limit must be defined larger than or equal to zero. Similarly, the condition less than or equal to zero also applies to the negative offset limit.

10.2.1 Relative positive offset limit (P-AXIS-00138)

P-AXIS-00138	**Relative positive offset limit in manual mode**	
Description	The parameter defines the relative positive offset limit.	
Parameter	handbetrieb.offsetgrenze_pos	
Data type	SGN32	
Data range	0 ≤ offsetgrenze_pos ≤ MAX(SGN32)	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	1000000	
drive types.	----	
Remarks	If both parameters offsetgrenze_neg and offsetgrenze_pos are set to 0, offset monitoring is inactive!	

10.2.2 Relative negative offset limit (P-AXIS-00137)

P-AXIS-00137	**Relative negative offset limit in manual mode**	
Description	The parameter defines the relative negative offset limit.	
Parameter	handbetrieb.offsetgrenze_neg	
Data type	SGN32	
Data range	MIN(SGN32) ≤ offsetgrenze_neg ≤ 0	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	-1000000	
drive types.	----	
Remarks	If both parameters offsetgrenze_neg and offsetgrenze_pos are set to 0, offset monitoring is inactive!	

10.2.3 Setting of default values after G200 or G201 (P-AXIS-00446)

P-AXIS-00446	**Setting of default values after G200 or G201**	
Description	This parameter determines whether the default entries of the axis list for the parameters P-AXIS-00139 [▸ 460] and P-AXIS-00046 [▸ 461] should be valid after reset.	
Parameter	handbetrieb.default.after_g200_g201	
Data type	BOOLEAN	
Data range	0: Manual mode settings for P-AXIS-00139 [▸ 460] and P-AXIS-00046 [▸ 461] should remain valid after rest. 1: Default entries of the axis list for P-AXIS-00139 [▸ 460] and P-AXIS-00046 [▸ 461] are adopted.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

10.3 ACS movement limits

These parameters defines the axis-specific movement range in manual mode. In contrast to the offset limits P-AXIS-00137 [▸ 462] and P-AXIS-00138 [▸ 462], these values are always absolute values which affect the level of the axis coordinates. The adjustable minimum and maximum values are determined by the software limit switches.

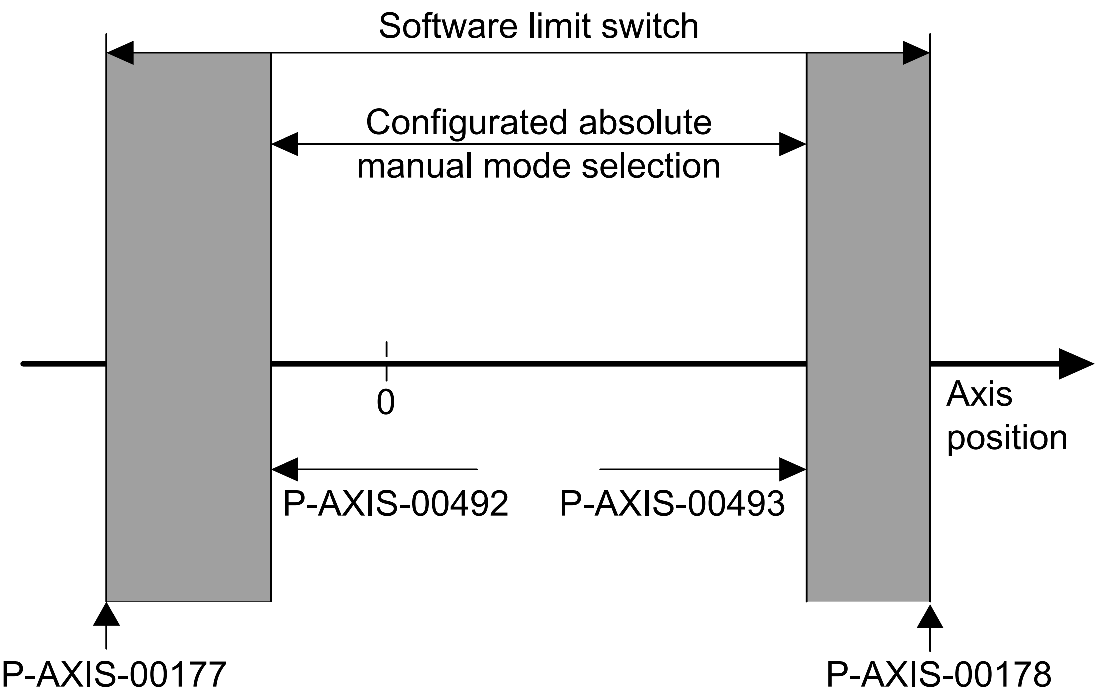


Fig. 39: Absolute motion limits in manual mode

10.3.1 Absolute positive ACS movement limit (P-AXIS-00493)

P-AXIS-00493	**Absolute positive ACS movement limit in manual mode**	
Description	The parameter defines the absolute positive ACS movement limit.	
Parameter	handbetrieb.acs_limit_pos	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] ≤ acs_limit_pos ≤ P-AXIS-00178 [▸ 121]	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	0	
drive types.	----	
Remarks	If both parameters acs_limit_neg and acs_limit_pos are set to 0, the offset monitoring is inactive!	

10.3.2 Absolute negative ACS movement limit (P-AXIS-00492)

P-AXIS-00492	**Absolute negative ACS movement limit in manual mode**	
Description	The parameter defines the absolute negative ACS movement limit.	
Parameter	handbetrieb.acs_limit_neg	
Data type	SGN32	
Data range	P-AXIS-00177 [▸ 121] ≤ acs_limit_neg ≤ P-AXIS-00178 [▸ 121]	
Axis types	T, R	
Dimension	T: 0.1µm	R: 0.0001 °
Default value	0	
drive types.	----	
Remarks	If both parameters acs_limit_neg and acs_limit_pos are set to 0, the offset monitoring is inactive!	

10.3.3 Effect of feedhold control signals (P-AXIS-00529)

P-AXIS-00529	**Effect of feedhold control signals in manual mode**	
Description	This parameter influences the effect of channel- and axis-specific feedhold on manual movements. Both variants, exclusive manual mode (G200) and inclusive manual mode (G201), can be controlled. For example, a manual mode axis can be moved although the path movement stops because of active channel feedhold. The parameter P-AXIS-00540 [▸ 192] defines the mode of the feedhold interface.	
Parameter	handbetrieb.feedhold_mode	
Data type	UNS32	
Data range	0: With G200 or G201, the channel- and axis-specific feedholds are effective 1: With G201, only axis specific feedhold is effective; with G200, channel- and axis-specific feedholds are effective. 2: With G200 and G201, only axis-specific feedhold is effective.	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

10.4 Settings for hand wheel (handbetrieb.hr.*)

This structure defines the parameters for the 'Handwheel' operating mode.

10.4.1 Hand wheel resolutions (P-AXIS-00025)

P-AXIS-00025	**Hand wheel resolutions**	
Description	Handwheel resolutions are expected in the unit [0.1µm/U] for linear axes or in the unit [0.0001°/U] for rotary axes.	
Parameter	handbetrieb.hr.aufl[i] with i = 0 … 2 (Count of resolution steps: 3) *	
Data type	REAL64	
Data range	> 0	
Axis types	T, R	
Dimension	T: 0.1µm/U	R: 0.0001°/U
Default value	10	
Drive types	----	
Remarks	This axis-specific resolution for the handwheel operating mode should not be confused with the handwheel-specific resolution [MANU]. * As of **V3.00.et seq.** and **V263.SBV.et seq.** : i = 0 … 5 (Count of resolution steps: 6)	

10.4.2 Filter time constant for hand wheel increments (P-AXIS-00069)

P-AXIS-00069	**Filter time constant for hand wheel increments**	
Description	After multiplication by the handwheel resolution, a mean value for read-in handwheel increments is calculated with 'filter_zeit' cycles.	
Parameter	handbetrieb.hr.filter_zeit	
Data type	UNS32	
Data range	0 ≤ filter_zeit ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: Number of interpolation cycles	R: Number of interpolation cycles
Default value	10	
Drive types	----	
Remarks		

10.5 Settings for the continuous jog mode (handbetrieb.tipp.*)

This structure defines the parameters for the 'continuous jog' operation mode.

10.5.1 Velocity for the continuous jog mode (P-AXIS-00077)

P-AXIS-00077	**Velocity for the continuous jog mode**	
Description	The continuous jog velocities are expected in the unit [µm /s] for linear axes or in the unit [0.001°/s] for rotary axes.	
Parameter	handbetrieb.tipp.geschw[i] where i = 0 … 2 (Count of continuous jog velocity steps: 3) *	
Data type	UNS32	
Data range	0 ≤ geschw[i] ≤ P-AXIS-00212 [245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0,001°/s
Default value	16666	
Drive types	----	
Remarks	* As of **V3.00.et seq.** and **V263.SBV.et seq.** : i = 0 … 5 (Count of continuous jog velocity steps: 6)	

10.5.2 Rapid mode velocity for continuous jog mode (P-AXIS-00210)

P-AXIS-00210	**Rapid mode velocity for continuous jog mode**	
Description	The parameter defines the rapid traverse velocity for continuous jog mode.	
Parameter	handbetrieb.tipp.vb_eilgang	
Data type	UNS32	
Data range	0 ≤ vb_eilgang ≤ P-AXIS-00212 [245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0,001°/s
Default value	166666	
Drive types	----	
Remarks		

10.6 Settings for incremental jog mode (handbetrieb.jog.*)

This structure defines the parameters for the 'incremental jog' operating mode .

10.6.1 Jog incremental widths (P-AXIS-00232)

P-AXIS-00232	**Jog incremental widths**	
Description	Jog incremental widths are expected in the unit [0.1µm] for linear axes or in the unit [0.0001°] for rotary axes.	
Parameter	handbetrieb.jog.weg[i] with i = 0 … 2 (Count of jog parameter steps: 3) *	
Data type	REAL64	
Data range	> 0	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	10000	
Drive types	----	
Remarks	* As of **V3.00.et seq.** and **V263.SBV.et seq.** : i = 0 … 5 (Count of jog parameter steps: 6)	

10.6.2 Incremental jog velocities (P-AXIS-00076)

P-AXIS-00076	**Incremental jog velocities**	
Description	The incremental jog velocities are expected in the unit [µm /s] for linear axes or in the unit [0.001°/s] for rotary axes.	
Parameter	handbetrieb.jog.geschw[i] where i = 0 … 2 (Count of jog parameter steps: 3) *	
Data type	UNS32	
Data range	0 ≤ geschw[i] ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0,001°/s
Default value	16666	
Drive types	----	
Remarks	* As of **V3.00.et seq.** and **V263.SBV.et seq.** : i = 0 … 5 (Count of jog parameter steps: 6)	

10.6.3 Rapid mode velocity for jog mode (P-AXIS-00530)

P-AXIS-00530	**Rapid mode velocity for jog mode**	
Description	The parameter defines the rapid traverse velocity for jog mode. If this value is not set, the value of P-AXIS-00213 [▸ 474] (hb.vb_max) is used.	
Parameter	handbetrieb.jog.rapid_velocity	
Data type	UNS32	
Data range	0 ≤ rapid_velocity ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0,001°/s
Default value	0	
Drive types	----	
Remarks	As of **V3.1.3050.03** When this parameter is 0, the value of P-AXIS-00213 [▸ 474] (hb.vb_max) is used.	

10.7 Manual operation mode with parallel interpolation (handbetrieb.ipo.*)

For manual operation with parallel interpolation, the permissible axis dynamics parameters are divided between manual operation and interpolation.

Notice

For manual mode with active kinematic transformation in connection with Cartesian machine structures (e.g. robots), specify the Cartesian dynamic parameters in P-CHAN-00198, P-CHAN-00199 and P-CHAN-00200 as well as the axis-specific dynamic parameters described below.

If the former are not assigned, the axis-specific values are used for Cartesian dynamics.

10.7.1 Velocity part of manual operation (P-AXIS-00083)

P-AXIS-00083	**Velocity part of manual operation with parallel interpolation**	
Description	The parameter defines the velocity part of manual operation mode at the permissible axis velocity.	
Parameter	handbetrieb.ipo.hb_proz_v_max	
Data type	UNS16	
Data range	0 … 100	
Axis types	T, R	
Dimension	T: %	R: %
Default value	30	
Drive types	----	
Remarks		

10.7.2 Velocity part of interpolation (P-AXIS-00095)

P-AXIS-00095	**Velocity part of interpolation**	
Description	The parameter defines the velocity part of interpolation at the permissible axis velocity.	
Parameter	handbetrieb.ipo.ipo_proz_v_max	
Data type	UNS16	
Data range	0 … 100	
Axis types	T, R	
Dimension	T: %	R: %
Default value	70	
Drive types	----	
Remarks	P-AXIS-00083 [▸ 470] (hb_proz_v_max) and P-AXIS-00095 [▸ 471] (ipo_proz_v_max) together must be 100%.	

10.7.3 Acceleration part of manual operation (P-AXIS-00082)

P-AXIS-00082	**Acceleration part of manual operation with parallel interpolation**	
Description	The parameter defines the acceleration part of manual operation mode at the permissible axis acceleration.	
Parameter	handbetrieb.ipo.hb_proz_a_max	
Data type	UNS16	
Data range	0 … 100	
Axis types	T, R	
Dimension	T: %	R: %
Default value	30	
Drive types	----	
Remarks		

10.7.4 Acceleration part of interpolation (P-AXIS-00094)

P-AXIS-00094	**Acceleration part of interpolation**	
Description	The parameter defines the acceleration part of interpolation at permissible axis acceleration.	
Parameter	handbetrieb.ipo.ipo_proz_a_max	
Data type	UNS16	
Data range	0 … 100	
Axis types	T, R	
Dimension	T: %	R: %
Default value	70	
Drive types	----	
Remarks	P-AXIS-00082 [▹ 471] (hb_proz_a_max) and P-AXIS-00094 [▹ 472] (ipo_proz_a_max) together must be 100%.	

10.7.5 Position correction

In some applications the manual operation mode interface is used for position correction. So, in general, the velocities and accelerations which are greater than the maximum limits must also be set. The following parameters permit the setting of specific dynamic values for manual operation mode.

10.7.5.1 Velocity during position correction (P-AXIS-00365)

P-AXIS-00365	**Velocity during position correction**	
Description	The parameter defines the effective velocity of manual operation mode during the use in a position correction.	
Parameter	handbetrieb.ipo.hb_v_max_track	
Data type	UNS32	
Data range	0 < hb_v_max_track ≤ 2000000000 (Presetting of maximum axis velocity, plausibility limit, application-specific)	
Axis types	T, R, S	
Dimension	T: µm/s	R,S: 0,001°/s
Default value	0	
Drive types	----	
Remarks		

10.7.5.2 Acceleration during position correction (P-AXIS-00366)

P-AXIS-00366	**Acceleration during position correction**	
Description	The parameter defines the effective acceleration of manual operation mode during use in a position correction.	
Parameter	handbetrieb.ipo.hb_a_max_track	
Data type	UNS32	
Data range	0 < hb_a_max_track ≤ 100000000 (Presetting of maximum axis acceleration, plausibility limit, application-specific)	
Axis types	T, R, S	
Dimension	T: mm/s²	R,S: °/s²
Default value	0	
Drive types	----	
Remarks	There is no limitation of the parameter values on the permissible maximum velocities P-AXIS-00212 [▸ 245] and acceleration parameters P-AXIS-00008 [▸ 246].	

10.8 Manual operation mode without parallel interpolation (handbetrieb.hb.*)

This structure defines the permissible axis dynamics parameters for manual operation mode without parallel interpolation.

Notice

For manual mode with active kinematic transformation in connection with Cartesian machine structures (e.g. robots), specify the Cartesian dynamic parameters in P-CHAN-00198, P-CHAN-00199 and P-CHAN-00200 as well as the axis-specific dynamic parameters described below.

If the former are not assigned, the axis-specific values are used for Cartesian dynamics.

10.8.1 Maximum velocity (P-AXIS-00213)

P-AXIS-00213	**Maximum velocity for manual operation without parallel interpolation**	
Description	The parameter defines the maximum velocity for manual operation mode.	
Parameter	handbetrieb.hb.vb_max	
Data type	UNS32	
Data range	0 < vb_max ≤ P-AXIS-00212 [▸ 245]	
Axis types	T, R	
Dimension	T: µm/s	R: 0,001°/s
Default value	166666	
Drive types	----	
Remarks		

10.8.2 Maximum acceleration (P-AXIS-00009)

P-AXIS-00009	**Maximum acceleration for manual operation without parallel interpolation**	
Description	The parameter defines the maximum acceleration for manual operation mode.	
Parameter	handbetrieb.hb.a_max	
Data type	UNS32	
Data range	0 ≤ a_max ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	1000	
Drive types	----	
Remarks		

10.8.3 Feedhold acceleration (P-AXIS-00259)

P-AXIS-00259	**Feedhold acceleration for manual operation without parallel interpolation**	
Description	The parameter defines the acceleration with active feedhold for manual operation mode. When the parameter has the value 0, it is assigned the value of P-AXIS-00009 [474] (handbetrieb.hb.a_max).	
Parameter	handbetrieb.hb.a_feedh	
Data type	UNS32	
Data range	0 ≤ a_feedh ≤ P-AXIS-00008 [246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	0	
Drive types	----	
Remarks		

10.8.4 Ramp time during maximum acceleration (P-AXIS-00359)

P-AXIS-00359	**Ramp time during maximum acceleration for manual operation without parallel interpolation**	
Description	The parameter defines the ramp time in basic mode for manual operation mode. Value 0 means linear slope (default).	
Parameter	handbetrieb.hb.tr	
Data type	UNS32	
Data range	P-AXIS-00201 [247] ≤ tr ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: µs	R: µs
Default value	0	
Drive types	----	
Remarks		

10.8.5 Ramp time at feedhold (P-AXIS-00360)

P-AXIS-00360	**Ramp time at feedhold for manual operation without parallel interpolation**	
Description	The parameter defines the ramp time during active feedhold for manual operation mode.	
Parameter	handbetrieb.hb.tr_feedh	
Data type	UNS32	
Data range	P-AXIS-00201 [▸ 247] ≤ tr_feedh ≤ MAX(UNS32)	
Axis types	T, R	
Dimension	T: µs	R: µs
Default value	0	
Drive types	----	
Remarks	P-AXIS-00259 [▸ 475] is output and P-AXIS-00360 is only used if parameter P-CHAN-00097 in the channel parameter list is assigned the value 1.	

10.8.6 Maximum deceleration (P-AXIS-00541)

P-AXIS-00541	**Maximum delay for manual operation without parallel interpolation**	
Description	The parameter defines the maximum delay for manual operation mode. When the parameter has the value 0, it is assigned the value of P-AXIS-00009 [▸ 474] (handbetrieb.hb.a_max).	
Parameter	handbetrieb.hb.d_max	
Data type	UNS32	
Data range	0 < d_max ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	0	
Drive types	----	
Remarks		

10.8.7 Reduced maximum acceleration (P-AXIS-00545)

P-AXIS-00545	**Reduced maximum acceleration for manual operation without parallel interpolation**	
Description	The parameter defines the active acceleration for manual mode with an active PLC control signal via the control unit Activation of reduced manual mode acceleration (bahn_mc_control.reduced_acceleration).	
Parameter	handbetrieb.hb.a_max_red	
Data type	UNS32	
Data range	0 < a_max_red ≤ P-AXIS-00008 [▸ 246]	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	1000	
drive types.	----	
Remarks		

11 Parameters for measurement simulation (meas_simu.*)

This structure groups the axis-specific measurement simulation parameters.

11.1 Methods for measurement simulation (P-AXIS-00112)

P-AXIS-00112	Methods for measurement simulation	
Description	This parameter defines the method that is used to calculate the measurement signal point. The measurement signal point is the position when the measurement signal is output. The value in P-AXIS-00145 [479] must be specified depending on the measuring method selected. With measuring method 1, the axis position is assigned to P-AXIS-00145 [479].	
Parameter	meas_simu.meas_simu_mode	
Data type	SGN32	
Data range	1: Measurement signal is generated after reaching or crossing a predefined axis position. (interpretation mode: axis position *) 2: Measurement signal is generated after a defined number of CNC cycles. (interpretation mode: time *) 3: Measurement signal is triggered as soon as the percentage residual path of the axis in the measuring block is less than the set value. (interpretation mode: part distance *) 4: Measurement signal is generated if all axes have reached the target position. (interpretation mode: path position) 5: Measurement signal is generated if one of the axes has reached the target position. In contrast to mode 4 the signal is set immediately if any of the programmed measurement axes is already placed on the target position. (interpretation mode: path position) 6: Measuring signal is set if a geometric object (e.g. sphere) is probed. For a detailed description of the object, see P-AXIS-00145 [479]. (interpretation mode: geometry**)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
drive types.	SERCOS	
Remarks	* In addition, the parameter P-AXIS-00145 [479] must be set for the modes 1, 2, 3. ** In addition, the parameters P-AXIS-00145 [479] to P-AXIS-00148 [483] must be set for Mode 6.	

11.2 Setting of the measurement position for simulation

11.2.1 Setting of Parameter 1 (P-AXIS-00145)

<table>
<tr><th>P-AXIS-00145</th><th colspan="5">Setting parameter 1 for measurement simulation</th></tr>
<tr><td>Description</td><td colspan="5">Depending on the method selected, the measurement simulation requires meas_simu_mode (P-AXIS-00112 [▸ 478]) a predefined value (axis position, part distance, counter value) as command condition to generate the measurement signal.
This predefined value is stored in this parameter in the corresponding unit.</td></tr>
<tr><td>Parameter</td><td colspan="5">meas_simu.parameter1</td></tr>
<tr><td>Data type</td><td colspan="5">SGN32</td></tr>
<tr><td>Data range</td><td colspan="5">MIN(SGN32) ≤ parameter1≤ MAX(SGN32)</td></tr>
<tr><td>Axis types</td><td colspan="5">T, R</td></tr>
<tr><td>Dimension</td><td colspan="2">T: ----</td><td colspan="3">R,S: ----</td></tr>
<tr><td>Default value</td><td colspan="5">0</td></tr>
<tr><td>Drive types</td><td colspan="5">Simulation</td></tr>
<tr><td rowspan="3">Remarks</td><td colspan="5">Dimension of parameter 1 dependent on the selected mode:</td></tr>
<tr><td>meas_simu_mode - Wert</td><td>1</td><td>2</td><td>3</td><td>6</td></tr>
<tr><td>parameter1 - dimension</td><td>[0.1 µm or 0.0001°]</td><td>-------</td><td>%</td><td>[0.1 µm or 0.0001°]</td></tr>
</table>

Supplements and examples of Mode 6

Mode 6 simulates the probing of a geometric object. In the XY plane this may be a rectangle or a circle; in XYZ space this may be a cuboid, a sphere or a cylinder.

The 4 axis parameters P-AXIS-00145 to P-AXIS-00148 [▸ 483] are required to describe the object.

Parameter ID	Parameter name	Meaning	Unit
P-AXIS-00145	meas_simu.parameter1	Minimum position	[0.1 µm or 0.0001°]
P-AXIS-00146 [▸ 482]	meas_simu.parameter2	Maximum position	[0.1 µm or 0.0001°]
P-AXIS-00147 [▸ 482]	meas_simu.parameter3	Centre point coordinates	[0.1 µm or 0.0001°]
P-AXIS-00148 [▸ 483]	meas_simu.parameter4	Radius	[0.1 µm or 0.0001°]

Example

Rectangle in XY plane

The measurement signal is triggered when the machine moves within the (axis-parallel) rectangle specified by the following coordinates:

- bottom left corner has the coordinates [17mm, 5mm]
- top right corner has the coordinates [32mm, 8mm]

Parameter name	Meaning	X axis	Y axis	Z axis
meas_simu.parameter1	Minimum position	170000	50000	0
meas_simu.parameter2	Maximum position	320000	80000	0
meas_simu.parameter3	Centre point coordinates	0	0	0
meas_simu.parameter4	Radius	0	0	0

Example

Cube in XYZ space

The measurement signal is triggered when the machine moves in the (axis-parallel) cube which has the following opposite corners:

- bottom left front corner has the coordinates [17mm, 5mm, -6mm]
- top right rear corner has the coordinates [32mm, 8mm, 2mm]

Parameter name	Meaning	X axis	Y axis	Z axis
meas_simu.parameter1	Minimum position	170000	50000	-60000
meas_simu.parameter2	Maximum position	320000	80000	20000
meas_simu.parameter3	Centre point coordinates	0	0	0
meas_simu.parameter4	Radius	0	0	0

Example

Circle in the XY plane

The measurement signal is triggered when the machine moves into the circle with centre point [11mm, 22mm] and radius 17mm.

The radius must be specified in every axis involved.

Parameter name	Meaning	X axis	Y axis	Z axis
meas_simu.para-meter1	Minimum position	0	0	0
meas_simu.para-meter2	Maximum position	0	0	0
meas_simu.para-meter3	Centre point coordinates	110000	220000	0
meas_simu.para-meter4	Radius	170000	170000	0

Example

Sphere in XYZ space

The measurement signal is triggered when the machine moves into the sphere with centre point [11mm, 22mm, 33mm] and radius 17mm.

The radius must be specified in every axis involved.

Parameter name	Meaning	X axis	Y axis	Z axis
meas_simu.para-meter1	Minimum position	0	0	0
meas_simu.para-meter2	Maximum position	0	0	0
meas_simu.para-meter3	Centre point coordinates	110000	220000	330000
meas_simu.para-meter4	Radius	170000	170000	170000

11.2.2 Setting of Parameter 2 (P-AXIS-00146)

P-AXIS-00146	**Setting parameter 2 for measurement simulation**	
Description	Depending on the method selected, the measurement simulation requires *meas_simu_mode* (P-AXIS-00112 [▸ 478]) a predefined value (axis position, part distance, counter value) as command condition to generate the measurement signal. This predefined value is stored in this parameter in the corresponding unit.	
Parameter	meas_simu.parameter2	
Data type	SGN32	
Data range	MIN(SGN32) ≤ parameter2≤ MAX(SGN32)	
Axis types	T, R	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	Simulation	
Remarks	Dimension of parameter 2 depending on the selected mode:	

11.2.3 Setting of Parameter 3 (P-AXIS-00147)

P-AXIS-00147	**Setting parameter 3 for measurement simulation**	
Description	Depending on the method selected, the measurement simulation requires *meas_simu_mode* (P-AXIS-00112 [▸ 478]) is a predefined value (axis position, part distance, counter value) to check the command condition for generating a measurement signal. This predefined value is stored in this parameter in the corresponding dimension.	
Parameter	meas_simu.parameter3	
Data type	SGN32	
Data range	MIN(SGN32) ≤ parameter3≤ MAX(SGN32)	
Axis types	T, R	
Dimension	T: ----	T: ----
Default value	0	
Drive types	Simulation	
Remarks	Dimension of parameter 3 depending on the selected mode:	

11.2.4 Setting of Parameter 4 (P-AXIS-00148)

P-AXIS-00148	**Setting parameter 4 for measurement simulation**	
Description	Depending on the method selected, the measurement simulation requires *meas_simu_mode* (P-AXIS-00112 [▸ 478]) is a fourth predefined value (axis position, part distance, counter reading) to check the command condition for generating a measurement signal. This predefined value is stored in this parameter in the corresponding dimension.	
Parameter	meas_simu.parameter4	
Data type	SGN32	
Data range	MIN(SGN32) ≤ parameter4≤ MAX(SGN32)	
Axis types	T, R	
Dimension	T: ----	T: ----
Default value	0	
Drive types	Simulation	
Remarks	Dimension of parameter 4 depending on the selected mode:	

12 Axis-specific filter functions

12.1 Default filter function (filter[i].*)

In this structure the parameters for the axis specific filters are defined.

Structure name	Index
filter[i]	0 ≤ i ≤ 2 (Quantity of different filters: 3, application-specific)

12.1.1 Filter - order (P-AXIS-00140)

P-AXIS-00140	**Order of axis specific command value filter**	
Description	This parameter defines the filter order. In addition, this parameter is a value which expresses the fall of frequency response (fall = - order x 20 dB/ decade). The value **order = 0** means: no filter is active. With HSC NoVib or time delay filters, the order is calculated internally but an order > 0 is required, otherwise the filter is not active.	
Parameter	filter[i].order	
Data type	UNS32	
Data range	0 ≤ order ≤ 6 for low-pass, high-pass and all-pass filters 0 ≤ order ≤ 3 for band-pass and band-stop filters order = 0 or 1 for PT1 filters order = 0 or 2 for PT2 filters order = 0 or > 0 for time delay filters 0 ≤ order ≤ 200 for HSC filters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

12.1.2 Filter - characteristic (P-AXIS-00153)

P-AXIS-00153	**Characteristic of axis-specific command value filter**	
Description	The parameter defines the filter characteristic.	
Parameter	filter[i].prototype	
Data type	STRING	
Data range	CRIT_DAMPING 1: 'Critical damping' filter characteristic: BUTTERWORTH 2: Butterworth filter characteristic BESSEL 3: Bessel filter characteristic HSC - 5: Filter characteristic 'HSC'	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	CRIT_DAMPING	
Drive types	----	
Remarks		

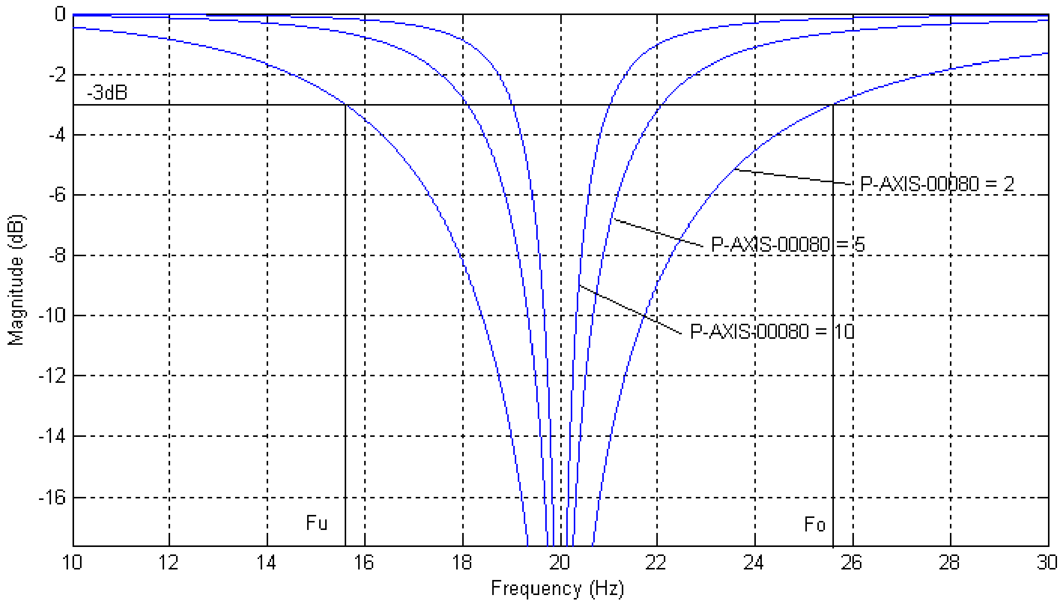
12.1.3 Filter - type (P-AXIS-00204)

P-AXIS-00204	**Type of axis-specific command value filter**	
Description	The parameter defines the filter type.	
Parameter	filter[i].type	
Data type	UNS32	
Data range	1 ≤ type ≤ 12 where:	
	1	Low-pass filter
	2	High-pass filter
	3	Band-pass filter
	4	Band-stop filter
	5	All-pass filter
	6	PT1 filter
	7	reserved
	8	HSC average
	9	reserved
	10	PT2 filter
	11	Time delay filter (as of CNC Build 3013 and higher)
	12	HSC NoVib
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1 for standard filters (filter[i].prototype 1-4) 8 for HSC filters (filter[i].prototype 5)	
Drive types	----	
Remarks		

12.1.4 Filter - frequency (P-AXIS-00067)

P-AXIS-00067	**Characteristic frequency of the axis-specific command value filter**	
Description	- The frequency range parameter defines the following standard filters: • Low-pass: Beginning of cut-off frequency range (ideal filter) • High-pass : Beginning of pass-band frequency range (ideal filter) • Band-pass and band-stop filters : Middle frequency - This parameter defines the first natural frequency to be suppressed for the HSC NoVib	
Parameter	filter[i].fg_f0	
Data type	REAL64	
Data range	$0 \le fg\_f0 < 0.5/T_{fall}$ (where T_{fall} is the NC cycle time)	
Axis types	T, R, S	
Dimension	T: Hz	R,S: Hz
Default value	3.000000e+001	
Drive types	----	
Remarks		

12.1.5 Filter - bandwidth (P-AXIS-00080)

<table>
<tr><td>P-AXIS-00080</td><td colspan="2">Bandwidth of axis specific command value filter</td></tr>
<tr><td>Description</td><td colspan="2">Definition of reciprocal of bandwidth for band-pass and band-stop filter types.
The figure below illustrates the parameter behaviour.
</td></tr>
<tr><td>Parameter</td><td colspan="2">filter[i].guete</td></tr>
<tr><td>Data type</td><td colspan="2">REAL64</td></tr>
<tr><td>Data range</td><td colspan="2">1 ≤ guete ≤ 10</td></tr>
<tr><td>Axis types</td><td colspan="2">T, R, S</td></tr>
<tr><td>Dimension</td><td>T: ----</td><td>R,S: ----</td></tr>
<tr><td>Default value</td><td colspan="2">1.0</td></tr>
<tr><td>Drive types</td><td colspan="2">----</td></tr>
<tr><td>Remarks</td><td colspan="2"></td></tr>
</table>

12.1.6 Filter - signal share (P-AXIS-00164)

P-AXIS-00164	**Signal share of axis specific command value filter**	
Description	The parameter defines the signal share in percent which is processed by the filter.	
Parameter	filter[i].share_percent	
Data type	REAL64	
Data range	0 ≤ share_percent ≤ 100	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1.000000e+002	
Drive types	----	
Remarks		

12.1.7 Filter - activation (P-AXIS-00319)

P-AXIS-00319	**Activate the axis-specific command value filter (for standard filters)**	
Description	This parameter controls the general enabling/disabling of the filter function.	
Parameter	filter[i].enable	
Data type	BOOLEAN	
Data range	0: Filter is disabled 1: Filter is enabled	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	The filter function is only activated for filter order > 0 (P-AXIS-00140 [▸ 484]).	

12.1.8 Filter - time constant (P-AXIS-00357)

P-AXIS-00357	**Time constant of axis specific command value filter**	
Description	- Application for standard filters: The parameter defines the time constants of the PT1, PT2 and time delay filters. - Application with HSC filters: Filter order in µs [alternative to parameter P-AXIS-00140 [▸ 484] The value time_constant is only used if P-AXIS-00140 [▸ 484] is not configured or has the value 0. If time_constant < NC cycle time, the filter is not active unless the parameter order P-AXIS-00140 [▸ 484] has a valid value which is then used in this case. With HSC NoVib, the order is calculated internally but an order > 0 is required, otherwise the filter is not active.	
Parameter	filter[i].time_constant	
Data type	UNS32	
Data range	- Standard filters: For PT1 / PT2 filters: TAb ≤ P-AXIS-00357 ≤ MAX(UNS32) For time delay filters: 0 ≤ P-AXIS-00357 < 6 * TAb (where TAb is NC cycle time in s) - HSC filters: TAb < P-AXIS-00357 < 200 * TAb (where TAb is NC cycle time in µs)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	10000	
Drive types	----	
Remarks		

12.2 FIR filters (filter_fir.*)

FIR filters (Finite Impulse Response filters) are discrete filters with an impulse response of finite length.

Release Note

The functions and parameters are available as of CNC Build V.3.1.3075..

12.2.1 FIR filters - activation (P-AXIS-00573)

P-AXIS-00573	**Enable axis-specific FIR filter**	
Description	This parameter controls the general enabling/disabling of the filter function.	
Parameter	filter_fir.enable	
Data type	BOOLEAN	
Data range	0: Filter is disabled 1: Filter is enabled	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks	The filter function is only enabled if a valid filter type (P-AXIS-00586 [492]) is selected, otherwise the filter is disabled. Alternatively, the filter can also be enabled or disabled with the NC command #FILTER ON/OFF. The parameter is available as of V3.1.3075.00	

12.2.2 FIR filters - type (P-AXIS-00586)

P-AXIS-00586	**Type of axis-specific FIR filter**	
Description	The parameter defines the FIR filter type	
Parameter	filter_fir.type	
Data type	UNS32	
Data range	0 – No filter 1 – Moving average filter 2 – Gaussian filter 3 – Windowed sinc filter 4 – Time delay filter	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks	The filter function is only enabled if a valid filter type is selected, otherwise the filter is disabled. The parameter is available as of V3.1.3075.00	

12.2.3 FIR filters - order (P-AXIS-00587)

P-AXIS-00587	**Order of axis-specific FIR filter**	
Description	This parameter defines the order of FIR axis filters. The filter is off when order = 0. In order to use a configured filter effectively, it is absolutely necessary to specify order > 0.	
Parameter	filter_fir.order	
Data type	UNS32	
Data range	0 ≤ order ≤ 200 (*)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
drive types.	----	
Remarks	Alternatively, filter effectiveness can be achieved by assigning a valid value in P-AXIS-00591 [▸ 493] or by programming a filter order in the NC program. (*) The data range of the filter type (P-AXIS-00586) time delay filter is 0 ≤ order ≤ 100 The parameter is available as of V3.1.3075.00	

12.2.4 FIR filters - order in time (P-AXIS-00591)

P-AXIS-00591	**Order of axis-specific FIR filter in time**	
Description	Alternatively to P-AXIS-00587 [▸ 492] , this parameter specifies the order of the FIR filter. If this parameter is smaller than the NC cycle time, the filter is disabled. This parameter is used only if P-AXIS-00587 [▸ 492] was not configured and no filter order was programmed by the NC program.	
Parameter	filter_fir.order_time	
Data type	UNS32	
Data range	NC cycle time ≤ order_time ≤ 200 * NC cycle time (*)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0	
Drive types	----	
Remarks	(*) The data range of the filter type (P-AXIS-00586) time delay filter is NC cycle time ≤ order_time ≤ 100* NC cycle time The parameter is available as of V3.1.3075.00	

12.2.5 FIR filters - share factor (P-AXIS-00590)

P-AXIS-00590	**FIR filter share factor**	
Description	This parameter defines the effectiveness of the FIR filter. When the parameter is assigned: • share = 0 : no filter effect • share = 100 : the filter is 100% effective on axis setpoints (default)	
Parameter	filter_fir.share	
Data type	UNS32	
Data range	0 ≤ order ≤ 100	
Axis types	T, R, S	
Dimension	T: %	R,S: %
Default value	100	
drive types.	----	
Remarks	The parameter is available as of V3.1.3075.00	

12.2.6 FIR filters - limit frequency (P-AXIS-00585)

P-AXIS-00585	**Cut-off frequency of the FIR filter**	
Description	This parameter defines the cut-off frequency of the FIR filter. This parameter is only relevant for FIR filters which consider a cut-off frequency. This is dependent on the filter type of the FIR filter (P-AXIS-00586) [492]; the cut-off frequency is only considered with type 3 (windowed sinc filter).	
Parameter	filter_fir.fcut	
Data type	REAL64	
Data range	1 ≤ fcut	
Axis types	T, R, S	
Dimension	T: Hz	R,S: Hz
Default value	30	
drive types.	----	
Remarks	The parameter is available as of V3.1.3075.00	

12.2.7 FIR filters - quality (P-AXIS-00593)

P-AXIS-00593	**FIR filter quality**	
Description	This parameter influences the shape of the FIR filter core and therefore setpoint smoothing. The quality then specifies the width of the filter core curve. The higher the quality, the wider the filter core curve and the stronger the smoothing effect of the filter. The width of the actual filter core in the shape of the specified order is not affected by bandwidth.	
Parameter	filter_fir.quality	
Data type	REAL64	
Data range	0 < quality <= 1	
Axis types	T, R	
Dimension	T, R: -	S: -
Default value	1.0	
drive types.	----	
Remarks	The parameter is available as of Build V3.1.3075.04 and only acts on filter type 2 (P-AXIS-00586 [492] – Gaussian) The parameter is available as of V3.1.3075.04	

12.3 Vibration suppression (vib_guard.*)

Release Note

The functions and parameters are available as of CNC Build V.3.1.3075..

12.3.1 Activating the Vibration Guard (P-AXIS-00588)

P-AXIS-00588	**Activating the Vibration Guard**	
Description	This parameter can permanently activate or deactivate the Vibration Guard function at program start.	
Parameter	vib_guard.active	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	Alternatively, the Vibration Guard can also be activated or deactivated by the NC command #VIB GUARD / OFF . The parameter is available as of V3.1.3075.00	

12.3.2 Vibration Guard mode (P-AXIS-00571)

P-AXIS-00571	**Vibration Guard mode**	
Description	This parameter defines Modes 1 - 4 of the Vibration Guard function. Modes 1– 3: • Asymmetrical modes (contours may have different forward and backward motions). • The higher the mode (1-3), the less sensitive to deviations from the actual natural frequency • The higher the mode (1-3), the larger the axis error (or contour deviation) Mode 4: • Symmetrical mode (contours are identical in forward and backward motion).	
Parameter	vib_guard.mode	
Data type	UNS32	
Data range	1 ≤ mode ≤ 4	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	1	
Drive types	----	
Remarks	See Table of sensitivity to natural frequency: [496] The parameter is available as of V3.1.3075.00	

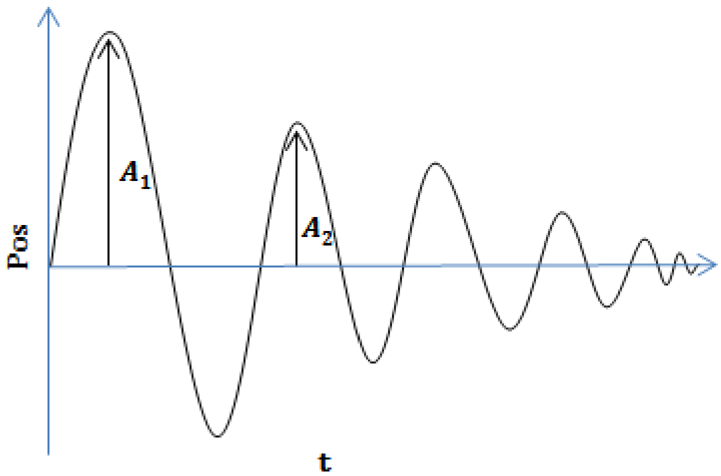
Table of standard values for sensitivity

Permitted deviations for max. 5% residual vibration (at damping=0.1)	max. negative deviation	max. positive deviation
Mode 1:	-3%	+3%
Mode 2:	-13%	+19%
Mode 3:	-20%	+33%
Mode 4:	-10%	+13%

12.3.3 Machine natural frequency (P-AXIS-00589)

P-AXIS-00589	**Machine natural frequency**	
Description	This parameter specifies the machine's natural frequency which the Vibration Guard function is to suppress.	
Parameter	vib_guard.freq	
Data type	REAL64	
Data range	1 ≤ freq	
Axis types	T, R, S	
Dimension	T: Hz	R,S: Hz
Default value	30	
Drive types	----	
Remarks	The parameter is available as of V3.1.3075.00	

12.3.4 Damping factor of natural frequency (P-AXIS-00568)

P-AXIS-00568	Damping factor of natural frequency	
Description	Besides the natural frequency itself, this parameter can also specify the damping factor of the natural frequency which is defined as follows: $$DAMPING = \frac{1}{\sqrt{1+\left(\frac{2\pi}{\delta}\right)^2}}, \qquad \delta = ln(A_1/A_2)$$ 	
Parameter	vib_guard.damping	
Data type	REAL64	
Data range	0 ≤ damping ≤ 1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0.1	
Drive types	----	
Remarks	The parameter is available as of V3.1.3075.00	

13 Parameters for axis specific transformation (trafo.*)

13.1 Actual value transformation (trafo.actual_pos.*)

This structure defines the parameters for the axis-specific actual value transformation.

13.1.1 Activation (P-AXIS-00380)

P-AXIS-00380	**Activation of axis specific actual value transformation**	
Description	This parameter controls the general activation/deactivation of the transformation. Selection/ deselection is possible only during start-up.	
Parameter	trafo.actual_pos.enable	
Data type	BOOLEAN	
Data range	0: Transformation is disabled (default) 1: Transformation is enabled	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

13.1.2 Transformation ID (P-AXIS-00381)

P-AXIS-00381	**Transformation ID of axis specific actual value transformation**	
Description	This parameter defines the value of the transformation ID.	
Parameter	trafo.actual_pos.id	
Data type	UNS16	
Data range	0: No function (default) 1: Double axes angle-strut length transformation type 1 2: Double axes angle-strut length transformation type 2 3: Single axis angle-strut length transformation type 3	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

13.1.3 Transformation parameters (P-AXIS-00382)

P-AXIS-00382	**Transformation parameters of axis specific actual value transformation**	
Description	This parameter parameterises the selected transformation of P-AXIS-00381 [▸ 499] . The significance of the parameters depends on the particular transformation.	
Parameter	trafo.actual_pos.param[i] with i = 0 … 74 (Maximum number of trafo parameters, application-specific)	
Data type	REAL64	
Data range	Depends on transformation ID	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

13.1.4 Additional input axes (P-AXIS-00371)

P-AXIS-00371	**Additional input axes of axis specific actual value transformation**	
Description	Some specific transformation types, like transformation ID 1 and 2, not only require the current actual position of the related axis as input variable but also the actual positions of additional axes. This parameter allows the definition of additional input axes by their logical axis numbers.	
Parameter	trafo.actual_pos.input[i].nr	
Data type	UNS16	
Data range	0 < nr < MAX(UNS16)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

13.2 Command value transformation (trafo.command_pos.*)

This structure defines the parameters for an axis-specific command value transformation.

13.2.1 Activation (P-AXIS-00368)

P-AXIS-00368	Activation of axis specific command value transformation	
Description	This parameter controls the general activation/deactivation of the transformation. Selection/ deselection is possible only on start-up.	
Parameter	trafo.command_pos.enable	
Data type	BOOLEAN	
Data range	0: Transformation is disabled (default) 1: Transformation is enabled	
Axis types	R	
Dimension		R: ----
Default value	0	
Drive types	----	
Remarks		

13.2.2 Transformation ID (P-AXIS-00369)

P-AXIS-00369	Transformation ID of axis specific command value transformation	
Description	This parameter defines the value of the transformation ID. At the moment the following transformation functions are available:	
Parameter	trafo.command_pos.id	
Data type	UNS16	
Data range	0: No function (default value) 1: e-function [505]: Transformation from linear motion to rotation 2: Crank function [506]: Transformation from linear motion to rotation 3: Eccenter function [508]: Transformation from linear motion to rotation 4: Slider crank kinematic [509]: Transformation from rotation to linear motion 5: Angular kinematic [511]: Transformation from angular kinematic to linear motion (as of V3.1.3107.41/ V4.3.0) 6: Symmetrical slider crank [515]: Transformation from linear motion to rotation (as of V3.1.3080.10 or V3.1.3107.43/V4.5.0]	
Axis types	R	
Dimension		R: ----
Default value	0	
Drive types	----	
Remarks		

13.2.3 Transformation parameters (P-AXIS-00370)

P-AXIS-00370	Transformation parameters of axis specific command value transformation
Description	The transformation parameters are entered in this array corresponding to the selected transformation ID P-AXIS-00369 [501] .
Parameter	trafo.command_pos.param[i] where i = 0 … 74 (Maximum number of transformation parameters, application-specific
Data type	REAL64
Data range	Meaning (depends on transformation ID) ID 1 [505]: **e-function** param[0] h (*) in 1.0 E-4 mm param[1] k_0 (*) param[2] k_1 (*) param[3] k_2 (*) param[4] φ_{Norm} Normalisation of motor angle (*) in 1.0 E-4° (*see equations of the functions) ID 2 [506]: **Crank function** param[0] Crank length l_1 in 1.0 E-4 mm param[1] Con-rod length l_2 in 1.0 E-4 mm param[2] Eccentricity e param[3] Solution range for motor angle φM 0:.0-180 degrees 1: 180-360 degrees param[4] Moving direction of linear axis 0: positive 1: negative param[10] Zero point offset of linear axis In 1.0 E-4 mm ID 3 [508]: **Eccenter function** param[0] Eccenter radius R in 1.0 E-4 mm param[1] Offset zero position linear axis In 1.0 E-4 mm param[2] Offset zero position rotary axis in 1.0 E-4° param[3] Solution range angle j 0:.-90..+90 degrees 1: 90..270 degrees ID 4 [509]: **Slider crank kinematic** param[0] l_a Distance 1 hinge points In 1.0 E-4 mm param[1] l_b Distance 2 hinge points In 1.0 E-4 mm param[2] Crank length l_h in 1.0 E-4 mm param[3] Offset zero position linear axis In 1.0 E-4 mm param[4] Rotation direction of rotary axis B 0: positive 1: negative

	ID 5 [▸ 511]: **Angular kinematic** param[0] l_1 Length 1 in 1.0 E-4 mm param[1] l_2 Length 2 in 1.0 E-4 mm param[2] Stroke length l_h in 1.0 E-4 mm param[3] Lower limit of angle excursion in 1.0 E-4° param[4] Upper limit of angle excursion in 1.0 E-4° param[5] Position offset for linear axis in 1.0 E-4 mm (as of V3.1.3107.46/ V4.7.0) param[6] Angle offset of angle excursion in 1.0 E-4°(as of V3.1.3107.52) param[7] Angle inversion (as of V3.1.3107.52) 0:.no angle inversion 1: Angle value is inverted. param[8] Inversion of linear position (as of V3.1.3107.52) 0: no inversion 1: Linear position is inverted. ID 6 [▸ 515]: **Symmetrical slider crank** param[0] Crank length/con-rod length l in 1.0 E-4 mm param[1] Offset zero position linear axis ln 1.0 E-4 mm param[2] Zero point offset of rotary axis 1.0 E-4° param[3] Solution range for motor angle φM 0:.0-180 degrees 1: 180-360 degrees	
Axis types	R	
Dimension		R: ----
Default value	0	
Drive types	----	
Remarks		

13.2.4 Transformation types

ID 1: e function

$$x = f(\varphi) = h * \left(k_1 * e^{k_2 * \varphi} + k_3\right),$$

$$with\ \varphi = \frac{\varphi_M}{\varphi_{Norm}}, \qquad 0 \leq \varphi_M \leq \varphi_{Norm}, 0 \leq \varphi_{Norm} \leq 360°$$

Example:

```
trafo.command_pos.param[0]  10000   (h)
trafo.command_pos.param[1]  1.0     (k0)
trafo.command_pos.param[2]  2.0     (k1)
trafo.command_pos.param[3]  1.0     (k2)
trafo.command_pos.param[4]  1800000 (normalisation of motor angle)
```

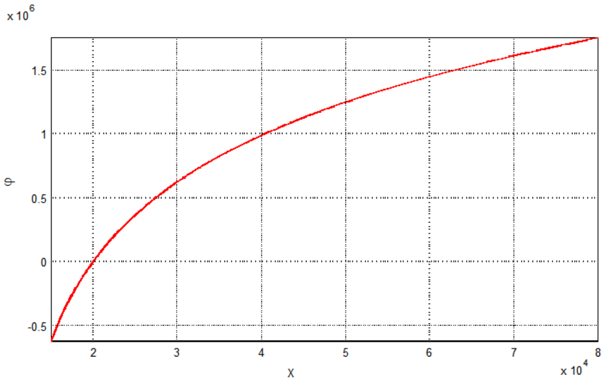


Fig. 40: Graphic diagram of e-function

ID2: Crank

$$x = f(\varphi) = l_1 * \cos\varphi + \sqrt{l_2^2 - (e + l_1 * \sin\varphi)^2}, \quad \text{mit } \varphi = 180° - \varphi_M, \quad 0 \leq \varphi_M \leq 180°$$

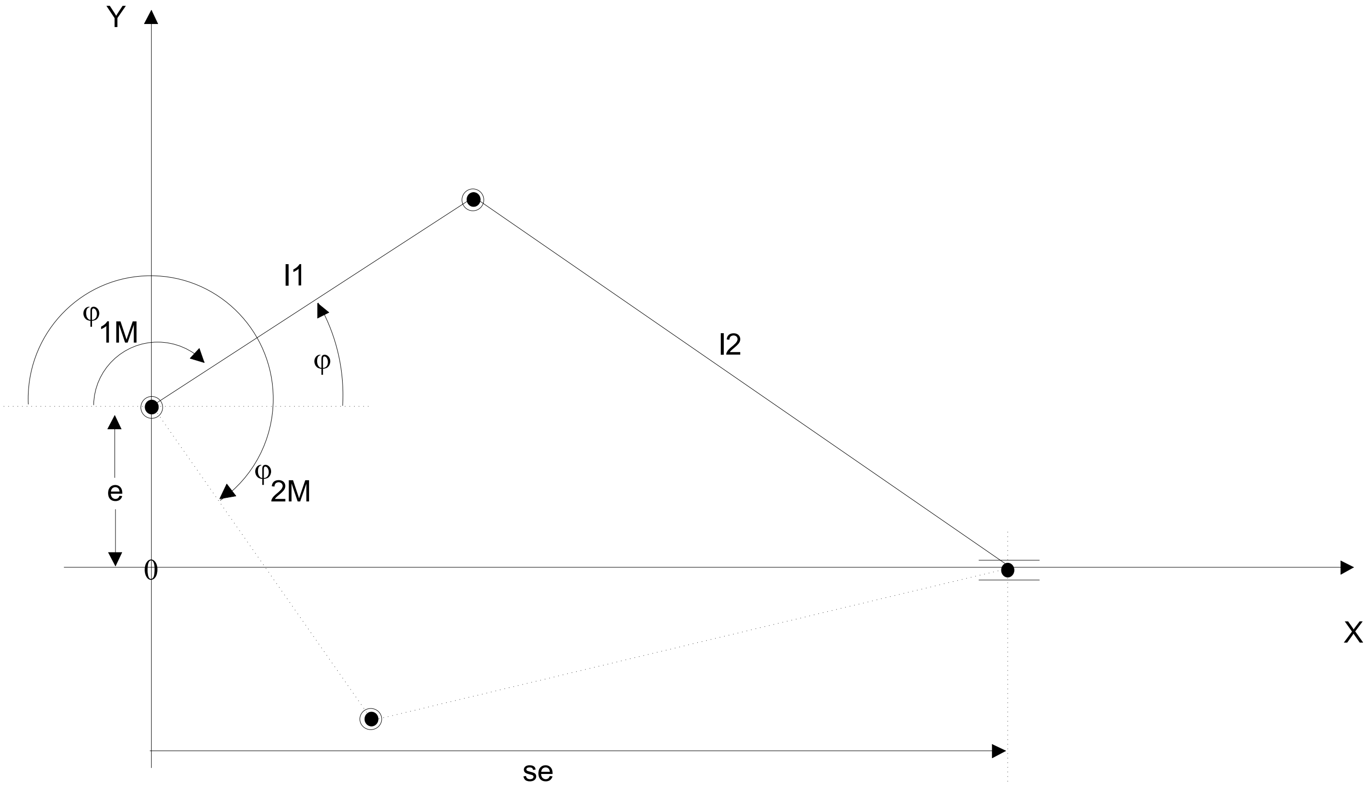


Fig. 41: Kinematic structure of slider crank

Example:

```
trafo.command_pos.param[0]   1000000 (crank length l₁)
trafo.command_pos.param[1]   3000000 (con-rod- length l₂)
trafo.command_pos.param[2]   0       (eccentricity e)
trafo.command_pos.param[3]   0       (solution range for motor angle)
trafo.command_pos.param[3]   0       (movement direction of linear axis)
```

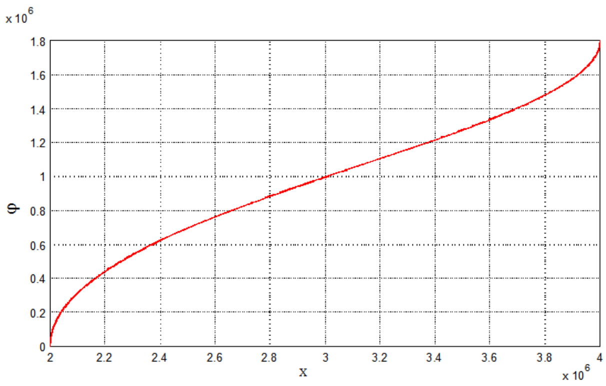


Fig. 42: Graphic diagram of transfer function

Notice

In the event of eccentricity e != 0 and specific parameter settings (e.g. $(l_2-l_1) < e$), there may be limits to the motor angle movement range because of jamming in the kinematic structure. In this case, the motor angle movement range of both solutions is smaller than 360 degrees (see figure below).

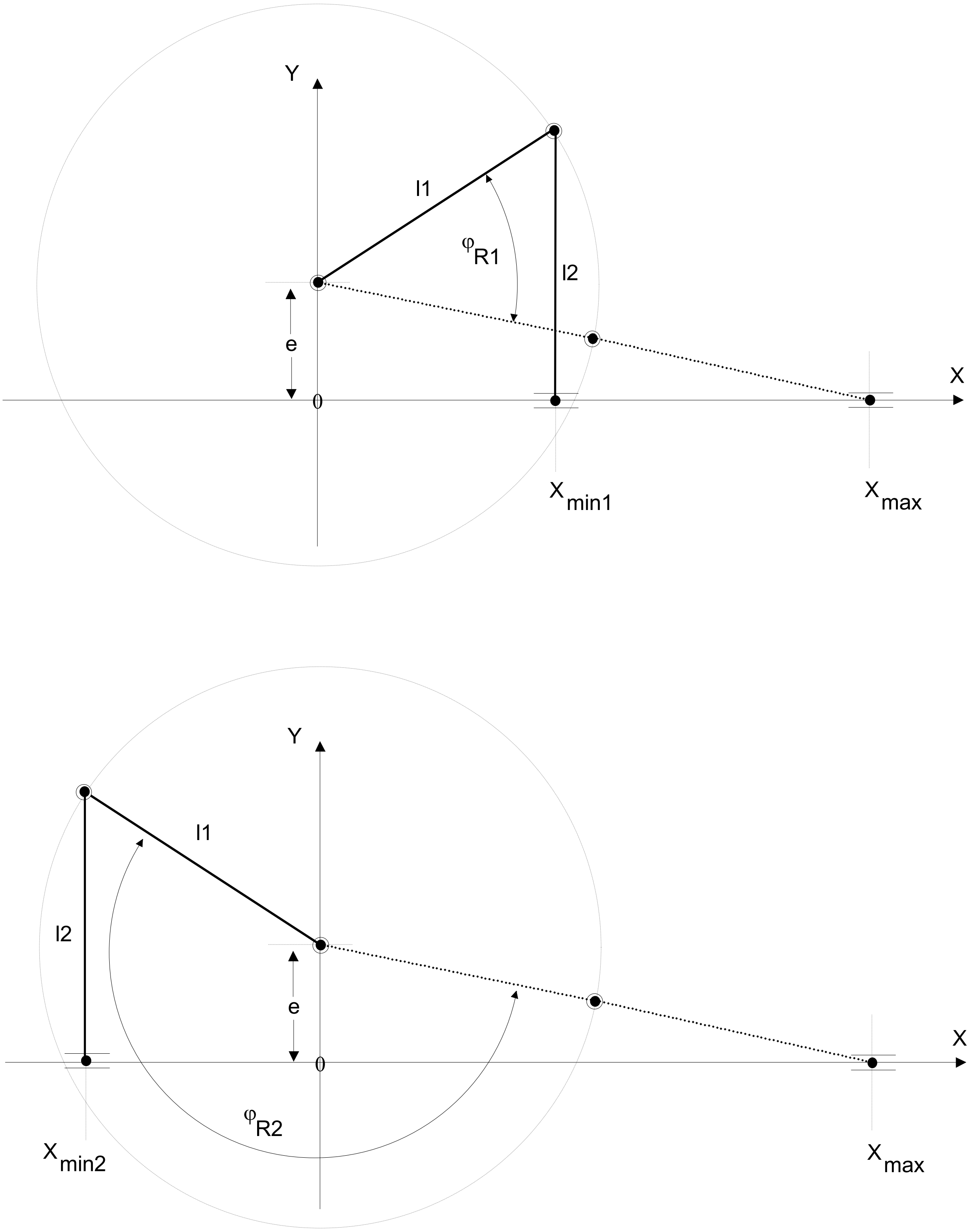


Fig. 43: Extreme positions of slider crank with eccentricity

ID3: Eccenter

$$xs = f(\varphi) = R * \sin(\varphi) - x_0$$

$$\varphi = \varphi_M + \varphi_0$$

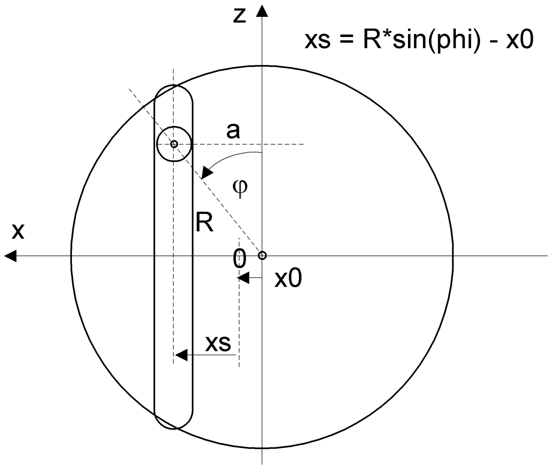


Fig. 44: Kinematic diagram of the eccenter function

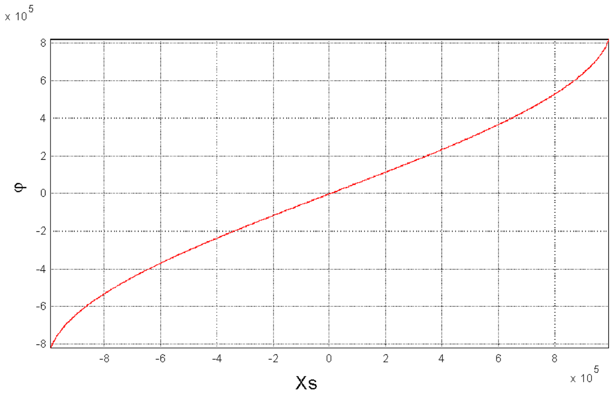


Fig. 45: Graphic diagram of the eccenter function

Example:

```
trafo.command_pos.param[0]  1000000 (eccenter radius R)
trafo.command_pos.param[1]  0       (offset zero position linear axis)
trafo.command_pos.param[2]  0       (offset zero position rotary axis)
trafo.command_pos.param[3]  0       (solution range angle)
```

ID4: Crank with linkage by linear axis

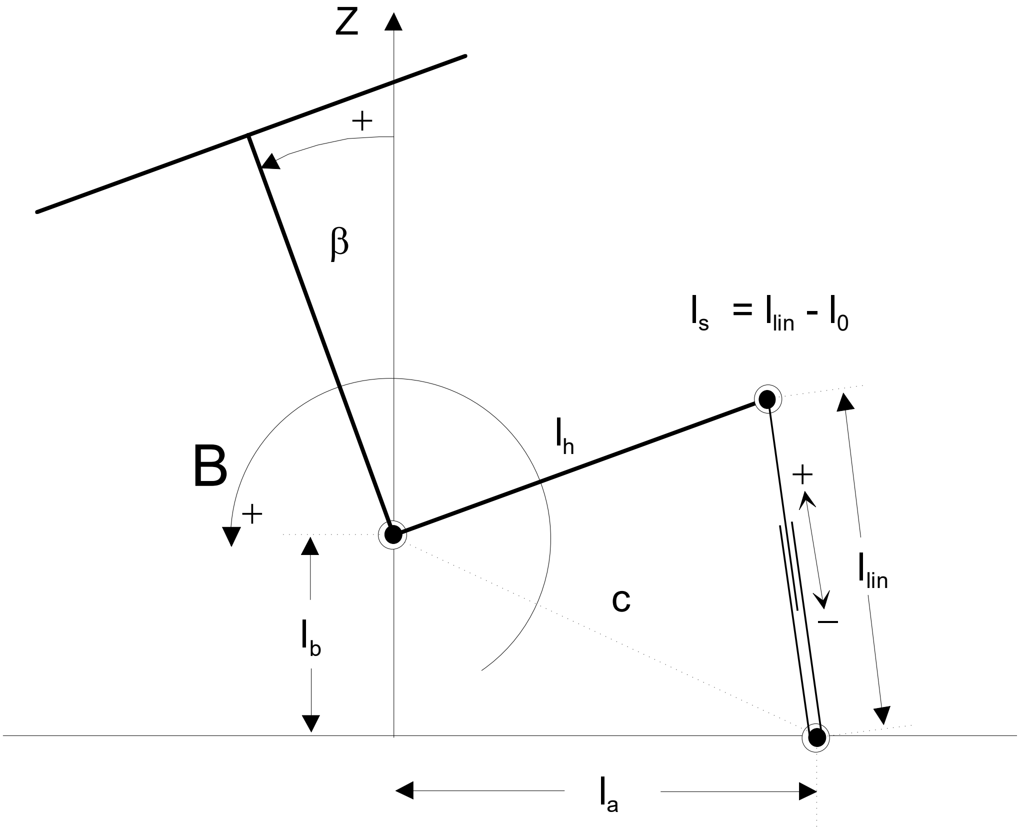


Fig. 46: Kinematic structure of crank and linkage

Example:

```
trafo.command_pos.param[0]   1000000 (distance la joint point)
trafo.command_pos.param[1]   1410000 (distance lb joint point)
trafo.command_pos.param[2]   1000000 (crank length lh)
trafo.command_pos.param[3]   0       (offset zero position)
trafo.command_pos.param[4]   0       (movement direction of rotary axis)
```

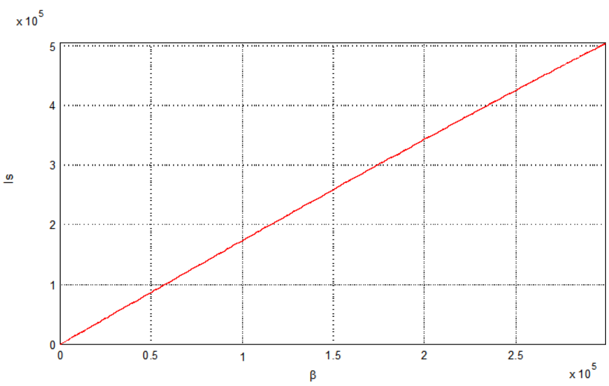


Fig. 47: Graphic diagram of transfer function

If the kinematic (β=0) is in zero position, the transformation delivers the drive position 0 for l_s. If necessary, by param[3] an offset to this position can be defined. (Example: Drive position at β=0 is 50mm -> the offset value has to be set on 50mm). Mathematically, the default rotational direction of the B axis is positive. This can be adapted by the parameter *trafo.command_pos.param[4]*, see figure below.

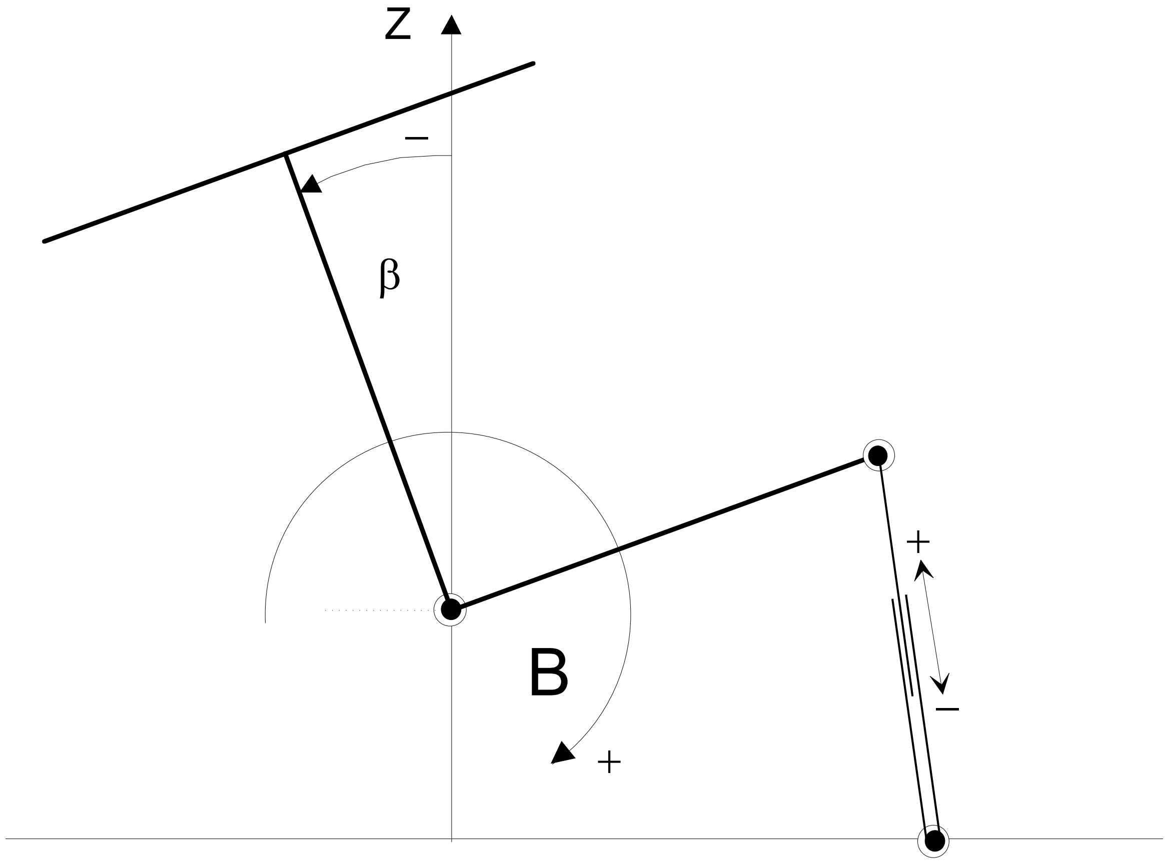


Fig. 48: Zero offset point of drive position

ID5: Angular kinematic

Available as of CNC Build V3.1.3107.41/V4.3.0.

A linear movement results from the angular movement.

The parameters specify the lengths l_1,l_2 and l_h. The maximum excursions are defined by the parameters γ_{max} and γ_{min}.

$$x(\gamma) = \sqrt{2al_h\,cos(90^0 - \gamma_2 - \gamma) - a^2 - l_h^2}$$

mit

$$a = \sqrt{l_1^2 + l_2^2}$$

$$\gamma_2 = sin^{-1}\left(\frac{l_1}{a}\right)$$

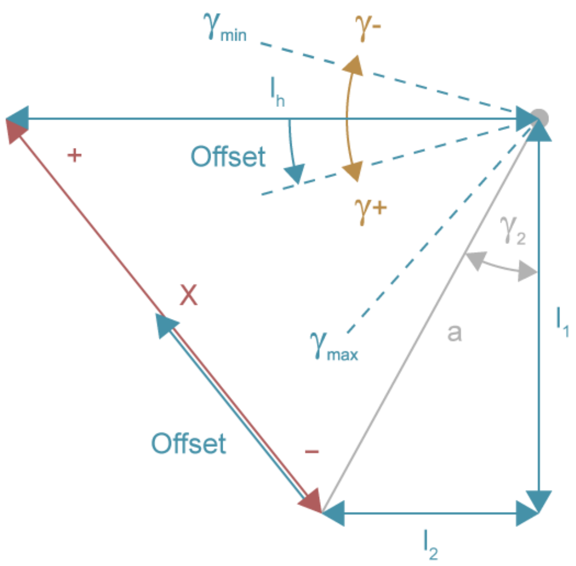


Fig. 49: Angular kinematic

Example:

```
trafo.command_pos.param[0]  1900000 (length of distance l1)
trafo.command_pos.param[1]  600000  (length of distance l2)
trafo.command_pos.param[2]  4428300 (length of distance lh)
trafo.command_pos.param[3] -450000  (angle excursion lower limit γmin)
trafo.command_pos.param[4]  450000  (angle excursion upper limit γmax)
trafo.command_pos.param[5]  0/3400000 (position offset)
trafo.command_pos.param[6]  0       (angle offset)
trafo.command_pos.param[7]  0       (angle inversion)
trafo.command_pos.param[8]  0       (linear position inversion)
```

Below is the transfer function with and without position offset

Red: without position offset

Light blue: with posi8tion offset

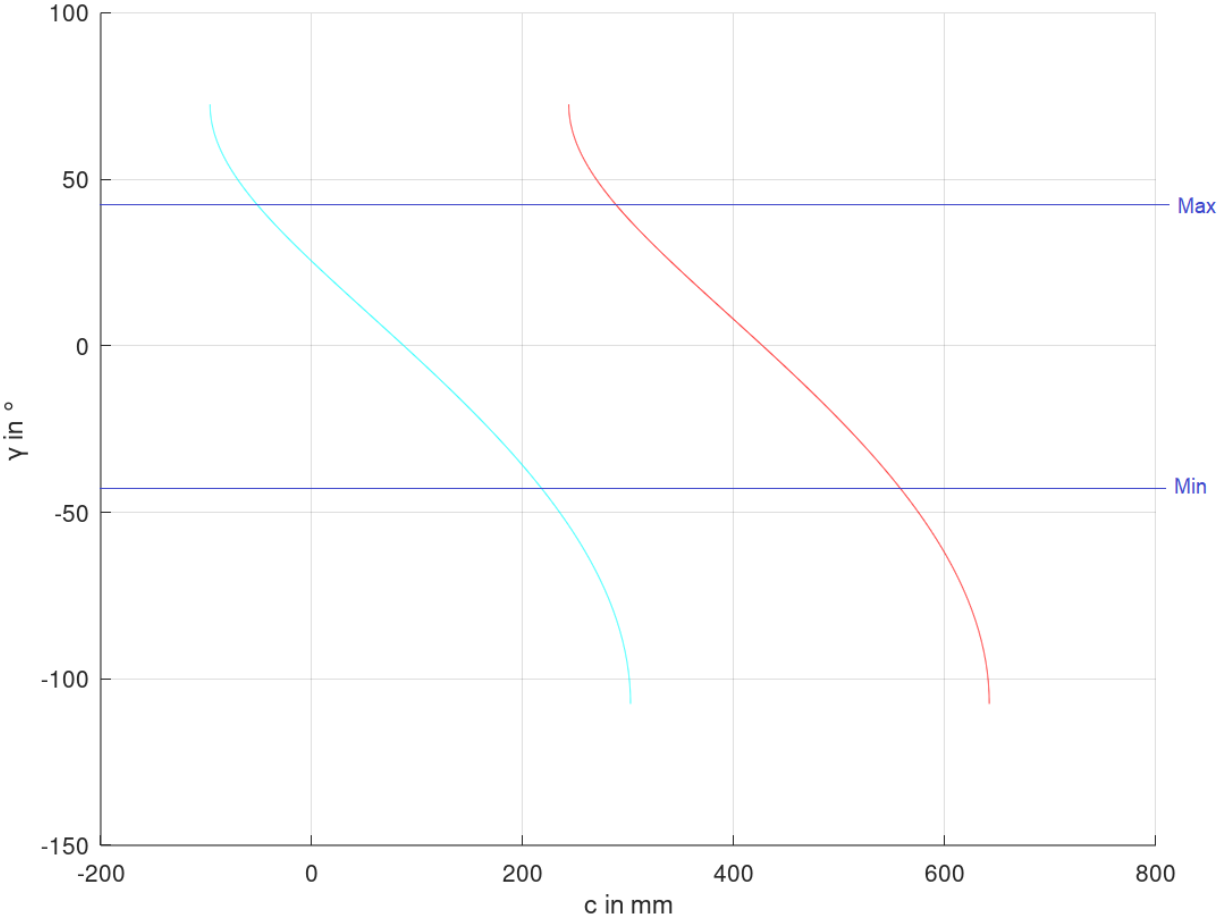


Fig. 50: Transfer function with and without position offset

Angle offset and angle inversion

In addition to the example above, the angle can be provided with an angle offset by parameters and can also be inverted.

```
trafo.command_pos.param[0]  1900000 (length of distance l1)
trafo.command_pos.param[1]  600000  (length of distance l2)
trafo.command_pos.param[2]  4428300 (length of distance lh)
trafo.command_pos.param[3] -450000  (angle excursion lower limit γmin)
trafo.command_pos.param[4]  450000  (angle excursion upper limit γmax)
trafo.command_pos.param[5]  3400000 (position offset)
trafo.command_pos.param[6]  250000   (angle offset)
trafo.command_pos.param[7]  0/1       (angle inversion)
trafo.command_pos.param[8]  0       (linear position inversion)
```

The following transfer function is with and without angle inversion.

Red: without angle inversion

Light blue: with angle inversion

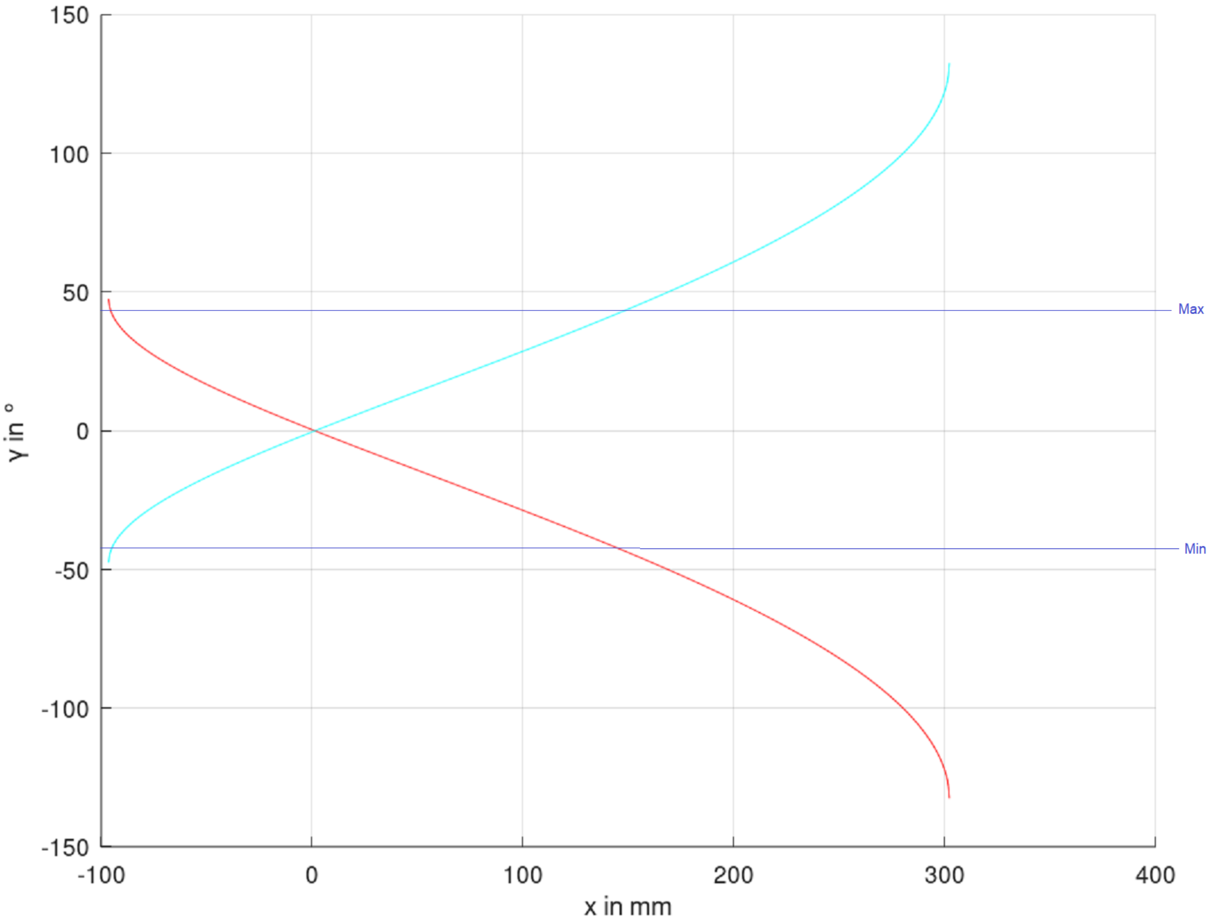


Fig. 51: Transfer function with and without angle inversion

Linear position inversion

Based on the example above, the linear position can be inverted.

```
trafo.command_pos.param[0]  1900000 (length of distance l1)
trafo.command_pos.param[1]  600000  (length of distance l2)
trafo.command_pos.param[2]  4428300 (length of distance lh)
trafo.command_pos.param[3] -450000  (angle excursion lower limit γmin)
trafo.command_pos.param[4]  450000  (angle excursion upper limit γmax)
trafo.command_pos.param[5]  3400000 (position offset)
trafo.command_pos.param[6]  250000   (angle offset)
trafo.command_pos.param[7]  0       (angle inversion)
trafo.command_pos.param[8]  0/1       (linear position inversion)
```

The following transfer function is with and without linear position inversion.

Red: without linear position inversion

Light blue: with linear position inversion

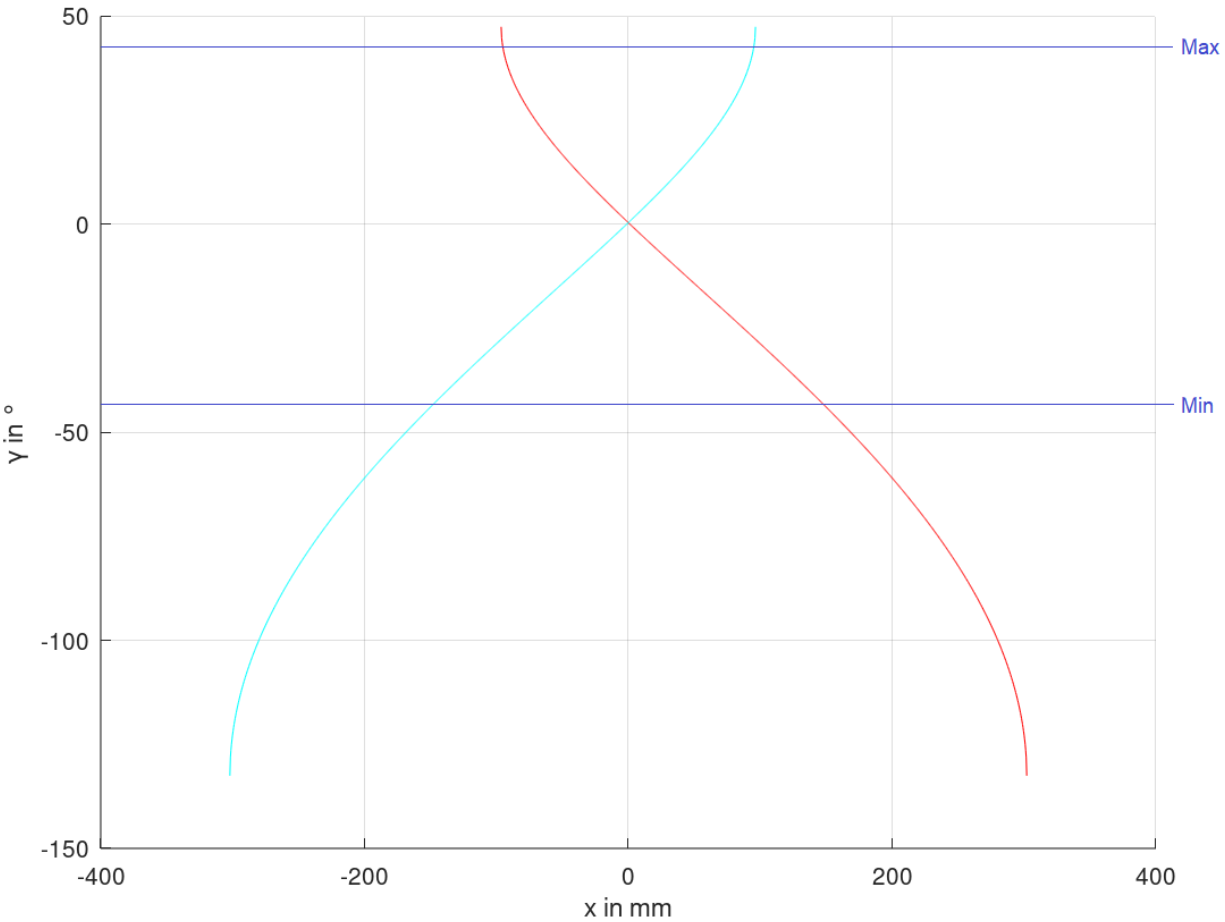


Fig. 52: Transfer function with and without linear position inversion

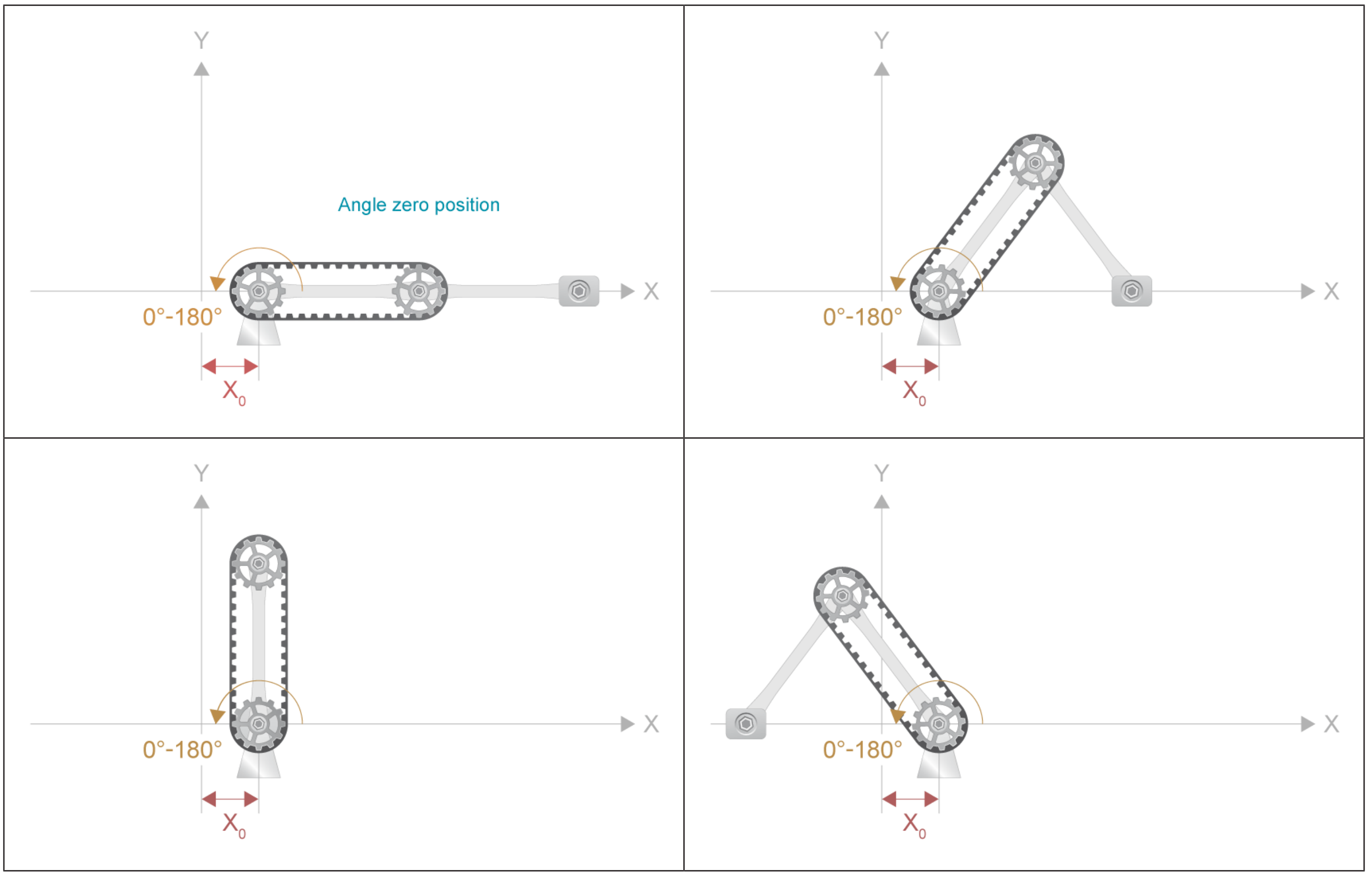
As a general rule, the following applies:

The specified angle of the kinematic has mathematical limits due to the specified input variables. If they are not observed, error ID 70342 is output.

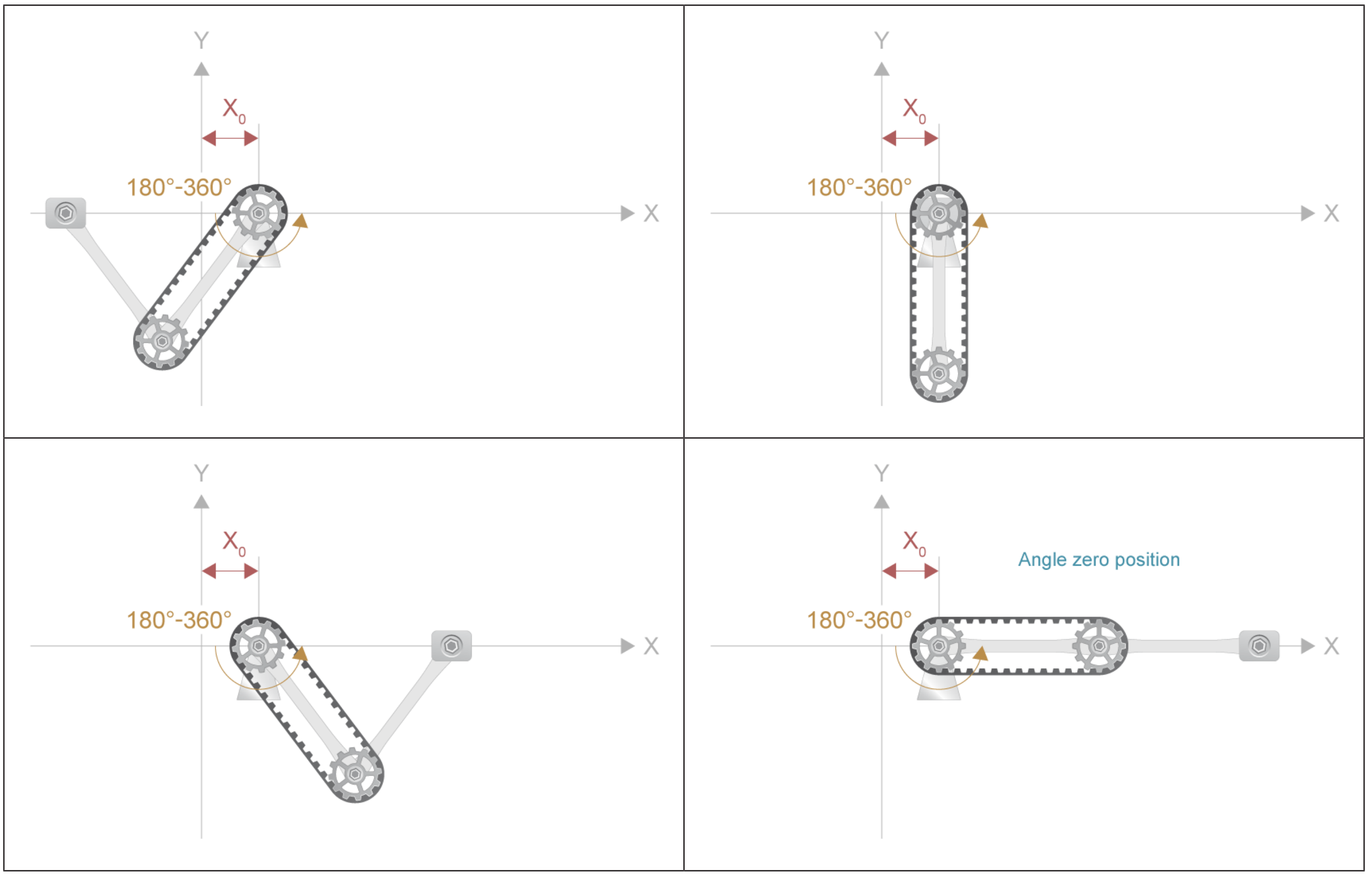
ID 6: Symmetrical slider crank

In addition to identical lengths of crank and con-rod, this structure has an additional mechanical coupling between these elements so that no mechanical jamming can occur in the centre position of the slider (linear position).

Symmetrical slider crank solution range 0 to 180 degrees:



Symmetrical slider crank solution range 180 to 360 degrees:



Example:

```
trafo.command_pos.param[0]  1500000  (con-rod length == crank length)
trafo.command_pos.param[1]  0        (linear position offset)
trafo.command_pos.param[2]  0        (angle position offset)
trafo.command_pos.param[3]  0        (angle solution range)
```

Transfer function φ= f(x)

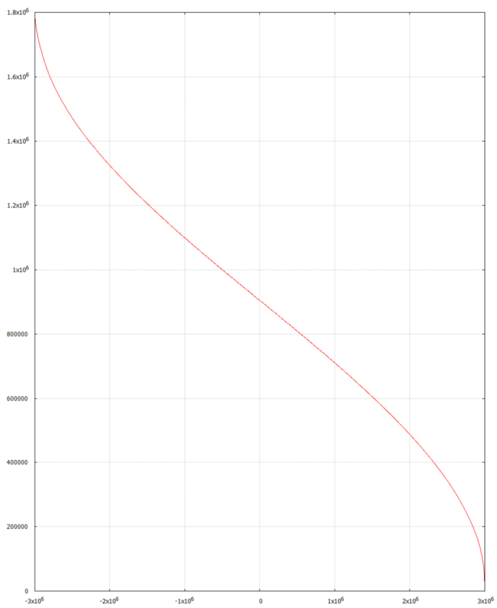


Fig. 53: Transfer function of the symmetrical slider crank

13.2.5 Software limit switches and motion ranges

The software limit switch (SLS) monitor functions on the input side of the backward transformation (ACS0). The motion range must be limited within this system by using suitable SLS settings, P-AXIS-00177 [▸ 121], P-CHAN-00178) so that the input values of the axis transformation (P-AXIS-00370 [▸ 503]) do not leave the validity range.

Fig. 54: Input of backward transformation with SLS monitoring

```
trafo.command_pos.param[0]      1000000
trafo.command_pos.param[1]      0
trafo.command_pos.param[2]      0
trafo.command_pos.param[3]      0
trafo.command_pos.param[4]      0

kenngr.swe_neg     -850000
kenngr.swe_pos      850000
```

14 Parameters for path dependent on dynamic weighting (dynamic_weighting.*)

With certain technologies (e.g. ‘punching’), it is required to weight dynamic limit values (velocity, acceleration, jerk) for **rapid traverse movements** to reduce machine excitation depending on the relative path distance of the axes involved in the path movement.

Dynamic weighting is activated by P-AXIS-00431 [518] and is only effective if channel-specific path-dependent weighting in (P-CHAN-00190) is inactive.

Notice

A programmed weighting with G129 in the NC program overwrites the values of the path-dependent dynamic weighting.

14.1 activation (P-AXIS-00431)

P-AXIS-00431	**Activation of dynamic weighting**	
Description	This parameter enables the automatically path dependent dynamic weighting in the axis.	
Parameter	dynamic_weighting.enable	
Data type	BOOLEAN	
Data range	0: Weighting in axis is not active (default) 1: Weighting in axis is active	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	0	
Drive types	----	
Remarks		

14.2 Table of dynamic weightings (dynamic_weighting.param[i].*)

This structure consists of the elements for the path limit and the assigned weighting factors for the velocity, acceleration and ramp time for rapid feed.

Structure name	Index
param[i]	i = 0 … 7 (Maximum number of table entries: 8, application-specific)

The following further conditions must be considered when defining table entries:

- the motion path limit in the table increases as index values become larger.
- The weighting factor is limited to a minimum value of 1%. For ramp time, the minimum ramp time tr_min (P-AXIS-00201 [▸ 247]) must also be considered as the lower limit value.
- Weighting is possible upwards to the maximum value of vb_max (P-AXIS-00212 [▸ 245]) and a_max (P-AXIS-00008 [▸ 246]). With ramp time tr_grenz (P-AXIS-00200 [▸ 239]) the weighting has no upper limit.

14.2.1 Path distance limit (P-AXIS-00432)

<table>
<tr><th>P-AXIS-00432</th><th colspan="4">Path distance limit (dynamic weighting)</th></tr>
<tr><td>Description</td><td colspan="4">This parameter defines the upper distance limit. The weighting factors of the current entries under index < i are effective up to this limit.</td></tr>
<tr><td>Parameter</td><td colspan="4">dynamic_weighting.param[i].path_limit</td></tr>
<tr><td>Data type</td><td colspan="4">UNS32</td></tr>
<tr><td>Data range</td><td colspan="4">0 < path_limit < MAX(UNS32)</td></tr>
<tr><td>Axis types</td><td colspan="4">T, R</td></tr>
<tr><td>Dimension</td><td colspan="2">T: 0.1µm</td><td colspan="2">R: 0.0001°</td></tr>
<tr><td>Default value</td><td colspan="4">0</td></tr>
<tr><td>Drive types</td><td colspan="4">----</td></tr>
<tr><td rowspan="3">Remarks</td><td colspan="2"></td><td>i = 0</td><td>i ≥ 1</td></tr>
<tr><td rowspan="2">Path limit</td><td>lower</td><td>0</td><td>path_limit[i-1]</td></tr>
<tr><td>upper</td><td>path_limit[i]</td><td>path_limit[i]</td></tr>
</table>

14.2.2 Weighting factor for rapid feed velocity (P-AXIS-00433)

P-AXIS-00433	**Weighting factor for rapid feed velocity (dynamic weighting)**	
Description	This parameter defines the weighting factor for rapid traverse velocity in the i element.	
Parameter	dynamic_weighting.param[i].velocity_fact	
Data type	UNS32	
Data range	10 < velocity_fact < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1%	R: 0.1%
Default value	0	
Drive types	----	
Remarks		

14.2.3 Weighting factor for rapid feed acceleration (P-AXIS-00434)

P-AXIS-00434	**Weighting factor for rapid feed acceleration (dynamic weighting)**	
Description	This parameter defines the weighting factor for rapid traverse acceleration in the i element	
Parameter	dynamic_weighting.param[i].acceleration_fact	
Data type	UNS32	
Data range	10 < acceleration_fact < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1%	R: 0.1%
Default value	0	
Drive types	----	
Remarks		

14.2.4 Weighting factor for rapid feed ramp time (P-AXIS-00435)

P-AXIS-00435	**Weighting factor for rapid feed ramp time (dynamic weighting)**	
Description	This parameter defines the weighting factor for rapid traverse acceleration in the i element	
Parameter	dynamic_weighting.param[i].ramp_time_fact	
Data type	UNS32	
Data range	10 < ramp_time_fact < MAX(UNS32)	
Axis types	T, R	
Dimension	T: 0.1%	R: 0.1%
Default value	0	
Drive types	----	
Remarks		

14.2.5 Example of a table

Basis is the following table of dynamic weighting values with 6 rows:

Index	Path limit value path_limit [0.1µm] (range limits)	Weighting factor velocity_fact [0.1%]	Weighting factor acceleration_fact [0.1%]	Weighting factor ramp_time_fact [0.1%]
0	10000 (0-10000)	100	1000	1000
1	20000 (10000-20000)	200	900	1500
2	40000 (20000-40000)	300	800	2000
3	80000 (40000-80000)	400	700	3000
4	160000 (80000-160000)	500	600	4000
5	200000000 (160000-200000000)	1000	500	5000

Mapping of the weighting table on the structure of the axis parameters:

```
# Axis dependent dynamic weighting
# ================================
dynamic_weighting.enable 1 0:not active 1:active
#
dynamic_weighting.param[0].path_limit 10000 [0.1µm]
dynamic_weighting.param[0].velocity_fact 100 [0.1%]
dynamic_weighting.param[0].acceleration_fact 1000 [0.1%]
dynamic_weighting.param[0].ramp_time_fact 1000 [0.1%]

dynamic_weighting.param[1].path_limit 20000 [0.1µm]
dynamic_weighting.param[1].velocity_fact 200 [0.1%]
dynamic_weighting.param[1].acceleration_fact 900 [0.1%]
dynamic_weighting.param[1].ramp_time_fact 1500 [0.1%]

dynamic_weighting.param[2].path_limit 40000 [0.1µm]
dynamic_weighting.param[2].velocity_fact 300 [0.1%]
dynamic_weighting.param[2].acceleration_fact 800 [0.1%]
dynamic_weighting.param[2].ramp_time_fact 2000 [0.1%]

dynamic_weighting.param[3].path_limit 80000 [0.1µm]
dynamic_weighting.param[3].velocity_fact 400 [0.1%]
dynamic_weighting.param[3].acceleration_fact 700 [0.1%]
dynamic_weighting.param[3].ramp_time_fact 3000 [0.1%]

dynamic_weighting.param[4].path_limit 160000 [0.1µm]
dynamic_weighting.param[4].velocity_fact 500 [0.1%]
dynamic_weighting.param[4].acceleration_fact 600 [0.1%]
dynamic_weighting.param[4].ramp_time_fact 4000 [0.1%]

dynamic_weighting.param[5].path_limit 200000000 [0.1µm]
dynamic_weighting.param[5].velocity_fact 1000 [0.1%]
dynamic_weighting.param[5].acceleration_fact 500 [0.1%]
dynamic_weighting.param[5].ramp_time_fact 5000 [0.1%]
```

15 Parameters used by Twincat system manager (twincat.*)

This structure is used for operation with TwinCAT system via ADS communication. Via ADS communication access to axis specific objects is possible. No setting by operator necessary, all subelements and structures are used or managed by TwinCAT.

16 User-defined data (customer.*)

16.1 Free user defined values (P-AXIS-00510)

P-AXIS-00510	**Free user-defined values**	
Description	The user can enter arbitrary data in this array, The values are not used ion the controller, but only on the HLI in the element gpAx*[axis_idx]*^.head.**customer_val_r[ ]** (see [HLI:]) and are not used in the controller. This allows the user to transfer configuration data to the PLC or HMI.	
Parameter	customer.val[i] where i = 0 (application-specific)	
Data type	UNS32	
Data range	0 … MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

16.2 User-specific character string (P-AXIS-00785)

P-AXIS-00785	**User-specific character string**	
Description	This parameter is for customers to parameterise character strings for user-specific use. Character strings are not used CNC internally.	
Parameter	customer.string[]	
Data type	STRING	
Data range	Maximum length of the character string. 23 characters	
Axis types	T, R	
Dimension	T: ----	R: ----
Default value	*	
Drive types	SERCOS, Terminal, Lightbus, Profidrive, CANopen	
Remarks	* Note: The default value of variables is a blank string. This parameter is not available under TwinCAT.	

17 Filter parameters for error handling on axis (error_filter[i].*)

Users/machine manufacturers parameterise the required actions or filtering operations for error messages for each platform/channel/axis. For more information, see [FCT-M7// Error management]

Structure name	Index
error_filter[i]	0 ≤ i ≤ 3 (maximum number of error filters: 4)

17.1 Cause of error (P-AXIS-00627)

P-AXIS-00627	Cause of error (filtering of axis error messages)	
Description	The individual error codes can be listed as numbers or texts, whereby the entire row must comply with the following syntax: (number | text) {, (number | text) } where: number:= CNC error number text:="error-specific text" Example: error_filter[0].reason "D012:", 123000, 123001 If an error is logged, the program looks in the defined platform/channel/axis filters whether a user-specific filter rule is defined for it.	
Parameter	error_filter[i].reason where i = 0 ... 3 (maximum number of filters, application-specific)	
Data type	STRING	
Data range	Maximum of 96 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Remarks	* Note: The default value of variables is a blank string.	

17.2 Error action (P-AXIS-00628)

P-AXIS-00628	**Error action (filtering of axis error messages)**	
Description	Action that is to be performed if an error occurs.	
Parameter	error_filter[i].action where i = 0 ... 3 (maximum number of filters, application-specific)	
Data type	STRING	
Data range	ACTION = NONE | DRIVE_STATE_REQ | PRE_RUN_STATE_REQ | RUN_STATE_REQ NONE: No action DRIVE_STATE_REQ: Read out drive status PRE_RUN_STATE_REQ: Error at start-up of the controller bus in PRE-run state RUN_STATE_REQ: Error at start-up of the controller bus in Run state	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Remarks	For SERCOS drive profiles: DRIVE_STATE_REQ S-0-0095 diagnostic PRE_RUN_STATE_REQ S-0-0021: list of unknown operation data in CP2 -> CP3, command 127 RUN_STATE_REQ S-0-0022: list of unknown operation data in CP3 -> CP4, command 128 For ProfiDrive profiles: <all actions> Parameter 945 For CANopen profiles <all actions> Parameter ID603F * Note: The default value of variables is a blank string.	

17.3 Conditional activation (P-AXIS-00629)

P-AXIS-00629	**Conditional activation (filtering of axis error messages)**	
Description	This filter rule is activated when the applicable bit is set via the user interface or the PLC (HLI:: Activating error filter rules - Axis) control unit.	
Parameter	error_filter[i].conditional_activation where i = 0 ... 3 (maximum Number of filters, application-specific)	
Data type	UNS32	
Data range	32-bit	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Remarks	Parameterisation example: *error_filter[0].conditional_activation 0x2* An activation bit = 0 means that the action is always executed.	

17.4 Conditional action (P-AXIS-00630)

P-AXIS-00630	**Conditional action (filtering of axis error messages)**	
Description	Action that is to be executed if an error occurs and if the condition applies.	
Parameter	error_filter[i].conditional_action where i = 0 ... 3 (maximum number of filters, application-specific)	
Data type	STRING	
Data range	ACTION = NONE | ([HIDE] [FORCE]) FORCE = F_WARNING | F_SYNTAX | F_ERROR | F_SEVERE | F_FATAL HIDE = [HIDE] [HIDE_LOG] [HIDE_PRINT] [HIDE_REPORT]	
	NONE:	No action
	HIDE:	Suppress every error output
	HIDE_LOG:	Error output to error log file is suppressed
	HIDE_DISPLAY:	Error output is suppressed
	HIDE_REPORT:	Application-specific error output is suppressed
	F_WARNING:	Error is output as a WARNING (remedy class = 0)
	F_SYNTAX:	Error is output as a syntax error (remedy class = 2)
	F_ERROR:	Error due to NC program or other operator action (error remedy class = 5)
	F_SEVERE:	Severe error, requires a warm start (remedy class = 6)
	F_FATAL:	Severe error, requires a complete cold start (remedy class = 7)
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Remarks	* Note: The default value of variables is a blank string.	

17.5 Conditional filter activation (P-AXIS-00631)

P-AXIS-00631	**Conditional filter activation (filtering of axis error messages)**	
Description	The individual error codes can be listed as numbers or texts, whereby the entire row must comply with the following syntax: (number | text) {, (number | text) } where: number:= CNC error number text := **"** error-specific text **"**	
Parameter	error_filter[i].conditional_param where i = 0 ... 3 (maximum number of filters, application-specific)	
Data type	STRING	
Data range	Maximum of 96 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Remarks	Parameterisation example: *error_filter[0].conditional_param* "D012:", 123, 1001 Individual error texts are currently only checked when the SERCOS drive error S95 is read out. Error numbers are checked only in the case of SERCOS drive errors (S21 and S22) and in the case of ProfiDrive drive errors (parameter 945). * Note: The default value of variables is a blank string.	

17.6 Output of additional error information (P-AXIS-00632)

P-AXIS-00632	**Output of additional error information (filtering of axis error messages)**	
Description	This text is forwarded transparently via the CNC_ERROR_INFO data structure if the filter condition applies, i.e. users have a possibility of conditionally also including additional error information in the output.	
Parameter	error_filter[i].conditional_output where i = 0 ... 3 (maximum number of filters, application-specific)	
Data type	STRING	
Data range	Maximum of 32 characters	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	*	
Remarks	* Note: The default value of variables is a blank string.	

18 Parameter of the external compensation

18.1 Maximum position change of the compensation - warning limit (P-AXIS-00743)

P-AXIS-00743	**Maximum position change of the compensation - warning limit**	
Description	This parameter defines the warning limit for maximum position change of the external compensation. If the warning limit is exceeded, the warning is output with ID 70583. If the compensation value remains above the warning limit, no further warnings are output. A repeat warning is only output when the warning limit is again exceeded.	
Parameter	lr_param.ext_comp.warn_limit	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00743 <= MAX_UNS32	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Remarks	Parameter available as of CNC Build V3.1.3074.0 and higher	

18.2 Maximum position change of the compensation - error limit (P-AXIS-00744)

P-AXIS-00744	**Maximum position change of the compensation - error limit**	
Description	This parameter defines the error limit for maximum position change of the external compensation. If the maximum position change is exceeded, the error ID 70584 is output and the CNC is stopped.	
Parameter	lr_param.ext_comp.err_limit	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00744 <= MAX_UNS32	
Axis types	T, R	
Dimension	T: 0.1 µm	R: 0.0001°
Default value	0	
Remarks	Parameter available as of CNC Build V3.1.3074.0 and higher	

18.3 Maximum acceleration of the axes by compensation offset (P-AXIS-00745)

P-AXIS-00745	Maximum acceleration of the axes by a compensation offset	
Description	This parameter defines the limit value for the maximum permitted acceleration generated by the offsets of the external compensation.	
Parameter	lr_param.ext_comp.max_a	
Data type	UNS32	
Data range	0 ≤ P-AXIS-00745 <= MAX_UNS32	
Axis types	T, R	
Dimension	T: mm/s²	R: °/s²
Default value	P-AXIS-00008	
Remarks	Parameter available as of CNC Build V3.1.3074.0 and higher	

19 Settings for throughfeed machining (conv_sync.*)

Attention

These parameters are available in TwinCAT as of CNC Build V3.1.3108.2

Throughfeed machines are essentially used for the rapid consecutive machining of workpieces. They are firmly secured to a conveyor belt and pass through several successive machining stations. The conveyor belt runs at a constant speed, i.e. workpieces are machined without stopping while they pass through the stations. The conveyor belt therefore represents an axis with a constant feed rate.

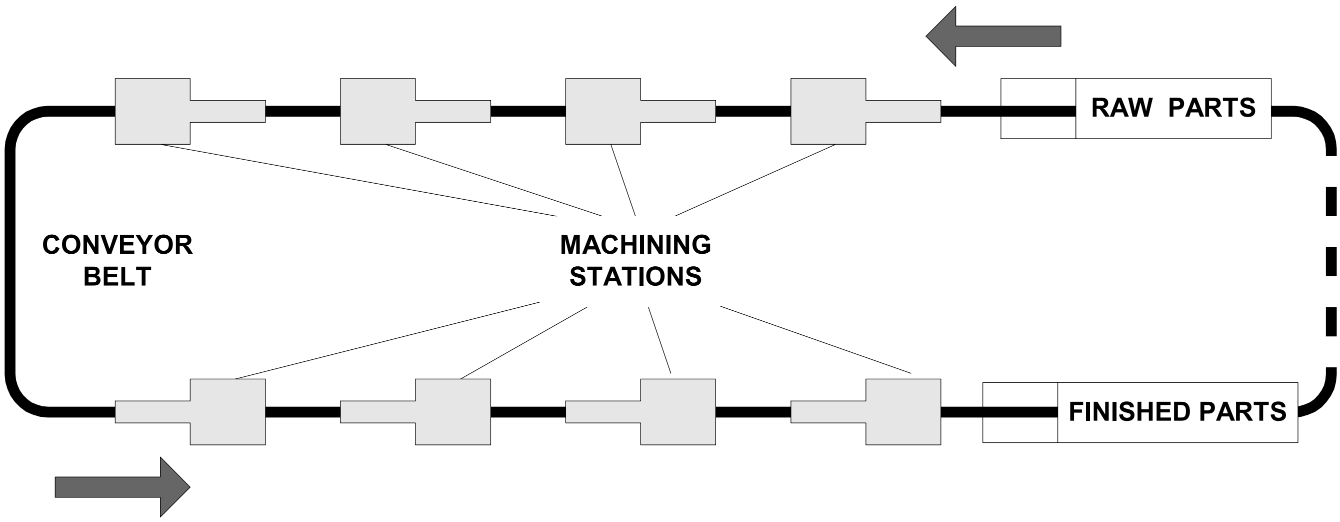


Fig. 55: Schematic diagram of a throughfeed machine

The machining stations (units) may possess an X axis in parallel to the direction of conveyor belt movement and at right angles to a feed axis Y. Below, the belt axis is referred to as the master axis. For stable synchronisation, it is generally necessary to smooth the actual values of the master axis. This is achieved by means of the filter parameters described below.

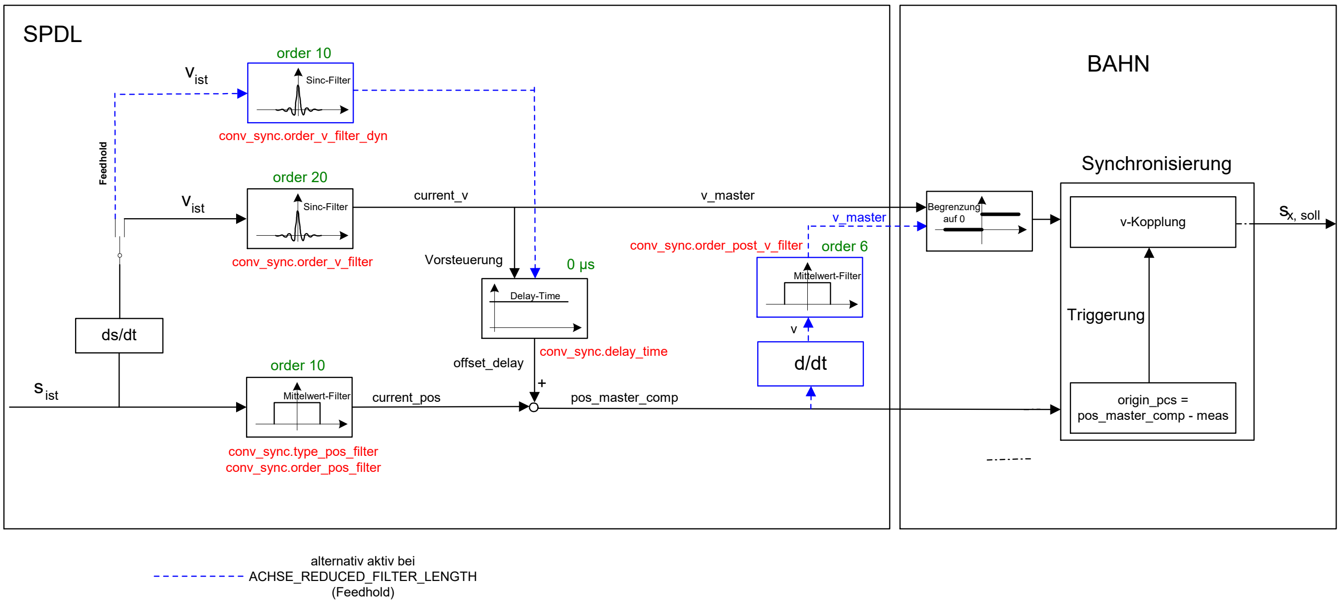


Fig. 56: Block diagram of master axis filtering

19.1 Definition of the master axis of conveyor belt synchronisation (P-AXIS-00708)

P-AXIS-00708	**Definition of the master axis of conveyor belt synchronisation**	
Description	The master axis of conveyor belt synchronisation is defined with this parameter.	
Parameter	conv_sync.is_master	
Data type	BOOLEAN	
Data range	0: Axis is not a master axis of a conveyor belt synchronisation 1: Axis is the master axis of a conveyor belt synchronisation	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	0	
Drive types	----	
Remarks		

19.2 Actual position value filter for the master axis (P-AXIS-00620)

P-AXIS-00620	**Actual position value filter for the master axis (throughfeed machining)**	
Description	Filtering of the actual position values of the master axis is activated/deactivated with this parameter.	
Parameter	conv_sync.enable_filter	
Data type	BOOLEAN	
Data range	0: Actual position value filter off 1: Actual position value filter on	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	0	
Drive types	----	
Remarks		

19.3 Type of the actual position value filter of the master axis (P-AXIS-00621)

P-AXIS-00621	**Type of the actual position value filter of the master axis (throughfeed machining)**	
Description	The type of the actual position value filter of the master axis is defined with this parameter.	
Parameter	conv_sync.type_pos_filter	
Data type	UNS32	
Data range	1, 2 where: 1: FIR low-pass filter 2: Average filter	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	1	
Drive types	----	
Remarks		

19.4 Order of the actual position value filter of the master axis (P-AXIS-00622)

P-AXIS-00622	Order of the actual position value filter of the master axis (throughfeed machining)	
Description	The order (number of filtered values) of the actual position value filter of the master axis is defined with this parameter.	
Parameter	conv_sync.order_pos_filter	
Data type	UNS32	
Data range	0 ≤ order_pos_filter ≤ 1000	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	10	
Drive types	----	
Remarks		

19.5 Order of the actual speed value filter of the master axis(P-AXIS-00623)

P-AXIS-00623	Order of the actual speed value filter of the master axis (throughfeed machining)	
Description	The order (number of filtered values) of the actual speed value filter of the master axis is defined with this parameter. The filter is off in the case of order 0. An FIR low-pass filter is used automatically.	
Parameter	conv_sync.order_v_filter	
Data type	UNS32	
Data range	0 ≤ order_v_filter ≤ 1000	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	20	
Drive types	----	
Remarks		

19.6 Order of the subsequent actual velocity filter in the case of feedhold on the master axis (P-AXIS-00624)

P-AXIS-00624	**Order of the subsequent actual velocity filter in the case of feedhold on the master axis (throughfeed machining)**	
Description	The order (number of filtered values) of the subsequent actual speed value filter in the case of feedhold on the master axis is defined with this parameter. The filter is off in the case of order 0. An average filter is used automatically.	
Parameter	conv_sync.order_post_v_filter	
Data type	UNS32	
Data range	0 ≤ order_post_v_filter ≤ 1000	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	6	
Drive types	----	
Remarks		

19.7 Order of the actual speed filter in the case of feedhold on the master axis (P-AXIS-00625)

P-AXIS-00625	**Order of the actual speed filter in the case of feedhold on the master axis (throughfeed machining)**	
Description	The order (number of filtered values) of the actual speed value filter in the case of feedhold on the master axis is defined with this parameter. The filter is off in the case of order 0. An FIR low-pass filter is used automatically.	
Parameter	conv_sync.order_v_filter_dyn	
Data type	UNS32	
Data range	0 ≤ order_v_filter_dyn ≤ 1000	
Axis types	T, R, S	
Dimension	T: ----	R, S: ----
Default value	10	
Drive types	----	
Remarks		

19.8 Delay time between master and slave axes (P-AXIS-00626)

P-AXIS-00626	**Delay time between master and slave axes (throughfeed machining)**	
Description	The delay time between the read-in actual value of the master axis and the output set value of the slave axis is defined with this parameter. The speed of the slave axis is pilot-controlled with this delay time.	
Parameter	conv_sync.delay_time	
Data type	UNS32	
Data range	0 ≤ delay_time ≤ 1000	
Axis types	T, R, S	
Dimension	T: [µs]	R, S: [µs]
Default value	0	
Drive types	----	
Remarks		

Monitoring the workspace of throughfeed machines (P-AXIS-00555)

P-AXIS-00555	**Selecting the process for monitoring the workspace of throughfeed machines.**	
Description	This parameter influences the workspace monitor when workpieces are machined on a conveyor belt. With throughfeed machines the tool should remain as close as possible to the *end stop position* defined in P-CHAN-00374 in order to exploit the workspace fully. In the event of a movement contrary to the belt direction, the control brakes the tool accordingly to prevent the position from being exceeded. When contour elements are fed through in the opposite belt direction at a higher feed rate than the conveyor belt velocity, a check must be made whether the workspace is exited in the opposite conveyor belt direction. This requires a more complex check of the workspace and can be activated by this parameter.	
Parameter	kenngr.conv_sync_optim	
Data type	BOOLEAN	
Data range	0: Simplified process with low computing time requirement. It is only suitable when the belt speed is significantly higher than the programmed feed rate. 1: The programmed contour is tested for collision. In this method, the tool travels to the required *end stop position* if possible.	
Axis types	T	
Dimension	T: ----	
Default value	0	
Drive types	----	
Remarks		

20 General examples

20.1 Settings of position scaling

Example 1

Linear axis with a rotary encoder fitted to the motor with 2^20 increments per motor revolution (indirect measuring system), a gear with a gear ratio of 2:1 (input/output) and a ball screw spindle with a spindle pitch of 20 mm.

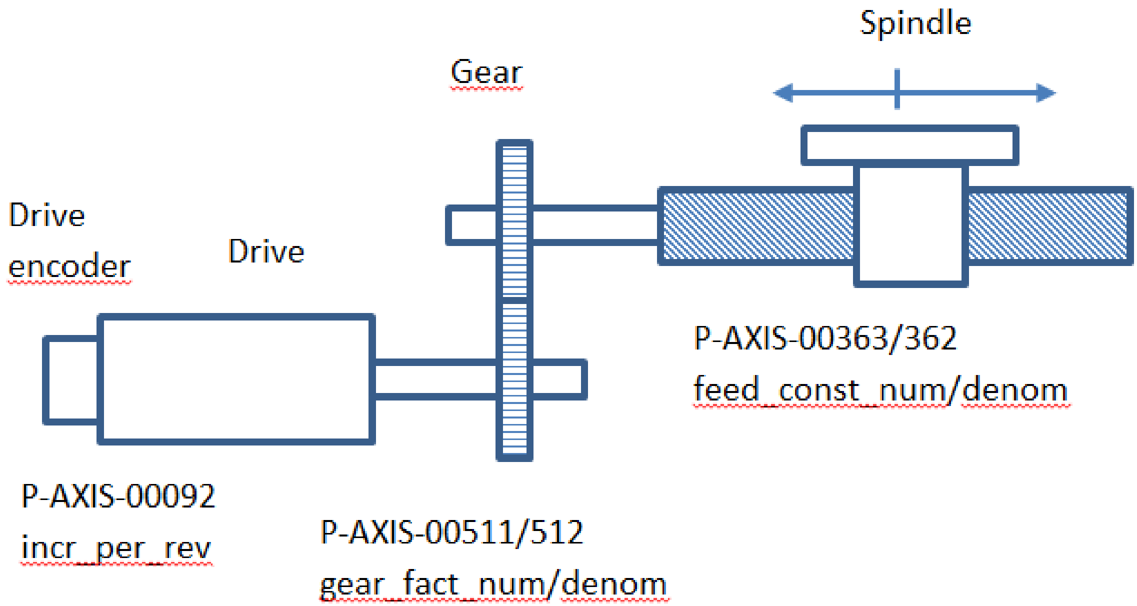


Fig. 57: Position scaling with rotary encoder

```
P-AXIS-00092       1048576     ( incr_per_rev 2 ^ 20
                               ( Increments per motor revolution
P-AXIS-00362       200000      ( feed_const_num 20 mm
                               ( = 200000 * 0.1 µm
P-AXIS-00363       1           ( feed_const_denom 1 revolution
P-AXIS-00511       2           ( gear_fact_num gear
                               ( Input revolutions
P-AXIS-00512       1           ( gear_fact_denom gear
                               ( Output revolutions
```

Example 2

Linear axis with a linear encoder fitted to the spindle nut with a resolution of 1 µm (direct measuring system), a gear with a gear ratio of 2:1 (input/output) and a ball screw spindle with a spindle pitch of 20 mm.

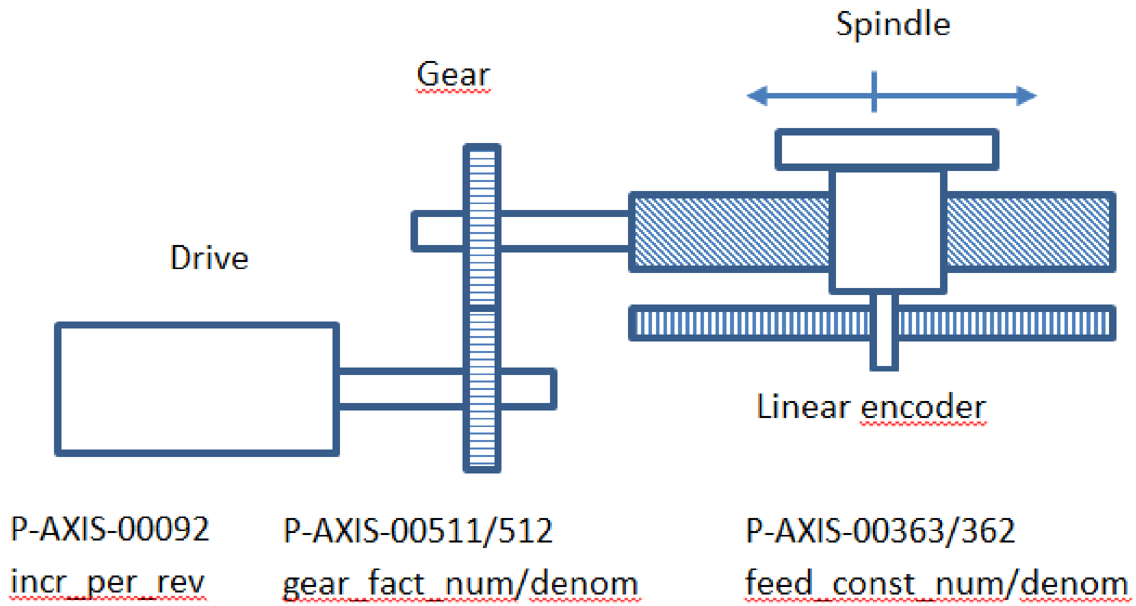


Fig. 58: Position scaling with linear encoder

```
P-AXIS-00092        1000        ( incr_per_rev
                                ( 1000 increments
P-AXIS-00362        10000       ( feed_const_num 20 mm
                                ( = 10000 * 0.1 µm
P-AXIS-00363        1           ( feed_const_denom 1 revolution
P-AXIS-00511        2           ( gear_fact_num gear
                                ( Input revolutions
P-AXIS-00512        1           ( gear_fact_denom gear
                                ( Output revolutions
```

Example 3

Spindle with an encoder fitted to the motor with 2^24 increments per revolution and a gear with a gear ratio of 1:3 (input/output).

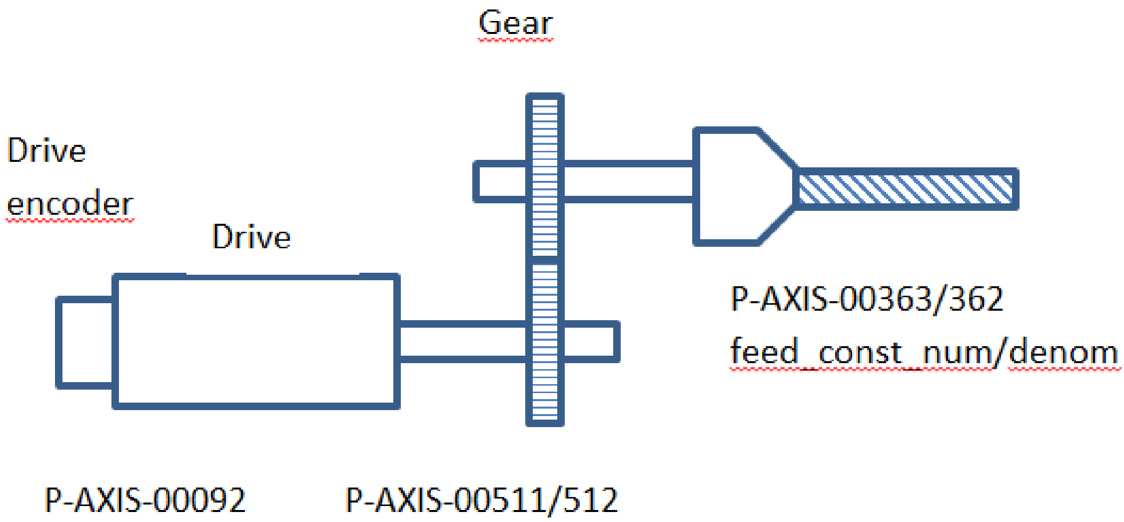


Fig. 59: Position scaling with fitted encoder

```
P-AXIS-00092          16777216       ( incr_per_rev
                                     ( 2^24 increments
P-AXIS-00362          3600000        ( feed_const_num 1 revolution
                                     ( The result at the gear output is
                                     (360 ° = 360 * 10000 * 0.1 µ°
P-AXIS-00363          1              ( feed_const_denom 1 revolution
P-AXIS-00511          1              ( gear_fact_num gear
                                     ( Input revolutions
P-AXIS-00512          3              ( gear_fact_denom gear
                                     ( Output revolutions
```

Example 4:

Gear ratios with numerical values with several decimal points.

Assuming:

- A motor delivers 131072 increments per revolution.
- A spindle with a pitch of 1.7/8 inch and
  a gear with a ratio of 7:1 are fitted.
- Notice that, after ‘expansion’, the product is less than 2^31 - 1. A factor of 1000000 would therefore be too large.

Covered path per motor revolution in 0.1 um:

1.7/8 *25.4 /7 * 10000 = 7710.714285714285714

Expand the above fraction by 10 to remove the decimal point.

(17 * 254000)/(80 * 7)

The entire fraction feed_const_num/ feed_const_denom is thus

$$\frac{131072}{\frac{(17 * 254000)}{(80 * 7)}} = \frac{131072 * 80 * 7}{17 * 254000}$$

Shortened by 10:

$$\frac{131072 * 8 * 7}{17 * 25400} = \frac{7340032}{431800}$$

```
P-AXIS-00092       131072      ( incr_per_rev
P-AXIS-00362       7340032     ( feed_const_num 20 mm
                               ( = 10000 * 0.1 µm
P-AXIS-00363       431800      ( feed_const_denom 1 revolution
P-AXIS-00511       7           ( gear_fact_num gear
                               ( Input revolutions
P-AXIS-00512       1           ( gear_fact_denom gear
                               ( Output revolutions
```

21 Appendix

21.1 Legacy parameters

The parameters below were transferred to other parameters due to further developments or renaming. The previous parameters may still be used, but they should no longer be used to generate new configurations.

21.1.1 Activation of (additional) interface for loading application-specific command values (P-AXIS-00091)

P-AXIS-00091	**Activation of (additional) interface for loading application-specific command values**	
Description	If it should be possible to load additional position or velocity command values on the drive via the PLC, this parameter has to be TRUE. For more information see [HLI//Section External commanding of an axis].	
Parameter	kenngr.in_add_interface	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	New parameter in P-AXIS-00732 [▸ 267]	

21.1.2 Activation of (additional) interface for loading of command and actual values (P-AXIS-00141)

P-AXIS-00141	**Activation of (additional) interface for loading of command and actual values**	
Description	Because of the possibility of an interpolator synchronous PLC task this parameter is not used. Therefore the value has to be FALSE.	
Parameter	kenngr.out_add_interface	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks		

21.1.3 Time constant of the PT2-Filter for the additive command value interface (P-AXIS-00438)

P-AXIS-00438	Time constant of the PT2-Filter for the additive command value interface	
Description	For the additive command value interface (see P-AXIS-00091 [▸ 542], [HLI//Section External commanding of an axis]) in the position controller, a PT2 filter can be activated to smooth the command values. This may be necessary e.g. if the PLC does not run in the interpolation cycle time of the CNC. The time constant of the PT2 filter is given in the parameter in microseconds. The filter is inactive, if the time constant is set to 0 (default setting).	
Parameter	kenngr.in_add_interface_filter_time	
Data type	UNS32	
Data range	0 < in_add_interface_filter_time < MAX(UNS32)	
Axis types	T, R, S	
Dimension	T: µs	R,S: µs
Default value	0 *	
Drive types	----	
Remarks	Due to the filter, the axis stop can be delayed a little bit, if the additive command value interface is deactivated (enable_w = FALSE). The axis stop can be checked in the movement flag pAC[axis_idx]^.addr^.StateLR_Data.X_IsMoved of the axis (see [HLI//Status information of an axis]). The time constant of the PT2 filter may only be actualized via parameter update if the axis is in standstill. *(PT2 filter not active) For new parameter see P-AXIS-00742 [▸ 272]	

21.1.4 Handling of the loaded position command values as offset (P-AXIS-00322)

P-AXIS-00322	Handling the loaded position command values as offset	
Description	If the external position command values commanded over the additional interface (P-AXIS-00091 [542]) are to be handled as a compensation value (offset, permanently active), assign this parameter with TRUE. If the parameter is FALSE, the additional correction values are moved again at each internal channel synchronization (Program start, axes exchange, reset, requesting of command values etc.).	
Parameter	kenngr.in_add_interface_pos_as_offset	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	For new parameter see P-AXIS-00733 [267]	

21.1.5 Reinitialisation of additional position interface on enable (P-AXIS-00499)

P-AXIS-00499	Reinitialisation of additional position interface after enable	
Description	Additional position command values can be applied to an axis by the PLC via the HLI (see [HLI:]) over the additional position controller interface. These additional values are passed as absolute values via the HLI and are output to the axis if the interface is enabled. When the value in that interface is changed while it is disabled, that change becomes effectivve the next time the interface is enabled, which can cause unexpected axis movements. This parameter can set that changes in the additional position interface while the interface is disabled do not cause an axis movement on reactivation, but only changes while the interface is enabled.	
Parameter	kenngr.in_add_interface_init_on_enable	
Data type	BOOLEAN	
Data range	0/1	
Axis types	T, R, S	
Dimension	T: ----	R,S: ----
Default value	0	
Drive types	----	
Remarks	For new parameter see P-AXIS-00734 [268]	

21.1.6 Use default parameters for the drive type (P-AXIS-00746)

P-AXIS-00746	**Use of default parameters for the drive type**	
Description	By default the drive objects for moving to fixed stop are preconfigured for each drive type when the controller starts and this overwrites any assignment made in the default axis parameter list. All parameters required to change the drive objects are affected by pre-initialisation, i.e. the parameters assigned in the structure antr.fixed_stop.drive_ident[i].*. However, it a parameterisation is used from the default list, this parameter can be set to the value 0. In this case, no default initialisation of the drive object takes place.	
Parameter	antr.fixed_stop.drive_ident[i].default	
Data type	BOOLEAN	
Data range	0 / 1	
Axis types	T, R	
Dimension	T: -	R: -
Default value	1	
Drive types	SERCOS, CANopen	
Remarks	This parameter is replaced by P-AXIS-00821 [▸ 449](as of Build V3.1.3080.11).	

21.1.7 Torque limit value (P-AXIS-00342)

P-AXIS-00342	**Torque limit value during homing to a fixed stop**	
Description	This parameter specifies the percentage torque limit value of the homing travel during the search for the fixed stop.	
Parameter	getriebe[i].homing.torq_move_torque_limit	
Data type	UNS16	
Data range	0 ≤ torq_move_torque_limit ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0	
Drive types	DSE (KUKA)	
Remarks		

21.1.8 Reducing the torque limit for detection (P-AXIS-00343)

P-AXIS-00343	Reducing the torque limit for detection during homing to a fixed stop	
Description	This parameter defines the percentage reduction in torque limit with reference to P-AXIS-00342 [▸ 545] for detection of the stationary axis at the fixed stop.	
Parameter	getriebe[i].homing.torq_detect_torque_limit	
Data type	UNS16	
Data range	0 ≤ torq_detect_torque_limit ≤ 1000	
Axis types	T, R, S	
Dimension	T: 0.1%	R,S: 0.1%
Default value	0	
Drive types	DSE (KUKA)	
Remarks		

21.2 References

[PROG] ISG Programming manual

[SERC-S2] SERCOS Interface Update 9/91

[[CHAN] Documentation of channel parameters

[MANU] Documentation Manual Operation Parameters

[HWCF] Documentation Hardware configuration list

[STUP] Documentation of start-up list

[HLI:] Documentation HLI interface

21.3 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):

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Keyword index

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