

AKD™

Parameter and Command Reference Guide



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Original Document



Patents Pending

Keep all manuals as a product component during the life span of the product.
Pass all manuals to future users/owners of the product.



Record of Document Revisions:

Revision	Remarks
12/2009	Launch version
2/2010, Rev -	Added WS feature, revised analog I/O scale functions (AIN), multiple parameter updates.
6/2010, Rev A	Modified parameters current to firmware version M_01-02-00-000. Added parameters to capture (CAP), programmable limit switch (PLS), wake and shake (WS), field bus parameters (FBUS), position loop (PL). Deleted parameters in drive (DRV), regen (REGEN), bode (BODE), feedback (FB1), GUI, and SUP.

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Current patents:

US Patent 5,646,496 (used in control card R/D and 1 Vp-p feedback interface)

US Patent 5,162,798 (used in control card R/D)

US Patent 6,118,241 (used in control card simple dynamic braking)

Technical changes which improve the performance of the device may be made without prior notice.

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About the Parameter and Command Reference Guide

This reference guide provides descriptive information about each parameter and command used in the AKD firmware. Parameters and commands are used to configure the drive or to return status information from the drive via the WorkBench terminal screen. The use of parameters and commands to perform various drive functions is detailed in Section [link] of the AKD User Guide.

For each parameter or command, this guide presents the following table of information, followed by a description of the command and examples as appropriate.

ZZZ.ZZZ(Parameter or Command Name)

General Information	
Type	One of four types: • Command: Action or W/O command. • NV Parameter: R/W and stored in nonvolatile (NV) memory • R/W Parameter: Can be either read from or written to the drive. • R/O Parameter. Can only be read from the drive
Description	Brief description of the parameter or command; note if parameter or command is not active in all opmodes.
Units	Appropriate units (see Table of Units [link] unit descriptions)
Range	Permissible range; multiple ranges are sometimes present.
Default Value	Determined at setup process time or motor ID; otherwise set to 0.010.
Data Type	Integer, Boolean, Float, or String
See Also	Links to related information such as other parameters, block diagrams, schematics, or other sections of the product manual.
Start Version	The minimum firmware version number required to use the parameter or command

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	1 four-digit hex number/1 two-digit hex number.
Data Type	See DS301 list.
PDO Mappable	Yes or no.
Start Version	The minimum firmware version number required to use the parameter or command.

Additional data types may include:

Type	Description
Error	Illegal type=0
b	Boolean
U8	8 x unsigned numbers
S8	8 x signed numbers
U16	16 x unsigned numbers

Type	Description
S16	16 x signed numbers
U32	32 x unsigned numbers
S32	32 x signed numbers
U64	64 x unsigned numbers
S64	64 x signed numbers

Parameter and Command Naming Conventions

Abbreviation	Term
ACC	Acceleration
APP	Apply
CLR	Clear
CS	Controlled Stop
I	Current
D	Current D component
DEC	Deceleration
DIR	Direction
DIS	Disable
DIST	Distance
EMUE	Emulated encoder
EN	Enable
ERR	Error
F	Fault
FB	Feedback
FF	Feedforward
K	Gain
INT	Integrator
LIM	Limit
L	Loop
MAX	Maximum
MIN	Minimum
N	Negative
NV	Nonvolatile
P	Position, Proportional, Positive
RLS	Release
R	Resistance
STATE	Status, State, Stat
THRESH	Threshold
T	Time
TMAX	Timeout
U	User
V	Velocity, Volt
W	Warning

Summary of Parameters and Commands

This table lists all valid commands and parameters, with a brief description for each. The parameter name and description are linked to the parameter tables. The description field also notes if a parameter is not active in all opmodes. Generally speaking, all parameters and commands are active in all opmodes, with the following exceptions:

Parameter or Command	Active in Opmodes
GEAR (all parameters and commands)	2 (position) only
HOME (all parameters and commands)	2 (position) only
MT (all parameters and commands)	2 (position) only
SM.I1, SM.I	0 (torque) only
SM.V1, SM.V2	1 (velocity) only
SM.VPM1, SM.VPM2	2 (position) only
VL (all parameters and commands)	1 (velocity) and 2 (position) only

Parameter or Command	Type	Description
Analog Input (AIN)		
AIN.CUTOFF	NV	Sets the analog input low-pass filter cutoff frequency.
AIN.DEADBAND	NV	Sets the analog input signal deadband.
AIN.ISCALE	NV	Sets the analog current scale factor.
AIN.OFFSET	NV	Sets the analog input offset.
AIN.PSCALE	NV	Sets the analog position scale factor.
AIN.VALUE	R/O	Reads the value of the analog input signal.
AIN.VSCALE	NV	Sets analog velocity scale factor.
AIN.ZERO	Command	Zeroes the analog input signal.
Analog Input/Output (AIO)		
AIO.ISCALE	NV	Sets the analog current scale factor.
AIO.VSCALE	NV	Sets velocity scale factor.
AIO.PSCALE	NV	Sets position scale factor.
Analog Output (AOUT)		
AOUT.DEBUGADDR	NV	Sets the memory address to debug.
AOUT.DEBUGDATATYPE	NV	Sets the data type of the value to be debugged.
AOUT.DEBUGSCALE		Sets the scale to be used for debug.
AOUT.ISCALE	NV	Sets the analog current scale factor.
AOUT.MODE	NV	Sets the analog output mode.
AOUT.OFFSET	NV	Sets the analog input offset.
AOUT.PSCALE	NV	Sets the analog position scale factor.
AOUT.VALUE	NV	Reads the analog output value.
AOUT.VALUEU	R/W	Sets the analog output value.
AOUT.VSCALE	NV	Sets velocity scale factor for analog output.
Code plot (BODE)		
BODE.EXCITEGAP	R/W	Controls how often the excitation is updated.
BODE.FREQ	R/W	Sets the frequency of the sine excitation source.

Parameter or Command	Type	Description
BODE.IAMP	R/W	Sets current command value used during the Bode procedure.
BODE.INJECTPOINT	R/W	Sets whether the excitation uses current or velocity excitation type.
BODE.MODE	R/W	Sets the mode of the excitation.
BODE.MODETIMER	R/W	Sets the watchdog timer of the excitation.
BODE.PRBDDEPTH	R/W	Sets the length of the PRB signal before it repeats.
BODE.VAMP	R/W	Sets the amplitude of the excitation when in velocity mode.
Capture (CAP)		
CAP0.EDGE, CAP1.EDGE	R/W	Selects the capture edge.
CAP0.EN, CAP1.EN	R/W	Enables or disables the related capture engine.
CAP0.EVENT, CAP1.EVENT		Controls the precondition logic.
CAP0.FILTER, CAP1.FILTER	R/W	Controls the precondition logic.
CAP0.MODE, CAP1.MODE	NV	Selects the captured value.
CAP0.PLFB, CAP1.PLFB	R/O	Sets captured position value.
CAP0.PREEDGE, CAP1.PREEDGE		Selects the capture precondition edge.
CAP0.PREFILTER, CAP1.PREFILTER	R/W	Sets the filter for the precondition input source.
CAP0.PRESELECT, CAP1.PRESELECT	R/W	Sets the precondition trigger.
CAP0.STATE, CAP1.STATE	R/O	Indicates whether or not trigger source was captured.
CAP0.T, CAP1.T	R/O	Reads time capture (if time capture was configured).
CAP0.TRIGGER, CAP1.TRIGGER	R/W	Specifies the trigger source for the position capture.
Controlled Stop (CS)		
CS.DEC	NV	Sets the deceleration value for the controlled stop process.
CS.STATE	NV	Returns the internal status of the controlled stop process.
CS.TMAX	R/O	Sets the time-out value for the drive to disable if velocity is not within CS.VTHRESH.
CS.TO	NV	Sets the time value for the drive velocity to be within CS.VTHRESH.
CS.VTHRESH	NV	Sets the velocity threshold for the controlled stop.
Digital Input (DIN)		
DIN.ROTARY	R/O	Reads the rotary knob value.
DIN.STATES	R/O	Reads the digital input states.
DIN1.INV TO DIN7.INV	R/W	Sets the indicated the polarity of a digital input mode.

Parameter or Command	Type	Description
DIN1.MODE TO DIN6.MODE	NV	Sets the digital input modes.
DIN1.PARAM TO DIN7.PARAM	R/W	Sets a value used as an extra parameter for digital inputs nodes.
DIN1.STATE TO DIN7.STATE	R/O	Reads a specific digital input state.
Digital Output (DOUT)		
DOUT.CTRL	NV	Sets the source of digital outputs (firmware or fieldbus).
DOUT.RELAYMODE	R/W	Indicates faults relay mode.
DOUT.STATES	R/O	Reads the state of the two digital outputs.
DOUTx.MODE	NV	Sets the digital output mode.
DOUT1.PARAM AND DOUT2.PARAM	NV	Sets extra parameters for the digital outputs.
DOUT1.STATE AND DOUT2.STATE	R/O	Reads the digital output state.
DOUT1.STATEU AND DOUT2.STATEU	R/W	Sets the state of the digital output node.
Drive (DRV)		
DRV.ACC	NV	Describes the acceleration ramp for the velocity central loop.
DRV.ACTIVE	R/O	Reads the enable status of an axis.
DRV.BLINKDISPLAY	Command	Causes the display to blink for 10 seconds.
DRV.BURNINOFFT (Password Protected)	R/W	Sets the burn-in test mode off time.
DRV.CLRFAULTIST	Command	Clears the fault history log in the NV.
DRV.CLRFAULTS	Command	Tries to clear all active faults in the drive.
DRV.CMDSOURCE	NV	Sets the command source (service, fieldbus, analog input, gearing, digital, or Bode).
DRV.CRASHDUMP	Command	Retrieves diagnostic information after the drive crashes.
DRV.DBILIMIT	NV	Sets the maximum amplitude of the current for dynamic braking.
DRV.DEC	NV	Sets the deceleration value for the velocity loop.
DRV.DIR	R/W	Changes drive direction.
DRV.DIS	Command	Disables the axis (software).
DRV.DISMODE	NV	Selects between disable immediately or stop and then disable.
DRV.DISSOURCES	R/O	Returns the possible reason for a drive disable.
DRV.DISTO	R/W	Sets the emergency timeout
DRV.EMUEDIR	R/W	Sets the direction of the emulated encoder output (EEO) signal.
DRV.EMUEMODE	R/W	Sets the mode of the emulated encoder output (EEO) connector.
DRV.EMUEMTURN	R/W	Defines the location of the index pulse on the EEO (emulated encoder output) when DRV.EMU-EMODE=2.

Parameter or Command	Type	Description
DRV.EMUERES	R/W	Sets the resolution of the EEO (emulated encoder output).
DRV.EMUEZOFFSET	R/W	Sets the resolution of the EEO (emulated encoder output).
DRV.EN	Command	Enables the axis (software).
DRV.ENDEFAULT	R/W	Sets the default state of the software enable
DRV.FAULTHIST	R/O	Reads the last 10 faults from NV memory.
DRV.FAULTS	R/O	Reads the active faults.
DRV.FLASHREAD (Password Protected)	R/O	Reads a value from the serial flash memory.
DRV.HANDWHEEL	R/O	Reads the EEO input value.
DRV.HELP	R/O	Reads the minimum, maximum, and default values for a specific parameter or command.
DRV.HELPALL	R/O	Retrieves the minimum, maximum, default, and actual values for all available parameters and commands.
DRV.ICONT	R/O	Reads the continuous rated current value.
DRV.INFO	R/O	Reads general information about the drive.
DRV.IPEAK	R/O	Reads the peak rated current value.
DRV.IZERO	R/W	Sets the current that will be used during the DRV.ZERO procedure.
DRV.LIST	R/O	Reads the list of available parameters and commands.
DRV.LOGICVOLTS		Reads the logic voltages.
DRV.NAME	NV	Sets and reads the name of the drive.
DRV.NVLIST	R/O	Lists the NV parameters and values from the RAM.
DRV.NVLOAD	W/O	Loads all data from the NV memory of the drive into the RAM parameters.
DRV.NVSAVE	Command	Saves the drive parameters from the RAM to the NV memory.
DRV.ONTIME	R/O	Returns how long the drive has been running since last power up.
DRV.OPMODE	NV	Sets the drive operation mode (current, velocity, or position).
DRV.READFORMAT	R/W	Sets the value returned to either decimal or hexadecimal.
DRV.RSTVAR	Command	Sets default values in the drive without re-booting the drive and without resetting the NV memory.
DRV.RUNTIME	R/O	Returns how long the drive has been running since first activated.
DRV.SETUPREQBITS	R/O	Reads the bitwise set status of parameters that must be set before the drive can be enabled
DRV.SETUPREQLIST	R/O	Reads the list of parameters that must be set before the drive can be enabled.

Parameter or Command	Type	Description
DRV.STOP	Command	This command stops all drive motion.
DRV.TEMPERATURES	R/O	Reads the temperature of drive components.
DRV.VER	R/O	Reads the drive version.
DRV.VERIMAGE	R/O	Returns the version data from each image.
DRV.TEMPERATURES	R/O	Reads the temperature of drive components.
DRV.WARNINGS	R/O	Reads the active warnings.
DRV.ZERO	R/W	Sets the zero mode. The procedure is activated when the drive is enabled.
Feedback (FB1)		
FB1.ENCRES	NV	Sets the resolution of the motor encoder.
FB1.HALLSTATE	R/O	Reads the Hall switch values (encoder feedback)
FB1.IDENTIFIED	R/O	Reads the type of feedback device used by the drive/motor.
FB1.INITSIGNED	NV	Sets initial feedback value as signed or unsigned.
FB1.LDLL	R/O	Reads the motor line-to-line inductance from the FPGA.
FB1.LQLL	R/O	Reads the motor line-to-line inductance in the back emf axis (q axis) from the SFD memory from the FPGA.
FB1.MECHPOS	R/O	Reads the mechanical position.
FB1.MEMDUMP	W/O	Dumps the memory ID data values of a feedback with memory
FB1.MEMVER	R/O	Returns the memory feedback version.
FB1.OFFSET	NV	Sets position feedback offset.
FB1.POLES	R/O	Reads the number of feedback poles.
FB1.OFFSET	NV	Sets position feedback offset.
FB1.POLES	R/O	Reads the number of feedback poles.
FB1.SELECT	NV	Sets user entered type or identified type (–1).
Fieldbus (FBUS)		
FBUS.PARAM1 TO FBUS.PARAM20	NV	Set fieldbus specific meanings.
FBUS.PLLSTATE	R/O	Returns the status of the PLL
FBUS.PLLTHRESH	NV	Sets number of successful synchronized cycles needed to lock the PLL.
FBUS.SAMPLEPERIOD	NV	Sets fieldbus sample period.
FBUS.SYNCACT	R/O	Reads actual distance from the desired sync distance.
FBUS.SYNCDIST	NV	Sets time target for synchronization.
FBUS.SYNCWND	NV	Sets symmetrically arranged window around the desired sync distance.
FBUS.TYPE	R/O	Shows the active fieldbus type.
Gearing (GEAR)		

Parameter or Command	Type	Description
GEAR.ACCMAX	R/W	Sets the maximum allowed acceleration value; active in opmode 2 (position) only.
GEAR.DECMAX	R/W	Sets the maximum allowed deceleration value; active in opmode 2 (position) only.
GEAR.IN	R/W	Sets the denominator of the electronic gearing ratio; active in opmode 2 (position) only.
GEAR.MODE	R/W	Selects electronic gearing mode; active in opmode 2 (position) only.
GEAR.MOVE	Command	Starts the electronic gearing; active in opmode 2 (position) only.
GEAR.OUT	R/W	Sets the numerator of the electronic gearing ratio; active in opmode 2 (position) only.
GEAR.VMAX	R/W	Reads the maximum allowed velocity value; active in opmode 2 (position) only.
Homing (HOME)		
HOME.ACC	R/W	Sets homing acceleration; active in opmode 2 (position) only.
HOME.AUTOMOVE	R/W	Sets homing auto move flag.
HOME.DEC	R/W	Sets homing deceleration; active in opmode 2 (position) only.
HOME.DIR	NV	Sets homing direction; active in opmode 2 (position) only.
HOME.DIST	R/W	Sets homing distance; active in opmode 2 (position) only.
HOME.FEEDRATE	R/W	Sets homing velocity factor; active in opmode 2 (position) only.
HOME.IPEAKHOME.IPEAK	R/W	Sets the current limit during homing procedure to a mechanical stop; active in opmode 2 (position) only.
HOME.MODEHOME.MODE	R/W	Selects the homing mode; active in opmode 2 (position) only.
HOME.MOVEHOME.MOVE	Command	Starts a homing procedure; active in opmode 2 (position) only.
HOME.PHOME.P	R/W	Sets home position; active in opmode 2 (position) only.
HOME.PERRTHRESH HOME.PERRTHRESH	R/W	Sets the position lag threshold; active in opmode 2 (position) only.
HOME.SETHOME.SET	Command	Immediately sets the home position; active in opmode 2 (position) only.
HOME.VHOME.V	R/W	Sets homing velocity; active in opmode 2 (position) only.
Hardware Limit Switch (HWLS)		
HWLS.NEGSTATE	R/O	Reads the status of the negative hardware limit switch.

Parameter or Command	Type	Description
HWLS.POSSTATE	R/O	Reads the status of the positive hardware limit switch.
Current Loop (IL)		
IL.BUSFF	R/O	Displays the current feedforward value injected by the fieldbus
IL.CMD	R/O	Reads the value of the q-component current controller inside the FPGA.
IL.CMDU	R/W	Sets the user current command.
IL.DCMD (Password Protected)	R/O	Reads the value of the d-component current controller inside the FPGA.
IL.DCMD (Password Protected)	R/O	Reads the value of the d-component current controller inside the FPGA.
IL.DCMDU (Password Protected)	R/W	Sets user d-component current command.
IL.DEADBAND (Password Protected)	R/O	Reads the deadband of two IGBTs in series connection.
IL.DFB	R/O	Reads the actual value of the d-component current.
IL.DFOLDD (Password Protected)	R/O	Reads the motor foldback maximum time at motor peak current.
IL.DFOLDR (Password Protected)	R/O	Reads the motor foldback recovery time.
IL.DFOLDT	R/O	Reads the motor foldback time constant of the exponential current drop (foldback).
IL.DIFOLD	R/O	Reads the drive foldback current limit.
IL.DLIMITN	R/W	Sets the negative user (application-specific) d-component current limit.
IL.DLIMITP	R/W	Sets the positive user (application-specific) d-component current limit.
IL.FB	R/O	Reads the actual value of the d-component current.
IL.FOLDFTHRESH	NV	Reads the foldback fault level.
IL.FOLDWTHRESH	NV	Sets the foldback warning level.
IL.IFOLD	R/O	Reads the overall foldback current limit.
IL.INTEN (Password Protected)	NV	Enables/disables the integrator part of the PI loop.
IL.IUOFFSET (Password Protected)	R/W	Sets the offset added to the sigma-delta measured current value in the u-winding.
IL.IUFB	R/O	Reads the sigma-delta measured current in the u-winding of the motor.
IL.IVFB (PASSWORD PROTECTED)	R/W	Sets the sigma-delta measured current in the u-winding of the motor.
IL.IVOFFSET (Password Protected)	R/W	Sets the offset added to the sigma-delta measured current value in the v-winding.
IL.KP	NV	Sets the proportional gain of the q-component of the PI regulator.
IL.KPDRATIO	NV	IL.KPDRATIO

Parameter or Command	Type	Description
IL.LIMITN	NV	Sets the negative user (application-specific) current limit.
IL.LIMITP	NV	Sets the positive user (application-specific) current limit.
IL.MFOLDD	NV	Sets the motor foldback maximum time at motor peak current.
IL.MFOLDR	R/O	Sets the motor foldback recovery time.
IL.MFOLDT	NV	Sets the motor foldback time constant of the exponential current drop (foldback).
IL.MIFOLD	R/O	Sets the motor foldback current limit.
IL.PWMFREQ (Password Protected)	NV	Reads and sets the PWM frequency of the IGBTs.
IL.VDCMD	R/O	Sets the output of the d-component PI-regulator.
IL.VCMD	R/O	Sets the output of the q-component PI regulator.
IL.VUFB	R/O	Reads the measured voltage on the u-winding of the motor.
IL.VVFB	R/O	Reads the measured voltage on the v-winding of the motor.
IL.DLIMITN	R/W	Sets the negative user (application-specific) d-component current limit.
IL.DLIMITP	R/W	Sets the positive user (application-specific) d-component current limit.
IL.FB	R/O	Reads the actual value of the d-component current.

Motor (MOTOR) Parameters		
MOTOR.BRAKE	NV	Sets the presence or absence of a motor brake.
MOTOR.TBRAKEAPP	NV	The delay time used for applying the motor brake.
MOTOR.TBRAKERLS	NV	The delay time used for releasing the motor brake.
MOTOR.ICONT	NV	Sets the motor continuous current.
MOTOR.INERTIA	NV	Sets the motor inertia.
MOTOR.IPEAK	NV	Sets the motor peak current.
MOTOR.KT	NV	Sets the torque constant of the motor.
MOTOR.LQLL	NV	Sets the line-to-line motor Lq.
MOTOR.VMAX	NV	Sets the maximum motor speed.
MOTOR.NAME	NV	Sets the motor name.
MOTOR.PHASE	NV	Sets the motor phase.
MOTOR.PITCH	NV	Sets the motor pitch.
MOTOR.POLES	NV	Sets the number of motor poles.
MOTOR.R	NV	Sets the stator winding resistance phase-phase in ohms.
MOTOR.TEMP	R/O	Reads the motor temperature represented as the resistance of the motor PTC.

MOTOR.TEMPFAULT	NV	Sets the motor temperature fault level.
MOTOR.TEMPWARN	NV	Sets the motor temperature warning level.
MOTOR.TYPE	NV	Sets the motor type.
MOTOR.VOLTMAX	NV	Sets the motor maximum voltage.
Motion Task (MT)		
MT.ACC	R/W	Specifies motion task acceleration; active in opmode 2 (position) only.
MT.CLEAR	Command	Clears motion tasks from the drive; active in opmode 2 (position) only.
MT.CNTL	R/W	Sets motion task control word; active in opmode 2 (position) only.
MT.CONTINUE	Command	Continues a stopped motion task; active in opmode 2 (position) only.
MT.DEC	R/W	Sets motion task deceleration; active in opmode 2 (position) only.
MT.EMERGMT	R/W	Selects a motion task to be triggered after an emergency stop procedure; active in opmode 2 (position) only.
MT.MTNEXT	R/W	Specifies following motion task number; active in opmode 2 (position) only.
MT.TNEXT	R/W	Specifies following motion task time; active in opmode 2 (position) only.
MT.LIST	Command	Lists all initialized motion tasks in the drive; active in opmode 2 (position) only.
MT.LOAD	Command	Reads/loads a motion task number from the drive; active in opmode 2 (position) only.
MT.MOVE	Command	Starts a motion task; active in opmode 2 (position) only.
MT.NUM	R/W	Sets the motion task number; active in opmode 2 (position) only.
MT.PARAMS	Command	Shows a motion task; active in opmode 2 (position) only.
MT.P	R/W	Sets the motion task position; active in opmode 2 (position) only.
MT.SET	Command	Sets the motion task in the drive; active in opmode 2 (position) only.
MT.TNUM	R/W	Motion task customer table number.
MT.V	R/W	Sets the motion task velocity; active in opmode 2 (position) only.
Position Loop (PL)		
PL.CMD	NV	Reads the position command directly from the entry to the position loop.
PL.ERR	NV	Returns the position error present when the drive is controlling the position loop.
PL.ERRFTHRESH	NV	Sets the maximum position error.
PL.ERRWTHRESH	NV	Sets the position error warning level.

PL.FB	R/O	Reads the position feedback value.
PL.FBSOURCE	NV	Sets the feedback source for the position loop.
PL.INTINMAX	NV	Limits the input of the position loop integrator by setting the input saturation.
PL.INTOUTMAX	NV	Limits the output of the position loop integrator by setting the output saturation.
PL.KD	NV	Sets the derivative gain of the position loop.
PL.KI	NV	Sets the integral gain of the position loop.
PL.KP	NV	Sets the proportional gain of the position regulator PID loop.
Position Register Switches (PLS)		
PLS.CLR	W/O	Defines which position register to clear.
PLS.EN	R/W	Enables programmable limit switch (PLS).
PLS.MODE	NV	Selects programmable limit switch mode.
PLS.POLARITY	NV	Sets the polarity of the position registers.
PLS.P1 TO PLS.P8	NV	Sets the trigger point for programmable limit switches.
PLS.STATE	R/O	Reads the programmable limit switch state.
Recorder (REC)		
REC.ACTIVE	R/O	Indicates if data recording is in progress (active).
REC.CH1 to REC.CH6	R/W	Sets recording channels 1 to 6.
REC.DONE	R/O	Checks whether or not the recorder has finished recording.
REC.GAP	R/W	Specifies the gap between consecutive samples.
REC.NUMPOINTS	R/W	Sets the number of points to record.
REC.OFF	R/W	Turns the recorder OFF.
REC.RETRIEVE	R/O	Transfers all the recorded data to the communication channel.
REC.STOPTYPE	R/W	Sets the recorder stop type.
REC.TRIG	Command	Triggers the recorder.
REC.TRIGSLOPE	R/W	Sets the trigger slope.
REC.TRIGTYPE	R/W	Sets the trigger type.
REC.TRIGVAL	R/W	Sets the trigger value.
Regen Resistor (REGEN)		
REGEN.REXT	NV	Sets the external, user-defined regen resistor resistance.
REGEN.TYPE	NV	Sets the regen resistor type.
REC.TRIGPOS	R/W	Sets the trigger position in the recording buffer.
VBUS.UVFTHRESH	R/O	Reads the under voltage fault level.
VBUS.OVFTHRESH	R/O	Reads the over voltage fault level.
VBUS.VALUE	R/O	Reads DC bus voltage.
Units (UNIT)		
UNIT.ACCLINEAR	NV	Sets the linear acceleration/deceleration units.
UNIT.ACCROTARY	NV	Sets the rotary acceleration/deceleration units.

UNIT.LABEL	NV	Sets user-defined name for user-defined position units.
UNIT.PIN	NV	Sets gear IN for the unit conversion.
UNIT.PLINEAR	NV	Sets the linear position units.
UNIT.POUT	NV	Sets gear out for the unit conversion.
UNIT.PROTARY	NV	Sets the position units when the motor type (MOTOR.TYPE) is rotary.
UNIT.VLINEAR	NV	Sets the linear velocity units.
UNIT.VROTARY	NV	Sets the velocity units when the motor type (MOTOR.TYPE) is rotary.
Bus voltage (VBUS)		
VBUS.OVFTHRESH	R/O	Reads the over voltage fault level.
VBUS.OVFWTHRESH	N/V	Sets voltage level for over voltage warning.
VBUS.RMSLIMIT	R/O	Reads the limit for the bus capacitors load.
VBUS.UVFTHRESH	R/O	Reads the under voltage fault level.
VBUS.UVMODE		Indicates undervoltage (UV) mode.
VBUS.UVWTHRESH	NV	Sets voltage level for undervoltage warning.
VBUS.VALUE	R/O	Reads DC bus voltage.
Velocity Loop (VL)		
VL.ARPF1 TO VL.ARPF4	R/W	Sets the natural frequency of the pole (denominator) of anti-resonance (AR) filters 1, 2, 3, and 4; active in opmodes 1 (velocity) and 2 (position) only.
VL.ARPQ1 TO VL.ARPQ4	R/W	Sets the Q of the pole (denominator) of anti-resonance (AR) filter 1; active in opmodes 1 (velocity) and 2 (position) only.
VL.ARTYPE1 TO VL.ARTYPE4	NV	Indicates the method used to calculate BiQuad coefficients; active in opmodes 1 (velocity) and 2 (position) only.
VL.ARZF1 TO VL.ARZF4	R/W	Sets the natural frequency of the zero (numerator) of anti-resonance (AR) filter 1; active in opmodes 1 (velocity) and 2 (position) only.
VL.ARZQ1 TO VL.ARZQ4	R/W	Sets the Q of the zero (numerator) of anti-resonance filter #1; active in opmodes 1 (velocity) and 2 (position) only.
VL.BUSFF	R/O	Displays the velocity loop feedforward value injected by the field-bus; active in opmodes 1 (velocity) and 2 (position) only.
VL.CMD	R/O	Reads the actual velocity command; active in opmodes 1 (velocity) and 2 (position) only.
VL.CMDU	R/W	Sets the user velocity command; active in opmodes 1 (velocity) and 2 (position) only.
VL.ERR	R/O	Sets the velocity error; active in opmodes 1 (velocity) and 2 (position) only.
VL.FB	R/O	Reads the velocity feedback; active in opmodes 1 (velocity) and 2 (position) only.

VL.FBFILTER	R/O	Filters VL.FB value; active in opmodes 1 (velocity) and 2 (position) only.
VL.FBSOURCE	NV	Sets feedback source for the velocity loop; active in opmodes 1 (velocity) and 2 (position) only.
VL.FF	R/O	Displays the velocity loop overall feedforward value; active in opmodes 1 (velocity) and 2 (position) only.
VL.GENMODE	NV	Selects mode of velocity generation (Observer, d/dt); active in opmodes 1 (velocity) and 2 (position) only.
VL.KBUSFF	R/W	Sets the velocity loop acceleration feedforward gain value; active in opmodes 1 (velocity) and 2 (position) only.
VL.KI	NV	Sets the velocity loop integral gain for the PI controller; active in opmodes 1 (velocity) and 2 (position) only.
VL.KP	NV	Sets velocity loop proportional gain for the PI controller; active in opmodes 1 (velocity) and 2 (position) only.
VL.KVFF	R/W	Sets the velocity loop velocity feedforward gain value; active in opmodes 1 (velocity) and 2 (position) only.
VL.LIMITN	NV	Sets the velocity lower limit; active in opmodes 1 (velocity) and 2 (position) only.
VL.LIMITP	NV	Sets the velocity high limit; active in opmodes 1 (velocity) and 2 (position) only.
VL.LMJR	R/W	Sets the ratio of the estimated load moment of inertia relative to the motor moment of inertia; active in opmodes 1 (velocity) and 2 (position) only.
VL.THRESH	NV	Sets the over speed fault value; active in opmodes 1 (velocity) and 2 (position) only.
Wake and Shake (WS)		
WS.ARM	Command	Sets wake and shake to start at the next drive enable.
WS.DISTMIN	R/W	Sets the minimum movement required for wake and shake.
WS.IMAX	R/W	Sets maximum current used for wake and shake.
WS.MODE	R/W	Sets the method used for wake and shake.
WS.DISTMAX	R/W	Sets maximum movement allowed for wake and shake.
WS.NUMLOOPS	R/W	Sets the number of repetitions for wake and shake.
WS.STATE	R/O	Reads wake and shake status
WS.T	R/W	Sets wake and shake current-vector appliance time
WS.TDELAY1	NV	Delay for wake and shake timing

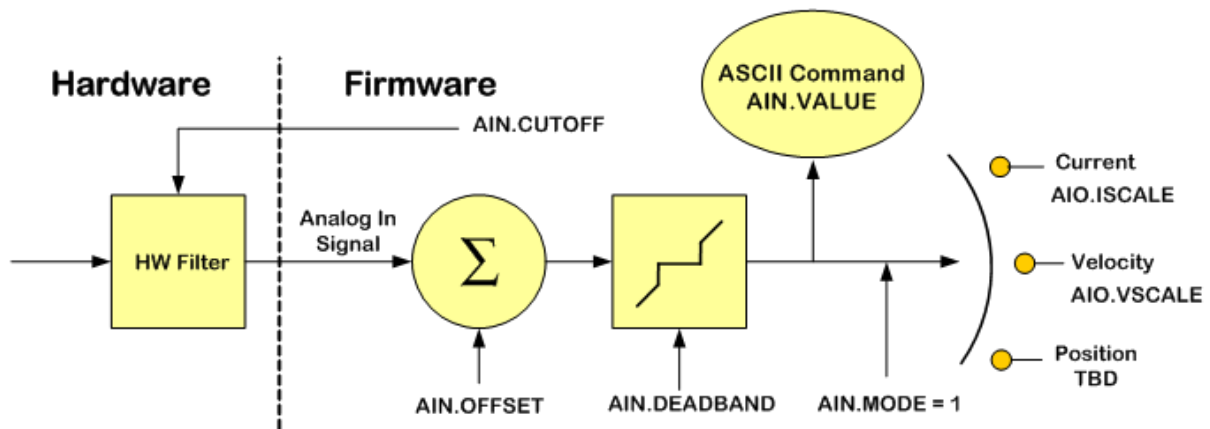
WS.TDELAY2	NV	Sets the delay for wake and shake timing.
WS.TDELAY3	NV	Sets the delay for wake and shake between loops in mode 0.
WS.VTHRESH	NV	Defines the maximum allowed velocity for Wake & Shake

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AIN Parameters

This section describes the analog input (AIN) parameters. AIN parameters function as shown in the block diagram below:

Analog Input Block Diagram



AIN.CUTOFF

General Information	
Type	NV Parameter
Description	Sets the analog input low-pass filter cutoff frequency.
Units	Hz
Range	0 to 10,000 Hz
Default Value	5,000 Hz
Data Type	Float
See Also	Analog Input Block Diagram
Start Version	M_0-0-15

Description

AIN.CUTOFF sets the break frequency in Hz for two cascaded single-pole low-pass filters on the hardware command input. Since the two poles are cascaded at the same frequency, the -3 dB frequency is $0.64 \cdot \text{AIN.CUTOFF}$ in hertz and the 10% to 90% step response rise time is $0.53/\text{AIN.CUTOFF}$ in seconds.

Suggested operating values are as follows:

- Analog torque opmode: 5 kHz
- Analog velocity opmode: 2.5 kHz
- General purpose analog input high resolution: 500 Hz

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.DEADBAND

General Information	
Type	NV Parameter
Description	Sets the analog input signal deadband.
Units	V
Range	0 to 12.5 V
Default Value	0 V
Data Type	Float
See Also	Analog Input Block Diagram
Start Version	M_0-0-15

Description

AIN.DEADBAND sets the deadband of the analog input signal. If the absolute value of the analog input signal is less than the AIN.DEADBAND value, then no analog command signal is generated.

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.ISCALE

General Information	
Type	NV Parameter
Description	Sets the analog current scale factor.
Units	A/V
Range	0.001 to 22.4 A/V
Default Value	0.001 A/V
Data Type	Float
See Also	Analog Input Block Diagram
Start Version	M_01-01-01-000

Description

AIN.ISCALE sets the analog current scale factor that scales the analog input (AIN.VALUE) for DRV.O-PMODE = 1 (analog torque mode).

The value entered is the motor current per 10 V of analog input. This value may be either higher or lower than 100%, but the actual analog input will be limited by the application current limit (IL.LIMITN and IL.LIMITP).

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.OFFSET

General Information	
Type	NV Parameter
Description	Sets the analog input offset.
Units	V
Range	–10 to +10 V
Default Value	0 V
Data Type	Float
See Also	Analog Input Block Diagram, AIN.ZERO
Start Version	M_0-0-15

Description

AIN.OFFSET sets the analog offset, which is added to the analog input command to the drive. This value compensates for the analog input signal (AIN.VALUE) offset or drift.

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.PSCALE

General Information	
Type	NV Parameter
Description	Sets the analog position scale factor.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts/V, rad/V, deg/V, (PIN/POUT)/V, counts 16 bit/V Linear: counts/V, mm/V, $\mu\text{m}/\text{V}$, (PIN/POUT)/V, counts 16 bit/V
Range	Rotary: 1 to 9,223,372,036,854,775 counts/V 0 to 13,493,026.816 rad/V 0 to 773,094,113.280 deg/V 0 to 10,737,418.240 (PIN/POUT)/V 0 to 140,737,488,355.327 counts 16 bit/V Linear: 1 to 9,223,372,036,854,775 counts/V 0 to 2147483.648 mm/V 0 to 2147483648.000 $\mu\text{m}/\text{V}$ 0 to 10737418.240 (PIN/POUT)/V 0 to 140737488355.327 counts 16 bit/V
Default Value	Rotary: 1 counts/V 0 rad/V 0 deg/V 0 (PIN/POUT)/V 0 counts 16 bit/V Linear: 1 count/V 0 rad/V 0 deg/V 0 (PIN/POUT)/V 0 counts 16 bit/V
Data Type	Float
See Also	N/A
Start Version	M_01-01-01-000

Description

AIN.PSCALE is an analog position scale factor that scales the analog input (AIN.VALUE) for DRV.OPMODE = 2, DRV.CMDSOURCE = 3 (analog position mode).

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.VALUE

General Information	
Type	R/O Parameter
Description	Reads the value of the analog input signal.
Units	V
Range	-12.5 to +12.5 V
Default Value	N/A
Data Type	Float
See Also	AIN.OFFSET, AIN.ZERO, Analog Input Block Diagram
Start Version	M_0-0-15

Description

AIN.VALUE reads the analog input value after the value is filtered (as shown in the Analog Input Block Diagram).

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.VSCALE

General Information	
Type	NV Parameter
Description	Sets analog velocity scale factor.
Units	Depends on UNIT.VROTARY or UNIT.ACCLINEAR Rotary: rpm/V, rps/V, (deg/s)/V, [(PIN/POUT)/s]/V, (rad/s)/V Linear: counts/s/V, (mm/s)/V, (μm/s)/V, [(PIN/POUT)/s]/V
Range	Rotary: 0.060 to 60,000 rpm/V 0.001 to 1,000 rps/V 0.359 to 360,000 (deg/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V 0.006 to 6,283.186 (rad/s)/V Linear: 0.001 to 1.000 counts/s/V 0.001*MOTOR.PITCH to 1,000.000*MOTOR.PITCH (mm/s)/V 0.998*MOTOR.PITCH to 1,000,000.000*MOTOR.PITCH (μm/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V
Default Value	Rotary: 0.060 rpm/V 0.001 rps/V 0.359 (deg/s)/V 0.005 [(PIN/POUT)/s]/V 0.006 (rad/s)/V Linear: 0.001 counts/s/V 0.001*MOTOR.PITCH (mm/s)/V 0.998*MOTOR.PITCH (μm/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V
Data Type	Float
See Also	N/A
Start Version	

Description

AIN.VSCALE is an analog velocity scale factor that scales the analog input AIN.VALUE) for DRV.OPMODE = 1 (analog velocity mode).

The value entered is the motor velocity per 10 V of analog input. This value may be either higher or lower than the application velocity limit (VL.LIMITP or VL.LIMITN), but the actual analog I/O will be limited by VL.LIMITP or VL.LIMITN.

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

AIN.ZERO

General Information	
Type	Command
Description	Zeroes the analog input signal.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	AIN.VALUE, AIN.OFFSET
Start Version	M_0-0-50-0

Description

AIN.ZERO causes the drive to zero the analog input signal (AIN.VALUE). You may need to execute this command more than once to achieve zero offset, and AIN.OFFSET is modified in this process.

Related Topics

1 Analog Input

Velocity Controller Environment Block Diagram (for the drive controller environment).

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AIO Parameters

AIO.ISCALE

General Information	
Type	NV Parameter
Description	Sets the analog current scale factor.
Units	A/V
Range	0.001 to 22.4 A/V
Default Value	0.001 A/V
Data Type	Float
See Also	Analog Input Block Diagram
Start Version	M_0-0-15
End Version	M_01-01-01-000

Description

AIO.ISCALE sets the analog current scale factor that scales:

- The analog input (AIN.VALUE) for DRV.OPMODE = 0 (analog torque mode), DRV.CMDSOURCE = 3 (analog)
- The analog output (AOUT.VALUE) for AOUT.MODE = 5 or 6. The value entered is the motor current per 1 V of analog input or output. This value may be either higher or lower than 100%, but the actual analog I/O will be limited by the application current limit (IL.LIMITN and IL.LIMITP).

AIO.PSCALE

General Information	
Type	NV Parameter
Description	Sets position scale factor.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts/V, rad/V, deg/V, (PIN/POUT)/V, counts 16 bit/V Linear: counts/V, mm/V, um/V, (PIN/POUT)/V, counts 16 bit/V
Range	Rotary: 1 to 9,223,372,036,854,775 counts/V 0 to 13,493,026.816 rad/V 0 to 773,094,113.280 deg/V 0 to 10,737,418.240 (PIN/POUT)/V 0 to 140,737,488,355.327 counts 16 bit/V Linear: 1 to 9,223,372,036,854,775 counts/V 0 to 2147483.648 mm/V 0 to 2147483648.000 um/V 0 to 10737418.240 (PIN/POUT)/V 0 to 140737488355.327 counts 16 bit/V
Default Value	Rotary: 1 counts/V 0 rad/V 0 deg/V 0 (PIN/POUT)/V 0 counts 16 bit/V Linear: 1 count/V 0 rad/V 0 deg/V 0 (PIN/POUT)/V 0 counts 16 bit/V
Data Type	Float
See Also	Analog Input Block Diagram
Start Version	M_00-00-56-000/M_01-01-01-000

Description

AIO.PSCALE is an analog position scale factor that scales:

1. The analog input (AIN.VALUE) for DRV.OPMODE = 2, DRV.CMDSOURCE = 3 (analog position mode)
2. The analog output (AOUT.VALUE) for AOUT.MODE = 6, or 7. (actual position or position error) per 10 V of analog input or output.

AIO.VSCALE

General Information	
Type	NV Parameter
Description	Sets velocity scale factor.
Units	Depends on UNIT.VROTARY or UNIT.ACCLINEAR Rotary: rpm/V, rps/V, (deg/s)/V, [(PIN/POUT)/s]/V, (rad/s)/V Linear: counts/s/V, (mm/s)/V, (um/s)/V, [(PIN/POUT)/s]/V
Range	Rotary: 0.060 to 60,000 rpm/V 0.001 to 1,000 rps/V 0.359 to 360,000 (deg/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V 0.006 to 6,283.186 (rad/s)/V Linear: 0.001 to 1.000 counts/s/V 0.001*MOTOR.PITCH to 1,000.000*MOTOR.PITCH (mm/s)/V 0.998*MOTOR.PITCH to 1,000,000.000*MOTOR.PITCH (um/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V
Default Value	Rotary: 0.060 rpm/V 0.001 rps/V 0.359 (deg/s)/V 0.005 [(PIN/POUT)/s]/V 0.006 (rad/s)/V Linear: 0.001 counts/s/V 0.001*MOTOR.PITCH (mm/s)/V 0.998*MOTOR.PITCH (um/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V
Data Type	Float
See Also	Analog Input Block Diagram
Start Version/End Version	M_0-0-15/M_01-01-01-000

Description

AIO.VSCALE is an analog velocity scale factor that scales:

1. The analog input (AIN.VALUE) for DRV.OPMODE = 2 (analog velocity mode)
2. The analog output (AOUT.VALUE) for AOUT.MODE = 1, 3, or 7. The value entered is the motor velocity per 10 V of analog input or output. This value may be either higher or lower than the application velocity limit (VL.LIMITP or VL.LIMITN), but the actual analog I/O will be limited by VL.LIMITP or VL.LIMITN.

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AOUT Parameters

AOUT.DEBUGADDR

General Information	
Type	NV Parameter
Description	Sets the memory address to debug.
Units	N/A
Range	4 to 4,292,870,142
Default Value	4
Data Type	Integer
See Also	AOUT.MODE
Start Version	M_01-01-01-000

Description

AOUT.DEBUGADDR sets the memory address to debug when AOUT.MODE = 9 (debug mode).

AOUT.DEBUGDATATYPE

General Information	
Type	NV Parameter
Description	Sets the data type of the value to be debugged.
Units	N/A
Range	0 to 10
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_01-01-01-000

Description

AOUT.DEBUGDATATYPE is used in AOUT.MODE = 9 (debug mode).

This parameter sets the data type of the value to be debugged according to the table below:

Value	Data Type
0	Illegal type
1	Signed char (1 byte)
2	Unsigned char (1 byte)
3	Signed word (2 bytes)
4	Unsigned word (2 bytes)
5	Signed integer (4 bytes)
6	Unsigned integer (4 bytes)
7	Signed double double (8 bytes)
8	Unsigned double double (8 bytes)
9	Pointer to char (one byte)
10	Fix shift

AOUT.DEBUGSCALE

General Information	
Type	NV Parameter
Description	Sets the scale to be used for debug.
Units	N/A
Range	0.001 to 9,223,372,036,854,775.000
Default Value	1
Data Type	Float
See Also	AOUT.MODE
Start Version	M_01-01-01-000

Description

AOUT.DEBUGADDR sets the scale to be used for debug when AOUT.MODE = 9 (debug mode).

AOUT.ISCALE

General Information	
Type	NV Parameter
Description	Sets the analog current scale factor.
Units	A/V
Range	0.001 to 22.4 A/V
Default Value	0.001 to 22.4 A/V
Data Type	Float
See Also	AOUT.VALUE
Start Version	M_01-01-01-000

Description

AOUT.ISCALE sets the analog current scale factor that scales the analog output (AOUT.VALUE) for AOUT.MODE = 4 or 5. The value entered is the motor current per 10 V of analog input or output. This value may be either higher or lower than 100%, but the actual analog I/O will be limited by the application current limit (IL.LIMITN and IL.LIMITP).

AOUT.MODE

General Information	
Type	NV Parameter
Description	Sets the analog output mode.
Units	N/A
Range	0 to 9
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3470h/1
Data Type	Integer 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

AOUT.MODE sets the analog output functionality.

AOUTx.MODE	Description
0	User variable. The analog output signal is determined by the user (using AOUT.VALUEU).
1	Actual velocity. The analog signal describes the current velocity value.
2	Velocity error. The analog signal describes the velocity error value.
3	Velocity command. The analog signal describes the velocity command value.
4	Actual current. The analog signal describes the actual current value.
5	Current command. The analog signal describes the current command value.
6	Actual position. The analog signal describes the current position value.
7	Position error. The analog signal describes the position error value.
8	Triangle wave. The analog signal is a triangle wave (sawtooth pattern).
9	Debug mode. In this mode the user can define a drive variable to monitor via the analog output (AOUT.VALUEU).

Example

You can use AOUT.VALUEU to implement a voltage output. As an example:

```
-->AOUT.MODE 0
```

```
-->AOUT.VALUEU 5
```

```
-->AOUT.VALUEU 4.33
```

AOUT.OFFSET

General Information	
Type	NV Parameter
Description	Sets the analog input offset.
Units	V
Range	-10 to +10 V
Default Value	0 V
Data Type	Float
See Also	N/A
Start Version	M_00-00-65-000

Description

This parameter sets the analog input offset.

AOUT.PSCALE

General Information	
Type	NV Parameter
Description	Sets the analog position scale factor.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts/V, rad/V, deg/V, (PIN/POUT)/V, counts 16 bit/V Linear: counts/V, mm/V, $\mu\text{m}/\text{V}$, (PIN/POUT)/V, counts 16 bit/V
Range	Rotary: 1 to 9,223,372,036,854,775 counts/V 0 to 13,493,026.816 rad/V 0 to 773,094,113.280 deg/V 0 to 10,737,418.240 (PIN/POUT)/V 0 to 140,737,488,355.327 counts 16 bit/V Linear: 1 to 9,223,372,036,854,775 counts/V 0 to 2147483.648 mm/V 0 to 2147483648.000 $\mu\text{m}/\text{V}$ 0 to 10737418.240 (PIN/POUT)/V 0 to 140737488355.327 counts 16 bit/V
Default Value	Rotary: 1 counts/V 0 rad/V 0 deg/V 0 (PIN/POUT)/V 0 counts 16 bit/V Linear: 1 counts/V 0 rad/V 0 deg/V 0 (PIN/POUT)/V 0 counts 16 bit/V
Data Type	Float
See Also	AOUT.VALUE
Start Version	M_01-01-01-000

Description

AOUT.PSCALE is an analog position scale factor that scales the analog output (AOUT.VALUE) for AOUT.MODE = 6, or 7. (actual position or position error) per 10 V of analog input or output.

AOUT.VALUE

General Information	
Type	N/V Parameter
Description	Reads the analog output value.
Units	V
Range	–10 to +10 V
Default Value	0
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3470h/2
Data Type	Integer 16
PDO Mappable	Yes
Start Version	

Description

AOUT.VALUE reads the analog output value. This parameter can also be used to set the value of the analog output when AOUT.MODE = 0 (analog output signal is determined by the user).

AOUT.VALUEU

General Information	
Type	R/W parameter
Description	Sets the analog output value.
Units	V
Range	–10 to +10 V
Default Value	0
Data Type	Float
See Also	N/A
Start Version	M_00-00-50-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3470h/3
Data Type	Integer 16
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

AOUT.VALUEU reads/writes the analog output value when AOUT.MODE = 0 (analog output signal is determined by the user).

AOUT.VSCALE

General Information	
Type	NV Parameter
Description	Sets velocity scale factor for analog output.
Units	Depends on UNIT.VROTARY or UNIT.ACCLINEAR Rotary: rpm/V, rps/V, (deg/s)/V, [(PIN/POUT)/s]/V, (rad/s)/V Linear: counts/s/V, (mm/s)/V, (μm/s)/V, [(PIN/POUT)/s]/V
Range	Rotary: 0.060 to 60,000 rpm/V 0.001 to 1,000 rps/V 0.359 to 360,000 (deg/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V 0.006 to 6,283.186 (rad/s)/V Linear: 0.001 to 1.000 counts/s/V 0.001*MOTOR.PITCH to 1,000.000*MOTOR.PITCH (mm/s)/V 0.998*MOTOR.PITCH to 1,000,000.000*MOTOR.PITCH (μm/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V
Default Value	Rotary: 0.060 rpm/V 0.001 rps/V 0.359 (deg/s)/V 0.005 [(PIN/POUT)/s]/V 0.006 (rad/s)/V Linear: 0.001 counts/s/V 0.001*MOTOR.PITCH (mm/s)/V 0.998*MOTOR.PITCH (μm/s)/V 0.005 to 5,000 [(PIN/POUT)/s]/V
Data Type	Float
See Also	AOUT.VALUE
Start Version	M_01-01-01-000

Description

AOUT.VSCALE is an analog velocity scale factor that scales the analog output (AOUT.VALUE) for AOUT.MODE = 1, 2, or 3. The value entered is the motor velocity per 10 V of analog output. This value may be either higher or lower than the application velocity limit (VL.LIMITP or VL.LIMITN), but the actual analog I/O will be limited by VL.LIMITP or VL.LIMITN.

BODE Parameters

BODE.EXCITEGAP

General Information	
Type	R/W Parameter
Description	Controls how often the excitation is updated.
Units	Drive samples
Range	1 to 255 drive samples
Default Value	2 drive samples
Data Type	N/A
See Also	BODE.MODE
Start Version	M_0-0-30

Description

BODE.EXCITEGAP controls how often the excitation is updated. The excitation is updated every n drive samples, where n is BODE.EXCITEGAP. For example, if BODE.EXCITEGAP = 2, then the excitation is updated every $2/(16,000 \text{ Hz}) = 1/8,000 \text{ Hz} = 0.000125 \text{ sec}$. When measuring a system, update the excitation only as often as the data is recorded.

Example

Set excitation update rate to 8,000 Hz:

-->BODE.EXCITEGAP 2

Set excitation update rate to 4,000 Hz:

-->BODE.EXCITEGAP 4

Get excitation update rate (already set to 8000 Hz)

-->BODE.EXCITEGAP 2

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.FREQ

General Information	
Type	R/W Parameter
Description	Sets the frequency of the sine excitation source.
Units	Hz
Range	0 to 8,000 Hz
Default Value	0 Hz
Data Type	Float
See Also	BODE.MODE BODE.INJECTPOINT, BODE.IAMP, BODE.VAMP
Start Version	M_0-0-30

Description

BODE.FREQ sets the frequency of the sine excitation source in Hz. The sine excitation source is used to take frequency response measurements of a system.

Example

Setting up a sine excitation source of 0.2 A at 50 Hz:

```
-->BODE.INJECTPOINT 1
```

```
-->BODE.IAMP 0.2
```

```
-->BODE.FREQ 50.0
```

```
-->BODE.MODE 2
```

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.IAMP

General Information	
Type	R/W Parameter
Description	Sets current command value used during the Bode procedure.
Units	A
Range	+/- Combined drive and motor current limit
Default Value	0.2 A
Data Type	Float
See Also	BODE.INJECTPOINT, BODE.FREQ
Start Version	M_0-0-30

Description

BODE.IAMP sets the amplitude of the excitation when in current mode as set in BODE.INJECTPOINT. When using BODE.MODE = 1 and BODE.INJECTPOINT = 1, this parameter will determine the level of noise injected to commanded current value.

Example

Set the excitation current to 0.2 A

-->BODE.IAMP 0.2

Get the excitation current (already set to 0.2 A)

-->BODE.IAMP 0.200 [A]

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.INJECTPOINT

General Information	
Type	R/W Parameter
Description	Sets whether the excitation uses current or velocity excitation type.
Units	N/A
Range	0 to 2
Default Value	0
Data Type	Integer
See Also	BODE.IAMP, BODE.MODE, BODE.VAMP
Start Version	M_0-0-30

Description

BODE.INJECTPOINT sets whether the excitation uses current or velocity excitation type.

BODE.INJECTPOINT	Description
0	None
1	Current
2	Velocity

Example

Set BODE.INJECTPOINT to current:

```
-->BODE.INJECTPOINT 1
```

Get BODE.INJECTPOINT (already set to current)

```
-->BODE.INJECTPOINT 1
```

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.MODE

General Information	
Type	R/W Parameter
Description	Sets the mode of the excitation.
Units	N/A
Range	0 to 4
Default Value	0
Data Type	Integer
See Also	BODE.INJECTPOINTBODE.VAMP
Start Version	M_0-0-30

Description

BODE.MODE sets the mode of the excitation.. The excitation can be set to the modes shown in the table below. BODE.MODE is always set to **None** when Ethernet communication is disconnected. The peak amplitude of the excitation is set by either BODE.IAMP or BODE.VAMP (depending on BODE.INJECTPOINT).

BODE.MODE is subject to a watchdog timer (BODE.MODETIMER). If BODE.MODETIMER is 0, then BODE.MODE is not affected. If BODE.MODETIMER is set to a value greater than 0, then BODE.MODE will be set to 0 (None) after the BODE.MODETIMER time milliseconds. If you reset BODE.MODE to a non-zero value while it is already a non-zero value, this will reset the watchdog timer. This mechanism is intended to turn off the excitation signal if you lose communication with the drive.

BODE.MODE	Description	Comments
0	None	Turns all excitation off
1	PRB	Uses Pseudo Random Binary (PRB) excitation. PRB is a signal that is always +/- peak amplitude, varying only in phase. PRB excitation results in a flat excitation frequency spectrum. PRB results in a high peak excitation amplitude, which can help minimize friction in a frequency response test. PRB excitation repeats every $(2^{\text{BODE.PRBDEPTH}}) / \text{BODE.EXCITEGAP}$ drive samples. This repetition can be used to reveal the effects of friction.
2	Sine	Uses Sine excitation
3	Noise	Uses random noise excitation. Noise is a random number generator that varies between +/- peak amplitude.
4	Offset	Sets a torque offset equal to BODE.IAMP

Example

Set BODE.MODE to PRB:

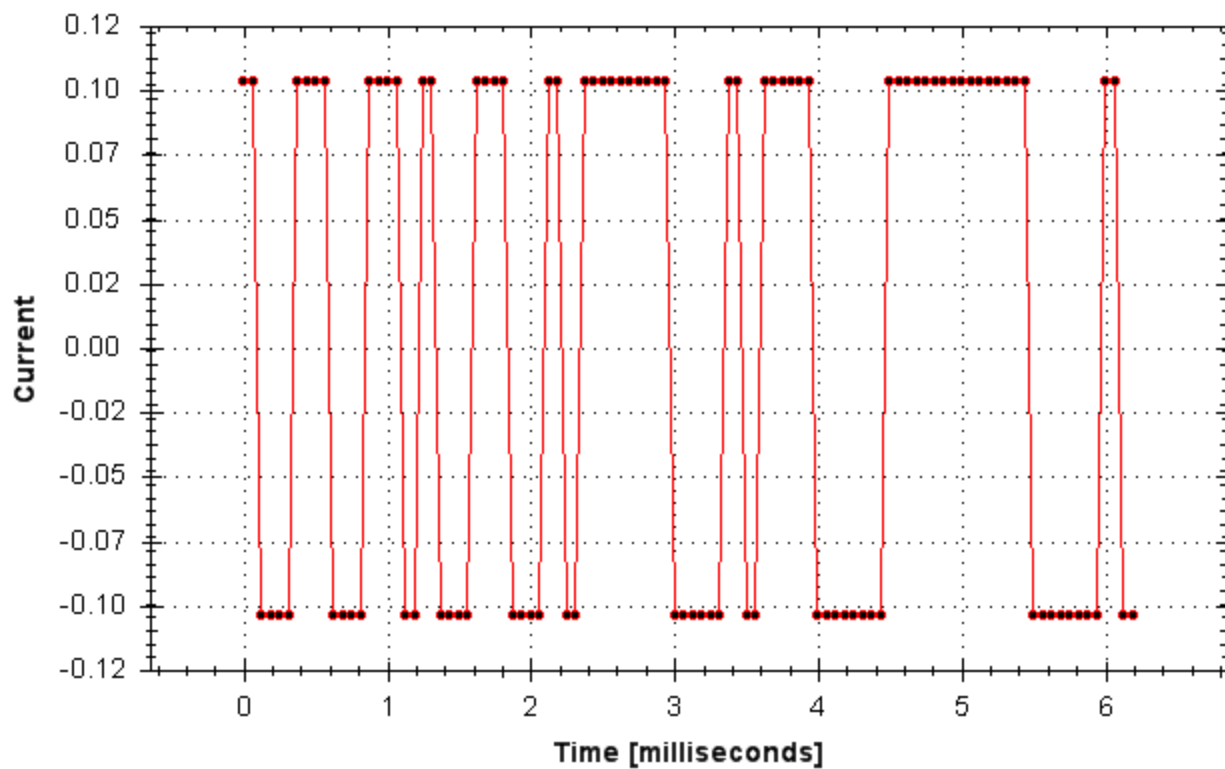
```
-->BODE.MODE 1
```

Get BODE.MODE (already set to PRB):

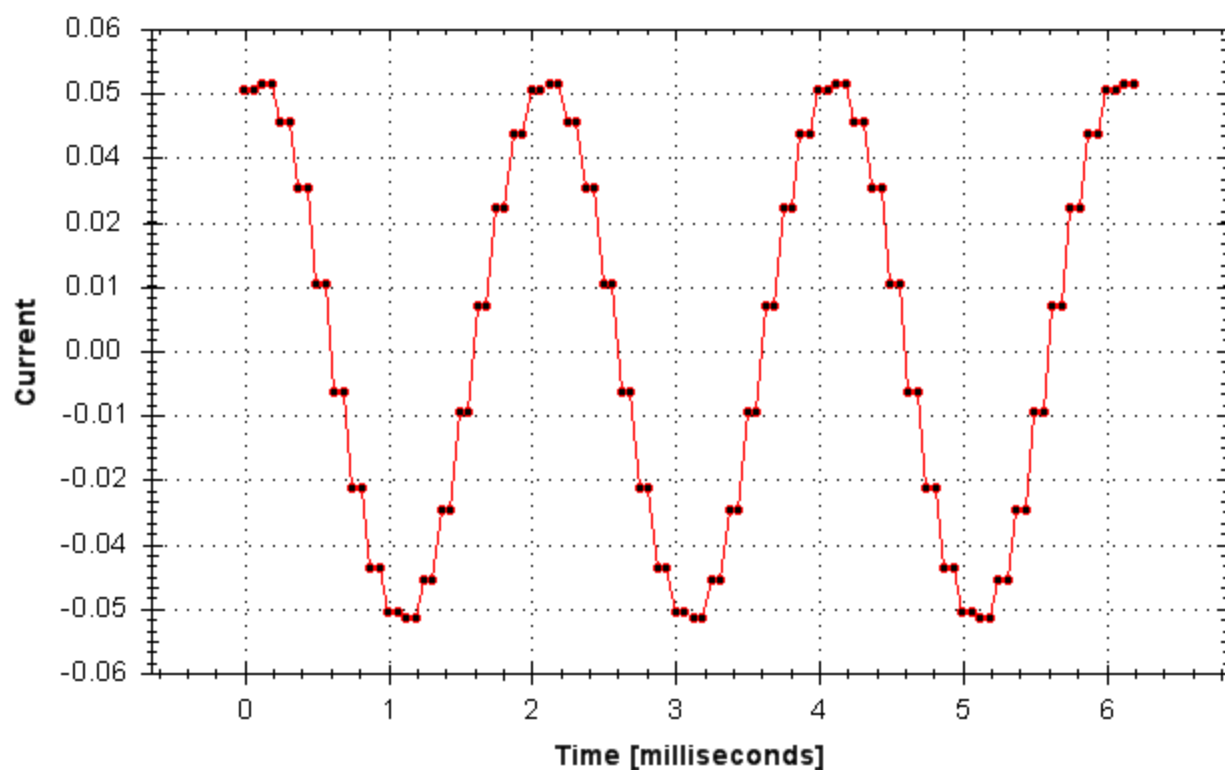
```
-->BODE.MODE
```

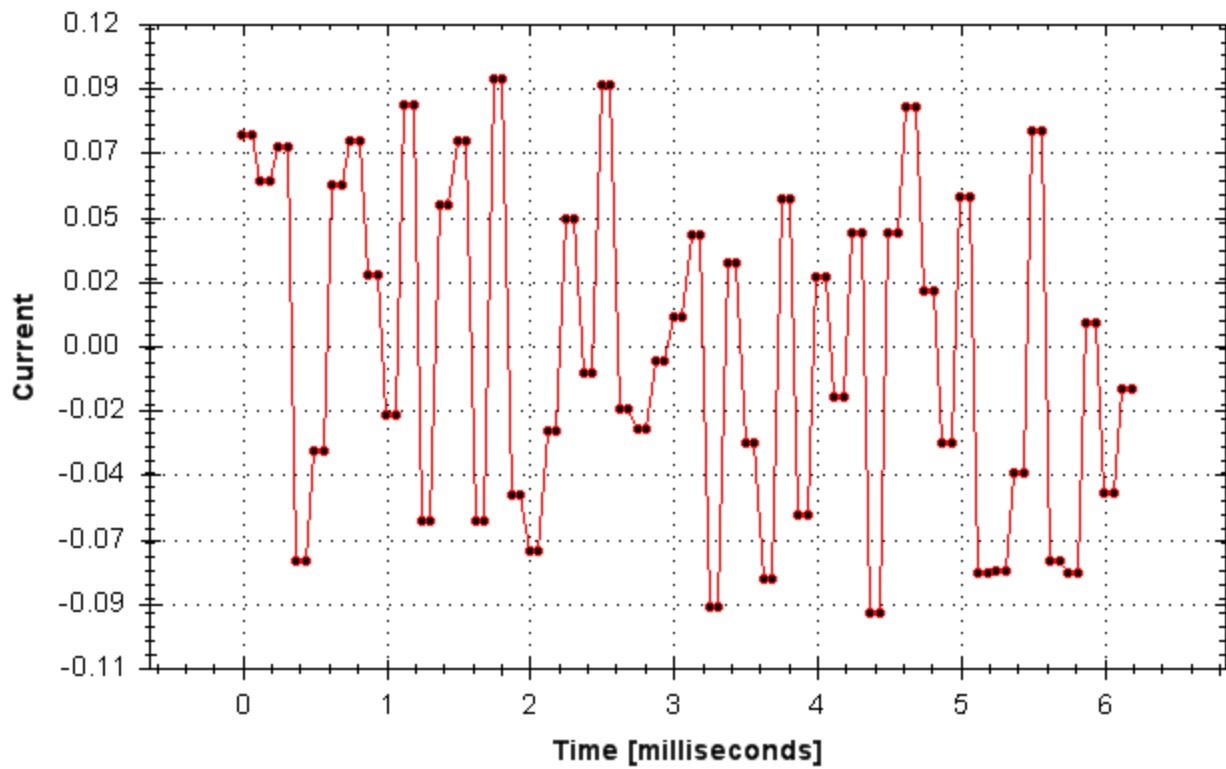
```
1
```

PRB excitation:



Sine excitation:



Noise excitation:**Related Topics**

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.MODETIMER

General Information	
Type	R/W Parameter
Description	Sets the watchdog timer of the excitation.
Units	ms
Range	0 to 268,435,456
Default Value	0
Data Type	Integer
See Also	BODE.MODE
Start Version	M_1-03-00-000

Description

BODE.MODETIMER sets the watchdog timer for the excitation. This watchdog is used to automatically turn off the excitation of the system if communication is lost. It is highly recommended that you use the watchdog for any excitation measurements. The WorkBench autotuner and Bode tool automatically use these values, requiring no action from you.

If you set BODE.MODETIMER to a nonzero value, the Bode watchdog is enabled. BODE.MODE will be set to 0 (None) after the BODE.MODETIMER value elapses. To reset the watchdog timer, reset BODE.MODE to a nonzero value while it is already a nonzero value.

BODE.MODETIMER	Comments
0	BODE.MODE is left at the value you set it to.
> 0	Uses pseudo random binary (PRB) excitation. PRB is a signal that is always +/- peak amplitude, varying only in phase. PRB excitation results in a flat excitation frequency spectrum. PRB also results in a high peak excitation amplitude, which can help minimize friction in a frequency response test. PRB excitation repeats every $(2^{\text{BODE.PRBDPTH}})/\text{BODE.EXCITEGAP}$ drive samples. This repetition can be used to reveal the effects of friction.

Example

Disable BODE.MODETIMER:

```
-->BODE.MODETIMER // Set to 0 to disable the watchdog
0
-->BODE.MODE // Observe starting state of the Bode mode
0
-->BODE.MODE 1 // Set Bode mode to PRB
-->BODE.MODE // Observe Bode mode state is the same after 0.5 seconds
1
-->BODE.MODE // Observe Bode mode state is the same after 10 seconds
1
```

Enable BODE.MODETIMER:

```
-->BODE.MODETIMER 1000 // Set watchdog to 1 second
-->BODE.MODE 1 // Set Bode mode to PRB
-->BODE.MODE // Observe Bode mode state is the same after 0.5 seconds
1
-->BODE.MODE // Observe Bode mode state has been set to zero after 1.0 seconds
0
```

Enable and reenale BODE.MODETIMER:

```
-->BODE.MODETIMER 2500 // Set watchdog to 2.5 seconds
-->BODE.MODE 1 // Set Bode mode to PRB
-->BODE.MODE // Observe Bode mode state is the same after 1.5 seconds
1
-->BODE.MODE 1//SetBodemodetoPRB,resettingthewatchdogtimertotheoriginal2.5secondvaluesetabove
-->BODE.MODE // Observe Bode mode state is the same after 3.0 seconds after the original enabling of
BODE.MODE 1
-->BODE.MODE // Observe Bode mode state has been set to zero after 4.0 seconds after the original ena-
bling of BODE.MODE
0
```

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.PRBDDEPTH

General Information	
Type	R/W Parameter
Description	Sets the length of the PRB signal before it repeats.
Units	NA
Range	4 to 19
Default Value	19
Data Type	Integer
See Also	BODE.MODE, BODE.INJECTPOINT, BODE.IAMP, BODE.VAMP
Start Version	M_0-0-30

Description

BODE.PRBDDEPTH sets the length of the PRB signal before it repeats. This applies only when BODE.MODE = PRB. The PRB excitation will repeat after $(2^{\text{BODE.PRBDDEPTH}}) / \text{BODE.EXCITEGAP}$ drive samples.

Example

Set BODE.PRBDDEPTH to 19:

```
-->BODE.PRBDDEPTH 19
```

Get BODE.PRBDDEPTH (already set to 19):

```
-->BODE.PRBDDEPTH 19
```

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

BODE.VAMP

General Information	
Type	R/W Parameter
Description	Sets the amplitude of the excitation when in velocity mode.
Units	rpm
Range	0 to maximum motor speed
Default Value	0
Data Type	Float
See Also	BODE.MODE, BODE.INJECTPOINT
Start Version	M_0-0-30

Description

BODE.VAMP sets the amplitude of the excitation when in velocity mode as set in BODE.INJECTPOINT.

Example

Set the excitation velocity to 100 RPM

```
-->BODE.VAMP 100
```

Get the excitation velocity(already set to 100 RPM)

```
-->BODE.VAMP
```

```
100.000 [rpm]
```

Related Topics

1 Using the Autotuner

Using the Autotuner: Advanced

1 Scope

1.2.1.5 Bode (set command source)

1 Settings (set command source)

Drive Fault 126

Bode parameter errors (Error: Invalid Bode plot mode for this function. and others)

CAP Parameters

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.EDGE, CAP1.EDGE

General Information	
Type	R/W Parameter
Description	Selects the capture edge.
Units	N/A
Range	1 to 3
Default Value	1
Data Type	U8
See Also	CAP0.PREEDGE, CAP1.PREEDGE
Start Version	M_0-0-50-0

Description

The filtered trigger source is monitored for rising edge, falling edge, or both edges. The event mode logic may ignore the precondition edge detection; however, the trigger always uses edge detection.

The precondition logic has an identical feature controlled by CAP0.PREEDGE, CAP1.PREEDGE.

Value	Description
0	Reserved
1	Rising edge
2	Falling edge
3	Both edges

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.EN, CAP1.EN

General Information	
Type	R/W Parameter
Description	Enables or disables the related capture engine.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter enables or disables the related capture engine. After each successful capture event, this parameter is reset to 0 and must be activated again for the next capture. Also note that CAP0.PLFB, CAP1.PLFB is set to 0 when this parameter is set to 1.

0 = Disable

1 = Enable

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.EVENT, CAP1.EVENT

General Information	
Type	R/W Parameter
Description	Controls the precondition logic.
Units	N/A
Range	0 to 3
Default Value	0
Data Type	U8
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3460h/5 CAP0.EVENT 3460h/6 CAP1.EVENT
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

The event mode controls use of the precondition logic. The four event modes are listed below.

Event	Description
0	Trigger Event = Trigger edge (ignore precondition)
1	Trigger Event = Trigger edge after precondition edge
2	Trigger Event = Trigger edge while precondition = 1
3	Trigger Event = Trigger edge while precondition = 0

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

Example

Event 0

The following diagram shows an example of Event = 0 (trigger on edge, trigger edge = rising). In this mode, the precondition logic is ignored.

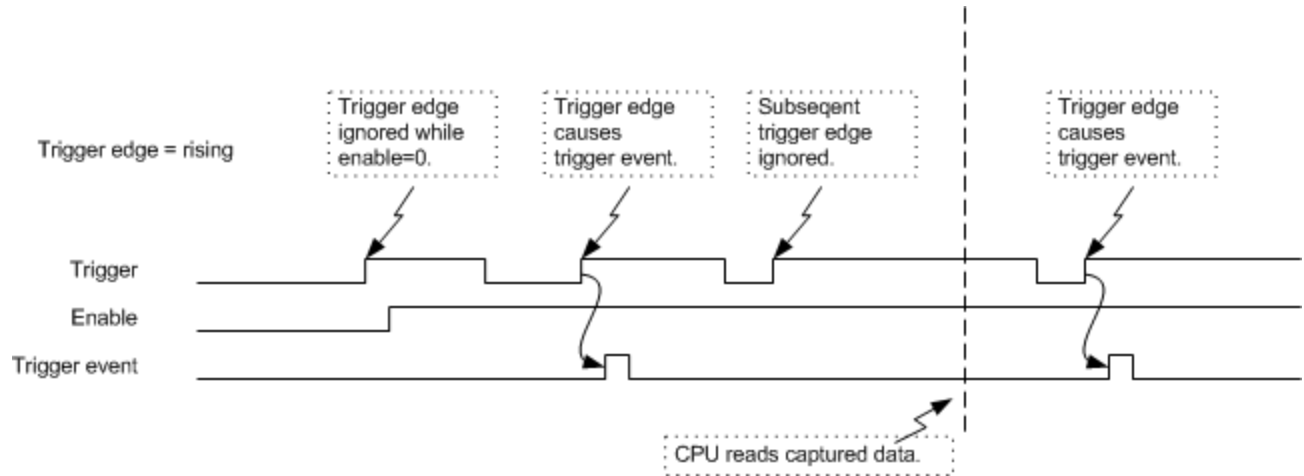


Figure 1: Trigger Edge Mode

Events 2 and 3 (Trigger edge while precondition = 0 or 1)

In these events, the precondition logic samples the current (post-filter) state of the selected precondition source input. The capture engine looks for a trigger edge while the precondition input is at a “1” or “0” state.

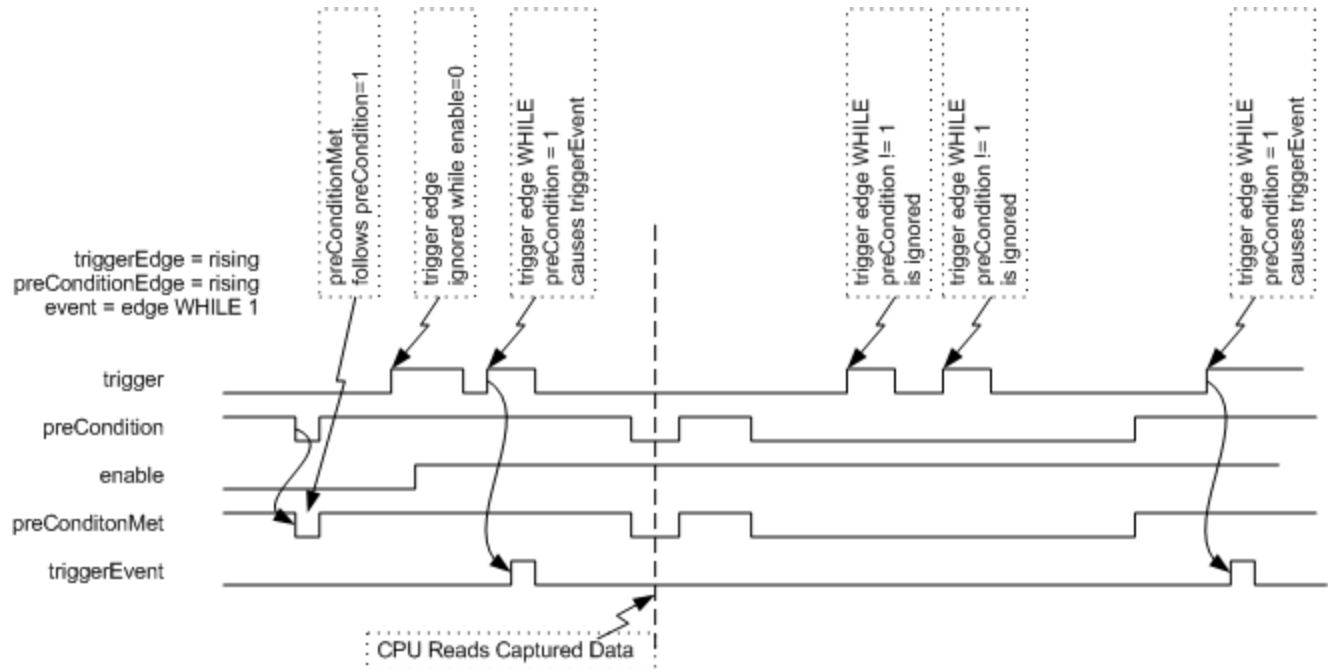


Figure 2: Trigger edge WHILE precondition edge

Event 1 (Trigger edge after precondition)

In this event, each trigger event requires Enable=1, a new precondition edge, followed by a new trigger edge. The sequence requirements are shown in the figure below.

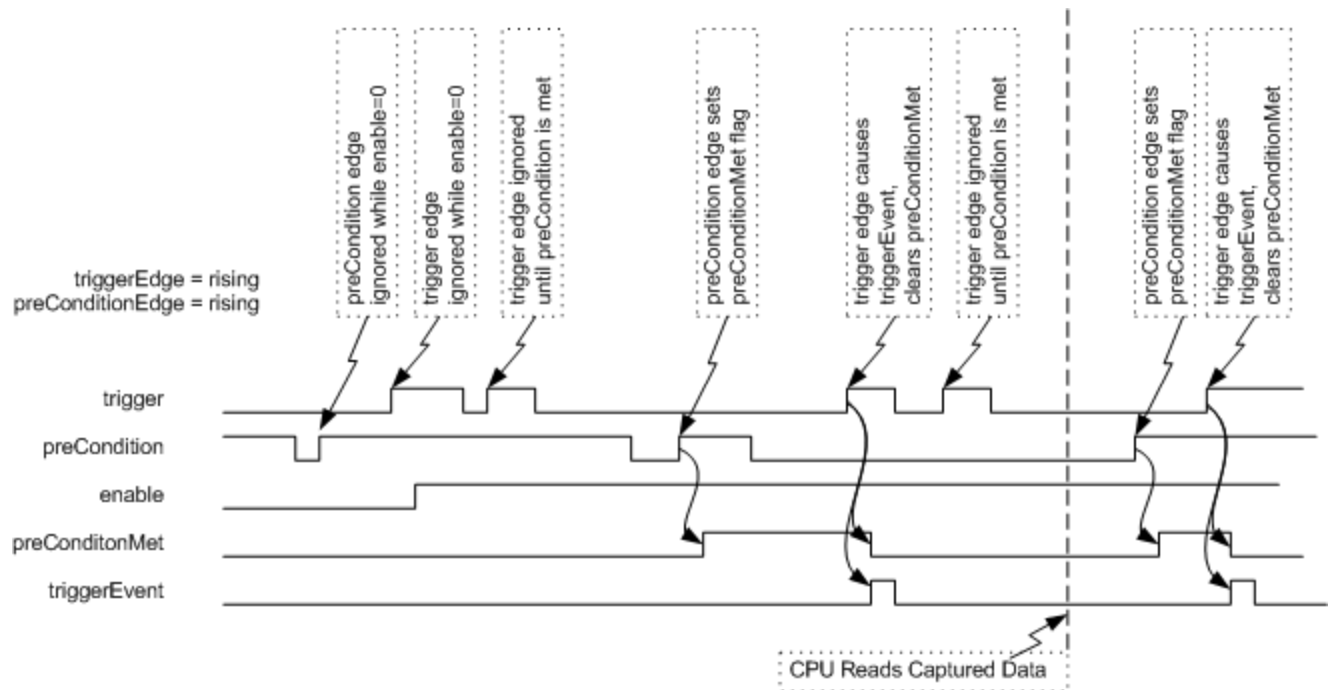


Figure 3: Trigger edge after precondition edge

Note: If the precondition and trigger edges occur at the same time, it is not a valid trigger event. A subsequent trigger edge must occur after the precondition edge. The same time resolves to a single 40 ns clock tick in the trigger event logic (after the optional filter function as well as any sensor, cable, or noise delays).

CAP0.FILTER, CAP1.FILTER

General Information	
Type	R/W Parameter
Description	Sets the filter for the capture source input.
Units	N/A
Range	0 to 2
Default Value	0
Data Type	U8
See Also	CAP0.PREFILTER, CAP1.PREFILTER
Start Version	M_0-0-50-0

Description

An optional glitch filter may be used to debounce the input trigger signals. By default the filter is disabled. A 0.6 μ s filter may be selected for fast signals such as RS422, or fast opto. A 40 μ s filter may be selected for slow opto inputs. Exact values for each filter mode are listed below (the precondition logic has an identical filter).

Filter Mode (if no glitch)	Trigger Filter (filter clock enable period)	Filter Delay			
		Min (μ s)	Typical (μ s)	Max (μ s)	(μ s)
off	0	N/A	N/A	N/A	N/A
(default)	0	0	0	N/A	N/A
fast	1	0.56	0.6	0.64	0.80
slow	2	35.84	38.4	40.96	5.12

The filter uses seven stages of delay when enabled. An input glitch restarts the filter delay. The clock enable period for the seven stage filter is set to 0.080 μ s for the fast filter, 5.12 μ s for the slow filter. The filter delay for a clean input edge is therefore an average of 7.5 periods (+/-0.5 period for worst case).

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.MODE, CAP1.MODE

General Information	
Type	NV Parameter
Description	Selects the captured value.
Units	N/A
Range	0 to 3
Default Value	0
Data Type	U8
See Also	N/A
Start Version	M_00-00-51-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3460h/3 CAP0.MODE
	3460h/4 CAP1.MODE
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

Mode 0 is the standard position capture which stores PL.FB. Data can be retrieved with CAP0.PLFB, CAP1.PLFB.

Mode 1 is the drive internal time capture. Data can be retrieved with CAP0.T, CAP1.T.

Mode 2 is the KAS EtherCAT distributed clock time (DCT) capture. Instead of using a position value, the DCT is calculated. There is no user parameter to retrieve the captured DCT.

Mode 3 is capture of primary encoder signal. It is used to home onto a feedback index. This mode sets other parameters needed for this mode. These parameters can be changed later, but this is not recommended unless your input source of the index signal varies. Parameters set in this mode are:

- CAPx.TRIGGER 10 // index mark of primary encoder
- CAPx.EDGE 1 // rising edge
- CAPx.EVENT 0 // ignore precondition

Also the capture engine is immediately enabled and is continuously triggered again.

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.PLFB, CAP1.PLFB

General Information	
Type	R/O Parameter
Description	Sets captured position value.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, PIN/POUT, counts 16 bit Linear: counts, mm, μ m, PIN/POUT, counts 16 bit
Range	Full range of a signed 64 bit variable
Default Value	0
Data Type	S64
See Also	UNIT.PROTARY, UNIT.PLINEAR
Start Version	M_0-0-51-0-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	20A0h/0 CAP0.PLFB
	20A1h/0 CAP0.PLFB
	20A2h/0 CAP1.PLFB
	20A3h/0 CAP1.PLFB
Data Type	Integer 32
PDO Mappable	Yes
Start Version	

Description

This parameter sets the captured position value scaled to actual set units. See UNIT.PROTARY or UNIT.PIN for these units.

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.PREEDGE, CAP1.PREEDGE

General Information	
Type	R/W Parameter
Description	Selects the capture precondition edge.
Units	N/A
Range	1 to 3
Default Value	1
Data Type	U8
See Also	CAP0.EDGE, CAP1.EDGE
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3460h/7 CAP0.PREEDGE
	3460h/8 CAP1.PREEDGE
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

The precondition edge is monitored for rising edge, falling edge, or both. The event mode logic may ignore the precondition edge detection (trigger always uses edge detection).

The filtered trigger source has an identical feature controlled by CAP0.EDGE, CAP1.EDGE.

Value	Description
0	Reserved
1	Rising edge
2	Falling edge
3	Both edges

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.PREFILTER, CAP1.PREFILTER

General Information	
Type	R/W Parameter
Description	Sets the filter for the precondition input source.
Units	N/A
Range	0 to 2
Default Value	0
Data Type	U8
See Also	CAP0.FILTER, CAP1.FILTER
Start Version	M_0-0-50-0

Description

You can use an optional glitch filter to debounce the input trigger signals. By default the filter is disabled. A 0.6 us filter may be selected for fast signals such as RS422, or fast opto. A 40 us filter may be selected for slow opto inputs. Exact values for each filter mode are listed below.

Filter (if no glitch)	Trigger Filter (filter clock enable period)	Filter Delay (us)			
		Min	Typ	Max	
off	0	N/A	N/A	N/A	N/A
(default)	0	0	0	N/A	N/A
fast	1	0.56	0.6	0.64	0.80
slow	2	35.84	38.4	40.96	5.12

The filter uses seven stages of delay when enabled. An input glitch restarts the filter delay. The clock enable period for the seven-stage filter is set to 0.080 us for the fast filter, 5.12 us for the slow filter. The filter delay for a clean input edge is therefore an average of 7.5 periods (+/- 0.5 period for worst case).

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.PRESELECT, CAP1.PRESELECT

General Information	
Type	R/W Parameter
Description	Sets the precondition trigger.
Units	N/A
Range	0 to 11
Default Value	0
Data Type	U8
See Also	CAP0.TRIGGER, CAP1.TRIGGER
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3460h/9 CAP0.PRESELECT
	3460h/10 CAP1.PRESELECT
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter specifies the input signal for the precondition trigger.

Trigger Source	Input Name
0	General Input 1
1	General Input 2
2	General Input 3
3	General Input 4
4	General Input 5
5	General Input 6
6	General Input 7
7	RS485 Input 1
8	RS485 Input 2
9	RS485 Input 3
10	Primary Index
11	Tertiary Index

NOTE

CAP1 and associated triggers, enables, preselecs, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.STATE, CAP1.STATE

General Information	
Type	R/O Parameter
Description	Indicates whether or not trigger source was captured.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-50-0

Description

When enabling the capture (CAP0.EN, CAP1.EN), this parameter is set to 0 until the next event is captured.

0 = Not captured

1 = Captured

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.T, CAP1.T

General Information	
Type	R/O Parameter
Description	Reads time capture (if time capture was configured).
Units	ns
Range	N/A
Default Value	N/A
Data Type	U32
See Also	CAP0.MODE, CAP1.MODE
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	20A0h/0 CAP0.T
	20A1h/0 CAP0.T
	20A2h/0 CAP1.T
	20A3h/0 CAP1.T
Data Type	Integer 32
PDO Mappable	Yes
Start Version	

Description

If time capture was configured, the captured time is stored in this parameter. The reference time is the occurrence of the last MTS signal (recurring every 62.5 μ s), so this is a purely drive internal time.

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CAP0.TRIGGER, CAP1.TRIGGER

General Information	
Type	R/W Parameter
Description	Specifies the trigger source for the position capture.
Units	N/A
Range	0 to 11
Default Value	0
Data Type	U8
See Also	CAP0.PRESELECT, CAP1.PRESELECT
Start Version	M_0-0-50-0

Fieldbus Information		
	EtherCAT COE & CANopen	
Index/Subindex or Parameter Number	3460h/1	CAP0.TRIGGER
	3460h/2	CAP1.TRIGGER
Data Type	Unsigned 8	
PDO Mappable	N/A	
Start Version	M_00-00-62-000	

Description

This parameter specifies the trigger source (capture input signal).

Trigger Source	Input Name
0	General Input 1
1	General Input 2
2	General Input 3
3	General Input 4
4	General Input 5
5	General Input 6
6	General Input 7
7	RS485 Input 1
8	RS485 Input 2
9	RS485 Input 3
10	Primary Index
11	Tertiary Index

NOTE

CAP1 and associated triggers, enables, preselects, and other functions are currently not operational. Please do not use CAP1 at this time for captures.

CS Parameters

Controlled stop (CS) parameters set the values for the controlled stop process.

CS.DEC

General Information	
Type	NV Parameter
Description	Sets the deceleration value for the controlled stop process.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 Counts/s ² 0.031*MOTOR.PITCH to 833333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833333333.333*MOTOR.PITCH μm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 Counts/s ² 50.000*MOTOR.PITCH mm/s ² 50000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	CS.VTHRESH, CS.TO, DRV.DIS, DIN1.MODE TO DIN6.MODE, DRV.DISM0DE, DRV.DISSOURCES
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3440h/1

Fieldbus Information	
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the deceleration value for the controlled stop process.

Related Topics

0.1 Controlled Stop

1 Digital Inputs and Outputs (Digital input mode 13)

1 Fault and Warning Messages (this table indicates faults for which a controlled stop occurs)

CS.STATE

General Information	
Type	R/O Parameter
Description	Returns the internal status of the controlled stop process.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	CS.DEC, CS.VTHRESH, CS.TODRV.DISMODE, DRV.DISSOURCES
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3441h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

CS.STATE returns the internal state machine value of the controlled stop.

0 = controlled stop is not occurring.

1 = controlled stop is occurring

Related Topics

0.1 Controlled Stop

1 Digital Inputs and Outputs (Digital input mode 13)

1 Fault and Warning Messages (this table indicates faults for which a controlled stop occurs)

CS.TMAX

General Information	
Type	NV Parameter
Description	Sets the time-out value for the drive to disable if velocity is not within CS.VTHRESH.
Units	ms
Range	1 to 30,000 ms
Default Value	1,000 ms
Data Type	Integer
See Also	CS.DEC, CS.VTHRESH, CS.TOCS.STATEDRV.DISMODE, DRV.DI-SOURCES
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	36DCh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

CS.TMAX is the time-out value for the drive to disable if velocity is not within CS.VTHRESH.

Example

CS.TMAX 1000.

Related Topics

0.1 Controlled Stop

1 Digital Inputs and Outputs (Digital input mode 13)

1 Fault and Warning Messages (this table indicates faults for which a controlled stop occurs)

CS.TO

General Information	
Type	NV Parameter
Description	Sets the time value for the drive velocity to be within CS.VTHRESH.
Units	ms
Range	1 to 30,000 ms
Default Value	6 ms
Data Type	Integer
See Also	CS.DEC, CS.VTHRESH, CS.STATE, DRV.DIS, DIN1.MODE TO DIN6.MODE, DRV.DISM, DRV.DISSOURCES
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3440h/3
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

CS.TO is the time value for the drive velocity to be within CS.VTHRESH before the drive disables.

Example

CS.TO 100

Related Topics

0.1 Controlled Stop

1 Digital Inputs and Outputs (Digital input mode 13)

1 Fault and Warning Messages (this table indicates faults for which a controlled stop occurs)

CS.VTHRESH

General Information	
Type	NV Parameter
Description	Sets the velocity threshold for the controlled stop.
Units	rpm, rps, deg/s, (PIN/POUT)/s
Range	0.001 to 200.000 rpm
Default Value	120 rpm
Data Type	Float
See Also	CS.DEC, CS.TO, CS.STATE DRV.DIS, DIN1.MODE TO DIN6.MODE, DRV.DISM, DRV.DISSOURCES
Start Version	M-0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3440h/2
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

CS.VTHRESH is the velocity threshold for the controlled stop algorithm.

Example

CS.VTHRESH 100

Related Topics

0.1 Controlled Stop

1 Digital Inputs and Outputs (Digital input mode 13)

1 Fault and Warning Messages (this table indicates faults for which a controlled stop occurs)

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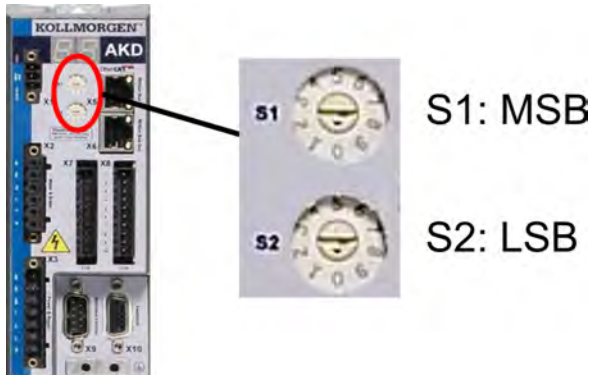
DIN Parameters

DIN.ROTARY

General Information	
Type	R/O Parameter
Description	Reads the rotary knob value.
Units	N/A
Range	0 to 99
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

DIN.ROTARY reads the rotary knob value.



Related Topics

- 1 Digital Inputs and Outputs

DIN.STATES

General Information	
Type	R/O Parameter
Description	Reads the digital input states.
Units	N/A
Range	0000000 to 1111111
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DIN.STATES reads the states of the seven digital inputs. The leftmost bit represents digital input 1 (DIN1) and the rightmost bit represents digital input 7 (DIN7).

Related Topics

- 1 Digital Inputs and Outputs

DIN1.INV TO DIN7.INV

General Information	
Type	R/W Parameter
Description	Sets the indicated the polarity of a digital input mode.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_00-00-51-000

Description

Sets the indicated the polarity of a digital input mode.

Example

DIN1.INV = 0 : Input is active high.

DIN1.INV = 1 : Input is active low.

Related Topics

- 1 Digital Inputs and Outputs

DIN1.MODE TO DIN6.MODE

General Information	
Type	R/W Parameter
Description	Sets the digital input modes.
Units	N/A
Range	0 to 21
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3562h/0 DIN1.MODE
	3565h/0 DIN2.MODE
	3568h/0 DIN3.MODE
	356Bh/0 DIN4.MODE
	36F6h/0 DIN5.MODE
	36F9h/0 DIN6.MODE
	36FCh/0 DIN7.MODE
Data Type	Integer 32 (all)
PDO Mappable	No
Start Version	M_00-00-62-000

Fieldbus Information, Profile Specific SDO	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	60FDh/0
Data Type	Unsigned 32
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

DIN1.MODE to DIN6.MODE parameters set the functionality of the digital inputs 1 through 6. Digital inputs and corresponding X7 and X8 pin connectors are described in the AKD Installation Manual, section 8.16.4, Digital Inputs. The table below summarizes the digital input modes; for detailed descriptions of each mode, see 1 Digital Inputs and Outputs.

DINx.MODE	Description
0	No function; off
1	Fault reset
2	Start motion task (use DINx.PARAM for this task)
3	Motion task select bit (see Motion Tasks)

DINx.MODE	Description
4	Motion task start selected (see Motion Tasks)
5	Start home (see Homing)
6	Start jog
7	Reserved
8	Zero latch
9	Reserved
10	Control fault relay
11	Home reference
13	Controlled stop (see Controlled Stop)
15	Quick stop
16	Activate electronic gearing (see Electronic Gearing)
17	Activate electronic gear position shift
18	Positive limit switch
19	Negative limit switch
20	Brake release
21	Current limit

Mode 0: Off

This mode is the non-use state. The drive defaults to this setting.

Mode 1: Fault Reset

This mode is used to clear the drive faults. A change in state causes the drive to reset faults. This mode will only correct non-fatal faults (see fault chart). Upon a rising edge a command, which is similar to DRV.CLRFAULTS, is issued and faults are cleared.

Mode 2: Start Motion Task

This mode is used to start motion task number X. This input will trigger a motion task number as defined in the extra parameter field for this input.

X = the value of the associated input parameter.

It is assumed that motion task number X exists.

Example:

```

-->DIN1.MODE 2 - sets the input mode mode to be Start Motion Task
-->DIN1.PARAM 1 - sets the Motion Task to start to be 1
-->MT.LIST - make sure that Motion Task 1 does exist
10.000 [counts] 1000.000 [rpm] 0 1001.358 [rpm/s] 1001.358 [rpm/s] 0 0 0 [ms]
<Create a rising edge of the input>
<Motion Task 1 executed>

```

Mode 3: Motion Task Select Bit

This mode is used to select the motion tasks that are stored in the drive (numbers 1 to 127) or the reference traverse/homing (0). The motion task number is presented externally at the digital inputs. The motion task set by this mode will be executed when digital input assigned to mode 4 (motion task start selected) gets a rising edge.

Example

Assume:

DIN1.MODE = DIN2.MODE

DIN3.MODE = 3

The state of input 1 and 3 are 1

The state of input 2 is 0

that motion task 5 ($2^0 + 2^2$) will be executed.

Mode 4: Motion Task Start Selected

This mode is used to start the motion task that is stored in the servo amplifier, by giving the motion task number. This input utilizes a secondary variable for the motion task number to be started with the Input trigger. The secondary variable is set by mode 3 (Motion task select bit).

Motion task number "0" initiates homing/reference traverse. A rising edge starts the motion task and a falling edge cancels the motion task.

Mode 5: Start Home

This mode is used to start the homing motion task on the rising edge. The falling edge has no effect on this input mode of operation.

Mode 6: Start Jog

This mode is used to start a jog move. This input mode utilizes a secondary variable for the jog's velocity. The jog will start upon a rising edge. A falling edge stops the jog.

Mode 7: Reserved

Mode 8 – Zero Latch

This mode is used to define the current drive position as the zero pulse for the drive EEO and sets the incremental encoder zero pulse offset. The current position, depending on the incremental encoder resolution that is set, is calculated at the rising edge and stored as an offset. An automatic save is then generated. This function is used to perform an automatic setting of the zero pulse in one turn of the motor.

Mode 9: Reserved

Mode 10: Control Fault Relay

This mode is used to create an external fault.

Input state is 0 – drive regular behavior

Input state is 1 – "Fault 245 – external fault" is issued.

Mode 11: Home reference

This mode is used to receive a physical home reference switch located on the machine to use for the different Home Types.

Mode 12: Reserved

Mode 13: Controlled Stop

This mode is used to stop the motor using the deceleration variable ramp. If zero velocity is reached, the power stage is then disabled. Also see controlled stop (CS) parameters and commands and Controlled Stop.

Mode 14: Reserved

Mode 15: Quick Stop

This mode is used to stop the motor. It is equivalent to issuing a DRV.STOP command.

Mode 16: Activate Electronic Gearing

This mode starts/activates an electronic gearing procedure upon a rising edge.

Mode 17: Activate Electronic Gear Position Shift

This mode is used to add a position shift to the gearing upon a rising edge. The distance of the position shift is set by the secondary variable. The secondary variable is set by DINx.PARAM. The parameter is in position units and is used to incorporate a phase shift while operating in electronic gearing mode.

Example: An input is set to add a 180 degree "phase shift" when triggered. As the drive is following the electronic gearing input, the input is triggered and the motor will follow the drive acceleration and deceleration rates to shift 180 degrees while maintaining the gearing synchronization.

Mode 18: Positive Limit Switch

This mode will cause the input to operate as the positive limit switch. If the positive limit switch input is triggered (goes low), the positive direction motion will then be stopped.

Mode 19: Negative Limit Switch

This mode will cause the input to operate as the negative limit switch. If the negative limit switch input is triggered (goes low), the negative direction motion will then be stopped.

Mode 20: Brake Release

This mode is used to lift the brake when the drive is not active.

Input = 0: the drive controls the brake (regular drives behavior)

Input = 1: the user controls the brake (lift or close using commands)

Mode 21: Current Limit

This mode is used to limit the drive current. The current limit is set by a secondary variable; use DINx.PARAM to set the secondary variable.

Related Topics

1 Digital Inputs and Outputs

0.1 Controlled Stop

0.1 Homing

0.1 Motion Tasks

0.1 Electronic Gearing

0.1 Clearing Faults

Drive Fault and Warning table, Fault 245

CS Parameters

DIN1.PARAM TO DIN7.PARAM

General Information	
Type	R/W Parameter
Description	Sets a value used as an extra parameter for digital inputs nodes.
Units	N/A
Range	-9,223,372,036,854,775,000 to +9,223,372,036,854,775,000
Default Value	0
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter sets a value that is used as an extra parameter for digital inputs nodes.

Example

The digital input mode "Start motion task" is used to start a motion task. This mode uses an extra parameter as the ID of the motion task to be started.

DIN1.STATE TO DIN7.STATE

General Information	
Type	R/O Parameter
Description	Reads a specific digital input state.
Units	N/A
Range	0 to 1
Default Value	N/A
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-15

Description

DIN1.STATE to DIN7.STATE reads the state of one digital input according to the number identified in the command.

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DOUT Parameters

DOUT.CTRL

General Information	
Type	NV Parameter
Description	Sets the source of digital outputs (firmware or fieldbus).
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-15

Description

DOUT.CTRL sets the source of the digital outputs:

0 = Firmware controlled

1 = Fieldbus controlled

Related Topics

DOUT.RELAYMODE

General Information	
Type	R/W Parameter
Description	Indicates faults relay mode.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_00-00-51-000

Description

DOUT.RELAYMODE indicates the faults relay mode as follows:

If DOUT.RELAYMODE= 0 and faults exist, then the relay is open.

If DOUT.RELAYMODE= 0 and faults do not exist - relay closed.

If DOUT.RELAYMODE = 1 and the drive is disabled, then the relay is open.

If DOUT.RELAYMODE = 1 and the drive is enabled, then the relay is closed.

DOUT.STATES

General Information	
Type	R/O Parameter
Description	Reads the state of the two digital outputs.
Units	N/A
Range	0 to 11
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DOUT.STATES reads the states of the two digital outputs. The rightmost bit represents DOUT2 and the leftmost bit represents DOUT1.

DOUTx.MODE

General Information	
Type	NV Parameter
Description	Sets the digital output mode.
Units	N/A
Range	0 to 14
Default Value	0
Data Type	Integer
See Also	DOUT1.PARAM AND DOUT2.PARAM
Start Version	M_0-0-15

Description

DOUTx.MODE sets the functionality of the digital outputs. The table below summarizes the digital output modes; for detailed descriptions of each mode, see 1 Digital Inputs and Outputs.

DOUTx.MODE	Description
0	User (default = 0)
1	Mains ready
2	Software limit switch reached
3	Move complete
4	In position
5	Position greater than x
6	Position less than x
7	Drive produced warning
8	Drive enabled
10	Motor brake
11	Drive produced fault
12	Absolute velocity greater than x
13	Absolute velocity less than x
14	Homing complete
15	PLS.STATE bits or connected

Related Topics

1 Digital Inputs and Outputs

DOUT1.PARAM AND DOUT2.PARAM

General Information	
Type	NV Parameter
Description	Sets extra parameters for the digital outputs.
Units	N/A
Range	DOUT1.PARAM: -357,913.941 to 357,913.941 DOUT2.PARAM: -79,164,837,199.872 to 79,164,837,199.856
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

DOUT1.PARAM and DOUT2.PARAM set the extra parameter needed for the digital outputs calculations, respectively.

DOUT1.STATE AND DOUT2.STATE

General Information	
Type	R/O Parameter
Description	Reads the digital output state.
Units	N/A
Range	0 to 1
Default Value	N/A
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-15

Description

DOUT1.STATE and DOUT2.STATE read the state of one digital output according to the value stated in the command. These parameters can also be used to set a value of one digital output (only if the output mode is idle).

DOUT1.STATEU AND DOUT2.STATEU

General Information	
Type	R/W Parameter
Description	Sets the state of the digital output node.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	N/A
See Also	N/A
Start Version	M_01-01-01-000

Description

DOUT1.STATEU and DOUT2.STATEU set the state of the digital output node as follows:

0 = deactivated

1 = activated

DOUT1.STATEU and DOUT2.STATEU are used when DOUTx.MODE = 0 (user mode).

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DRV Parameters and Commands

DRV.ACC

General Information	
Type	NV Parameter
Description	Describes the acceleration ramp for the velocity loop.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Note: The range and default values of (PIN/POUT)/s ² units depend on the values of PIN and POUT. The range and default values listed in this table are derived from the default values of PIN and POUT. Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.666 (PIN/POUT)/s ² 0.375 to 5,235,987.750 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.995*MOTOR.PITCH to 2,147,483.647*MOTOR.PITCH μm/s ² 0.155 to 2,147,483.647 (PIN/POUT)/s ²
Default Value	Note: The range and default values of (PIN/POUT)/s ² units depend on the values of PIN and POUT. The range default values listed in this table are derived from the default values of PIN and POUT. Rotary: 166.714 rps/s 10,002.851 rpm/s 60,017.108deg/s ² 833.571 (PIN/POUT)/s ² 1,047.496 rad/s ² Linear: 0.166 counts/s ² 166.714*MOTOR.PITCH mm/s ² 166,714.191*MOTOR.PITCH μm/s ² 833.571 (PIN/POUT)/s ²
Data Type	Float
See Also	DRV.DEC, UNIT.ACCLINEAR, UNIT.ACCROTARY
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3501h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

Describes the acceleration ramp for the velocity central loop.

DRV.ACTIVE

General Information	
Type	R/O Parameter
Description	Reads the enable status of an axis.
Units	N/A
Range	0 to 1
Default Value	N/A
Data Type	Integer
See Also	DRV.EN, DRV.DISSOURCES
Start Version	M_0-0-15

Description

DRV.ACTIVE reads the enable status of an axis.

0 = Axis disabled

1 = Axis enabled.

If an axis is not enabled (DRV.ACTIVE is 0), but DRV.EN is 1 and the hardware enable is high, read the value of DRV.DISSOURCES to query the reason that the drive is not enabled.

DRV.BLINKDISPLAY

General Information	
Type	Command
Description	Causes the display to blink for 10 seconds.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-15

Description

DRV.BLINKDISPLAY causes the drive display located on the front of the drive to blink for 10 seconds. This command allows the user to identify the drive that is currently communicating with WorkBench.

DRV.CLRFAULTHIST

General Information	
Type	Command
Description	Clears the fault history log in the NV.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.FAULTHIST
Start Version	M_0-0-15

Description

DRV.CLRFAULTHIST clears the fault history from the nonvolatile memory of the drive.

This command erases all faults returned by DRV.FAULTHIST.

DRV.CLRFAULTS

General Information	
Type	Command
Description	Tries to clear all active faults in the drive.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.FAULTS, DRV.EN, DRV.DIS
Start Version	M_0-0-15

Description

DRV.CLRFAULTS tries to clear all active faults in the drive. If the command succeeds, then the reply to DRV.FAULTS states that no faults exist. If the command fails, then the fault condition is still present.

When a fault occurs, the fault is registered in the drive fault handler. DRV.CLRFAULTS clears the fault from the drive fault handler. However, if the fault still exists in the system, DRV.CLRFAULTS fails and the fault is re-registered in the fault handler.

Note that executing a drive disable (DRV.DIS) followed by a drive enable (DRV.EN) has the same effect as executing DRV.CLRFAULTS.

DRV.CMDSOURCE

General Information	
Type	NV Parameter
Description	Sets the command source (service, fieldbus, analog input, gearing, digital, or Bode).
Units	N/A
Range	0 to 3
Default Value	0
Data Type	Integer
See Also	DRV.OPMODE
Start Version	M_0-0-15

Description

DRV.CMDSOURCE specifies the source of the command to the drive. DRV.OPMODE sets the operation mode to the relevant control loop.

DRV.CMDSOURCE cannot be changed while the drive is enabled. When the drive is disabled, the DRV.CMDSOURCE values can be set as follows:

Value	Description
0	Service, TCP/IP command
1	Fieldbus command
2	Gearing command
3	Analog command

Example

To set the command source to the TCP/IP channel and the operation mode to velocity:

```
-->DRV.CMDSOURCE 0
-->DRV.OPMODE 1
```

DRV.CRASHDUMP

General Information	
Type	Command
Description	Retrieves diagnostic information after the drive crashes.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-50-0

Description

Drives rarely crash, but if a crash occurs, information that can help diagnose the cause of a crash is saved to the nonvolatile (NV) memory within the drive. After the drive is restarted, you can use the DRV.CRASHDUMP command to retrieve this diagnostic information, which can be emailed to Kollmorgen for further support.

If the drive crashes (display flashes an F and three bars), it saves the diagnostic information to a specific block of the drive NV memory. The DRV.CRASHDUMP command then prints the diagnostic information from this NV memory block. Subsequent crash conditions will overwrite the NV memory block. Since the NV memory block is overwritten, but never erased, the DRV.CRASHDUMP command always shows the diagnostic information for the most recent crash.

DRV.DBILIMIT

General Information	
Type	NV Parameter
Description	Sets the maximum amplitude of the current for dynamic braking.
Units	Arms
Range	0 to minimum of drive peak current (DRV.IPEAK) and motor peak current (MOTOR.IPEAK).
Default Value	Minimum of drive continuous current (DRV.ICONT) and motor continuous current (MOTOR.ICONT).
Data Type	Float
See Also	DRV.DISMODE
Start Version	M-0-0-50

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3444h/0
Data Type	Unsigned 16
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the maximum amplitude of the current for dynamic braking.

Example

Setting DRV.DBILIMIT to 2 limits the dynamic brake current to 2 Arms.

DRV.DEC

General Information	
Type	NV Parameter
Description	Sets the deceleration value for the velocity loop.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833,333.333*MOTOR.PITCH μm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3,000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 counts/s ² 1.000*MOTOR.PITCH mm/s ² 1,000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	DRV.ACC, UNIT.ACCROTARY, UNIT.ACCLINEAR, DRV.OPMODE
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3522h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

DRV.DEC sets the deceleration value for the velocity loop command (VL.CMDU) and for the analog

velocity command (AIN.VALUE). The operation mode (DRV.OPMODE) must be set to velocity mode for this command to function.

DRV.DIR

General Information	
Type	R/W Parameter
Description	Changes drive direction.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-38

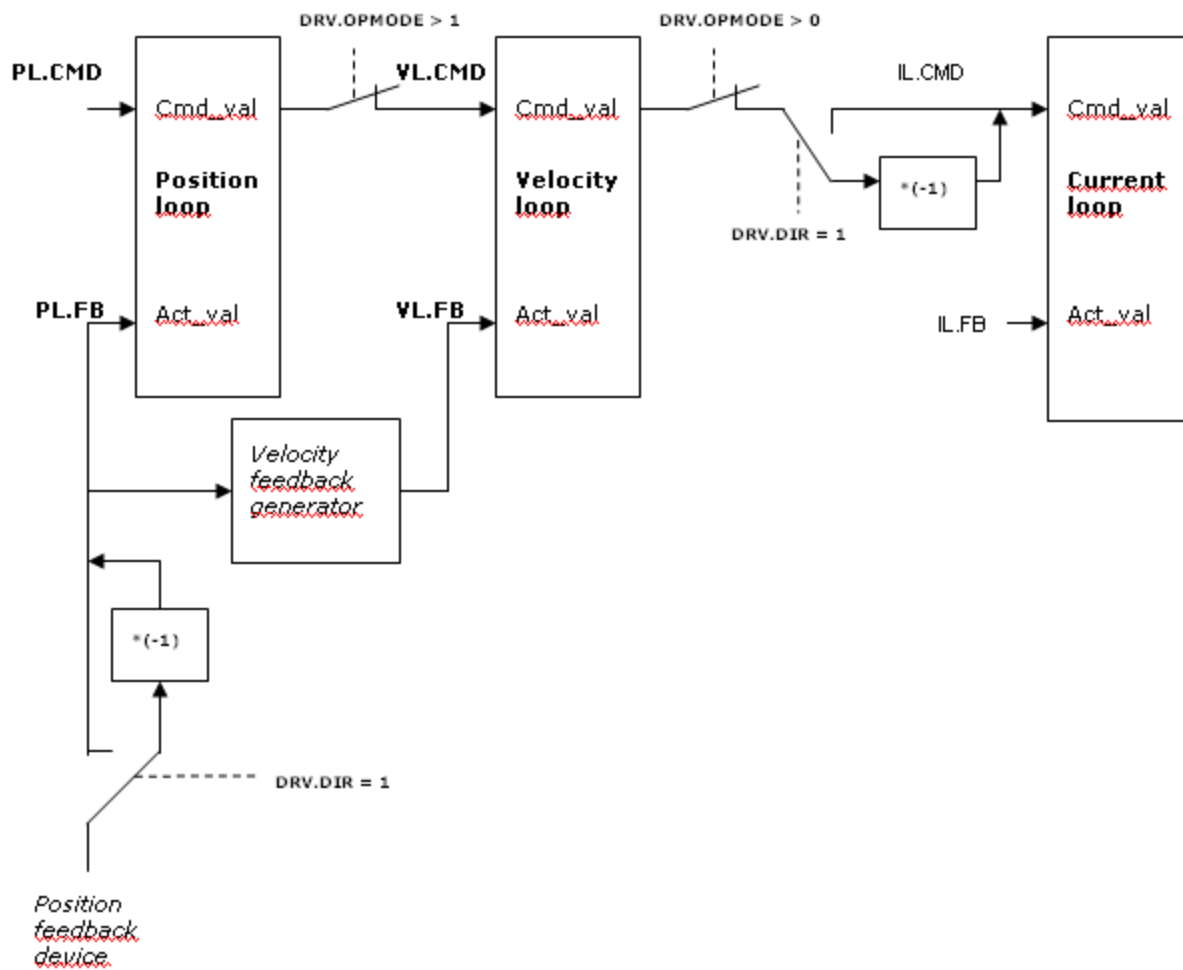
Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	352Ah/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

DRV.DIR changes the direction of the motor by changing the algebraic sign of the current command and position feedback value according to the figure below.

Note the following when using DRV.DIR:

- You can only change the DRV.DIR command when the drive is disabled.
- The drive status changes to "Axis not homed" as soon as the DRV.DIR parameter changes value (see DRV.MOTIONSTAT).
- You must verify the settings of the hardware limit switches. If necessary, switch the positive and negative hardware limit switches by swapping the wires at the digital inputs.



DRV.DIS

General Information	
Type	Command
Description	Disables the axis (software).
Units	N/A
Range	N/A
Default Value	Analog drive software enabled. All other types of drive software disabled.
Data Type	N/A
See Also	DRV.EN, DRV.DISSOURCES, DRV.ACTIVE, DRV.DISMODE, DRV.DISTO
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3442h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

DRV.DIS issues a software disable to the drive. The method by which the drive will be disabled (either immediately or with a ramp down first) is controlled by DRV.DISMODE.

By querying the value of DRV.ACTIVE, you can check whether the drive is currently enabled or disabled.

By querying the value of DRV.DISSOURCES, you can check whether the software enable bit is high (software enabled was issued by executing DRV.EN) or the software enable bit is low (software disable was issued by executing DRV.DIS).

If DRV.DIS is commanded the emergency timeout is started. If the drive does not disable or activate dynamic brake within DRV.DISTO, fault 703 is reported.

Related topics:

Controlled Stop

DRV.DISMODE

General Information	
Type	NV Parameter
Description	Selects between disable immediately or stop and then disable.
Units	N/A
Range	0 to 2
Default Value	0
Data Type	Integer
See Also	DRV.DBILIMIT , DRV.DISTO, CS.VTHRESH
Start Version	M-0-0-50

Description

DRV.DISMODE sets the drive reaction to a DRV.DIS command.

Example

DRV.DISMODE 0 - Disable axis immediately.

DRV.DISMODE 2 - Use a controlled stop to ramp down and then disable the drive.

In all cases described above, if a brake is configured (MOTOR.BRAKE), the brake closes if VL.FB drops below CS.VTHRESH.

WARNING

- Do not set this parameter to values other than 0 or 2.
- Be careful with vertical loads when modifying this parameter. Coordinate this parameter's correct setting with the drive brake settings properly. If these settings are not coordinated, then vertical loads may have no stopping or holding force when the drive is disabled and the load could fall.

Related Topics

0.1 Controlled Stop

CS Parameters

DRV.DISSOURCES

General Information	
Type	R/O Parameter
Description	Returns the possible reason for a drive disable.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.ACTIVE, DRV.FAULTS, DRV.EN, DRV.DIS
Start Version	M_0-0-15

Description

DRV.DISSOURCES is a bitwise parameter that returns the status of possible causes of a drive disable. If this parameter is 0, then the drive is enabled.

The return value specific bits are as follows:

Bit	Status and Response
0	Software disable (execute DRV.EN to issue software enable)
1	Fault exists (read DRV.FAULTS to get the active faults)
2	Hardware disable (remote enable input is low)
3	In-rush disable (the in-rush relay is opened)
4	Initialization disable (the drive did not finish the initialization process)
5	Controlled stop disable from a digital input.

DRV.DISTO

General Information	
Type	R/W Parameter
Description	Sets the emergency timeout
Units	ms
Range	500 to 120,000 ms
Default Value	1,000 ms
Data Type	U32
See Also	DRV.DIS, DRV.DISMODE
Start Version	M-0-0-55

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3445h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This timer starts when DRV.DIS is issued (regardless of the DRV.DIS origin). After this timeout elapses, the actual state of the drive is compared to the DRV.DISM MODE setting. If the actual state does not match the DRV.DISM MODE setting, a fault is reported and the hardware immediately executes the DRV.DISM MODE setting (for instance, disable or activate dynamic brake).

DRV.EMUEDIR

General Information	
Type	R/W Parameter
Description	Sets the direction of the emulated encoder output (EEO) signal.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	N/A
See Also	DRV.EMUEMODE
Start Version	M_0-0-59

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3493h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter allows the user to change the direction of the emulated encoder output. DRV.DIR also affects the output direction (through an XOR, "exclusive or", operation). The drive uses DRV.DIR and DRV.EMU-EDIR to decide the direction of the emulated encoder output. If DRV.DIR and DRV.EMUEDIR have the same value, then DRV.EMUEDIR is set to 0 (meaning an increase in the motor feedback will result an increase of the encoder emulation output and vice-versa). If these parameters have different values, then DRV.EMUEDIR is set to 1 (meaning an increase in the motor feedback will result in a decrease of the encoder emulation output and vice-versa).

DRV.EMUEMODE

General Information	
Type	R/W Parameter
Description	Sets the mode of the emulated encoder output (EEO) connector.
Units	N/A
Range	0 to 5
Default Value	0
Data Type	Integer
See Also	DRV.EMUERES, DRV.EMUEZOFFSET, DRV.EMUEMTURN
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3534h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the EEO connector to act as either an input or output as follows:

Setting	Function
0	EEO connector is not operative.
1	Output, with once per rev index pulse.
2	Output, with absolute index pulse.
3	Input, A/B signals.
4	Input, step and direction signals.
5	Input, up-down signals.

DRV.EMUEMTURN

General Information	
Type	R/W Parameter
Description	Defines the location of the index pulse on the EEO (emulated encoder output) when DRV.EMUEMODE=2.
Units	counts
Range	0 to 4,294,967,295
Default Value	0
Data Type	Integer
See Also	DRV.EMUEMODE, DRV.EMUERES
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3491h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

If the EEO mode with absolute index is selected (DRV.EMUEMODE=2), the index will be output when the feedback position (in counts) matches this parameter.

DRV.EMUERES

General Information	
Type	R/W Parameter
Description	Sets the resolution of the EEO (emulated encoder output).
Units	lines/rev (when DRV.EMUEMODE = 1, 2, or 3) counts/rev (when DRV.EMUEMODE = 4 or 5)
Range	0 to 65,535 lines per revolution
Default Value	0 lines per revolution
Data Type	Integer
See Also	DRV.EMUEMODE
Start Version	M_00-00-50-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3535h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the emulated encoder (EEO) resolution. DRV.EMUERES also defines how many lines are output for one revolution of the primary feedback (when this port is configured as an output), or how many lines will be considered a full revolution of the handwheel (when this port is configured as an input).

DRV.EMUEZOFFSET

General Information	
Type	R/W Parameter
Description	Sets the location of the EEO (emulated encoder output) index pulse (when DRV.EMUEMODE=1).
Units	1/65536 rev
Range	0 to 65535 rev
Default Value	0 rev
Data Type	Integer
See Also	DRV.EMUEMODE, DRV.EMUEMTURN
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3537h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

When EEO multiturn is selected (DRV.EMUEMODE=1), this parameter sets a position of the EEO index. When the primary feedback position (within a revolution) equals this value, an index pulse will output.

DRV.EN

General Information	
Type	Command
Description	Enables the axis (software).
Units	N/A
Range	N/A
Default Value	Analog drive software is enabled. All other types of drive software are disabled.
Data Type	N/A
See Also	DRV.DIS, DRV.DISSOURCES DRV.ACTIVE
Start Version	M_0-0-15

Description

DRV.EN issues a software enable to the drive. You can query the value of DRV.ACTIVE to check whether the drive is currently enabled or disabled.

You can also query the value of DRV.DISSOURCES to check whether the software enable bit is high (software enabled was issued by executing DRV.EN) or the software enable bit is low (software disable was issued by executing DRV.DIS). If the drive software enable bit is low and DRV.EN is executed, then drive faults are automatically cleared during the software enable process.

DRV.ENDEFAULT

General Information	
Type	R/W Parameter
Description	Sets the default state of the software enable
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M-0-30-00

Description

DRV. ENDEFAULT sets the default state of the software enable on power up for drives without fieldbuses (DRV.CMDSOURCE other than 1).

For drives with fieldbuses, such as CANopen (DRV.CMDSOURCE is 1), the default state of the software enable is "disabled", regardless the value of DRV.ENDEFAULT.

DRV.FAULTHIST

General Information	
Type	R/O Parameter
Description	Reads the last 10 faults from NV memory.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.FAULTS, DRV.CLRFAULTHIST
Start Version	M_0-0-15

Description

DRV.FAULTHISTORY returns the last 10 faults that occurred in the drive. The faults are shown with their fault number (which matches the one displayed on the drive display) and a time stamp that indicates when they last occurred.

Issue a DRV.CLRFAULTHIST to clear this fault log.

DRV.FAULTS

General Information	
Type	R/O Parameter
Description	Reads the active faults.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.CLRFAULTS, DRV.FAULTHIST, DRV.CLRFAULTHIST
Start Version	M_0-0-15

Description

DRV.FAULTS returns a list of all currently active faults in the system, preceded by their fault number which matches the number displayed on the drive display.

To clear the faults, either issue a DRV.CLRFAULTS or issue a DRV.DIS followed by DRV.EN.

If no active faults are in the system, then after executing DRV.CLRFAULTS the value read by DRV.FAULTS is "No faults active".

Example

```
-->DRV.FAULTS  
  
502: Bus under voltage.  
  
-->
```

DRV.HANDWHEEL

General Information	
Type	R/O Parameter
Description	Reads the EEO input value.
Units	1/4,294,967,296 rev
Range	0 to 4,294,967,295 rev
Default Value	0 rev
Data Type	Integer
See Also	DRV.EMUERES, DRV.EMUEMODE
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	2050h/0
Data Type	Integer 32
PDO Mappable	No
See Also	Manufacturer specific SDOs
Start Version	M_00-00-62-000

Description

When the EEO is selected as an input (DRV.EMUEMODE=3,4,5), this parameter reads the EEO value (where 4,294,967,296 is a full revolution, then the value rolls over). DRV.EMUERES defines the how many counts constitute a revolution on the EEO.

DRV.HELP

General Information	
Type	R/O Parameter
Description	Reads the minimum, maximum, and default values for a specific parameter or command.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-15

Description

This parameter returns more information about a specific parameter or command.

In most cases, except special parameters, this command tells you the minimum, maximum, default, and actual value of a parameter. Exceptions are commands that do not have these values (such as DRV.EN) or information commands (such as DRV.VER).

DRV.HELPALL

General Information	
Type	R/O Parameter
Description	Retrieves the minimum, maximum, default, and actual values for all available parameters and commands.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0_0_38

Description

This parameter retrieves all information about all parameters and commands in the firmware. In most cases, DRV.HELPALL returns the minimum, maximum, default, and actual value for each parameter and command. Exceptions include parameters and commands that do not have these values (such as DRV.EN) or pure INFO commands (such as DRV.VER).

DRV.ICONT

General Information	
Type	R/O Parameter
Description	Reads the continuous rated current value.
Units	Arms
Range	N/A
Default Value	N/A
Data Type	Float
See Also	DRV.IPEAK
Start Version	M_0-0-15

Description

DRV.ICONT returns the drive continuous rated current in Arms.

The value of the continuous current is read automatically on drive boot from the power EEPROM of the drive. This value cannot be modified.

DRV.INFO

General Information	
Type	R/O Parameter
Description	Reads general information about the drive.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DRV.INFO returns general information about the drive.

Example

```
Danaher Motion - Digital Servo Drive
```

```
-----
Drive mode                      : AKD-B00606-NAAN-0000
Continuous current              : 12.000 A
Peak current: 30.000 A
Mac address: 00.23.1B.00.00.16
FPGA size: 1600
Fieldbus type: Analog
Power type                      : MV - Medium Voltage
Product serial number: 16777215
Product manufacturing date code : 65535
Power board serial number      : 0
Power board manufacturing date code: 0
Control board serial number: 0
Control board manufacturing date code: 0
Option board serial number: 0
Option board manufacturing date code: 0
```

DRV.IPEAK

General Information	
Type	R/O Parameter
Description	Reads the peak rated current value.
Units	Arms
Range	N/A
Default Value	N/A
Data Type	Float
See Also	DRV.ICONT
Start Version	M_0-0-15

Description

DRV.IPEAK returns the drive peak rated current in Arms.

The value of the peak current is read automatically on drive boot from the power EEPROM of the drive. This value cannot be modified.

DRV.IZERO

General Information	
Type	R/W Parameter
Description	Sets the current that will be used during the DRV.ZERO procedure.
Units	Arms
Range	Drive peak current to 0 Arms
Default Value	0 Arms
Data Type	Float
See Also	DRV.ZERO
Start Version	M_0-0-50-0

Description

This parameter sets the current that is used during the DRV.ZERO procedure.

DRV.LIST

General Information	
Type	R/O Parameter
Description	Reads the list of available parameters and commands.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DRV.LIST reads the list of available commands and parameters from the drive.

To filter this list, enter DRV.LIST followed by the prefix of the commands and parameters that you wish to display.

Example

Return a list of all available commands in the system:

```
-->DRV.LIST
```

Return all commands with the prefix DRV:

```
-->DRV.LIST DRV
```

DRV.LOGICVOLTS

General Information	
Type	R/O Parameter
Description	Reads the logic voltages.
Units	mv , Ω
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DRV.LOGICVOLTS reads the logic voltages data of 1.2 V, 2.5 V, 3.3 V, 5 V, 12 V, -12 V, and 3.3 AV.

Example

Below is an example of the output for this command:

```
ch0 = 1.2V      : 1211 mv
ch1 = 2.5V      :2488 mv
ch2 = 3.3V      :3274 mv
ch3 = 5V        :4950 mv
ch4 = 12V       :11892 mv
ch5 = -12V      : -11912 mv
ch6 = 3.3AV     :3300 mv
ch7 = R ohm     :100000 ohm
```

DRV.MEMADDR

General Information	
Type	R/W Parameter
Description	Sets the read and write address.
Units	N/A
Range	N/A
Default Value	1.U8
Data Type	N/A
See Also	DRV.MEMDATA
Start Version	M_0-0-14

Description

DRV.MEMADDR sets the address that is used by DRV.MEMDATA. The input can be either an internal parameter of the drive or any direct address from the DSP address space (SDRAM, internal RAM, or asynchronous memory). The input value can be either decimal or hexadecimal with 0x prefix.

Type extension can be one of the following:

U8,S8,U16,S16,U32,S32,U64,S64.

Examples

Setting to an internal parameter:

```
-->DRV.MEMADDR CCommandHandler.Debug1
```

Setting to an internal address:

```
-->DRV.MEMADDR 0xffabcde.u16
```

DRV.MEMDATA

General Information	
Type	R/W Parameter
Description	Sets or reads a value from an internal address.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.MEMADDR
Start Version	M_0-0-14

Description

DRV.MEMDATA reads a value from the address that was set by DRV.MEMADDR or writes a value to this address. The input value can be either decimal or hexadecimal with 0x prefix.

Examples

Read a value from internal address:

```
-->DRV.MEMDATA 01
```

Write a hexadecimal value to an internal address:

```
-->DRV.MEMADDR 0x01
```

DRV.MOTIONSTAT

General Information	
Type	R/O Parameter
Description	Reads the motion status of the drive.
Units	N/A
Range	0 to 4,294,967,295
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3492h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This command indicates the current status of the drive internal motion (see table below).

Bit	Significance	Description
0	0x00000001	Motion task is active (high active)
1	0x00000002	Home position found /reference point set (high active)
2	0x00000004	Homing finished (high active)
3	0x00000008	Homing active (high active)
4	0x00000010	Homing error condition has occurred (high active)*
5	0x00000020	Slave in electronic gearing mode synchronized (high active)
6	0x00000040	Electronic gearing is active (high active)
7	0x00000080	Emergency stop procedure in progress (high active)
8	0x00000100	Emergency stop procedure has an error (high active)
9	0x00000200	Service motion active (high active)
10	0x00000400	A motion task could not be activated /invalid MT (high active)**
11	0x00000800	Motion task target position has been reached. See also MT.TPOSWND (high active).
12	0x00001000	Motion task target velocity has been reached. See also MT.TVELWND (high active).
13	0x00002000	The Bode plot procedure within the drive is active (high active).
14	0x00004000	The target position of a motion task has been crossed. This situation occurs for motion tasks with a change on the fly when triggering the DRV.STOP command just before the reaching the target velocity of the current active motion task. The ramp-down procedure with the motion task deceleration ramp causes the target position to be crossed (high active).

* A possible error condition for homing to a reference switch could be that no reference switch was found between two hardware limit switches.

** A possible error condition for an invalid motion task could be that a motion task tried to trigger automatically following motion task that has never been initialized (called an "empty motion" task).

Drive Name:

DRV.NAME

General Information	
Type	NV Parameter
Description	Sets and reads the name of the drive.
Units	N/A
Range	N/A
Default Value	No-Name
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

You can assign a unique name to any AKD drive. This name is one way to identify the drive in a multiple drive network (for instance, in a TCP/IP network on which multiple drives reside).

From the terminal screen, DRV.NAME returns the name of the drive as ASCII characters.

DRV.NVLIST

General Information	
Type	R/O Parameter
Description	Lists the NV parameters and values from the RAM.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-15

Description

DRV.NVLIST lists all the drive parameters that reside in NV memory.

The list includes each parameter name, followed by its current value from the RAM.

DRV.NVLOAD

General Information	
Type	W/O Parameter
Description	Loads all data from the NV memory of the drive into the RAM parameters.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.NVLOAD DRV.NVLIST
Start Version	M_00-00-62-000

Description

DRV.NVLOAD loads all data from the NV memory of the drive into the RAM parameters.

DRV.NVSAVE

General Information	
Type	Command
Description	Saves the drive parameters from the RAM to the NV memory.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.RSTVAR
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	1010h/1
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

DRV.NVSAVE saves the current drive parameter values from the RAM to the NV memory.

The drive parameters that were saved to the NV are read from the NV on the next drive boot, causing the values to be automatically set to the saved values on every drive boot.

Executing DRV.RSTVAR does not modify the values of the NV, but instead sets the drive values in RAM to their defaults.

DRV.ONTIME

General Information	
Type	R/O Parameter
Description	Returns how long the drive has been running since last power up.
Units	Days:Hours:Minutes:Seconds
Range	N/A
Default Value	N/A
Data Type	String
See Also	Returns how long the drive has been running since first activated.
Start Version	M_0-0-59

Description

This parameter returns the length of time that the drive has been running for the current session (since the last power up).

DRV.OPMODE

General Information	
Type	NV Parameter
Description	Sets the drive operation mode (current, velocity, or position).
Units	N/A
Range	0 to 2
Default Value	0
Data Type	Integer
See Also	DRV.CMDSOURCE
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35B4h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

DRV.OPMODE specifies the operation mode of the drive. You must also use DRV.CMDSOURCE to set the source of the command to the drive.

The operation mode values can be set as follows:

Mode	Description
0	Current (torque) operation mode
1	Velocity operation mode
2	Position operation mode

DRV.OPMODE can be changed while the drive is enabled or disabled. If you are using the terminal to change the operation mode, then it is recommended that you disable the drive before changing the operation mode. If you change the operation mode from the terminal while the drive is enabled, the system may experience a step change in demand.

Example

Set the source of the command to a TCP/IP channel and the desired operation mode to velocity:

```
-->DRV.CMDSOURCE 0
```

```
-->DRV.OPMODE 1
```

Related Topics

- 1 Current Loop
- 1 Velocity Loop
- 1 Position Loop

DRV.READFORMAT

General Information	
Type	R/W Parameter
Description	Sets the value returned to either decimal or hexadecimal.
Units	N/A
Range	10 or 16
Default Value	10
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

DRV.READFORMAT sets the return values type to either decimal or hexadecimal.

Format	Description
10	Sets the read values to decimal format
16	Sets the read values to hexadecimal format

DRV.RSTVAR

General Information	
Type	Command
Description	Sets default values in the drive without re-booting the drive and without resetting the NV memory.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	
Start Version	M_0-0-15

Description

DRV.RSTVAR causes the drive to return to the default values without the need to re-boot the drive first and without resetting the NV memory. Use DRV.RSTVAR to return to the default settings and recover a working drive.

DRV.RUNTIME

General Information	
Type	R/O Parameter
Description	Returns how long the drive has been running since first activated.
Units	Days:Hours:Minutes:Seconds
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DRV.RUNTIME returns the length of time that the drive has been running since it was first activated. This time includes the current session and the total amount of time from all previous sessions.

DRV.SETUPREQBITS

General Information	
Type	R/O Parameter
Description	Reads the bitwise set status of parameters that must be set before the drive can be enabled
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.SETUPREQLIST, MOTOR.AUTOSET
Start Version	M-00-00-64-000

Description

This command returns the bitwise set status of parameters that needs to be set up before the drive can be enabled. Only when this command returns 0 can the drive be enabled.

Parameter	Bits
IL.KP	0x00000001
MOTOR.IPEAK	0x00000002
MOTOR.ICONT	0x00000004
MOTOR.VMAX	0x00000008
MOTOR.POLES	0x00000010
MOTOR.PHASE	0x00000020

Please note that if MOTOR.AUTOSET is set to 1 (parameters automatically calculated from motor ID data), then all values in the list will be initialized from the feedback device. Otherwise, the parameters must be set manually.

Example

```
-->DRV.SETUPREQBITS
0
-->
```

DRV.SETUPREQLIST

General Information	
Type	R/O Parameters
Description	Reads the list of parameters that must be set before the drive can be enabled.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	DRV.SETUPREQBITS, MOTOR.AUTOSSET
Start Version	M-00-00-64-000

Description

This command returns the list of parameters that must be set before the drive can be enabled and also whether or not each one of those parameters is set. Only when all commands have value of 0 can the drive be enabled.

Please note that if MOTOR.AUTOSSET is set to 1 (parameters automatically calculated from motor ID data), then all values in the list will be initialized from the feedback device. Otherwise, the parameters must be set manually.

Example

```
-->DRV.SETUPREQLIST

IL.KP 0

MOTOR.ICONT 0

MOTOR.IPEAK 0

MOTOR.POLES 0

-->
```

DRV.STOP

General Information	
Type	Command
Description	This command stops all drive motion.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35FEh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This command stops all drive motion.

DRV.TEMPERATURES

General Information	
Type	R/O Parameter
Description	Reads the temperature of drive components.
Units	°C
Range	55 to 125 °C
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3413h/0
Data Type	Unsigned 16
PDO Mappable	No
Start Version	

Description

DRV.TEMPERATURES reads the temperature in different parts of the drive (power and control boards). The temperature is read from temperature sensors located in the drive.

Example

Below is an example of the output for this command :

```
Control Temperature: 39 °C
Power1  Temperature: 31 °C
Power2  Temperature: Sensor does not exist.
Power3  Temperature: Sensor does not exist.
```

DRV.VER

General Information	
Type	R/O Parameter
Description	Reads the drive version.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DRV.VER reads both FPGA and firmware versions.

The version data presented is hard coded in the firmware code.

Example

Below is an example of the output for this command:

```
Danaher Motion - Digital Servo Drive
-----

FPGA version : FP0004_0001_00_07

Firmware Version : M_0-0-15_T_2009-01-19_10-36-28_IR
```

DRV.VERIMAGE

General Information	
Type	R/O Parameter
Description	Returns the version data from each image.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

DRV.VERIMAGE reads the versions of the different images in the drive. This parameter returns the version data from each image .i00 file.

Example

Below is an example of the output for this parameter:

```
Danaher Motion - Digital Servo Drive
-----
Resident Firmware: R_0-0-11
Operational Firmware: M_0-0-15
Resident FPGA: FPB004_0001_00_07
Operational FPGA : FP0004_0001_00_07
```

DRV.WARNINGS

General Information	
Type	R/O Parameter
Description	Reads the active warnings.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-50-0

Description

DRV.WARNINGS returns a list of all currently active warnings in the system.

DRV.ZERO

General Information	
Type	R/W Parameter
Description	Sets the zero mode. The procedure is activated when the drive is enabled.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	DRV.IZERO
Start Version	M_0-0-50-0

Description

The zero procedure is a sequence in which phase commutation is initialized. During this procedure, the motor is held at a certain known electrical position (by applying a current defined by DRV.IZERO). After the motor rests at this position, the commutation angle is calculated and set automatically.

FB1 Parameters

FB1.BISSBITS

General Information	
Type	NV Parameter
Description	Specifies the number of Biss Sensor (Position) Bits for the BiSS Mode C encoder in use.
Units	bits
Range	0 to 64 bits
Default Value	32 bits
Data Type	Integer
See Also	FB1.SELECT, FB1.IDENTIFIED
Start Version	M_01-01-00-100 and M_01-01-03-000

Description

FB1.BISSBITS specifies the number of BiSS sensor (position) bits for the BiSS Mode C encoder in use. Typically the value is either 26 or 32 for a BiSS Mode C Renishaw encoder. The required value for this parameter is provided by the feedback device manufacturer for the particular device being used.

FB1.ENCRES

General Information	
Type	NV Parameter
Description	Sets the resolution of the motor encoder.
Units	Encoder counts
Range	0 to $2^{32}-1$
Default Value	1,024
Data Type	Integer
See Also	N/A
Start Version	M_0-0-14

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3533h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets or gets the resolution of the motor encoder (encoder feedback systems only) in number of counts per revolution for a rotary motor and the number of encoder pitches per motor pole pitch for a linear motor. The number of encoder counts per revolution is obtained by multiplying the motor catalog resolution in units of PPR by four. For example, for a 1024 PPR resolution motor, the number of encoder counts per revolution is $1024 \times 4 = 4096$. For this motor FB1.ENCRES must be set to 4096.

For linear motors, the value of FB1.ENCRES is set to the number of encoder pitches per motor pole pitch. For a motor with 32 mm pole pitch, and a 40 μm encoder pitch, the value for FB1.ENCRES should be set to $32 \text{ mm} / 40 \mu\text{m} = 800$.

FB1.HALLSTATE

General Information	
Type	R/O Parameter
Description	Reads the Hall switch values (encoder feedback only).
Units	Binary
Range	0 0 0 to 1 1 1
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-14

Description

FB1.HALLSTATE reads the Hall switch values (encoder feedback only).

FB1.IDENTIFIED

General Information	
Type	R/O Parameter
Description	Reads the type of feedback device used by the drive/motor.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	Integer
See Also	FB1.SELECT
Start Version	M_0-0-15

Description

This parameter is set according to FB1.SELECT on drive power up if FB1.SELECT is not –1; otherwise the parameter value is read from the drive memory.

Type	Description
0	Unknown
10	Incremental encoder with A/B Quad, marker pulse and Hall
11	Incremental encoder with A/B Quad, marker pulse and no Hall
20	Sine Encoder , with marker pulse and Hall
21	Sine encoder , with marker pulse & No Halls
30	EnDat 2.1 with Sine Cosine
31	EnDat 2.2
32	BiSS with Sine Cosine
33	HIPERFACE
34	BiSS Mode C Renishaw
40	Resolver
41	SFD

FB1.INITSIGNED

General Information	
Type	NV Parameter
Description	Sets initial feedback value as signed or unsigned.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	FB1.ORIGIN
Start Version	M-0-0-51

Description

This parameter sets whether the initial value of the feedback read from the feedback device will be set as a signed or as an unsigned value

The drive internal process for the feedback initialization is as follows:

1. Reads the position feedback.
2. Adds the origin to the feedback.
3. Determines modulo from Step 2 by the actual feedback bits.
4. Sets the position feedback sign according to FB1.INITSIGNED.

Value	Functionality
0	Set as unsigned
1	Set as signed

Example

FB1.INITSIGNED 1

FB1.MECHPOS

General Information	
Type	R/O Parameter
Description	Reads the mechanical position.
Units	counts
Range	0 to 4,294,967,295 counts
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

FB1.MECHPOS reads the mechanical angle which is equal to the lower 32 bits in the 64-bit position feedback word.

FB1.MEMVER

General Information	
Type	R/O Parameter
Description	Returns the memory feedback version.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

FB1.MEMVER returns the memory feedback version (only applicable for feedbacks with memory).

FB1.OFFSET

General Information	
Type	NV Parameter
Description	Sets position feedback offset.
Units	Depends on UNIT.ACCROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, PIN/POUT, counts 16 bit Linear: counts, mm, μ m, PIN/POUT, counts 16 bit
Range	Rotary: -5,123,372,000,000,005.000 to 5,123,372,000,000,005.000 counts -7495.067 to 7495.067 rad -429,436.096 to 429,436.096 deg -5,964.390 to 5,964.390 [PIN/POUT] -78,176,452.637 to 78,176,452.636 counts 16 bit Linear: -5,123,372,000,000,005.000 to 5,123,372,000,000,005.000 counts -1192.878*MOTOR.PITCH to 1192.878*MOTOR.PITCH mm -1192877.952*MOTOR.PITCH to 1192877.952*MOTOR.PITCH μ m -5964.390 to 5964.390 PIN/POUT -78176452.637 to 78176452.636 counts 16 bit
Default Value	0
Data Type	Float
See Also	PL.FB
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3490h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

FB1.OFFSET is a value added to the position feedback (PL.FB).

Example

If PL.FB is 10 deg and FB1.OFFSET is set to -10 deg, then the next read of PL.FB will return ~0 deg.

FB1.ORIGIN

General Information	
Type	NV Parameter
Description	Adds to the initial feedback position.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: counts, rad, deg, PIN/POUT, counts 16 Bit Linear: counts, mm, µm, PIN/POUT, counts 16 Bit
Range	Rotary: 0.000 to 5,123,372,000,000.000 counts 0.000 to 7,495.067 rad 0.000 to 429,436.096 deg 0.000 to 5,964.390 PIN/POUT 0.000 to 78,176,452.636 counts 16 Bit Linear: 0.000 to 5,123,372,000,000.000 Counts 0.000 to 1,192.878 mm 0.000 to 1,192,877.952 µm 0.000 to 5,964.390 PIN/POUT 0.000 to 78,176,452.636 counts 16 Bit
Default Value	0 counts
Data Type	Float
See Also	FB1.INITSIGNED
Start Version	M-0-0-51

Description

FB1.ORIGIN is a value that is added to the feedback device position. Initial value and modulo are determined from the number of bits of the feedback:

Initial position value = (<feedback from device> + FB1.ORIGIN) modulo <number of feedback bits>

The number of feedback bits is set according to the feedback type. For memory feedbacks it is the number of feedback bits; for none memory it is always single turn.

The drive internal process for the feedback initialization is as follows:

1. Reads the position feedback.
2. Adds the origin to the feedback.
3. Determines modulo from Step 2 by the actual feedback bits.
4. Sets the position feedback sign according to FB1.INITSIGNED.

Example

This example uses UNIT.PROTARY set to 2 (degrees)

It also assumes that the AKD is connected to a single turn feedback device with memory.

FB1.ORIGIN is set to 22 and saved into NV memory.

Drive boots and reads from feedback device position 340 degrees. According to the description section above, calculation will be:

$(340 + 22) \text{ modulo } 360 = 2 \text{ degrees.}$

Therefore the initial feedback value will be set to 2 degrees.

FB1.PFIND

General Information	
Type	R/W Parameter
Description	A procedure that allows the user to find the commutation angle for encoder feedback, which has no halls.
Units	NA
Range	0, 1
Default Value	0
Data Type	Integer
See Also	FB1.PFINDCMDU
Start Version	M_0-0-53

Description

A procedure that allows the user to find the commutation angle for encoder feedback (which has no Halls).

FB1.PFINDCMDU

General Information	
Type	R/W Parameter
Description	Current value used during the phase finding procedure (PFB.PFIND=1)
Units	A
Range	0 to DRV.IPEAK
Default Value	0
Data Type	Float
See Also	PFB.PFIND
Start Version	M_0-0-53

Description

FB1.PFINDCMDU sets the current value used during the phase finding procedure.

FB1.POLES

General Information	
Type	R/O Parameter
Description	Reads the number of feedback poles.
Units	N/A
Range	2 to 128
Default Value	2
Data Type	Integer
See Also	MOTOR.POLES
Start Version	M_0-0-15

Description

FB1.POLES sets the number of individual poles in the feedback device. This variable is used for the commutation function, as well as for velocity feedback scaling, and represents the number of individual poles (not pole pairs). The division value of motor poles (MOTOR.POLES) and feedback poles (FB1.POLES) must be an integer when moving drive to enable, otherwise a fault is issued.

FB1.PSCALE

General Information	
Type	R/W Parameter
Description	Sets position scaling value for fieldbus transferred position objects.
Units	N/A
Range	0 to 32
Default Value	20
Data Type	Integer
See Also	N/A
Start Version	M_00-00-51-000

Description

Position values transferred over fieldbus are converted from AKD native 64-bit values to a maximum 32-bit position value. This parameter sets the resolution/revolution of position values back to the controller.

FB1.PSCALE determines the counts per revolution of position values delivered by fieldbus. The default value is 20, which yields 2^{20} counts/revolution. This scaling is used for CAN PDOs 6064 (Position Actual Value) and 60F4 (Following Error Actual Value).

Example

The drive always works internally with 64-bit position values. The drive internal 64-bit actual position should contain the following value:

0x0000.0023.1234.ABCD

The lower 32 bits represent the mechanical angle of the feedback. The upper 32 bits represent the number of turns.

FB1.PSCALE = 20

The 32-bit position is: 0x0231234A

FB1.PSCALE = 16

The 32-bit position is: 0x00231234

FB1.RESKTR

General Information	
Type	NV Parameter
Description	Sets the resolver nominal transformation ratio.
Units	N/A
Range	0.001 to 50.000
Default Value	0.5
Data Type	Float
See Also	N/A
Start Version	M-0-0-50

Description

This parameter sets the resolver nominal transformation ratio. It affects the resolver excitation output amplitude. The value can be obtained from the resolver data sheet.

Example

FB1.RESKTR 0.5

FB1.RESREFPHASE

General Information	
Type	NV Parameter
Description	Sets the electrical degrees of phase lag in the resolver.
Units	electrical degrees
Range	-180 to 180°
Default Value	-2°
Data Type	Float
See Also	N/A
Start Version	M-0-0-50-0

Description

This parameter sets the electrical degrees of phase lag in the resolver.

See the motor resolver datasheet for the value for this parameter .

Example

FB1.RESREFPHASE -2

FB1.SELECT

General Information	
Type	NV Parameter
Description	Sets user entered type or identified type (–1).
Units	N/A
Range	–1, 10, 20, 30, 31, 32, 40, 41
Default Value	–1
Data Type	Integer
See Also	FB1.IDENTIFIED
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	353Bh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

FB1.SELECT sets the feedback type manually (see FB1.IDENTIFIED) or allows the drive to automatically identify the feedback type on power up.

FB1.SELECT Input Values

Input Value	Description
–1	The drive automatically identifies the type of feedback as part of the power up process. Setting this value does not modify FB1.IDENTIFIED, unless it is saved in the NV memory for the next power up. If a feedback with memory is connected to the drive, the value of FB1.IDENTIFIED is set automatically to the feedback identified and all parameters read from the feedback are set according to the values read from the feedback. If no feedback is connected or a feedback with no memory is connected, the value of FB1.IDENTIFIED is set to 0 (no feedback identified) and all values normally read from the feedback are read from NV memory (if stored in NV) otherwise they are set to the default values.
10	Manually sets the type to incremental encoder. This input sets the value of FB1.IDENTIFIED to 10. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).
20	Manually sets the type to sine encoder. This input sets the value of FB1.IDENTIFIED to 20. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).
30	Manually sets the type to Endat 2.1. This input sets the value of FB1.IDENTIFIED to 30. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).

Input Value	Description
31	Manually sets the type to Endat 2.2. This input sets the value of FB1.IDENTIFIED to 31. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).
32	Manually sets the type to BiSS. This input sets the value of FB1.IDENTIFIED to 32. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).
33	Manually sets the type to Hyperface. This input sets the value of FB1.IDENTIFIED to 33. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).
40	Manually sets the type to resolver. This input sets the value of FB1.IDENTIFIED to 40. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).
41	Manually sets the type to SFD. This input sets the value of FB1.IDENTIFIED to 41. If the feedback setting fails, FB1.IDENTIFIED is automatically set to 0 (no feedback identified).

FB1.SELECT Feedback Types

Type	Description
0	Unknown
10	Incremental encoder with A/B Quad, marker pulse and Hall
11	Incremental encoder with A/B Quad, marker pulse and no Hall
20	Sine Encoder , with marker pulse and Hall
21	Sine encoder , with marker pulse & No Halls
30	EnDat 2.1 with Sine Cosine
31	EnDat 2.2
32	BiSS with Sine Cosine
33	HIPERFACE
34	BiSS Mode C Renishaw
40	Resolver
41	SFD

FB1.TRACKINGCAL

General Information	
Type	NV Parameter
Description	Controls tracking calibration algorithm.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M-0-0-50

Description

This parameter turns the tracking calibration algorithm on or off for sine-cosine or resolver.

Value	Functionality
0	Tracking calibration is off
1	Tracking calibration is on

Example

FB1.TRACKINGCAL 1

FBUS Parameters

FBUS.PARAM1 TO FBUS.PARAM20

General Information	
Type	NV Parameter
Description	Set fieldbus specific meanings.
Units	N/A
Range	See table below.
Default Value	See table below.
Data Type	Unsigned 32
See Also	CANopen Communication Manual, EtherCAT Communication Manual
Start Version	M_0-0-33

Fieldbus Information			
	EtherCAT COE & CANopen		
Index/Subindex or Parameter Number	FBUS.PARAM01	0x36E5/0	FBUS.PARAM06
	FBUS.PARAM02		FBUS.PARAM07
	FBUS.PARAM03		FBUS.PARAM08
	FBUS.PARAM04		FBUS.PARAM09
	FBUS.PARAM05		FBUS.PARAM10
Range	EtherCAT COE		CANopen
FBUS.PARAM01	N/A		125; 250; 500; 1000
FBUS.PARAM02	0 to 1		0 to 1
FBUS.PARAM03	1,001 to 65,535		N/A
FBUS.PARAM04	0 to 1		0 to 1
FBUS.PARAM05	0 to 1		0 to 1
Default Value	EtherCAT COE		CANopen
FBUS.PARAM01	N/A		125
FBUS.PARAM02	1		0
FBUS.PARAM03	0		N/A
FBUS.PARAM04	1		0
FBUS.PARAM05	0		0
Data Type	Unsigned 32		
PDO Mappable	No		
Start Version	M_00-00-62-000		

Description

FBUS.PARAM01 sets the baudrate for the CANopen bus. Supported baudrates are 125, 250, 500 and 1000 kBaud.

FBUS.PARAM02 switches the phase locked loop (PLL) for synchronized use: 0 = OFF, 1 = ON

FBUS.PARAM03 sets the configured station alias for EtherCAT.

FBUS.PARAM04 switches the surveillance of SYNC-signals: 0 = OFF, 1 = ON

FBUS.PARAM05 is used to configure some special behaviors of the DS402.

FBUS.PARAM06 - FBUS.PARAM10 are reserved.

FBUS.PARAM04 Additional Notes

FBUS.PARAM04 enables (1) or disables (0) the synchronization supervision of the CANOpen or EtherCAT fieldbus.

Default values:

- CANOpen: disabled (0)
- EtherCAT: enabled (1)

The synchronization supervision is active when:

- FBUS.PARAM04 = 1
- The first CANOpen Sync message or first EtherCAT frame was received.

When more than three CANOpen sync messages or seven EtherCAT frames have not been received, and the drive is enabled, fault 125, "Synchronization lost", occurs.

FBUS.PARAM05 Additional Notes

Bit 0 configures the behavior of DS402 state machine in case of fault resets.

- Bit 0 = 1: Faults can only be reset using DS402 control word bit 7.
- Bit 0 = 0: The reset can also be done via telnet or digital input and the DS402 state machine reflects this condition.

FBUS.PLLSTATE

General Information	
Type	R/O Parameter
Description	Returns the status of the PLL
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	FBUS.PARAM1 TO FBUS.PARAM20, Fieldbus documentation
Start Version	M_01-02-00-000

Description

FBUS.PLLSTATE returns the status of the phase locked loop (PLL). The PLL states are as follows:

PLL State	Description
PLL not activated	This state is set using FBUS.PARAM02. Not each fieldbus or operation mode needs synchronization.
PLL activated, but unlocked	The PLL is activated but has not yet been locked successfully. This state is related to the fieldbus master, as well as to the fieldbus mode of operation.
PLL activated and locked	PLL is fully operational and locked

For more information, see the AKD CANopen Manual, Phase Locked Loop.

FBUS.PLLTHRESH

General Information	
Type	NV Parameter
Description	Sets number of successful synchronized cycles needed to lock the PLL.
Units	N/A
Range	0 to 10,000
Default Value	0
Data Type	Integer, U32
See Also	Appendix B: Fieldbus Manuals
Start Version	M_0-0-33

Description

This parameter sets number of successful synchronized cycles needed to lock the PLL.

FBUS.SAMPLEPERIOD

General Information	
Type	NV Parameter
Description	Sets fieldbus sample period.
Units	Whole multiples of MTS 250 μ s
Range	4 to 128 and value must be a power of 4
Default Value	32 = 2 ms
Data Type	U8
See Also	Appendix B: Fieldbus Manuals
Start Version	M_0-0-33

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	60C2h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the fieldbus cycle time. It is normally written in the startup phase of the field busses via the object 60C2 subindex 1 (interpolation time units) and 2 (interpolation time index), where the index stands for a power of 10 seconds (for instance, -3 stands for milliseconds) and the units are the counts of these units. Kollmorgen recommends the following standard cycle rates, 250 μ s (4), 500 μ s (8), 1 ms (16), 2 ms (32), 4 ms (64).

FBUS.SYNCACT

General Information	
Type	R/O Parameter
Description	Reads actual distance from the desired sync distance.
Units	ns
Range	
Default Value	
Data Type	Integer, U 32
See Also	Appendix B: Fieldbus Manuals
Start Version	M_0-0-33

Description

This parameter reads actual distance from the desired sync distance.

FBUS.SYNCDIST

General Information	
Type	NV Parameter
Description	Sets time target for synchronization.
Units	ns
Range	0 to 250,000
Default Value	100,000
Data Type	Integer, U32
See Also	Appendix B: Fieldbus Manuals
Start Version	M_0-0-33

Description

This parameter sets time target for synchronization.

FBUS.SYNCWND

General Information	
Type	NV Parameter
Description	Sets symmetrically arranged window around the desired sync distance.
Units	ns
Range	0 to 1,000,000
Default Value	50,000
Data Type	Integer, U2
See Also	Appendix B: Fieldbus Manuals
Start Version	M_0-0-33

Description

This parameter sets symmetrically arranged window around the desired sync distance.

FBUS.TYPE

General Information	
Type	R/O Parameter
Description	Shows the active fieldbus type.
Units	N/A
Range	0 to 3
Default Value	0
Data Type	U8
See Also	Fieldbus Manuals
Start Version	M_0-0-33

Description

FBUS.TYPE shows the active fieldbus type.

0 = No fieldbus available

1 = SynqNet

2 = EtherCAT

3 = CANopen

GEAR Parameters

GEAR.ACCMAX

General Information	
Type	R/W Parameter
Description	Sets the maximum allowed acceleration value; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 83,333,333.333*MOTOR.PITCH μm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3,000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 Counts/s ² 1.000*MOTOR.PITCH mm/s ² 1000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	UNIT.ACCROTARY, UNIT.ACCLINEAR, GEAR.DECMAX
Start Version	M_0-0-50-0

Description

This parameter limits the acceleration of the slave to a numerical higher value.

GEAR.DECMAX

General Information	
Type	R/W Parameter
Description	Sets the maximum allowed deceleration value; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 c/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833,333.333*MOTOR.PITCH μm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3,000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 counts/s ² 1.000*MOTOR.PITCH mm/s ² 1,000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	UNIT.ACCROTARY, UNIT.ACCLINEAR, GEAR.ACCMAX
Start Version	M_0-0-50-0

Description

This parameter limits the deceleration of the slave to a numerical higher value.

GEAR.IN

General Information	
Type	R/W Parameter
Description	Sets the denominator of the electronic gearing ratio; active in opmode 2 (position) only.
Units	N/A
Range	1 to 65,535
Default Value	1
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter sets the denominator of the gear ratio for the electronic gearing mode. The gear ratio is used in order to increase and decrease the slave velocity. The slave velocity can be calculated by the following formula:

Slave velocity = Master velocity * GEAR.OUT/GEAR.IN

Be sure that you set the external master source number of signals per revolution correctly. Also, select the gear ratio so that the maximum electronic gearing velocity (GEAR.VELMAX) is not exceeded.

Master velocity_{max} * GEAR.OUT/GEAR.IN < GEAR.VELMAX

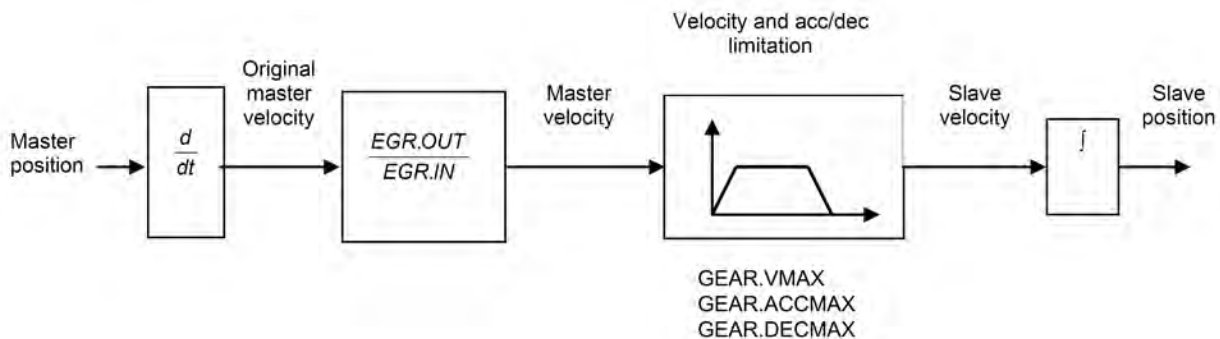
GEAR.MODE

General Information	
Type	R/W Parameter
Description	Selects electronic gearing mode; active in opmode 2 (position) only.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Description

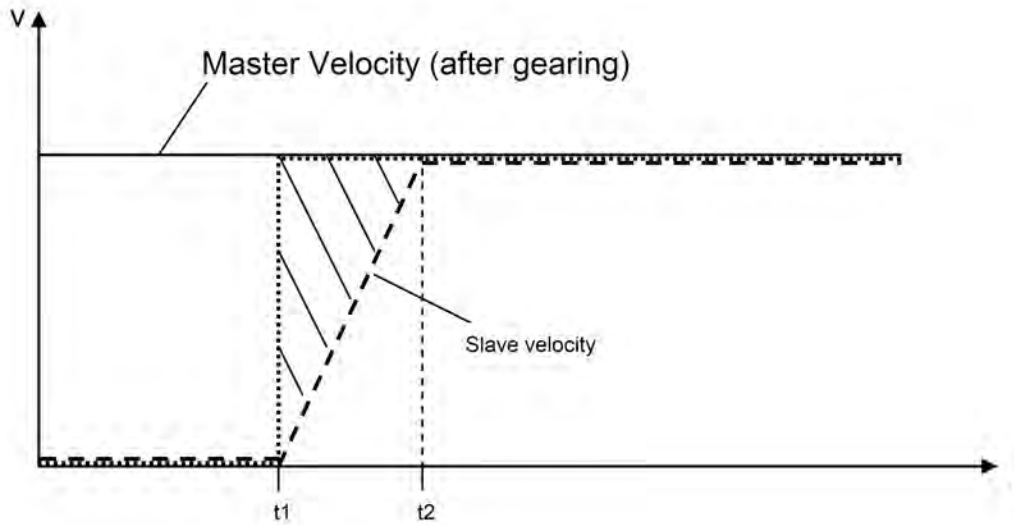
This parameter selects the electronic gearing mode at the beginning of the electronic gearing procedure. The gearing mode determines drive synchronization. In the context of electronic gearing, synchronization means that the slave follows the master pulses without losing counts due to acceleration or velocity limitations.

- Mode 0: The slave is not immediately synchronized after a GEAR.MOVE command. The slave accelerates until the master velocity (velocity after the gearing) has been reached. The drive is synchronized as soon as the velocity of the master has been reached.
- Mode 1: The slave is immediately synchronized after a GEAR.MOVE command.



Block diagram of the electronic gearing feature

The slave position is forwarded to the position loop. Ensure that DRV.OPMODE has been set to 2 and DRV.CMDSOURCE has been set to 2. The slave is able to reach the master velocity according to the GEAR.VMAX setting. GEAR.VMAX does not limit the slave velocity.



Acceleration process for GEAR.MODE 0

Time	Description
$t < t_1$	The master sends already signals to the slave drive, but the GEAR.MOVE command has not been triggered yet.
$t = t_1$	A GEAR.MOVE command has been triggered.
$t_1 < t < t_2$	The slave accelerates according to the GEAR.ACCMAX setting. The position, which is marked with solid lines, will be ignored.
$t = t_2$	The slave has reached the master velocity and is from now on considered as synchronized. Synchronization means that the slave will not lose any more position counts coming from the master.
$t > t_2$	The slave follows the master input signals.

Related Topics:

0.1 Electronic Gearing

GEAR.MOVE

General Information	
Type	Command
Description	Starts the electronic gearing; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-50-0

Description

The command GEAR.MOVE starts the electronic gearing procedure according to the selected electronic gearing mode. The electronic gearing process can be stopped using the DRV.STOP command.

GEAR.OUT

General Information	
Type	R/W Parameter
Description	Sets the numerator of the electronic gearing ratio; active in opmode 2 (position) only.
Units	N/A
Range	-32,768 to +32,767
Default Value	1
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter is the numerator of the gear ratio for the electronic gearing mode. The gear ratio is used in order to increase/decrease the slave velocity. The slave velocity can be calculated by the following formula:

Slave velocity = Master velocity * GEAR.OUT/GEAR.IN

Make sure that the external master source has been set properly. Also, be certain to select a gear ratio such that the maximum electronic gearing velocity (GEAR.VELMAX) will not be exceeded.

Master velocity_{max} * GEAR.OUT/GEAR.IN < GEAR.VELMAX

GEAR.VMAX

General Information	
Type	R/W Parameter
Description	Reads the maximum allowed velocity value; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: 0.001 to 12,000.000 rpm 0.001 to 200.000 rps 0.001 to 72,000.000 deg/s 0.001 to 1,000.000 (PIN/POUT)/s 0.001 to 1256.637 rad/s Linear: 0.001 to 0.200 counts/s 0.001*MOTOR.PITCH to 200.000*MOTOR.PITCH mm/s 0.004*MOTOR.PITCH to 200,000.000*MOTOR.PITCH $\mu\text{m/sec}$ 0.001 to 1,000.000 (PIN/POUT)/s
Default Value	Rotary: 12,000.000 rpm 200.000 rps 17,999.998 deg/s 250.000 (PIN/POUT)/s 1,256.637 rad/s Linear: 0.050 Counts/s 50.000*MOTOR.PITCH mm/s 49,999.996*MOTOR.PITCH $\mu\text{m/sec}$ 250.000 (PIN/POUT)/s
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter limits the maximum velocity of the slave drive.

GUI Parameters

GUI parameters are used within WorkBench for data reporting and data storage.

GUI.DISPLAY

General Information	
Type	R/O Parameter
Description	Reads drive display data.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	Display
See Also	N/A
Start Version	M_0-0-15

Description

This parameter reports to the GUI what the drive currently is displaying. For all GUI commands, the data is compressed and formatted for the GUI, not for the user.

GUI.PARAM01

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM02

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM03

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM04

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM05

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM06

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM07

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM08

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM09

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

GUI.PARAM10

General Information	
Type	NV Parameter
Description	Used by the GUI to store data.
Units	N/A
Range	2,147,483,648 to 2,147,483,647
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

The GUI uses this parameter to store data. Only the GUI can modify this data (not the user).

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HOME Parameters

HOME.ACC

General Information	
Type	R/W Parameter
Description	Sets homing acceleration; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , µm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833,333,333.333*MOTOR.PITCH µm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3,000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 counts/s ² 1.000*MOTOR.PITCH mm/s ² 1,000.000*MOTOR.PITCH µm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	UNIT.ACCROTARY, UNIT.ACCLINEAR
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3502h/0
Data Type	Integer 32

Fieldbus Information	
PDO Mappable	No
Start Version	

Description

This parameter determines the acceleration of the motor during the homing procedure.

Related Topics

Homing

HOME.AUTOMOVE

General Information	
Type	R/W Parameter
Description	Sets homing auto move flag.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_01-02-00-000

Description

HOME.AUTOMOVE allows the drive to start a homing procedure after enabling the drive.

HOME.AUTOMOVE=0: The drive is not allowed to start automatically a homing procedure after the enable command.

HOME.AUTOMOVE = 1: The drive is allowed to start automatically a homing procedure after the enable command.

When HOME.AUTOMOVE is set to 1, the drive continuously checks the following conditions in case that :

1. Is the drive enabled (DRV.ACTIVE = 1)
2. Is the drive in DRV.OPMODE = 2?
3. Has the command source been adjusted to 0 (DRV.CMDSOURCE = 0).
4. Is currently no other motion active (see DRV.MOTIONSTAT).
5. Is the drive not yet homed (see DRV.MOTIONSTAT).

The drive tries to activate the homing procedure, which has been selected via the SM.MODE setting, as soon as all of the conditions above are true. The automatic homing procedure is finished as soon as the homing procedure has been successfully triggered by the drive. From now on the drive will not try to trigger any additional homing procedure by its own.

Related Topics:

Homing

HOME.DEC

General Information	
Type	R/W Parameter
Description	Sets homing deceleration; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833,333.333*MOTOR.PITCH μm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3,000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 counts/s ² 1.000*MOTOR.PITCH mm/s ² 1000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	UNIT.ACCROTARY, UNIT.ACCLINEAR
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3524h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the deceleration of the motor during the homing procedure.

Related Topics:

Homing

HOME.DIR

General Information	
Type	NV Parameter
Description	Sets homing direction; active in opmode 2 (position) only.
Units	N/A
Range	0 to 1
Default Value	1
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	6098h/0
Data Type	Integer 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter determines the direction in which the motor should start to move during a homing procedure.

0 = Movement in negative direction.

1 = Movement in positive direction.

Related Topics:

Homing

HOME.DIST

General Information	
Type	R/W Parameter
Description	Sets homing distance; active in opmode 2 (position) only.
Units	Depends on UNIT.PROTARY or UNIT.PLINEARUNIT.ACCLINEAR Rotary: counts, rad, deg, PIN/POUT, counts 16 bit Linear: counts, mm, μ m, PIN/POUT, counts 16 bit
Range	N/A
Default Value	0
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter takes effect only after the homing procedure is complete (see the HOME.MODE description). HOME.DIST specifies an additional movement after the homing procedure is complete. The drive uses the homing acceleration, deceleration, and velocity parameters for this movement. This parameter can be used to let the motor move away from the home position by the value of HOME.DIST.

A value not equal to 0 triggers an additional movement of the selected homing distance after the general homing procedure. A value of 0 for HOME.DIST causes no additional movement.

Related Topics:

Homing

HOME.FEEDRATE

General Information	
Type	R/W Parameter
Description	Sets homing velocity factor; active in opmode 2 (position) only.
Units	%
Range	0 to 100%
Default Value	50%
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	6099h/2
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is used in order to reduce the velocity during the index search (index = zero-pulse of a feed-back device). This parameter determines the percentage of the homing velocity (HOME.V) that should be used during the index-search.

Related Topics:

Homing

HOME.IPEAK

General Information	
Type	R/W Parameter
Description	Sets the current limit during homing procedure to a mechanical stop; active in opmode 2 (position) only.
Units	A
Range	± Drive peak current A
Default Value	$[(1/120) * DRV.IPEAK]$ A
Data Type	Float
See Also	HOME.MODE
Start Version	M_00-00-62

Description

This parameter sets the intermediate current limit during a homing procedure to a mechanical stop (HOME.MODE 8 and 9). The current-controller limit (IL.LIMITP and IL.LIMITN) is set to ±HOME.IPEAK while the homing procedures are active.

HOME.IPEAK is active as soon as the homing procedure starts and remains active until the home position is found. Previous current limit settings are re-activated before the motor covers the homing distance (HOME.DIST ≠ 0).

Related Topics:

Homing, HOME.MODE 8 and 9

HOME.MODE

General Information	
Type	R/W Parameter
Description	Selects the homing mode; active in opmode 2 (position) only.
Units	N/A
Range	0 to 10
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	6098h/0
Data Type	Integer 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

HOME.MODE specifies the homing procedure of the drive. The homing modes available in the drive are summarized in the following table; see Homing for a detailed discussion and examples for each mode:

Mode	Description
0	Home using current position
1	Find limit input
2	Find input limit then find zero angle
3	Find input limit then find index
4	Find home input
5	Find home input then find zero angle
6	Find home input then find index
7	Find zero angle
8	Move until position error exceeded
9	Move until position error exceeded, then find zero angle

Related Topics:

Homing

HOME.MOVE

General Information	
Type	Command
Description	Starts a homing procedure; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-38

Description

The HOME.MOVE command starts a homing procedure. The DRV.OPMODE must be set to 2 (closed position loop) and DRV.CMDSOURCE must be set to 0 (TCP/IP command).

Related Topics:

Homing

HOME.P

General Information	
Type	R/W Parameter
Description	Sets home position; active in opmode 2 (position) only.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, PIN/POUT, counts 16 bit Linear: counts, mm, μ m, PIN/POUT, counts 16 bit
Range	N/A
Default Value	0
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	607Ch/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the home position. The command and actual position of the drive will be set to this value as soon as a homing event occurs. The homing events differ in each homing mode.

Related Topics:

Homing

HOME.PERRTHRESH

General Information	
Type	R/W Parameter
Description	Sets the position lag threshold; active in opmode 2 (position) only.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, PIN/POUT, Counts16 bit Linear: counts, mm, μ m, PIN/POUT, Counts16 bit
Range	N/A
Default Value	N/A
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter is used for the homing modes against a mechanical stop (HOME.MODE = 8 and 9). The absolute value of the following error (PL.ERR) is compared with HOME.PERRTHRESH in order to detect a mechanical stop.

Related Topics:

HOME.MODE 8: Move Until Position Error Exceeded

HOME.SET

General Information	
Type	Command
Description	Immediately sets the home position; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_0-0-38

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	35F0h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

The HOME.SET command immediately homes the drive. The drive can be homed in an enabled or disabled state. Motion in the current mode of operation (DRV.OPMODE=0) or velocity mode of operation (DRV.OPMODE=1) is not affected by the HOME.SET command. Motion in the position mode of operation (DRV.OPMODE=2) is immediately aborted when the HOME.SET command is issued.

Related Topics:

Homing

HOME.V

General Information	
Type	R/W Parameter
Description	Sets homing velocity; active in opmode 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: 0.001 to 12,000.000 rpm 0.001 to 200.000 rps 0.001 to 72,000.000 deg/s 0.001 to 1,000.000 (PIN/POUT)/s 0.001 to 1,256.637 rad/s Linear: 0.001 to 0.200 counts/s 0.001*MOTOR.PITCH to 200.000*MOTOR.PITCH mm/s 0.004*MOTOR.PITCH to 200,000.000*MOTOR.PITCH $\mu\text{m/sec}$ 0.001 to 1,000.000 (PIN/POUT)/s
Default Value	Rotary: 12,000.000 rpm 200.000 rps 17,999.998 deg/s 250.000 (PIN/POUT)/s 1,256.637 rad/s Linear: 0.050 counts/s 1.000*MOTOR.PITCH mm/s 999.998*MOTOR.PITCH $\mu\text{m/sec}$ 250.000 (PIN/POUT)/s
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	6099h/1
Data Type	Unsigned 32
PDO Mappable	N/A
Start Version	M_00-00-62-000

Description

This parameter sets the velocity of the motor during the homing procedure.

Related Topics:

Homing

HWLS Parameters

HWLS.NEGSTATE

General Information	
Type	R/O Parameter
Description	Reads the status of the negative hardware limit switch.
Units	0 to 1
Range	N/A
Default Value	Boolean
Data Type	HWLS.POSSTATE
See Also	N/A
Start Version	M_00-00-62-000

Description

HWLS.NEGSTATE reads the status of the negative HW limit switch as follows:

0 = low

1 = high

HWLS.POSSTATE

General Information	
Type	R/O Parameter
Description	Reads the status of the positive hardware limit switch.
Units	N/A
Range	0 to 1
Default Value	N/A
Data Type	Boolean
See Also	HWLS.NEGSTATE
Start Version	M_00-00-62-000

Description

HWLS.POSSTATE reads the status of the positive hardware limit switch as follows:

0 = low

1 = high

IL Parameters

IL.BUSFF

General Information	
Type	R/O Parameter
Description	Displays the current feedforward value injected by the fieldbus
Units	Arms
Range	N/A
Default Value	N/A
Data Type	Float
See Also	IL.KBUSFF
Start Version	M_0-0-32

Description

This parameter displays the current feedforward value injected by the fieldbus

IL.CMD

General Information	
Type	R/O Parameter
Description	Reads the value of the q-component current controller inside the FPGA.
Units	Arms
Range	± Drive peak current (DRV.IPEAK)
Default Value	N/A
Data Type	Float
See Also	DRV.IPEAK
Start Version	M_0-0-15

Description

IL.CMD displays the q-component current command value of the current loop after any limitation (such as a parameter setting or I^2t calculation).

IL.CMD is limited also by motor peak current, IL.LIMITN and IL.LIMITP.

Related Topics

- 1 Analog Input

IL.CMDU

General Information	
Type	R/W Parameter
Description	Sets the user current command.
Units	Arms
Range	[Maximum of user negative current limit (IL.LIMITN) and negative motor peak current (MOTOR.IPEAK)] to [minimum of user positive current limit (IL.LIMITP) and motor peak current (MOTOR.IPEAK)]
Default Value	0 Arms
Data Type	Float
See Also	DRV.IPEAK, DRV.OPMODE, DRV.CMDSOURCE
Start Version	M_0-0-15

Description

This parameter sets the user current command value.

The current command value, which is provided to the current loop (IL.CMD), can be limited further using a parameter setting or I^2t calculation. IL.CMDU is limited also by motor peak current, IL.LIMITN and IL.LIMITP.

IL.DIFOLD

General Information	
Type	R/O Parameter
Description	Reads the drive foldback current limit.
Units	Arms
Range	0 to 2,147,483.647 Arms
Default Value	N/A
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3559h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

IL.DIFOLD is the output of the drive foldback algorithm. It is an artificial current, which can be higher or lower than the drive peak current (DRV.IPEAK). When IL.DIFOLD is lower than the existing current limit (such as IL.LIMITP), it becomes the active current limit.

IL.DIFOLD decreases when the actual current is higher than drive continuous current and increases (up to a certain level) when the actual current is lower than drive continuous current.

IL.FB

General Information	
Type	R/O Parameter
Description	Reads the actual value of the d-component current.
Units	Arms
Range	± Drive peak current (DRV.IPEAK)
Default Value	N/A
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Description

This parameter reads the measured, de-rotated actual current value of the motor.

IL.FF

General Information	
Type	R/O Parameter
Description	Displays the current loop overall feedforward value
Units	Arms
Range	N/A
Default Value	N/A
Data Type	Float
See Also	IL.KBUSFF, IL.KVFF, IL.OFFSET, IL.FRICTION, IL.KACCFF
Start Version	M_0-0-32

Description

This parameter displays the current loop overall feedforward value.

IL.FOLDFTHRESH

General Information	
Type	R/O Parameter
Description	Reads the foldback fault level.
Units	Arms
Range	0 to 500 Arms
Default Value	Drive peak current (DRV.IPEAK)
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE and CANopen
Index/Subindex or Parameter Number	3420h/0
Data Type	Unsigned 16
PDO Mappable	No
Start Version	M_00-00-62-000

Description

IL.FOLDFTHRESH is the fault level of the current foldback algorithm. If IL.IFOLD drops below the value for IL.FOLDFTHRESH, then a fault is generated and the drive is disabled.

To avoid reaching the current foldback fault level, set IL.FOLDFTHRESHU well below the continuous current value for both the drive and the motor or set the IL.FOLDFTHRESHU value to zero.

IL.FOLDFTHRESHU

General Information	
Type	NV Parameter
Description	Sets the user value for the foldback fault level.
Units	Arms
Range	0 to 500 Arms
Default Value	Drive peak current (DRV.IPEAK)
Data Type	Float
See Also	IL.FOLDFTHRESH, Foldback
Start Version	M_00-00-55-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3421h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	

Description

IL.FOLDFTHRESHU is the fault level of the current foldback algorithm. The value of IL.FOLDFTHRESH is the minimum of DRV.IPEAK, MOTOR.IPEAK, and IL.FOLDFTHRESHU.

IL.FOLDWTHRESH

General Information	
Type	NV Parameter
Description	Sets the foldback warning level.
Units	Arms
Range	0 to 500 Arms
Default Value	0 A
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	355Ah/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

IL.FOLDWTHRESH is the warning level of the current foldback algorithm. When IL.IFOLD drops **below** IL.FOLDWTHRESH a warning is generated.

To ensure that the current foldback warning level is never reached, IL.FOLDWTHRESH should be set well below the continuous current value for both the drive and the motor. You can also set the IL.FOLDFTHRESH value to zero.

IL.FRICTION

General Information	
Type	R/W Parameter
Description	Sets friction compensation value.
Units	A
Range	0 to the minimum of user positive current limit (IL.LIMITP) and motor peak current (MOTOR.IPEAK).IL.LIMITP
Default Value	0
Data Type	Float
See Also	IL.FF
Start Version	M_0-0-32

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	3422h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

Position command derivative sign is multiplied by this value to be injected to the current command.

IL.IFOLD

General Information	
Type	R/O Parameter
Description	Reads the overall foldback current limit.
Units	A
Range	0 to 2,147,483.647 A
Default Value	N/A
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Description

Two current foldback algorithms run in parallel in the drive: the drive foldback algorithm and the motor foldback algorithm. Each algorithm uses different sets of parameters.

Each algorithm has its own foldback current limit, IL.DIFOLD and IL.MIFOLD. The overall foldback current limit is the minimum of the two at any given moment.

$IL.IFOLD = \min(IL.DIFOLD, IL.MIFOLD)$.

IL.DIFOLD is an artificial current, which can be higher or lower than the drive or motor peak current. When IL.IFOLD becomes lower than the existing current limit (e.g. IL.LIMITP), it becomes the active current limit.

IL.KACCFF

General Information	
Type	R/W Parameter
Description	Sets current loop acceleration feedforward gain value
Units	NA
Range	0.0 to 2.0
Default Value	0.0
Data Type	Float
See Also	IL.FF
Start Version	M_0-0-32

Description

This value sets the gain for the acceleration feedforward (a scaled second derivative of the position command is added to the current command value) .

This parameter is valid only in the position mode (DRV.OPMODE = 2).

IL.KBUSFF

General Information	
Type	RW
Description	Current loops fieldbus injected feed-forward gain
Units	NA
Range	0 to 2
Default Value	0
Data Type	Float
See Also	IL.FF, IL.BUSFF
Start Version	M_0-0-32

Description

This parameter scales the feedforward term added by the fieldbus to the current command. The nominal feed-forward value can be multiplied by this gain value.

This parameter is only used in the position mode (DRV.OPMODE = 2).

IL.KP

General Information	
Type	NV Parameter
Description	Sets the proportional gain of the q-component of the PI regulator.
Units	V/A
Range	0 to 2,000 V/A
Default Value	Read from the motor or, if no memory, 50.009 V/A
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3598h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

IL.KP is used to modify the proportional gain of the PI-loop that controls the q-component of the current.

IL.KPDRATIO

General Information	
Type	NV Parameter
Description	Sets the proportional gain of the d-component current PI-regulator as a percentage of IL.KP
Units	N/A
Range	0 to 100
Default Value	1
Data Type	Float
See Also	IL.KP
Start Version	M_0-0-15

Description

This parameter allows the user to modify the proportional gain of the PI-loop, which controls the d-component of the current.

IL.KVFF

General Information	
Type	R/W
Description	Current loops velocity feed-forward gain
Units	NA
Range	0 to 2
Default Value	0
Data Type	Float
See Also	IL.FF
Start Version	M_0-0-32

Description

This parameter sets the gain for the velocity loop feedforward. The nominal feedforward value can be multiplied by this gain value.

This parameter is only used in position mode (DRV.OPMODE = 2).

IL.LIMITN

General Information	
Type	NV Parameter
Description	Sets the negative user (application-specific) current limit.
Units	A
Range	Negative drive peak current (DRV.IPEAK) to 0 A
Default Value	Negative drive peak current (DRV.IPEAK)
Data Type	Float
See Also	IL.LIMITP
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	356Fh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the negative user limitation of the q-component current command value. The real current command value can furthermore be limited by additional settings or calculations, such as an I^2t calculation or motor peak current.

IL.LIMITP

General Information	
Type	NV Parameter
Description	Sets the positive user (application-specific) current limit.
Units	A
Range	0 A to drive peak current (DRV.IPEAK)
Default Value	Drive peak current (DRV.IPEAK)
Data Type	Float
See Also	IL.LIMITN
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	356Eh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the positive user limitation of the q-component current command value. The real current command value can furthermore be limited by some additional settings or calculations such as I^2t calculation and motor peak current.

IL.MFOLDD

General Information	
Type	R/O Parameter
Description	Sets the motor foldback maximum time at motor peak current.
Units	s
Range	0.1 to 2400 s
Default Value	10 s
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Description

IL.MFOLDD sets the maximum time allowed for the motor to remain at peak current before starting to fold towards the motor continuous current. When at motor peak current, IL.MFOLDD is the amount of time before the foldback algorithm starts to reduce the current.

IL.MFOLDER

General Information	
Type	R/O Parameter
Description	Sets the motor foldback recovery time.
Units	s
Range	0.1 to 65,535 s
Default Value	Calculated from other foldback parameters.
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Description

IL.MFOLDER sets the recovery time for the motor foldback algorithm. If 0 current is applied for at least the recovery time duration, it is possible to apply motor peak current for the duration of IL.MFOLDD time.

The IL.MFOLDER value is automatically calculated from other foldback parameters.

IL.MFOLDT

General Information	
Type	R/O Parameter
Description	Sets the motor foldback time constant of the exponential current drop (foldback).
Units	s
Range	0.1 to 2,400 s
Default Value	10 s
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Description

IL.MFOLDT sets the time constant of the exponential drop (foldback) of the current towards motor continuous current.

IL.MIFOLD

General Information	
Type	R/O Parameter
Description	Sets the motor foldback current limit.
Units	A
Range	0 to 2147483.647 A
Default Value	N/A
Data Type	Float
See Also	Foldback
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35A4h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

IL.MIFOLD sets the output of the motor foldback algorithm. It is an artificial current, which can be higher or lower than the motor peak current. When IL.MIFOLD becomes lower than the existing current limit (IL.LIMITP) it becomes the active current limit.

IL.MIFOLD decreases when the actual current is higher than motor continuous current and increases (up to a certain level) when the actual current is lower than the motor continuous current.

IL.OFFSET

General Information	
Type	RW
Description	A constant current command added to compensate for gravity.
Units	A
Range	[IL.LIMITN to IL.LIMITP
Default Value	0 A
Data Type	Float
See Also	IL.FF
Start Version	M_0-0-32

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	3423h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This value is added to the overall current loop feedforward value.

IL.VCMD

General Information	
Type	R/O Parameter
Description	Sets the output of the q-component PI regulator.
Units	Vrms
Range	0 Vrms to bus voltage
Default Value	N/A
Data Type	Integer
See Also	IL.VDCMD
Start Version	M_0-0-15

Description

Sets the output of the current loop that controls the q-component of the current.

IL.VUFB

General Information	
Type	R/O Parameter
Description	Reads the measured voltage on the u-winding of the motor.
Units	V
Range	-1200*VBusScale to +1200*VBusScale
Default Value	N/A
Data Type	Integer
See Also	IL.VVFB
Start Version	M_0-0-15

Description

The range for this parameter depends on whether the drive model is an MV/240 Vac or an HV/480 Vac.

The VBusScale parameter sets the drive model:

MV/240 Vac: VBusScale = 1

HV/480 Vac: VBusScale = 2

VBusScale must be used for multiple parameter ranges that are model dependent, such as IL.KP.

IL.VVFB

General Information	
Type	R/O Parameter
Description	Reads the measured voltage on the v-winding of the motor.
Units	V
Range	-1200*VBusScale to +1200*VBusScale
Default Value	N/A
Data Type	Integer
See Also	IL.VUFB
Start Version	M_0-0-15

Description

The range for this parameter depends on whether the drive model is an MV/240 Vac or an HV/480 Vac.

The VBusScale parameter sets the drive model:

MV/240 Vac: VBusScale = 1

HV/480 Vac: VBusScale = 2

VBusScale needs to be used for multiple parameter ranges that are model dependent such as IL.KP.

MOTOR Parameters

MOTOR.AUTOSSET

General Information	
Type	NV Parameter
Description	Determines which drive parameters are calculated automatically.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_00-00-58-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3451h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter determines whether or not certain drive parameters (for example, IL.KP or MOTOR.POLES) are calculated automatically. A value of 1 causes the parameters to be automatically calculated from the motor ID data (read from memory-supporting feedback devices, such as SFD, Endat, and BISS). Automatically calculated parameters are read-only. A value of 0 disables the automatic calculation and you must set the parameters manually. Manually set parameters are read-write.

MOTOR.BRAKE

General Information	
Type	NV Parameter
Description	Sets the presence or absence of a motor brake.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3587h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

The MOTOR.BRAKE parameter notifies the firmware whether a brake exists or not. It does not enable or disable the brake. If a brake is found to be present, the firmware considers hardware indications regarding the brake circuits (open circuit, short circuit, etc). If a brake does not exist, then the firmware ignores the hardware indications since they are irrelevant.

Value	Status
0	Motor brake does not exist.
1	Motor brake exists and brake hardware circuitry checks are enabled.

Enabling the MOTOR.BRAKE (value set to 1) when no motor brake exists creates a fault.

The motor brake is polled every 16 ms.

MOTOR.BRAKERLS

General Information	
Type	Command
Description	Allows a user to release the motor brake.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-41

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3450h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This command allows a user to release motor brake although the brake should be engaged.

0 = Drive controls the brake.

1 = Brake is released.

Note: There is a digital input mode used for the same purpose. The two mechanisms are independent.

MOTOR.BRAKESTATE

General Information	
Type	R/O Parameter
Description	Reads the actual status of the motor brake.
Units	N/A
Range	Brake closed or not present. Brake opened.
Default Value	Brake closed or not present.
Data Type	String
See Also	N/A
Start Version	M_0-0-42

Description

This parameter reads the actual status of the motor brake and can only show two states:

- 1) Brake closed or not present
- 2) Brake open

MOTOR.CTF0

General Information	
Type	NV Parameter
Description	Sets the thermal constant of the motor coil.
Units	mHz
Range	0.265 to 16,000 mHz
Default Value	10 mHz
Data Type	Float
See Also	N/A
Start Version	M_00-00-62-000

Description

This parameter is used to configure the thermal constant of the motor coil, which is the break frequency of a single-pole low-pass filter model of the thermal dynamics of the motor coil.

This parameter, together with MOTOR.IPEAK and MOTOR.ICONT, determine the motor foldback parameters IL.MFOLDD, IL.MFOLDT, and IL.MFOLDR.

Calculating MOTOR.CTF0

Given a motor coil/winding thermal time constant T in seconds, then:

$$\text{MOTOR.CTF0} = 1/(2\pi T)$$

MOTOR.ICONT

General Information	
Type	NV Parameter
Description	Sets the motor continuous current.
Units	A
Range	0.1 to 500 A
Default Value	1.0 A
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	358Eh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is used to configure the motor continuous current.

MOTOR.IDDATAVALID

General Information	
Type	
Description	Reports the status of the motor memory.
Units	
Range	
Default Value	
Data Type	
See Also	
Start Version	

Description

MOTOR.IDDATAVALID reports the status of the motor memory status.

The valid values for this keyword are the following:

Value	Description
0	Error in identification
1	Success in identification
2	Identification in process
3	Identification not started yet
4	Success recognizing feedback, but failed to verify OEM data integrity

MOTOR.INERTIA

General Information	
Type	NV Parameter
Description	Sets the motor inertia.
Units	kgcm ² for rotary motors kg for linear motors
Range	1 to 200,000 kgcm ² or kg
Default Value	100 kgcm ² or kg
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Description

This parameter sets the motor inertia.

MOTOR.IPEAK

General Information	
Type	NV Parameter
Description	Sets the motor peak current.
Units	mA
Range	0.200 to 1,000 A
Default Value	2.000 A
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	358Fh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is used to configure the motor peak current.

MOTOR.KT

General Information	
Type	NV Parameter
Description	Sets the torque constant of the motor.
Units	Nm/A
Range	0.001 to 65 Nm/A
Default Value	0.1 Nm/A
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Description

This parameter is the torque constant of the motor in Nm/A.

The value can be online checked according to the following equation:

$$K_t = 60 \cdot \sqrt{3} \cdot U_i / (2 \cdot \pi \cdot n)$$

U_i = induced voltage of the motor

n = actual rotor velocity

MOTOR.LQLL

General Information	
Type	NV Parameter
Description	Sets the line-to-line motor Lq.
Units	mH
Range	1 to 2^{32} H
Default Value	17.000 H
Data Type	Float
See Also	N/A
Start Version	M_0-0-15

Description

This parameter is used to configure the motor line-to-line inductance.

MOTOR.NAME

General Information	
Type	NV Parameter
Description	Sets the motor name.
Units	N/A
Range	11 chars
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-15

Description

This parameter is used to set the motor name.

MOTOR.PHASE

General Information	
Type	NV Parameter
Description	Sets the motor phase.
Units	Electrical degrees
Range	0 to 360°
Default Value	0°
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

This parameter sets the motor phase.

MOTOR.PITCH

General Information	
Type	NV Parameter
Description	Sets the motor pitch.
Units	μm
Range	1,000 to 1,000,000 μm
Default Value	1.000 μm
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

This parameter defines the pole-to-pair pitch for the linear motor in micrometers.

MOTOR.POLES

General Information	
Type	NV Parameter
Description	Sets the number of motor poles.
Units	N/A
Range	0 to 128
Default Value	6
Data Type	Integer
See Also	FB1.POLES
Start Version	M_0-0-15

Description

MOTOR.POLES sets the number of motor poles. This command is used for commutation control and represents the number of individual magnetic poles of the motor (not pole pairs). The division value of motor poles (MOTOR.POLES) and feedback poles (FB1.POLES) must be an integer when setting drive to enable, otherwise a fault is issued.

MOTOR.R

General Information	
Type	NV Parameter
Description	Sets the stator winding resistance phase-phase in ohms.
Units	Ω
Range	0.001 to 650 Ω
Default Value	10 Ω
Data Type	Float
See Also	N/A
Start Version	M_0-0-15; Units changed in M_00-00-66-000

Description

MOTOR.R sets the stator winding resistance phase-to-phase in ohms.

MOTOR.RTYPE

General Information	
Type	NV Parameter
Description	Defines the type of thermal resistor inside the motor.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-63

Description

This parameter defines the type of thermal resistor used inside of the motor to measures motor temperature.

0 = PTC

1 = NTC

MOTOR.TBRAKEAPP

General Information	
Type	NV Parameter
Description	The delay time used for applying the motor brake.
Units	ms
Range	0 to 1,000 ms
Default Value	75 ms
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	366Fh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is used to configure the mechanical delay when releasing the motor brake. MOTOR.TBRAKEAPP is a time delay that is applied when a brake exists and the drive is disabled at the end of a controlled stop. This delay lasts from the time that the brake is commanded to engage until the time that the drive is disabled.

This feature allows you to disable the drive and engage the brake on a vertical application without the load falling. Without this time delay, if you immediately disable the drive then the load falls during the time needed for the brake to mechanically engage.

MOTOR.TBRAKERLS

General Information	
Type	NV Parameter
Description	The delay time used for releasing the motor brake.
Units	ms
Range	0 to 1,000 ms
Default Value	75 ms
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	366Eh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is used to configure the mechanical delay when releasing the motor brake. MOTOR.TBRAKERLS is a time delay that is applied when a brake exists and the drive is enabled. When the drive is enabled, the brake is commanded to disengage, and during the MOTOR.TBRAKERLS period of time the drive does not accept a motion command. This delay allows the brake to fully disengage before the drive begins a new motion. Please note that the MOTOR.TBRAKERLS feature is not implemented yet.

MOTOR.TEMP

General Information	
Type	R/O Parameter
Description	Reads the motor temperature represented as the resistance of the motor PTC.
Units	Ω
Range	0 to $2^{32} \Omega$
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3612h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is used to get the motor temperature which is represented as the resistance of the motor PTC.

MOTOR.TEMPFAULT

General Information	
Type	NV Parameter
Description	Sets the motor temperature fault level.
Units	Ω
Range	0 to 2,000,000,000 Ω
Default Value	0 Ω = switched off
Data Type	Integer
See Also	MOTOR.TEMP
Start Version	M_0-0-15

Description

This parameter is used to configure the motor temperature fault level as a resistance threshold of the motor PTC. A zero value prevents any warning from being created.

MOTOR.TEMPWARN

General Information	
Type	NV Parameter
Description	Sets the motor temperature warning level.
Units	Ω
Range	0 to 2,000,000,000 Ω
Default Value	0 Ω = switched off
Data Type	Integer
See Also	MOTOR.TEMP
Start Version	M_0-0-15

Description

This parameter is used to configure the motor temperature warning level as a resistance threshold of the motor PTC.

A zero value prevents any warning from being created.

MOTOR.TYPE

General Information	
Type	NV Parameter
Description	Sets the motor type.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

MOTOR.TYPE sets the drive control algorithms to different motor types as follows:

0: Rotary motor

1: Linear motor

MOTOR.VMAX

General Information	
Type	NV Parameter
Description	Sets the maximum motor speed.
Units	rpm
Range	100 to 40,000 rpm
Default Value	3,000 rpm
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

This parameter is used to configure the maximum speed of the motor.

MOTOR.VOLTMAX

General Information	
Type	NV Parameter
Description	Sets the motor maximum voltage.
Units	Vrms
Range	110 to 900 Vrms
Default Value	230 Vrms
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

This parameter sets the maximum permissible motor voltage. For instance, if a motor that is rated for a 400 V supply is connected to the drive, then the MOTOR.VOLTMAX setting is 400. This value also sets regen and over voltage thresholds in the drive to acceptable values for the motor so that the motor windings are not damaged.

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MT Parameters and Commands

MT.ACC

General Information	
Type	R/W Parameter
Description	Specifies motion task acceleration; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833,333.333 rps/s 1.860 to 50,000,000.000 rpm/s 11.158 to 300,000,000.000 deg/s ² 0.155 to 4,166,666.752 (PIN/POUT)/s ² 0.195 to 5,235,987.968 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833,333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833,333,333.333*MOTOR.PITCH μm/s ² 0.155 to 4,166,666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3,000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 counts/s ² 1.000*MOTOR.PITCH mm/s ² 1000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	6083h/0

Fieldbus Information	
Data Type	Unsigned 32
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

MT.ACC specifies the motion task acceleration and is used by the MT.SET and MT.LOAD command. This parameter is a temporary value, since a motion task is only set after a MT.SET command. The motion task acceleration is further limited by the maximum allowed acceleration DRV.ACC

A value of 0 for MT.ACC should not be used when setting a motion task via MT.SET because this value causes a validity check of the MT.SET command to fail.

A value of 0 for MT.ACC after an MT.LOAD command displays an empty (not initialized) motion task.

Related Topics

0.1 Motion Tasks

MT.CLEAR

General Information	
Type	Command
Description	Clears motion tasks from the drive; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC,MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Description

MT.CLEAR clears a motion task from the drive. This command needs one argument in order to clear a motion task. A motion task consists of the following parameters: MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC,MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT

A value of –1 clears all motion tasks in the drive (MT.CLEAR –1).

Example

MT.CLEAR 5: Clear motion task number 5.

After performing a command such as MT.PARAMS 5, the drive displays the following:

```
5    0.000 Counts    0.000 rpm    0    0.000 rpm/s    0.000 rpm/s    0    0
0 ms
```

A value of 0 for velocity, acceleration, or deceleration displays motion task as uninitialized.

Related Topics

0.1 Motion Tasks

MT.CNTL

General Information	
Type	R/W Parameter
Description	Sets motion task control word; active in opmode 2 (position) only.
Units	N/A
Range	0 to 4,294,967,295
Default Value	0
Data Type	Integer
See Also	MT.NUM , MT.P, MT.V, MT.ACCMT.V, MT.DEC, MT.TNUM, MT.MTNEXT MT.MTNEXT , MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	6086h/0
Data Type	Integer 16
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

MT.CNTL specifies the motion task control word, which is used by the MT.SET and MT.LOAD commands. The control word describes the behavior of the motion task. This parameter is a temporary value, since a motion task is only set after an MT.SET command is issued.

Since this parameter is read bitwise, it can combine multiple functions into a single word. The meaning of each bit is described in the tables below.

Table 1: Motion Task (MT) Bit Descriptions

Bit	Meaning	Description
0	0x00001	See Table 2: MT Type.
1	0x00002	
2	0x00004	
3	0x00008	
4	0x00010	If this bit is 0, then the next MT is not executed. If this bit is 1, then the next MT is executed.
5	0x00020	See Table 3: Next MT Start Type.
6	0x00040	
7	0x00080	
8	0x00100	
9	0x00200	See Table 4: MT Acceleration Type.
10	0x00400	
11	0x00800	
12	0x01000	Activates the override functionality for a trapezoidal MT. If this bit is 1, a motion task with override functionality must be activated (see bit 5).

Table 2: MT Type

Bits 3, 2, 1, 0	Description
0000	Absolute MT. The target position is defined by the MT.P value.
1000	Absolute MT. The target position is defined by an external source, such as an analog input.
0001	Relative MT. The target position is defined as: Target position = PL.CMD + MT.P
0011	Relative MT. The target position is defined as: Target position = Target position of the last motion task + MT.P
0101	Relative MT. The target position is defined as: Target position = External start position + MT.P The 'external start position' can be generated by a latched position, analog input, and other sources.
0111	Relative MT. The target position is defined as: Target position = PL.FB + MT.P

Table 3: Next MT Start Type

Bits 9, 8, 7, 6, 5	Description
00000	Switches over to next MT after stopping. After an MT ends, the next MT starts immediately.
00001	Switches over to next MT after stopping and delay. After an MT ends, the MT following time (MT.TNEXTelapse in order to start the next MT.
00010	Switches over to next MT after stopping and external event. After an MT ends, an external event (such as a high digital input) must occur in order to start the next MT.
00011	Switches over to next MT after stopping, delay, and external event. After an MT ends, the MT.TNEXTmust elapse and an external event (such as a high digital input) must occur in order to start the next MT.
00111	Switches over to next MT after stopping, then delay or external event. After an MT ends, the MT.TNEXT must elapse or an external event (such as a high digital input) must occur in order to start the next MT.
10000	Switches over to the next MT at present MT speed (change on the fly). After reaching the target position of an MT, the next MT starts. The drive then accelerates with the adjusted acceleration ramp of this next MT to the target velocity of this next MT. The MT.TNEXT setting is ignored.
11000	Switches over to the next MT at next MT speed (change on the fly). When the target position of an MT is reached, the drive has already accelerated with the acceleration ramp of the next MT to the target velocity of the next MT. Thus, the drive begins the next MT at the next MT target velocity. The MT.TNEXT setting is ignored if adjusted.

Table 4: MT Acceleration Type

Bits 11, 10	Description
00	Trapezoidal acceleration and deceleration.
01	1:1 customer table motion task. The drive follows the customer table without inserting a constant velocity phase between the acceleration and deceleration process. This setting allows the usage of nonsymmetric velocity profiles. The MT.TNUM parameter defines which table to use for the 1:1 profile handling. See "AKD Customer Profile Application Note" on the Kollmorgen web site (www.kollmorgen.com) for additional details.
11	Standard customer table motion task. The drive accelerates according to the shape of the customer table by stepping through the first half of the customer table. Then the drive inserts a constant velocity phase until the brake-point is reached. Finally, the drive decelerates by stepping through the second half of the customer profile table. The MT.TNUM parameter defines which table to use for the 1:1 profile handling. This mode allows also a change on the fly between motion tasks (see Table 3 above). See "AKD Customer Profile Application Note" on the Kollmorgen web site (www.kollmorgen.com) for additional details.

Related Topics

0.1 Motion Tasks

MT.CONTINUE

General Information	
Type	Command
Description	Continues a stopped motion task; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	0
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACCMT.V, MT.DEC, MT.TNUM, MT.MTNEXT MT.MTNEXT , MT.SET , MT.LOAD
Start Version	M_0-0-17

Description

MT.CONTINUE continues a motion task that has been stopped by the DRV.STOP command.

Related Topics

0.1 Motion Tasks

MT.DEC

General Information	
Type	R/W Parameter
Description	Sets motion task deceleration; active in opmode 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rps/s, rpm/s, deg/s ² , (PIN/POUT)/s ² , rad/s ² Linear: counts/s ² , mm/s ² , μm/s ² , (PIN/POUT)/s ²
Range	Rotary: 0.031 to 833333.333 rps/s 1.860 to 50000000.000 rpm/s 11.158 to 300000000.000 deg/s ² 0.155 to 4166666.752 (PIN/POUT)/s ² 0.195 to 5235987.968 rad/s ² Linear: 0.000 to 833.333 counts/s ² 0.031*MOTOR.PITCH to 833333.333*MOTOR.PITCH mm/s ² 30.994*MOTOR.PITCH to 833333333.333*MOTOR.PITCH μm/s ² 0.155 to 4166666.667 (PIN/POUT)/s ²
Default Value	Rotary: 50.000 rps/s 3000.000 rpm/s 18,000.000 deg/s ² 250.000 (PIN/POUT)/s ² 314.159 rad/s ² Linear: 0.050 counts/s ² 1.000*MOTOR.PITCH mm/s ² 1000.000*MOTOR.PITCH μm/s ² 250.000 (PIN/POUT)/s ²
Data Type	Float
See Also	MT.ACC, MT.NUM, MT.P, MT.V, MT.CNTL, MT.TNUM, MT.MTNEXT, MT.TNEXT, MT.SET, MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	6084h/0
Data Type	Unsigned 32
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

MT.DEC specifies the motion task deceleration and is used by the MT.SET and MT.LOAD commands. This parameter is a temporary value, since a motion task is only set after an MT.SET command is issued. The motion task deceleration is further limited by the maximum allowed acceleration, DRV.DEC.

A value of 0 for MT.DEC should not be used when setting a motion task via MT.SET because this value causes a validity check of the MT.SET command to fail.

A value of 0 for MT.DEC after an MT.LOAD command displays an empty (not initialized) motion task.

Related Topics

0.1 Motion Tasks

MT.EMERGMT

General Information	
Type	R/W Parameter
Description	Selects a motion task to be triggered after an emergency stop procedure; active in opmode 2 (position) only.
Units	N/A
Range	1 to 128
Default Value	0
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Description

MT.EMERGMT selects the motion task to be triggered after an emergency stop procedure.

A value of –1 shows that no motion task must be started after a ramp-down procedure in a closed position loop mode of operation.

Related Topics

0.1 Motion Tasks

MT.LIST

General Information	
Type	Command
Description	Lists all initialized motion tasks in the drive; active in opmode 2 (position) only.
Units	N/A
Range	0
Default Value	N/A
Data Type	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
See Also	M_0-0-17
Start Version	N/A

Description

MT.LIST reads every initialized motion task from the drive. A motion task consists of the following parameters: MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , and MT.TNEXT.

A motion task is considered as initialized as soon as MT.V, MT.ACC, and MT.DEC of that specific motion task have values not equal to 0.

Related Topics

0.1 Motion Tasks

MT.LOAD

General Information	
Type	Command
Description	Reads/loads a motion task number from the drive; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	0
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET
Start Version	M_0-0-17

Description

MT.LOAD reads out a motion task number MT.NUM from the drive. A motion task consists of the following parameters: MT.NUM, MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT. These parameters belong to the motion task number MT.NUM and are refreshed by MT.LOAD.

Related Topics

0.1 Motion Tasks

MT.MOVE

General Information	
Type	Command
Description	Starts a motion task; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	0
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Description

MT.MOVE starts a motion task. This command needs one argument in order to start a motion task. The drive must be homed, otherwise the motion task will not start (see also HOME commands).

Example

MT.MOVE 3 -> Start motion task number 3.

Related Topics

0.1 Motion Tasks

MT.MTNEXT

General Information	
Type	R/W Parameter
Description	Specifies following motion task number; active in opmode 2 (position) only.
Units	N/A
Range	0 to 128
Default Value	0
Data Type	Integer
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35BCh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

MT.MTNEXT specifies the number of the following motion task and is used by the MT.SET and MT.LOAD command. This parameter is a temporary value. A motion task is only set after an MT.SET command.

The motion task control word can be selected so that a following motion task is executed after a first motion task. This parameter displays which motion task should be started after the first motion task.

Related Topics

0.1 Motion Tasks

MT.NUM

General Information	
Type	R/W Parameter
Description	Sets the motion task number; active in opmode 2 (position) only.
Units	N/A
Range	0 to 128
Default Value	0
Data Type	Integer
See Also	MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	365Bh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

MT.NUM specifies the motion task number, which is used by the MT.SET and MT.LOAD commands. This parameter is a temporary value. A motion task is only set after an MT.SET command is issued.

Related Topics

0.1 Motion Tasks

MT.P

General Information	
Type	R/W Parameter
Description	Sets the motion task position; active in opmode 2 (position) only.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR
Range	N/A
Default Value	0
Data Type	Float
See Also	MT.NUM , MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	607Ah/0
Data Type	Integer 32
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

MT.P specifies the motion task position, which is used by the MT.SET and MT.LOAD command. Depending on the motion task control word (MT.CNTL), the MT.P command can either be the target position of the motion task or a relative distance. This parameter is a temporary value. A motion task is only set after an MT.SET command.

Related Topics

0.1 Motion Tasks

MT.PARAMS

General Information	
Type	Command
Description	Shows a motion task; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	0
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Description

MT.PARAMS displays a motion task. This command needs one argument in order to show a motion task. If you enter MT.PARAMS without an argument, the drive returns the current or last active motion task.

Example

MT.PARAMS 5

The drive responds as follows:

```

7    5222.000 Counts    135.000 rpm    1    550.746 rpm/s    654.458 rpm/s
0    0      0 ms

```

Related Topics

0.1 Motion Tasks

MT.SET

General Information	
Type	Command
Description	Sets the motion task in the drive; active in opmode 2 (position) only.
Units	N/A
Range	N/A
Default Value	0
Data Type	N/A
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.LOAD
Start Version	M_0-0-17

Description

MT.SET sends a motion task to the drive. A motion task consists of the following parameters: MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , and MT.TNEXT.

The motion task number (MT.NUM) with the parameters above is sent to the drive only after the MT.SET command.

Related Topics

0.1 Motion Tasks

MT.TNEXT

General Information	
Type	R/W Parameter
Description	Specifies following motion task time; active in opmode 2 (position) only.
Units	ms
Range	0 to 65,535 ms
Default Value	0 ms
Data Type	Integer
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35BDh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

MT.TNEXT specifies the time that must elapse before starting a following motion task. This value is used by the MT.SET and MT.LOAD command. This parameter is a temporary value. A motion task is only set after an MT.SET command.

The motion task control word can be selected so that a following motion task is executed after a first motion task and this additional delay time.

Related Topics

0.1 Motion Tasks

MT.TNUM

General Information	
Type	R/W Parameter
Description	Sets the motion task customer table number; active in opmode 2 (position) only.
Units	N/A
Range	0 to 7
Default Value	0
Data Type	Integer
See Also	MT.NUM , MT.P, MT.V, MT.CNTL, MT.ACC, MT.DEC, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Description

MT.TNUM specifies the customer profile table and is used by the MT.SET and MT.LOAD command. This parameter is a temporary value. A motion task is only set after an MT.SET command.

The drive can have up to eight customer specific profile tables. The drive performs an S-curve acceleration with these profile tables. The shapes of these tables have an impact on the shape of the motion task acceleration and deceleration. The motion task control word specifies if a customer profile table is used or not.

This parameter has no impact when a trapezoidal motion task acceleration and deceleration profile is selected (see Table 4: MT Acceleration Type in the MT.CNTL description).

Related Topics

0.1 Motion Tasks

MT.TPOSWND

General Information	
Type	R/W Parameter
Description	Sets the motion task target position window; active in opmode 2 (position) only.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, PIN/POUT, counts 16 bit Linear: counts, mm, µm, PIN/POUT, counts 16 bit
Range	N/A
Default Value	0.5 rev
Data Type	Float
See Also	DRV.MOTIONSTAT
Start Version	M_0-0-32

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35C6h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

Within DRV.MOTIONSTAT, MT.TPOSWND is used to indicate that the target position of a motion task has been reached. DRV.MOTIONSTAT displays a "Target Position Reached" bit as soon as the following statement becomes true:

$$\text{abs}(\text{actual_position} - \text{target_position}) < \text{MT.TPOSWND}$$

Related Topics

0.1 Motion Tasks

MT.TVELWND

General Information	
Type	R/W Parameter
Description	Sets the motion task target velocity window; active in opmode 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: Counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: 0.000 to 12000.000 rpm 0.000 to 200.000 rps 0.000 to 72000.000 deg/s 0.000 to 1000.000 (PIN/POUT)/s 0.000 to 1256.637 rad/s Linear: 0.000 to 0.200 counts/s 0.000 to 200.000*MOTOR.PITCH mm/s 0.000 to 200,000.000*MOTOR.PITCH $\mu\text{m/sec}$ 0.000 to 1000.000 (PIN/POUT)/s
Default Value	Rotary: 60.000 rpm 1.000 rps 359.999 deg/s 5.000 (PIN/POUT)/s 6.283 rad/s Linear: 0.001 Counts/s 1.000*MOTOR.PITCH mm/s 999.998*MOTOR.PITCH $\mu\text{m/sec}$ 5.000 (PIN/POUT)/s
Data Type	Float
See Also	DRV.MOTIONSTAT
Start Version	M_0-0-32

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3856h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

Within DRV.MOTIONSTAT, MT.TVELWND is used to indicate that the target velocity of a motion task has been reached. DRV.MOTIONSTAT displays a "Target Velocity Reached" bit as soon as the following statement becomes true:

$$(\text{target velocity} - \text{MT.TVELWND}) < \text{actual velocity} < (\text{target velocity} + \text{MT.TVELWND})$$

Related Topics

0.1 Motion Tasks

MT.V

General Information	
Type	R/W Parameter
Description	Sets the motion task velocity; active in opmode 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, μm/s, (PIN/POUT)/s
Range	Rotary: 0.000 to 12,000.000 rpm 0.000 to 200.000 rps 0.000 to 72,000.000 deg/s 0.000 to 1,000.000 (PIN/POUT)/s 0.000 to 1,256.637 rad/s Linear: 0.000 to 0.200 Counts/s 0.000 to 200.000*MOTOR.PITCH mm/s 0.000 to 200,000.000*MOTOR.PITCH μm/sec 0.000 to 1000.000 (PIN/POUT)/s
Default Value	0
Data Type	Float
See Also	MT.NUM , MT.P, MT.CNTL, MT.ACC, MT.DEC, MT.TNUM, MT.MTNEXT , MT.TNEXT, MT.SET , MT.LOAD
Start Version	M_0-0-17

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	6081h/0
Data Type	Unsigned 32
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

MT.V specifies the motion task velocity, which is used by the MT.SET and MT.LOAD command. This parameter is a temporary value. A motion task is only set after an MT.SET command. The motion task velocity is furthermore limited by VL.LIMITP or VL.LIMITN depending on the direction of the motion task.

A value of 0 should not be used when setting a motion task via MT.SET because this value causes a validity check of the MT.SET command to fail.

A value of 0 after an MT.LOAD command displays an empty (not initialized) motion task.

Related Topics

0.1 Motion Tasks

MT.VCMD

General Information	
Type	R/O Parameter
Description	Reads the derivative of PL.CMD; active in opmode 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR
Range	N/A
Default Value	N/A
Data Type	Float
See Also	N/A
Start Version	M_00-00-63-000

Description

MT.VCMD returns the derivative of the position loop trajectory (PL.CMD), which is therefore a velocity. MT.VCMD is updated while the drive is in DRV.OPMODE 2 and is processing the following motion types:

- Motion tasking
- Homing
- Electronic gearing
- Service motion
- External trajectory coming from a fieldbus
- External trajectory calculated from an analog input signal

Related Topics

0.1 Motion Tasks

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PL Parameters

PL.CMD

General Information	
Type	NV Parameter
Description	Reads the position command directly from the entry to the position loop.
Units	Depends on UNIT.PROTARY or UNIT.PLINEARUNIT.ACCLINEAR Rotary: counts, rad, deg, (PIN/POUT), counts 16 Bit Linear: counts, mm, μ m, (PIN/POUT), counts 16 Bit
Range	N/A
Default Value	N/A
Data Type	Float
See Also	PL.FB
Start Version	M_0-0-15

Description

PL.CMD returns the position command as it is received in the position loop entry.

Related Topics:

- 1 Analog Input

PL.ERR

General Information	
Type	NV Parameter
Description	Returns the position error present when the drive is controlling the position loop.
Units	counts, rad, deg, (PIN/POUT)
Range	N/A
Default Value	N/A
Data Type	Float
See Also	PL.FB
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	60F4h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

PL.ERR returns the position error present when the drive is controlling the position loop. PL.ERR is the difference between the actual position of the motor shaft (PL.FB) and the commanded position of the drive (PL.CMD). If the drive is not in the position operating mode (DRV.OPMODE = 2), then the PL.ERR value is not generated by the drive and this parameter is read as 0.

PL.ERRFTHRESH

General Information	
Type	NV Parameter
Description	Sets the maximum position error.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: counts, rad, deg, (PIN/POUT), counts 16 Bit Linear: counts, mm, μ m, (PIN/POUT), counts 16 Bit
Range	Rotary: 0.000 to 5,123,372,000,000,005.000 counts 0.000 to 7,495,067.136 rad 0.000 to 429,436,076.032 deg 0.000 to 5,964,389.888 (PIN/POUT) 0.000 to 78,176,452,636.718 counts 16 Bit Linear: 0.000 to 5,123,372,000,000,005.000 counts 0.000 to 1,192,877.952*MOTOR.PITCH mm 0.000 to 1,192,878,014.464*MOTOR.PITCH μ m 0.000 to 5,964,389.888 (PIN/POUT) 0.000 to 78,176,452,636.718 counts 16 Bit
Default Value	0.000
Data Type	Float
See Also	PL.ERR
Start Version	M_0_0_33

Fieldbus Information	
	EtherCAT COE & CANOpen
Index/Subindex or Parameter Number	35C7h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the maximum position error. If the position error PL.ERR is larger than PL.ERRFTHRESH the drive generates a fault. If PL.ERRFTHRESH is set to 0, the maximum position error is ignored.

Example

Set position rotary units to 2 (degrees). Setting PL.ERRFTHRESH to 1000 states that is the position error is larger than 1000 degrees, the drive will generate a fault.

UNIT.PROTARY 2

PL.ERRFTHRESH 1000

PL.ERRWTHRESH

General Information	
Type	NV Parameter
Description	Sets the position error warning level.
Units	Depends on UNIT.PROTARY or UNIT.PLINEARUNIT.ACCLINEAR Rotary: counts, rad, deg, (PIN/POUT), counts 16 Bit Linear: counts, mm, μ m, (PIN/POUT), counts 16 Bit
Range	Rotary: 0.000 to 5,123,372,000,000,005.000 counts 0.000 to 7,495,067.136 rad 0.000 to 429,436,076.032 deg 0.000 to 5,964,389.888 (PIN/POUT) 0.000 to 78,176,452,636.718 counts 16 Bit Linear: 0.000 to 5,123,372,000,000,005.000 counts 0.000 to 1,192,877.952*MOTOR.PITCH mm 0.000 to 1,192,878,014.464*MOTOR.PITCH μ m 0.000 to 5,964,389.888 (PIN/POUT) 0.000 to 78,176,452,636.718 counts 16 Bit
Default Value	0.000 deg
Data Type	Float
See Also	PL.ERR
Start Version	M_0-0-51

Description

If this value is not equal 0 and the position error PL.ERR is larger than this value, the drive will generate a warning.
If PL.ERRWTHRESH is set to 0 the warning is not issued.

Example

Set position rotary units to 2 degrees. If you set PL.ERRWTHRESH to 100 and the position error is larger than 100 degrees, then the drive will generate a warning.

UNIT.PROTARY 2

PL.ERRWTHRESH 100

PL.FB

General Information	
Type	R/O Parameter
Description	Reads the position feedback value.
Units	Depends on UNIT.PROTARY or UNIT.PLINEARUNIT.ACCLINEAR Rotary: counts, rad, deg, (PIN/POUT), counts 16 Bit Linear: counts, mm, μ m, (PIN/POUT), counts 16 bit
Range	N/A
Default Value	N/A
Data Type	Float
See Also	FB1.OFFSET
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	6064h/0
Data Type	Integer 32
PDO Mappable	Yes
See Also	
Start Version	M_00-00-62-000

Description

PL.FB returns the position feedback value.

Note that this value is not the pure feedback value read from the feedback device, but also includes the value of the FB1.OFFSET and an internal offset set automatically by the FW when a homing switch is actuated.

Related topics:

Selecting and Using Homing Modes

PL.FBSOURCE

General Information	
Type	NV Parameter
Description	Sets the feedback source for the position loop.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	VL.FBSOURCE
Start Version	M_00-00-51-000

Description

This parameter determines the feedback source to be used by the position loop. A value of 0 selects the primary feedback, 1 selects the secondary feedback.

PL.INTINMAX

General Information	
Type	NV Parameter
Description	Limits the input of the position loop integrator by setting the input saturation.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, (PIN/POUT), 16-bit counts Linear: counts, mm, μm , (PIN/POUT), 16-bit counts
Range	Rotary: 0.000 to 18,446,744,073,709.000 counts 0.000 to 26,986.052 rad 0.000 to 1,546,188.288 deg 0.000 to 21,474.836 (PIN/POUT) 0.000 to 281,474,976.710 16-bit counts Linear: 0.000 to 18,446,744,073,709.000 counts 0.000 to 4,294.968*MOTOR.PITCH mm 0.000 to 4,294,967.296*MOTOR.PITCH μm 0.000 to 21,474.836 (PIN/POUT) 0.000 to 281,474,976.710 counts 16 Bit
Default Value	Rotary: 4,000,000,000.000 counts 5.851 rad 335.275 deg 0.006 (PIN/POUT) 61,035.156 16-bit counts Linear: 4,000,000.000 counts 0MOTOR.PITCH mm 9MOTOR.PITCH μm 0.006 (PIN/POUT) 61,035.156 16-bit counts
Data Type	Float
See Also	PL.FB
Start Version	M_0-0-15

Description

PL.INTINMAX limits the input of the position loop integrator by setting the input saturation. When used in concert with PL.INSATOUT, this variable allows you to make the position loop integrator effective near the target position. Far from the target position, however, the integrator is not dominant in the loop dynamics.

PL.INTOUTMAX

General Information	
Type	NV Parameter
Description	Limits the output of the position loop integrator by setting the output saturation.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR Rotary: counts, rad, deg, (PIN/POUT), 16-bit counts Linear: counts, mm, μm , (PIN/POUT), 16-bit counts
Range	Rotary: 0.000 to 18,446,744,073,709.000 counts 0.000 to 26,986.052 rad 0.000 to 1,546,188.288 deg 0.000 to 21,474.836 (PIN/POUT) 0.000 to 281,474,976.710 counts 16 bit Linear: 0.000 to 18,446,744,073,709.000 counts 0.000 to 4,294.968*MOTOR.PITCH mm 0.000 to 4,294,967.296*MOTOR.PITCH μm 0.000 to 21,474.836 (PIN/POUT) 0.000 to 281,474,976.710 16-bit counts
Default Value	Rotary: 4,000,000,000.000 counts 5.851 rad 335.275 deg 0.006 (PIN/POUT) 61,035.156 16-bit counts Linear: 4,000,000,000.000 counts 0.931 mm 931.323 μm 0.006 (PIN/POUT) 61,035.156 16-bit counts
Data Type	Float
See Also	PL.INTINMAX
Start Version	M_0-0-14

Description

PL.INTOUTMAX limits the output of the position loop integrator by setting the output saturation.

When used in concert with PL.INTINMAX, this variable allows you to make the position loop integrator effective near the target position. Far from the target position, however, the integrator is not dominant in the loop dynamics.

PL.KI

General Information	
Type	NV Parameter
Description	Sets the integral gain of the position loop.
Units	Hz
Range	0 to 250 Hz
Default Value	0 Hz
Data Type	Float
See Also	PL.KP, PL.KD
Start Version	M_0-0-15

Description

PL.KI sets the integral gain of the position regulator PID loop.

PL.KP

General Information	
Type	NV Parameter
Description	Sets the proportional gain of the position regulator PID loop.
Units	(rev/s)/rev
Range	0 to 2,147,483.008 (rev/s)/rev
Default Value	100 rps/rev
Data Type	Float
See Also	PL.KI, PL.KD
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3542h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

PL.KP sets the proportional gain of the position regulator PID loop.

Related Topics

0.1 Position Loop

PL.MODP1

General Information	
Type	R/W parameter
Description	Sets modulo range parameter.
Units	Depends on UNIT.PROTARY and UNIT.PLINEAR
Range	N/A
Default Value	N/A
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3637h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is either the beginning or the end of the modulo range, depending on whether this value is smaller or larger than PL.MODP2. If you set PL.MODP1 equal to PL.MODP2, an error message occurs.

Condition	Beginning of the modulo-range	End of the modulo-range
PL.MODP1 < PL.MODP2	PL.MODP1	PL.MODP2
PL.MODP2 < PL.MODP1	PL.MODP2	PL.MODP1

PL.MODP2

General Information	
Type	R/W Parameter
Description	Sets the beginning or end modulo range parameter.
Units	Depends on UNIT.PROTARY and UNIT.PLINEAR.
Range	N/A
Default Value	N/A
Data Type	Float
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3638h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter is either the beginning or the end of the modulo range, depending on whether this value is smaller or larger than PL.MODP1.

Condition	Beginning of the modulo-range	End of the modulo-range
PL.MODP1 < PL.MODP2	PL.MODP1	PL.MODP2
PL.MODP2 < PL.MODP1	PL.MODP2	PL.MODP1

PL.MODPDIR

General Information	
Type	R/W Parameter
Description	Sets the direction for absolute motion tasks.
Units	N/A
Range	0 to 2
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3430h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter defines the direction of an absolute motion task when the modulo position has been activated. For more details about absolute motion tasks, see .0.1 Motion Tasks. For absolute motion tasks, you can only select a target position within the modulo range.

PL.MODPDIR Settings

Value	Description
0	The motor moves in a negative direction if the target position of the absolute motion task is less than the current position. The motor moves in positive direction if the target position of the absolute motion task is greater than the current position.
1	The motor always moves in a positive direction relative to the target position of the absolute motion task.
2	The motor always moves in a negative direction relative to the target position of the absolute motion task.

PL.MODPEN

General Information	
Type	R/W Parameter
Description	Enables the modulo position.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-50-0

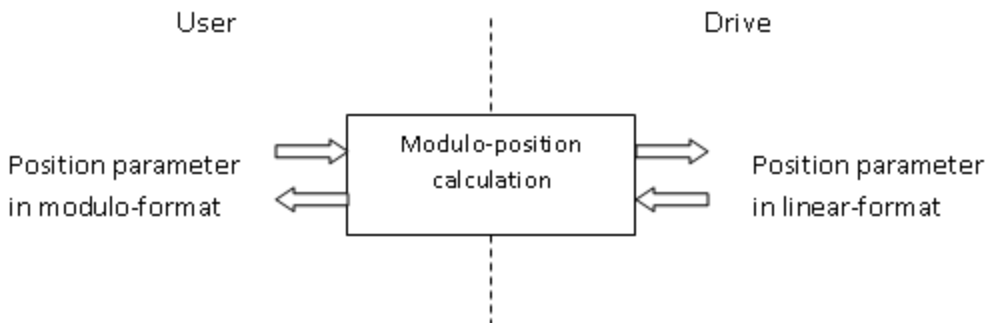
Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35CFh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

A value of 0 disables the modulo-position and a value of 1 enables the modulo-position feature. The modulo-position feature can be used for circular applications such as round tables.

The position loop of the drive uses always a linear position variable but the data-exchange between the user and the drive uses the modulo-position calculation in order to convert values from linear format into modulo format and vice versa.

The following figure shows the interface between the user and the drive for PL.MODPEN=1:



PLS Parameters and Commands

PLS.CLR

General Information	
Type	W/O Parameter
Description	Defines which position register to clear.
Units	N/A
Range	0 to 65,535
Default Value	0
Data Type	U16
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter clears bits inside of PLS.STATE.

Example

If PLS.CLR Bit 0=1, then Bit 0 in PLS.STATE is set to 0.

If PLS.CLR Bit 15=1, then Bit 15 in PLS.STATE is set to 0.

Related Topics

- 1 Programmable Limit Switch

PLS.EN

General Information	
Type	R/W Parameter
Description	Enables programmable limit switch (PLS).
Units	N/A
Range	0 to 255
Default Value	0
Data Type	Integer
See Also	PLS.MODE, PLS.RESET, PLS.STATE, PLS.UNITS, PLS.P1 to PLS.P8, PLS.WIDTH1 to PLS.WIDTH8, PLS.T1 to PLS.T8
Start Version	M_01-02-03-000

Description

PLS.EN is a bit variable which determines the mode of an individual PLS. Eight PLSs are available in the AKD.

Example

Bit Value	Behavior
Bit 0 = 0	Disables PLS 1
Bit 0 = 1	Enables PLS 1
Bit 7 = 0	Disables PLS 8
Bit 7 = 1	Enables PLS 8

Related Topics

- 1 Programmable Limit Switch

PLS.MODE

General Information	
Type	R/W Parameter
Description	Selects programmable limit switch mode.
Units	N/A
Range	0 to 255
Default Value	0
Data Type	Integer
See Also	PLS.EN, PLS.RESET, PLS.STATE, PLS.UNITS, PLS.P1 to PLS.P8, PLS.WIDTH1 to PLS.WIDTH8, PLS.T1 to PLS.T8
Start Version	M_01-02-03-000

Description

PLS.MODE is a bit variable which determines the mode of an individual PLS. Eight PLSs are available in the drive.

Example

Bit Value	Behavior
Bit 0 = 0	PLS 1 is monitored continuously.
Bit 0 = 1	PLS 1 is monitored until it is triggered once (single-shot method). The PLS observation can be re-armed using the PLS.RESET command.
Bit 7 = 0	PLS 8 is monitored continuously.
Bit 7 = 1	PLS 8 is monitored until it is triggered once (single-shot method). The PLS observation can be re-armed using the PLS.RESET command.

Related Topics

- 1 Programmable Limit Switch

PLS.POLARITY

General Information	
Type	NV Parameter
Description	Sets the polarity of the position registers.
Units	N/A
Range	0 to 65,535
Default Value	0
Data Type	U16
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter selects the polarity of the position register switches.

Example

Bit 0 = 0: PLS.P01 is active if PL.FB < PLS.P01.

Bit 0 = 1: PLS.P01 is active if PL.FB > PLS.P01.

Bit15 = 0: PLS.P16 is active if PL.FB < PLS.P16.

Bit15 = 1: PLS.P16 is active if PL.FB > PLS.P16.

Related Topics

- 1 Programmable Limit Switch

PLS.P1 TO PLS.P8

General Information	
Type	R/W Parameter
Description	Sets the trigger point for programmable limit switches.
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR
Range	N/A
Default Value	0
Data Type	Float
See Also	UNIT.PROTARYUNIT.PLINEAR
Start Version	M_01-02-03-000

Description

PLS.P1 to PLS.P8 define the trigger point of the PLS. For further information about how these parameters affect PLS behavior, see the PLS.UNITS parameter description.

Related Topics

- 1 Programmable Limit Switch

PLS.RESET

General Information	
Type	W/O Parameter
Description	Resets programmable limit switch.
Units	N/A
Range	0 to 255
Default Value	N/A
Data Type	Integer
See Also	PLS.EN, PLS.MODE, PLS.STATE, PLS.UNITS, PLS.Px (x=1...8), PLS.WIDTHx (x=1...8), PLS.Tx (x=1...8)
Start Version	M_01-02-03-000

Description

This parameter is a bit variable and is used in order to re-arm the corresponding PLS.STATE observation for another single-shot PLS use (see also PLS.MODE).

Example

Bit Value	Behavior
Bit 0 = 0	The PLS 1 observation (PLS.STATE bit 0) is not re-armed.
Bit 0 = 1	The PLS 1 observation (PLS.STATE bit 0) is re-armed.
Bit 7 = 0	The PLS 8 observation (PLS.STATE bit 7) is not re-armed.
Bit 7 = 1	The PLS 8 observation (PLS.STATE bit 7) is re-armed.

Related Topics

- 1 Programmable Limit Switch

PLS.STATE

General Information	
Type	R/O Parameter
Description	Reads the programmable limit switch state.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	Integer
See Also	PLS.EN, PLS.RESET, PLS.UNITS, PLS.MODE, PLS.P1 TO PLS.P8, PLS.WIDTH1 TO PLS.WIDTH8, PLS.T1 TO PLS.T8
Start Version	M_01-02-03-000

Description

This parameter is a bit variable and displays the current status of the individual programmable limit switches.

Example

Bit 0 = 0: Programmable Limit Switch 1 (PLS 1) is not active.

Bit 0 = 1: Programmable Limit Switch 1 (PLS 1) is active.

Bit 7 = 0: Programmable Limit Switch 8 (PLS 8) is not active.

Bit 7 = 1: Programmable Limit Switch 8 (PLS 8) is not active.

Related Topics

- 1 Programmable Limit Switch

PLS.T1 TO PLS.T8

General Information	
Type	R/W parameter
Description	Sets programmable limit switch time
Units	ms
Range	0 to 65,536 ms
Default Value	500 ms
Data Type	Integer
See Also	PLS.EN, PLS.RESET, PLS.STATE, PLS.UNITS, PLS.MODE, PLS.WIDTH1 TO PLS.WIDTH8, PLS.P1 TO PLS.P8
Start Version	M_01-02-03-000

Description

These parameters define the time of the PLS pulse for time-based PLS handling.

For further information about the PLS functionality, especially the meaning of the PLS.T1 to PLS.T8 parameter, refer to the PLS.UNITS parameter.

Related Topics

- 1 Programmable Limit Switch

PLS.UNITS

General Information	
Type	R/W parameter
Description	Sets programmable limit switch (PLS) units.
Units	N/A
Range	0 to 255
Default Value	0
Data Type	Integer
See Also	PLS.EN, PLS.RESET, PLS.STATE, PLS.MODE, PLS.P1 TO PLS.P8, PLS.WIDTH1 TO PLS.WIDTH8, PLS.T1 TO PLS.T8
Start Version	M_01-02-03-000

Description

PLS.UNITS is a bit variable which determines the behavior of the eight PLSs available in the drive. This parameter is used to select the units for the PLS pulse.

Examples

Bit Value	Behavior
Bit 0 = 0 Position-based PLS handling.	The PLS.STATE parameter displays an active PLS 1 when the position is within the range of PLS.P1 + PLS.WIDTH1 ($\text{PLS.P1} \leq \text{PL.FB} \leq \text{PLS.P1} + \text{PLS.WIDTH1}$). When the parameter PLS.WIDTH1 has been set to the value of 0, this bit will be activated as soon as $\text{PLS.FB} \geq \text{PL.P1}$.
Bit 0 = 1 Time-based PLS handling.	After PLS.P1 is crossed, the PLS.STATE parameter displays an active PLS 1 for a PLS.T1 ms period of time.
Bit 7 = 0 Position-based PLS handling.	The PLS.STATE parameter displays an active PLS 8 when the position is within the range of PLS.P8 + PLS.WIDTH8 ($\text{PLS.P8} \leq \text{PL.FB} \leq \text{PLS.P8} + \text{PLS.WIDTH8}$). When the parameter PLS.WIDTH8 has been set to the value of 0, this bit will be activated as soon as $\text{PLS.FB} \geq \text{PL.P8}$.
Bit 7 = 1 Time-based PLS handling.	After PLS.P8 has been crossed, the PLS.STATE parameter displays an active PLS 8 for a PLS.T8 ms period of time.

Continuous position-based PLS handling

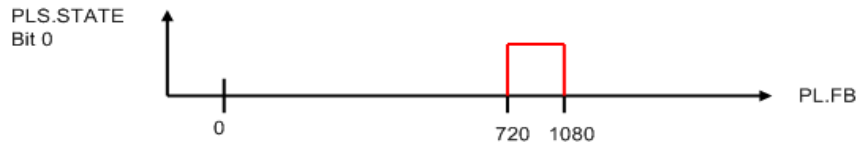
PLS.P1 = 720

PLS.WIDTH1 = 360

PLS.UNITS bit 0 (for PLS 1) = low; PLS.T1 is not considered.

PLS.EN bit 0 (for PLS 1) = high

PLS.MODE bit 0 (for PLS 1) = low



Time-based PLS handling

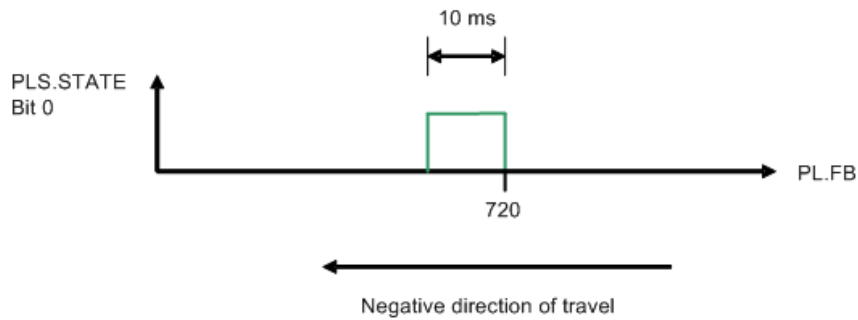
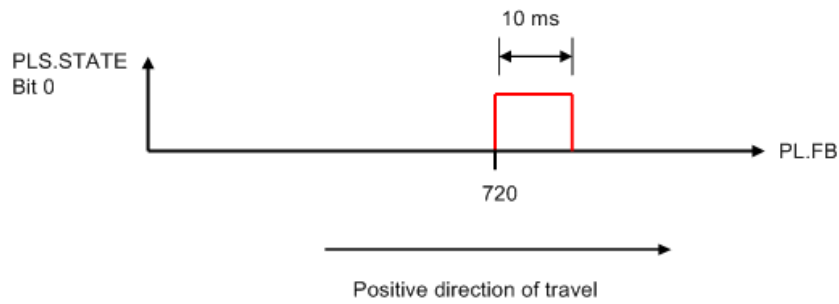
PLS.P1 = 720

PLS.T1 = 10

PLS.UNITS bit 0 (for PLS 1) = low; PLS.WIDTH1 is not considered.

PLS.EN bit 0 (for PLS 1) = high

PLS.MODE bit 0 (for PLS 1) = low



Related Topics

1 Programmable Limit Switch

PLS.WIDTH1 TO PLS.WIDTH8

General Information	
Type	R/W parameter
Description	Programmable Limit Switch Width
Units	Depends on UNIT.PROTARY or UNIT.PLINEAR
Range	N/A
Default Value	0
Data Type	Float
See Also	PLS.EN, PLS.RESET, PLS.STATE, PLS.UNITS, PLS.MODE, PLS.P1 TO PLS.P8, PLS.T1 TO PLS.T8
Start Version	M_01-02-03-000

Description

These parameter defines the width of the PLS pulse for position-based PLS handling. For further information about the PLS functionality, especially the meaning of the PLS.WIDTH1 to PLS.WIDTH8 parameter, refer to the PLS.UNITS parameter.

Related Topics

- 1 Programmable Limit Switch

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REC Parameters and Commands

REC.ACTIVE

General Information	
Type	R/O Parameter
Description	Indicates if data recording is in progress (active).
Units	N/A
Range	0 to 1
Default Value	N/A
Data Type	Boolean
See Also	REC.DONE, REC.OFF
Start Version	M_0-0-16

Description

REC.ACTIVE indicates whether or not data recording is in progress. This action means that the trigger was met and the recorder is recording all data.

REC.CH1 to REC.CH6

General Information	
Type	R/W Parameter
Description	Sets recording channels 1 to 6.
Units	N/A
Range	N/A
Default Value	CH1 = IL.FB CH2 = IL.CMD CH3 = VL.FB CH4 = Empty CH5 = Empty CH6 = Empty
Data Type	String
See Also	REC.TRIG
Start Version	M_0-0-16

Description

REC.CHx specifies the recording channels.

There are 3 options to set the recording channels values:

- Set 0, CLR, or CLEAR. This setting clears the recording channel.
- Set one of the recordable commands. The list of recordable commands can be obtain by executing REC.RECPRMLIST.
- Set an internal value or variable of the drive (same as for DRV.MEMADDR input).

REC.DONE

General Information	
Type	R/O Parameter
Description	Checks whether or not the recorder has finished recording.
Units	N/A
Range	0 to 1
Default Value	N/A
Data Type	Boolean
See Also	REC.ACTIVE, REC.OFF
Start Version	M_0-0-14

Description

REC.DONE indicates that the recorder has finished recording.

This value is reset to 0 when the recorder trigger is set.

This value is reset by the system when the recording has finished or when REC.OFF is executed.

REC.GAP

General Information	
Type	R/W Parameter
Description	Specifies the gap between consecutive samples.
Units	N/A
Range	1 to 65,535
Default Value	1
Data Type	Integer
See Also	REC.TRIG
Start Version	M_0-0-16

Description

REC.GAP specifies the gap between consecutive samples. The recording base rate is 16 kHz, thus a gap of 1 means that a sample is recorded every 62.5 us.

REC.NUMPOINTS

General Information	
Type	R/W Parameter
Description	Sets the number of points to record.
Units	N/A
Range	1 to 65,535
Default Value	1,000
Data Type	Integer
See Also	REC.TRIG
Start Version	M_0-0-16

Description

REC.NUMPOINTS specifies the number of points (samples) to record.

REC.OFF

General Information	
Type	R/W Parameter
Description	Turns the recorder OFF.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	REC.ACTIVE, REC.DONE, REC.READY
Start Version	M_0-0-15

Description

REC.OFF turns the recorder off. In order to set the recorder again, the recorder must first be armed and then a trigger set.

REC.RECPRMLIST

General Information	
Type	R/O Parameter
Description	Reads the list of recordable parameters.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	REC.CH1 to REC.CH6
Start Version	M_0-0-50-0

Description

This command returns the list of recordable parameters. You can use recordable parameter as an input to any of the recording channels.

Note that an internal address or a registered variable can be used as input to any of the channels in addition to the list.

REC.RETRIEVE

General Information	
Type	R/O Parameter
Description	Transfers all the recorded data to the communication channel.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	String
See Also	N/A
Start Version	M_0-0-14

Description

REC.RETRIEVE causes the drive to transfer all the recorded data to the communication channel.

Example

The following format is the retrieve reply format (for N samples, G sample gap, and M parameters, where M<=6):

```
Recording
<N>,<G>
<parameter name 1> ... <parameter name M>
Value11 ... Value1M
Value N1 ... ValueNM
```

REC.RETRIEVEDATA

General Information	
Type	R/W Parameter
Description	Retrieves the recorded data without the header.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	REC.RETRIEVE, REC.RETRIEVEHDR, REC.RETRIEVESIZE
Start Version	M_0-0-50-0

Description

REC.RETRIEVEDATA retrieves a section of recorded data according to REC.RETRIEVESIZE from the received index; if no index is received, the drive retrieves the data from next section. An index is supplied to enable multiple retrieves and to give better control on the buffer in case of overflow. If no index or a negative value is present, then the index is ignored.

WorkBench uses this parameter to retrieve the data continuously for RT recoding.

The size of the data returned by this command depends on the number set by REC.RETRIEVESIZE.

Use REC.RETRIEVE for complete recording information view.

Notes:

- If REC.RETRIEVESIZE is larger than the buffer size, then it simply returns the whole buffer (no error).
- If the index is received, the data will be continuously returned starting from the given index (default starting index is 0).
- If the index is out of the bounds of the buffer, then it will be ignored.
- If recorder is active and REC.STOPTYPE==0, then this parameter returns an error.
- If REC.STOPTYPE==1, then this parameter returns the next section of data in the buffer (even if it reached the end of the buffer, it will return to the beginning of the buffer and add the data from index 0.)
- If REC.STOPTYPE==1 and the retrieve is too slow (gets overrun by the recorder), an overflow error message is returned instead of the retrieved data.
- If REC.STOPTYPE==0 and no index is received, continuously send the sections of data until the end of the buffer is reached. Then, return to the beginning of buffer and continue.
- A new REC.TRIG command automatically sets the index to 0.

Example

The following example retrieves data from index 100 in the size of 10 (hence places 100 to 109 in the buffer)

```
REC.NUMPOINTS 1000
REC.RETRIVESIZE 10
REC.TRIG
REC.RETRIEVEDATA 100
```

REC.RETRIEVEFRMT

General Information	
Type	R/W Parameter
Description	Sets the format for recorded data output.
Units	N/A
Range	0 to 1; 0 = Standard format, 1 = Internal format (high speed)
Default Value	1
Data Type	Integer
See Also	REC.RETRIEVE, REC.RETRIEVEDATA
Start Version	M_00-00-64-000

Description

Recorded data is transferred to the communication channel in one of two formats: standard or internal high speed. The standard (slower) format cannot be used for continuous recording, but is more easily read. The high speed format allows continuous data recording (needed for autotuning). WorkBench supports both formats.

Example

The following recorder data is in standard format:

```
10,1
IL.FB,VL.CMD,VL.FB
-0.086,0.000,2.661
0.000,0.000,3.605
0.029,0.000,-0.486
```

The following recorder data is in internal format:

```
10,1
IL.FB,VL.CMD,VL.FB
F3-0x56,F30x0,F30xA65
F30x0,F30x0,F30xE15
F30x1D,F30x0,F3-0x1E6
```

REC.RETRIEVEHDR

General Information	
Type	R/O Parameter
Description	Retrieves the recorded header without the data.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	REC.RETRIEVE, REC.RETRIEVEDATA
Start Version	M_0-0-50-0

Description

This command retrieves the recorded header without the data of the recording.

WorkBench uses this parameter to retrieve the header once before continuously reading the data for RT recoding.

Use REC.RETRIEVE for complete recording information view.

Example

REC.RETRIEVEHDR

REC.RETRIVESIZE

General Information	
Type	R/W Parameter
Description	Sets the number of samples that REC.RETRIEVEDATA returns.
Units	recorder samples
Range	0 to 65,535 recorder samples
Default Value	1,000 recorder samples
Data Type	Integer
See Also	REC.RETRIEVEDATA, REC.RETRIEVEHDR
Start Version	M_0-0-50-0

Description

This parameter sets the number of samples that REC.RETRIEVEDATA returns.

WorkBench also uses this parameter to set the number of samples returned when retrieving the data continuously for RT recoding.

Use REC.RETRIEVE for the complete recording information view.

Example

```
REC.RETRIVESIZE 2000
```

REC.STOPTYPE

General Information	
Type	R/W
Description	Sets the recorder stop type.
Units	N/A
Range	0 or 1
Default Value	0
Data Type	Integer
See Also	REC.RETRIEVEDATA, REC.RETRIEVESIZE
Start Version	M_0-0-50-0-0

Description

This parameter sets the stop type for the recording.

0 = Recorder runs, continuously filling the recording circular buffer.

1 = Recorder fills in the buffer once.

To stop RT recording, execute REC.OFF.

Example

REC.STOPTYPE

REC.TRIG

General Information	
Type	Command
Description	Triggers the recorder.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	REC.RETRIEVE, REC.OFF
Start Version	M_0-0-16

Description

REC.TRIG starts the trigger and effectively starts recording values while waiting for the trigger to occur.

REC.TRIG sets the value of REC.DONE to 0.

After calling REC.TRIG, the data that was recorded by previous recording is deleted and cannot be retrieved.

No REC parameters can be set after a call to REC.TRIG until the recorder has finished or until REC.OFF is executed.

REC.TRIGPARAM

General Information	
Type	R/W Parameter
Description	Sets the parameter that triggers the recorder.
Units	N/A
Range	N/A
Default Value	IL.FB
Data Type	String
See Also	REC.TRIG
Start Version	M_0-0-14

Description

REC.TRIGPARAM sets the parameter on which the recorder triggers.

This parameter is only used when REC.TRIGTYPE = 2.

Input values are:

1. One of the set drive parameters list that can be set as a trigger. The available parameters for trigger are: PL.ERR, PL.CMD, PL.FB, VL.CMD, VL.FB, IL.CMD, and IL.FB.
2. Internal value or variable of the drive (same as for DRV.MEMADDR input).

REC.TRIGPOS

General Information	
Type	R/W Parameter
Description	Sets the trigger position in the recording buffer.
Units	%
Range	1 to 100%
Default Value	10%
Data Type	Integer
See Also	REC.TRIG, REC.NUMPOINTS
Start Version	M_0-0-16

Description

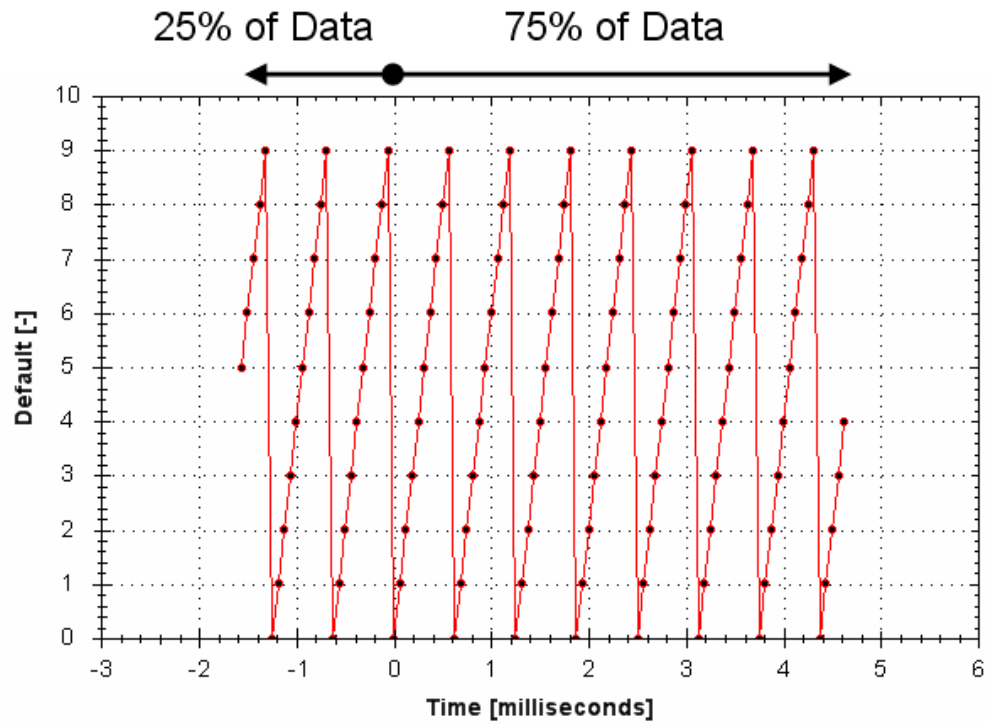
REC.TRIGPOS sets the trigger position in the recording buffer. The recording buffer size is defined by REC.NUMPOINTS. The input value is a percentage of the buffer (that is, a value of 25 means saving 25% of the buffer data before the trigger occurs and 75% after it occurs). This parameter is only used when REC.TRIGTYPE = 2 or 3.

Trigger Position

Trigger position (REC.TRIGPOS) allows you to collect data that occurs before the trigger occurs. If you have a rare condition, you may want to see the conditions that led up to it. Trigger position lets you control how much signal is collected before the trigger condition occurred .

Trigger position is specified in units of percent (%). If you specify a trigger position of X% , X% of the data is before 0 ms in the data time and 100-X% (the rest of the data) is at or greater than 0 ms. In the figure below, the trigger position is set to 25% (REC.TRIGPOS 25).

In the WorkBench scope, the 0 time point is clear. When collecting the data using REC.RETRIEVE or similar commands, the time is not returned, so some caution should be used when the trigger point is important to understand.



REC.TRIGPRMLIST

General Information	
Type	R/O Parameter
Description	Reads the list of possible trigger parameters.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	REC.TRIGPARAM
Start Version	M_0-0-50-0

Description

This command returns the list of trigger parameters. Each one of those parameters can serve as the trigger parameter (input to REC.TRIGPARAM).

Note that an internal address or a registered variable can be used as input to REC.TRIGPARAM in addition to the list that this parameter returns.

Example

REC.TRIGPRMLIST

REC.TRIGSLOPE

General Information	
Type	R/W Parameter
Description	Sets the trigger slope.
Units	0 = Negative 1 = Positive
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	REC.TRIG, REC.NUMPOINTS
Start Version	M_0-0-16

Description

REC.TRIGSLOPE sets the recorder trigger slope.

This parameter is only used when REC.TRIGTYPE = 2 or 3.

REC.TRIGTYPE

General Information	
Type	R/W Parameter
Description	Sets the trigger type.
Units	0 = immediate 1 = command 2 = parameter 3 = boolean
Range	0 to 2
Default Value	0
Data Type	Integer
See Also	REC.TRIG, REC.TRIGPARAM, REC.TRIGVAL, REC.TRIGSLOPE REC.TRIGPOS
Start Version	M_0-0-16

Description

REC.TRIGTYPE sets the type of trigger.

Input values are as follows:

Value	Description
0	Recording starts immediately
1	Recording starts on the next command executed through the TCP/IP. The trigger location in the buffer is set according to REC.TRIGPOS.
2	Recording starts per the values of REC.TRIGPARAM, REC.TRIGVAL, REC.TRIGSLOPE, and REC.TRIGPOS.
3	Recording starts when the value of REC.TRIGPARAM is 0 for REC.TRIGSLOPE = 0 or 1 for REC.TRIGSLOPE = 1

REC.TRIGVAL

General Information	
Type	R/W Parameter
Description	Sets the trigger value.
Units	The units of the parameter are chosen according to the unit type.
Range	0 to 2
Default Value	0
Data Type	Integer
See Also	REC.TRIG, REC.TRIGPARAM, REC.TRIGVAL, REC.TRIGSLOPE, REC.TRIGPOS
Start Version	M_0-0-16

Description

REC.TRIGVAL is the value that must be met by REC.TRIGPARAM for the trigger to occur.

Note that the units of this parameter are set according to the units of REC.TRIGPARAM.

REGEN Parameters

REGEN.POWER

General Information	
Type	R/O parameter
Description	
Units	Watt
Range	N/A
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_00-00-52-000

Description

Gets regen resistor's calculated power. (V^2 / R) * DutyCycle)

REGEN.REXT

General Information	
Type	NV Parameter
Description	Sets the external, user-defined regen resistor resistance.
Units	Ω
Range	0 to 255 Ω
Default Value	0 Ω
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35C2h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

REGEN.REXT sets the external user-defined regen resistor resistance. This variable is needed for the regen resistor temperature estimation algorithm.

REGEN.TEXT

General Information	
Type	R/W Parameter
Description	Sets the external regen resistor thermal protection time constant.
Units	s
Range	0.1 to 1,200 s
Default Value	100 s
Data Type	Float
See Also	REGEN.WATTEXT, REGEN.REXT
Start Version	

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3415h/0
Data Type	Unsigned 32
PDO Mappable	No
Start Version	

Description

REGEN.TEXT is a thermal time constant used to protect an external regeneration (braking) resistor from overheating and failing. It is the time-to-fault when input power steps from 0 to 150% of REGEN.WATTEXT. The drive's regen resistor protection algorithm continuously calculates the power dissipated in the resistor and processes that power value through a single pole low pass filter to model the resistor's thermal inertia. When the filtered regen power on the output of the filter exceeds REGEN.WATTEXT, a fault occurs. REGEN.TEXT sets the time constant of this thermal inertia filter.

REGEN.TEXT can often be found directly on power resistor data sheets. Just look for the peak overload curve and find the safe allowed time to be at 150% of the resistor's continuous power rating. Another way power resistors peak overload capability is often specified is by giving the energy rating in joules of the resistor. If you have the energy rating E then:

$$\text{REGEN.TEXT} = (1.1) * ((\text{joule limit}) / \text{REGEN.WATTEXT})$$

Example:

The external regen resistor is rated for 250 W continuous, is 33 ohm, and has a joule rating of 500 joules. To use this resistor, the drive settings become:

REGEN.TYPE = -1 (External Regen)

REGEN.REXT = 33

REGEN.WATTEXT = 250

$$\text{REGEN.TEXT} = (1.1) * (500 \text{ j}) / (250 \text{ W}) = 2.2 \text{ sec}$$

REGEN.TYPE

General Information	
Type	NV Parameter
Function	Sets the regen resistor type.
WorkBench Location (Screen/Dialog Box)	Power/Regen Resistor Type
Units	N/A
Range	–1 to 0
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3412h/0
Data Type	Integer 8
PDO Mappable	No
Start Version	

Description

You can specify a user-defined external regen resistor, select an internal regen resistor, or choose from a list of predefined regen resistors. The values for REGEN.TYPE are shown below:

Type	Description
–1	External user-defined regen resistor
0	Internal regen resistor

If you specify a user-defined regen resistor, then you must also define this resistor's resistance (REGEN.REXT), heatup time (REGEN.REXT), and power (REGEN.WATTEXT).

For more information on regen resistors, see Regeneration.

REGEN.WATTEXT

General Information	
Type	R/W parameter
Description	Sets the regen resistor's power fault level for an external regen resistor.
Units	W
Range	0 to 62,000 W
Default Value	1000 W
Data Type	Integer
See Also	N/A
Start Version	M_00-00-53-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3414h/0
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

Gets/Sets the regen resistor's power fault level for an external regen resistor (when REGEN.TYPE = -1)
 Above this fault level, the regen resistor's PWM will be 0 and a fault will be issued.

SM Parameters

SM.I1

General Information	
Type	R/W Parameter
Description	Sets service motion current 1; active in opmode 0 (torque) only.
Units	A
Range	–Drive peak current to +Drive peak current
Default Value	0.025 · Drive peak current
Data Type	Float
See Also	SM.ACCTYPE, SM.I2, SM.MODE, SM.MOVE, SM.T1, SM.T2, SM.V1, SM.V2, SM.VPM1, SM.VPM2
Start Version	M_0-0-16

Description

SM.I1 defines the current that is used in service motion modes 0 and 1 (see SM.MODE).

Related topics:

Service Motion

SM.I2

General Information	
Type	R/W Parameter
Description	Sets service motion current 2; active in opmode 0 (torque) only.
Units	A
Range	–Drive peak current to +Drive peak current
Default Value	0.025 · Drive peak current
Data Type	Float
See Also	SM.ACCTYPE, SM.I1, SM.MODE, SM.MOVE, SM.T1, SM.T2, SM.V1, SM.V2, SM.VPM1, SM.VPM2
Start Version	M_0-0-16

Description

SM.I2 defines the current that is used in service motion mode 1 (see SM.MODE).

Related topics:

Service Motion

SM.MODE

General Information	
Type	R/W Parameter
Description	Sets the service motion mode.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	SM.I1, SM.I2, SM.MOVE, SM.T1 SM.T2, SM.V1, SM.V2, DRV.ACCDRV.DEC
Start Version	M_01-01-00-000

Description

SM.MODE defines the mode of service motion for each loop. Two types of service motion are available :

1. A constant motion in one direction (endless or for a certain amount of time).
2. An alternating motion.

The possible modes for this parameter are described in the following table:

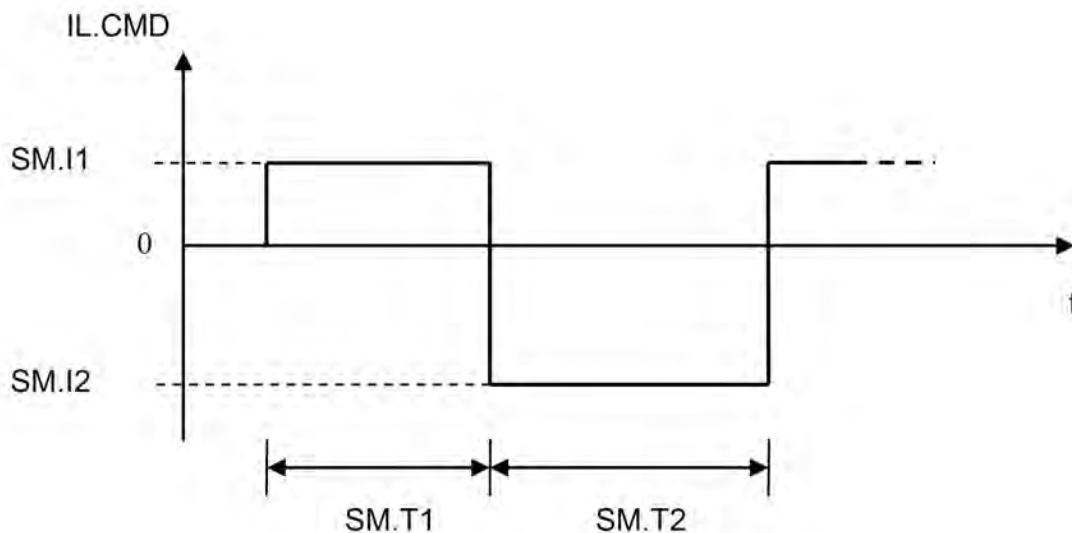
SM.MODE	Description	Requirements
0	Constant motion in closed current loop mode of operation. • DRV.OPMODE 0: The drive generates a constant current command value (SM.I1) for a certain amount of time (if SM.T1>0) or endless (if SM.T1=0). The drive will not generate any ramps in this mode of operation. • DRV.OPMODE 1 or 2: The drive generates a constant velocity command value (SM.V1) for a certain amount of time (if SM.T1>0) or endless (if SM.T1=0). The drive generates acceleration and deceleration ramps according to the DRV.ACC and DRV.DEC setting in this mode of operation. The service motion can be stopped by using the DRV.STOP command.	DRV.OPMODE = 0, 1, or 2 DRV.CMDSOURCE = 0

SM.MODE	Description	Requirements
1	• DRV.OPMODE 0: The drive generates a current command value (SM.I1) for a certain amount of time (SM.T1). Afterwards the drive generates a current command value (SM.I2) for another certain amount of time (SM.T2). This sequence is repeated as long as a DRV.STOP command occurs. The drive will not generate any ramps in this mode of operation. • DRV.OPMODE 1 or 2: The drive generates a velocity command value (SM.V1) for a certain amount of time (SM.T1). Afterwards the drive generates a velocity command value (SM.V2) for another certain amount of time (SM.T2). This sequence is repeated as long as a DRV.STOP command occurs. The drive will generate an acceleration and deceleration ramps according to the DRV.ACC and DRV.DEC setting in this mode of operation.	DRV.OPMODE = 0, 1, or 2 DRV.CMDSOURCE = 0

Ramps

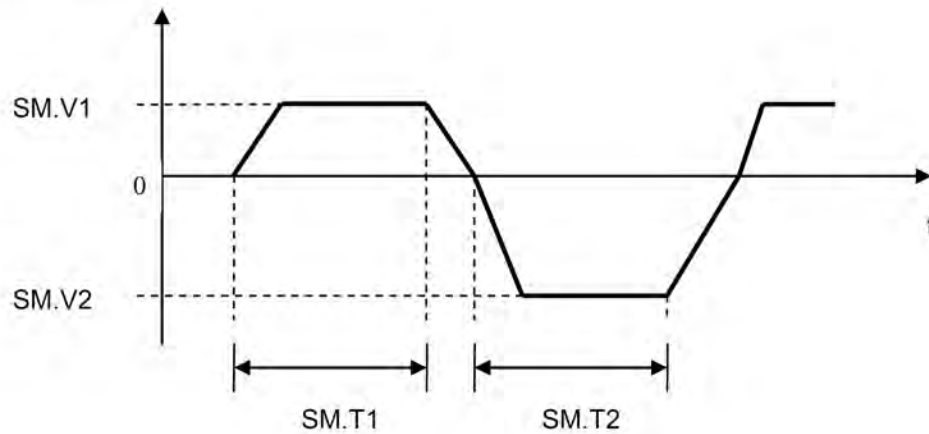
The drive uses DRV.ACC and DRV.DEC for the ramps in DRV.OPMODE 1 (closed velocity) and 2 (closed position). The drive does not generate any ramps in service motion mode 0 and 1.

Service Motion for DRV.OPMODE 0 and SM.MODE 1



Service motion for DRV.OPMODE 1 or 2 and SM.MODE 1

DRV.OPMODE 1: VL.CMD
 DRV.OPMODE 2: d/dt (PL.CMD)



The deceleration process from SM.V1 or SM.V2 to 0 is not included in SM.T1 and SM.T2, respectively. SM.T1 and SM.T2 start as soon as the command value has reached the velocity 0.

Related topics:

0.1 Service Motion

SM.MOVE

General Information	
Type	Command
Description	Starts the service motion.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	SM.MODE
Start Version	M_0-0-16

Description

This command starts the service motion that has been selected by the SM.MODE parameter.

SM.T1

General Information	
Type	R/W Parameter
Description	Sets the service motion time 1.
Units	ms
Range	0 to 65,535 ms
Default Value	500 ms
Data Type	Integer
See Also	SM.I1, SM.I2, SM.MODE, SM.MOVE, SM.T2, SM.V1, SM.V2, SM.VPM1, SM.VPM2
Start Version	M_0-0-16

Description

SM.T1 defines the time of the service motion that is used in all service motion modes (see SM.MODE). For an alternating service motion mode, SM.T1 may not be set to 0.

SM.T2

General Information	
Type	R/W Parameter
Description	Sets the service motion time 2.
Units	ms
Range	1 to 65,535 ms
Default Value	500 ms
Data Type	Integer
See Also	SM.I1, SM.I2, SM.MODE, SM.MOVE, SM.T1, SM.V1, SM.V2, SM.VPM1, SM.VPM2
Start Version	M_0-0-16

Description

SM.T2 defines the time of the service motion that is used in service motion modes 1, 3, and 5 (see SM.MODE).

SM.V1

General Information	
Type	R/W Parameter
Description	Sets service motion velocity 1; active in opmode 1 (velocity) and 2 (position).
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: Counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: -12,000.000 to 12,000.000 rpm -200.000 to 200.000 rps -72,000.000 to 72,000.000 deg/s -1,000.000 to 1,000.000 (PIN/POUT)/s -1,256.637 to 1,256.637 rad/s Linear: -0.200 to 0.200 Counts/s -200.000*MOTOR.PITCH to 200.000*MOTOR.PITCH mm/s -200,000.000*MOTOR.PITCH to 200,000.000*MOTOR.PITCH $\mu\text{m/s}$ -1,000.000 to 1,000.000 (PIN/POUT)/s
Default Value	Rotary: 60.000 rpm 1.000 rps 359.999 deg/s 5.000 (PIN/POUT)/s 6.283 rad/s Linear: 0.001 Counts/s 1.000*MOTOR.PITCH mm/s 999.998*MOTOR.PITCH $\mu\text{m/sec}$ 5.000 (PIN/POUT)/s
Data Type	Float
See Also	SM.I1, SM.I2, SM.MODE, SM.MOVE, SM.T1, SM.T2, SM.V2
Start Version	M_0-0-16

Description

SM.V1 defines the velocity that is used in service motion modes 0 and 1 (see SM.MODE) in the closed velocity and position mode of operation.

Related topics:

0.1 Service Motion

SM.V2

General Information	
Type	R/W Parameter
Description	Sets service motion velocity 2; active in opmode 1 (velocity) and 2 (position).
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: -12,000.000 to 12,000.000 rpm -200.000 to 200.000 rps -72,000.000 to 72,000.000 deg/s -1,000.000 to 1,000.000 (PIN/POUT)/s -1,256.637 to 1,256.637 rad/s Linear: -0.200 to 0.200 counts/s -200.000*MOTOR.PITCH to 200.000*MOTOR.PITCH mm/s -200,000.000*MOTOR.PITCH to 200,000.000*MOTOR.PITCH $\mu\text{m/s}$ -1,000.000 to 1,000.000 (PIN/POUT)/s
Default Value	Rotary: -60.000 rpm -1.000 rps -359.999 deg/s -5.000 (PIN/POUT)/s -6.283 rad/s Linear: -0.001 counts/s -1.000*MOTOR.PITCH mm/s -999.998*MOTOR.PITCH $\mu\text{m/sec}$ -5.000 (PIN/POUT)/s
Data Type	Float
See Also	SM.I1, SM.I2, SM.MODE, SM.MOVE, SM.T1, SM.T2, SM.V1
Start Version	M_0-0-16

Description

SM.V2 defines the velocity that is used in service motion mode 1 (see SM.MODE) in the closed velocity and position mode of operation.

Related topics:

0.1 Service Motion

STO Parameters

STO.STATE

General Information	
Type	R/O Parameter
Description	Returns the status of the safe torque off.
Units	N/A
Range	0 to 1
Default Value	none
Data Type	Integer
See Also	N/A
Start Version	M_00-00-56-000

Description

STO.STATE returns the status of the safe torque off.

1 - Safe torque on (no safe torque off fault).

0 - Safe torque off (safe torque off fault).

SWLS Parameters

SWLS.EN

General Information	
Type	NV Parameter
Description	Position software emergency stop switch enable
Units	N/A
Range	0 to 3
Default Value	0
Data Type	U8
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter enables the software emergency stop switches. The software limit switches are only active if the axis is homed. For more information about homing, please refer to the HOME and DRV.MOTIONSTAT parameters.

Example

Bit 0 = 0: Disable SWLS.LIMIT0

Bit 0 = 1: Enable SWLS.LIMIT0

Bit 1 = 0: Disable SWLS.LIMIT1

Bit 1 = 1: Enable SWLS.LIMIT1

SWLS.LIMIT0

General Information	
Type	NV Parameter
Description	Sets the position software emergency stop switch 0
Units	Position units
Range	-9,007,199,254,740,992 to 9,007,199,254,740,991
Default Value	0
Data Type	S64
See Also	UNIT.PROTARY, UNIT.PLINEAR
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	607Dh/1
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the compare register for the software emergency stop switch 0. This can be either the lower or the upper software limit switch register, depending on SWLS.LIMIT1. The software limit switches are only active if the axis is homed. For more information about homing, please refer to the HOME Parameters and DRV.MOTIONSTAT.

SWLS.LIMIT1

General Information	
Type	NV Parameter
Description	Position software emergency stop switch 1
Units	Position units
Range	-9,007,199,254,740,992 to 9,007,199,254,740,991
Default Value	1,048,576.000 counts, 16bit (firmware versions M_01-02-00-000 and above) 68,719,476,736 counts (for firmware version M_01-01-00-000)
Data Type	S64
See Also	UNIT.PROTARY, UNIT.PLINEAR
Start Version	M_0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	607Dh/2
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the compare register for the software emergency stop switch 1. This value can be either the lower or the upper software limit switch register, depending on SWLS.LIMIT0. The software limit switches are only active if the axis is homed. For more information about homing, please refer to the HOME and DRV.MOTIONSTAT parameters.

SWLS.STATE

General Information	
Type	R/O Parameter
Description	Actual status of SW limit switches.
Units	N/A
Range	0 to 3
Default Value	0
Data Type	U8
See Also	N/A
Start Version	M_0-0-50-0

Description

This parameter reads the status word of the software emergency stop switches. The status word indicates the result of the compare between the software emergency stop switch compare register and the actual position of the position loop.

Example

Bit 0 = 0: SWLS.LIMIT0 is not active.

Bit 0 = 1: SWLS.LIMIT0 is active.

Bit 1 = 0: SWLS.LIMIT1 is not active.

Bit 1 = 1: SWLS.LIMIT1 is active.

Bits 2 to 7 are currently not in use.

UNIT Parameters

UNIT.ACCLINEAR

General Information	
Type	NV Parameter
Description	Sets the linear acceleration/deceleration units.
Units	N/A
Range	0 to 3
Default Value	0
Data Type	Integer
See Also	DRV.ACC, DRV.DEC, MOTOR.TYPE
Start Version	M_0-0-15

Description

UNIT.ACCLINEAR sets the units type for the acceleration and deceleration parameters, when the motor type (MOTOR.TYPE) is linear.

UNIT.ACCLINEAR Types

Type	Description
0	[PIN/POUT]/s ²
1	millimeters per second squared (mm/s ²)
2	micrometers per second squared (μm/s ²)
3	Feedback counts/s ²

UNIT.ACCROTARY

General Information	
Type	NV Parameter
Description	Sets the rotary acceleration/deceleration units.
Units	rpm/s, rps/s, deg/s ² , [PIN/POUT]/s ²
Range	0 to 3
Default Value	0 rpm/s
Data Type	Integer
See Also	DRV.ACC, "DRV.DEC" (page 112), MOTOR.TYPE
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3659h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

UNIT.ACCROTARY sets the acceleration/deceleration units when the motor type (MOTOR.TYPE) is rotary.

UNIT.ACCROTARY Types

Type	Description
0	rpm/s
1	rps/s
2	deg/s ²
3	(PIN/POUT)/s ²

UNIT.LABEL

General Information	
Type	NV Parameter
Description	Sets user-defined name for user-defined position units.
Units	N/A
Range	Maximum 16 characters, no spaces
Default Value	PIN/POUT
Data Type	String
See Also	UNIT.PLINEAR, UNIT.POUT
Start Version	M_0-0-50-0

Description

If you define a special position unit with UNIT.PLINEAR and UNIT.POUT, then you can give this unit a descriptive name. You can name the unit anything you wish, as long as the name is limited to 16 characters and includes no spaces. This name is shown in derived units as velocity and acceleration.

This parameter is descriptive only and does not influence drive internal functions in any way.

UNIT.PIN

General Information	
Type	NV Parameter
Description	Sets gear IN for the unit conversion.
Units	User units
Range	0 to 65,535
Default Value	100
Data Type	Integer
See Also	UNIT.POUT
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35CAh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

UNIT.PIN is used in conjunction with UNIT.POUT to set application specific units. This parameter is used as follows in the drive unit conversion:

- For position, this parameter sets the units as [PIN/POUT]/rev.
- For velocity, this parameter sets the units as [PIN/POUT]/s.
- For acceleration/deceleration, this parameter sets the units as [PIN/POUT]/s².

UNIT.PLINEAR

General Information	
Type	NV Parameter
Description	Sets the linear position units.
Units	N/A
Range	0 to 4
Default Value	0
Data Type	Integer
See Also	PL.FB, PL.CMD, MOTOR.TYPE
Start Version	M_0-0-15

Description

UNIT.PLINEAR sets the units type for the position parameters when the motor type (MOTOR.TYPE) is linear.

UNIT.PLINEAR Types

Type	Description
0	Counts (32 bit)
1	Millimeters (mm)
2	Micrometers (μm)
3	(PLINEAR/POUT) per revolution
4	Counts (16 Bit)

UNIT.POUT

General Information	
Type	NV Parameter
Description	Sets gear out for the unit conversion.
Units	User units.
Range	0 to 65,535
Default Value	20
Data Type	Integer
See Also	UNIT.PLINEAR
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	35CBh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

UNIT.POUT is used in conjunction with UNIT.PLINEAR to set application specific units in UNIT.POUT. This parameter is used as follows in the drive unit conversion:

- For position, this parameter sets the units as [PIN/POUT]/rev.
- For velocity, this parameter sets the units as [PIN/POUT]/s.
- For acceleration/deceleration, this parameter sets the units as [PIN/POUT]/s².

UNIT.PROTARY

General Information	
Type	NV Parameter
Description	Sets the position units when the motor type (MOTOR.TYPE) is rotary.
Units	counts, rad, deg, [PIN/POUT], counts 16bit
Range	0 to 4
Default Value	4 counts 16bit (for firmware versions M_01-02-00-000 and above) 0 counts (for firmware version M_01-01-00-000)
Data Type	Integer
See Also	PL.FB, PL.CMD, MOTOR.TYPE
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3660h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

UNIT.PROTARY sets the position units when the motor type (MOTOR.TYPE) is rotary.

UNIT.PROTARY Types

Value	Units
0	counts
1	radians
2	degrees
3	[PIN/POUT]
4	counts 16bit

UNIT.VLINEAR

General Information	
Type	NV Parameter
Description	Sets the linear velocity units.
Units	N/A
Range	0 to 3
Default Value	0
Data Type	Integer
See Also	VL.FB, VL.CMDU, VL.CMD, MOTOR.TYPE
Start Version	M_0-0-15

Description

UNIT.VLINEAR sets the units type for the velocity parameters when the motor type (MOTOR.TYPE) is linear.

UNIT.VLINEAR Types

Type	Description
0	(PIN/POUT) per second
1	Micrometers per second
2	Millimeters per second
3	Counts per second

UNIT.VROTARY

General Information	
Type	NV Parameter
Description	Sets the velocity units when the motor type (MOTOR.TYPE) is rotary.
Units	rpm, rps, deg/s, (PIN/POUT)/s
Range	0 to 3
Default Value	0 rpm
Data Type	Integer
See Also	VL.FB, VL.CMDU, VL.CMD, MOTOR.TYPE
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	365Fh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

UNIT.VROTARY sets the velocity units when the motor type (MOTOR.TYPE) is rotary.

Value	Units
0	rpm
1	rps
2	deg/s
3	(PIN/POUT)/s

VBUS Parameters

VBUS.OVFTHRESH

General Information	
Type	R/O Parameter
Description	Reads the over voltage fault level.
Units	Vdc
Range	0 to 900 Vdc
Default Value	N/A
Data Type	Integer
See Also	VBUS.UVFTHRESH
Start Version	M_0-0-15

Description

VBUS.OVFTHRESH reads the over voltage fault level for the DC bus.

This value is read from the drive EEPROM and varies according to the drive type.

Related Topics

- 1 Regeneration

VBUS.OVFWTHRESH

General Information	
Type	NV Parameter
Description	Sets voltage level for over voltage warning.
Units	Vdc
Range	0 to 900 Vdc
Default Value	0 Vdc (warning disabled)
Data Type	U16
See Also	N/A
Start Version	M_0-0-50-0

Description

If VBUS.VALUE value exceeds VBUS.OVFWTHRESH, then a warning is generated.

Related Topics

- 1 Regeneration

VBUS.RMSLIMIT

General Information	
Type	R/O Parameter
Description	Reads the limit for the bus capacitors load.
Units	Vrms
Range	N/A
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_00-00-55-000

Description

This parameter reads the limit of the bus capacitor load. When the bus capacitor loads exceeds this limit, the drive generates fault F503.

Excessive bus capacitor load may indicate a disconnected main supply phase.

VBUS.UVFTHRESH

General Information	
Type	R/O Parameter
Description	Reads the under voltage fault level.
Units	Vdc
Range	0 to 900 Vdc
Default Value	Depends on hardware
Data Type	Integer
See Also	VBUS.OVFTHRESH
Start Version	M_0-0-15

Description

VBUS.UVFTHRESH reads the undervoltage fault level of the DC bus.

The value is read from the drive EEPROM. The value is varied according to drive type.

VBUS.UVMODE

General Information	
Type	
Description	Indicates undervoltage (UV) mode.
Units	N/A
Range	0 to 1
Default Value	1
Data Type	Boolean
See Also	N/A
Start Version	M_0-0-37

Description

This parameter indicates undervoltage (UV) mode.

When VBUS.UVMODE = 0, an undervoltage fault is issued whenever the DC bus goes below the undervoltage threshold.

When VBUS.UVMODE = 1, an undervoltage fault is issued whenever the DC bus goes below the under voltage threshold and the controller attempts to enable the drive (software or hardware enable).

VBUS.UVWTHRESH

General Information	
Type	NV Parameter
Description	Sets voltage level for undervoltage warning.
Units	Vdc
Range	0 to 900 Vdc
Default Value	10 volts above the default value of the under voltage fault threshold (VBUS.UVFTHRESH). The default value of VBUS.UVFTHRESH is hardware dependent.
Data Type	U16
See Also	VBUS.UVFTHRESH
Start Version	M_0-0-50-0

Description

If VBUS.VALUE value drops below VBUS.UVWTHRESH, then a warning is generated.

VBUS.VALUE

General Information	
Type	R/O Parameter
Description	Reads DC bus voltage.
Units	Vdc
Range	0 to 900 Vdc
Default Value	N/A
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	361Ah/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VBUS.VALUE reads the DC bus voltage.

Related Topics

- 1 Regeneration

VL Parameters

VL.ARPF1 TO VL.ARPF4

General Information	
Type	R/W Parameter
Description	Sets the natural frequency of the pole (denominator) of anti-resonance (AR) filters 1, 2, 3, and 4; active in opmodes 1 (velocity) and 2 (position) only.
Units	Hz
Range	5 to 5,000 Hz
Default Value	500 Hz
Data Type	Float
See Also	VL.ARPQ1 TO VL.ARPQ4, VL.ARZF1 TO VL.ARZF4, Sets the Q of the zero (numerator) of anti-resonance filter #1; active in opmodes 1 (velocity) and 2 (position) only.
Start Version	

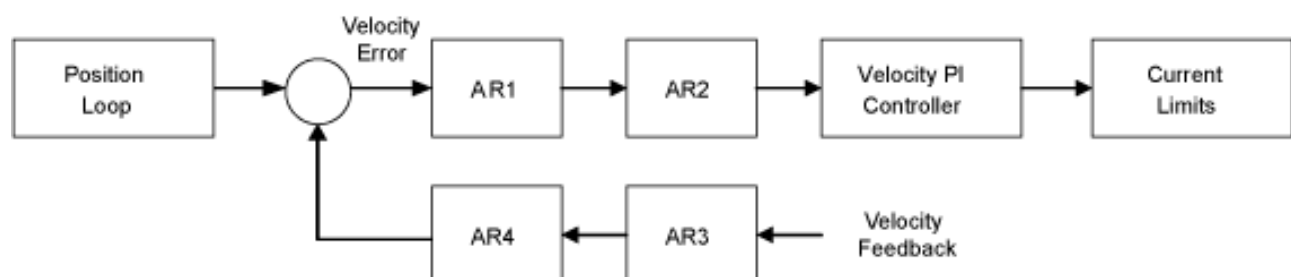
Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3406h/1 VL.ARPF1
	3406h/2 VL.ARPF2
	3406h/3 VL.ARPF3
	3406h/4 VL.ARPF4
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.ARPF1 sets the natural frequency of the pole (denominator) of AR filter 1. This value is F_p in the approximate transfer function of the filter:

$$ARx(s) = [s^2/(2\pi F_z)^2 + s/(Q_z 2\pi F_z) + 1] / [s^2/(2\pi F_p)^2 + s/(Q_p 2\pi F_p) + 1]$$

The following block diagram describes the AR filter function; note that AR1 and AR2 are in the forward path, while AR3 and AR4 are applied to feedback:



AR1, AR2, AR3, and AR4 are used in velocity and position mode, but are disabled in torque mode.

Discrete time transfer function (applies to all AR filters)

The velocity loop compensation is actually implemented as a digital discrete time system function on the DSP.

The continuous time transfer function is converted to the discrete time domain by a backward Euler mapping:

$$s \approx (1-z^{-1})/t, \text{ where } t = 62.5 \mu\text{s}$$

The poles are prewarped to F_p and the zeros are prewarped to F_z .

VL.ARPQ1 TO VL.ARPQ4

General Information	
Type	R/W Parameter
Description	Sets the Q of the pole (denominator) of anti-resonance (AR) filter 1; active in opmodes 1 (velocity) and 2 (position) only.
Units	None
Range	0.2 to 20
Default Value	0.5
Data Type	Float
See Also	VL.ARPF1 TO VL.ARPF4, VL.ARZF1 TO VL.ARZF4, VL.ARZQ1 TO VL.ARZQ4
Start Version	

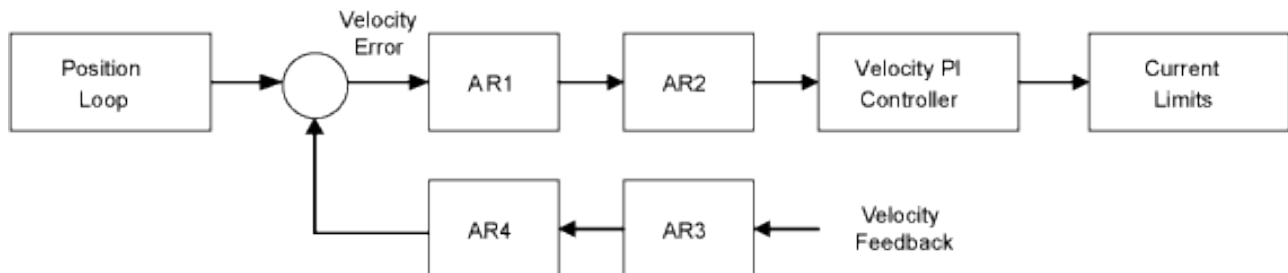
Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3406h/5 VL.ARPQ1
	3406h/6 VL.ARPQ2
	3406h/7 VL.ARPQ3
	3406h/8 VL.ARPQ4
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.ARPQ1 sets the Q (quality factor) of the pole (denominator) of AR filter 1. This value is Q_p in the approximate transfer function of the filter:

$$ARx(s) = [s^2/(2\pi F_z)^2 + s/(Q_z 2\pi F_z) + 1] / [s^2/(2\pi F_p)^2 + s/(Q_p 2\pi F_p) + 1]$$

The following block diagram describes the AR filter function; note that AR1 and AR2 are in the forward path, while AR3 and AR4 are applied to feedback:



AR1, AR2, AR3, and AR4 are used in velocity and position mode, but are disabled in torque mode.

Discrete time transfer function (applies to all AR filters)

The velocity loop compensation is actually implemented as a digital discrete time system function on the DSP. The continuous time transfer function is converted to the discrete time domain by a backward Euler mapping:

$$s \approx (1-z^{-1})/t, \text{ where } t = 62.5 \mu s$$

The poles are prewarped to F_p and the zeros are prewarped to F_z .

VL.ARTYPE1 TO VL.ARTYPE4

General Information	
Type	NV Parameter
Description	Indicates the method used to calculate BiQuad coefficients; active in opmodes 1 (velocity) and 2 (position) only.
Units	N/A
Range	0
Default Value	0
Data Type	U8
See Also	N/A
Start Version	M_00-00-56-000

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3405h/1 VL.ARTYPE1
	3405h/2 VL.ARTYPE2
	3405h/3 VL.ARTYPE3
	3405h/4 VL.ARTYPE4
Data Type	Unsigned 8
PDO Mappable	No
Start Version	M_00-00-62-000

Description

These parameters indicate the method used to calculate the biquad coefficients VL.ARPFx, VL.ARPQx, VL.ARZFx, and VL.ARZQx. A value of 0 indicates that the coefficients are set directly. This parameter has no effect on the filter itself, but is only used to determine the original design parameters. Currently, only the value of 0 is supported.

VL.ARZF1 TO VL.ARZF4

General Information	
Type	R/W Parameter
Description	Sets the natural frequency of the zero (numerator) of anti-resonance (AR) filter 1; active in opmodes 1 (velocity) and 2 (position) only.
Units	Hz
Range	5 to 5,000 Hz
Default Value	500 Hz
Data Type	Float
See Also	VL.ARPF1 TO VL.ARPF4, VL.ARPQ1 TO VL.ARPQ4, VL.ARZQ1 TO VL.ARZQ4
Start Version	

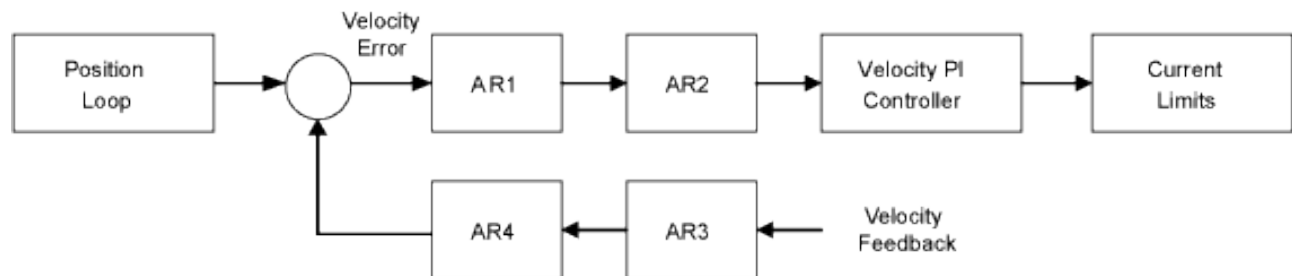
Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3406h/9 VL.ARZF1
	3406h/ah VL.ARZF2
	3406h/bh VL.ARZF3
	3406h/ch VL.ARZF4
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.ARZF1 sets the natural frequency of the zero (numerator) of AR filter 1. This value is F_z in the approximate transfer function of the filter:

$$ARx(s) = [s^2/(2\pi F_z)^2 + s/(Q_z 2\pi F_z) + 1] / [s^2/(2\pi F_p)^2 + s/(Q_p 2\pi F_p) + 1]$$

The following block diagram describes the AR filter function; note that AR1 and AR2 are in the forward path, while AR3 and AR4 are applied to feedback:



AR1, AR2, AR3, and AR4 are used in velocity and position mode, but are disabled in torque mode.

Discrete time transfer function (applies to all AR filters)

The velocity loop compensation is actually implemented as a digital discrete time system function on the DSP. The continuous time transfer function is converted to the discrete time domain by a backward Euler mapping:

$$s \approx (1-z^{-1})/t, \text{ where } t = 62.5 \mu s$$

The poles are prewarped to F_p and the zeros are prewarped to F_z .

VL.ARZQ1 TO VL.ARZQ4

General Information	
Type	R/W Parameter
Description	Sets the Q of the zero (numerator) of anti-resonance filter #1; active in opmodes 1 (velocity) and 2 (position) only.
Units	N/A
Range	0.1 to 5
Default Value	0.5
Data Type	Float
See Also	VL.ARPF1 TO VL.ARPF4, VL.ARPQ1 TO VL.ARPQ4, VL.ARZF1 TO VL.ARZF4
Start Version	

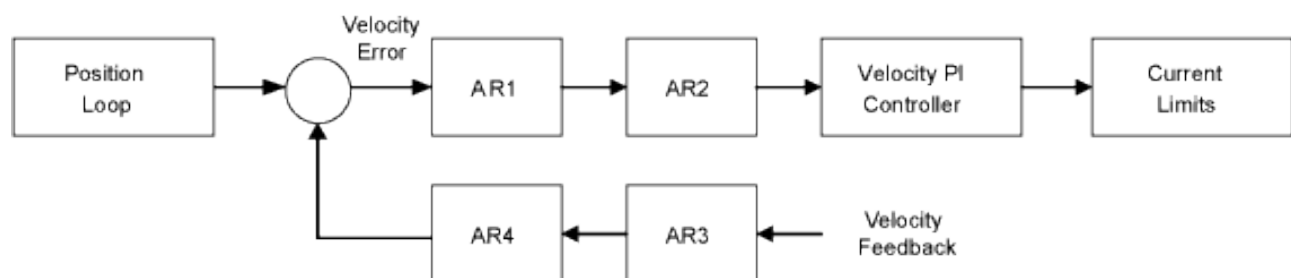
Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3406h/dh VL.ARZQ1 3406h/eh VL.ARZQ2 3406h/fh VL.ARZQ3 3406h/10h VL.ARZQ4
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.ARZQ1 sets the Q (quality factor) of the zero (numerator) of AR filter 1. This value is Q_z in the approximate transfer function of the filter:

$$AR1(s) = [s^2/(2\pi F_z)^2 + s/(Q_z 2\pi F_z) + 1] / [s^2/(2\pi F_p)^2 + s/(Q_p 2\pi F_p) + 1]$$

The following block diagram describes the AR filter function; note that AR1 and AR2 are in the forward path, while AR3 and AR4 are applied to feedback:



AR1, AR2, AR3 and AR4 are used in velocity and position mode, but are disabled in torque mode.

Discrete time transfer function (applies to all AR filters)

The velocity loop compensation is actually implemented as a digital discrete time system function on the DSP. The continuous time transfer function is converted to the discrete time domain by a backward Euler mapping:

$$s \approx (1-z^{-1})/t, \text{ where } t = 62.5 \mu\text{s}.$$

The poles are prewarped to F_p and the zeros are prewarped to F_z .

VL.BUSFF

General Information	
Type	R/O Parameter
Description	Displays the velocity loop feedforward value injected by the field-bus; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEARUNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, μ m/s, (PIN/POUT)/s
Range	0.0 to VL.LIMITP
Default Value	0.0
Data Type	Float
See Also	VL.FF, VL.KBUSFF
Start Version	M_0-0-32

Description

Displays the velocity loop feedforward value injected by the fieldbus.

VL.CMD

General Information	
Type	R/O Parameter
Description	Reads the actual velocity command; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEARUNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, μ m/s, (PIN/POUT)/s
Range	N/A
Default Value	N/A
Data Type	Float
See Also	VL.FB, VL.CMDU, VL.LIMITP, VL.LIMITN
Start Version	M_0-0-15

Description

VL.CMD returns the actual velocity command as it is received in the velocity loop entry after all velocity limits (such as VL.LIMITN and VL.LIMITP). See velocity loop design diagram for more details.

Related Topics

- 1 Analog Input
- 1 Velocity Loop
- 1 Position Loop
- 1 Block Diagrams

VL.CMDU

General Information	
Type	R/W Parameter
Description	Sets the user velocity command; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEARUNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: -12,000.000 to 12,000.000 rpm -200.000 to 200.000 rps -72,000.000 to 72,000.00 deg/s -1,000.000 to 1,000.000 (PIN/POUT)/s -1,256.637 to 1,256.637 rad/s Linear: -0.200 to 0.200 counts/s -200.000*MOTOR.PITCH to 200.000*MOTOR.PITCH mm/s -200,000.000*MOTOR.PITCH to 200,000.000*MOTOR.PITCH $\mu\text{m/s}$ -1000.000 to 1000.000 (PIN/POUT)/s
Default Value	0
Data Type	Float
See Also	VL.FB, VL.CMD, DRV.OPMODE, DRV.CMDSOURCE
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	60FFh/0
Data Type	Integer 32
PDO Mappable	Yes
Start Version	M_00-00-62-000

Description

VL.CMDU sets the user velocity command.

When DRV.OPMODE is set to 1 (velocity loop) and DRV.CMDSOURCE is set to 0 (TCP/IP channel), then setting this value when the drive is enabled will cause the drive to rotate at the required velocity.

VL.ERR

General Information	
Type	R/O Parameter
Description	Sets the velocity error; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	N/A
Default Value	N/A
Data Type	Float
See Also	VL.CMD, VL.FB
Start Version	M_0-0-15

Description

VL.ERR sets the velocity error. It is calculated in the velocity loop as the difference between VL.CMD and VL.FB. See the velocity loop design for more information.

VL.FB

General Information	
Type	R/O Parameter
Description	Reads the velocity feedback; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEARUNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: Counts/s, mm/s, μ m/s, (PIN/POUT)/s
Range	N/A
Default Value	N/A
Data Type	Float
See Also	VL.CMDU
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3618h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.FB returns the velocity feedback as it is received in the velocity loop.

VL.FBFILTER

General Information	
Type	R/O Parameter
Description	Filters VL.FB value; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, μ m/s, (PIN/POUT)/s
Range	N/A
Default Value	N/A
Data Type	Float
See Also	VL.FB
Start Version	M-0-0-50-0

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3407h/1
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter returns the same value as VL.FB, filtered through a 10 Hz filter.

VL.FBSOURCE

General Information	
Type	NV Parameter
Description	Sets feedback source for the velocity loop; active in opmodes 1 (velocity) and 2 (position) only.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Boolean
See Also	PL.FBSOURCE
Start Version	M_00-00-51-000

Description

This parameter determines the feedback source to be used by the velocity loop. A value of 0 selects the primary feedback, 1 selects the secondary feedback.

VL.FF

General Information	
Type	R/O Parameter
Description	Displays the velocity loop overall feedforward value; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.ACCROTARY or UNIT.ACCLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	0 to VL.LIMITP
Default Value	0
Data Type	Float
See Also	VL.KBUSFF, VL.KVFF, VL.ACCFFGAIN
Start Version	M_0-0-32

Description

This parameter displays the velocity loop overall feedforward value.

VL.GENMODE

General Information	
Type	NV Parameter
Description	Selects mode of velocity generation (Observer, d/dt); active in opmodes 1 (velocity) and 2 (position) only.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	Integer
See Also	N/A
Start Version	M_0-0-15

Description

This parameter is used to select the velocity generator mode.

Mode	Description
0	d/dt mode, the derivative of the mechanical angle of the drive, is fed to a first order low pass.
1	Luenberger Observer mode, (TBD the Luenberger observer is not implemented yet)

VL.KBUSFF

General Information	
Type	R/W Parameter
Description	Sets the velocity loop acceleration feedforward gain value; active in opmodes 1 (velocity) and 2 (position) only.
Units	NA
Range	0.0 to 2.0
Default Value	0.0
Data Type	Float
See Also	VL.BUSFF
Start Version	M_0-0-32

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3407h/3
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the gain for the acceleration feedforward (a scaled second derivative of the position command is added to the velocity command value).

The nominal feedforward value can be multiplied by this gain value.

This will have affect only when using position mode (DRV.OPMODE = 2).

VL.KI

General Information	
Type	NV Parameter
Description	Sets the velocity loop integral gain for the PI controller; active in opmodes 1 (velocity) and 2 (position) only.
Units	Hz
Range	0 to 1,000 Hz
Default Value	160 Hz
Data Type	Float
See Also	VL.KP
Start Version	M_0-0-15

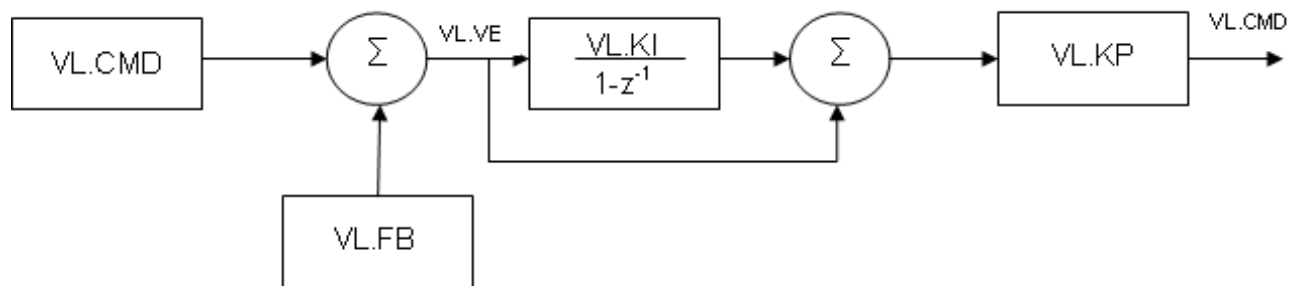
Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	354Dh/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.KI sets the integral gain of the velocity loop.

A factor of 2π is included in the time calculation, therefore a PI velocity loop with a constant error of 1 rps in which VL.KI is set to 160 and VL.KP is set to 1, will take $(1000/160)*2\pi$ ms to increase the integral gain to 1. Therefore, the total gain is 2 at this time (see velocity loop structure below).

Velocity Loop Structure



VL.KP

General Information	
Type	NV Parameter
Description	Sets velocity loop proportional gain for the PI controller; active in opmodes 1 (velocity) and 2 (position) only.
Units	A/(rad/sec)
Range	0.001 to 2,147,483.008
Default Value	1
Data Type	Float
See Also	VL.KI
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3548h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.KP sets the proportional gain of the velocity loop.

The idealized velocity loop bandwidth in Hz is:

$$VL.KP * Kt / (2\pi * Jm)$$

Where:

Kt is the motor torque constant and Jm is the total shaft inertia. The units of Kt/Jm are rad/sec²/A.

See Velocity Controller Environment Block Diagram for more information.

VL.KVFF

General Information	
Type	R/W Parameter
Description	Sets the velocity loop velocity feedforward gain value; active in opmodes 1 (velocity) and 2 (position) only.
Units	NA
Range	0.0 to 2.0
Default Value	0.0
Data Type	Float
See Also	VL.FF
Start Version	M_0-0-32

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3407h/2

Fieldbus Information	
Data Type	Unsigned 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

This parameter sets the gain for the velocity feedforward (a scaled derivative of the position command is added to the velocity command value). The nominal feedforward value can be multiplied by this gain value.

This parameter is only used in the position mode (DRV.OPMODE = 2).

VL.LIMITN

General Information	
Type	NV Parameter
Description	Sets the velocity lower limit; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: -12,000.000 to 0.000 rpm -200.000 to 0.000 rps -72,000.000 to 0.000 deg/s -1,000.000 to 0.000 (PIN/POUT)/s -12,56.637 to 0.000 rad/s Linear: -0.200 to 0.000 counts/s -200.000*MOTOR.PITCH to 0.000 mm/s -200,000.000*MOTOR.PITCH to 0.000 $\mu\text{m/sec}$ -1,000.000 to 0.000 (PIN/POUT)/s
Default Value	Rotary: -3,000.000 rpm -50.000 rps -17,998.998 deg/s -250.000 (PIN/POUT)/s -314.159 rad/s Linear: -0.050 Counts/s -50*MOTOR.PITCH mm/s -49,999.996*MOTOR.PITCH $\mu\text{m/sec}$ -250.000 (PIN/POUT)/s
Data Type	Float
See Also	VL.LIMITP, VL.CMD
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3623h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.LIMITN sets the velocity command negative limit.

If the input to the velocity loop is lower than VL.LIMITN, then the actual velocity command VL.CMD is limited by the value of VL.LIMITN.

VL.LIMITP

General Information	
Type	NV Parameter
Description	Sets the velocity high limit; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: 0.000 to 12,000.000 rpm 0.000 to 200.000 rps 0.000 to 72,000.000 deg/s 0.000 to 1,000.000 (PIN/POUT)/s 0.000 to 1256.637 rad/s Linear: 0.000 to 0.200 Counts/s 0.000 to 200.000*MOTOR.PITCH mm/sec 0.000 to 200,000.000*MOTOR.PITCH $\mu\text{m/s}$ 0.000 to 1,000.000 (PIN/POUT)/s
Default Value	Rotary: 3,000.000 rpm 50.000 rps 17,998.998 deg/s 250.000 (PIN/POUT)/s 314.159 rad/s Linear: 0.050 Counts/s 50.000*MOTOR.PITCH mm/sec 49,999.996*MOTOR.PITCH $\mu\text{m/sec}$ 250.000 (PIN/POUT)/s
Data Type	Float
See Also	VL.LIMITN, VL.CMD
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3622h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.LIMITP sets the velocity command positive limit.

If the input to the velocity loop is higher than VL.LIMITP, then the actual velocity command VL.CMD is limited by the value of VL.LIMITP.

VL.LMJR

General Information	
Type	R/W Parameter
Description	Sets the ratio of the estimated load moment of inertia relative to the motor moment of inertia; active in opmodes 1 (velocity) and 2 (position) only.
Units	NA
Range	0 to 100.0
Default Value	0
Data Type	Float
See Also	IL.KACCFF, IL.FF
Start Version	M_0-0-32

Description

This parameter is used in the internal calculation of the current loop acceleration feed forward gain value.

VL.THRESH

General Information	
Type	NV Parameter
Description	Sets the over speed fault value; active in opmodes 1 (velocity) and 2 (position) only.
Units	Depends on UNIT.VROTARY or UNIT.VLINEAR Rotary: rpm, rps, deg/s, (PIN/POUT)/s, rad/s Linear: counts/s, mm/s, $\mu\text{m/s}$, (PIN/POUT)/s
Range	Rotary: 0 to 1,200.000 rpm 0 to 200.000 rps 0 to 72,000.000 deg/s 0 to 1,000.000 (PIN/POUT)/s 0.000 to 1,256.637 rad/s Linear: 0.000 to 0.200 counts/s 0.000 to 200.000*MOTOR.PITCH mm/sec 0.000 to 200,000.000*MOTOR.PITCH $\mu\text{m/s}$ 0 to 1,000.000 (PIN/POUT)/s
Default Value	Rotary: 1,000.000 rpm 16.667 rps 21,600.000 deg/s 300.000 (PIN/POUT)/s 376.991 rad/s Linear: 0.060 counts/s 60.000*MOTOR.PITCH mm/sec 60,000.000*MOTOR.PITCH $\mu\text{m/s}$ 300.000 (PIN/POUT)/s
Data Type	Float
See Also	VL.CMD, VL.CMDU
Start Version	M_0-0-15

Fieldbus Information	
	EtherCAT COE & CANopen
Index/Subindex or Parameter Number	3627h/0
Data Type	Integer 32
PDO Mappable	No
Start Version	M_00-00-62-000

Description

VL.THRESH sets the threshold for the velocity over which an over speed fault is generated.

The value is considered as an absolute value, hence it applies for both negative and positive velocities.

Example

VL.THRESH is set to 600 rpm. A velocity command of 700 rpm will generate an over speed fault.

WS Parameters

WS.ARM

General Information	
Type	Command
Description	Sets wake and shake to start at the next drive enable.
Units	N/A
Range	N/A
Default Value	N/A
Data Type	N/A
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

This command sets wake and shake to start at the next drive enable. Feedback type is not relevant for this command. If WS.STATE is 0 and the drive is disabled, WS.STATE will change to 1 after issuing WS.CALC. With this command wake and shake can be repeated if desired.

Related topics:

Using Wake and Shake

WS.DISTMIN

General Information	
Type	R/W Parameter
Description	Sets the minimum movement required for wake and shake.
Units	Actual position units
Range	0 to 36°
Default Value	1°
Data Type	S64
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

This parameter sets the minimum movement that is required for commutation finding. If this value is too small, the the commutation finding might fail if too little current is used. The larger this value, the more movement is needed in order to avoid F473: "Wake and Shake: Too little movement".

For a detailed description of the wake and shake feature, see the User Guide (Using Wake and Shake).

WS.IMAX

General Information	
Type	R/W Parameter
Description	Sets maximum current used for wake and shake.
Units	mA
Range	0 to (lower value of MOTOR.IPEAK and DRV.DIPEAK) mA
Default Value	(half of maximum) mA
Data Type	U16
See Also	MOTOR.IPEAK, DRV.IPEAK
Start Version	M_01-01-00-101, M_01-02-00-000

Description

This parameter defines the maximum current used for wake and shake. If the selected current is too low, the minimum required movement may not occur. If the selected current is too high, the movement may be too fast (overspeed) or too large (over maximum movement).

The maximum of this parameter is the lower value of MOTOR.IPEAK and DRV.DIPEAK. The default value of this parameter is the half of its maximum. This value depends on the specific application.

Related topics:

Using Wake and Shake

WS.MODE

General Information	
Type	R/W Parameter
Description	Sets the method used for wake and shake.
Units	N/A
Range	0 to 1
Default Value	0
Data Type	U8
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

This parameter sets the method used for finding commutation.

0 = Standard wake and shake

Two iterations are used to find the correct angle in this mode. Coarse (current mode) and fine (velocity mode) iterations are done in a loop (WS.NUMLOOPS times). The average angle of all loops is calculated and used.

1 = Commutation alignment by fixed commutation vector (Zero Method)

The motor poles are set to 0, current mode is activated, and WS.IMAX is applied. The angle in which the motor settles is used for commutation. Other settings are restored (such as motor poles and operation mode).

Related topics:

Using Wake and Shake

WS.DISTMAX

General Information	
Type	R/W Parameter
Description	Sets maximum movement allowed for wake and shake.
Units	deg (position units)
Range	0 to 72 deg
Default Value	15 deg
Data Type	S64
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

This parameter sets the maximum movement that is allowed for finding commutation. If this value is too small, F475, "Wake and Shake. Too much movement", may occur before wake and shake is finished. The bigger this value, the more movement is allowed for wake and shake. This value is application dependent.

Related topics:

Using Wake and Shake

WS.NUMLOOPS

General Information	
Type	R/W Parameter
Description	Sets the number of repetitions for wake and shake.
Units	counts
Range	0 to 20 counts
Default Value	5 counts
Data Type	U8
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

Max. number of wake and shake repetitions. MOTOR.PHASE is calculated as mean value of all wake and shake repetitions.

For a detailed description of the wake and shake feature, see the User Guide (Using Wake and Shake).

WS.STATE

General Information	
Type	R/O Parameter
Description	Reads wake and shake status
Units	N/A
Range	N/A
Default Value	Only valid before the first enable happens. 0 - for feedback types that do not require wake and shake 1 - for feedback types that require wake and shake
Data Type	U8
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

WS.STATE 0 = wake and shake successful or not configured.

WS.STATE 1 = wake and shake configured and will be done at next enable.

WS.STATE 2 and higher = wake and shake running.

Overview of the mode 0 states:

State	Description
1	- Waiting for drive enable - save original settings - switch to current mode
2	- wait 100ms before continuing - activate real-time (RT) functions RT will switch different current vectors and record position feedback. WS.T and WS.TDEL1 are used for RT switching of current vectors.
3	- wait for RT to finish - calculate coarse angle from RT data
4	- wait WS.TDEL2 before continuing - switch to velocity mode
5	- wait 10ms before continuing - activate RT current feedback filtering
6	- ramp up D-Current up to 75% of WS.IMAX - execute angle fine calculation
7	- check if difference between coarse and fine calculation is lower than 30°, else generate fault "Wake and Shake.Fine-Coarse delta too big." - if this was not the last loop switch to current mode and go to 2

State	Description
8	- check if difference between loops is lower than 30°, else generate fault "Wake and Shake. Loop angle delta too big." - if W&S was successful apply motor.phase and restore other parameters, else restore all parameters
9 (and larger values)	- fault state. Generate fault and apply all original parameters

WS.T

General Information	
Type	R/W Parameter
Description	Sets wake and shake current-vector appliance time
Units	ms
Range	1 to 10 ms
Default Value	1 ms
Data Type	U8
See Also	WS.IMAX, WS.DISTMAX
Start Version	M_01-01-00-101, M_01-02-00-000

Description

This parameter defines the duration for each different current-vector while the coarse angle calculation. The move distance is proportional to the WS.T and WS.IMAX value.

For a detailed description of the wake and shake feature, see the User Guide (Using Wake and Shake).

WS.TDELAY1

General Information	
Type	NV Parameter
Description	Delay for wake and shake timing
Units	ms
Range	0 to 200 ms
Default Value	5 ms
Data Type	U8
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

WS.TDELAY1 defines the delay time of the wake and shake function. This time is a delay time between the switching of different current vectors during the wake and shake procedure. This time should be increased in the case of movement interferences between single current vectors.

For a detailed description of the wake and shake feature, see the User Guide (Using Wake and Shake).

WS.TDELAY2

General Information	
Type	NV Parameter
Description	Sets the delay for wake and shake timing.
Units	ms
Range	0 to 200 ms
Default Value	50 ms
Data Type	U8
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

WS.TDELAY2 defines the delay between switching from coarse angle calculation to fine angle calculation during the wake and shake procedure. This time should be increased in the case of interferences between the coarse calculation done in current mode and the fine calculation done in velocity mode. Choosing too large a value increases the wake and shake duration.

For a detailed description of the wake and shake feature, see the User Guide (Using Wake and Shake).

WS.TDELAY3

General Information	
Type	NV Parameter
Description	Sets the delay for wake and shake between loops in mode 0.
Units	ms
Range	0 to 2000 ms
Default Value	100 ms
Data Type	U16
See Also	N/A
Start Version	M_01-01-00-102, M_01-02-00-000

Description

WS.TDELAY3 defines the delay between complete loops in mode 0 only. Decreasing this value makes the wake and shake procedure faster, but may lead to problems if the motor moves too long. Increasing this value will make wake and shake significantly longer.

WS.VTHRESH

General Information	
Type	NV Parameter
Description	Defines the maximum allowed velocity for Wake & Shake
Units	actual velocity units
Range	0 to 1000
Default Value	100
Data Type	U16
See Also	N/A
Start Version	M_01-01-00-101, M_01-02-00-000

Description

Defines the maximum allowed velocity that occurs while commutation finding is active. This supervision runs in realtime, but only while wake and shake is active (WS.STATE 1 or greater). If at any time while wake and shake is running a velocity higher than this value is detected, a fault is generated.

For a detailed description of the wake and shake feature, see the User Guide (Using Wake and Shake).

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