VarCom

Reference Manual

CDHD Servo Drive

DDHD Dual Drive

Revision: 8.6
Firmware Version 1.41.x

Revision History

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Trademarks

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Contents

1 Introduction

VarCom Overview

When the host and drive are communicating over serial connection, a proprietary set of commands and variables, called **VarCom**, are used to configure, control and monitor the drive.

Commands and variables are identified by mnemonic (easily remembered code) names. For example, MPOLES is the VarCom code used to read and write the setting for the number of motor poles.

Some variables are read-only, while others have read and write access. Variables can be stored in the CDHD's non-volatile flash memory for use at each power-up.

Note: The terms *variable* and *parameter* are used interchangeably throughout the documentation.

Manual Format

This manual details the entire set of VarCom commands and variables, in alphabetic order.

Command and variable descriptions use different formats, as described below.

All commands and variables are presented as follows:

Definition	Short name, used in the graphical user interface software.
Type	**Variable (R/W)**: A read/write variable. **Variable (R)**: A read-only variable. **Command**
Description	Description of the command or variable.
Syntax	The command format, including any optional or required parameters. Commands are described using the following conventions: **[ ]** Indicates an **optional** parameter. **{ }** Indicates a **required** parameter. **|** A vertical bar separates two or more choices, either required arguments enclosed in braces { } or optional arguments enclosed in brackets [ ]. Variable parameters are italicized within **< >**.
Firmware	The earliest version, or specific versions, in which the described functionality is available.
Drive status	**Enabled | Disabled** Indicates the required state of the drive when the command or variable is issued or invoked.

Range	Discrete values and ranges of values.
	Parameter values can be written with up to 9 digits following the decimal point. When read, values will show only 3 digits following the decimal point.
	For example:
	`-->acc 0.123456789`
	`-->acc`
	`0.123 [rpm/s]`
	`-->`

Default value	The variable's default (factory-defined) value.
Unit	When variable or command values imply units of measure, these units are specified.
Non-volatile	**Yes | No** Indicates whether the value of the variable is stored in the non-volatile memory, and thereby available when the drive is rebooted. Not applicable for Command.
Example	`Examples of use.`
See also	Links to related commands and variables.
CANopen	Where applicable, the equivalent EtherCAT COE and CANopen object code.

2 VarCom Functions

Activation and Faults

Includes drive status, software enable, hardware enable, faults, fault history, fault recovery, clear faults, emergency stop.

ACTIVE	K	RELAY	SWEN
CLEARFAULTS	MOTORPHASESCAN	RELAYMODE	SWENMODE
DISMODE	COMMERRMAXCNT	REMOTE	UVMODE
DISPLAYTEST	COMMERRTTHRESH	ST	UVRECOVER
EN	COMMERRVTHRESH	STALLTIME	UVTHRESH
FASTSTOENABLE	IGNOREBRKFLT	STALLVEL	UVTIME
FLT	OUTFLTLVL	STAT	WRN
FLTHIST	READY	STATUS	

Hardware Power

Includes bus, PWM, drive rating, regeneration resistor, line-loss, under-voltage.

DICONT	LINELOSSTYPE	REGENMAXPOW	UVTHRESH
DIPEAK	OVTHRESH	REGENPOW	UVTIME
KCD	PWMFRQ	REGENRES	VBUS
LINELOSSMODE	REGENFLTMODE	UVMODE	VBUSREADOUT
LINELOSSRECOVER	REGENMAXONTIME	UVRECOVER	

Communication

Includes drive address, serial communication, fieldbus, peek-poke, privilege.

ADDR	ECEMCYMODE	FBGMS	MTPMODE
BAUDRATE	ECHO	FBITIDX	OPMODE
CHECKSUM	FBGDS	FBITPRD	PASSWORD
COMMODE	FBGMS	FBPLIGNORE	SYNCSOURCE
DELAY	FBITIDX	FBSCALE	
DRIVESCRIPT	FBITPRD	GETMODE	
DRIVESCRIPTST	FBGDS	MSGPROMPT	

Commutation

Includes phase find, phase advance, electrical angle, Hall sensors, sine commutation, six-step.

CANBITRATE	HALLS	MPITCH	PHASEFINDI
COMMERRMAXCNT	HALLSINV	MPOLES	PHASEFINDMODE
COMMERRTTHRESH	HALLSTYPE	MTANGLC	PHASEFINDST
COMMERRVTHRESH	MENCRES	MTANGLP	PHASEFINDTIME
COMMFLTTRESH	MENCTYPE	MVANGLF	WNSERR
COMMFLTTRESH	MENCZPOS	MVANGLH	ZERO
CONFIG	MOTORCOMMTYPE	PHASEFIND	ZEROST
ELECTANGLE	MOTORSETUP	PHASEFINDANGLE	
FEEDBACKTYPE	MOTORSETUPST	PHASEFINDDELTA	
GETREC	MPHASE	PHASEFINDGAIN	

Controller – Current

Includes controller, variables, DQ coordinates, and phase.

ANIN1ISCALE	I	IV	ML
ANIN2ISCALE	ICMD	IVOFFSET	MLGAINC
CLVD	ID	KCBEMF	MLGAINP
CLVQ	IFFLPFHZ	KCD	MOTORPHASESCAN
CONFIG	IGRAV	KCFF	OPMODE
ESTOPILIM	ILIM	KCI	OUTILVL1
FRICINEG	IMAX	KCMODE	OUTILVL2
FRICIPOS	IQ	KCP	STOP
FRICNVHYST	IU	MICONT	T
FRICPVHYST	IUOFFSET	MIPEAK	VBUS

Controller – Position

Includes controller, variables, and gains.

DIR	ICMD	MFBDIR	PEMAX
FRICINEG	INPOS	MODMODE	PFB
FRICIPOS	KNLVFF	MOVEABS	POSCONTROLMODE
FRICNVHYST	KPAFRC	MOVEINC	PROTARY
FRICPVHYST	KPAFRV	OPMODE	PTPTE
GEARIN	KPD	OUTPLVL1	PTPVCMD
GEARMODE	KPE	OUTPLVL2	STOP
GEAROUT	KPI	PCMD	STOPPED
HOLD	KPISATIN	PCMDFBRAW	UNITSLINPOS
HWPEXT	KPISATOUT	PE	UNITSROTPOS
HWPEXTCNTRLR	KPP	PEINPOS	VCMD
HWPEXTMACHN	KPVFR	PEINPOSTIME	
HWPOS	MECHANGLE	PELOOP	

Controller – Velocity

Includes controller, variables, and gains.

ANIN1VSCALE	J	OUTVLVL2	VELCONTROLMODE
BW	KVFR	STEP	VELDESIGN
FILTHZ1	KVI	STOP	VELFILTFRQ
FILTHZ2	KVP	TF	VELFILTMODE
FILTMODE	LMJR	UNITSLINVEL	VF
FRICINEG	MJ	UNITSROTVEL	VFI
FRICIPOS	MKT	V	VH
FRICNVHYST	MSPEED	VCMD	VLIM
FRICPVHYST	NLVELLIMOPMODE	VD	VMAX
ICMD	OUTVLVL1	VE	VR

Direction

Includes elements and procedures related to direction of elements and motion, such as feedback device, motor leads, Halls.

DIR	MECHANGLE	MOTORSETUPST	V
ELECTANGLE	MFBDIR	MPHASE	
HWPOS	MOTORSETUP	PFB	

Emergency Stop

Includes active disable, dynamic braking, and faults, commutation error (runaway).

DECDIST	DISMODE	HOLD	COMMERRVTHRESH
DECDIST2	DISSPEED	ISTOP	STOP
DECSTOP	DISTIME	COMMERRMAXCNT	
DECSTOPTIME	ESTOPILIM	COMMERRTTHRESH	

Feedback

Includes elements related to the position feedback device, such as sensAR, secondary feedback, incremental encoder, sine encoder, EnDat, resolver, Tamagawa, A quad B, index, Halls, Nikon, multi-turn.

ABSOFFSET	HWPEXTCNTRLR	MFBDIR	SININITST
BISSCFIELDS	HWPEXTMACHN	MFBMODE	SINPARAM
BISSCINFO	HWPOS	MTTURNRESET	SFBVCINFO
DIR	INDEXDURATE	MOTORSETUP	TMTEMP
FEEDBACKTYPE	INDEXPFB	MOTORSETUPST	TMTURNRESET
HALLS	INDEXST	MRESPOLES	UNITSLINPOS
HALLSFILTAFF	IGNOREBATTFLT	MSININT	UNITSROTPOS
HALLSFILTT1	IZERO	PFBBACKUP	XENCRES
HALLSFILTT2	MECHANGLE	PFBOFFSET	ZERO
HALLSFILTVELFF	MENCAQBFILT	RESAMPLRANGE	ZEROST
HALLSINV	MENCRES	RESBW	
HALLSTYPE	MENCTYPE	SININIT	
HWPEXT	MENCZPOS	SININITMODE	

Feedback – Secondary

Variables and commands for configuring and using secondary feedback, and for calibrating the voltage correction to ensure accuracy of secondary feedback.

SFB	SFBPETHRESH	SFBVCILIM	SFBVCSPDFAST
SFB2MOTORDEN	SFBPETIME	SFBVCINFO	SFBVCSPDSLOW
SFB2MOTORNUM	SFBPFBPE	SFBVCINFO2	SFBVCVLOW
SFBCMD	SFBTYPE	SFBVCMANUAL	SFBVCVUP
SFBMODE	SFBUNITSDEN	SFBVCMODE	SFBVEL
SFBOFFSET	SFBUNITSNUM	SFBVCSECT	
SFBPEMAX	SFBVCBLDIST	SFBVCSECT2	

Foldback

Variables and commands for configuring and using a foldback mechanism for thermal protection of the drive and motor.

DICONT	IFOLDWTHRESH	MFOLDR	MIFOLDWTHRESH
DIPEAK	MFOLD	MFOLDT	MIPEAK
FOLD	MFOLDD	MICONT	
IFOLD	MFOLDDIS	MIFOLD	
IFOLDFTHRESH	MFOLDF	MIFOLDFTHRESH	

Gearing

Includes: pulse following, scaling the pulse train, smoothing the profile.

ENCFOLLOWER	GEARFILTMODE	GEARINMODE	HWPEXTCNTRLR
GEAR	GEARFILTT1	GEARLIMITSMODE	HWPEXTMACHN
GEARACCTHRESH	GEARFILTT2	GEARMODE	OPMODE
GEARDBVAL	GEARFILTVELFF	GEAROUT	PCMD
GEARFILTAFF	GEARIN	HWPEXT	XENCRES

HD Control – Anti-Vibration

Variables and commands for configuring anti-vibration functionality.

NLAFFLPFHZ	NLANTIVIBHZ	NLANTIVIBN	NLANTIVIBSHARP3
NLANTIVIBGAIN	NLANTIVIBHZ2	NLANTIVIBQ3	
NLANTIVIBGAIN2	NLANTIVIBHZ3	NLANTIVIBSHARP	
NLANTIVIBGAIN3	NLANTIVIBLMJR	NLANTIVIBSHARP2	

HD Control – Basic Tuning

Variables and commands for tuning the HD control loop.
VarCom mnemonics beginning with **KNL** usually indicate a gain.
VarCom mnemonics beginning with **NL** indicate other properties, such as frequency, damping, ratio, time constants, and so on.

KNLAFRC	KNLUSERGAIN	NLNOTCH2CENTER	NLPEDFFRATIO
KNLD	NLFILTDAMPING	NLNOTCHBW	NLVELLIM
KNLI	NLFILTT1	NLNOTCHCENTER	
KNLIV	NLMAXGAIN	NLPEAFF	
KNLP	NLNOTCH2BW	NLAFFLPFHZ	

Homing

Variables and commands for configuring the drive’s homing procedure.

HOMEACC	HOMEIHARDSTOP	HOMESPEED1	HOMETYPE
HOMECMD	HOMEOFFSET	HOMESPEED2	
HOMECMDST	HOMEOFSTMOVE	HOMESTATE	

I/Os – Analog

Includes scaling, offset, deadband, LP filter, current command, velocity command, dual gain, configurable analog output.

ANIN1	ANIN1ISCALE	ANIN2LPFHZ	ANOUT
ANIN1DB	ANIN1LPFHZ	ANIN2MODE	ANOUTCMD
ANIN1FILTAFF	ANIN1OFFSET	ANIN2OFFSET	ANOUTISCALE
ANIN1FILTIN	ANIN1VSCALE	ANIN2USER	ANOUTLIM
ANIN1FILTMODE	ANIN1ZERO	ANIN2USERDEN	ANOUTMODE
ANIN1FILTT1	ANIN2	ANIN2USERNUM	ANOUTVSCALE
ANIN1FILTT2	ANIN2DB	ANIN2USEROFFSET	OPMODE
ANIN1FILTVELFF	ANIN2ISCALE	ANIN2ZERO	

I/Os – Digital

Includes touch probe, encoder simulation, limit switch, script, homing, clear fault, active state, brake, in position, stopped, invert polarity, drive script.

ENCOUTMODE	GEARMODE	HWPEXTMACHN	ININV
ENCOUTRES	GEAROUT	IN	INMODE
ENCOUTZPOS	HWPEXT	IN32OPMODES	INPUTS
GEARIN	HWPEXTCNTRLR	IN32SWITCH	JOGSPD1

JOGSPD2	OUTFLTLVL	OUTPLVL1	RELAY
OUT	OUTILVL1	OUTPLVL2	RELAYMODE
OUTBRAKE	OUTILVL2	OUTPUTS	SYNCSOURCE
OUTBRAKEINV	OUTINV	OUTVLVL1	XENCRES
OUTBRAKEMODE	OUTMODE	OUTVLVL2	

Limits

Includes current, velocity, position, soft limits, stall detection, foldback.

DICONT	ILIMACT	MIFOLD	STALLTIME
DIPEAK	IMAX	MIPEAK	STALLVEL
ESTOPILIM	LIMSWITCHNEG	MSPEED	VLIM
FOLD	LIMSWITCHPOS	POSLIMHYST	VMAX
HOMEIHARDSTOP	MFOLD	POSLIMMODE	
IFOLD	MFOLDDIS	POSLIMNEG	
ILIM	MICONT	POSLIMPOS	

Linear System

Includes support for linear motor units, pitch, mass, force.

MKF	MOTORTYPE	UNITSLINACC	UNITSLINVEL
MMASS	MPITCH	UNITSLINPOS	

Memory – Non-volatile

Includes non-volatile memory elements, low level dump, non-SSV parameters that are saved, position backup process, firmware upgrade, production key, factory restore.

DICONT	FACTORYRESTORE	PFBBACKUP	UVTHRESH
DIPEAK	LOAD	PFBBACKUPMODE	
DUMP	OVTHRESH	SAVE	

Motion

Includes command profile source, trapeze, S-curve, profile smoothing, serial motion commands, user selectable units, acceleration, deceleration.

ACC	MBST	MOVESMOOTHAVG	STOPPED
DEC	MODMODE	MOVESMOOTHLPFHZ	UNITSLINACC
DECSTOP	MOVEABS	MOVESMOOTHMODE	UNITSLINPOS
HOLD	MOVEINC	MOVESMOOTHSRC	UNITSLINVEL
HOLDMODE	MOVEINCCOUNTER	PDEN	UNITSROTACC
IN32OPMODES	MOVEINCDELAY	PEINPOSTIME	UNITSROTPOS
IN32SWITCH	MOVEINCDIST1	PNUM	UNITSROTVEL
J	MOVEINCDIST2	PROTARY	VELCMDMOVEAVG
JOGSPD1	MOVEINCSPEED1	PTPTE	VLIM
JOGSPD2	MOVEINCSPEED2	PTPVCMD	
MB	MOVESINE	STEP	

Motor

Includes motor configuration parameters, type of motor, type of feedback, type of encoder, directions, thermal switch, phase advance, adaptive gain, foldback readout, temperature readout, motor setup procedure, motor parameter estimation.

DIR	MIFOLD	MOTORSETUP	MVANGLH
FEEDBACKTYPE	MIFOLDFTHRESH	MOTORSETUPST	OUTBRAKE
MENCRES	MIFOLDWTHRESH	MOTORTYPE	OUTBRAKEINV
MENCTYPE	MIPEAK	MPHASE	OUTBRAKEMODE
MENCZPOS	MJ	MPITCH	THERM
MFBDIR	MKF	MPOLES	THERMCLEARLEVEL
MFOLD	MKT	MR	THERMODE
MFOLDD	ML	MRESPOLES	THERMREADOUT
MFOLDDIS	MLGAINC	MSPEED	THERMTIME
MFOLDF	MLGAINP	MTANGLC	THERMTRIPLEVEL
MFOLDR	MMASS	MTANGLP	THERMTYPE
MFOLDT	MOTORCOMMTYPE	MTPMODE	
MICONT	MOTORNAME	MVANGLF	

Recording

Includes captured signals for analysis, triggering, variables, timing, data retrieval.

GET	PRBPARAM	RECOFF	RECTRIGLIST
GETMODE	RECDONE	RECORD	
PRBFRQ	RECING	RECRDY	
PRBMODE	RECLIST	RECTRIG	

Temperature

Includes thermal protection mechanisms, motor thermal switch, foldback limit, IPM temperature.

DRIVETEMP	THERMODE	THERMTRIPLEVEL
THERM	THERMREADOUT	THERMTYPE
THERMCLEARLEVEL	THERMTIME	TMTEMP

Touch Probe

Variables and commands for configuring and using a touch probe.

PROBECONFIG	PROBEDATAFALL	PROBELEVELPRD
PROBECOUNTER	PROBEDATARISE	PROBESTATUS

Units

Configurable units for linear and rotary motor systems, with several acceleration, velocity and position unit options.

ABSOFFSET	HOMEACC	OUTVLVL1	STEP
ACC	HOMEOFFSET	OUTVLVL2	UNITSLINACC
ANIN1VSCALE	HOMESPEED1	PCMD	UNITSLINPOS
ANIN2USER	HOMESPEED2	PDEN	UNITSLINVEL
ANIN2USERDEN	INDEXPFB	PE	UNITSROTACC
ANIN2USERNUM	J	PEINPOS	UNITSROTPOS
ANIN2USEROFFSET	KVP	PELOOP	UNITSROTVEL
ANOUTVSCALE	MOVEABS	PEMAX	V
DEC	MOVEINC	PFB	VCMD
DECDIST	MOVEINCDIST1	PFBOFFSET	VE
DECDIST2	MOVEINCDIST2	PNUM	VLIM
DECSTOP	MOVEINCSPEED1	POSLIMNEG	VMAX
DISSPEED	MOVEINCSPEED2	POSLIMPOS	
FRICNVHYST	MSPEED	PTPTE	
FRICPVHYST	OUTPLVL1	PTPVCMD	
GEARACCTHRESH	OUTPLVL2	STALLVEL	

3 Variables and Commands

ABSOFFSET

Definition	Absolute Feedback Offset
Type	Variable (R/W)
Description	Gets/sets the offset value that is added to the initial absolute position detected by a HIPERFACE encoder after a power-cycle.
Syntax	Read: ABSOFFSET Write: ABSOFFSET <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	HOMETYPE PFB PFBOFFSET
CANopen	200Dh, sub-index 0

ACC

Definition	Acceleration
Type	Variable (R/W)
Description	Gets/sets the following values: ■ Acceleration of internal profile velocity commands J (jog) and STEP. ■ Acceleration of internal profile position commands MOVEINC and MOVEABS. ■ Acceleration limit of P&D reference command (refer to GEARLIMITSMODE). ■ Acceleration limit of EtherCAT/CANopen reference commands. ■ Acceleration limit of the velocity command VCMD in Analog Velocity mode.
Syntax	Read: ACC Write: ACC <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.004 to 16666.666 UNITSROTACC 1 = 0.23 to 1000000 UNITSROTACC 2 = 1.35 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0.12 to 533333.333
Default value	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 10.000 UNITSROTACC 1 = 40000.000 UNITSROTACC 2 = 3600.000 UNITSROTACC 3 = 50.000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 320.000
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes
See also	DEC DECSTOP J STEP UNITSROTACC
CANopen	6083h, sub-index 0

ACTIVE

Definition	Drive Active Status (Drive Enabled)
Type	Variable (R)
Description	Indicates whether the drive is enabled and power is being applied to the motor. This variable is the drive's general operation status indicator.
Syntax	ACTIVE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Drive is inactive 1 = Drive is enabled
Default value	Not applicable
Unit	Not applicable
Non-volatile	No
See also	EN FLT J READY REMOTE ST SWEN

ADDR

Definition	Rotary Address Switch
Type	Variable (R)
Description	Indicates the rotary switch position that defines the drive's communication address.
Syntax	ADDR
Firmware	1.0.6
Drive status	Enabled | Disabled
CDHD Range	00 to 99
DDHD Range	00 to 10
Default value	Hardware defined
Unit	Not applicable
Non-volatile	No

Example	`-->addr`
	`03`
	`-->`

See also	ECHO MSGPROMPT
CANopen	20E1h, sub-index 0

ANIN1

Definition	Analog Input 1 Value
Type	Variable (R)
Description	Indicates the value of analog input 1.
Syntax	ANIN1
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±12.5
Default value	Not applicable
Unit	V
Non-volatile	No
See also	ANIN1DB ANIN1ISCALE ANIN1LPFHZ ANIN1OFFSET ANIN1VSCALE ANIN1ZERO ANIN2
CANopen	20F2h, sub-index 0

ANIN1DB

Definition	Analog Input 1 Deadband
Type	Variable (R/W)
Description	Gets/sets the deadband of analog input 1. If the absolute value of the analog input signal is less than this value, no analog command signal is generated. This function is useful for preventing the drive from responding to voltage noise near the zero point of the analog input. If ANIN1DB = 0.6, for example, the actual deadband range is -600 mV to +600 mV, and no motor movement occurs when the analog input voltage is within this range.
Syntax	Read: ANIN1DB Write: ANIN1DB <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 10
Default value	0.000
Unit	V
Non-volatile	Yes
See also	ANIN1 ANIN2LPFHZ
CANopen	20F3h, sub-index 0

ANIN1FILTAFF

Definition	Analog Input 1 MSQ Filter Second Derivative Feedforward
Type	Variable (R/W)
Description	Gets/sets an adjustable gain for the second derivative feedforward from the mean square filter applied to analog input 1.
Syntax	Read: ANIN1FILTAFF Write: ANIN1FILTAFF<*value*>
Firmware	1.40.0
Drive status	Disable
Range	-2 to 2
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes

Example	`--> ANIN1FILTAFF`
	`0`
	`--> ANIN1FILTAFF 1`

See also	ANIN1 ANIN1FILTIN ANIN1FILTMODE ANIN1FILTT1 ANIN1FILTT2 ANIN1FILTVELFF
CANopen	

ANIN1FILTIN

Definition	Analog Input 1 Value Before Mean Square Filter
Type	Variable (R)
Description	Value of the analog input 1 signal before the mean square filter is applied.
Syntax	ANIN1FILTIN
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	±12.5
Default value	0.000
Unit	V
Non-volatile	Yes | No
See also	ANIN1 ANIN1FILTAFF ANIN1FILTMODE ANIN1FILTT1 ANIN1FILTT2 ANIN1FILTVELFF
CANopen	

ANIN1FILTMODE

Definition	Analog Input 1 Mean Square Filter
Type	Variable (R/W)
Description	Defines whether or not the mean square filter on the analog input 1 signal is activated.
Syntax	Read: ANIN1FILTMODE Write: ANIN1FILTMODE <*value*>
Firmware	1.40.x
Drive status	Disabled
Range	0 = Mean square filter not activated 1 = Mean square filter activated
Default value	0
Unit	Not Applicable
Non-volatile	Yes

Example	`--> ANIN1FILTMODE`
	`0`
	`--> ANIN1FILTMODE 1`

See also	ANIN1 ANIN1FILTAFF ANIN1FILTIN ANIN1FILTT1 ANIN1FILTT2 ANIN1FILTVELFF
CANopen	

ANIN1FILTT1

Definition	Analog Input 1 Filter Depth
Type	Variable (R/W)
Description	Gets/sets the filtering time of the mean square filter on the analog input 1 signal, in 125 μs quanta.
Syntax	Read: ANIN1FILTT1 Write: ANIN1FILTT1 <*value*>
Firmware	1.40.0
Drive status	Disabled
Range	0.375 to 32
Default value	2.000
Unit	ms
Non-volatile	Yes

Example	`--> ANIN1FILTT1`
	`2.000 [ms]`
	`--> ANIN1FILTT1 3`

See also	ANIN1 ANIN1FILTAFF ANIN1FILTIN ANIN1FILTMODE ANIN1FILTT2 ANIN1FILTVELFF
CANopen	

ANIN1FILTT2

Definition	Analog Input 1 MSQ Filter Depth First and Second Derivative
Type	Variable (R/W)
Description	Gets/sets the filtering time of the mean square filter for the first and second derivative analog on the input 1 signal, in 125 µs quanta.
Syntax	Read: ANIN1FILTT2 Write: ANIN1FILTT3 <*value*>
Firmware	1.40.0
Drive status	Disabled
Range	0 to 32
Default value	4.000
Unit	ms
Non-volatile	Yes

Example	`--> ANIN1FILTT2`
	`4.000 [ms]`
	`--> ANIN1FILTT2 3`

See also	ANIN1 ANIN1FILTAFF ANIN1FILTIN ANIN1FILTMODE ANIN1FILTT1 ANIN1FILTVELFF
CANopen	

ANIN1FILTVELFF

Definition	Analog Input 1 MSQ Filter First Derivative Feedforward
Type	Variable (R/W)
Description	Gets/sets an adjustable gain for the first derivative feedforward from the mean square filter applied to analog input 1.
Syntax	Read: ANIN1FILTVELFF Write: ANIN1FILTVELFF <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	-32 to 32
Default value	0.000
Unit	ms
Non-volatile	Yes

Example	`--> ANIN1FILTAFF`
	`0.000 [ms]`
	`--> ANIN1FILTAFF 1`

See also	ANIN1 ANIN1FILTAFF ANIN1FILTIN ANIN1FILTMODE ANIN1FILTT1 ANIN1FILTT2
CANopen	

ANIN1ISCALE

Definition	Analog Input 1 Current Scaling
Type	Variable (R/W)
Description	Gets/sets the scaling value of the analog current command from input 1. Current scaling affects how the motor current varies relative to any change in voltage at the analog input command. When the first analog input is used as the command for the current loop, it is important to set the scaling, that is, the ratio of the analog input voltage to the command that the drive interprets. For example, ANIN1ISCALE = 0.1 will produce a change of 0.1A to the motor for every 1V change.
Syntax	Read: ANIN1ISCALE Write: ANIN1ISCALE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±0.001 to DIPEAK
Default value	DIPEAK/100
Unit	A/V
Non-volatile	Yes
See also	OPMODE
CANopen	20F4h, sub-index 0

ANIN1LPFHZ

Definition	Analog Input 1 Filter
Type	Variable (R/W)
Description	Gets/sets the corner frequency of a first order (low pass) filter that is applied to analog input 1. This function is useful for filtering out high frequency noise from the analog input, or for limiting the rate of change of that signal. The ANIN1LPFHZ value represents the corner frequency of the filter. This filter is always present and is adjusted automatically as the analog input sampling rate changes for different operational modes. **Note**: If ANIN1LPFHZ is set to 10000, the filter will have no effect on the analog input value.
Syntax	Read: ANIN1LPFHZ Write: ANIN1LPFHZ <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	10 to 10000
Default value	1000
Unit	Hz
Non-volatile	Yes
See also	ANIN1 ANIN1DB
CANopen	20F5h, sub-index 0

ANIN1OFFSET

Definition	Analog Input 1 Offset
Type	Variable (R/W)
Description	Gets/sets the offset voltage for analog input 1. Used to compensate for the analog input signal offset or drift. The offset can also be set by a zeroing procedure, using the command ANIN1ZERO.
	The drive can receive an analog input signal in the range of ±10V. The drive uses the value stored in the ANIN1 variable to command the velocity of the motor or the current applied to the motor. The default correlation between the actual input signal and the value of ANIN1 is ±10V = ±10000 mV. However, some applications provide, or require, a different analog input signal range. The drive analog offset function (ANIN1OFFSET) modifies the range correlation of the analog input signal and the velocity loop command (ANIN1). However, the value of ANIN1 remains ±10V; the upper value cannot be greater than 10V and the lower value cannot be less than -10V. For example, if ANIN1OFFSET = 5000, an analog input signal range of ±10V equates to a command range of -5000 mV to +10000 mV. Motor movement is in response to a range of -5V to 10V on the input.
Syntax	Read: ANIN1OFFSET Write: ANIN1OFFSET <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±10
Default value	0.000
Unit	V
Non-volatile	Yes
See also	ANIN1 ANIN1ZERO
CANopen	20F6h, sub-index 0

ANIN1VSCALE

Definition	Analog Input 1 Velocity Scaling
Type	Variable (R/W)
Description	Gets/sets the scaling of the analog velocity command from input 1.
	Velocity scaling affects how the motor speed will vary as a result of any change in voltage at the analog velocity command. When the first analog input is used as the command for the velocity loop, it is important to set the scaling, that is, the ratio of the analog input voltage to the command that the drive interprets. For example, if ANIN1VSCALE = 500 and UNITSROTVEL=1 (rpm), the result will be a variation of 500 rpm in the motor velocity for every 1V change.
Syntax	Read: ANIN1VSCALE Write: ANIN1VSCALE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = ±(0.001 to 3999.999) UNITSROTVEL 1 = ±(0.06 to 239999.94) UNITSROTVEL 2 = ±(0.36 to 1439999.64) If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = ±(0.032 to 127999.96)
Default value	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = 0.001 UNITSROTVEL 1 = 0.060 UNITSROTVEL 2 = 0.360 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 0.032
Unit	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = rps/V UNITSROTVEL 1 = rpm/V UNITSROTVEL 2 = (deg/s)/V If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = (mm/s)/V
Non-volatile	Yes
See also	OPMODE
CANopen	20F7h, sub-index 0

ANIN1ZERO

Definition	Analog Input 1 Zeroing
Type	Command
Description	Causes the value of the analog input 1 signal to become 0 by modifying the analog offset value (ANIN1OFFSET).
	This command samples the analog input 64 times, calculates an average, and then adjusts IN1OFFSET to cancel out any input offset that may be present from such factors as drift and noise.
Syntax	ANIN1ZERO
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not applicable
Default value	Not applicable
Unit	Not applicable
Non-volatile	Not applicable
See also	ANIN1OFFSET
CANopen	20F8h, sub-index 0

ANIN2

Definition	Analog Input 2 Value
Type	Variable (R)
Description	Indicates the value of analog input 2.
Syntax	ANIN2
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±12.5
Default value	Not applicable
Unit	V
Non-volatile	No
See also	ANIN1 ANIN2MODE
CANopen	20F9h, sub-index 0

ANIN2DB

Definition	Analog Input 2 Deadband
Type	Variable (R/W)
Description	Gets/sets the deadband of analog input 2. If the absolute value of the analog input signal is less than this value, no analog command signal is generated.
Syntax	Read: ANIN2DB Write: ANIN2DB <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 10
Default value	0.000
Unit	V
Non-volatile	Yes
See also	ANIN1DB ANIN2 ANIN2LPFHZ
CANopen	20FAh, sub-index 0

ANIN2ISCALE

Definition	Analog Input 2 Current (Torque) Scaling
Type	Variable (R/W)
Description	Gets/sets the scaling of the analog current command from input 2.
	When the second analog input is configured as the analog current limit, ANIN2SCALE sets the scaling of the current limit, in amperes per volt. The valid input voltage range for this functionality is 0-10 V, since current and current limits in the drive are positive values only. A negative analog input will be interpreted as zero.
Syntax	Read: ANIN2ISCALE Write: ANIN2ISCALE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±0.001 to DIPEAK
Default value	DIPEAK/100
Unit	A/V
Non-volatile	Yes
See also	ANIN1ISCALE ANIN2 ANIN2MODE
CANopen	20FBh, sub-index 0

ANIN2LPFHZ

Definition	Analog Input 2 Filter
Type	Variable (R/W)
Description	Gets/sets the corner frequency of a first order filter that is applied to analog input 2. **Note**: If ANIN2LPFHZ is set to 10000, the filter will have no effect on the analog input value.
Syntax	Read: ANIN2LPFHZ Write: ANIN2LPFHZ <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	10 to 10000
Default value	1000
Unit	Hz
Non-volatile	Yes
See also	ANIN1LPFHZ ANIN2 ANIN2DB
CANopen	20FCh, sub-index 0

ANIN2MODE

Definition	Analog Input 2 Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines the function of analog input 2.
Syntax	Read: ANIN2MODE Write: ANIN2MODE <*value*>
Firmware	1.0.6
Drive status	Disabled
CDHD Range	-1= Hardware defined dual gain. ANIN2 is inactive, ANIN1 has a 16 bit resolution, ANIN2MODE is read only. 0 = Idle. ANIN2 input voltage is read only. 1 = Dual gain - external jumper connection between the analog inputs is required. 2 = Current limit mode - second analog input limits current command (uses ANIN2ISCALE) **Note**: Make sure hardware matches this configuration.
CDHD Default value	0 = When the drive is configured with Analog Input 2 -1 =When the drive is not configured with Analog Input 2
DDHD Range	0 = Unavailable. **Note:** In DDHD, each axis has only one analog input: ■ For axis 1, analog input is ANIN1 (interface C4 – pins 24 and 49). ■ For axis 2, analog input is ANIN1 (interface C4 – pins 25 and 50).
Unit	Not Applicable
Non-volatile	Yes
See also	ANIN2 ANIN2ISCALE
CANopen	2100h, sub-index 0

ANIN2OFFSET

Definition	Analog Input 2 Offset
Type	Variable (R/W)
Description	Gets/sets the offset voltage for analog input 2. Used to compensate for the analog input signal offset or drift. The offset can also be set by a zeroing procedure, using the command ANIN2ZERO.
Syntax	Read: ANIN2OFFSET Write: ANIN2OFFSET <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±10
Default value	0.000
Unit	V
Non-volatile	Yes
See also	ANIN1OFFSET ANIN2 ANIN2ZERO
CANopen	20FDh, sub-index 0

ANIN2USER

Definition	Analog Input 2 Voltage Defined in User Units
Type	Variable (R)
Description	Returns the value of the analog input 2 voltage converted into a user-defined unit. ANIN2USER is calculated as follows: $ANIN2USER = ANIN2 \times (\frac{ANIN2USERNUM}{ANIN2USERDEN}) + ANIN2USEROFFSET$ This equation defines the number of units (ANIN2USER) that are equivalent to a voltage value (ANIN2USERDEN).
Syntax	ANIN2USER
Firmware	1.20.6
Drive status	Enable | Disable
Range	Not Applicable
Default value	Not Applicable
Unit	User defined
Non-volatile	No
Example	`-->ANIN2USER` `-7654`
See also	ANIN2USERDEN ANIN2USERNUM ANIN2USEROFFSET
CANopen	Not Applicable

ANIN2USERDEN

Definition	Analog Input 2 Value Conversion to ANIN2USER - Denominator
Type	Variable (R/W)
Description	Gets/sets the denominator value in the ANIN2USER equation: $ANIN2USER = ANIN2 \times (\frac{ANIN2USERNUM}{ANIN2USERDEN}) + ANIN2USEROFFSET$
Syntax	ANIN2USERDEN
Firmware	1.20.6
Drive status	Enable | Disable
Range	1 to 2147483647
Default value	1
Unit	V
Non-volatile	Yes

Example	`--> ANIN2USERDEN`
	`1`
	`--> ANIN2USERDEN 1234`
	`-->`

See also	ANIN2USER ANIN2USERNUM ANIN2USEROFFSET
CANopen	216Eh, sub-index 0

ANIN2USERNUM

Definition	Analog Input 2 Value Conversion to ANIN2USER - Numerator
Type	Variable (R/W)
Description	Gets/sets the numerator value in the ANIN2USER equation: $ANIN2USER = ANIN2 \times (\frac{ANIN2USERNUM}{ANIN2USERDEN}) + ANIN2USEROFFSET$
Syntax	ANIN2USERNUM
Firmware	1.20.6
Drive status	Enable | Disable
Range	-2147483647 to 2147483647
Default value	100
Unit	User defined
Non-volatile	Yes
Example	--> ANIN2USERNUM 100 --> ANIN2USERNUM 1234 -->
See also	ANIN2USER ANIN2USERDEN ANIN2USEROFFSET
CANopen	216Fh, sub-index 0

ANIN2USEROFFSET

Definition	Analog Input 2 Value Conversion to ANIN2USER - Offset
Type	Variable (R/W)
Description	Gets/sets the offset value in the ANIN2USER equation: $ANIN2USER = ANIN2 \times (\frac{ANIN2USERNUM}{ANIN2USERDEN}) + ANIN2USEROFFSET$
Syntax	Read: ANIN2USEROFFSET Write: ANIN2USEROFFSET <*value*>
Firmware	1.20.6
Drive status	Enable | Disable
Range	-2147483647 to 2147483647
Default value	0
Unit	User defined
Non-volatile	Yes

Example	`--> ANIN2USEROFFSET`
	`0`
	`--> ANIN2USEROFFSET 1234`
	`-->`

See also	ANIN2USER ANIN2USERDEN ANIN2USERNUM
CANopen	2170h, sub-index 0

ANIN2ZERO

Definition	Analog Input 2 Zero Command
Type	Command
Description	Causes the value of the analog input 2 signal to become 0 by modifying the analog offset value (ANIN2OFFSET).
Syntax	ANIN2ZERO
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not applicable
Default value	Not applicable
Unit	Not applicable
Non-volatile	Not applicable
See also	ANIN1ZERO ANIN2 ANIN2OFFSET
CANopen	20FFh, sub-index 0

ANOUT

Definition	Analog Output Value
Type	Variable (R)
Description	Indicates the analog output value, in volts, as set by ANOUTMODE. The drive's analog output capability is ±12V.
Syntax	ANOUT
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±12
Default value	Not applicable
Unit	V
Non-volatile	No
See also	ANOUTMODE ANOUTCMD
CANopen	2133h, sub-index 0

ANOUTCMD

Definition	Analog Output Command
Type	Command
Description	The analog output value set by user. Requires ANOUTMODE 0
Syntax	ANOUTCMD {*value*}
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±ANOUTLIM
Default value	0
Unit	V
Non-volatile	No
See also	ANOUT ANOUTLIM ANOUTMODE
CANopen	2134h, sub-index 0

ANOUTISCALE

Definition	Analog Output Current Scaling
Type	Variable (R/W)
Description	Gets/sets the scaling of the analog output voltage that represents the motor current (I) or the current command (ICMD). For example, if ANOUTMODE=4 (current command monitoring): ANOUT [V] = ICMD [A] ÷ ANOUTISCALE [A/V]
Syntax	ANOUTISCALE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 10
Default value	0.01 × DIPEAK
Unit	A/V
Non-volatile	Yes
See also	ANOUT ANOUTLIM ANOUTMODE
CANopen	2135h, sub-index 0

ANOUTLIM

Definition	Analog Output Voltage Limit
Type	Variable (R/W)
Description	Gets/sets the maximum voltage of the analog output command for all modes.
Syntax	ANOUTLIM
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	1 to 12
Default value	10.000
Unit	V
Non-volatile	Yes
See also	ANOUT ANOUTCMD ANOUTMODE
CANopen	2136h, sub-index 0

ANOUTMODE

Definition	Analog Output Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines the function of the analog output. Known Limitation: For the first 3 seconds after power-up, DAC will output 12V.
Syntax	Read: ANOUTMODE Write: ANOUTMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = User command. Uses value set by ANOUTCMD. 1 = Tachometer mode. For velocity feedback. 2 = Equivalent current monitoring. 3 = Velocity error monitoring. 4 = Current command monitoring. 5 = Triangle wave at low frequency (0.041 Hz). For testing. 6 = Current in-phase component (IQ) monitoring. 7 = Reserved (output 0). 8 = Reserved (output 0). 9 = Reserved. 10 = Reserved. 11 = Triangle wave (10 Hz). 12 = Rectangular wave (10 Hz). 13 = Velocity command (VCMD). 14 = Deactivated (ANOUT not supported; typically due to hardware limitation).
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	ANOUT ANOUTCMD ANOUTISCALE ANOUTLIM ANOUTVSCALE
Note	Velocity variables are scaled by ANOUTVSCALE, while current variables are scaled by ANOUTISCALE.
CANopen	2137h, sub-index 0

ANOUTVSCALE

Definition	Analog Output Velocity Scaling
Type	Variable (R/W)
Description	Gets/sets the scaling of the analog output voltage that represents the actual velocity (V) or the velocity error (VE).
Syntax	Read: ANOUTVSCALE Write: ANOUTVSCALE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary) UNITSROTVEL 0 = -3999.999 to 3999.999 UNITSROTVEL 1 = -239999.940 to 239999.940 UNITSROTVEL 2 = -1439999.640 to 1439999.640 If MOTORTYPE 0 (Linear) UNITSROTVEL 1 = -127999.968 to 127999.968
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = rps/V UNITSROTVEL 1 = rpm/V UNITSROTVEL 2 = (deg/s)/V If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = (mm/s)/V
Non-volatile	Yes
See also	ANOUT ANOUTLIM ANOUTMODE
CANopen	2138h, sub-index 0

AUTOHOME

Definition	Automatic Homing Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines whether or not automatic homing will be performed at power up. When automatic homing mode is active, homing will be attempted as soon as the drive is enabled for the first time after power up (even if faults needed to be cleared first). The drive should be in a position operation mode (OPMODE 4 or OPMODE 8).
Syntax	Read: AUTOHOME Write: AUTOHOME <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	0 = No Action. User must initiate homing manually. 1 = Homing to be attempted after power up if conditions allow (that is, drive is enabled by means of a serial or hardware command, and no faults exist).
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	HOMECMD HOMETYPE
CANopen	200Eh, sub-index 0

BAUDRATE

Definition	Serial Baud Rate
Type	Variable (R/W)
Description	Sets the communication bit rate between the drive and host computer. It is intended to enable more reliable communication in noisy environments. Changing the bit rate requires reestablishing communication with the PC software. At bootup, the 7-segment displays the message **b r x x x x x** (x = selected baud rate) if the baud rate is not the default value.
Syntax	READ: BAUDRATE WRITE: BAUDRATE <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	9600 19200 38400 57600 115200
Default value	115200
Unit	bps
Non-volatile	Yes
See also	

BISSCFIELDS

Definition	BiSS-C Encoder Data Fields Lengths and Bits
Type	Command
Description	The drive firmware handles various BiSS-C devices according to the communication packet structure defined by the command BISSCFIELDS. This command sets the encoder multi-turn data length, multi-turn data resolution, single-turn data length, and single-turn data resolution values.
Syntax	BISSCFIELDS {*aa bb cc dd*} where: *aa* = multi-turn data length value; *aa* must be equal to or greater than *bb* *bb* = multi-turn data resolution value [*aa*+*bb*] sum must not exceed 45 *cc* = single-turn data length value; *cc* must be equal to or greater than *dd* *dd* = single-turn data resolution value
Firmware	1.20.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	BISSCINFO
CANopen	2176h, sub-index 0

BISSCINFO

Definition	BiSS-C Encoder Info
Type	Command
Description	Returns information about the BiSS-C device.
Syntax	BISSCINFO
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	BISSCFIELDS

BW

Definition	Velocity Loop Bandwidth for Pole Placement
Type	Variable (R/W)
Description	Gets/sets the velocity control loop bandwidth for the pole placement controller. (VELCONTROLMODE 2 or 4)
Syntax	Read: BW Write: BW <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	10 to 600
Default value	30
Unit	Hz
Non-volatile	Yes
See also	FILTMODE LMJR MJ MKT TF VELCONTROLMODE
CANopen	2010h, sub-index 0

CANBITRATE

Definition	CAN Bus Bit Rate
Type	Variable (R/W)
Description	Gets/sets the CAN bus bit rate. When the drive is powered, it assumes the bit rate of any existing communication on the CAN bus. If no such communication is detected, the drive sets the communication rate to the CANBITRATE value. For the CANBITRATE setting to take effect, a SAVE command followed by a cycle power sequence must be executed.
Syntax	CANBITRATE CANBITRATE <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	1 = 125 kbps 2 = 250 kbps 3 = 500 kbps 4 = 1000 kbps (required for CDHD with softMC 7)
Default value	3
Unit	Not Applicable
Non-volatile	Yes
See also	FBGDS FBITPRD

CHECKSUM

Definition	Checksum
Type	Variable (R/W)
Description	Enables/disables checksum protection on messages communicated between drive and host. The checksum is an 8-bit value, displayed within brackets <>. For example, 0x1F checksum is displayed as <1F> at the end of the message before the carriage return.
Syntax	Read: CHECKSUM Write: CHECKSUM <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Message checksum disabled 1 = Message checksum enabled
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	COMMODE ECHO MSGPROMPT

CLEARFAULTS

Definition	Clear Faults
Type	Command
Description	Clears latched faults. Once all faults are cleared, the drive becomes ready for activation (READY). If clearing the faults causes the drive to re-enable, then software enable (SWEN) is disabled to prevent spontaneous re-enable.
Note	When using a Tamagawa 17-bit multi-turn encoder, the command CLEARFAULT must be preceded by the command TMTURNRESET.
Syntax	CLEARFAULTS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	DISMODE FLT FLTHIST

CLVD

Definition	Voltage Command D Component
Type	Variable (R)
Description	Shows the D output of the current controller.
Syntax	CLVD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Internal
Default value	Not Applicable
Unit	V
Non-volatile	No
See also	CLVQ
CANopen	2013h, sub-index 0

CLVQ

Definition	Voltage Command Q Component
Type	Variable (R)
Description	Shows the Q output of the current controller.
Syntax	CLVQ
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Internal
Default value	Not Applicable
Unit	V
Non-volatile	No
See also	CLVD
CANopen	2014h, sub-index 0

COMMERRMAXCNT

Definition	Commutation Error Counter
Type	Variable (R/W)
Description	Gets/clears the variable whose value indicates the commutation error count since COMMERRMAXCNT was last cleared.
Note	Replaces RAMAXERRCNT
Syntax	Read: COMMERRMAXCNT Write: COMMERRMAXCNT 0
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 (no other value allowed)
Default value	0
Unit	ms
Non-volatile	No
See also	COMMERRVTHRESH COMMFLTTRESH

COMMERRTTHRESH

Definition	Commutation Error Threshold
Type	Variable (R/W)
Description	Motor commutation errors are typically caused by incorrect wiring, incorrect parameters values, or encoder malfunction. The commutation error parameters allow users to define the settings for detecting an uncontrolled motion and declaring a fault. COMMERRTTHRESH gets/sets the error-counter threshold value for generating a commutation fault. When the commutation error is detected consecutively for COMMERRTTHRESH number of times, a commutation fault is generated.
Note	Replaces RATTHRESH
Syntax	Read: COMMERRTTHRESH Write: COMMERRTTHRESH <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 to 3000
Default value	0
Unit	ms
Non-volatile	Yes
See also	COMMERRVTHRESH COMMFLTTRESH

COMMERRVTHRESH

Definition	Commutation Error Velocity Deviation
Type	Variable (R/W)
Description	Motor commutation errors are typically caused by incorrect wiring, incorrect parameters values, or encoder malfunction. The commutation error parameters allow users to define the settings for detecting an uncontrolled motion and declaring a fault. COMMERRVTHRESH gets/sets the threshold value of velocity deviation that will generate a commutation fault.
Note	Replaces parameter RAVTHRESH
Syntax	Read: COMMERRVTHRESH Write: COMMERRVTHRESH <*value*>
Firmware	1.40.0
Drive status	Enable | Disable
Range	0 to VLIM
Default value	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 = 1.000 If UNITSROTVEL 1 = 60.000 If UNITSROTVEL 2 = 359.999 If UNITSROTVEL 3 = 1×(PNUM/PDEN) If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 1×MPITCH UNITSLINVEL 2 = 1×(PNUM/PDEN)
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 = rps If UNITSROTVEL 1 = rpm If UNITSROTVEL 2 = deg/s If UNITSROTVEL 3 = user/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s UNITSLINVEL 2 = user/s
Non-volatile	Yes
See also	COMMFLTTRESH

COMMFLTTRESH

Definition	Commutation Error Index Position Deviation
Type	Variable (R/W)
Description	Motor commutation errors are typically caused by incorrect wiring, incorrect parameters values, or encoder malfunction. The commutation error parameters allow users to define the settings for detecting an uncontrolled motion and declaring a fault. COMMFLTTRESH gets/sets the value of commutation deviation from the index position that will generate a commutation fault. After commutation is initialized, the commutation angle at the index crossing position is monitored; if the angle deviates from the initial location by more than COMMFLTTRESH, a commutation fault is declared. The fault disables the drive according to the DISMODE setting for a (still) reliable feedback condition. The error message is "AqB Commutation fault", and the 7-segment LED display shows error code **r39**. Use COMMFLTTRESH 0 to disable this function.
Notes	Applicable for use only with encoders that have an index pulse. COMMFLTTRESH; not COMMFLTHRESH
Syntax	Read: COMMFLTTRESH Write: COMMFLTTRESH <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 20
Default value	2
Unit	Electrical degree
Non-volatile	Yes
See also	COMMERRMAXCNT COMMERRTTHRESH COMMERRVTHRESH DISMODE ELECTANGLE FEEDBACKTYPE MENCTYPE MPHASE

COMMODE

Definition	Communication Interface Mode
Type	Variable (R/W)
Description	Gets/sets the fieldbus communication interface mode. COMMODE 1 is applicable only for EtherCAT and CANopen drives.
Syntax	Read: COMMODE Write: COMMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Serial RS232/USB communication enabled. EtherCAT/CANopen communication disabled. Drive can be software enabled at power-up (SWENMODE). Reference commands accepted via serial/pulse /analog interfaces only. 1 = For EtherCAT/CANopen drive only. EtherCAT/CANopen communication is enabled. Serial RS232/USB communication can be used as a utility for monitoring and changing parameters with limited functionality. Reference commands cannot be received via serial/ pulse/analog interfaces.
Default value	0 = For analog drive 1 = For CAN/EtherCAT drive
Unit	Not Applicable
Non-volatile	Yes
See also	CHECKSUM MSGPROMPT SWENMODE

CONFIG

Definition	Configure Drive
Type	Command
Description	Configures the current control and other internal drive mechanisms based on the configuration set. Since this configuration procedure depends on several variables, it is not executed automatically following parameter changes. The configuration process may take more than a few seconds to complete. Be sure the configuration has completed before attempting to enable the drive. When configuration is required, the 7-segment display shows **-1**.
	CONFIG is required after modifying the value of certain parameters, including, but not necessarily limited to, the following: DIR ENCOUTMODE ENCOUTRES FEEDBACKTYPE KCBEMF KCD KCFF KCI KCP MENCRES MENCTYPE MFBDIR MFBMODE MICONT MIPEAK MJ MKF MKT ML MLGAINC MLGAINP MOTORCOMMTYPE MOTORTYPE MPITCH MPOLES MR MRESPOLES MSININT MSPEED PWMFRQ VBUS VLIM
Syntax	CONFIG
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	MENCTYPE ML
CANopen	2002h, sub-index 0

CUSTOMERID

Definition	Customer ID
Type	Variable (R/W)
Description	Gets/sets a customer ID assigned to the drive unit.
Syntax	Read: CUSTOMERID Write: CUSTOMERID <*value*>
Firmware	1.41.9
Drive status	Enabled | Disabled
Range	0 to 4294967295
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	

DEC

Definition	Deceleration
Type	Variable (R/W)
Description	Gets/sets the deceleration value of the drive.
Syntax	Read: DEC Write: DEC <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.004 to 16666.666 UNITSROTACC 1 = 0.23 to 1000000 UNITSROTACC 2 = 1.38 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0.12 to 533333.333
Default value	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 10.000 UNITSROTACC 1 = 600.000 UNITSROTACC 2 = 3600.000 UNITSROTACC 3 = 50.000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 320.000
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes
See also	ACC ANIN1 DECSTOP J STEP UNITSROTACC
CANopen	6084h, sub-index 0

DECDIST

Definition	Deceleration Distance
Type	Variable (R/W)
Description	The target position offset value, relative to the position captured at a stop triggered by a digital input set to INMODE 15. When the input triggers a stop, a position capture occurs, and a deceleration ramp is generated to stop the motion at DECDIST relative to the captured position. DECDIST is in user defined position units.
Syntax	Read: DECDIST Write: DECDIST <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	DECDIST2 DISMODE INMODE
CANopen	2047h, sub-index 0

DECDIST2

Definition	Deceleration Distance 2
Type	Variable (R/W)
Description	The target position offset value, relative to the position captured at a stop triggered by a digital input set to INMODE 16. When the input triggers a stop, a position capture occurs, and a deceleration ramp is generated to stop the motion at DECDIST2 relative to the captured position. DECDIST2 is in user defined position units.
Syntax	Read: DECDIST2 Write: DECDIST2<*value*>
Firmware	1.2.12
Drive status	Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	DECDIST DISMODE INMODE
CANopen	2048h, sub-index 0

DECSTOP

Definition	Active Disable Deceleration
Type	Variable (R/W)
Description	Gets/sets the deceleration value for an Active Disable or emergency stop.
Syntax	Read: DECSTOP Write: DECSTOP <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.004 to 16666.666 UNITSROTACC 1 = 0.23 to 1000000 UNITSROTACC 2 = 1.38 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0.12 to 533333.333
Default value	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 1666.667 UNITSROTACC 1 = 100000.000 UNITSROTACC 2 = 600000.000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 53333.333
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes
See also	ACC DEC UNITSROTACC
CANopen	6085h, sub-index 0

DECSTOPTIME

Definition	Active Disable Deceleration Time
Type	Variable (R/W)
Description	Gets/sets the deceleration time for an Active Disable or emergency stop. DECSTOP will override DECSTOPTIME if the resulting deceleration level exceeds DECSTOP.
Syntax	Read: DECSTOPTIME Write: DECSTOPTIME <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	0 to 6500
Default value	0
Unit	ms
Non-volatile	Yes
See also	DECSTOP DISMODE
CANopen	2049h, sub-index 0

DELAY

Definition	Script Delay
Type	Command
Description	Allows a pause during the execution of a drive script command.
Syntax	DELAY {*value*}
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	Not Applicable
Unit	ms
Non-volatile	No
See also	DRIVESCRIPT DRIVESCRIPTST

DICONT

Definition	Drive Continuous Current
Type	Variable (R)
Description	Indicates the continuous rated current for the drive (sinusoidal peak). This is a hardware-defined read-only variable that is detected automatically by the drive.
Syntax	DICONT
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Hardware defined
Unit	A
Non-volatile	Yes
See also	DIPEAK FOLD IFOLD MICONT
CANopen	207Ch, sub-index 0

DIPEAK

Definition	Drive Peak Current
Type	Variable (R)
Description	Indicates the rated peak current of the drive (sinusoidal peak). This is a hardware-defined read-only variable.
Syntax	DIPEAK
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Hardware defined
Unit	A
Non-volatile	Yes
See also	DICONT IMAX MIPEAK
CANopen	207Bh, sub-index 0

DIR

Definition	Feedback Direction
Type	Variable (R/W)
Description	Gets/sets the feedback positive direction. When DIR is set to 1, the variable V is inverted and the actual position determined by the motor feedback (PFB) is reversed. Other variables (MECHANGLE, ELECTANGLE, HWPOS) remain unchanged. Motor rotation does not change. To reverse the direction of rotation of motors that do not have an electronic motorplate (servo parameter bundle), 180 degrees must be added to MPHASE. In motors that have an electronic motorplate, the firmware will handle it internally. However, when DIR=1, issuing certain motion commands, such as Jog in Velocity Control mode or Move Absolute in Position Control mode, will produce motion in the direction and at the velocity indicated after the feedback inversion. When the value of DIR is changed, CONFIG is required.
Syntax	Read: DIR Write: DIR <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Feedback direction not inverted 1 = Feedback direction inverted -1 =Feedback direction inverted (same as DIR 1) without the negation of speed phase advance (MVANGLH/F)
Default value	0
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter DIR is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Not applicable
Non-volatile	Yes
See also	MFBDIR MOTORSETUP MPHASE PFB V
CANopen	2045h, sub-index 0

DISMODE

Definition	Disable Mode
Type	Variable (R/W)
Description	The disabling of the drive may be the result of an explicit command from the motion controller or the drive's own response to a fault condition. When the drive becomes disabled, the Disable Mode function can be used in certain cases (see Note below) to bring the motor to a fast stop before power to the motor is shut off. This reduces the amount of motor coasting. DISMODE gets/sets a value that defines the Disable mode. The Disable mode consists of two mechanisms: ■ **Active Disabling** brings the motor to a stop by means of a controlled deceleration to zero velocity, and then disables the drive. Active Disable cannot be applied when the drive is operating in a current control mode (OPMODE 2 or OPMODE 3). ■ **Dynamic Braking** holds the motor while the drive is disabled by applying only the motor's back-EMF to the stopping current; it can therefore be used even in the event of feedback loss.
Syntax	Read: DISMODE Write: DISMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = No active disabling; no dynamic braking. 1 = No active disabling; dynamic braking on fault only. 2 = No active disabling; dynamic braking on any disable. 3 = Active disabling on fault*; no dynamic braking. 4 = Active disabling on fault*; dynamic braking on fault only. 5 = Active disabling on fault*; dynamic braking on any disable.
Note	*When supported. Faults that require immediate disable (to prevent drive damage) and feedback faults that might cause a commutation error (runaway motor) cannot issue Active Disabling. In DISMODE 4 and 5 both Active Disable and Dynamic Braking are supported. In these modes, Active Disable brings the motor to a stop, and Dynamic Braking is activated after DISTIME.
Note	Even when DISMODE=0 and DISTIME=0, a few milliseconds will elapse from the time of the disable request until the actual disable occurs.
Default value	0
Unit	Not Applicable

Non-volatile	Yes
See also	DECSTOP DISSPEED DISTIME FLT ISTOP
CANopen	2046h, sub-index 0

DISPLAYMODE

Definition	Display Mode
Type	Variable (R/W)
Description	Gets/sets the 7-segment digital display mode.
Syntax	Read: DISPLAYMODE Write: DISPLAYMODE <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 = Serial communication operation modes are displayed 1 = Fieldbus operation modes are displayed 2 = Node IDs are displayed.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	ACTIVE COMMODE FLT OPMODE ST

DISPLAYTEST

Definition	Test 7-Segment Display
Type	Command
Description	Tests the 7-segment LED display on the front panel of the drive.
Syntax	DISPLAYTEST All LED segments blink several times. DISPLAYTEST -1 The LED panel executes a test sequence. DISPLAYTEST {≥ 0} Returns to the terminal the binary equivalent of the LED segments that are currently lit.
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	ADDR
CANopen	20E2h, sub-index 0

DISSPEED

Definition	Active Disabling Speed Threshold
Type	Variable (R/W)
Description	Gets/sets the velocity threshold below which the motor is considered stopped and the Active Disabling timer starts the countdown to disable. The motor velocity must remain below this threshold for at least 50 ms for the motor to be considered stopped. The Active Disabling function ramps the motor to zero speed using DECSTOP. DISSPEED is compared to the actual motor speed; when the absolute speed drops below the threshold value for 50 ms, the active disabling timer (DISTIME) begins timing. Once the timer times out, the drive is disabled.
Note	To use the Active Disabling function effectively, a position controller must be configured.
Syntax	Read: DISSPEED Write: DISSPEED <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to VMAX
Default value	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.167 UNITSROTACC 1 = 10.000 UNITSROTACC 2 = 60.0 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 5333.304
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	DECSTOP DISMODE DISTIME FLT
CANopen	204Ah, sub-index 0

DISTIME

Definition	Active Disabling Time
Type	Variable (R/W)
Description	Gets/sets the continuous time the motor must remain below DISSPEED before the drive is disabled by the Active Disabling function. This delay is typically set to accommodate brake engage time. The DISTIME counter begins only after motor velocity has been below DISSPEED for at least 50 ms.
Note	To use the Active Disabling function effectively, a position controller must be configured.
Note	Even when DISMODE=0 and DISTIME=0, a few milliseconds will elapse from the time of the disable request until the actual disable occurs.
Syntax	Read: DISTIME Write: DISTIME <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 6500
Default value	10
Unit	ms
Non-volatile	Yes
See also	DECSTOP DISMODE DISSPEED FLT
CANopen	204Bh, sub-index 0

DRIVENAME

Definition	Drive Name
Type	Variable (R/W)
Description	Gets/sets the name assigned to the drive unit. The name may contain up to 20 alphanumeric characters. A quotation mark (") always precedes the name. Additional valid characters for use in the text string: ( ) / - . :
Syntax	Read: DRIVENAME Write: DRIVENAME <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	"
Unit	Not Applicable
Non-volatile	No

Example	`-->drivename "robot-axis1`
	`-->drive name`
	`"ROBOT-AXIS1`
	`-->`

See also	INFO MOTORNAME

DRIVESCRIPT

Definition	Drive Script Command
Type	Command
Description	Triggers a predefined sequence of terminal commands according to the combined status of defined digital inputs. The drive supports up to 32x2 scripts, each with a maximum of 128 characters. Up to 5 digital inputs can be defined to activate the scripts, with an additional digital input that serves as a trigger and defines whether activation occurs on rising or falling edge.
Syntax	DRIVESCRIPT *n I* "*command1~command2~command3* ;*remark* *n* = The identifier of the script based on the digital inputs defined as script bits 0 to 4 *i* = The script trigger input level for script activation: 0 = triggered on falling edge 1 = triggered on rising edge " = The start of the script string ~ = Command separator ; = Remark separator
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
Example	`-->drivescript 1 2 "k~opmode 0~en~j -10 ;Slowly Backward`
See also	DRIVESCRIPTST

DRIVESCRIPTST

Definition	Drive Script Status
Type	Variable (R)
Description	Indicates the script that is being executed. If no script is defined for the digital input combination, nothing will run. Digital input definition: INMODE 5=9 Script INMODE 6=10 Script bit 0 INMODE 7=11 Script bit 1 INMODE 8=12 Script bit 2 INMODE 9=13 Script bit 3 INMODE 10=14 Script bit 4 Digital inputs 6-10 define which script to run. Digital input 5 triggers script execution.
Syntax	DRIVESCRIPTST
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	`-->drivescriptst`
	`DriveScript [01][0] Start:J 100:DriveScript [01][0] Stop:`
	`-->`

See also	DRIVESCRIPT INMODE

DRIVETEMP

Definition	Drive Temperature
Type	Variable (R)
Description	Indicates the temperature of the control and power boards in the drive, in Celsius degrees.
Syntax	DRIVETEMP
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	°C
Non-volatile	No

Example	`-->drivetemp`
	`--> Control: 32[deg C] Power: 29[deg C]`
	`-->`

See also	FOLD IFOLD THERM
CANopen	2044h, sub-index 1

DUMP

Definition	Dump Drive Parameter Values
Type	Command
Description	Returns the set of configuration parameters that defines the complete functionality of the drive. The command can be used to backup the configuration.
Note	Some parameters, not intended for users, may appear in the list. **Do not attempt to manipulate parameters that are not described in the product documentation or Help.**
Syntax	DUMP
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	LOAD SAVE

ECEMCYMODE

Definition	EtherCAT Emergency Message Mode
Type	Variable (R/W)
Description	Defines whether or not EtherCAT emergency message is sent to the master.
Syntax	Read: ECEMCYMODE Write: ECEMCYMODE <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 = EtherCAT emergency message is not sent to master 1 = EtherCAT emergency message is sent to master
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	

ECHO

Definition	Serial Communication Character Echo
Type	Variable (R/W)
Description	Enables/disables the serial port character echo. If echo is enabled, characters received via the serial port are echoed back to the serial port and displayed on the computer monitor. ECHO 1 is required for proper operation of the graphic interface software. ECHO 0 will cause the graphic interface software to lose certain functionalities. Use with caution.
Syntax	Read: ECHO Write: ECHO <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Serial port echo disabled 1 = Serial port echo enabled
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Yes
See also	ADDR MSGPROMPT

ELECTANGLE

Definition	Electrical Position
Type	Variable (R)
Description	Indicates the electrical angle position in 16-bit resolution.
Syntax	ELECTANGLE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	Not Applicable
Unit	65536/electrical cycle
Non-volatile	No
See also	MECHANGLE MENCRES MPHASE PHASEFIND
CANopen	2016h, sub-index 0

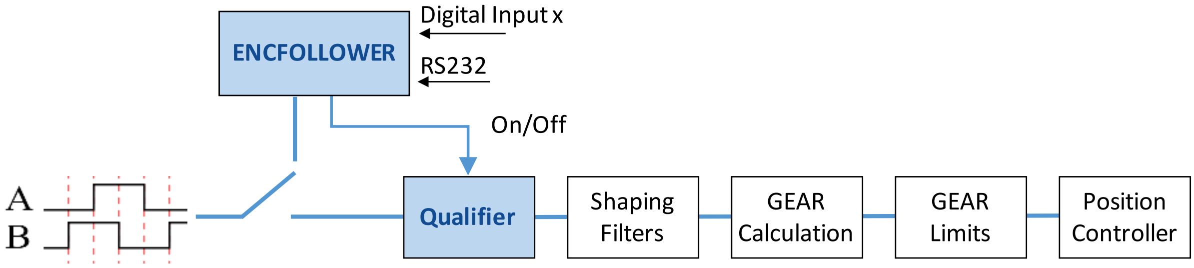
EN

Definition	Software Enable Command
Type	Command
Description	Initiates a software enable of the drive. This command first attempts to reset any existing fault conditions, then sets SWEN to 1. If both READY and REMOTE have values of 1, the drive is in Active state. The value of ACTIVE indicates whether the EN command successfully enabled the drive.
Syntax	EN
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	ACTIVE FLT K READY REMOTE ST SWEN
Note	■ EN is the Software Enable command. It first attempts to clear any latched faults; if successful, the drive becomes Ready for enabling. When the drive is Ready and the Remote Enable (hardware) signal is on, the drive is enabled. ■ READY (R) indicates whether a drive is ready to be enabled (waiting for Remote Enable ON signal). ■ ACTIVE (R) indicates whether a drive is enabled.

ENCFOLLOWER

Definition	Encoder Following Mode
Type	Variable (R/W)
Description	The encoder following function is activated by the digital input parameter INMODE <*input#*> 33|34|35|36|37, which sets both the required Position Gear mode (OPMODE 4) and a specific type of encoder following as defined ENCFOLLOWER.
Syntax	Read: ENCFOLLOWER Write: ENCFOLLOWER <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 = Encoder following is disabled. The drive ignores all input pulses from the master encoder. Input pulses are ignored and do not accumulate in the GEAR box. 1= Bi-Directional Encoder Following (Default). The master encoder following mode is enabled. The drive accepts all pulses from the master encoder “as is” as input to the GEAR box. 2 = Uni-Directional Encoder Following – Positive. The master encoder following mode is enabled. The drive follows master encoder pulses in the positive direction only. If the master encoder moves in the opposite direction, the pulses from master encoder are discarded. After direction qualification and manipulation, the master encoder pulses to be used are input to the GEAR box. 3 = Uni-directional Encoder Following – Negative The master encoder following mode is enabled. The drive follows master encoder pulses in the negative direction only. If the master encoder moves in the opposite direction, the pulses from master encoder are discarded. After direction qualification and manipulation, the master encoder pulses to be used are input to the GEAR box. 4 = Absolute to Positive Direction Encoder Following. The master encoder following mode is enabled. The drive follows master encoder pulses in the positive direction regardless of the direction of the master encoder; for example, if the master encoder sends 1000 pulses, the drive follows 1000 pulses; if the master encoder sends -1000 pulses, the drive still follows 1000 pulses in the positive direction. After direction qualification and manipulation, the master encoder pulses to be used are input to the GEAR box.

	5 = Absolute to Negative Direction Encoder Following. The master encoder following mode is enabled. The drive follows master encoder pulses in the negative direction regardless of the direction of the master encoder; for example, if the master encoder sends -1000 pulses, the drive follows -1000 pulses; if the master encoder sends 1000 pulses, the drive still follows -1000 pulses in the negative direction. After direction qualification and manipulation, the master encoder pulses to be used are input to the GEAR box.
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	INMODE 33|34|35|36|37
CANopen	



ENCOUTMODE

Definition	Encoder Simulation Mode
Type	Variable (R/W)
Description	Gets/sets the value that indicates the state of encoder simulation. When the value of ENCOUTMODE is changed, CONFIG is required. Known Limitation: No index signal available for absolute Tamagawa encoder.
Syntax	Read: ENCOUTMODE Write: ENCOUTMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Encoder simulation not active 1 = A/B encoder simulation. An index pulse is generated for each motor revolution (or pitch for linear motors). This mode is typically used with feedback devices that do not have a physical index. The drive outputs a simulated index. 2 = A/B encoder simulation. The index pulse is routed directly from the motor feedback device (by the FPGA) to the drive, regardless of the value of ENCOUTRES. This mode is typically used for linear motors that have incremental AqB encoders, in which the index is used for homing and appear once per linear scale.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	ENCOUTRES ENCOUTZPOS MENCRES
CANopen	20E3h, sub-index 0

ENCOUTRES

Definition	Encoder Simulation Line Resolution
Type	Variable (R/W)
Description	Gets/sets the resolution, in number of lines, of the encoder simulation output. Use plus for positive direction; minus for negative direction. When the value of ENCOUTRES is changed, CONFIG is required.
Notes	ENCOUTRES is applicable only when ENCOUTMODE=1. Changing the value of ENCOUTRES might cause the encoder simulation to generate extra pulses.
Syntax	Read: ENCOUTRES Write: ENCOUTRES <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	±10000000
Default value	2048
Unit	If MOTORTYPE=0 (Rotary): lines per revolution (LPR) If MOTORTYPE=2 (Linear): lines per pitch (LPP)
Non-volatile	Yes
See also	ENCOUTMODE ENCOUTZPOS MENCRES
CANopen	20E4h, sub-index 0

ENCOUTZPOS

Definition	Encoder Simulation Index Position
Type	Variable (R/W)
Description	Gets/sets the index offset value of the encoder simulation output (ENCOUTRES).
Note	ENCOUTRES is applicable only when ENCOUTMODE=1.
Syntax	Read: ENCOUTZPOS Write: ENCOUTZPOS <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 40000000
Default value	0
Unit	Count
Non-volatile	Yes
See also	ENCOUTMODE ENCOUTRES MENCRES
CANopen	20E5h, sub-index 0

ESTOPILIM

Definition	Emergency or Controlled Stop Current Limit
Type	Variable (R/W)
Description	Gets/sets the current limit during an emergency or controlled stop (expressed as factor of ILIM).
Syntax	Read: ESTOPILIM Write: ESTOPILIM <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	0.001 to 1
Default value	1.000 (factor ofILIM)
Unit	Not Applicable
Non-volatile	Yes
See also	DISMODE ILIM
CANopen	208Dh, sub-index 0

EXTADDITIVEICMD

Definition	External Additive ICMD Value
Type	Variable (R/W)
Description	EXTADDITIVEICMD is a feedforward current offset, which is added to the current command issued by the drive's position/velocity controller. The command is intended to be used by EtherCAT/CANopen devices operating in Cyclic Position mode.
Syntax	Read: EXTADDITIVEICMD Write: EXTADDITIVEICMD <*value*>
Firmware	1.4.6
Drive status	Enabled | Disabled
Range	± ILIM
Default value	0.000
Unit	A
Non-volatile	No
See also	EXTADDITIVEVCMD
CANopen	60B2h, sub-index 0

EXTADDITIVEVCMD

Definition	External Additive VCMD Value
Type	Variable (R/W)
Description	EXTADDITIVEVCMD is a feedforward current offset, which is added to the current command issued by the drive's position/velocity controller. EXTADDITIVEVCMD is applicable only to the linear position controller (POSCONTROLMODE 0).
Syntax	Read: EXTADDITIVEVCMD Write: EXTADDITIVEVCMD <*value*>
Firmware	1.4.6
Drive status	Enabled | Disabled
Range	± VLIM
Default value	0.000
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	No
See also	EXTADDITIVEICMD
CANopen	60B1h, sub-index 0

FACTORYRESTORE

Definition	Restore Factory Settings
Type	Command
Description	Restores all configuration variables to their factory default settings. If the drive system includes an encoder with an electronic motor plate (MTP), the drive will restore all configuration variables from the MTP. FACTORYRESTORE does not clear the fault log.
Syntax	FACTORYRESTORE
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	DUMP LOAD SAVE
CANopen	204Ch, sub-index 0

FASTSTOENABLE

Definition	Fast STO-Enable Function
Type	Variable (R/W)
Description	Defines whether the Fast STO Enable function is activated. **Applicable only for DDHD and STO-certified CDHD drives (-ST models)** – drives capable of AC-loss detection. When Fast STO Enable is active, the drive can be reenabled within 150 ms, rather than 800 ms, once the STO condition is cleared.
Syntax	Read: FASTOENABLE Write: FASTOENABLE <*value*>
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	0 = Not activated 1 = Activated
Default value	0, if applicable
Unit	Not Applicable
Non-volatile	No
See also	

FBGDS

Definition	Fieldbus CANopen Gear Driving Shaft Scaling
Type	Variable (R/W)
Description	Fieldbus CANopen gear ratio driving shaft revolution scaling factor (object 6091h sub-index 2).
Syntax	Read: FBGDS Write: FBGDS <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	1 to 4294967295
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	FBGMS FBITIDX FBSCALE
CANopen	6091h, sub-index 2

FBGMS

Definition	Fieldbus CANopen Gear Motor Shaft Scaling
Type	Variable (R/W)
Description	Fieldbus CANopen gear ratio motor shaft revolution scaling factor (object 6091h sub-index 1)
Syntax	Read: FBGMS Write: FBGMS <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	1 to 4294967295
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	FBGDS FBITIDX FBSCALE
CANopen	6091h, sub-index 1

FBITIDX

Definition	Fieldbus EtherCAT/CANopen Interpolation Time Index
Type	Variable (R/W)
Description	Fieldbus CANopen interpolation time **index** for the fieldbus cycle time calculations.
Note	The cycle time in the controller and the cycle time in the drive (FBITIDX, FBITPRD) must be identical.
Syntax	Read: FBITIDX Write: FBITIDX <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	-128 to 63
Default value	-3
Unit	Not Applicable
Non-volatile	Yes
See also	FBGDS FBGMS FBITIDX FBITPRD FBSCALE
CANopen	60C2h, sub-index 2

FBITPRD

Definition	Fieldbus EtherCAT/CANopen Interpolation Time
Type	Variable (R/W)
Description	Fieldbus CANopen interpolation time **period** for the fieldbus cycle time calculations.
Note	The cycle time in the controller and the cycle time in the drive (FBITIDX, FBITPRD) must be identical.
Syntax	Read: FBITPRD Write: FBITPRD <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	1 to 255
Default value	2
Unit	Not Applicable
Non-volatile	Yes
See also	CANBITRATE FBGDS FBITIDX FBITPRD
CANopen	60C2h, sub-index 1

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FBPLIGNORE

Definition	Fieldbus Ignore Packet Loss Fault
Type	Variable (R/W)
Description	Defines whether the drive ignores or responds to the fieldbus packet loss fault.
Syntax	Read: FBPLIGNORE Write: FBPLIGNORE <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	0 = Drive responds to fault 1 = Drive ignores fault
Default value	0
Unit	Not Applicable
Non-volatile	No
See also	FBSCALE

FBSCALE

Definition	Fieldbus Unit Scaling
Type	Variable (R/W)
Description	Fieldbus unit scaling for internal counts. Defines the number of bits of a 32-bit position that are equivalent to a number of revolutions.
Syntax	Read: FBSCALE Write: FBSCALE <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	0 to 20
Default value	12
Unit	Not Applicable
Non-volatile	Yes
See also	FBPLIGNORE MENCRES
CANopen	200Fh, sub-index 0

FEEDBACKBR

Definition	Communication Feedback Baud Rate		
Type	Variable (R/W)		
Description	Gets/sets the baud rate of certain feedback devices. FEEDBACKBR values other than the default may be set only if the configured encoder requires the change (such as Nikon with 4 MBaud communication rate), or if the configured encoder communication rate is determined by the drive (clocked encoders such as EnDat and BiSS-C). When using a FEEDBACKBR value other than the default with clocked encoders, verify that the selected baud rate matches the encoder query rate		
	By default, FEEDBACKBR = 0, meaning feedback devices are automatically set to the following baud rates:		
	Nikon 17-bit and 20-bit Absolute Encoder; single/multi-turn	FEEDBACKTYPE 4	2.5 MBd
	Tamagawa 17-bit and 23-bit Absolute Encoder; multi- turn	FEEDBACKTYPE 6	2.5 MBd
	Tamagawa 17-bit and 23-bit Absolute Encoder; single turn	FEEDBACKTYPE 7	2.5 MBd
	EnDat 2.x Communication Only	FEEDBACKTYPE 11	2 MBd
	sensAR	FEEDBACKTYPE 12	2.5 MBd
	Sankyo Absolute Rotary Encoder	FEEDBACKTYPE 14	2.5 MBd
Syntax	Read: FEEDBACKBR Write: FEEDBACKBR <*value*>		
Firmware	1.15.xx		
Drive status	Disabled		
Range	0 to 5000		
Default value	0		
Unit	kBd		
Non-volatile	Yes		
Example	`--> FEEDBACKBR 4000`	Sets the baud rate to 4 MBd	
See also	FEEDBACKTYPE		

FEEDBACKTYPE

Definition	Feedback Type		
Type	Variable (R/W)		
Description	Gets/set the motor feedback type. If FEEDBACKTYPE = 0, the motor feedback is detected automatically by the drive. When the value of FEEDBACKTYPE is changed, CONFIG is required.		
Syntax	Read: FEEDBACKTYPE Write: FEEDBACKTYPE <*value*>		
Firmware	1.0.6		
Drive status	Disabled		
Range		**FEEDBACKTYPE**	**MENCTYPE**
	Resolver	1	Not Applicable (0)
	Incremental Encoder; A, B and index channels, and Halls (A/B/Z/H)	2	0
	Incremental Encoder; A/B/Z commutation initialization by PHASEFIND command	2	1
	Incremental Encoder; A/B/Z commutation initialization by ENABLE or PHASEFIND command	2	2
	Incremental Encoder; A/B commutation initialization by PHASEFIND command	2	3
	Incremental Encoder; A/B commutation initialization by ENABLE or PHASEFIND command	2	4
	Halls only	2	5
	Incremental Encoder; A/B/H	2	6
	Tamagawa Incremental Encoder (8 wires)	2	11
	Sine Encoder; A/B/Z/H	3	0
	Sine Encoder; A/B/Z commutation initialization by PHASEFIND command	3	1
	Sine Encoder; A/B/Z commutation initialization by ENABLE and PHASEFIND command	3	2
	Sine Encoder; A/B commutation initialization by PHASEFIND command	3	3
	Sine Encoder; A/B ; commutation initialization by ENABLE or PHASEFIND command	3	4
	Sine Encoder; A/B/H	3	6
	EnDat 2.X with Sine Signals	3	9
	HIPERFACE with Sine Signals	3	10

	Nikon 17-bit and 20-bit Absolute Encoder; single/multi-turn	4	Not Applicable (0)
	Tamagawa 17-bit and 23-bit Absolute Encoder; multi-turn	6	Not Applicable (0)
	Tamagawa 17-bit and 23-bit Absolute Encoder; single turn	7	Not Applicable (0)
	EnDat 2.x Communication Only	11	0
	sensAR Single turn	12	Not Applicable (0)
	Sankyo Absolute Rotary Encoder; 17-bit per revolution; 24-bit multi-turn counter. Requires MENCRES=32768	14	Not Applicable (0)
	Biss-C feedback device	16	Not Applicable (0)
	sensAR Multi-turn	19	Not Applicable (0)
Default value	0		
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter FEEDBACKTYPE is loaded directly from the encoder memory to the drive RAM at power-up.		
Unit	Not Applicable		
Non-volatile	Yes		
See also	MENCRES MENCTYPE MOTORTYPE MRESPOLES		
CANopen	204Dh, sub-index 0		

FILTHZ1

Definition	Velocity Loop Output Filter Parameter 1
Type	Variable (R/W)
Description	Velocity loop output filter first parameter. A multi-function parameter for setting the output filter of the velocity controller. FILTMODE defines its functionality.
Syntax	Read: FILTHZ1 Write: FILTHZ1 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	1 to 10000
Default value	1000
Unit	Hz
Non-volatile	Yes
See also	FILTHZ2 FILTMODE
CANopen	204Eh, sub-index 0

FILTHZ2

Definition	Velocity Loop Output Filter Parameter 2
Type	Variable (R/W)
Description	Velocity loop output filter second parameter. A multi-function parameter for setting the output filter of the velocity controller. FILTMODE defines its functionality.
Syntax	Read: FILTHZ2 Write: FILTHZ2 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	1 to 10000
Default value	2000
Unit	Hz
Non-volatile	Yes
See also	FILTHZ1 FILTMODE
CANopen	204Fh, sub-index 0

FILTMODE

Definition	Velocity Loop Output Filter Mode
Type	Variable (R/W)
Description	Gets/sets the value that defines the velocity loop output filter.
Syntax	Read: FILTMODE Write: FILTMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Transparent feed through; no filtering. 1 = First order low pass filter; sets FILTHZ1 as corner frequency. 2 = Double first order low pass filter; sets FILTHZ1 and FILTHZ2 as corner frequencies. 3 = Notch filter; sets FILTHZ2 as notch center frequency and FILTHZ1 as notch frequency width. 4 = High pass filter; sets FILTHZ1 as corner frequency. 5 = Band pass; sets FILTHZ2 as bandpass center frequency and FILTHZ1 as bandpass frequency width. 6 = User defined polynomial filter; sets VF.
Default value	2
Unit	Not applicable
Non-volatile	Yes
See also	FILTHZ1 FILTHZ2 VELCONTROLMODE VF
CANopen	2050h, sub-index 0

FLT

Definition	Print Faults
Type	Variable (R)
Description	Returns a list of faults latched by the drive. Faults remain latched until cleared by CLEARFAULTS or EN, provided that the fault condition has been removed.
Syntax	FLT
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	DISMODE FLTHIST WRN
CANopen	603Fh, sub-index 0

FLTHIST

Definition	Fault History
Type	Command
Description	Returns the contents of the fault buffer. The drive transmits the fault history to the serial port. The most recent fault is sent first. A time stamp in the format of hours:minutes:seconds is displayed along with each fault, indicating the time at which the fault occurred. The fault buffer can contain up to 40 faults. Once the buffer is full, the oldest fault is automatically removed whenever a new fault is added.
Syntax	FLTHIST
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	`--> flthist`
	`2:28:55 A/B Line Break`
	`2:28:55 Illegal Halls`
	`2:28:49 Illegal Halls`
	`-->`

See also	FLT WRN

FOLD

Definition	Drive Foldback Status
Type	Variable (R)
Description	Indicates whether the drive foldback limit (IFOLD) has dropped below the application's current limits (ILIM).
Syntax	FOLD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Foldback limit above ILIM 1 = Foldback limit below ILIM
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	DICONT IFOLD IFOLDFTHRESH IFOLDWTHRESH ILIM
CANopen	2051h, sub-index 0

FRICINEG

Definition	Friction Compensation Negative Current
Type	Variable (R/W)
Description	Gets/sets the level of current to add to the current command when commanded velocity is negative. Subject to hysteresis of the friction compensation mechanism.
Syntax	Read: FRICINEG Write: FRICINEG <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±DIPEAK
Default value	0.000
Unit	A
Non-volatile	Yes
See also	FRICIPOS FRICNVHYST FRICPVHYST
CANopen	2052h, sub-index 0

FRICIPOS

Definition	Friction Compensation Positive Current
Type	Variable (R/W)
Description	Gets/sets the level of current to add to the current command when commanded velocity is positive. Subject to hysteresis of the friction compensation mechanism.
Syntax	Read: FRICIPOS Write: FRICIPOS <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±DIPEAK
Default value	0.000
Unit	A
Non-volatile	Yes
See also	FRICINEG FRICNVHYST FRICPVHYST
CANopen	2053h, sub-index 0

FRICNVHYST

Definition	Friction Compensation Negative Velocity Hysteresis
Type	Variable (R/W)
Description	Gets/sets the velocity hysteresis in the negative direction for the friction compensation mechanism.
Syntax	Read: FRICNVHYST Write: FRICNVHYST <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±1000 rpm
Default value	0.000
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	FRICINEG FRICIPOS FRICPVHYST
CANopen	2054h, sub-index 0

FRICPVHYST

Definition	Friction Compensation Positive Velocity Hysteresis
Type	Variable (R/W)
Description	Gets/sets the velocity hysteresis in the positive direction for the friction compensation mechanism.
Syntax	Read: FRICPVHYST Write: FRICPVHYST <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±1000 [rpm]
Default value	0.000
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	FRICINEG FRICIPOS FRICNVHYST
CANopen	2055h, sub-index 0

GEAR

Definition	Gear
Type	Variable (R/W)
Description	Engages/disengages the gearing.
Syntax	Read: GEAR Write: GEAR <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Gearing disengaged 1 = Gearing engaged
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	GEARMODE
CANopen	211Eh, sub-index 0

GEARACCTHRESH

Definition	Gear Acceleration Threshold
Type	Variable (R/W)
Description	Maximum acceleration for gearing. Used for the combination of HD position controller (POSCONTROLMODE 2 or 1) and gearing input (OPMODE 4). This threshold defines the value below which the acceleration derived from the gear filter as input to the position controller is 0.
Syntax	Read: GEARACCTHRESH Write: GEARACCTHRESH <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0 to 16666.666 UNITSROTACC 1 = 0 to 1000000 UNITSROTACC 2 = 0 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0 to 533333.333
Default value	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 16666.667 UNITSROTACC 1 = 1000000.000 UNITSROTACC 2 = 6000000.000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 533333.333
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes
See also	GEARMODE OPMODE POSCONTROLMODE
CANopen	2120h, sub-index 0

GEARDBVAL

Definition	Gearing Deadband Value
Type	Variable (R/W)
Description	Gets/sets a deadband value for a master encoder input. Applicable only when an encoder following mode (ENCFOLLOWER) is active.
Syntax	Read: GEARDBVAL Write: GEARDBVAL <value>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 to 32767
Default value	2
Unit	Not Applicable
Non-volatile	Yes
See also	ENCFOLLOWER
CANopen	

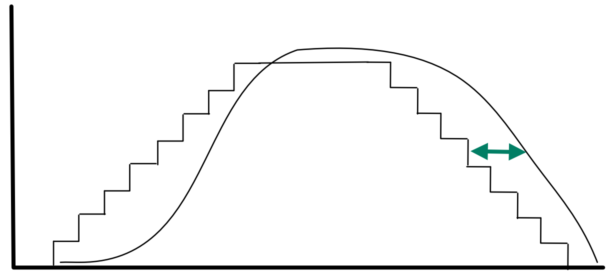
GEARFILTAFF

Definition	Gear Filter Acceleration Feedforward
Type	Variable (R/W)
Description	Gets/sets the value of the gear filter acceleration feedforward.
Syntax	Read: GEARFILTAFF Write: GEARFILTAFF <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	±2
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	GEARMODE
CANopen	2121h, sub-index 0

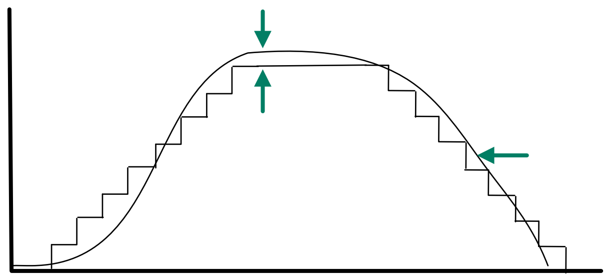
GEARFILTMODE

Definition	Gear Filter Mode
Type	Variable (R/W)
Description	Defines whether or not the gear filter is activated.
Syntax	Read: GEARFILTMODE Write: GEARFILTMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Gear filter not activated 1 = Gear filter activated
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	GEARFILTT1 GEARFILTT2 GEARMODE
CANopen	2122h, sub-index 0

GEARFILTT1

Definition	Gear Filter Depth
Type	Variable (R/W)
Description	Gear filter depth, in 0.25 ms quanta. Increasing GEARFILT1 smooths the input command PTPVCMD, but adds a delay. GEARFILT1 = ~2 x input step width 
Syntax	Read: GEARFILTT1 Write: GEARFILTT1 <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.75 to 32
Default value	2.000
Unit	ms
Non-volatile	Yes
See also	GEARFILTT2 GEARMODE
CANopen	2123h, sub-index 0

GEARFILTT2

Definition	Gear Filter Velocity and Acceleration Depth
Type	Variable (R/W)
Description	Gear filter velocity and acceleration depth. Increasing GEARFILT2 and VELFF compensates for the delay, but adds overshoots. If VELFF= GEARFILT2: no delay 
Syntax	Read: GEARFILTT2 Write: GEARFILTT2 <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 60
Default value	4.000
Unit	ms
Non-volatile	Yes
See also	GEARFILTT1 GEARMODE
CANopen	2124h, sub-index 0

GEARFILTVELFF

Definition	Gear Filter Velocity Feedforward
Type	Variable (R/W)
Description	Gets/sets the gear filter velocity feedforward. **Note**: Was GEARFILTVFF in previous firmware versions.
Syntax	Read: GEARFILTVELFF Write: GEARFILTVELFF <*value*>
Firmware	1.3.2
Drive status	Disabled
Range	±200
Default value	0.000
Unit	ms
Non-volatile	Yes
See also	GEARFILTAFF GEARFILTMODE GEARFILTT1 GEARFILTT2 GEARMODE
CANopen	2125h, sub-index 0

GEARIN

Definition	Gear Ratio Numerator
Type	Variable (R/W)
Description	Gets/sets the numerator of the gearbox equation. The gearing relationship is as follows: (GEARIN/GEAROUT) ×(1/XENCRES) Gearing sets up a relationship between the number of input pulses (HWPEXT counts) and the position increments of the motor shaft (or actual motor position, PFB). The rate at which position increments of the motor shaft (motor speed) occur is determined by the gearing relationship and the line frequency of the pulse train. The direction of rotation is determined by the sign of the variable GEARIN.
Note	The HWPEXT/PCMD ratio is not maintained under the following condition: GEAROUT=1 GEARIN>5000 No warning is issued.
Syntax	Read: GEARIN Write: GEARIN <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±2147483647
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	GEARMODE GEAROUT
CANopen	2126h, sub-index 0

GEARINMODE

Definition	Gearing Input Interpolation
Type	Variable (R/W)
Description	Used for gearing that is fed through the Controller I/F connector only. Enables interpolation of the gearing signal and increase of resolution by a factor of 16.
Syntax	Read: GEARINMODE Write: GEARINMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Gearing input interpolation not activated 1 = Gearing input interpolation activated
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	GEARMODE HWPEXT
CANopen	2127h, sub-index 0

GEARLIMITSMODE

Definition	Electronic Gearing Mode
Type	Variable (R/W)
Description	Defines how the drive performs electronic gearing when operating in Gear Position mode (OPMODE 4).
	This is a bit-wise parameter, hence the range 0 to 31. The bits have the following meanings. **Bit 0:** 0= If the drive is disabled or if HOLD 0 is in effect, incoming master pulses are discarded. 1 = Even if the drive is disabled, incoming master pulses are evaluated. **Bit 1:** 0 = If a limit switch has been activated, incoming master pulses that command motion in the direction of the activated switch are discarded. 1 = If a limit switch has been activated, and even if the motor has stopped, incoming master pulses that command motion in the direction of the activated switch are evaluated. **Bit 2:** 0= Trajectory of the master is not limited by the ACC, DEC and VLIM settings of the drive. 1 = Trajectory of the master is limited by the ACC, DEC and VLIM settings of the drive. **Bit 3:** 0= Follows the master position with compensation for the position lag between the master and the slave, which may be caused by the ACC, DEC or VLIM settings. 1 = Does not compensate for the position lag between the master and the slave. **Bit 4:** 0= Does not allow overshoot of the master position. The trajectory generator of the slave always attempts to decelerate into the target position of the master. 1 = Allows the slave to run synchronously with the master, which may result in the slave overshooting the target position of the master (particularly if acceleration and deceleration limits cause an abrupt stop of the master).
Note	If bit 0 is set, bit 2 must also be set. Since the position difference between the master and the slave may increase while drive is in disabled state, it is necessary to apply ACC, DEC, VLIM settings after the drive is reenabled.
Syntax	Read: GEARLIMITSMODE Write: GEARLIMITSMODE <*value*>
Firmware	1.0.6

Drive status	Enabled | Disabled
Range	0 to 31 (If all bits are true, the bit-combination in binary format is 0b11111, which has a decimal value of 31.)
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	GEARFILTMODE GEARMODE
CANopen	2128h, sub-index 0

GEARMODE

Definition	Gearing Operation Mode
Type	Variable (R/W)
Description	Gets/sets the gearing source and method.
Syntax	Read: GEARMODE Write: GEARMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0* = Encoder (quadrature) following (controller interface). Signals are received on the Controller interface (C2) at pins 28 and 11 (Quadrature A), and pins 9 and 27 (Quadrature B). 1* = Pulse and direction (controller interface). Signals are received on the Controller interface (C2) at pins 28 and 11 (Pulse), and 9 and 27 (Direction). 2* = Up/down counting (controller interface). Signals are received on the Controller interface (C2) at pins 28 and 11 (Up) and pins 9 and 27 (Down). 3 = Encoder (quadrature) follower (secondary encoder). Signals are received on the Machine interface (C3) at pins 1 and 11 (Quadrature A) and pins 2 an 12 (Quadrature B). 4 = Pulse and direction (secondary encoder). Signals are received on the Machine interface (C3) at pins 1 and 11 (Pulse), and 2 and 12 (Direction).
***Note**	GEARMODE 0, 1, 2: If inputs 5 and 6 are set, respectively, to INMODE 17 and 18, signals are received instead from fast inputs 5 and 6 on the Controller interface (C2) at pins **32** and **15**.
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	GEARIN GEAROUT INMODE OPMODE PCMD
CANopen	20B3h, sub-index 0

GEAROUT

Definition	Gear Ratio Denominator
Type	Variable (R/W)
Description	Gets/sets the denominator of the gearbox equation. The gearing relationship is as follows: (GEARIN/GEAROUT) × (1/XENCRES) Gearing sets up a relationship between the number of input pulses (HWPEXT counts) and the position increments of the motor shaft (or actual motor position, PFB). The rate at which position increments of the motor shaft (motor speed) occur is determined by the gearing relationship and the line frequency of the pulse train.
Note	The HWPEXT/PCMD ratio is not maintained under the following condition: GEAROUT=1 GEARIN>5000 No warning is issued.
Syntax	Read: GEAROUT Write: GEAROUT <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±2147483647
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	GEARIN GEARMODE
CANopen	2129h, sub-index 0

GET

Definition	Get Recorded Data
Type	Command
Description	Gets the recorded data that was captured using the recording mechanism. The data is retrieved in ASCII or binary format according to the value of GETMODE.
Syntax	GET
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	GETMODE RECORD

Example	`-->get`
	`Binary Units Frame:`
	`HD Recording (Binary Format(`
	`1000,32`
	`"PE","VCMD","V"`
	`0.000,0.000,0.000`
	`0.000,0.000,0.000`
	`0.000,0.000,0.000`
	`0.000,20.176,0.000`
	`0.000,74.176,0.000`
	`0.000,128.176,0.000`
	`0.000,182.176,14.736`
	`0.000,236.176,31.747`
	`...`
	`0.000,1999.978,1999.471`
	`0.000,1999.978,1998.976`
	`0.000,1999.978,1998.779`
	`0.000,1999.978,2000.559`
	`0.000,1999.978,1999.471`
	`0.000,1999.978,1998.383`
	`0.000,1999.978,1998.581`
	`0.000,1999.978,2001.943`
	`...`
	`0.000,0.000,0.000`
	`0.000,0.000,0.000`
	`-->`

CANopen	20E7, sub-index 1

GETMODE

Definition	Recorded Data Transfer Format
Type	Variable (R/W)
Description	Gets/sets the data transfer format used by the GET command.
Syntax	Read: GETMODE Write: GETMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = ASCII data transfer format 3 = Binary data transfer format 4 = Binary data transfer format, including header data
Default value	3
Unit	Not Applicable
Non-volatile	Yes
See also	GET RECORD

GETREC

Definition	Get Line of Recorded Data
Type	Command
Description	Gets a specific line from the last buffer of recorded data that was captured using RECORD. For example, GETREC 5 returns the fifth line of the last recorded buffer. To retrieve data using this command, GETMODE≠3.
Syntax	GETREC {*value*}
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	RECORD

HALLS

Definition	Hall Signals
Type	Variable (R)
Description	Indicates the current state of the Hall commutation sensors.
Syntax	HALLS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Hall sensor in low position 1 = Hall sensor in high position
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	`-->halls`
	`Hu Hv Hw`
	` 1  1  1`
	`-->`

See also	ELECTANGLE FEEDBACKTYPE MECHANGLE MENCTYPE
CANopen	2056h, sub-index 1

HALLSCOMMTHRESH

Definition	Halls-Only Commutation Source Threshold
Type	Variable (R/W)
Description	Gets/sets the threshold value for Halls-only (MENCTYPE 5) commutation, in Hall signals per seconds. When the Hall sensor signaling rate goes above the threshold, commutation changes to sine commutation. When the Hall sensor signaling rate falls below 75% of threshold value, commutation changes to six-step commutation.
Syntax	Read: HALLSCOMMTHRESH Write: HALLSCOMMTHRESH <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	10 to 10,000
Default value	40
Unit	Hall signals per second
Non-volatile	Yes
See also	HALLSONLYCOMM MENCTYPE 5
CANopen	

HALLSFILTAFF

Definition	Halls-Only Mean Square Filter Acceleration Feedforward
Type	Variable (R/W)
Description	Provides adjustable gain for the acceleration feedforward from the MSQ filter for Halls-only feedback.
Syntax	Read: HALLSFILTAFF Write: HALLSFILTAFF <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	-2 to 2
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE HALLS HALLSFILTT1 HALLSFILTT2 MENCTYPE

HALLSFILTT1

Definition	Halls-Only Mean Square Filter Depth
Type	Variable (R/W)
Description	Filtering time constant for Halls-only position feedback, in 125 µs quanta.
Syntax	Read: HALLSFILTT1 Write: HALLSFILTT1 <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	0.375 to 32
Default value	2.000
Unit	ms
Non-volatile	Yes
See also	HALLSFILTAFF HALLSFILTT2 HALLSFILTVELFF MENCTYPE

HALLSFILTT2

Definition	Halls-Only Mean Square Filter Velocity and Acceleration Filter Depth
Type	Variable (R/W)
Description	Filtering time constant for Halls-only velocity and acceleration indications, in 125 μs quanta.
Syntax	Read: HALLSFILTT2 Write: HALLSFILTT2<*value*>
Firmware	1.4.4
Drive status	Disabled
Range	0 to 32
Default value	4.000
Unit	ms
Non-volatile	Yes
See also	HALLSFILTAFF HALLSFILTT1 HALLSFILTVELFF MENCTYPE

HALLSFILTVELFF

Definition	Halls-Only Mean Square Filter Velocity Feedforward
Type	Variable (R/W)
Description	Halls-only filter velocity feedforward output gain.
Syntax	Read: HALLSFILTVELFF Write: HALLSFILTVELFF <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	-32 to 32
Default value	0.000
Unit	ms
Non-volatile	Yes
See also	HALLSFILTAFF HALLSFILTT1 HALLSFILTT2 MENCTYPE

HALLSINV

<table>
<tr><td>Definition</td><td>Hall Signals Inversion</td></tr>
<tr><td>Type</td><td>Variable (R/W)</td></tr>
<tr><td>Description</td><td>Inverts the polarity of individual Hall signals associated with motor phases UVW, thereby providing correction for crossed wiring. This variable is set during the MOTORSETUP procedure.</td></tr>
<tr><td>Syntax</td><td>Read: HALLSINV
Write: HALLSINV <0|1> <0|1> <0|1></td></tr>
<tr><td>Firmware</td><td>1.0.6</td></tr>
<tr><td>Drive status</td><td>Enabled | Disabled</td></tr>
<tr><td>Range</td><td>0 = Hall signal not inverted
1 = Hall signal inverted</td></tr>
<tr><td>Default value</td><td>0</td></tr>
<tr><td>Unit</td><td>Not Applicable</td></tr>
<tr><td>Non-volatile</td><td>Yes</td></tr>
<tr><td>Example</td><td><code>-->hallsinv 1 1 0</code>
<code>-->halls</code>
<code>Hu Hv Hw</code>
<code> 0 0 1</code>
<code>-->hallsinv 1 0 0</code>
<code>-->halls</code>
<code>Hu Hv Hw</code>
<code> 0 1 1</code>
<code>--></code></td></tr>
<tr><td>See also</td><td>FEEDBACKTYPE
HALLS
HALLSTYPE
MOTORSETUP
MENCTYPE</td></tr>
<tr><td>CANopen</td><td>2057h, sub-index 1</td></tr>
</table>

HALLSONLYCOMM

Definition	Halls-Only Commutation Source
Type	Variable (R/W)
Description	Defines whether the Halls-only commutation (MENCTYPE 5) is performed according to six-step phase currents, or whether it is based on an extrapolated position.
Syntax	Read: HALLSONLYCOMM Write: HALLSONLYCOMM *<value>*
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 = Six-step commutation with MPHASE correction (backward compatible) 1 = Commutation is based on an extrapolated position while velocity exceeds the threshold of Hall signals per second set by HALLSCOMMTHRESH, and changes to six-step when velocity falls below 75% of the Hall signals per second threshold.
	1 - Halls-Only will switch to Commutation based on Extrapolated Position when Velocity exceeds 40 Halls-Switches per Second, and will revert to Six-Step when Velocity falls below 30 Halls-Switches per Second.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	HALLSCOMMTHRESH MENCTYPE 5
CANopen	2179h, sub-index 1

HALLSTYPE

Definition	Hall Signals Type
Type	Variable (R/W)
Description	Gets/sets the source and method used for Hall sensors.
Syntax	Read: HALLSTYPE Write: HALLSTYPE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
CDHD Range	0 = Single-ended connection through the main Feedback connector 1 = Differential connection through the main Feedback connector. Refer to pinout documentation in product user manual.
DDHD Range	2 = Differential connection through the Machine I/F connector. Refer to pinout documentation in product user manual.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE HALLS HALLSINV MOTORSETUP MENCTYPE
CANopen	2058h, sub-index 0

HOLD

Definition	Hold Position Command
Type	Command
Description	Instructs motor whether to maintain its position.
Syntax	HOLD Queries the Hold state HOLD {0|1} Defines the Hold state
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Do not hold position 1 = Hold position
Default value	0
Unit	Not Applicable
Non-volatile	No
See also	J OPMODE MOVEINC STOPPED
CANopen	2063h, sub-index 0

HOLDMODE

Definition	Resume Motion or Homing After Hold Interrupt
Type	Variable (R/W)
Description	Defines whether or not an interrupted motion or homing will resume once the input that triggered the hold is released.
	Hold in OPMODE 0 (Velocity control) or **Hold in OPMODE 8 (Position control)**: When the digital input configured for the Hold function (INMODE <*i#*> 30) is activated, the drive stops (according to DECSTOP) and command execution is paused. While in the Hold state, a warning is indicated both on the drive’s 7-segment display (blinking operation mode) and in response to ST (“HOLD mode active” message). In addition, while in the Hold state, STOPPED= -1, indicating that movement has been interrupted. If HOLDMODE=1 (and OPMODE=0 or 8): When the Hold input is released, the drive resumes the interrupted motion, and continues to the original target (Position mode) or executes a jog according to the original JOG command (Velocity mode). Once the original motion has resumed, STOPPED=0. When the original command is completed, STOPPED=2, indicating the motion profile has been completed. If HOLDMODE=0 (and OPMODE=0 or 8): When the Hold input is released, the drive does not resume the interrupted motion. A new command can be generated by applying a new MOVEINC or MOVEABS command.
	Hold during Homing: When the digital input configured for the Hold function (INMODE <*i#*> 30) is activated, the drive halts the homing process and the motor stops. While in the Hold state, a warning is indicated both on the drive’s 7-segment display (blinking operation mode) and in response to ST (Hold Mode Active message). If HOLDMODE=1: When the Hold input is released, the homing process automatically restarts. If HOLDMODE=0: When the Hold input is released, the drive does not resume the interrupted homing sequence (HOMESTATE=20, indicating homing failed). A new homing command can be generated by issuing a new HOMECMD command.
Syntax	Read: HOLDMODE Write: HOLDMODE <*value*>
Firmware	1.20.6

Drive status	Enabled | Disabled
Range	0 = When the Hold input is released, the interrupted movement/homing does not resume. 1 = When the Hold input is released, the interrupted movement/homing resumes.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	INMODE 30

HOMEACC

Definition	Homing Acceleration
Type	Variable (R/W)
Description	Acceleration (and deceleration) for the homing process. HOMEACC is defined according to the units currently in effect. It is used in acceleration and deceleration of all trajectories (moves) during homing. If and when a limit switch is engaged, DECSTOP will override HOMEACC.
Syntax	Read: HOMEACC Write: HOMEACC <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.004 to 16666.666 UNITSROTACC 1 = 0.224 to 1000000 UNITSROTACC 2 = 1.342 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0.12 to 533333.333
Default value	4000 [rpm/s]
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes
See also	HOMETYPE
CANopen	609Ah, sub-index 0

HOMECMD

Definition	Homing Command
Type	Command
Description	HOMECMD starts the homing process. Before HOMECMD can be issued, the drive must be in Position Control or Position Gear operation mode (OPMODE 8 or OPMODE 4, respectively), and enabled; this means that no faults are in effect. If homing is in progress and needs to be aborted, use the command HOMECMD 0. This will stop all motion. It will also reset the homing state machine, resulting in HOMESTATE 0. Do not use the STOP command to terminate the homing procedure.
Syntax	HOMECMD Starts the homing process. HOMECMD 0 Aborts homing and stops all motion.
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	HOMETYPE
CANopen	2103h, sub-index 0

HOMECMDST

Definition	Homing Process Status
Type	Variable (R)

Description	Gets and displays the status of the homing process.
	Possible responses:
	`Homing Not Issued`
	Homing has not been initiated since the last power cycle (corresponds to HOMESTATE 0).
	`Homing Succeeded`
	Homing completed successfully (corresponds to HOMESTATE 19).
	`Homing Process Active Currently at State: nn, using State-Machine xx`
	Homing is in progress; 'nn' is the state of the homing state-machine (corresponds to HOMESTATE response), 'xx' is the state-machine in use (for factory troubleshooting only).
	`State-Machine used: 'xx' Failure at Homing State: 'nn' Failure Cause: [Neg. Limit-Switch | Pos. Limit-Switch | Home-Switch not Engaged | Drive Disabled | Incorrect Stopping Indication | Home-Switch not Disengaged]`
	Homing has failed (corresponds to HOMESTATE 20), with a list of possible causes for the failure.

Syntax	HOMECMDST
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	HOMESTATE LIMSWITCHNEG LIMSWITCHPOS

HOMEIHARDSTOP

Definition	Current Level for Homing on Hard Stop
Type	Variable (R/W)
Description	Gets/sets the current level at which a hard stop is detected. Used when the homing process uses a hard stop for direction-reversal (and not a limit switch).
Syntax	Read: HOMEIHARDSTOP Write: HOMEIHARDSTOP <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 to 150
Default value	0.000
Unit	A
Non-volatile	Yes
See also	HOMETYPE
CANopen	2104h, sub-index 0

HOMEOFFSET

Definition	Home Offset
Type	Variable (R/W)
Description	Gets/sets the value that defines an offset from the homing trigger position. The trigger may be an index mark, a transition of a limit switch or the home switch, or another source (as defined by HOMETYPE). HOMEOFFSET is used when the position at which the homing trigger is detected is not considered the home position (PFB 0). Once the trigger source is detected, the drive sets the feedback position (PFB) to the value of HOMEOFFSET, and instructs the motor to move to position 0.
Note	HOMEOFFSET value is not applied when HOMETYPE=35 (declares present position as home).
Syntax	Read: HOMEOFFSET Write: HOMEOFFSET <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	HOMETYPE
CANopen	607Ch, sub-index 0

HOMEOFSTMOVE

Definition	Home Offset Move
Type	Variable (R/W)
Description	Defines whether or not the axis is moved according to HOMEOFFSET during the homing process. The HOMEOFFSET movement is used to ensure that the value of PFB is 0 at the end of the homing process. HOMEOFSTMOVE is ignored if HOMETYPE=35.
Syntax	Read: HOMEOFSTMOVE Write: HOMEOFSTMOVE <*value*>
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	0 = Once the homing trigger is detected, the axis will move to the location of the trigger; at the end of the homing process the value of PFB will be HOMEOFFSET. 1 = Once the homing trigger is detected, the axis will move according to the value of HOMEOFFSET; at the end of the homing process the value of PFB will be 0.
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	HOMEOFFSET HOMETYPE

HOMESPEED1

Definition	Homing Speed 1 - Switch Search
Type	Variable (R/W)
Description	The initial velocity used in the homing process during the search for limit switches, home switches, and hard stops. HOMESPEED1 is defined according to the units currently in effect.
Syntax	Read: HOMESPEED1 Write: HOMESPEED1<*value*>
Firmware	1.2.12
Drive status	Disabled
Range	1 [rpm] to VMAX
Default value	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =1.166 If UNITSROTVEL 1 =100 If UNITSROTVEL 2 =600 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 53.333
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	HOMETYPE
CANopen	6099h, sub-index 1

HOMESPEED2

Definition	Homing Speed 2 - Index Search
Type	Variable (R/W)
Description	The velocity used in the homing process during the search for the homing trigger, which may be an index mark, a limit switch transition, a home switch transition, or another source (as defined by HOMETYPE). HOMESPEED2 is defined according to the units currently in effect. The value of HOMESPEED2 should be set much lower than HOMESPEED1 to increase the accuracy of the trigger capture.
Syntax	Read: HOMESPEED2 Write: HOMESPEED2<*value*>
Firmware	1.2.12
Drive status	Disabled
Range	1 [rpm] to VMAX
Default value	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =0.333 If UNITSROTVEL 1 =20 If UNITSROTVEL 2 =120 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 10.667
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	HOMETYPE
CANopen	6099h, sub-index 2

HOMESTATE

Definition	Homing Status
Type	Variable (R)
Description	Indicates the state of the homing process. HOMESTATE 0 indicates homing is idle. Use HOMECMD 0 (abort homing) to reset. Any HOMESTATE value other than 0, 19 or 20 indicates homing is in progress or stuck; reset if necessary.
Syntax	HOMESTATE
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	0 = Homing idle 19 = Homing completed 20 = Homing failed *any other value* = Homing in progress, or stalled
Default value	0
Unit	Not Applicable
Non-volatile	No
See also	HOMETYPE
CANopen	2090h, sub-index 0

HOMETYPE

Definition	Homing Type
Type	Variable (R/W)
Description	Gets/sets a value that defines the type of homing process that will be performed. HOMETYPE defines when direction of motion is reversed during homing, the homing trigger (e.g., switch, index), and other conditions. Homing types 1 through 14, 17 through 30 and 33 through 35 are according to CiA 402. Additional homing types have been defined per customer requests. Homing on index mark can be used with resolver motor feedback (HOMETYPE 1-14, 33, 34, -8, -12, -33, -34, -40, -44, -65, -66, -97, -98). The location of the resolver index mark is where the motor mechanical angle (MECHANGLE) is 0. To achieve greater accuracy of the homing procedure (i.e., minimum PFB counts from MECHANGLE 0), reduce the value of HOMESPEED2.
Syntax	Read: HOMETYPE Write: HOMETYPE <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	1 = Homing on first index mark after disengaging from negative limit. 2 = Homing on first index mark after disengaging from positive limit. 3 = Homing on first index mark after disengaging from home switch (home switch at positive travel). 4 = Homing on first index mark after engaging home switch (home switch at positive travel). 5 = Homing on first index mark after disengaging from home switch (home switch at negative travel). 6 = Homing on first index mark after engaging home switch (home switch at negative travel). 7 = Homing on first index mark after disengaging from negative side of home switch; initial move positive. 8 = Homing on first index mark after engaging negative side of home switch; initial move positive. 9 = Homing on first index mark after engaging positive side of home switch; initial move positive. 10 = Homing on first index mark after disengaging from positive side of home switch; initial move positive. 11 = Homing on first index mark after disengaging from positive side of home switch; initial move negative. 12 = Homing on first index mark after engaging positive side of home switch; initial move negative.

	13 = Homing on first index mark after engaging negative side of home switch; initial move negative. 14 = Homing on first index mark after disengaging from negative side of home switch; initial move negative. 15 = Reserved 16 = Reserved 17 = Homing on falling edge of negative limit. 18 = Homing on falling edge of positive limit. 19 = Homing on falling edge of home switch (home switch at positive travel). 20 = Homing on rising edge of home switch (home switch at positive travel). 21 = Homing on falling edge of home switch (home switch at negative travel). 22 = Homing on rising edge of home switch (home switch at negative travel). 23 = Homing on negative side falling edge of home switch; initial move positive. 24 = Homing on negative side rising edge of home switch; initial move positive. 25 = Homing on positive side rising edge of home switch; initial move positive. 26 = Homing on positive side falling edge of home switch; initial move positive. 27 = Homing on positive side falling edge of home switch; initial move negative. 28 = Homing on positive side rising edge of home switch; initial move negative. 29 = Homing on negative side rising edge of home switch; initial move negative. 30 = Homing on negative side falling edge of home switch; initial move negative. 31 = Reserved 32 = Reserved 33 = Homing on index mark, moving negative.34 = Homing on index mark, moving positive. 35 = Declare present position as home. (PFB reading after homing will always be HOMEOFFSET regardless of HOMEOFSTMOVE setting).
	-8 = Homing on first index mark after engaging negative side of home switch; initial move positive, retract upon first contact with home switch edge. -9 = Homing on first index mark after engaging positive side of home switch; initial move positive; if engaging positive limit switch then stop and issue failure indication. -10 = Homing on first index mark after disengaging from positive side of home switch; initial move positive; if engaging positive limit switch then stop and issue failure indication.

	-12 = Homing on first index mark after engaging positive side of home switch; initial move negative, retract upon first contact with home switch edge. -13 = Homing on first index mark after engaging negative side of home switch; initial move negative; if engaging negative limit switch then stop and issue failure indication. -14 = Homing on first index mark after disengaging from negative side of home switch; initial move negative; if engaging negative limit switch then stop and issue failure indication. -24 = Homing on negative side rising edge of home switch; initial move positive, retract upon first contact with home switch edge. -26 = Homing on positive side falling edge of home switch; initial move positive; if engaging positive limit switch then stop and issue failure indication. -28 = Homing on positive side rising edge of home switch; initial move negative, retract upon first contact with home switch edge. -30 = Homing on negative side falling edge of home switch; initial move negative; if engaging negative limit switch then stop and issue failure indication. -33 = Homing on index mark after direction reversal on hard stop; initial move negative. -34 = Homing on index mark after direction reversal on hard stop; initial move positive. -40 = Homing on first index mark after engaging negative side of home switch; initial move positive; reverse direction on hard stop. -44 = Homing on first index mark after engaging positive side of home switch; initial move negative; reverse direction on hard stop. -56 = Homing on negative side rising edge of home switch; initial move positive; reverse direction on hard stop; retract upon first contact with home-switch edge. -60 = Homing on positive side rising edge of home switch; initial move negative; reverse direction on hard stop, retract upon first contact with home switch edge. -65 = Homing on index mark; initial move negative; if index mark not found reverse direction on hard stop. -66 = Homing on index mark; initial move positive; if index mark not found reverse direction on hard-stop. -97 = Homing on index mark; initial move negative; if index mark not found reverse direction on negative limit switch. -98 = Homing on index mark; initial move positive; if index mark not found reverse direction on positive limit switch. -125 = Homing on hard stop at negative end of travel. -126 = Homing on hard stop at positive end of travel.

Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	HOMEACC HOMECMD HOMEOFFSET HOMEOFSTMOVE HOMESPEED1 HOMESPEED2 HOMESTATE
CANopen	6098h, sub-index 0

HSAVE

Definition	Save Parameters to Encoder EEPROM
Type	Command
Description	Writes the current values of MPHASE and PFBOFFSET to the EnDat/HIPERFACE encoder memory. These parameters will be loaded after the next power up or feedback initialization. The command HSAVE 1 performs the same function as HSAVE, but prevents the (possibly incorrect) parameter values from being loaded from the encoder memory at the next power up or feedback initialization; instead, the encoder will be initialized with parameters values from drive memory.
Syntax	HSAVE
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	FEEDBACKTYPE MPHASE PFBOFFSET

HWPEXT

Definition	Hardware Position External
Type	Variable (R)
Description	Indicates the position as measured by an external feedback device. HWPEXT displays a valid value ONLY when the secondary encoder input is in use while a Gearing operation mode (GEARMODE) is enabled.
Note	The HWPEXT/PCMD ratio is not maintained under the following condition: GEAROUT=1 GEARIN>5000 No warning is issued.
Note	HWPEXT 0 When operating in Gearing mode (OPMODE 4), it may be useful to zero the indicated position of the master axis, by means of the command HWPEXT 0. HWPEXT 0 stores the indicated master position into an offset variable, and subtracts the offset value from the indicated position from that point on.
Syntax	HWPEXT
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	Not Applicable
Unit	counts
Non-volatile	No
See also	GEARMODE PCMD XENCRES
CANopen	2064h, sub-index 0

HWPEXTCNTRLR

Definition	Hardware Position External (FPGA)
Type	Variable (R)
Description	Indicates the position as measured by an external feedback device (FPGA); 32-bit counter of the pulse and direction input from the controller interface connector.
Syntax	HWPEXTCNTRLR
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	Not applicable
Default value	Not applicable
Unit	Count
Non-volatile	No
Example	`-->hwpextcntrlr` `4294943248 [Counts]`
See also	GEARINMODE GEARMODE HWPEXT HWPEXTMACHN
CANopen	217Eh, sub-index 0

HWPEXTMACHN

Definition	Hardware Position External (DSP)
Type	Variable (R)
Description	Indicates the position as measured by an external feedback device (DSP); 32-bit counter of the pulse and direction input from the machine interface connector.
Syntax	HWPEXTMACHN
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	Not applicable
Default value	Not applicable
Unit	Count
Non-volatile	No
Example	`-->hwpextmachn` `4294943248 [Counts]`
See also	GEARMODE HWPEXT HWPEXTCNTRLR
CANopen	20B6h, sub-index 0

HWPOS

Definition	Hardware Position
Type	Variable (R)
Description	Indicates the position, as measured by the feedback device.
Syntax	HWPOS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable. Depends upon the feedback device.
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ELECTANGLE FEEDBACKTYPE MECHANGLE MENCRES MENCTYPE MRESPOLES
CANopen	2065h, sub-index 0

I

Definition	Motor Current
Type	Variable (R)
Description	Indicates the equivalent motor current (equivalent sinusoidal peak).
Syntax	I
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	ICMD ID IFOLD ILIM IMAX IU
CANopen	6078h, sub-index 0

ICMD

Definition	Current Command
Type	Variable (R)
Description	Indicates the current command, which is generated either directly (EtherCAT/CANopen, serial or analog reference command), or as output of the position or velocity controller.
Syntax	ICMD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	I ID IFOLD ILIM IMAX IU
CANopen	6074h, sub-index 0

ID

Definition	Current D Axis
Type	Variable (R)
Description	In vector control, indicates the value perpendicular to IQ.
Syntax	ID
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	I ILIM IMAX IQ IU
CANopen	2066h, sub-index 0

IFFLPFHZ

Definition	Current Feedforward Low Pass Filter
Type	Variable (R/W)
Description	Gets/sets the corner frequency of a first-order filter of the feedforward low pass filter.
Syntax	Read: IFFLPFHZ Write: IFFLPFHZ <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	10 to 1000
Default value	80
Unit	Hz
Non-volatile	Yes
See also	KCBEMF MKT
CANopen	2068h, sub-index 0

IFOLD

Definition	Drive Foldback Current Limit
Type	Variable (R)
Description	Indicates the current limit derived from the foldback mechanism. A foldback condition occurs when IFOLD drops below ILIM. This variable is useful for checking how close the current is to the foldback limit.
Syntax	IFOLD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	Not applicable
Unit	A
Non-volatile	No
See also	DICONT FOLD IFOLDFTHRESH IFOLDWTHRESH ILIM
CANopen	2069h, sub-index 0

IFOLDFTHRESH

Definition	Drive Foldback Fault Threshold
Type	Variable (R/W)
Description	Gets/sets the current threshold level for declaring a fault due to foldback. The drive foldback threshold fault is declared when IFOLD drops below IFOLDFTHRESH.
Syntax	Read: IFOLDFTHRESH Write: IFOLDFTHRESH <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	Not Applicable
Unit	A
Non-volatile	Yes
See also	DICONT FOLD IFOLD IFOLDWTHRESH ILIM
CANopen	206Ah, sub-index 0

IFOLDWTHRESH

Definition	Drive Foldback Warning Threshold
Type	Variable (R/W)
Description	Gets/sets the current threshold level for declaring a warning due to foldback. The drive foldback threshold warning is declared when IFOLD drops below IFOLDWTHRESH.
Syntax	Read: IFOLDWTHRESH Write: IFOLDWTHRESH <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	Not Applicable
Unit	A
Non-volatile	Yes
See also	DICONT FOLD IFOLD IFOLDFTHRESH ILIM
CANopen	206Bh, sub-index 0

IGNOREBATTFLT

Definition	Ignore Encoder Battery Fault
Type	Variable (R/W)
Description	Indicates whether the drive will respond to an encoder battery voltage warning or fault. Allows a multi-turn absolute encoder to be used without a backup battery, as a single-turn absolute encoder.
Syntax	Read: IGNOREBATTFLT Write: IGNOREBATTFLT <*value*>
Firmware	1.41.x
Drive status	Enabled | Disabled
Range	0 = Drive detects and responds to encoder battery fault. 1 = Drive ignores encoder battery fault (absolute multi-turn position will not be retained after a power cycle).
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	MTTURNRESET

IGNOREBRKFLT

Definition	Ignore Power Brake Fault
Type	Variable (R/W)
Description	**Note**: Applicable only to CDHD 400/480 VAC drives, 3A, 6A, 12A, 30A
Note	Previously: IGNOREPWRBRK
Syntax	Read: IGNOREBRKFLT Write: IGNOREBRKFLT <*value*>
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	0 = Drive ignores brake fault indication 1 = Drive ignores STO fault indication
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	ST

IGNOREPDLB

Definition	Ignore Pulse and Direction Line Break
Type	Variable (R/W)
Description	Defines whether the Pulse and Direction line break is ignored while the drive is disabled.
Syntax	Read: IGNOREPDLB Write: IGNOREPDLB <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 = Drive disregards P&D line break when disabled 1 = Drive responds to P&D line break even when disabled
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	GEARMODE

IGRAV

Definition	Gravity Compensation
Type	Variable (R/W)
Description	Gets/sets the value of the gravity compensation constant. IGRAV is added to the current loop command to compensate for gravity or similar constant interference.
Syntax	Read: IGRAV Write: IGRAV <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±DIPEAK
Default value	0.000
Unit	A
Non-volatile	Yes
See also	I FRICINEG FRICIPOS ILIM DIPEAK
CANopen	206Ch, sub-index 0

ILIM

Definition	User Current Limit
Type	Variable (R/W)
Description	Gets/sets the application current limit, allowing the user to limit the drive's peak current. This variable limits the current command that will be accepted from the user (using the T command in OPMODE 2) or issued by the control loops (in OPMODE 0, 1, 3, and 4). ILIM is an independent variable that is not calculated from hardware parameters and is not dependent on any other variables. ILIM is similar to VLIM (which is used in OPMODE 0 and 1) and can be used to protect delicate load equipment.
Syntax	Read: ILIM Write: ILIM <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to IMAX
Default value	Not Applicable
Unit	A
Non-volatile	Yes
See also	I IMAX
CANopen	6073h, sub-index 0

ILIMACT

Definition	Drive Actual Current Limit
Type	Variable (R)
Description	Reports the actual current limit. Useful when the limit is dynamic due to analog control over current limit. ILIMACT is the minimum between ILIM and the analog current limit (only for ANIN2MODE 2).
Syntax	ILIMACT
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	ANIN2MODE ILIM IMAX

IMAX

Definition	Drive Current Limit
Type	Variable (R)
Description	Displays the maximum current limit for a drive and motor combination.
Syntax	IMAX
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	DIPEAK I ILIM MIPEAK
CANopen	20F0h, sub-index 0

IN

Definition	Input Status
Type	Variable (R)
Description	Gets the state of a digital input.
Syntax	IN <*input#*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	*input#* = 1 to 11 0 = Input off 1 = Input on
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
Example	`-->IN 1` `0`
See also	ININV INMODE INPUTS
CANopen	60FDh, sub-index 0

IN32OPMODES

Definition	Operation Mode Change Input Level
Type	Variable (R/W)
Description	Enables the operation mode to be changed on-the-fly, even while drive is enabled. IN32OPMODES holds a 16-bit value. The high byte defines the operation mode to be activated upon a high level of the digital input defined in INMODE <*i#*> 32. The low byte defines the operation to be activated upon a low level of the digital input defined in INMODE <*i#*> 32. For example: `-->INMODE 8 32` `-->IN32OPMODES h0`**`4`**`0`**`3`** A high level of digital input 8 sets OPMODE **4**. A low level of digital input 8 sets OPMODE **3**.
Syntax	Read: IN32OPMODES Write: IN32OPMODES <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 to 2056 (0 … 0x808)
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	IN32SWITCH INMODE OPMODE OPMODESWITCH
CANopen	

IN32SWITCH

Definition	Operation Mode Change Resume Motion
Type	Variable (R/W)
Description	Defines if and how motion resumes after switching back to an OPMODE that corresponds to a specific input level.
Note	When switching back to OPMODE 4: The gearing position will be restored only if bit 2 in the GEARLIMITSMODE parameter is set to 1; otherwise the drive will be unable to perform any profile according to ACC, DEC or VLIM.
Syntax	Read: IN32SWITCH Write: IN32SWITCH <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 to 3
Range	0 = No further action will occur after switching the operation mode via INMODE <*i#*> 32. 1 = The previous command value will be restored if the digital input switches back to the OPMODE defined in the low byte of IN32OPMODES. 2 = The previous command value will be restored if the digital input switches back to the OPMODE defined in the high byte of IN32OPMODES. 3 = The previous command value will be restored if the digital input switches back to the OPMODE defined by either the low or high byte in IN32OPMODES.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	IN32SWITCH INMODE OPMODE OPMODESWITCH
CANopen	

INDEXDURATE

Definition	Simulated Encoder Index Pulse Duration
Type	Variable (R/W)
Description	Gets/sets the duration of the simulated index pulse in the encoder simulation feature. This function allows users to observe index pulses of very short durations. To be used effectively, the duration of the simulated index pulse must be shorter than the time length of one revolution; otherwise a constant signal will be generated. INDEXDURATE 0 = The drive will issue the simulated index pulse according to the hardware mechanism's defaults.
Syntax	Read: INDEXDURATE Write: INDEXDURATE <*value*>
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	0 to 100
Default value	0
Unit	ms
Non-volatile	Yes
See also	ENCOUTMODE ENCOUTRES ENCOUTZPOS INDEXST MENCRES

INDEXPFB

Definition	Encoder Index Position Feedback
Type	Variable (R)
Description	Indicates the position feedback (PFB) captured at the first index detection after power on.
Syntax	INDEXPFB
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = 0.309 UNITSROTPOS 1 = 2529.69 UNITSROTPOS 2 = 111.168 If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = 0.309 UNITSLINPOS 1 = 2529.69
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	FEEDBACKTYPE HWPOS MENCTYPE MENCZPOS PFB UNITSROTPOS
CANopen	206Fh, sub-index 0

INDEXST

Definition	Encoder Index Signal Status
Type	Variable (R)
Description	Indicates the state of the encoder index signal.
Syntax	Read: INDEXST Write: INDEXST <*value*>
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	0 = Encoder index signal inactive; position not within index 1 = Encoder index signal active; position within index
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ENCOUTMODE ENCOUTRES ENCOUTZPOS INDEXDURATE MENCRES

INFO

Definition	Drive Info
Type	Command
Description	Returns information about the drive.
Syntax	INFO
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable

Example	`-->info`
	`Digital Servo Drive`
	`---------------------------------------`
	`Drive model number: CDHD-0062AAF1-00`
	`Peak current      : 25.455 A / 18.000 Arms`
	`Continuous current: 8.485 A / 6.000 Arms`
	`Feedback type     : sensAR Magnetic Encoder Single Turn`
	`Interface         : Analog Voltage, Pulse Train Ref, CANopen(R),`
	`                    USB, RS232`
	`Voltage           : 200 V`
	`Product S/N       : 214M-2015139, December 2014`
	
	`Control board`
	`P/N               : PRDr90CSCF7z-00`
	`S/N               : F4114-000038`
	`HW revision       : B0`
	`Eeprom revision   : 4`
	`Flash Device ID   : SST 39VF1601C`
	
	`Power board`
	`P/N               : PRDr90PACSMz-06`
	`S/N               : F4214-000521`
	`HW revision       : C0`
	`Eeprom revision   : 9`
	
	`Firmware Version  : 1.41.9`
	`FPGA Version      : 1.87 May 26 2016`
	`Resident Version  : 1.3.1`
	`Runtime           : 186:15:04`

See also	DRIVENAME TRUN VER

ININV

Definition	Input Polarity
Type	Variable (R/W)
Description	Gets/sets the input polarity of the digital inputs. ININV *i#* 0: no inversion is in effect, and the input is considered inactive when it is pulled low through a connection to digital ground. ININV *i#* 1: inversion is in effect, and the switch is considered inactive when it is open-circuit or pulled high.
	Warning: Make sure ININV=0 for the input that triggers Hold and Resume Motion (INMODE *i#* 30). Thus, if the input value is 0 and a wire break occurs, no unintentional movement will result. Reversing the input logic on this input is not recommended, and is fully the responsibility of the user.
Syntax	Read: ININV <*input#*> Write: ININV <*input#*> <*invert*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	*input#* = 1 to 11 *invert*: 0 = Input not inverted 1 = Input inverted
Default value	0
Unit	Not applicable
Non-volatile	Yes

Example	`-->ininv 1`
	`0`
	`-->ininv 1 1`
	`-->ininv 1`
	`1`
	`-->`

See also	IN INMODE INPUTS
CANopen	2070h, sub-index 1

INMODE

Definition	Input Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines a functionality for each of the available digital inputs.
Syntax	Read: INMODE <*input#*> Write: INMODE <*input#*> <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
CDHD Range	*input#* = **1 to 11** *value*: 0 = Idle 1 = Remote enable 2 = Clear faults***** 3 = Phase lock loop (PLL) synchronization 4 = Emergency stop, activates Active Disable 5 = Limit switch positive 6 = Limit switch negative 7 = Reserved 8 = Home switch 9 = Script trigger 10 = Script bit 0 11 = Script bit 1 12 = Script bit 2 13 = Script bit 3 14 = Script bit 4 15 = Stop on input (with DECDIST as offset) 16 = Stop on input (with DECDIST2 as offset) 17 = Gearing pulse signal – on digital **input 5** only 18 = Gearing direction signal - on digital **input 6** only 19 to 25 = Reserved 26 = Homing command 27 = Touch probe 1 28 = Reserved 29 = Reserved 30 = Hold and resume motion** 31 = Reserved 32 = Operation mode change while drive enabled 33 = Explicitly sets OPMODE 4 and ENCFOLLOWER 1[†] 34 = Explicitly sets OPMODE 4 and ENCFOLLOWER 2[†] 35 = Explicitly sets OPMODE 4 and ENCFOLLOWER 3[†] 36 = Explicitly sets OPMODE 4 and ENCFOLLOWER 4[†] 37 = Explicitly sets OPMODE 4 and ENCFOLLOWER 5[†] 38 = JOG motor to positive direction at speed JOGSPD1[‡] 39 = JOG motor to negative direction at speed -JOGSPD1[‡] 40 = JOG motor to positive direction at speed JOGSPD2[‡] 41 = JOG motor to negative direction at speed -JOGSPD2[‡]

DDHD Range	DDHD*: input#* = **1 to 8** *value*: 0 = Idle 1 = Remote enable 2 = Clear faults***** 3 = Phase lock loop (PLL) synchronization 4 = Emergency stop, activates Active Disable 5 = Limit switch positive 6 = Limit switch negative 7 = Reserved 8 = Home switch 9 = Script trigger 10 = Script bit 0 11 = Script bit 1 12 = Script bit 2 13 = Script bit 3 14 = Script bit 4 15 = Stop on input (with DECDIST as offset) 16 = Stop on input (with DECDIST2 as offset) 17 = Gearing pulse signal – on digital **input 5** only 18 = Gearing direction signal - on digital **input 6** only 19 to 25 = Reserved 26 = Homing command 27 = Touch probe 1 28 = Touch probe 2 29 = Reserved 30 = Hold and resume motion ** 31 = Reserved . . .

***Note**	**INMODE <*i#*> 2** will not clear a fault if the condition causing the fault has not been removed.
	To clear a fault using I/Os, REMOTE must be disabled. Therefore, when a fault occurs, enter the following sequence of commands to prevent the drive from being reenabled unintentionally before the fault is cleared:
	`REMOTE 0`
	`INMODE <i#> 2`
	`REMOTE 1`
	If CLEARFAULTS is used, it will also issue a software disable command (K) automatically; thus, if all other conditions for activation are present, the software enable command (EN) will immediately enable the drive.

****Note**	**INMODE <*i#*> 30**: Defines an input as a Hold and Resume Motion trigger. When the digital input configured for the Hold/Resume function is activated, the drive stops a jog movement (in OPMODE 0), or a motion task (in OPMODE 8), or a running homing procedure (in OPMODE 8). When the input is released, the drive allows the interrupted motion to resume. While in the Hold state, a warning is indicated both on the drive's 7-segment display (blinking operation mode) and in response to ST (Hold Mode Active message). Requires HOLDMODE=1. If HOLDMODE=0, the interrupted motion will not resume. **Warning:** Make sure ININV=0 for the input that triggers Hold and Resume Motion. Thus, if the input value is 0 and a wire break occurs, no unintentional movement will result. Reversing the input logic (ININV=1) is not recommended, and is fully the responsibility of the user.
†Note	**INMODE <*i#*> 33|34|35|36|37** Only one digital input should be defined for the encoder following functionality. If two or more digital inputs are defined for encoder following and activated at the same time, the drive will set ENCFOLLOWER=0, and issue a warning. If multiple digital inputs defined for encoder following are all inactive at the same time, the drive will set ENCFOLLOWER=0. If no digital input is defined for encoder following, the drive will use the ENCFOLLOWER value from non-volatile memory or from RAM.
‡Note	Only one of the digital inputs defined for the jog function should be activated at a time. If two or more digital inputs are defined for the jog function and activated at the same time, the drive will not jog the motor.
CDHD Default value	INMODE <*input1*> = 1 INMODE <*input2-11*> = 0
DDHD Default value	INMODE <*input1*> = 1 INMODE <*input2-8*> = 0
Unit	Not Applicable
Non-volatile	Yes

Example	`-->INMODE 1 0`
	`-->INMODE 1`
	`0`
	`-->`

See also	GEARMODE HOLDMODE IN ININV INPUTS SYNCSOURCE
CANopen	20E0h, sub-index 1

INPOS

Definition	In Position Indication
Type	Variable (R)
Description	Indicates that the position error PE has entered the allowed tolerance PEINPOS. INPOS can be used only when the motion command has been generated by the drive.
Syntax	INPOS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Not in position 1 = In position
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Yes
See also	PEINPOS PEINPOSTIME PEMAX STOPPED
CANopen	20B5h, sub-index 0

INPUTS

Definition	Inputs Status
Type	Variable (R)
Description	Gets the state of all digital inputs. A header lines identifies each of the inputs.
Syntax	INPUTS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Input off 1 = Input on
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	`-->INPUTS`
	`1 2 3 4 5 6 7 8 9 10 11`
	`1 0 0 0 0 0 0 0 0  0  0`
	`-->`

See also	IN ININV INMODE

IQ

Definition	Current Q Axis
Type	Variable (R)
Description	In vector control, indicates the current for the torque. This value is perpendicular to ID .
Syntax	IQ
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	I ID ILIM IMAX IU
CANopen	2067h, sub-index 0

ISTOP

Definition	Dynamic Braking Current
Type	Variable (R/W)
Description	Gets/sets the maximum current allowed during the dynamic braking process. Dynamic braking is a mechanism by which the drive holds the motor during Disabling mode, with only the motor's back EMF used to apply the stopping current.
Syntax	Read: ISTOP Write: ISTOP <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to DIPEAK
Default value	DIPEAK
Unit	A
Non-volatile	Yes
See also	DISMODE DISSPEED FLT
CANopen	2071h, sub-index 0

IU

Definition	Phase U Actual Current
Type	Variable (R)
Description	Indicates the actual current in Phase U (of UVW).
Syntax	IU
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	I ID ICMD ILIM IUOFFSET IV
CANopen	2072h, sub-index 0

IUOFFSET

Definition	Phase U Current Offset
Type	Variable (R)
Description	Indicates the current offset of phase U (of UVW)..
Syntax	IUOFFSET
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	IU
CANopen	2073h, sub-index 0

IV

Definition	Phase V Actual Current
Type	Variable (R)
Description	Indicates the actual current in phase V (of UVW).
Syntax	IV
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	I ID ICMD ILIM IU IUOFFSET
CANopen	2074h, sub-index 0

IVOFFSET

Definition	Phase V Current Offset
Type	Variable (R)
Description	Indicates the current offset of phase V (of UVW).
Syntax	IVOFSET
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	Yes
See also	IV
CANopen	2075h, sub-index 0

IZERO

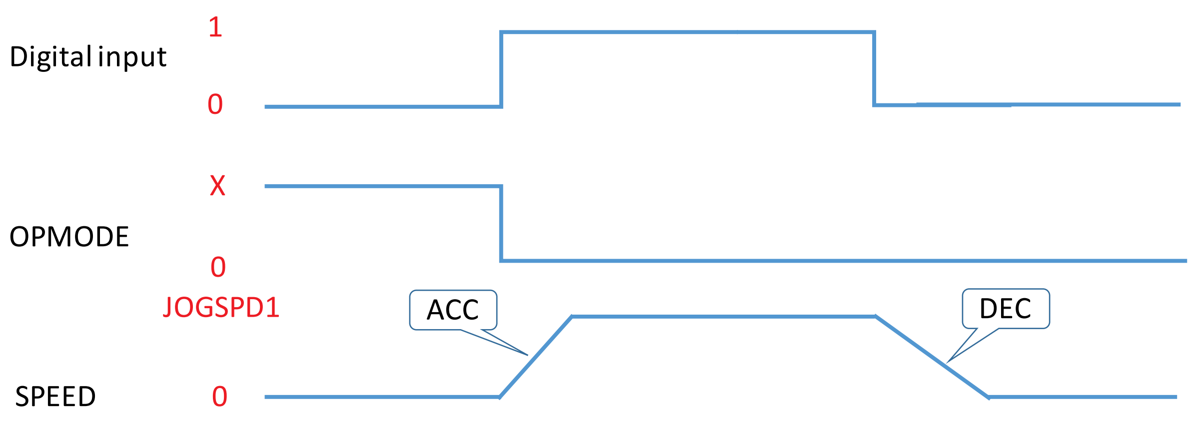
Definition	Zero Procedure Current
Type	Variable (R/W)
Description	Gets/sets the current for the **ZERO** procedure.
Syntax	IZERO
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to DIPEAK
Default value	0.100
Unit	A
Non-volatile	Yes
See also	ILIM MIPEAK ZERO
CANopen	2076h, sub-index 0

J

Definition	Jog Command
Type	Command
Description	Issues a velocity jog. If the drive has been disabled, the jog command is reset to zero.
Syntax	J Queries the command J *speed* Starts jog at a constant speed. J *speed duration* Starts jog at a constant speed for specified duration, after which a zero velocity command is issued.
Firmware	1.0.6
Drive status	Enabled
Range	*speed*: ±VLIM *duration:* +[*unlimited*]
Default value	Not Applicable
Unit	*speed*: If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = rps UNITSROTVEL 1 = rpm UNITSROTVEL 2 = deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s *duration*: ms
Non-volatile	Not Applicable
See also	ACC OPMODE STEP STOP

JOGSPD1

Definition	Jog Speed 1 Triggered by Input
Type	Variable (R/W)
Description	Defines a speed for a JOG command triggered by a digital input. The configured digital input functionality defines whether the motor moves in a positive (INMODE 38) or negative (INMODE 39) direction. ACC and DEC define the acceleration and deceleration values.
Note	Only one of the digital inputs defined for the jog function should be activated at a time. If two or more digital inputs are defined for the jog function and activated at the same time, the drive will not jog the motor.
Syntax	Read: JOGSPD1 Write: JOGSPD1 <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 to VLIM
Default value	100.000
Unit	According to UNITSROTVEL
Non-volatile	Yes
See also	JOGSPD2
CANopen	



JOGSPD2

Definition	Jog Speed 2 Triggered by Input
Type	Variable (R/W)
Description	Defines a speed for a JOG command triggered by a digital input. The configured digital input functionality defines whether the motor moves in a positive (INMODE 40) or negative (INMODE 41) direction. ACC and DEC define the acceleration and deceleration values.
Note	Only one of the digital inputs defined for the jog function should be activated at a time. If two or more digital inputs are defined for the jog function and activated at the same time, the drive will not jog the motor.
Syntax	Read: JOGSPD2 Write: JOGSPD2 <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 to VLIM
Default value	500.000
Unit	According to UNITSROTVEL
Non-volatile	Yes
See also	JOGSPD1
CANopen	

K

Definition	Disable Command
Type	Command
Description	Disables the drive. The behavior of the drive upon disable command is defined by DISMODE. K removes the software enable condition (SWEN) from the activation chain.
Note	Applicable in COMMODE 0 only. When the drive is operating in COMMODE 1, it must be disabled through the EtherCAT/CANopen interface.
Syntax	K
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	ACTIVE EN FLT READY REMOTE ST SWEN

KCBEMF

Definition	Current BEMF Compensation Gain
Type	Variable (R/W)
Description	Gets/sets the feedforward BEMF compensation ratio for the current control. When the value of KCBEMF is changed, CONFIG is required.
Note	As of version 1.40.0, the drive firmware includes a table that has bundled parameter data for certain drive and motor pairings. When a system drive and motor “parameter bundle” is found in the table, the values of current loop parameters KCBEMF, KCD, KCFF, KCI, and KCP are set automatically and cannot be manipulated by users.
Syntax	Read: KCBEMF Write: KCBEMF <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 2
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	IFFLPFHZ MKT
CANopen	2003h, sub-index 0

KCD

Definition	Dead Time Compensation Minimal Level
Type	Variable (R/W)
Description	Minimum current level to start compensation for dead-time effect. When the value of KCD is changed, CONFIG is required.
Note	As of version 1.40.0, the drive firmware includes a table that has bundled parameter data for certain drive and motor pairings. When a system drive and motor “parameter bundle” is found in the table, the values of current loop parameters KCBEMF, KCD, KCFF, KCI, and KCP are set automatically and cannot be manipulated by users.
Syntax	Read: KCD Write: KCD <*value*>
Firmware	1.3.2
Drive status	Disabled
Range	0 to 10
Default value	2.00
Unit	Not Applicable
Non-volatile	Yes
See also	PWMFRQ
CANopen	20EFh, sub-index 0

KCFF

Definition	Current KFF Gain
Type	Variable (R/W)
Description	Gets/sets the current controller feedforward (KFF) gain. When the value of KCFF is changed, CONFIG is required.
Note	As of version 1.40.0, the drive firmware includes a table that has bundled parameter data for certain drive and motor pairings. When a system drive and motor "parameter bundle" is found in the table, the values of current loop parameters KCBEMF, KCD, KCFF, KCI, and KCP are set automatically and cannot be manipulated by users.
Syntax	Read: KCFF Write: KCFF <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.001 to 100
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	KCBEMF KCI KCP
CANopen	2082h, sub-index 0

KCI

Definition	Current KI Gain
Type	Variable (R/W)
Description	Gets/sets the current controller integrator (KI) gain. When the value of KCI is changed, CONFIG is required.
Note	As of version 1.40.0, the drive firmware includes a table that has parameter bundled data for certain drive and motor pairings. When a system drive and motor “parameter bundle” is found in the table, the values of current loop parameters KCBEMF, KCD, KCFF, KCI, and KCP are set automatically and cannot be manipulated by users.
Syntax	Read: KCI Write: KCI <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.001 to 100
Default value	1.000
Unit	Not applicable
Non-volatile	Yes
See also	KCBEMF KCFF KCP
CANopen	2006h, sub-index 0

KCMODE

Definition	Current Loop Compatibility Mode
Type	Variable (R/W)
Description	Gets/sets the type of current control loop. Enables use of the new firmware version while maintaining the existing current control settings. Useful for applications in which the upgrade to the latest current control structure is not desired.
Syntax	Read: KCMODE Write: KCMODE <*value*>
Firmware	1.3.2
Drive status	Disabled
Range	0 = Current control loop for firmware version 1.3.2 and higher. 1 = Keeps the current control loop from a previous firmware version (SSV file). After changing KCMODE from 0 to 1, you must issue the command SAVE, and recycle the drive's AC power. 2 = Uses the latest version of the current controller; recommended except in specific cases of backward compatibility issues. 3 = Reserved. 4 = Reserved. 5 = Reserved. 6= Enhanced current control loop. Provides better current symmetry and better bandwidth.
Note	KCMODE 6 is the default value. Users of previous firmware versions may want to change or keep KCMODE at its previous setting to maintain backward compatible and avoid fine tuning. However, for new applications the Enhanced Current Loop setting is highly recommended to achieve better performance and bandwidth.
Default value	6
Unit	Not Applicable
Non-volatile	Yes
See also	CONFIG ML
CANopen	2106h, sub-index 0

KCP

Definition	Current KP Gain
Type	Variable (R/W)
Description	Gets/sets the current controller proportional (KP) gain. When the value of KCP is changed, CONFIG is required.
Note	As of version 1.40.0, the drive firmware includes a table that has bundled parameter data for certain drive and motor pairings. When a system drive and motor "parameter bundle" is found in the table, the values of current loop parameters KCBEMF, KCD, KCFF, KCI, and KCP are set automatically and cannot be manipulated by users.
Syntax	Read: KCP Write: KCP <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 100
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	KCBEMF KCFF KCI
CANopen	2007h, sub-index 0

KCUSERGAIN

Definition	Current User Gain
Type	Variable (R/W)
Description	Gets/sets the current user gain.
Syntax	Read: KCUSERGAIN Write: KCUSERGAIN <*value*>
Firmware	1.41.x
Drive status	Enable | Disabled
Range	0.1 to 10
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	
CANopen	

KNLAFRC

Definition	HD Acceleration Feedforward
Type	Variable (R/W)
Description	ICMD acceleration feedforward.
Syntax	Read: KNLAFRC Write: KNLAFRC <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 200
Default value	0
Unit	% of nominal
Non-volatile	Yes
See also	KNLD KNLI KNLIV KNLP

KNLD

Definition	HD Derivative Gain
Type	Variable (R/W)
Description	KNLD is the HD control equivalent of PID D. It is used in the HD control loop to reduce velocity error. The feedback gain parameters are tuned in the following general order: KNLD → KNLIV → KNLP → KNLI
Syntax	Read: KNLD Write: KNLD <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 2000
Default value	80.000
Unit	Hz
Non-volatile	Yes
See also	KNLI KNLP KNLIV POSCONTROLMODE
CANopen	2017h, sub-index 0

KNLI

Definition	HD Integral Gain
Type	Variable (R/W)
Description	KNLIV is the HD control equivalent of PID I. It is used in the HD control loop to reduce standstill error. The feedback gain parameters are tuned in the following general order: KNLD → KNLIV → KNLP → KNLI
Syntax	Read: KNLI Write: KNLI <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 200
Default value	10.000
Unit	Hz
Non-volatile	Yes
See also	KNLD KNLP KNLIV POSCONTROLMODE
CANopen	2018h, sub-index 0

KNLIV

Definition	HD Derivative-Integral Gain
Type	Variable (R/W)
Description	KNLIV is the HD control equivalent of PID D and I. It is used in the HD control loop to reduce both error and steady state error and to increases control stiffness. The feedback gain parameters are tuned in the following general order: KNLD → KNLIV → KNLP → KNLI
Syntax	Read: KNLIV Write: KNIV <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 400
Default value	40.000
Unit	Hz
Non-volatile	Yes
See also	KNLD KNLI KNLP POSCONTROLMODE
CANopen	2019h, sub-index 0

KNLP

Definition	HD Proportional Gain
Type	Variable (R/W)
Description	KNLP is the HD control equivalent of PID P. It is used in the HD control loop to reduce position error. The feedback gain parameters are tuned in the following general order: KNLD → KNLIV → KNLP → KNLI
Syntax	Read: KNLP Write: KNLP <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 400
Default value	30.000
Unit	Hz
Non-volatile	Yes
See also	KNLD KNLI KNLIV POSCONTROLMODE
CANopen	201Ah, sub-index 0

KNLUSERGAIN

Definition	HD Global Gain
Type	Variable (R/W)
Description	HD adaptive gain scaling factor
Syntax	Read: KNLUSERGAIN Write: KNLUSERGAIN <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0.1 to 3.0
Default value	0.500
Unit	Not Applicable
Non-volatile	Yes
See also	KNLI KNLP POSCONTROLMODE
CANopen	201Bh, sub-index 0

KNLVFF

Definition	HD Velocity Feedforward
Type	Variable (R/W)
	HD velocity feedforward
Description	HD velocity feedforward. The default value of 1 represents 100% feedforward value, which ensures the highest HD loop responsiveness. In applications that require a “softer” response, KNLVFF should be rapidly reduced until the desired response is achieved.
Syntax	Read: KNLVFF Write: KNLVFF <*value*>
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	0.000 to 1.000
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	

KPAFRC

Definition	Position Acceleration Feedforward to Current
Type	Variable (R/W)
Description	Gets/sets the position acceleration feedforward to current loop.
Syntax	Read: KPAFRC Write: KPAFRC <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	±1000
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	KPP KPVFR POSCONTROLMODE
CANopen	201Ch, sub-index 0

KPAFRV

Definition	Position Acceleration Feedforward
Type	Variable (R/W)
Description	Gets/sets the position acceleration feedforward.
Syntax	Read: KPAFR Write: KPAFR <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	±1000
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	KPP KPAFRC POSCONTROLMODE
CANopen	201Dh, sub-index 0

KPD

Definition	Position Derivative Gain
Type	Variable (R/W)
Description	Gets/sets the position controller derivative (KD) gain.
Syntax	Read: KPD Write: KPD <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	KPE KPI POSCONTROLMODE
CANopen	201Eh, sub-index 0

KPE

Definition	Position Proportional Adaptive Gain
Type	Variable (R/W)
Description	The position proportional adaptive gain.
Syntax	Read: KPE Write: KPE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 4
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	KPD KPI POSCONTROLMODE
CANopen	201Fh, sub-index 0

KPI

Definition	Position Integral Gain
Type	Variable (R/W)
Description	Gets/sets the position controller integral (KI) gain.
Syntax	Read: KPI Write: KPI <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000
Default value	0.000
Unit	Hz
Non-volatile	Yes
See also	KPE KPD POSCONTROLMODE
CANopen	2020h, sub-index 0

KPISATIN

Definition	Position Integral Input Saturation
Type	Variable (R/W)
Description	The position integral input saturation.
Syntax	Read: KPISATIN Write: KPISATIN <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 10000
Default value	0.000
Unit	If MOTORTYPE 0 (Rotary): rev If MOTORTYPE 2 (Linear): mm
Non-volatile	Yes
See also	KPI KPISATOUT POSCONTROLMODE
CANopen	2077h, sub-index 0

KPISATOUT

Definition	Position Integral Output Saturation
Type	Variable (R/W)
Description	The position integral output saturation.
Syntax	Read: KPISATOUT Write: KPISATOUT <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 10000
Default value	0.000
Unit	rps
Non-volatile	Yes
See also	KPI KPISATIN POSCONTROLMODE
CANopen	2021h, sub-index 0

KPP

Definition	Position Proportional Gain
Type	Variable (R/W)
Description	Gets/sets the proportional gain for the linear position controller (POSCONTROLMODE 0)
Syntax	Read: KPP Write: KPP <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1200
Default value	1.000
Unit	Rotary: rps/rev Linear: (mm/sec)/mm
Non-volatile	Yes
See also	KPD KPE KPI KPVFR POSCONTROLMODE
CANopen	2022h, sub-index 0

KPVFR

Definition	Position Velocity Feedforward
Type	Variable (R/W)
Description	The position control velocity feedforward.
Syntax	Read: KPVFR Write: KPVFR <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	-2 to 2
Default value	0.00
Unit	Not Applicable
Non-volatile	Yes
See also	KPD KPE KPI KPP POSCONTROLMODE
CANopen	2023h, sub-index 0

KVFR

Definition	Velocity Feedforward Ratio
Type	Variable (R/W)
Description	Gets/sets the velocity feedforward ratio.
Syntax	Read: KVFR Write: KVFR <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0.000 to 1.000
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	FILTMODE KVP KVI VELCONTROLMODE
CANopen	2025h, sub-index 0

KVI

Definition	Velocity Integral Gain
Type	Variable (R/W)
Description	Gets/sets the velocity integral gain
Syntax	Read: KVI Write: KVI <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 200000
Default value	0.000
Unit	Hz
Non-volatile	Yes
See also	FILTMODE KVFR KVP VELCONTROLMODE
CANopen	2026h, sub-index 0

KVP

Definition	Velocity Proportional Gain
Type	Variable (R/W)
Description	Gets/sets the velocity proportional gain.
Syntax	Read: KVP Write: KVP <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000000
Default value	0.010
Unit	If MOTORTYPE 0 (Rotary): A/rps If MOTORTYPE 2 (Linear): A/(mm/s)
Non-volatile	Yes
See also	FILTMODE KVFR KVI VELCONTROLMODE
CANopen	2027h, sub-index 0

LIMSWITCHNEG

Definition	Limit Switch Negative Status
Type	Variable (R)
Description	LIMSWITCHNEG indicates the status of all negative limit events. Its individual bits are set or cleared independently of each other, in response to the events described below. Bit 0 is set when the actual position (PFB) is less than the minimum position for software limit (POSLIMNEG). The bit is cleared otherwise. Bit 1 is set when the input assigned negative limit switch functionality by "INMODE *n* 6" is activated. The bit is cleared otherwise. Bits 2 and 3 are always set or cleared together. When bit 1 is set (negative limit switch is activated), bit 2 and bit 3 are also set; in addition, the actual position (PFB) is captured internally. Bits 2 and 3 are cleared whenever bit 1 is cleared AND the actual position is greater than the captured position. Bits 2 and 3 will not be set if bits 2 and 3 of LIMSWITCHPOS are already set. Possible values are combinations of bit 0, bit 1, and bits 2 and 3. It is sufficient, however, to monitor bit 2 only, or bit 3 only to obtain the limit switch status.
Syntax	LIMSWITCHNEG
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	HOMETYPE INMODE LIMSWITCHPOS POSLIMMODE
CANopen	2078h, sub-index 0

LIMSWITCHPOS

Definition	Limit Switch Positive Status
Type	Variable (R)
Description	LIMSWITCHPOS indicates the status of all positive limit events. Its individual bits are set or cleared independently of each other, in response to the events described below. Bit 0 is set when the actual position (PFB) is greater than the maximum position for software limit (POSLIMPOS). The bit is cleared otherwise. Bit 1 is set when the input assigned positive limit switch functionality by "INMODE *n* 5" is activated. The bit is cleared otherwise. Bits 2 and 3 are always set or cleared together. When bit 1 is set (positive limit switch is activated), bit 2 and bit 3 are also set; in addition, the actual position (PFB) is captured internally. Bits 2 and 3 are cleared whenever bit 1 is cleared AND the actual position is less than the captured position. Bits 2 and 3 will not be set if bits 2 and 3 of LIMSWITCHNEG are already set. Possible values are combinations of bit 0, bit 1, and bits 2 and 3. It is sufficient, however, to monitor bit 2 only, or bit 3 only to obtain the limit switch status.
Syntax	LIMSWITCHPOS
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	HOMETYPE INMODE LIMSWITCHNEG POSLIMMODE
CANopen	2079h, sub-index 0

LINELOSSMODE

Definition	Bus AC Supply Line Disconnect Mode
Type	Variable (R/W)
Description	**Applicable only for DDHD and STO-certified CDHD drives (-ST models)**. A feature that monitors the bus supply, and defines how the drive will respond if phase loss is detected. Warning display: **o** Warning message: Bus AC supply line disconnect Fault display: **o7** Fault message: Bus AC supply line disconnect
Syntax	Read: LINELOSSMODE Write: LINELOSSMODE <*value*>
Firmware	1.15.xx
Drive status	Enable | Disable
Range	0 = Fault when drive enabled or disabled 1 = Fault when drive enabled, warning when disabled 2 = Warning when drive enabled or disabled
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	LINELOSSRECOVER LINELOSSTYPE

LINELOSSRECOVER

Definition	Bus AC Supply Line Disconnect Recovery Mode
Type	Variable (R/W)
Description	**Applicable only for DDHD and STO-certified CDHD drives (-ST models)**. Defines how the drive will recover from a bus AC supply line disconnect fault.
Syntax	Read: LINELOSSRECOVER Write: LINELOSSRECOVER <*value*>
Firmware	1.15.xx
Drive status	Enable | Disable
Range	0 = No auto recovery 1 = Auto recovery (CLEARFAULTS is not needed)
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	LINELOSSMODE LINELOSSTYPE

LINELOSSTYPE

Definition	Bus AC Supply Line Disconnect Type
Type	Variable (R/W)
Description	**Applicable only for DDHD and STO-certified CDHD drives (-ST models)**. Defines the types of bus AC supply line disconnect fault. Programmable only if supported by hardware.
Syntax	Read: LINELOSSTYPE Write: LINELOSSTYPE <*value*>
Firmware	1.15.xx
Drive status	Enable | Disable
Range	0 – No detection 1 – Detection for one phase connection 2 – Detection for three phase connection
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	LINELOSSMODE LINELOSSRECOVER

LIST

Definition	List All Variables and Commands
Type	Command
Description	Returns a list of valid variables and commands. Only the variables names, and not their values, are transmitted.
Note	Some factory variables and commands, not intended for users, may appear in the list. **Do not attempt to manipulate parameters that are not described in the product documentation or Help.**
Syntax	LIST
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	INFO RECLIST RECTRIGLIST

LMJR

Definition	Load to Motor Inertia Ratio
Type	Variable (R/W)
Description	Gets/sets the ratio of the load inertia to the motor inertia. If LMJR=2, for example, the total inertia is 3 times the inertia of the motor: Jtotal = MJ×(1+LMJR) The motor rotor inertia (MJ) and the load moment of inertia ratio (LMJR) define the total system moment of inertia. LMJR can be set by the user or determined by an autotuning procedure.
Syntax	Read: LMJR Write: LMJR <value>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 2000
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	BW MJ TF VELCONTROLMODE
CANopen	207Ah, sub-index 0

LOAD

Definition	Load Commands to RAM
Type	Command
Description	Loads configuration variables from non-volatile memory to RAM. Any changes in configuration parameters which have been made since the last SAVE will be overwritten by the values loaded from the non-volatile memory.
Syntax	LOAD
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	DUMP FACTORYRESTORE SAVE
CANopen	1011h, sub-index 1

MB

Definition	Motion Buffer Command
Type	Command
Description	Activates the motion buffer sequence, as defined by: MOVEINCCOUNTER, MOVEINCDIST1, MOVEINCDIST2, MOVEINCSPEED1 and MOVEINCSPEED2. PEINPOS and PEINPOSTIME must also be defined. A set of two incremental position moves are repeated a number of times, as defined by the counter. The next move is performed when the PEINPOS condition is met.
Syntax	MB
Firmware	1.0.6
Drive status	Enabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	MBST MOVEINCCOUNTER MOVEINCDELAY MOVEINCDIST1 MOVEINCDIST2 MOVEINCSPEED1 MOVEINCSPEED2

MBST

Definition	Motion Buffer Execution Status
Type	Variable (R)
Description	Returns the motion buffer repetition count during operation, and returns the total duration as soon as the motion sequence is completed.
Syntax	MBST
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable; see Example below
Default value	Not Applicable; see Example below
Unit	Not Applicable; see Example below
Non-volatile	No

Example	Running the following command sequence produces the following MBST response.
	`-->MOVEINCCOUNTER=5`
	`-->MOVEINCDIST1=2`
	`-->MOVEINCDIST2=-2`
	`-->MOVEINCSPEED1=200`
	`-->MOVEINCSPEED2=300`
	`-->MB`
	`-->MBST`
	`Running. Iteration: 1/5 Execution Time: 8ms`
	`-->MBST`
	`Running. Iteration: 1/5 Execution Time: 1020ms`
	`-->MBST`
	`Running. Iteration: 2/5 Execution Time: 2033ms`
	`-->MBST`
	`Running. Iteration: 3/5 Execution Time: 3044ms`
	`-->MBST`
	`Running. Iteration: 4/5 Execution Time: 4056ms`
	`-->MBST`
	`Running. Iteration: 5/5 Execution Time: 5068ms`
	`-->MBST`
	`Done. Execution Time: 5501ms`

See also	MB MOVEINCCOUNTER MOVEINCDIST1 MOVEINCDIST2 MOVEINCSPEED1 MOVEINCSPEED2

MECHANGLE

Definition	Motor Mechanical Angle
Type	Variable (R)
Description	The actual position of the motor within one revolution.
Syntax	MECHANGLE
Firmware	1.0.6
Drive status	Disabled
Range	0 to 65535
Default value	Not applicable
Unit	If MOTORTYPE 0 (Rotary): 65536/rev If MOTORTYPE 2 (Linear): 65536/pitch
Non-volatile	No
See also	ELECTANGLE FEEDBACKTYPE MENCRES MPHASE
CANopen	2028h, sub-index 0

MENCAQBFILT

Definition	Motor Encoder A/B Quadrature Filter
Type	Variable (R/W)
Description	Enables/disables the FPGA filter on A and B signals from incremental encoders. Disabling the filter prevents the drive from losing commutation without sensing a fault.
Syntax	Read: MENCAQBFILT Write: MENCAQBFILT <*value*>
Firmware	1.4.4
Drive status	Disable
Range	0 = Disables filter on incremental encoder A and B signals. Recommended for use with high resolution incremental encoders, or incremental encoders whose A and B phase difference is not 90°. 1 = Enables filter on incremental encoder A and B signals.
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE

MENCRES

Definition	Motor Encoder Resolution
Type	Variable (R/W)
Description	For encoder feedback systems, gets/sets the resolution of the motor encoder, in number of lines per revolution, or lines per pitch, of the motor. When the value of MENCRES is changed, CONFIG is required.
Syntax	Read: MENCRES Write: MENCRES <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	Drive supporting rotary motor: 1 to 10,000 (LPR) Drive supporting linear and rotary motors: 1 to 256,000,000 (LPR/LPP)
Default value	1048576 [LPR]
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MENCRES is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	MOTORTYPE=0 (Rotary): lines per revolution (LPR) MOTORTYPE=2 (Linear): lines per pitch (LPP)
Non-volatile	Yes
See also	FEEDBACKTYPE MENCTYPE
CANopen	608F, sub-index 1

MENCTYPE

Definition	Motor Encoder Type		
Type	Variable (R/W)		
Description	Gets/sets the motor encoder type. When the value of MENCTYPE is changed, CONFIG is required. **Rotary motors**: When setting MENCTYPE=0 (A/B/Z/Halls) for the first time, it must be followed by the MOTORSETUP command. MOTORSETUP will always detect and set the correct commutation index position (MENCZPOS) for rotary motors. Failure to initialize the index may result in a commutation fault. **Linear motors**: The index position typically occurs once per linear scale, and not at every electrical revolution (MPITCH). Since the index may vary from motor to motor, always use MENCTYPE=6 (A/B+Halls) for linear motors. Homing on index and other functions dependent upon the index can still be executed.		
Syntax	Read: MENCTYPE Write: MENCTYPE <*value*>		
Firmware	1.0.6		
Drive status	Disabled		
Range		**MENCTYPE**	**FEEDBACKTYPE**
	Incremental Encoder; A, B and index channels, and Halls (A/B/Z/H)	0	2
	Sine Encoder; A/B/Z/H	0	3
	Incremental Encoder; A/B/Z commutation initialization by PHASEFIND command	1	2
	Sine Encoder; A/B/Z commutation initialization by PHASEFIND command	1	3
	Incremental Encoder; A/B/Z commutation initialization by ENABLE or PHASEFIND command	2	2
	Sine Encoder; A/B/Z commutation initialization by ENABLE and PHASEFIND command	2	3
	Incremental Encoder; A/B commutation initialization by PHASEFIND command	3	2
	Sine Encoder; A/B commutation initialization by PHASEFIND command	3	3
	Incremental Encoder; A/B commutation initialization by ENABLE or PHASEFIND command	4	2
	Sine Encoder; A/B ; commutation initialization by ENABLE or PHASEFIND command	4	3
	Halls only	5	2
	Incremental Encoder; A/B/H	6	2

	Sine Encoder; A/B/H	6	3
	EnDat 2.1 with Sine Signals	9	3
	HIPERFACE with Sine Signals	10	3
	Tamagawa Incremental Encoder (8 wires)	11	2
	Reserved	12	--
Default value	6		
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MENCTYPE is loaded directly from the encoder memory to the drive RAM at power-up.		
Unit	Not Applicable		
Non-volatile	Yes		
See also	FEEDBACKTYPE HALLS PHASEFIND		
CANopen	2029h, sub-index 0		

MENCZPOS

Definition	Motor Encoder Index Position
Type	Variable (R/W)
Description	For encoder feedback systems only, gets/sets the encoder index position.
Syntax	Read: MENCZPOS Write: MENCZPOS <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 359
Default value	0
Unit	Electrical degree
Non-volatile	Yes
See also	PHASEFIND MENCTYPE
CANopen	202Ah, sub-index 0

MFBDIR

Definition	Motor and Feedback Direction
Type	Variable (R/W)
Description	Gets/sets several direction and polarity options. MFBDIR is set by the MOTORSETUP procedure. When the value of MFBDIR is changed, CONFIG is required.
Syntax	Read: MFBDIR Write: MFBDIR <*value*>
Firmware	1.0.6
Drive status	Disabled

Range

MFBDIR		Swap U-V	Swap Halls Decoding	Invert Index	Invert Sin-Cos
0	=	No	No	No	No
1	=	Yes	No	No	No
2	=	No	Yes	No	No
3	=	Yes	Yes	No	No
4	=	No	No	Yes	No
5	=	Yes	No	Yes	No
6	=	No	Yes	Yes	No
7	=	Yes	Yes	Yes	No
8	=	No	No	No	Yes
9	=	Yes	No	No	Yes
10	=	No	Yes	No	Yes
11	=	Yes	Yes	No	Yes
12	=	No	No	Yes	Yes
13	=	Yes	No	Yes	Yes
14	=	No	Yes	Yes	Yes
15	=	Yes	Yes	Yes	Yes

Alternately, MFBDIR can be interpreted by its binary representation:

Bit 1: Swap U-V

Bit 2: Swap Halls Decoding

Bit 3: Invert Index

Bit 4: Invert Sine-Cosine (reverse direction)

Default value	0

Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MFBDIR is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Not Applicable
Non-volatile	Yes
See also	DIR MOTORSETUP MPHASE PFB V
CANopen	202Bh, sub-index 0

MFBMODE

Definition	Motor Feedback Mode
Type	Variable (R/W)
Description	Enables the resolution enhancement mechanism. MFBMODE is applicable only for incremental encoders (FEEDBACKTYPE 2, MENCTYPE 0, 1, 2, 3, 4, 6). When MFBMODE is enabled PFB is displayed with a decimal fraction. When the value of MFBMODE is changed, CONFIG is required.
Syntax	Read: MFBMODE Write: MFBMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Resolution enhancement disabled 1 = Resolution enhancement enabled 2 = Encoder interpolation is not performed, and there is no compensation for deviations from the 90-degree phase shift
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE MENCTYPE
CANopen	202Dh, sub-index 0

MFOLD

Definition	Motor Foldback Status
Type	Variable (R)
Description	Indicates whether the motor foldback limit (MIFOLD) has dropped below the application current limits (ILIM).
Syntax	MFOLD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Foldback limit above ILIM 1 = Foldback limit below ILIM
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ILIM MIFOLD MIFOLDFTHRESH MIFOLDWTHRESH
CANopen	202Eh, sub-index 0

MFOLDD

Definition	Motor Foldback Delay Time
Type	Variable (R/W)
Description	Gets/sets the time delay for motor foldback. This is the amount of time that the system current can exceed MICONT before the drive enters the motor foldback state (MFOLD 1). The timing units assume a worst-case scenario, in which the drive is applying MIPEAK current. A current level that is less than MIPEAK can be allowed for longer time.
Syntax	Read: MFOLDD Write: MFOLDD <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	1 to 2400
Default value	5.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MFOLDD is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	second
Non-volatile	Yes
See also	MFOLDDIS MFOLDR MFOLDT MICONT MIPEAK
CANopen	202Fh, sub-index 0

MFOLDDIS

Definition	Motor Foldback Disable
Type	Variable (R/W)
Description	Gets/sets a value that defines whether motor foldback protection is activated.
Syntax	Read: MFOLDDIS Write: MFOLDDIS <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Motor foldback protection activated. 1 = Motor foldback protection not activated.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	MFOLD MFOLDD MFOLDR MFOLDT MICONT MIFOLD MIPEAK
CANopen	2030h, sub-index 0

MFOLDF

Definition	Motor Foldback Factor
Type	Variable (R/W)
Description	MFOLDF is used to increase the effective continuous current setting of the motor (MICONT) for the motor foldback protection mechanism. When MFOLDF>1, the effective MICONT=MFOLDF × MICONT.
Syntax	Read: MFOLDF Write: MFOLDF <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	1 to 1.5
Default value	1
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MFOLDF is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Not Applicable
Non-volatile	Yes
See also	MFOLDDIS MFOLDT MICONT

MFOLDR

Definition	Motor Foldback Recovery Time
Type	Variable (R)
Description	Gets/sets the recovery time for motor foldback. After the drive enters the motor foldback state (MFOLD=1), and the current folds back to MICONT, this is the minimum amount of time that the current must be held at 0 before it can be MIPEAK for the full MFOLDD time.
Note	MFOLDR is a read only parameter, calculated from MIPEAK, MICONT, MFOLDD, and MFOLDT. Since MIPEAK and MICONT have a default value of 0, the initial value of MFOLDR is 0.001. Once proper values are set for MIPEAK and MICONT, MFOLDR gets a valid value.
Syntax	MFOLDR
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	second
Non-volatile	No
See also	MFOLDD MFOLDDIS MFOLDT MICONT MIPEAK
CANopen	2031h, sub-index 0

MFOLDT

Definition	Motor Foldback Time Constant
Type	Variable (R/W)
Description	Gets/sets the time constant for motor foldback. After the drive enters the motor foldback state (MFOLD 1), this variable defines how long it will take the drive to reduce the system current level to MICONT.
Syntax	Read: MFOLDT Write: MFOLDT <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	1 to 1200
Default value	5.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MFOLDT is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	second
Non-volatile	Yes
See also	MFOLDD MFOLDDIS MFOLDR MICONT MIPEAK
CANopen	2032h, sub-index 0

MICONT

Definition	Motor Continuous Current
Type	Variable (R/W)
Description	Gets/sets the motor’s continuous rated current. When the value of MICONT is changed, CONFIG is required.
Note	MICONT and MIPEAK have a factory default setting of 0. Once the values of MICONT and MIPEAK are set, the value of MIFOLD is set accordingly.
Syntax	Read: MICONT Write: MICONT <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.1 to 150
Default value	0.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MICONT is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	A (peak)
Non-volatile	Yes
See also	DICONT ILIM MFOLD MIFOLD MIPEAK
CANopen	6075h, sub-index 0

MIFOLD

Definition	Motor Foldback Current
Type	Variable (R)
Description	Indicates the current limit derived from the motor foldback mechanism. A foldback condition occurs when MIFOLD goes below ILIM. This variable is useful for checking how close the current is to the foldback limit. The value of MIFOLD is calculated according to the values of MIPEAK and MICONT
Syntax	MIFOLD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	0.000
Unit	A
Non-volatile	No
See also	ILIM MFOLD MIFOLD MIPEAK MIFOLDFTHRESH MIFOLDWTHRESH
CANopen	2033h, sub-index 0

MIFOLDFTHRESH

Definition	Motor Foldback Fault Threshold
Type	Variable (R/W)
Description	Gets/sets the motor foldback fault threshold.
Note	When the drive is paired with a PRO2 motor, and obtains data from the electronic motor nameplate, the default value of MIFOLDFTHRESH is the same as MICONT.
Syntax	Read: MIFOLDFTHRESH Write: MIFOLDFTHRESH <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	0.000
Unit	A
Non-volatile	Yes
See also	ILIM MFOLD MICONT MIFOLD MIFOLDWTHRESH
CANopen	2034h, sub-index 0

MIFOLDWTHRESH

Definition	Motor Foldback Warning Threshold
Type	Variable (R/W)
Description	Gets/sets the motor foldback fault warning threshold.
Note	When the drive is paired with a PRO2 motor, and obtains data from the electronic motor nameplate, the default value of MIFOLDWTHRESH is the same as MIPEAK.
Syntax	Read: MIFOLDWTHRESH Write: MIFOLDWTHRESH <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	0.000
Unit	A
Non-volatile	Yes
See also	ILIM MFOLD MIFOLD MIFOLDFTHRESH MIPEAK
CANopen	2035h, sub-index 0

MIPEAK

Definition	Motor Peak Current
Type	Variable (R/W)
Description	Gets/sets the motor's peak rated current. When the value of MIPEAK is changed, CONFIG is required.
Note	MIPEAK and MICONT have a factory default setting of 0. Once the values of MIPEAK and MICONT are set, the value of MIFOLD is set accordingly.
Syntax	Read: MIPEAK Write: MIPEAK <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.1 to 150
Default value	0.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MIPEAK is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	A
Non-volatile	Yes
See also	DIPEAK ILIM IMAX MICONT MIFOLD
CANopen	2036h, sub-index 0

MJ

Definition	Rotor Inertia
Type	Variable (R/W)
Description	Gets/sets the motor's rotor inertia (rotary motors). The motor rotor inertia (MJ) and the load moment of inertia ratio (LMJR) define the total system moment of inertia. When the value of MJ is changed, CONFIG is required.
Syntax	Read: MJ Write: MJ <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.00 to 2000000.00
Default value	0.020
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MJ is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	kg-$m^2 \times 10^{-3}$
Non-volatile	Yes
See also	LMJR MKT VELCONTROLMODE
CANopen	2037h, sub-index 0

MKF

Definition	Torque Constant for Linear Motor
Type	Variable (R/W)
Description	Linear motor torque constant. When the value of MKF is changed, CONFIG is required.
Note	Applicable only for drives that support linear servo motors.
Syntax	Read: MKF Write: MKF <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.001 to 1000
Default value	0.016
Unit	Nm/A
Non-volatile	Yes
See also	MKT MMASS MOTORTYPE MPITCH
CANopen	2038h, sub-index 0

MKT

Definition	Torque Constant
Type	Variable (R/W)
Description	Gets/sets the motor's torque constant (Kt) in metric units. This value is used for current loop controller design, KCBEMF, compensation algorithm, and standard pole-placement velocity controller design (VELCONTROLMODE 2 or 4). When the value of MKT is changed, CONFIG is required.
Syntax	Read: MKT Write: MKT <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	Drive supporting rotary motor: 0.001 to 3 Drive supporting linear and rotary motors: 0.001 to 65
Default value	**0.016**
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MKT is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Nm/A
Non-volatile	Yes
See also	KCBEMF LMJR MJ VELCONTROLMODE
CANopen	2039h, sub-index 0

ML

Definition	Motor Inductance
Type	Variable (R/W)
Description	Gets/sets the motor's minimum line-to-line inductance. This variable is used for current loop controller design and as an input to the vector control algorithms. When the value of ML is changed, CONFIG is required.
Syntax	Read: ML Write: ML <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.001 to 1000
Default value	0.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter ML is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	mH
Non-volatile	Yes
See also	KCP VBUS
CANopen	203Ah, sub-index 0

MLGAINC

Definition	Adaptive Gain at Continuous Motor Current
Type	Variable (R/W)
Description	Gets/sets the current loop adaptive gain value at continuous motor current (MICONT). MLGAINC and MLGAINP define the adaptive gain algorithm that is based on motor current. When the value of MLGAINP is changed, CONFIG is required.
Syntax	Read: MLGAINC Write: MLGAINC <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.1 to 1
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	ML MLGAINP
CANopen	203Bh, sub-index 0

MLGAINP

Definition	Adaptive Gain at Peak Motor Current
Type	Variable (R/W)
Description	Get/sets the current loop adaptive gain value at peak motor current (MIPEAK). MLGAINC and MLGAINP define the adaptive gain algorithm that is based on motor current. When the value of MLGAINP is changed, CONFIG is required.
Syntax	Read: MLGAINP Write: MLGAINP <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.1 to 1.0
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	ML MLGAINC
CANopen	203Ch, sub-index 0

MMASS

Definition	Mass of Linear Motor Without Load
Type	Variable (R/W)
Description	Gets/sets the mass of the linear motor carriage without any additional payload. It is used as the base for estimating the total moving mass.
Note	Applicable only for drives that support linear servo motors.
Syntax	Read: MMASS Write: MMASS <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 100
Default value	0.000
Unit	kg
Non-volatile	Yes
See also	MJ MKF MOTORTYPE MPITCH
CANopen	203Dh, sub-index 0

MODMODE

Definition	Position Modulo Mode
Type	Variable (R/W)
Description	Enables/disables the position modulo. When MODMODE is enabled, PFB and PCMD roll over the limits set by PROTARY. MODMODE has no effect when used with linear motors.
Syntax	Read: MODMODE Write: MODMODE <*value*>
Firmware	1.15.xx. Updated 1.41.9.
Drive status	Disabled
Range	0 = Position modulo mode disabled. 1 = Position modulo mode enabled;MOVEABS by shortest path. 3 = Position modulo mode enabled;MOVEABS in positive direction only. 5 = Position modulo mode enabled;MOVEABS in negative direction only.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	MOVEABS PROTARY
CANopen	214Eh, sub-index 0

MOTORCOMMTYPE

Definition	Motor Commutation Type
Type	Variable (R/W)
Description	Gets/sets a variable that defines the type of motor commutation When the value of MOTOCOMMTYPE is changed, CONFIG is required.
Syntax	Read: MOTORCOMMTYPE Write: MOTORCOMMTYPE <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	0 = Brushless motor 1 = Brush motor 2 = DC and voice coil motors
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	ELECTANGLE FEEDBACKTYPE MENCTYPE MOTORTYPE
CANopen	203Eh, sub-index 0

MOTORNAME

Definition	Motor Name
Type	Variable (R/W)
Description	Gets/sets the name assigned to the motor. The name may contain up to 20 alphanumeric characters. A quotation mark (") always precedes the name. Additional valid characters for use in the text string: ( ) / - . :
Syntax	Read: MOTORNAME Write: MOTORNAME <text>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	"
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MOTORNAME is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Not applicable
Non-volatile	Yes
See also	DRIVENAME FACTORYRESTORE MOTORTYPE
CANopen	203Fh, sub-index 0

MOTORPHASESCAN

Definition	Motor phase Disconnect Scan
Type	Variable (R/W)
Description	Enables/disables detection of wire breaks in motor phases. When enabled, if a wire break is detected in one or more of the motor phases, this mechanism issues a fault: "phase – disconnected" and the 7-segment display shows **r27**. Detection can occur only when drive is enabled and a current command is issued by the user, or by velocity or position controllers.
Syntax	Read: MOTORPHASESCAN Write: MOTORPHASESCAN <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Motor phases wire break detection disabled 1 = Motor phases wire break detection enabled 2 = Reserved
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	FLT ST
CANopen	2040h, sub-index 0

MOTORSETUP

Definition	Motor Setup Command
Type	Command
Description	Runs an automatic procedure for setting commutation related variables. The procedure involves finding the electrical phase and detecting the direction of motor movement, Hall switches and index crossing. MOTORSETUP sets MFBDIR, MENCRES, MPOLES, MPHASE, MENCZPOS. The procedure takes approximately 30 seconds and a motor rotation of about one revolution is expected. While the Motor Setup procedure is in progress (even when the drive is disabled), the drive's 7-segment display shows a flashing "A". When the procedure finishes successfully, the display returns to its normal state. If the procedure fails, the display shows "-5".
	The motor setup routine can be used for the following configurations: ■ Encoders with square-wave quadrature signals: FEEDBACKTYPE **2** with: MENCTYPE 0, 1, 2, 3, 4, 6, 11 ■ Encoders with sine signals: FEEDBACKTYPE **3** with: MENCTYPE 0, 1, 2, 3, 4, 6, 9 MENCTYPE 10 MENCTYPE 11 ■ Communication-only encoders: FEEDBACKTYPE **6** FEEDBACKTYPE **7** FEEDBACKTYPE **11** FEEDBACKTYPE **12** FEEDBACKTYPE **14** FEEDBACKTYPE **16** ■ Resolver: FEEDBACKTYPE **1**
Syntax	MOTORSETUP
Firmware	1.0.6
Drive status	Disabled
Range	Not applicable
Default value	Not applicable
Unit	Not applicable
Non-volatile	Not applicable

See also	FEEDBACKTYPE MENCRES MENCTYPE MENCZPOS MFBDIR MOTORSETUPST MPHASE MPOLES
CANopen	2041, sub-index 0

MOTORSETUPST

Definition	Motor Setup Status
Type	Command
Description	Reports the internal stages of the MOTORSETUP procedure together with the message that includes the running state, actions taken or failure cause.
Syntax	MOTORSETUPST
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable; see Example below
Default value	Not Applicable; see Example below
Unit	Not Applicable; see Example below
Non-volatile	Not Applicable

Example	`-->motorsetupst`
	`Motor Setup Not Issued`
	`Stage: 0/27`
	`-->`

Example	`1->motorsetupst`
	`Motor Setup Active`
	`Stage: 20/36`
	`1->motorsetupst`
	`Motor Setup Active`
	`Stage: 23/36`
	`1->motorsetupst`
	`Motor Setup Active`
	`Stage: 24/36`
	`1->motorsetupst`
	`Motor Setup Succeeded`
	`Current Pulse: 125 mA 195 ms`
	`Stage: 0/36`
	`1->`

See also	MOTORSETUP PHASEFINDST
CANopen	2042h, sub-index 0

MOTORTYPE

Definition	Motor Type
Type	Variable (R/W)
Description	Gets/sets a value that defines the motor type. When the value of MOTORTYPE is changed, CONFIG is required.
Syntax	Read: MOTORTYPE Write: MOTORTYPE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Rotary motor 2 = Linear motor **Note**: Applicable for drive models that support linear and rotary servo motors.
Default value	0
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MOTORTYPE is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE
CANopen	2024h, sub-index 0

MOVEABS

Definition	Move Absolute Command
Type	Command
Description	Executes an absolute position movement according to the acceleration settings that are in effect. STOPPED and PEINPOS indicate completion of motion.
Syntax	MOVEABS {*distance*} {*velocity*}
Firmware	1.0.6
Drive status	Enabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	MB MOVEINC OPMODE PFB

MOVEINC

Definition	Move Incremental Command
Type	Command
Description	Executes an incremental position movement according to the acceleration settings that are in effect. If *blending_mode* = 1 and MOVEINC is issued while a movement is in progress, the current movement is discontinued, and the new movement starts immediately. If *blending_mode* = 2 or 3 and MOVEINC is issued while a movement is in progress, the incremental move will be added to the position target of the current move. In all blending modes the final position is the summation of the target positions of both the currently executed command and the newly issued MOVEINC command. STOPPED and PEINPOS indicate completion of motion.
Syntax	MOVEINC {*distance*} {*velocity*} [*blending_mode*]
Note	*blending_mode* is optional; if not specified, blending mode 2 is used.
Firmware	1.0.6
Drive status	Enabled
Range	*distance* = Not Applicable *velocity* = Not Applicable *blending_mode*: 1 = MOVEINC is executed immediately. 2 = MOVEINC is executed at the end of the currently executed movement (default value). 3 = MOVEINC is executed at the end of the currently executed movement without stopping.
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Yes
See also	MB MOVEABS OPMODE PFB

MOVEINCCOUNTER

Definition	Move Incremental Iterations
Type	Variable (R/W)
Description	Gets/sets the number of repetitions of an incremental movement to be executed.
Syntax	Read: MOVEINCCOUNTER Write: MOVEINCCOUNTER <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	MB MBST MOVEINCDIST1 MOVEINCSPEED1

MOVEINCDELAY

Definition	Move Incremental Delay
Type	Variable (R/W)
Description	The delay between the preset incremental moves.
Syntax	Read: MOVEINCDELAY Write: MOVEINCDELAY <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 to 100000
Default value	0
Unit	ms
Non-volatile	Yes
See also	MB MBST MOVEINCCOUNTER

MOVEINCDIST1

Definition	Move Incremental Distance 1
Type	Variable (R/W)
Description	Gets/sets the first incremental move distance for the motion buffer cycle.
Syntax	Read: MOVEINCDIST1 Write: MOVEINCDIST1 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	MB MBST MOVEINCCOUNTER MOVEINCSPEED1

MOVEINCDIST2

Definition	Move Incremental Distance 2
Type	Variable (R/W)
Description	Gets/sets the second incremental move distance for the motion buffer cycle.
Syntax	Read: MOVEINCDIST2 Write: MOVEINCDIST2 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	MB MBST MOVEINCCOUNTER MOVEINCSPEED2

MOVEINCSPEED1

Definition	Move Incremental Speed 1
Type	Variable (R/W)
Description	Gets/sets the first incremental move velocity for the motion buffer cycle. The actual move speed value will not exceed VLIM.
Syntax	Read: MOVEINCSPEED1 Write: MOVEINCSPEED1 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to VLIM
Default value	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = 0.167 UNITSROTVEL 1 = 10.000 UNITSROTVEL 2 = 60.000 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 5.333
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 = rps If UNITSROTVEL 1 = rpm If UNITSROTVEL 2 = deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	MB MBST MOVEINCCOUNTER MOVEINCDIST1

MOVEINCSPEED2

Definition	Move Incremental Speed 2
Type	Variable (R/W)
Description	Gets/sets the second incremental move velocity for the motion buffer cycle. The actual move speed value will not exceed VLIM.
Syntax	Read: MOVEINCSPEED2 Write: MOVEINCSPEED2 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to VLIM
Default value	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = 0.167 UNITSROTVEL 1 = 10.000 UNITSROTVEL 2 = 60.000 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 5.333
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	MB MBST MOVEINCCOUNTER MOVEINCDIST2

MOVESINE

Definition	Move Sine Command
Type	Command
Description	Executes a sine position profile according to the specified amplitude and frequency settings. Available only in OPMODE 8. If the number of iterations is not specified, the movement is repeated endlessly. The command STOP can be used to terminate the movement.
Syntax	MOVESINE {*amplitude*} {*frequency*} [*repetitions*]
Firmware	1.40.0
Drive status	Enabled
Range	*amplitude*: 1 – 2^{32} *frequency*: 1 – 400 *repetitions:* 1 – 2^{32}
Default value	*amplitude*: 1000 *frequency*: 10 *repetitions*: 1
Unit	*amplitude*: user position units (rev, deg, count) *frequency*: Hz *repetitions*: Not Applicable
Non-volatile	No
Example	`MOVESINE 10000 10 5`
See also	
CANopen	202Ch, sub-index 0

MOVESMOOTHAVG

Definition	Position Command Moving Average Filter
Type	Variable (R/W)
Description	Gets/sets the moving average filter. The moving average filter can be applied to a position or velocity reference command in order to smooth the command and shape it into an S-curve profile. 
Syntax	Read: MOVESMOOTHAVG Write: MOVESMOOTHAVG <*value*>
Firmware	1.4.4
Drive status	Enabled (motor must be at standstill) | Disabled
Range	0.25 to 256
Default value	4
Unit	ms
Non-volatile	Yes
See also	MOVESMOOTHMODE
CANopen	2108h, sub-index 0

MOVESMOOTHLPFHZ

Definition	Position Command Move Low Pass Filter
Type	Variable (R/W)
Description	Gets/sets the low pass filter for position command move.
Syntax	Read: MOVESMOOTHLPFHZ Write: MOVESMOOTHLPFHZ <*value*>
Firmware	1.2.12
Drive status	Enabled (motor must be at standstill) | Disabled
Range	1 to 5000
Default value	5000
Unit	Hz
Non-volatile	Yes
See also	ACC DEC MOVEABS MOVEINC
CANopen	202Ch, sub-index 0

MOVESMOOTHMODE

Definition	Position Command Smoothing Mode
Type	Variable (R/W)
Description	Defines the method of smoothing for the position command.
Note	To apply a smoothing filter to an external reference command, such as P&D or EtherCAT/CANopen, certain bits in MOVESMOOTHSRC must first be set.
Syntax	Read: MOVESMOOTHMODE Write: MOVESMOOTHMODE <*value*>
Firmware	1.3.2
Drive status	Disabled
Range	0 = No smoothing of profile 1 = Low pass filter (LPF) smoothing of profile based on MOVESMOOTHLPFHZ 2 = S-curve smoothing according to MOVESMOOTHAVG
Default	2
Unit	Not Applicable
Non-volatile	Yes
See also	MOVEABS MOVEINC MOVESMOOTHAVG MOVESMOOTHLPFHZ MOVESMOOTHSRC
CANopen	2109h, sub-index 0

MOVESMOOTHSRC

Definition	Position Command Smoothing Source
Type	Variable (R/W)
Description	Defines the position command smoothing source. This is a bit-wise parameter, hence the range 0 to 15. bit 0: smooth on PTP (1=yes, 0=no) bit 1: smooth on gearing bit 2: smooth on fieldbus bit 3: smooth during halt (limit switch, for example) if the halted move is also smoothed.
Syntax	Read: MOVESMOOTHSRC Write: MOVESMOOTHSRC <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	0 to 15
Default value	15
Unit	Not Applicable
Non-volatile	Yes
See also	MOVESMOOTHAVG MOVESMOOTHLPFHZ MOVESMOOTHMODE

MPHASE

Definition	Commutation Offset
Type	Variable (R/W)
Description	Gets/sets the resolver/encoder phase relative to the standard commutation table. This variable can be used to compensate for resolver offset and should be set to 0 if there is no resolver offset. Changing MPHASE shifts the internal commutation table without affecting the feedback reading.
Syntax	Read: MPHASE Write: MPHASE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 359
Default value	0
Unit	Electrical degree
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MPHASE is loaded directly from the encoder memory to the drive RAM at power-up.
Non-volatile	Yes
See also	PHASEFIND ZERO
CANopen	2043h, sub-index 0

MPITCH

Definition	Motor Pitch
Type	Variable (R/W)
Description	Gets/sets linear motor’s pitch. When the value of MPITCH is changed, CONFIG is required.
Note	Applicable only for drives that support linear servo motors.
Syntax	Read: MPITCH Write: MPITCH <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.000 to 100000.000
Default value	32.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MPITCH is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	mm
Non-volatile	Yes
See also	MENCRES MMASS MOTORTYPE PFB UNITSLINPOS
CANopen	207Dh, sub-index 0

MPOLES

Definition	Motor Poles
Type	Variable (R/W)
Description	Gets/sets the number of motor poles. This variable is used for commutation control and represents the number of individual magnetic poles of the motor (not pole pairs). When MOTORTYPE =2 (linear motor), this variable will be forced to a value of 2. When the value of MPOLES is changed, CONFIG is required.
Syntax	Read: MPOLES Write: MPOLES <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	Drive supporting rotary motor: 2 to 20 Drive supporting linear and rotary motors: 2 to 200
Default value	2
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MPOLES is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	poles
Non-volatile	Yes
See also	ELECTANGLE MECHANGLE PHASEFIND ZERO
CANopen	207Eh, sub-index 0

MR

Definition	Motor Resistance
Type	Variable (R/W)
Description	The motor resistance. When the value of MR is changed, CONFIG is required.
Syntax	Read: MR Write: MR <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	0 to 75
Default value	0.000
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MR is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Ohm
Non-volatile	Yes
See also	ML
CANopen	207Fh, sub-index 0

MRESPOLES

Definition	Motor Resolver Poles
Type	Variable (R/W)
Description	Gets/sets the number of individual poles in the resolver 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. When the value of MRESPOLES is changed, CONFIG is required.
Syntax	Read: MRESPOLES Write: MRESPOLES <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	2 to 80
Default value	2
Unit	poles
Non-volatile	Yes
See also	FEEDBACKTYPE HWPOS MECHANGLE
CANopen	2080h, sub-index 0

MSGPROMPT

Definition	Drive Messages and Prompts
Type	Variable (R/W)
Description	Defines whether drive messages and prompts are enabled or disabled. MSGPROMPT 1 is required for proper operation of the graphic interface software. MSGPROMPT 0 will result in a loss of communication with the graphic interface software. Use with caution.
Syntax	Read: MSGPROMPT Write: MSGPROMPT <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Messages and prompts disabled. 1 = Messages and prompts enabled.
Default value	1
Unit	Not applicable
Non-volatile	Yes
See also	ADDR ECHO

MSININT

Definition	Motor Sine Interpolation
Type	Read/Write
Description	MSININT is used to define the resolution of the analog signals of sine encoders (SinCos), and sets the interpolation level of the drive. The equivalent number of counts per revolution is calculated from: $2^{MSININT} \times MENCRES$ The equivalent number of counts per revolution is limited by: $2^{MSININT} \times MENCRES \leq 2^{30}$ When the value of MSININT is changed, CONFIG is required.
Syntax	Read: MSININT Write: MSININT <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	2 to 16
Default value	16
Unit	bits
Non-volatile	Yes
See also	FEEDBACKTYPE MENCRES MENCTYPE MPITCH

MSPEED

Definition	Motor Maximum Speed
Type	Variable (R/W)
Description	Gets/sets the maximum velocity of the motor. When the value of MSPEED is changed, CONFIG is required.
Syntax	Read: MSPEED Write: MSPEED <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	If MOTORTYPE 0 (Rotary): 0 to 239999.999 If MOTORTYPE 2 (Linear): 0 to 127999.999
Default value	If MOTORTYPE 0 (Rotary): 0 If MOTORTYPE 2 (Linear): 0
Note	If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), the value of parameter MSPEED is loaded directly from the encoder memory to the drive RAM at power-up.
Unit	If MOTORTYPE 0 (Rotary): rpm If MOTORTYPE 2 (Linear): mm/s
Non-volatile	Yes
See also	MVANGLF MVANGLH VLIM VMAX
CANopen	2080h, sub-index 0

MTANGLC

Definition	Torque Commutation Angle Advance at Motor Continuous Current
Type	Variable (R/W)
Description	Gets/sets the value of the torque-related commutation angle advance at the motor's continuous current rating (MICONT). This variable helps increase reluctance torque. For surface magnet motors, a typical value is 5. For motors with embedded magnets, a typical value is 8 to 10.
Syntax	Read: MTANGLC Write: MTANGLC <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 45
Default value	0
Unit	Electrical degree
Non-volatile	Yes
See also	MTANGLP MVANGLF MVANGLH
CANopen	2083h, sub-index 0

MTANGLP

Definition	Torque Commutation Angle Advance at Motor Peak Current
Type	Variable (R/W)
Description	Gets/sets the value of the torque-related commutation angle advance at the motor's peak current (MIPEAK). This variable helps increase reluctance torque. For surface magnet motors, a typical value is 10. For motors with embedded magnets, a typical value is 23 to 25.
Syntax	Read: MTANGLP Write: MTANGLP <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 45
Default value	0
Unit	Electrical degree
Non-volatile	Yes
See also	MTANGLC MVANGLF MVANGLH
CANopen	2084h, sub-index 0

MTPMODE

Definition	Electronic Motor Nameplate Mode
Type	Variable (R/W)
Description	MTPMODE defines whether motor and feedback data is obtained from the feedback device’s non-volatile memory, referred to as an electronic motor nameplate (MTP). The electronic motor nameplate enables automatic setup of motor and current loop parameters. The drive is factory-configured without motor parameters. If the drive system detects an electronic motor nameplate (such as used in the sensAR magnetic encoder), certain motor and feedback parameters are loaded directly from the encoder memory to the drive RAM after power-up. If MTPMODE ≠ 0, motor and current loop parameters cannot be manipulated by user.
Syntax	Read: MTPMODE Write: MTPMODE <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	0 = Electronic motor nameplate not in use 1 = sensAR encoder 2 = HIPERFACE encoder; only the MPHASE data is read from the feedback device 3 = sensAR and HIPERFACE encoders
Default value	3
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE

MTPST

Definition	Electronic Motor Nameplate Status
Type	Variable (R)
Description	Indicates if and how the electronic motor nameplate (MTP) data is used.
Syntax	MTPST
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 = MTP not in use 1 = MTP in use and read correctly 2 = MTP in use but not read correctly 3 = MTP cannot be read; power cycle or clear faults required 4 = MTP in use; reading in progress
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	MTPMODE

MTTURNRESET

Definition	Multi-turn Encoder Reset
Type	Command
Description	Resets the position counter of an absolute multi-turn encoder, and clears battery low voltage fault.
Syntax	MTTURNRESET
Firmware	1.41.x
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	FEEDBACKTYPE MENCTYPE

MVANGLF

Definition	Velocity Commutation Angle Advance at Motor Maximum Speed
Type	Variable (R/W)
Description	Gets/sets the value of the velocity-related commutation angle advance to be used when the motor is operating at motor maximum speed (MSPEED). Between MSPEED/2 and MSPEED, the angle advance will be linearly interpolated based on MVANGLH and MVANGLF. When the value of MVANGLF is changed, CONFIG is required.
Syntax	Read: MVANGLF Write: MVANGLF <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 90
Default value	0
Unit	Electrical degree
Non-volatile	Yes
See also	MTANGLC MTANGLP MVANGLH
CANopen	2085h, sub-index 0

MVANGLH

Definition	Velocity Commutation Angle Advance at Motor Maximum Speed/2
Type	Variable (R/W)
Description	Gets/sets the value of the velocity-related commutation angle advance to be used when the motor is operating at motor maximum speed/2 (MSPEED/2). Between 0 rpm and MSPEED/2, the angle advance will be linearly interpolated based on MVANGLH . When the value of MVANGLH is changed, CONFIG is required
Syntax	Read: MVANGLH Write: MLVANGH <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 90
Default value	0
Unit	Electrical degree
Non-volatile	Yes
See also	MTANGLC MTANGLP MVANGLF
CANopen	2086h, sub-index 0

NLAFFLPFHZ

Definition	HD Spring Filter
Type	Variable (R/W)
Description	Used (with NLPEAFF) to reduce the vibrations induced to the load by abrupt changes in acceleration (jerk), and reduce tracking error; can also be used to minimize overshoot and settling time. NLAFFLPFHZ applies a low pass filter on the acceleration of the command position used to perform the compensation. This acceleration is calculated from the input command position, and may be noisy if the input command position has a relatively low resolution, as for example a pulse train input. Application of the low pass filter NLAFFLPFHZ smooths the calculated acceleration of the command position, and should be used whenever noisy operation is observed while applying the parameter NLPEAFF. Practical value: NLAFFLPFHZ = 3 × KNLD
Syntax	Read: NLAFFLPFHZ Write: NLAFFLPFHZ <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	10 to 7000
Default value	7000
Unit	Hz
Non-volatile	Yes
See also	NLNOTCHBW NLNOTCHCENTER NLPEAFF POSCONTROLMODE
CANopen	2087h, sub-index 0

NLANTIVIBGAIN

Definition	HD Anti-Vibration 1 Filter – Gain
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 1 filter – gain.
Syntax	Read: NLANTIVIBGAIN Write: NLANTIVIBGAIN <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 to 10000
Default value	0.000
Unit	(Rad$\times$10^{-3})/Nm
Non-volatile	Yes
See also	NLANTIVIBGAIN2 NLANTIVIBGAIN3 NLANTIVIBHZ NLANTIVIBQ3 NLANTIVIBSHARP
CANopen	200Ch, sub-index 0

NLANTIVIBGAIN2

Definition	HD Anti-Vibration 2 Filter – Gain
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 3 filter – gain
Syntax	Read: NLANTIVIBGAIN2 Write: NLANTIVIBGAIN2 <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 to 99
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBGAIN3 NLANTIVIBHZ NLANTIVIBQ3 NLANTIVIBSHARP
CANopen	200Ah, sub-index 0

NLANTIVIBGAIN3

Definition	HD Anti-Vibration 3 Filter – Gain
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 3 filter – gain
Syntax	Read: NLANTIVIBGAIN3 Write: NLANTIVIBGAIN3 <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 6
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBGAIN2 NLANTIVIBHZ NLANTIVIBQ3 NLANTIVIBSHARP

NLANTIVIBHZ

Definition	HD Anti-Vibration 1 Filter – Center Frequency
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 1 filter – center frequency.
Syntax	Read: NLANTIVIBHZ Write: NLANTIVIBHZ <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	5 to 400
Default value	400.000
Unit	Hz
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBGAIN2 NLANTIVIBGAIN3 NLANTIVIBQ3 NLANTIVIBSHARP
CANopen	2096h, sub-index 0

NLANTIVIBHZ2

Definition	HD Anti-Vibration 2 Filter – Center Frequency
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 2 filter – center frequency.
Syntax	Read: NLANTIVIBHZ2 Write: NLANTIVIBHZ2 <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	5 to 800
Default value	400.000
Unit	Hz
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBHZ NLANTIVIBHZ3 NLANTIVIBQ3 NLANTIVIBSHARP
CANopen	2097h, sub-index 0

NLANTIVIBHZ3

Definition	HD Anti-Vibration 3 Filter – Center Frequency
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 3 filter – center frequency.
Syntax	Read: NLANTIVIBHZ3 Write: NLANTIVIBHZ3 <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	5 to 800
Default value	400.000
Unit	Hz
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBHZ NLANTIVIBHZ2 NLANTIVIBQ3 NLANTIVIBSHARP

NLANTIVIBLMJR

Definition	HD Anti-Vibration – Load to Motor Inertia Ratio
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration filter – load to motor inertia ratio.
Syntax	Read: NLANTIVIBLMJR Write: NLANTIVIBLMJR <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 to 600
Default value	0.000
Unit	Not Applicable
Non-volatile	Yes
See also	—
CANopen	210Bh, sub-index 0

NLANTIVIBN

Definition	HD Anti-Vibration Filter - Divider
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration filter – divider
Syntax	Read: NLANTIVIBN Write: NLANTIVIBN <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0.01 to 100
Default value	2.000
Unit	Not Applicable
Non-volatile	Yes
See also	—
CANopen	210Ch, sub-index 0

NLANTIVIBQ3

Definition	HD Anti-Vibration Filter - Factor
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration filter – factor
Syntax	Read: NLANTIVIBQ3 Write: NLANTIVIBQ3 <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	1 to 10
Default value	1.000
Unit	Not Applicable
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBHZ NLANTIVIBSHARP NLANTIVIBSHARP2 NLANTIVIBSHARP3

NLANTIVIBSHARP

Definition	HD Anti-Vibration 1 Filter – Sharpness
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 1 filter – sharpness.
Syntax	Read: NLANTIVIBSHARP Write: NLANTIVIBSHARP <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0.01 to 10
Default value	0.500
Unit	Not Applicable
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBHZ NLANTIVIBQ3 NLANTIVIBSHARP2 NLANTIVIBSHARP3
CANopen	200Bh, sub-index 0

NLANTIVIBSHARP2

Definition	HD Anti-Vibration 2 Filter – Sharpness
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 2 filter – sharpness.
Syntax	Read: NLANTIVIBSHARP2 Write: NLANTIVIBSHARP2 <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0.01 to 10
Default value	0.500
Unit	Not Applicable
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBHZ NLANTIVIBQ3 NLANTIVIBSHARP NLANTIVIBSHARP3
CANopen	212Dh, sub-index 0

NLANTIVIBSHARP3

Definition	HD Anti-Vibration 3 Filter – Sharpness
Type	Variable (R/W)
Description	Gets/sets the HD position control loop anti-vibration module 3 filter – sharpness.
Syntax	Read: NLANTIVIBSHARP3 Write: NLANTIVIBSHARP3 <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0.01 to 10
Default value	0.200
Unit	Not Applicable
Non-volatile	Yes
See also	NLANTIVIBGAIN NLANTIVIBHZ NLANTIVIBQ3 NLANTIVIBSHARP NLANTIVIBSHARP2

NLFILTDAMPING

Definition	HD Current Filter Damping
Type	Variable (R/W)
Description	NLFILTDAMPING is used in the HD control loop to maintain the bandwidth of the filter up to the cutoff frequency. A practical value = 30 < NLFILTDAMPING< 95 Ideally, NLFILTDAMPING = maximum value
Syntax	Read: NLFILTDAMPING Write: <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 100
Default value	30
Unit	%
Non-volatile	Yes
See also	NLFILTT1 POSCONTROLMODE
CANopen	2060h, sub-index 0

NLFILTT1

Definition	HD Current Filter Low Pass Filter Rise Time
Type	Variable (R/W)
Description	NLFILTT1 is used in the HD control loop to define the inverse of the cutoff frequency. Ideally, NLFILTT1 = minimum value
Syntax	Read: NLFILTT1 Write: NLFILTT1<*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 30
Default value	3.000
Unit	ms
Non-volatile	Yes
See also	NLFILTDAMPING POSCONTROLMODE
CANopen	210Dh, sub-index 0

NLMAXGAIN

Definition	HD Maximum Adaptive Gain
Type	Variable (R/W)
Description	Autotuning automatically sets the variable gain according to the encoder resolution. This is the recommended value. Low resolution: wide range (Example: 13 bit: NLMAXGAIN=2.7) High resolution: narrow range (Example: 22 bit: NLMAXGAIN=1.6) Other resolutions can be extrapolated accordingly.
Syntax	Read: NLMAXGAIN Write: NLMAXGAIN <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	1 to 5
Default value	1.600
Unit	Not Applicable
Non-volatile	Yes
See also	KNLP KNLUSERGAIN POSCONTROLMODE
CANopen	208Ah, sub-index 0

NLNOTCH2BW

Definition	HD Current Filter – Second Notch Filter Bandwidth
Type	Variable (R/W)
Description	NLNOTCH2BW is used in the HD control loop to define the width (sharpness) of an additional high frequency that is causing system vibrations. If not used, set NLNOTCHBW=0
Syntax	Read: NLNOTCH2BW Write: NLNOTCH2BW <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 500
Default value	0
Unit	Hz
Non-volatile	Yes
See also	NLNOTCH2CENTER POSCONTROLMODE
CANopen	208Bh, sub-index 0

NLNOTCH2CENTER

Definition	HD Current Filter – Second Notch Filter Center
Type	Variable (R/W)
Description	NLNOTCH2CENTER is used in the HD control loop to block an additional high frequency that is causing system vibrations.
Syntax	Read: NLNOTCH2CENTER Write: NLNOTCH2CENTER <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	5 to 1800
Default value	100
Unit	Hz
Non-volatile	Yes
See also	NLNOTCH2BW POSCONTROLMODE
CANopen	208Ch, sub-index 0

NLNOTCHBW

Definition	HD Current Filter – Notch Filter Bandwidth
Type	Variable (R/W)
Description	NLNOTCHBW is used in the HD control loop to define the width (sharpness) of a high frequency that is causing system vibrations. If not used, set NLNOTCHBW=0
Syntax	Read: NLNOTCHBW Write: NLNOTCHBW <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 500
Default value	0
Unit	Hz
Non-volatile	Yes
See also	NLNOTCH2CENTER POSCONTROLMODE
CANopen	2062h, sub-index 0

NLNOTCHCENTER

Definition	HD Current Filter – Notch Filter Center
Type	Variable (R/W)
Description	NLNOTCHCENTER is used in the HD control loop to block a high frequency that is causing system vibrations.
Syntax	Read: NLNOTCHCENTER Write: NLNOTCHCENTER <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	5 to 1800
Default value	100
Unit	Hz
Non-volatile	Yes
See also	NLNOTCH2BW POSCONTROLMODE
CANopen	2061h, sub-index 0

NLPEAFF

Definition	HD Flexibility Compensation
Type	Variable (R/W)
Description	Used by the parameter NLPEDFFRATIO. Used (with NLAFFLPHZ) to reduce the vibrations induced to the load by abrupt changes in acceleration (jerk), and reduce tracking error; can also be used to minimize overshoot and settling time. NLPEAFF is set according to the rigidity of the system. Rigid systems require a high value. Systems with high load inertia and flexible couplings require lower values; the normal range is 400 to 30 Hz. If not used, set to 5000 Hz.
Syntax	Read: NLPEAFF Write: NLPEAFF <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 5000
Default value	5000.00
Unit	Hz
Non-volatile	Yes
See also	NLPEDFFRATIO NLAFFLPFHZ POSCONTROLMODE
CANopen	208Fh, sub-index 0

NLPEDFFRATIO

Definition	HD Acceleration/Deceleration Spring Filter Gain
Type	Variable (R/W)
Description	Determines the acceleration/deceleration spring filter gain according to the value of NLPEDFFRATIO=<*n*>, as follows: 0 — NLPEAFF used during acceleration. NLPEAFF not used during deceleration. $0 < n < 1$ — NLPEAFF used during acceleration. $n \times$ NLPEAFF used during deceleration. 1 — NLPEAFF used during both acceleration and deceleration. $1 < n \leq 2$ — NLPEAFF used during deceleration. $(2-n) \times$ NLPEAFF used during acceleration. 2 — NLPEAFF used during deceleration. NLPEAFF not used during acceleration.
Syntax	Read: NLPEDFFRATIO Write: NLPEDFFRATIO <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	0 to 2
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	ACC NLPEAFF NLPEDFFRATIO
CANopen	2091h, sub-index 0

NLVELLIM

Definition	HD Velocity Control Standstill Tolerance
Type	Variable (R/W)
Description	Applicable for use only in Analog Velocity operation mode (OPMODE 1) with the HD velocity control (VELCONTROLMODE 5, 6). Gets/sets a threshold value for the input command voltage. When the input command voltage drops below NLVELLIM, the integral and integral-derivative gains of the controller are reduced by half, hence improving standstill stability. Ideally, NLVELLIM should be set slightly above the analog input "0" noise level.
Syntax	Read: NLVELLIM Write: NLVELLIM <*value*>
Firmware	1.4.4
Drive status	Disabled
Range	-3.815 to 3.815
Default value	0.000
Unit	V
Non-volatile	Yes
See also	ANIN1VSCALE OPMODE VELCONTROLMODE

OPMODE

Definition	Drive Operation Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines the drive operation mode.
Syntax	Read: OPMODE Write: OPMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Velocity control, using serial commands 1 = Velocity control, using analog input 2 = Current control, using serial commands 3 = Current control, using analog input 4 = Position control, using gearing input 8 = Position control, using serial commands
Default value	2: If a drive-motor parameter bundle is not detected 8: If a drive-motor parameter bundle is detected
Note	Certain parameters may be stored in a drive-motor parameter bundle on an electronic motor nameplate, such as used in the sensAR magnetic encoder. When detected, the value of these parameters are loaded directly from the encoder memory to the drive RAM at power-up.
Unit	Not Applicable
Non-volatile	Yes
See also	ANIN2MODE COMMODE GEARMODE POSCONTROLMODE VELCONTROLMODE

OPMODESWITCH

Definition	Operation Mode Change While Drive Enabled
Type	Variable (R/W)
Description	The drive operation mode can be changed while the drive is enabled. The parameter INMODE <*input#*> 32 is used to activate this functionality. OPMODESWITCH defines whether the switch to another operation mode occurs immediately (on-the-fly) or whether a stop occurs (in standstill) prior to the switch.
	Standstill mode (OPMODESWITCH=0) In this mode, the operation mode is switched as follows: 1. The drive receives OPMODE change request. 2. The drive initiates HOLD. 3. The drive waits for a standstill condition (with a timeout of 10 second). 4. After reaching standstill or after the timeout, the drive changes the mode of operation; If the change in operation mode is defined to occur after a stop, it is important to define at the speed at which the motor is considered at standstill. Adjust parameters PEINPOS and PEINPOSTIME to achieve a standstill state; for example: PEINPOS=0.025[rev] and PEINPOSTIME=50 [ms]. A standstill condition will be generated if the motor does not move more than 0.025 rev within 50 ms (that is, V=0.025[rev]/50[ms] = 0.5 [rps] = 30 [rpm]).
	On-the-fly mode (OPMODESWITCH 1) In this mode, the drive performs the actions needed to continue executing the currently pending motion, such as applying the actual velocity as a command velocity when switching to Velocity operation mode. Note that the motor continues moving according to the actual torque/speed at the time the operation mode switch until a new command values arrives in the drive.
Syntax	Read: OPMODESWITCH Write: <*value*>
Firmware	1.40.0
Drive status	Enabled | Disabled
Range	0 = Mode change at standstill 1 = Mode change on-the-fly
Default value	0
Unit	Not Applicable
Non-volatile	Yes

See also	IN32OPMODES IN32SWITCH INMODE OPMODE PEINPOS PEINPOSTIME
CANopen	

OUT

Definition	Output Status
Type	Variable (R); (R/W in OUTMODE 0)
Description	Gets/sets the state of a digital output.
Syntax	Read: OUT <*output#*> Write: OUT <*output#*> <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	*output#* = 1 to 7 *value*: 0 = Output off 1 = Output on
Default value	0
Unit	Not Applicable
Non-volatile	No

Exampled	`-->out 1`
	`0`
	`-->out 1 1`
	`-->out 1`
	`1`
	`-->`

See also	OUTINV OUTMODE OUTPUTS
CANopen	60FEh, sub-index 1

OUTBRAKE

Definition	Manual Brake by Output
Type	Variable (R/W)
Description	Gets/sets the state of the dedicated output that causes the motor brake to engage. Requires OUTBRAKEMODE 0.
Note	Applicable only for CDHD 400/480 VAC models with Brake interface (P4).
Syntax	Read: OUTBRAKE Write: OUTBRAKE <*value*>
Firmware	1.41.0
Drive status	Enabled | Disabled
Range	0 = Output off disengages the brake (normal polarity) 1 = Output on engages the brake (normal polarity)
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	OUTBRAKEINV OUTBRAKEMODE OUTMODE
CANopen	

OUTBRAKEINV

Definition	Manual Brake by Output Inverse
Type	Variable (R/W)
Description	Inverts the polarity of the dedicated output that controls the motor brake.
Note	Applicable only for CDHD 400/480 VAC models with Brake interface (P4).
Syntax	Read: OUTBRAKEINV Write: OUTBRAKEINV <*value*>
Firmware	1.41.0
Drive status	Enabled | Disabled
Range	0 = Normal polarity 1 = Inverts output polarity
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	OUTBRAKE OUTBRAKEMODE
CANopen	

OUTBRAKEMODE

Definition	Manual Brake by Output Mode
Type	Variable (R/W)
Description	Defines whether the motor brake is operated automatically by the drive or manually by the user. It may be necessary to control the motor brake manually in certain instances, such as during replacement of a motor.
Note	Applicable only for CDHD 400/480 VAC models with Brake interface (P4).
Syntax	Read: OUTBRAKEMODE Write: OUTBRAKEMODE <*value*>
Firmware	1.41.0
Drive status	Enabled | Disabled
Range	0 = Manual control of motor brake 1 = Normal brake operation; motor brake disengaged when drive enabled; motor break engaged when drive disabled.
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	OUTBRAKE OUTBRAKEINV
CANopen	

OUTFLTLVL

Definition	Force Digital Output State on Fault
Type	Variable (R/W)
Description	Used to force digital outputs to a certain state when the drive is disabled due to a fault. This command can be used to override the digital output mode during a fault condition. It also overrides a potential inversion setting by the user (see also OUTINV). This command is considered bitwise, in which 2 bits define the behavior of a given output. Bit 0 and 1 define the behavior of output 1, bit 2 and 3 define the behavior of output 2, and so on. Bit 0: Defines the state of digital output 1 during a fault; that is, bit 1 is true: 0 = Low level 1 = High level Bit 1: If true, digital output 1 is set to the state defined in bit 0. If false, output 1 is set according to the defined output mode. Bit 2: Defines the state of digital output 2 during a fault; that is, bit 3 is true: 0 = Low level 1 = High level Bit 3: If true, digital output 2 is set to the state defined in bit 0. If false, output 2 is set according to the defined output mode For example: A fault has occurred and the drive is disabled. Digital outputs 1 and 3 are 0. Digital outputs 5 and 6 are 1. The remaining digital outputs function according to their dedicated output modes. Setting: 0b00 11 11 00 10 00 10 = 0xF22 = 3874
Syntax	Read: OUTFLTLVL Write: OUTFLTLVL <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 4294967295
Default value	0
Unit	Not Applicable
Non-volatile	Yes

Example	`-->OUTFLTLVL 3847`
	`--> OUTFLTLVL`
	`3874`
	`-->`

See also	OUT OUTMODE OUTPUTS
CANopen	2158h, sub-index 0

OUTILVL1

Definition	Current Level 1 for Digital Output Definition
Type	Variable (R/W)
Description	Gets/sets the first current level used for a condition that controls a digital output.
Syntax	Read: OUTILVL1 Write: OUTILVL1<*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 150
Default value	0.000
Unit	A
Non-volatile	Yes
See also	OUTILVL2 OUTINV OUTMODE OUTPUTS
CANopen	2099h, sub-index 0

OUTILVL2

Definition	Current Level 2 for Digital Output Definition
Type	Variable (R/W)
Description	Gets/sets the second current level used for a condition that controls a digital output.
Syntax	Read: OUTILVL2 Write: OUTILVL2<*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 150
Default value	0.000
Unit	A
Non-volatile	Yes
See also	OUTILVL1 OUTINV OUTMODE OUTPUTS
CANopen	209Ah, sub-index 0

OUTINV

Definition	Output Inversion
Type	Variable (R/W)
Description	Gets/sets the inversion of each of the digital outputs.
Syntax	Read: OUTINV <*output#*> Write: OUTINV <*output#*> <*invert*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	*output#* = 1 to 7 *invert*: 0 = Output not inverted 1 = Output inverted
Default value	0
Unit	Not Applicable
Non-volatile	Yes

Example	`-->outinv 3`
	`0`
	`-->outinv 3 1`
	`-->outinv 3`
	`1`

See also	OUT OUTMODE OUTPUTS
CANopen	209Bh, sub-index 1

OUTMODE

Definition	Output Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines the condition which will activate the specified digital output.
Syntax	Read: OUTMODE <*output#*> Write: OUTMODE <*output#*> <*condition*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	*output#* = 1 to 7 *condition*: 0 = Idle 1 = Active (enabled) 2 = Brake release signal 3 = Alarm for any fault 4 = In position indication matching INPOS 5 = Stopped indication (matching STOPPED=2) 6 = Foldback indication (motor or drive) (fault or FOLD) 7 = Average current exceeds OUTILVL1 8 = Average current is above OUTILVL1 and below OUTILVL2 9 = Velocity exceeds OUTVLVL1. Output will be activated when velocity exceeds the level set by OUTVLVL1. 10 = Velocity is above OUTVLVL1 and below OUTVLVL2. Output will be activated when velocity is above the level set by OUTVLVL1 **and** below the level set by OUTVLVL2. 11 = Position (PFB) is above OUTPLVL1. Output will be activated when position exceeds the level set by OUTPLVL1. 12 = Position (PFB) is above OUTPLVL1 and below OUTPLVL2. Output will be activated when position is above the level set by OUTPLVL1 **and** below the level set by OUTPLVL2. 13 = Encoder battery low voltage fault 14 = Warning on 15 = Faults or disabled 16 = Encoder battery low voltage warning 17 = Phase find succeeded 18 = Over-current fault exists 19 = Over-voltage fault exists 20 = Under-voltage fault exists 21 = Phase find required 22 = Alarm for any fault except phase find failure 23 = Homing complete

	24 = Encoder simulation index* 25 = Zero position after homing Modes 9, 10, 11 and 12 accept negative values and operate accordingly; that is, they are direction-sensitive.
Note	OUTMODE 24 limitations: CDHD AP, AF, EC models: Supported for fast outputs 3 and 6 only. Propagation delay is 1 µs CDHD EB model: Supported for fast outputs 3 and 6 only. Propagation delay is 1 µs DDHD: Supported for all standard outputs. Propagation delay is 1 ms.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	OUT OUTINV OUTPUTS
CANopen	209Ch, sub-index 1

OUTPLVL1

Definition	Position Level 1 for Digital Output Definition
Type	Variable (R/W)
Description	Gets/sets the first position level used for a condition that controls a digital output.
Syntax	Read: OUTPLVL1 Write: OUTPLVL1 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	OUTINV OUTMODE OUTPLVL2 OUTPUTS
CANopen	209Dh, sub-index 0

OUTPLVL2

Definition	Position Level 2 for Digital Output Definition
Type	Variable (R/W)
Description	Gets/sets the second position level used for a condition that controls a digital output.
Syntax	Read: OUTPLVL2 Write: OUTPLVL2 <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	OUTINV OUTMODE OUTPLVL1 OUTPUTS
CANopen	209Eh, sub-index 0

OUTPUTS

Definition	Outputs Status
Type	Variable (R)
Description	Indicates the state of all digital outputs. A header lines identifies each of the outputs.
Syntax	OUTPUTS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Output off 1 = Output on X = Not configured (CDHD 200V)
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	`-->OUTPUTS`
	`1 2 3 4 5 6 7`
	`0 0 0 0 0 0 X`

See also	OUT OUTINV OUTMODE

OUTVLVL1

Definition	Velocity Level 1 for Digital Output Definition
Type	Variable (R/W)
Description	Gets/sets the first velocity level used for a condition that controls a digital output.
Syntax	Read: OUTVLVL1 Write: OUTVLVL1<*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±192000 [rpm]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 = rps If UNITSROTVEL 1 = rpm If UNITSROTVEL 2 = deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	OUTINV OUTMODE OUTPUTS OUTVLVL2
CANopen	209Fh, sub-index 0

OUTVLVL2

Definition	Velocity Level 2 for Digital Output Definition
Type	Variable (R/W)
Description	Gets/sets the second velocity level used for a condition that controls a digital output.
Syntax	Read: OUTVLVL2 Write: OUTVLVL2<*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	±192000 [rpm]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 = rps If UNITSROTVEL 1 = rpm If UNITSROTVEL 2 = deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	OUTINV OUTMODE OUTPUTS OUTVLVL1
CANopen	20A0h, sub-index 0

OVTHRESH

Definition	Over-Voltage Threshold
Type	Variable (R)
Description	Indicates the threshold level for bus over-voltage detection.
Syntax	OVTHRESH
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	V
Non-volatile	Yes
See also	UVTHRESH VBUS VBUSREADOUT
CANopen	20A1h, sub-index 0

PASSWORD

Definition	Password
Type	Command
Description	Sets the privilege level of the allowable commands. There are two levels of protection. "factory" – allows all drive commands to be used. "master" – allows certain additional commands to be used. Issue of incorrect password resumes password protection.
Syntax	PASSWORD {*password*}
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	VER

PATHACC

Definition	Path Acceleration Rate
Type	Variable (R/W)
Description	Gets/sets the acceleration value for path execution.
Syntax	Read: PATHACC <*path#*> Write: PATHACC <*path#*> <*value*>
Firmware	1.4.4
Drive status	Enable | Disable
Range	*Path#*: 0 - 31 *Value*: If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.004 to 16666.666 UNITSROTACC 1 = 0.23 to 1000000 UNITSROTACC 2 = 1.38 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0.12 to 533333.333
Default value	600 [rpm/s]
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes

Example	`--> PATHACC 4`
	`600.000 [rpm/s]`
	`--> PATHACC 4 700`
	`--> PATHACC 4`
	`700.000 [rpm/s]`

See also	PATHCTRL PATHDEC PATHDELAY PATHPOS PATHSPEED

PATHCTRL

Definition	Path Control
Type	Variable (R/W)
Description	Gets/sets the behavior for executing the path. A path is a user-defined move command saved in drive memory, which is triggered by a digital input signal from an external device. Path control is defined by a word of 8 bits in which bit 4 sets the blending option and bit 7 sets the move type. Recommended values: Bit 4: Blending (insertion): 0 = Off (default = sequential execution) 1 = On Bit 7: Move type: 0 = Absolute (default) 1 = Incremental Path control options: <u>Move Type</u> — <u>Value</u> Absolute — 0x0 (0) Absolute with blending — 0x10 (16) Incremental — 0x80 (128) Incremental with blending — 0x90 (144) Use INMODE to execute the path. Allocate up to 5 digital inputs as path bits (INMODE 20 – 24) and one digital input as path trigger (INMODE 25). Configure the path bit inputs according to the path number. To execute the path, switch the state of the path trigger input from off to on.
Syntax	Read: PATHCTRL <*path#*> Write: PATHCTRL <*path#*> <*value*>
Firmware	1.4.4
Drive status	Enable | Disable
Range	*Path#*: 0 to 31 *Value*: Not Applicable
Default value	0
Unit	See Description, above.
Non-volatile	Yes

Example	Define path number 4 as an incremental move with blending:
	`-->PATHCTRL 4`
	`0`
	`-->PATHCTRL 4 h90`
	`-->PATHCTRL 4`
	`144`

See also	INMODE (20 – 25) PATHACC PATHDEC PATHDELAY PATHPOS PATHSPEED

PATHDEC

Definition	Path Deceleration Rate
Type	Variable (R/W)
Description	Gets/sets the deceleration value for path execution.
Syntax	Read: PATHDEC <*path#*> Write: PATHDEC <*path#*> <*value*>
Firmware	1.4.4
Drive status	Enable | Disable
Range	*Path#*: 0 to 31 *Value*: If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = 0.004 to 16666.666 UNITSROTACC 1 = 0.23 to 1000000 UNITSROTACC 2 = 1.38 to 6000000 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = 0.12 to 533333.333
Default value	600 [rpm/s]
Unit	If MOTORTYPE 0 (Rotary): UNITSROTACC 0 = rps/s UNITSROTACC 1 = rpm/s UNITSROTACC 2 = deg/s^2 If MOTORTYPE 2 (Linear): UNITSLINACC 1 = mm/s^2
Non-volatile	Yes

Example	`-->PATHDEC 4`
	`600.000 [rpm/s]`
	`-->PATHDEC 4 500`
	`-->PATHDEC 4`
	`500.000 [rpm/s]`

See also	PATHACC PATHCTRL PATHDELAY PATHPOS PATHSPEED

PATHDELAY

Definition	Path Delay
Type	Variable (R/W)
Description	Gets/sets a delay value for path execution. If execution is sequential (and not blended), the delay value is the time that will elapse, in milliseconds, between the end of the currently executed path and the start of the next path to be executed.
Syntax	Read: PATHDELAY <*path#*> Write: PATHDELAY <*path#*> <*value*>
Firmware	1.4.4
Drive status	Enable | Disable
Range	*Path#*: 0 to 31 *Value*: 0 = 32767
Default value	0
Unit	ms
Non-volatile	Yes

Example	`-->PATHDELAY 4`
	`0 [ms]`
	`-->PATHDELAY 4 1500`
	`-->PATHDELAY 4`
	`1500 [ms]`

See also	PATHACC PATHCTRL PATHDEC PATHPOS PATHSPEED

PATHPOS

Definition	Path Position
Type	Variable (R/W)
Description	Gets/sets the value of the target position to be reached by the path execution.
	A path is a user-defined move command saved in drive memory, which is triggered by a digital input signal from an external device. To define a path, you must configure six parameters: ■ PATHPOS (position) ■ PATHSPEED (speed) ■ PATHACC (acceleration) ■ PATHDEC (deleration) ■ PATHDELAY (delay) ■ PATHCTRL (control)
Syntax	Read: PATHPOS <*path#*> Write: PATHPOS <*path#*> <*value*>
Firmware	1.4.4
Drive status	Enable | Disable
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	0
Unit	*Path#*: 0 to 31 *Value*: If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes

Example	Define the target value of path number 4 as 12345 (counts):
	`--> PATHPOS 4`
	`0.000 [Counts]`
	`--> PATHPOS 4 12345`
	`--> PATHPOS 4`
	`12345.000 [Counts]`

See also	PATHACC PATHCTRL PATHDEC PATHDELAY PATHSPEED

PATHSPEED

Definition	Path Speed
Type	Variable (R/W)
Description	Gets/sets the speed value for path execution.
Syntax	Read: PATHSPEED <*path#*> Write: PATHSPEED <*path#*> <*value*>
Firmware	1.4.4
Drive status	Enable | Disable
Range	*Path#*: 0 to 31 *Value*: ±VLIM
Default value	227.5 [rpm]
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 = rps If UNITSROTVEL 1 = rpm If UNITSROTVEL 2 = deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes

Example	`-->PATHSPEED 4`
	`227.500 [rpm]`
	`-->PATHSPEED 4 555.5`
	`-->PATHSPEED 4`
	`555.500 [rpm]`

See also	PATHACC PATHCTRL PATHDEC PATHDELAY PATHPOS

PCMD

Definition	Position Command
Type	Variable (R)
Description	Gets the value of the position reference command.
Note	The HWPEXT/PCMD ratio is not maintained under the following condition: GEAROUT=1 GEARIN>5000 No warning is issued.
Syntax	PCMD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	GEARMODE MOVEINC PE PFB
CANopen	208Eh, sub-index 0

PCMDFBRAW

Definition	Raw Position Command from Fieldbus
Type	Variable (R)
Description	Gets the value of the raw target position command sent from the fieldbus, in fieldbus units.
Syntax	PCMDFBRAW
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	

PCMDRAW

Definition	Raw Position Command
Type	Variable (R)
Description	The value of the position command before smoothing. Useful for debugging. Reads the raw target data from the fieldbus.
Syntax	PCMDRAW
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	PCMD

PDEN

Definition	Feed Constant (Unit Conversion) Denominator
Type	Variable (R/W)
Description	The feed constant is the positional movement for any motor movement and is calculated as the following: *Feed constant = Feed ÷ Driving shaft revolutions* PDEN defines the denominator (revolutions) of the ratio. Used for scaling the motor revolution (rotary motors) or the motor pitch (linear motors), according to the type of motor (MOTORTYPE).
Syntax	Read: PDEN Write: PDEN <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	1 to 4294967295
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	PCMD PNUM
CANopen	6092h, sub-index 2

PE

Definition	Position Error
Type	Variable (R)
Description	Gets the value of the position error. The position error is calculated as the difference between PCMD and PFB.
Syntax	PE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	PCMD PFB PFBOFFSET
CANopen	60F4h, sub-index 0

PEINPOS

Definition	In Position Error Tolerance
Type	Variable (R/W)
Description	Gets/sets the error tolerance for declaring an "in position" state. The motor is considered settled when PE has remained below PEINPOS for a time defined by PEINPOSTIME.
Syntax	Read: PEINPOS Write: PEINPOS <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0.25 [rev]
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	INPOS MOVEINC PEINPOSTIME PEMAX STOPPED
CANopen	6067h, sub-index 0

PEINPOSTIME

Definition	In Position Time
Type	Variable (R/W)
Description	PEINPOSTIME specifies the duration of INPOS=1 at the end of a commanded movement that results in STOPPED=2 (“Profile completed and drive is in position”).
Syntax	Read: PEINPOSTIME Write: PEINPOSTIME <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000
Default value	1
Unit	ms
Non-volatile	Yes
See also	INPOS MOVEABS MOVEINC PE PEINPOS STOPPED
CANopen	6068h, sub-index 0

PELOOP

Definition	Position Loop Position Error
Type	Variable (R)
Description	Position error value used by the position loop
Syntax	PELOOP
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	PE
CANopen	20A3h, sub-index 0

PEMAX

Definition	Maximum Position Error
Type	Variable (R/W)
Description	Maximum position error value that does not produce a fault.
Syntax	Read: PEMAX Write: PEMAX <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = 0.500 UNITSROTPOS 1 = 8192.000 UNITSROTPOS 2 = 360.000 If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = 1.000 UNITSLINPOS 1 = 8192.000 UNITSLINPOS 3 = 32.000
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	INPOS MOVEINC PEINPOS STOPPED
CANopen	6065h, sub-index 0

PFB

Definition	Position
Type	Variable (R)
Description	Gets the value of the primary (motor) feedback, in user-defined units, including any offsets that have been added. PFB is the actual position, according to the motor feedback.
Syntax	PFB
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	PCMD PE PFBOFFSET
CANopen	6064h, sub-index 0

PFBBACKUP

Definition	Position Backup
Type	Command
Description	Reads the PFB values from non-volatile memory that were saved by the PFB backup process.
Syntax	PFBBACKUP
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Not Applicable
See also	PFB PFBBACKUPMODE
CANopen	2088h, sub-index 0

PFBBACKUPMODE

Definition	Position Backup Mode
Type	Variable (R/W)
Description	Enables and disables the position (PFB) backup process. In the event of an emergency stop, the PFB backup process saves PFB to non-volatile memory, and restores it at the next power up.
Syntax	Read: PFBBACKUPMODE Write: PFBBACKUPMODE<*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 = PFB backup process disabled 1 = PFB backup process enabled
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	PFB PFBBACKUP
CANopen	2089h, sub-index 0

PFBOFFSET

Definition	Position Offset
Type	Variable (R/W)
Description	Gets/sets a feedback offset that is added to the internal cumulative position counter, to give the value of PFB. When using count units, only integer values can be entered.
Syntax	Read: PFBOFFSET Write: PFBOFFSET <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	PCMD PE PFB
CANopen	2095h, sub-index 0

PHASEFIND

Definition	Phase Find Command
Type	Command
Description	Initiates a procedure that initializes commutation for incremental encoder systems. See PHASEFINDMODE for the execution options.
Note	Although highly unlikely, it is possible that PHASEFIND will produce an incorrect commutation angle, resulting in a runaway condition. Therefore, when using the PHASEFIND procedure, it is strongly recommended that the commutation error detection mechanism be enabled by setting appropriate values for COMMERRTTHRESH and COMMERRVTHRESH.
Syntax	PHASEFIND
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	FEEDBACKTYPE MENCRES MENCTYPE MPHASE PHASEFINDGAIN PHASEFINDI PHASEFINDMODE PHASEFINDST ZERO
CANopen	20A4h, sub-index 0

PHASEFINDANGLE

Definition	Forced Electrical Position
Type	Variable (R/W)
Description	Gets/sets the position in one revolution. Applicable only for MENCTYPE 11.
Syntax	Read: PHASEFINDANGLE Write: PHASEFINDANGLE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	0
Unit	65536/(electrical cycle)
Non-volatile	Yes
See also	PHASEFIND PHASEFINDMODE
CANopen	20A5h, sub-index 0

PHASEFINDDELTA

Definition	Delta Angle for Phase Find Tuning
Type	Variable (R/W)
Description	Delta angle for phase find tuning.
Syntax	Read: PHASEFINDDELTA Write: PHASEFINDDELTA <*value*>
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	0 to 359
Default value	5
Unit	Electrical degree
Non-volatile	No
See also	PHASEFINDMODE

PHASEFINDGAIN

Definition	Phase Find Gain
Type	Variable (R/W)
Description	Adjusts the gain of the phase finding mechanism.
Syntax	Read: PHASEFINDGAIN Write: PHASEFINDGAIN <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0.1 to 10
Default value	10.000
Unit	Not applicable
Non-volatile	Yes
See also	PHASEFIND PHASEFINDMODE
CANopen	20A6h, sub-index 0

PHASEFINDI

Definition	Phase Find Current
Type	Variable (R/W) .
Description	Adjusts the current of the phase finding mechanism.
Syntax	Read: PHASEFINDI Write: PHASEFINDI <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to IMAX
Default value	0.848
Unit	A
Non-volatile	Yes
See also	PHASEFIND PHASEFINDMODE
CANopen	20A7h, sub-index 0

PHASEFINDMODE

Definition	Phase Find Mode
Type	Variable (R/W)
Description	Gets/sets the commutation Phase Find mode.
Note	Although highly unlikely, it is possible that PHASEFIND will produce an incorrect commutation angle, resulting in a commutation error (runaway motor) condition. Therefore, when using the PHASEFIND procedure, it is strongly recommended that the commutation error detection mechanism be enabled by setting appropriate values for COMMERRTTHRESH and COMMERRVTHRESH.
Syntax	Read: PHASEFINDMODE Write: PHASEFINDMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	**PHASEFINDMODE 2** [**Soft start**]. **Default.** Also referred to as a Wake-No-Shake routine. Sets current command and searches for angle at which no movement occurs, and then adds 90 degrees to this angle. Uses PI controller where velocity is an input and commutation angle is an output. **Note:** The angle found may cause movement in the wrong direction; therefore, the process is performed twice to avoid incorrect detection. Use this mode with motors that have non-limited motion. 5. Set PHASEFINDI - range (0 to IMAX) [A peak]. If value is 0, drive will overwrite it to 0.15×MIN(DICONT,MICONT). A high value provides a more exact result but causes a higher rotor jump at start of process. 6. Set PHASEFINDGAIN - range (0.1 to 10). Use a lower value for systems with high inertia, and vice versa. 7. Set PHASEFINDTIME - range (0 to 16000) [ms]. Use a higher value for systems with high inertia, and vice versa. 8. Type PHASEFIND, and then EN.
	PHASEFINDMODE 4 [Smooth start] Sets commutation angle to 180 degrees and increases current until a movement of 1 electrical angle is detected. Divides the angle by half and sets the appropriate sign to move in the opposite direction. Increases current until a movement of 1 electrical angle is detected. Repeats until no movement occurs at maximum current. Adds 90 degree to the found angle. The maximum current value used during the process is limited by **MICONT**. Use this mode with motors that have non-limited motion. 1. Set PHASEFINDGAIN — range (0.1 - 10). In this mode

	the parameter is used as a factor for total movement. The larger factor will provide less movement but will take more time to execute PHASEFIND process. In systems with low inertia and cogging the actual movement will be unpredictable but never more than 90 electrical degrees. Use a higher value for systems with high inertia, and vice versa. 2. Type PHASEFIND, and then EN.
	PHASEFINDMODE 5 [**High torque start**] Sets commutation angle to 180 degrees and increases current until a movement of 1 electrical angle is detected. Divides the angle by half and sets the appropriate sign to move in the opposite direction. Increases current until a movement of 1 electrical angle is detected. Repeats until no movement occurs at maximum current. Adds 90 degree to the found angle. The maximum current value used during the process is limited by **IMAX**. Use this mode with motors that have non-limited motion. Use this mode when a high torque is required for initial motion. 1. Set PHASEFINDGAIN — range (0.1 - 10). In this mode the parameter is used as a factor for total movement. The larger factor will provide less movement but will take more time to execute PHASEFIND process. In systems with low inertia and cogging the actual movement will be unpredictable but never more than 90 electrical degrees. Use a higher value for systems with high inertia, and vice versa. 2. Type PHASEFIND, and then EN.

	PHASEFINDMODE 11 [**Manual commutation**] Commutation is defined by the value of PHASEFINDANGLE. 1. Set PHASEFINDANGLE — range (0 to 65535), where 1 electrical angle is 65535/359. 2. Type PHASEFIND, and then EN. Use this mode if the angle is known. For example: 1. Set shaft to zero electrical degrees (be sure MPHASE = 0). Use the ZERO command to set the shaft to zero electrical degree placement. 2. Set PHASEFINDANGLE = 0 3. Type PHASEFIND, and then EN
	PHASEFINDMODE 12 [Zeroing] Applies the ZERO command and uses the resulting MPHASE. Supports systems with Z-axis. Utilizes the following parameters: PHASEFINDI – Current applied to phases, in amperes. Minimum is 0; maximum is IMAX; default is 0.1×MICONT. A higher current will provide a more exact result, but will cause more aggressive behavior during the PHASEFIND process. Current value should be high enough to hold the load of the Z-axis. PHASEFINDDELTA – Allowable movement before PHASEFIND starts, in electrical degrees. Minimum is 0; maximum is 359; default is 5. PHASEFINDTIME – Timeout time, in milliseconds. Minimum is 30 seconds; maximum is 60 seconds; default is 30 seconds. Can be modified by user in the event of a timeout fault. For example, if PHASEFINDI is high and motor has a load, rotor oscillations during PHASEFIND may require more than 30 seconds for settling. WNSERR – Faults. For example: "Not enough motion detected". Possibly due to hard stop, low PHASEFINDI, locked rotor, high load. "Motor Settling Timeout". Due to rotor oscillations during PHASEFIND process. Try increasing PHASEFINDTIME. Verify PEINPOS is not 0 (this parameter is used to define settling status). PEINPOS– A lower value will provide a more exact result. Type PHASEFIND, and then EN. Wait for movement greater than *n* electrical degrees, where *n* is defined by PHASEFINDDELTA. If no movement is detected within 1 second, then start the phasing process. Apply ZERO command and use the resulting MPHASE.
Default value	2
Unit	Not applicable
Non-volatile	Yes

See also	FEEDBACKTYPE MENCTYPE MPHASE PHASEFIND (Modes 0, 2, 4, 11) PHASEFINDANGLE (Mode 11) PHASEFINDI (Mode 2) PHASEFINDGAIN (Modes 2, 4) PHASEFINDST (Modes 0, 2, 4,11) PHASEFINDTIME (Mode 2) WNSERR (Modes 2,4) ZERO
CANopen	20A8h, sub-index 0

PHASEFINDST

Definition	Phase Find Status
Type	Variable (R)
Description	Indicates the state of the commutation Phase Find procedure for incremental encoders.
Syntax	PHASEFINDST
Firmware	1.0.6
Drive status	Disabled
Range	0 = Not started 1 = Running 2 = Succeeded 3 = Failed
Default value	Not applicable
Unit	Not applicable
Non-volatile	No
See also	FEEDBACKTYPE MENCTYPE PHASEFIND PHASEFINDMODE ZERO
CANopen	20A9h, sub-index 0

PHASEFINDTIME

Definition	Phase Find Duraton
Type	Variable (R/W)
Description	Gets/set the duration of the phase finding mechanism in a soft start (PHASEFINDMODE 2).
Syntax	Read: PHASEFINDTIME Write: PHASEFINDTIME <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 to 60000
Default value	100
Unit	ms
Non-volatile	Yes
See also	PHASEFIND PHASEFINDMODE
CANopen	20AAh, sub-index 0

PNUM

Definition	Feed Constant (Unit Conversion) Numerator
Type	Variable (R/W)
Description	The feed constant is the positional movement for any motor movement and is calculated as the following: *Feed constant = Feed ÷ Driving shaft revolutions* PNUM defines the numerator (feed) of the ratio. Used for scaling the motor revolution (rotary motors) or the motor pitch (linear motors), according to the type of motor (MOTORTYPE).
Syntax	Read: PNUM Write: PNUM <*value*>
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	1 to 4294967295
Default value	360000
Unit	Not Applicable
Non-volatile	Yes
See also	PCMD PDEN
CANopen	6092h, sub-index 1

POSCONTROLMODE

Definition	Position Loop Controller Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines the type of position loop controller. POSCONTROLMODE 5 is recommended for all new applications. It replaces POSCONTROLMODE 1 and 2 used in previous firmware versions. POSCONTROLMODE 5 allows the HD controller to run at 8 kHz (250 µs sampling rate), enabling higher settings of HD controllers gains. This mode improves overall performance, such as faster settling times and smaller position errors.
Note	Due to differences in sample rates, if switching from POSCONTROLMODE 2 to 5, or 5 to 2, it is recommended that the HD controller gains be retuned.
Syntax	Read: POSCONTROLMODE Write: POSCONTROLMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = Linear control loop 1 = HD control loop; for backward compatibility only 2 = HD control loop with 250 µs sample rate 3 = Reserved 4 = Reserved 5 = HD control loop with 125 µs sample rate; recommended for all new applications
Default value	5
Unit	Not applicable
Non-volatile	Yes
See also	OPMODE VELCONTROLMODE
CANopen	20ABh, sub-index 0

POSLIMHYST

Definition	Software Position Limit Switch Hysteresis Value
Type	Variable (R/W)
Description	Hysteresis value around the software position limit switch. Serves to prevent false activation of a software limit switch due to an unstable control loop.
Syntax	Read: POSLIMHYST Write: POSLIMHYST <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	0 to 1/36 (0.278)
Default value	0.003
Unit	If MOTORTYPE 0 (Rotary): revolution If MOTORTYPE 2 (Linear): pitch
Non-volatile	Yes
See also	POSLIMMODE
CANopen	214A h, sub-index 0

POSLIMMODE

Definition	Position Limiting Mode
Type	Variable (R/W)
Description	Defines whether **software** position limits and/or **transient** position limits and/or **homing** limits are applied.

The value of POSLIMMODE depends on the bit values:

Bit 2	Bit 1	Bit 0		Value
0	0	0	=	**0**
0	0	1	=	**1**
0	1	0	=	**2**
0	1	1	=	**3**
1	0	0	=	**4**
1	0	1	=	**5**
1	1	0	=	**6**
1	1	1	=	**7**

bit 0:
  0 = Software position limits disabled
  1 = Software position limits enabled

bit 1:
  0 = Transient limits are used for all motion
  1 = Transient limits are ignored during any motion

bit 2:
  0 = Transient limits are used for homing
  1 = Transient limits are ignored during homing

Software position limits (bit 0) can be set only after a successful homing has been performed.

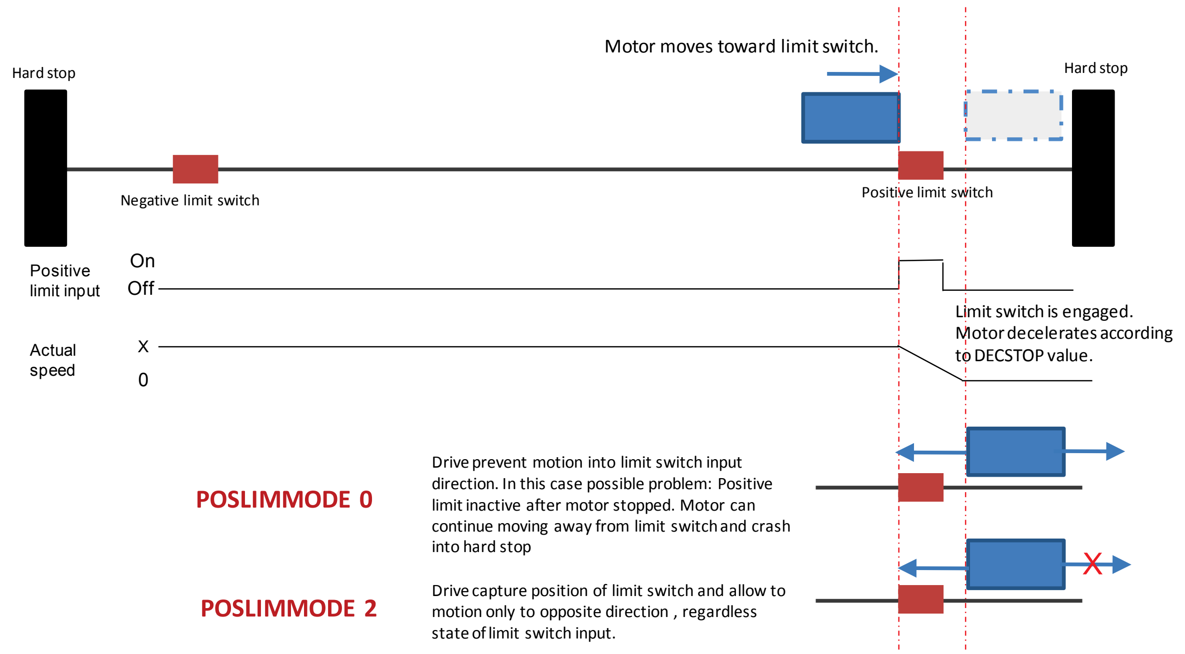
If **bit 0 = 1**, POSLIMNEG and POSLIMPOS serve as motion limits. When either limit is crossed, a deceleration occurs according to the value of DECSTOPTIME, unless it exceeds the value of DECSTOP. Once a limit is crossed, only motion commands in the reverse direction can be executed.

When a software limit switch is engaged, the 7-segment LED display shows either **L4** or **L5**. If both switches are engaged, the display shows **L6**.

Software position limits and the Disable mode use the same deceleration settings.

If **bit 1 = 0**, transient limits serve as motion limits. Transient limits are set when the respective hardware limit input is set; at the same time, the actual position is captured internally. The transient limits are maintained until the hardware limit input is reset and the actual position is closer to the travel range than the captured position above. For example, if a transient positive limit bit is set, this bit will be reset when the hardware positive limit input is reset and the actual position is less than the position that was captured

	when the positive hardware limit input was originally set. The drive will respond to the presence of a transient limit bit as if the respective hardware limit input is set.
Syntax	Read: POSLIMMODE Write: POSLIMMODE <*value*>
Firmware	1.2.12; 1.40.0
Drive status	Enabled | Disabled
Range	0 to 7 **Note**: Values 4 and 5 (where bit 1 = 0 and bit 2= 1) should not be used, since they do not represent any backward compatible configuration.
Default value	6
Unit	Not Applicable
Non-volatile	Yes | No
See also	DECSTOP DECSTOPTIME POSLIMNEG POSLIMPOS LIMSWITCHNEG LIMSWITCHPOS
CANopen	20ACh, sub-index 0



Limit switch is OFF

L1 = Hardware negative limit switch is open

L2 = Hardware positive limit switch is open

POSLIMNEG

Definition	Software Position Limit Minimum
Type	Variable (R/W)
Description	The minimum position for software limit.
Syntax	Read: POSLIMNEG Write: POSLIMNEG <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	POSLIMMODE POSLIMPOS
CANopen	607Dh, sub-index 1

POSLIMPOS

Definition	Software Position Limit Maximum
Type	Variable (R/W)
Description	The maximum position for software limit
Syntax	Read: POSLIMPOS Write: POSLIMPOS <*value*>
Firmware	1.2.12
Drive status	Disabled
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	POSLIMMODE POSLIMNEG
CANopen	607Dh, sub-index 2

PRBFRQ

Definition	PRB Generator Frequency
Type	Variable (R/W)
Description	Defines the frequency for PRB (pseudo-random binary) excitation. For pseudo binary noise (PRBPARAM 1), PRBFRQ has no effect. For sine and square wave generators (PRBPARAM 2, PRBPARAM 3), PRBFRQ defines the frequency of the sine and square wave generator, respectively.
Syntax	Read: PRBFRQ Write: PRBFRQ <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 5000
Default value	100.000
Unit	Hz
Non-volatile	No
See also	PRBMODE PRBPARAM
CANopen	20ADh, sub-index 0

PRBMODE

Definition	PRB Activation Mode
Type	Variable (R/W)
Description	Get/sets the activation mode of the PRB signal generator. PRB can either be disabled (PRBMODE 0), continuously activated (PRBMODE 2), or activated only when recording has been triggered (PRBMODE 1).
Syntax	Read: PRBMODE Write: PRBMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = PRB generator not activated 1 = PRB generator activated only during recording 2 = PRB generator activated continuously
Default value	0
Unit	Not Applicable
Non-volatile	No
See also	PRBFRQ PRBPARAM RECORD RECTRIG
CANopen	20AEh, sub-index 0

PRBPARAM

Definition	PRB Generator Configuration
Type	Command
Description	The PRB (pseudo-random binary) generator enables several advanced tests on the controlled axis. These tests include injecting sine or square wave signals of specified frequency in addition to the current and velocity commands. The PRB noise generator is used to excite the system with a wide uniform spectrum signal for identification purposes.
Syntax	PRBPARAM {*Signal_type*} {*Icmd_amp*} {*Vcmd_amp*} {*Update_ratio*}
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	*Signal_type*: 0 = Not activated 1 = Pseudo random binary 2 = Sine wave 3 = Square wave *Icmd_amp* = torque amplitude in [A]. *Vcmd_amp* = velocity amplitude in velocity units (as defined by UNITSROTVEL or UNITSLINVEL) *Update_ratio* = update ratio relative to current loop update rate.
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	PRBFRQ PRBMODE
CANopen	20AFh, sub-index 1

PROBECONFIG

Definition	Touch Probe Configuration
Type	Command
Description	Defines the probe functionality.
Syntax	PROBECONFIG <*probe number*> queries the configuration PROBECONFIG {<*probe number*> <*enable trigger*> <*capture method*> <*trigger source*> <*capture edge*> <*sampled variable*>}
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	*probe number*: 1 = First probe *enable trigger*: 0 = Disable triggering 1 = Enable triggering *capture method*: 0 = Trigger first event (single) 1 = Continuous (repeated) *trigger source*: 0 = Digital input 1 = Encoder index *capture edge*: 0 = Idle (use before changing edge event configuration and before reactivating one-shot probing) 1 = Rising edge 2 = Falling edge *sampled variable* (0x00 to 0x0F): 0x00 No variable to sample 0x01 Position feedback 0x02 Position error 0x04 Velocity 0x08 Current Q axis
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	Rejection of the command because probe functionality has not been assigned to any of the digital inputs.
	`PROBECONFIG 1 1 0 0 1 H0F`
	`ERR 260 No input assigned to touch probe`

Example	Configuring probe 1 to capture the values of all specified variables once a single event of rising edge occurs.
	`INMODE 2 27`
	`PROBECONFIG 1 1 0 0 1 HF`

Example	Configuring probe 1 to continuously capture position and velocity at each falling edge event. `INMODE 2 27` `PROBECONFIG 1 1` **`1`** `0` **`2 H05`**
Example	Setting probe 1 to idling to prevent capturing. `PROBECONFIG 1 1 1 0 0 H05`
Example	Setting probe 1 to idling to prevent capturing. `PROBECONFIG 1 1 1 0 0 H05`
Example	Continuously probing by using the feedback index at rising edge. `PROBECONFIG 1 1` **`1 1 1`** `H05`
See also	PROBECOUNTER PROBEDATAFALL PROBEDATARISE PROBELEVELPRD PROBESTATUS
CANopen	60B8h, sub-index 1

PROBECOUNTER

Definition	Touch Probe Event Counter
Type	Variable (R)
Description	Returns the number of captured events. PROBECOUNTER variable is incremented each time a configured event occurs.
Syntax	PROBECOUNTER
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	0
Unit	Not Applicable
Non-volatile	No

Example	`-->PROBECOUNTER`
	
	`Rise edge events: 0`
	`Fall edge events: 0`

See also	PROBECONFIG PROBESTATUS
CANopen	2131h, sub-index 0

PROBEDATAFALL

Definition	Touch Probe Sampled Data Falling
Type	Command
Description	Reads and stores the captured data from the last event on the falling edge.
Syntax	PROBEDATAFALL {1|2}
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	1 = Probe 1 2 = Probe 2
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	**`PROBECONFIG 1 1 0 0 2 h0F`**
	Before edge event:
	`probedatafall 1`
	`  0.000   [Counts]   ->position`
	`  0.000   [Counts]   ->position error`
	`  0.000   [rpm]      ->velocity`
	`  0.000   [A]        ->iq`
	
	After event occurred:
	`probedatafall 1`
	`  434041.314  [Counts]`
	`  0.000   [Counts]`
	`  497.667 [rpm]`
	`  0.068   [A]`

Example	**`PROBECONFIG 1 1 0 0 2 h05`**
	After event occurred:
	`probedatafall 1`
	`  1278100.564  [Counts]`
	`  482.546  [rpm]`

See also	PROBECONFIG PROBEDATARISE
CANopen	2148h, sub-index 0

PROBEDATARISE

Definition	Touch Probe Sampled Data Rising
Type	Variable (R)
Description	Reads and stores the captured data from the last event on the rising edge.
Syntax	PROBEDATARISE {1|2}
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	1 = Probe 1 2 = Probe 2
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	**`PROBECONFIG 1 1 0 0 1 h0F`**
	Before edge event:
	`probedatarise 1`
	`0.000 [Counts] ->position`
	`0.000 [Counts] ->position error`
	`0.000 [rpm] ->velocity`
	`0.000 [A] ->iq`
	
	After event occurred:
	`probedatarise 1`
	`434041.314 [Counts]`
	`0.000 [Counts]`
	`497.667 [rpm]`
	`0.068 [A]`

Example	**`PROBECONFIG 1 1 0 0 1 h05`**
	After event occurred:
	`probedatarise 1`
	`434041.314 [Counts] ->position`
	`49497.667 [rpm] ->iq`

See also	PROBECONFIG PROBEDATAFALL
CANopen	2147h, sub-index 0

PROBELEVELPRD

Definition	Touch Probe Stable Input Level Duration
Type	Variable (R/W)
Description	Gets/sets the minimum length of time required for a stable input level after a trigger event. Serves to overcome the bouncing effect of a switch.
Syntax	Read: PROBELEVELPRD Write: PROBELEVELPRD <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	2 to 32
Default value	5
Unit	31.25 μs
Non-volatile	Yes
See also	PROBECONFIG PROBESTATUS
CANopen	214Bh, sub-index 0

PROBESTATUS

Definition	Touch Probe Status
Type	Variable (R)
Description	Indicates whether the probe is enabled and which type of edge event has occurred.
Syntax	PROBESTATUS
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

Example	Probe is switched off:
	`PROBECONFIG 1 0 0 0 2 h05`
	`PROBESTATUS`
	`Probe -1 Is Switched Off`
	`No positive edge data stored`
	`No negative edge data stored`

Example	Probe is switched on:
	`PROBECONFIG 1 1 0 0 2 h05`
	`PROBESTATUS`
	`Probe -1 Is Switched On`
	`No positive edge data stored`
	`Negative edge data stored`
	
	After edge event occurred:
	`PROBESTATUS`
	`Probe -1 Is Switched On`
	`No positive edge data stored`
	`Negative edge data stored`

Example	Probe is switched on:
	`PROBECONFIG 1 1 0 0 1 h05`
	`PROBESTATUS`
	`Probe -1 Is Switched On`
	`No positive edge data stored`
	`Negative edge data stored`
	
	After edge event occurred:
	`PROBESTATUS`
	`Probe -1 Is Switched On`
	`Positive edge data stored`
	`Negative edge data stored`

Example	Loading capture edge with idle value will clear the status:
	`PROBECONFIG 1 1 0 0 0 h05`
	`Probe -1 Is Switched On`
	`No positive edge data stored`
	`No Negative edge data stored`

See also	PROBECONFIG PROBECOUNTER PROBEDATAFALL PROBEDATARISE PROBELEVELPRD
CANopen	60B9h, sub-index 0

PROTARY

Definition	Position Modulo Limits
Type	Variable (R/W)
Description	Gets/sets the range of the modulo. When the modulo is enabled, PFB and PCMD remain within this range. Upon reaching one of the limits, the position feedback rolls over to the other limit. PROTARY accepts two arguments. The first one selects the limit (1 or 2). The second argument sets the value of that limit in counts.
Syntax	Read: PROTARY <*limit#*> Write: PROTARY <*limit#*> <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	*Limit#*: 1 – 2 *Value*: ±(2^{31}–1) [count]
Default value	0
Unit	*Limit#*: Not Applicable *Value*: Count
Non-volatile	Yes

Example	`--> PROTARY 1`
	`0 [counts]`
	`--> PROTARY 2 360000`
	`--> PROTARY 2`
	`360000 [counts]`

See also	MODMODE

PTPTE

Definition	PTP Generator Target Error
Type	Variable (R)
Description	Reports the target error during a motion profile, which is the distance remaining to the destination in a point-to-point move.
Syntax	PTPTE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): ±(2^{31} -1) [rev] If MOTORTYPE 2 (Linear): ±(2^{31} -1) [pitch]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	No
See also	MOVEABS MOVEINC PCMD PE PTPVCMD
CANopen	20B0h, sub-index 0

PTPVCMD

Definition	Position Command Generator Velocity Command
Type	Variable (R)
Description	Reports the derivative of the position command profile in velocity units. PTPVCMD is useful for recording and viewing the actual velocity and the velocity command, which is available only as a derivative of the position profile. PTPVCMD is the trajectory velocity command applicable to all position loops. VCMD is the output velocity command of the linear controller. VCMD is not used in HD control (POSCONTROLMODE 2 or 1). In linear control (POSCONTROLMODE 0), the variable VCMD shows a value similar to PTPVCMD. However, since VCMD is issued by the position controller as a command to the velocity control, it is not strictly a reference signal (as it includes the response of the position control to PFB).
Syntax	PTPVCMD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): $\pm(2^{31}-1)$ [rev] If MOTORTYPE 2 (Linear): $\pm(2^{31}-1)$ [pitch]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	No
See also	MOVEABS MOVEINC PCMD PTPTE VCMD
CANopen	20B1h, sub-index 0

PWMFRQ

Definition	PWM Frequency
Type	Variable (R)
Description	Gets the frequency of the PWM signals.
Syntax	PWMFRQ
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	16.000
Default value	16.000
Unit	kHz
Non-volatile	No
See also	DIPEAKVBUS
CANopen	20B2h, sub-index 0

RAMAXERRCNT

Definition	Runaway Detection Maximum Error Counter Value
Description	Replaced by COMMERRMAXCNT.

RATTHRESH

Definition	Runaway Detection Time Threshold Value
Type	Variable (R/W)
Description	Replaced by COMMERRTTHRESH.

RAVTHRESH

Definition	Runaway Detection Velocity Threshold Value
Type	Variable (R/W)
Description	Replaced by COMMERRVTHRESH.

READY

Definition	Drive Ready
Type	Variable (R)
Description	Indicates whether the drive is ready for activation with only external remote enable switch still required (ACTIVE).
Syntax	READY
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Faults exist **or** SWEN 0 1 = No faults exist and SWEN 1
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ACTIVE EN FLT K REMOTE ST SWEN
CANopen	2113h, sub-index 0

RECDONE

Definition	Recording Done
Type	Variable (R)
Description	Indicates whether the RECORD command is done and data is available.
Syntax	RECDONE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Recording not finished 1 = Recording done; data available
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	GET RECING RECOFF RECORD RECRDY RECTRIG
CANopen	20E6h, sub-index 0

RECING

Definition	Recording
Type	Variable (R)
Description	Indicates if data recording is in progress.
Syntax	RECING
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Recording not in progress 1 = Recording in progress
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	RECDONE RECOFF RECORD RECRDY RECTRIG
CANopen	20EBh, sub-index 0

RECLIST

Definition	Recordable Variables List
Type	Command
Description	Returns a list of all variables that can be recorded by the RECORD command.
Syntax	RECLIST
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	RECORD

RECOFF

Definition	Cancel Recording
Type	Command
Description	Cancels an active recording.
Syntax	RECOFF
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	RECDONE RECING RECORD RECRDY RECTRIG
CANopen	20E9h, sub-index 0

RECORD

Definition	Record
Type	Command
Description	Captures real-time variables to memory for retrieval/ display by the GET command. RECORD must be set up before the RECTRIG command is used. RECLIST returns the list of the recordable variables.
Syntax	RECORD *sample_time num_points var1* [*var2* … *var6*] *sample_time* = 0 to 1000000 (multiples of 31.25 µs) *num_points* = 1 to 2000 *var* = Name of a recordable system variable that appears in RECTRIGLIST. System variables must be preceded by a quotation mark (").
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable. Refer to Syntax, above.
Default value	Not Applicable
Unit	Refer to Syntax, above
Non-volatile	No
Example	`RECORD 32 100 "VCMD "V "ICMD` Records 100 points for VCMD, V, and ICMD every 1 milliseconds
See also	GET RECDONE RECING RECLIST RECOFF RECRDY RECTRIG
CANopen	20EAh, sub-index 1

RECRDY

Definition	Ready to Record
Type	Variable (R)
Description	Indicates the ready status of the RECORD function. This variable can be polled after a RECORD command is issued to determine if the system is waiting for RECTRIG.
Syntax	RECRDY
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = RECTRIG has been received and record function is armed. 1 = Record function is waiting to be armed by RECTRIG command.
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	RECDONE RECING RECOFF RECORD RECTRIG
CANopen	20ECh, sub-index 0

RECTRIG

Definition	Trigger Recording
Type	Command
Description	Triggers the recorder. RECORD must be set up before a RECTRIG command is issued. The recording mechanism tracks the value of a system variable and starts the recording as soon as the value goes above or below the specified value. The recorder can also record a specified number of points before the trigger condition occurs. Known Limitation: If a trigger occurs before the pre-trigger buffer has been filled, the beginning of the recording will have garbage data.
Syntax	RECTRIG *var level pre-trig {above|under}* *var* = Name of a recordable system variable that appears in RECTRIGLIST. System variables must be preceded by a quotation mark ("). *level* = Threshold value for the trigger *pre-trig* = number of points to be recorded prior to trigger *above|under* = defines whether trigger occurs when value is above or below the threshold RECTRIG "IMM = starts the recording immediately RECTRIG "CMD = starts the recording as soon as the next command is sent to the drive.
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	GET RECDONE RECING RECOFF RECORD RECRDY RECTRIGLIST

Note	**Activation commands** ■ RECORD defines the variables to be recorded and the recording time span and sample time. ■ RECTRIG defines the triggering condition for starting a recording, and also pre-trigger duration. ■ RECOFF turns active recording off. **Utility information** ■ RECLIST lists all the variables that can be recorded by the record function. ■ RECTRIGLIST lists all the options for triggering the recording. **Status flags** ■ RECRDY indicates that a recording is armed and ready. ■ RECING indicates that a trigger condition has occurred and that a recording is active. ■ RECDONE indicates that the recording is completed **Data retrieval** ■ GETMODE defines the format for the recorded data (binary/ascii) ■ GET retrieves the recorded data
CANopen	20E8h, sub-index 1

RECTRIGLIST

Definition	Recording Trigger Variables List		
Type	Command		
Description	Returns a list of all trigger variables and options. Any variable that can be read easily and quickly can serve as a recording trigger. The variables listed below are the most commonly used trigger sources. To view the complete list of trigger variables, issue the command to the drive. The recording trigger is defined by RECTRIG.		
Note	Some factory variables and commands, not intended for users, may appear in the list. **Do not attempt to manipulate parameters that are not described in the product documentation or Help.**		
Syntax	RECTRIGLIST		
Firmware	1.0.6		
Drive status	Enabled | Disabled		
Range	Commonly used dynamic signal variables:		
	ANIN1 ANIN2 ANOUT CLVD CLVQ ELECTANGLE FOLD HWPEXT HWPEXTCNTRLR HWPEXTMACHN I ICMD	ID IFOLD ILIMACT IN (IN1 – IN11) IQ IU IV MECHANGLE MFOLD MIFOLD OUT (OUT1– OUT7 PCMD	PE PELOOP PFB PTPTE PTPVCMD REMOTE STOPPED THERM V VBUSREADOUT VCMD VE
	Commonly used status variables:		
	ACTIVE HOMESTATE	LIMSWITCHNEG LIMSWITCHPOS	
Default value	Not Applicable		
Unit	Not Applicable		
Non-volatile	No		
See also	RECTRIG		

REFOFFSETVAL

Definition	Offset After Homing
Type	Variable (R/W)
Description	Internal offset after homing. When using an absolute encoder, this value is (saved and) used to maintain a home reference position when drive power is cycled.
Syntax	Read: REFOFFSETVAL Write: REFOFFSETVAL <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	Not Applicable
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	ABSOFFSET HOMETYPE PFBOFFSET
CANopen	217Ch, sub-index 1

REGENFLTMODE

Definition	Regeneration Resistor Fault Mode
Type	Variable (R/W)
Description	Defines how the drive responds to an excessive on-time condition of the regeneration resistor. Allows the user to set parameter to protect the external regeneration resistor.
Syntax	Read: REGENFLTMODE Write: REGENFLTMODE<*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 = Warning 1 = Fault
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	REGENMAXONTIME REGENMAXPOW REGENPOW REGENRES

REGENMAXONTIME

Definition	Regeneration Resistor Maximum On Time
Type	Variable (R/W)
Description	The maximum time for which the regeneration resistor may be continually activated (on), in milliseconds.
Syntax	Read: REGENMAXONTIME Write: REGENMAXONTIME <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	10 to 100
Default value	40
Unit	ms
Non-volatile	Yes
See also	REGENFLTMODE REGENMAXPOW REGENPOW REGENRES

REGENMAXPOW

Definition	Regeneration Resistor Maximum Power
Type	Variable (R)
Description	Maximum calculated power of the regeneration resistor, in watts.
Syntax	REGENMAXPOW
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	-1 to 32767
Default value	-1
Unit	W
Non-volatile	No
See also	REGENFLTMODE REGENMAXONTIME REGENPOW REGENRES

REGENPOW

Definition	Regeneration Resistor Power
Type	Variable (R/W)
Description	Power of the regeneration resistor, in watts. Use REGENPOW -1 if the system does not have a regenerationresistor.
Note	If the system has a regeneration resistor, a value of -1 for either REGENRES or REGENPOW deactivates the regeneration resistor overload protection algorithm.
Syntax	Read: REGENPOW Write: REGENPOW <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	-1 to 32767
Default value	-1
Unit	W
Non-volatile	Yes

Example	`-->regenpow`
	`2 [W]`
	`-->regenpow -1`
	`-->regenpow`
	`-1 [W]`

See also	REGENFLTMODE REGENMAXONTIME REGENMAXPOW REGENRES

REGENRES

Definition	Regeneration Resistor Resistance
Type	Variable (R/W)
Description	Resistance of the regeneration resistor, in ohms. Use REGENRES -1 if the system does not have a regenerationresistor.
Note	If the system has a regeneration resistor, a value of -1 for either REGENRES or REGENPOW deactivates the regeneration resistor overload protection algorithm.
Syntax	Read: REGENRES Write: REGENRES <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	-1 to 32767
Default value	-1
Unit	Ohm
Non-volatile	Yes

Example	`-->regenres`
	`2 [Ohm]`
	`-->regenres -1`
	`-->regenres`
	`-1 [Ohm]`

See also	REGENFLTMODE REGENMAXONTIME REGENMAXPOW REGENPOW

RELAY

Definition	Fault Relay Status
Type	Variable (R)
Description	Indicates the state of the fault relay.
Syntax	RELAY
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Relay open 1 = Relay closed
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ACTIVE CLEARFAULTS FLT RELAYMODE REMOTE
CANopen	20B8h, sub-index 0

RELAYMODE

Definition	Relay Fault Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines how the fault relay operates.
Syntax	Read: RELAYMODE Write: RELAYMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Relay opens upon fault. 1= Relay opens upon disable. 2 = Deactivated (RELAY not supported; typically due to hardware limitation).
Default value	0
Unit	Not applicable
Non-volatile	Yes
See also	ACTIVE CLEARFAULTS FLT RELAY REMOTE
CANopen	20B9h, sub-index 0

REMOTE

Definition	Remote Hardware Enable Status
Type	Variable (R)
Description	Indicates the state of the external hardware enable input line.
Syntax	REMOTE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Remote enable input off. 1 = Remote enable input on.
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ACTIVE READY RELAY RELAYMODE
CANopen	20BAh, sub-index 0

RESAMPLRANGE

Definition	Resolver Amplitude Range
Type	Variable (R/W)
Description	Gets/sets the acceptable range of resolver sine/cosine signals, expressed as a percentage, around their nominal value. The default value of 10% means the sine/cosine signals are allowed to deviate up to 10% from the nominal before an Out-Of-Range Fault is declared.
Syntax	Read: RESAMPLRANGE Write: RESAMPLRANGE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 100
Default value	35
Unit	%
Non-volatile	Yes
See also	FEEDBACKTYPE RESBW SININIT SINPARAM
CANopen	20BBh, sub-index 0

RESBW

Definition	Resolver Conversion Bandwidth
Type	Variable (R/W)
Description	Get/sets the resolver conversion bandwidth. High bandwidth produces better dynamic tracking and less phase lag in high frequencies. Lower bandwidth results in better noise reduction. Resolvers typically enable slower dynamic tracking than encoders. RESBW sets the most balanced value according to specific application requirements.
Syntax	Read: RESBW Write: RESBW <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	200 to 800
Default value	300
Unit	Hz
Non-volatile	Yes
See also	FEEDBACKTYPE SININIT VELFILTMODE
CANopen	20BCh, sub-index 0

RESFILTMODE

Definition	Resolver Interpolation Mode
Type	Variable (R/W)
Description	Defines whether or not feedback position interpolation is performed on the resolver feedback in order to generate a continuous stream of data. The interpolation mode is useful since the resolver excitation signal is slower than the feedback sampling.
Syntax	Read: RESFILTMODE Write: RESFILTMODE <*value*>
Firmware	1.4.6
Drive status	Disabled
Range	0 = No interpolation 1 = Interpolation
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE RESBW

SAVE

Definition	Save Parameters
Type	Command
Description	Copies all system configuration variables from working RAM to non-volatile memory. This command must be executed in order to retain setting changes during power cycling.
Syntax	SAVE
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	DUMP FACTORYRESTORE LOAD
CANopen	1010h, sub-index 1

SFB

Definition	Secondary Feedback Position
Type	Variable (R)
Description	Gets the value of the secondary feedback, including any offsets that have been added. SFB is the actual position, according to the secondary feedback.
Syntax	SFB
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	User defined
Non-volatile	No
See also	SFB2MOTORDEN SFB2MOTORNUM SFBCMD SFBMODE SFBOFFSET SFBPEMAX
CANopen	2161h, sub-index 0

SFB2MOTORDEN

Definition	Secondary Feedback Scaling Denominator
Type	Variable (R/W)
Description	Gets/sets the denominator of the secondary feedback scaling ratio. SFB2MOTORNUM and SF2MOTORDEN configure the relationship between the primary (motor) and secondary feedbacks. Along with SFBOFFSET, they are used to convert the analog voltage of the secondary feedback device (SFBTYPE=1) into an absolute position SFB.
Syntax	Read: SFB2MOTORDEN Write: SFB2MOTORDEN <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	1 to 2147483647
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	SFB SFB2MOTORNUM SFBMODE
CANopen	213Ch, sub-index 0

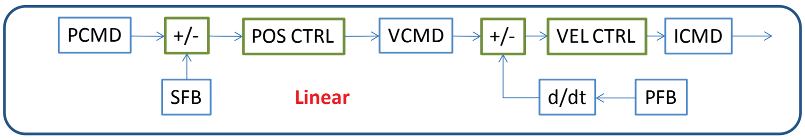
SFB2MOTORNUM

Definition	Secondary Feedback Scaling Numerator
Type	Variable (R/W)
Description	Gets/sets the numerator of the secondary feedback scaling ratio. SFB2MOTORNUM and SF2MOTORDEN configure the relationship between the primary (motor) and secondary feedbacks. Along with SFBOFFSET, they are used to convert the analog voltage of the secondary feedback device (SFBTYPE=1) into an absolute position SFB.
Syntax	Read: SFB2MOTORNUM Write: SFB2MOTORNUM <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	-2147483647 to 2147483647
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	SFB SFB2MOTORDEN SFBMODE
CANopen	213Bh, sub-index 0

SFBCMD

Definition	Secondary Feedback Position Command
Type	Variable (R)
Description	Indicates the value of the position command, in secondary feedback position units.
Syntax	SFBCMD
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	User defined
Non-volatile	No
See also	SFB SFBMODE
CANopen	2165h, sub-index 0

SFBMODE

Definition	Secondary Feedback Mode
Type	Variable (R/W)
Description	Defines whether the secondary feedback is enabled and whether it is used for the control loop. **Note**: Dual loop control is applicable only to linear position controller (POSCONTROLMODE 0). In a dual loop application, motor feedback is used for the velocity control loop and commutation, and secondary feedback is used for the position loop. **PFB** is the position generated by the motor feedback. **SFB** is the position generated by the secondary feedback. The drive supports secondary feedback devices whose output is an analog voltage (SFBTYPE=1). The secondary feedback analog voltage is converted, via SFB2MOTORNUM, SFB2MOTORDEN and SFBOFFSET, into an absolute position, SFB. Dual loop configuration requires scaling of the secondary feedback relative to the motor feedback, along with a particular tuning method, as shown in the diagram below. The secondary feedback mode must be disabled (SFBMODE=0) during the calibration of the secondary feedback voltage correction (SFBVCMODE). 
Syntax	Read: SFBMODE Write: SFBMODE <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	0 = Secondary feedback disabled; dual loop mode inactive. 1 = Secondary feedback enabled; dual loop mode active. Secondary feedback is used for the position control loop; primary (motor) feedback is used for the velocity control loop and commutation. 2 = Secondary feedback enabled; dual loop mode inactive. SFB is calculated and can be read, but is not applied to the control loop. The primary (motor) feedback PFB is used for the position control loop.
Default value	0
Unit	Not Applicable
Non-volatile	Yes

See also	SFB SFBOFFSET SFBPEMAX SFBPETHRESH SFBPETIME SFBTYPE SFBUNITSDEN SFBUNITSNUM SFBVEL
CANopen	2139h, sub-index 0

SFBOFFSET

Definition	Secondary Feedback Offset
Type	Variable (R/W)
Description	Gets/sets the offset value added to the secondary feedback.
Syntax	Read: SFBOFFSET Write: SFBOFFSET <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	0.000 [SFB user unit]
Non-volatile	Yes
See also	SFB SFBMODE
CANopen	2162h, sub-index 0

SFBPEMAX

Definition	Secondary Feedback Maximum Position Error
Type	Variable (R/W)
Description	Gets/sets the secondary feedback maximum position error without producing a fault. While the drive is enabled, SFBPEMAX monitors the increase of the error between SFB and PFB. While the drive is disabled, a correction offset is computed in order to zero the error. ■ If the error exceeds SFBTHRESH for a period of SFBPETIME [ms], the drive issues a fault. ■ As soon as the error exceeds SFBPEMAX, the drive issues a fault.
Syntax	Read: SFBPEMAX Write: SFBPEMAX <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0
Default value	0.000 [SFB user unit]
Unit	User defined
Non-volatile	Yes
See also	SFB SFBMODE
CANopen	2163h, sub-index 0

SFBPETHRESH

Definition	Secondary Feedback Position Error Threshold
Type	Variable (R/W)
Description	Gets/sets the threshold for the position error between load and motor. While the drive is enabled, SFBPEMAX monitors the increase of the error between SFB and PFB. While the drive is disabled, a correction offset is computed in order to zero the error. ■ If the error exceeds SFBTHRESH for a period of SFBPETIME [ms], the drive issues a fault. ■ As soon as the error exceeds SFBPEMAX, the drive issues a fault.
Syntax	Read: SFBPETHRESH Write: SFBPETHRESH <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0
Default value	0.000 [SFB user unit]
Unit	User defined
Non-volatile	Yes
See also	SFB SFBMODE
CANopen	2164h, sub-index 0

SFBPETIME

Definition	Secondary Feedback Position Error Time
Type	Variable (R/W)
Description	While the drive is enabled, SFBPEMAX monitors the increase of the error between SFB and PFB. While the drive is disabled, a correction offset is computed in order to zero the error. ■ If the error exceeds SFBTHRESH for a period of SFBPETIME [ms], the drive issues a fault. ■ As soon as the error exceeds SFBPEMAX, the drive issues a fault.
Syntax	Read: SFBPETIME Write: SFBPETIME <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 2000
Default value	1
Unit	ms
Non-volatile	Yes
See also	SFB SFBMODE
CANopen	2146h, sub-index 0

SFBPFBPE

Definition	Secondary Feedback Position Error
Type	Variable (R)
Description	Secondary feedback position error, displayed in secondary feedback position units.
Syntax	SFBPFBPE
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	User defined
Non-volatile	No
See also	SFB SFBMODE
CANopen	2166h, sub-index 0

SFBTYPE

Definition	Secondary Feedback Type
Type	Variable (R/W)
Description	Gets/sets the type of secondary feedback. **Note**: Secondary feedback type 1 cannot be used with analog operation modes (OPMODE 1, OPMODE 3).
Syntax	Read: SFBTYPE Write: SFBTYPE <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	1 = Analog input 1 (±10V)
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	SFB SFBMODE
CANopen	213Ah, sub-index 0

SFBUNITSDEN

Definition	Secondary Feedback Unit Conversion Denominator
Type	Variable (R/W)
Description	Defines the number of user-defined position units per one volt. SFBUNITSDEN and SFBUNITSNUM enable the setting of user-defined units, such as degrees or millimeters, for SFB, SFBOFFSET, and related position variables.
Syntax	Read: SFBUNITSDEN Write: SFBUNITSDEN <*value*>
Firmware	1.15.xx
Drive status	Disabled
Range	1 to 2147483647
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	SFB SFBUNITSNUM
CANopen	213Eh, sub-index 0

SFBUNITSNUM

Definition	Secondary Feedback Unit Numerator
Type	Variable (R/W)
Description	Defines the number of volts per SFBUNITSNUM position unit. SFBUNITSDEN and SFBUNITSNUM enable the setting of user-defined units, such as degrees or millimeters, for SFB, SFBOFFSET, and related position variables.
Syntax	Read: SFBUNITSNUM Write: SFBUNITSNUM <value>
Firmware	1.15.xx
Drive status	Disabled
Range	-2147483647 to 2147483647
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	SFB SFBUNITSDEN
CANopen	213Dh, sub-index 0

SFBVCBLDIST

Definition	Backlash Distance During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the distance of a motor movement in the opposite direction when either a positive or negative hard stop or limit switch is reached during the calibration of the voltage correction. This movement is used to compensate for the backlash of a gear-box. Afterward the movement, the drive measures U_{POS} or U_{NEG}. If SFBVCBLDIST is set to 0, it has no effect.
Syntax	Read: SFBVCBLDIST Write: SFBVCBLDIST <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	0
Unit	If MOTORTYPE 0 (Rotary): UNITSROTPOS 0 = rev UNITSROTPOS 1 = count UNITSROTPOS 2 = deg If MOTORTYPE 2 (Linear): UNITSLINPOS 0 = pitch UNITSLINPOS 1 = count UNITSLINPOS 3 = mm
Non-volatile	Yes
See also	SFB SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	215Dh, sub-index 0

SFBVCDWELLTIME

Definition	Dwell Time During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines a dwell time before execution of a voltage measurement during the calibration process. The dwell time ensures the motor has stopped before the voltage is measured.
Syntax	Read: SFBVCDWELLTIME Write: SFBVCDWELLTIME <*value*>
Firmware	1.20.6
Drive status	Enable/Disable
Range	0 to 20000
Default value	100
Unit	ms
Non-volatile	No
See also	SFB SFBVCBLDIST SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2167h, sub-index 0

SFBVCILIM

Definition	Current Limit During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the maximum current for the motor during the calibration of the voltage correction. This limit serves to protect the system when it moves against a hard stop. The user current limit ILIM is set to the value of SFBVCILIM for the duration of the calibration. ILIM is restored to its original value once the calibration is completed, or if the calibration is aborted. If SFBVCILIM is set to 0, it has no effect.
Syntax	Read: SFBVCILIM Write: SFBVCILIM <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to [Minimum motor or drive peak current]
Default value	0.000
Unit	A
Non-volatile	Yes
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	215Eh, sub-index 0

SFBVCINFO

Definition	SFB Voltage Correction Calibration Info for Analog Input 1
Type	Command
Description	Returns information about the calibration of the secondary feedback voltage correction. Applicable when Analog Input 1 is used as the secondary feedback.
Syntax	SFBVCINFO
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable

Example	`-->sfbvcinfo`
	`Feature: On`
	`Calibration state: 0`
	`Number of sectors: 6`
	`Identified sector: 2`
	`Sanity check error-code: 0`
	`Voltage array: 0.0414[V],  1.1414[V],  2.3414[V], 3.5414[V],  4.3414[V],  5.2414[V],  6.0414[V],`
	`Gains: 0.909,  0.833,  0.833,  1.249,  1.111, 1.249,`
	`PFB_pos: 35.378   /   PFB_neg: 3.960   in [rev]`
	`U_measured: 8234[Counts] = 3.1412[V]`
	`U_corrected: 7097[Counts] = 2.7073[V]`
	`NV save status: 0`
	`-->`

Line 1: indicates whether the calibration process is running.

Line 2: indicates the current state of the SFB voltage correction calibration process. Possible states:

// Idle
// Prepare the calibration process (e.g., set ILIM to SFBVCILIM)
2 // Initiate a movement in positive direction
3 // Wait for a stop condition in positive direction
4 // Initialize negative backlash compensation move
5 // Wait until the negative backlash move has been finalized
6 // Measure voltage UPOS at positive stop
7 // Initiate a movement in negative direction
8 // Wait for a stop condition in negative direction
9 // Initialize positive backlash compensation move
10 // Wait until the positive backlash move has been finalized
11 // Measure voltage UNEG at negative stop
12 // Init a stroke move, which is a movement by one section
13 // Wait for PTPVCMD to become unequal 0
14 // Wait for PTPVCMD to become 0
15 // Measure voltage at the border of the sector
16 // Save the voltage correction table
17 // Calculate SFB2MOTORNUM and SFB2MOTORDEN
18 // Finalize the calibration process (e.g., restore ILIM)

Line 3: user parameter, number of sections (minimum = 2, a value below 2 deactivates the process)

Line 4: the sector currently being processed:

0 … (Number_of_sectors - 1): within the table

-1 or (Number_of_sectors): outside the table

This line is displayed only if voltage correction calibration is active.

Line 5: for developers; displays a specific error code if the voltage array fails the sanity check

Line 6: displays the measured voltages.

Line 7: displays the gains for each sector.

Line 8: displayed after the calibration process finds the upper and/or lower end position, where U_{POS} and U_{NEG} have been measured.

Lines 9 and 10: (displayed if calibration is active) displays the actual measured and the corrected voltage in internal units (26214[Counts] = 10[V]) and in volts.

Line 11: displays the status and error code of the non-volatile save at the end of the calibration process. A value of 1 means the calibration data has been properly saved to the non-volatile memory.

See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2171h, sub-index 0

SFBVCINFO2

Definition	SFB Voltage Correction Calibration Info for Analog Input 2
Type	Command
Description	Returns information about the manual calibration of the secondary feedback voltage correction. Applicable when Analog Input 2 is used.
Syntax	SFBVCINFO2
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2172h, sub-index 0

SFBVCMANUAL

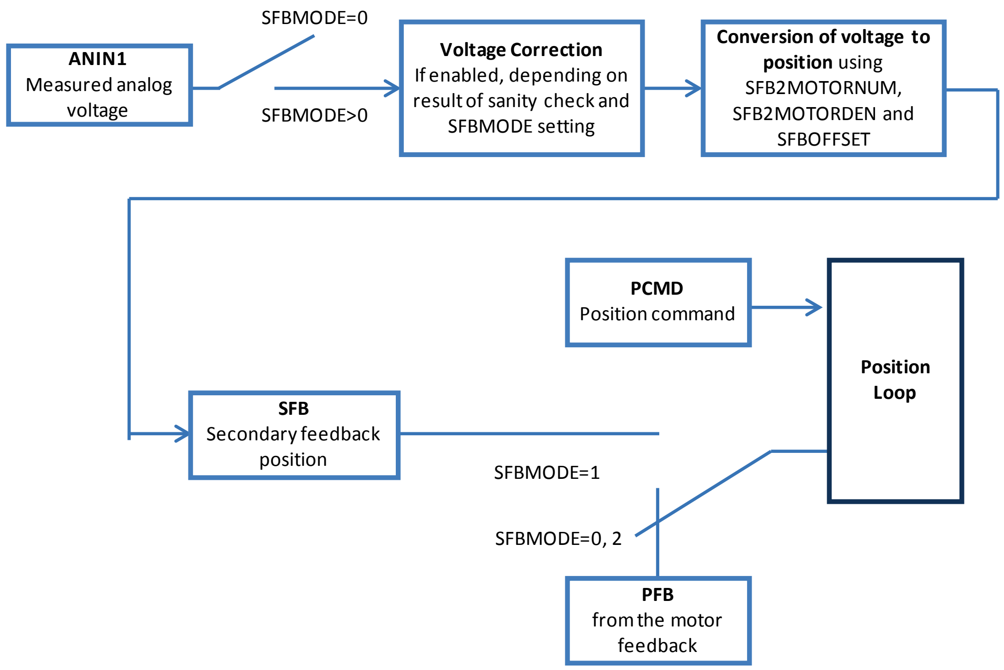
Definition	Manual Calibration of SFB Voltage Correction
Type	Command
Description	This command is used to manually simulate the calibration of the voltage correction. Applicable when Analog Input 2 is used. However, analog input 2 may not be connected to the motor, and is never used for dual loop control. It is for read-only purposes. The procedure is as follows: 1. Set SFBVCSECT2 to the number of sectors into which the voltage range for analog input 2 will be divided. 2. Move the system to the far left (the position at which U_{NEG} will be measured), and issue the command SFBVCMANUAL 0. 3. Move the system to the next point (where U_1 is located) and issue SFBVCMANUAL 1. 4. Continually repeat step 3, incrementing the value of SFBVCMANUAL each time. 5. When complete, save the data to the non-volatile memory by issuing SFBVCMANUAL 65535. Make sure the system moves the same distance for each movement (to generate equidistant strokes).
	Example of a manual calibration process with 4 sectors: 1. Issue SFBVCSECT2 4. 2. Move system to far left position; issue SFBVCMANUAL 0. 3. Move system to next position; issue SFBVCMANUAL 1. 4. Move system to next position; issue SFBVCMANUAL 2. 5. Move system to next position; issue SFBVCMANUAL 3. 6. Move system to the next position, which is the far right in this example, and issue SFBVCMANUAL 4. 7. Finally, issue SFBVCMANUAL 65535.
Syntax	SFBVCMANUAL {*value*}
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 65535
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No

See also	SFB SFBMODE SFBTYPE SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2157h, sub-index 0

SFBVCMODE

Definition	Start Calibration of SFB Voltage Correction
Type	Command
Description	When secondary feedback is enabled (SFBMODE 1 or 2) and the secondary feedback signal is generated by an analog voltage (SFBTYPE 1), it may be necessary to correct the voltage read by the drive, to ensure accuracy in determining the actual position (PFB). SFMBVCMOVE initiates a calibration process, in which the motor is moved to designated positions and the voltage on analog input 1 is measured. The drive then adjusts the voltage values according to a correction table. For the calibration, the drive must be in Position Control mode (OPMODE 8) since the motor needs to move in equidistant strokes. In addition, secondary feedback must be deactivated (SFBMODE 0) before the calibration is initiated since the calibration uses the primary (motor) feedback to generate PFB. When the calibration process is completed, the secondary feedback can be reactivated and the dual loop applies the corrected voltage.
Syntax	SFBVCMODE
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Aplicable
Non-volatile	Not Applicable
See also	SFB SFBMODE SFBTYPE SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP

CANopen	2151h, sub-index 0



SFBVCSECT

Definition	Sectors for Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the number of sectors into which the voltage range is divided for calibrating the secondary feedback analog voltage correction.
Syntax	Read: SFBVCSECT Write: SFBVCSECT <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 10 0 = disabled
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2152h, sub-index 0

SFBVCSECT2

Definition	Sectors for Calibration of Manual SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the number of sectors into which the voltage range is divided for manually calibrating the analog voltage correction. SFBVCSECT2 is used to perform a manual calibration when analog input 2 is used for reading a voltage, but is not connected to the motor.
Syntax	Read: SFBVCSECT2 Write: SFBVCSECT2 <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 10 0 = disabled
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2155h, sub-index 0

SFBVCSPDFAST

Definition	Fast Speed During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the speed of the motor to be used during the calibration if the measured voltage on analog input 1 is between SFBVCVUP and SFBVCVLOW. Serves to speed up the calibration process.
	Movement during the calibration is at a speed of 60 rpm if any of the following conditions are true: ANIN1 <= SFBVCVLOW ANIN1 >= SFBVCVUP SFBVCVLOW = SFBVCVUP Movement during the calibration is at speed SFBVCSPDFAST if SFBVCVLOW < ANIN1 < SFBVCVUP. The calibration always uses SFBVCSPDFAST for the stroke movements (to the positions at which U_1, U_2 .. U_n are measured).
Syntax	Read: SFBVCSPDFAST Write: SFBVCSPDFAST <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to VLIM
Default value	600.000 (rpm)
Unit	According to MOTORTYPE and UNITSROTVEL/UNITSLINVEL
Non-volatile	Yes
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	215Fh, sub-index 0

SFBVCSPDSLOW

Definition	Slow Speed During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the speed of the motor to be used during the calibration if the measured voltage on analog input 1 is higher than SFBVCVUP or less than SFBVCVLOW. Serves to speed up the calibration process.
Syntax	Read: SFBVCSPDSLOW Write: SFBVCSPDSLOW <*value*>
Firmware	1.20.6
Drive status	Enabled | Disabled
Range	0 to VLIM
Default value	60.000 (rpm)
Unit	According to MOTORTYPE and UNITSROTVEL/UNITSLINVEL
Non-volatile	Yes
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW SFBVCVUP
CANopen	2160h, sub-index 0

SFBVCVLOW

Definition	Lower Voltage for Speed During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the lower voltage level at which the calibration process changes the speed from SFBVCSPDFAST to 60 rpm. Serves to speed up the calibration process when trying to find the positive and the negative end stops (positions at which U_{POS} and U_{NEG} are measured).
Syntax	Read: SFBVCVLOW Write: SFBVCVLOW <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	-10 to 10
Default value	0.000
Unit	V
Non-volatile	Yes
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVUP
CANopen	2153h, sub-index 0

SFBVCVUP

Definition	Upper Voltage for Speed During Calibration of SFB Voltage Correction
Type	Variable (R/W)
Description	Defines the upper voltage level at which the calibration process changes the speed from SFBVCSPDFAST to 60 rpm. Serves to speed up the calibration process when trying to find the positive and the negative end stops (positions at which U_{POS} and U_{NEG} are measured).
Syntax	Read: SFBVCVUP Write: SFBVCVUP <*value*>
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	0 to 10
Default value	0.000
Unit	V
Non-volatile	Yes
See also	SFB SFBVCBLDIST SFBVCDWELLTIME SFBVCILIM SFBVCINFO SFBVCINFO2 SFBVCMANUAL SFBVCMODE SFBVCSECT SFBVCSECT2 SFBVCSPDFAST SFBVCSPDSLOW SFBVCVLOW
CANopen	2154h, sub-index 0

SFBVEL

Definition	Secondary Feedback Velocity
Type	Variable (R)
Description	Indicates the velocity of the motor as measured by the secondary feedback.
Syntax	SFBVEL
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	user-defined velocity unit per second
Non-volatile	No
See also	SFB SFBMODE
CANopen	2141h, sub-index 0

SININIT

Definition	Sine/Cosine Calibration Command
Type	Command
Description	Activates a procedure that calibrates sine encoder or resolver sine and cosine signals. The calibration serves to reduce harmonic errors in the sine encoder or resolver reading. The procedure averages sine encoder or resolver signals over several motor turns to determine the gain and offset correction. The progress of the procedure is reported by the SININITST command, and the resulting calibration gains and offsets are reported by SINPARAM.
Syntax	SININIT
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	FEEDBACKTYPE RESBW SININITMODE SININITST SINPARAM
CANopen	20BEh, sub-index 0

SININITMODE

Definition	Sine/Cosine Calibration Mode
Type	Variable (R/W)
Description	Enables/disables the automatic calibration of sine encoder or resolver sine and cosine signals at power up.
Syntax	Read: SININITMODE Write: SININITMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Automatic calibration of sine and cosine signals disabled 1 = Automatic calibration of sine and cosine signals enabled
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	FEEDBACKTYPE RESBW SININITST SINPARAM
CANopen	20BFh, sub-index 0

SININITST

Definition	Sine/Cosine Calibration Status
Type	Variable (R)
Description	Reports the status of the sine encoder or resolver calibration procedure.
Syntax	SININITST
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Not started, or completed 1 = In progress 2 = Velocity is too high
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	FEEDBACKTYPE HWPOS RESBW SINPARAM SININITMODE
CANopen	20C0h, sub-index 0

SINPARAM

Definition	Sine/Cosine Calibration Parameters
Type	Variable (R)
Description	Returns the parameters that are used for calibrating sine encoder or resolver sine and cosine signals. The parameters are in hexadecimal representation.
Syntax	SINPARAM
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	SINPARAM SININITST FEEDBACKTYPE
CANopen	20C1h, sub-index 0

SKTEMPVOLT

Definition	Sankyo Temperature and Battery Voltage
Type	Variable (R)
Description	Reads the temperature of the Sankyo encoder and the voltage of the backup battery. The values are not calibrated and should be used for trend indication only, and not as accurate indications. The battery voltage is read only once, at power up.
Syntax	SKTEMPVOLT
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	
Default value	
Unit	°C
Non-volatile	No
See also	SKTURNRESET THERM TMTEMP

SKTURNRESET

Definition	Sankyo Multi-Turn Reset
Type	Command
Description	Resets the counter of a Sankyo multi-turn encoder. SKTURNRESET clears the encoder's internal faults and resets the multi-turn counter. This prevents unpredictable values in the multi-turn position counter if the backup battery becomes disconnected and the encoder is not being powered by the drive. If the backup battery is disconnected while the encoder is not connected to the drive, an Absolute Encoder Battery Fault is issued. To clear this fault, use the SKTURNRESET command, and then use the CLEARFAULT command.
Syntax	SKTURNRESET
Firmware	1.15.xx
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	CLEARFAULTS SKTEMPVOLT
CANopen	215Ah, sub-index 0

SRVSNSINFO

Definition	sensAR Encoder Info
Type	Variable (R)
Description	Returns information about the sensAR encoder. A valid response includes the following data: ■ Production information – serial and product numbers of the device ■ Hardware – PCB and BOM revisions ■ Software – Firmware version info and sensAR protocol version ■ Online data: Temperature reading Raw velocity and in-turn position values Current sensAR faults and warnings information
Syntax	SRVSNSINFO
Firmware	1.15.xx
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
Example	see below

```
-->SRVSNSINFO
sensAR Magnetic Encoder
------------------------------
Production Information:

Encoder:
P/N:      PRDr0099000z-02
Rev:      01
S/N:      I1914_00000015

Stator Assembly:
P/N:      PRDr0099STAT-02
Rev:      01
S/N:      S1314_00000015

Hardware:
PCB Rev:   H0003
BOM Rev:   H0000

Software:
FW Version:    2.0.7
FW Version Date:    20140922
Comm Protocol Version:   002.005.006
```

	`Online data:`
	`Device Temperature:    39C`
	`Raw in-turn position value:    3978751`
	`Raw velocity value:    0`
	`No faults exist on sensAR`

See also	
CANopen	214Ch, sub-index 1

ST

Definition	Drive Status Messages
Type	Command
Description	Returns detailed drive status messages.
Syntax	ST
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
Example	`-->st` `Drive Active`
See also	ACTIVE FLT FLTHIST READY REMOTE SWEN
CANopen	2114h, sub-index 1

STALLTIME

Definition	Stall Time
Type	Variable (R/W)
Description	The minimum length of time at which a stall condition generates a stall fault. A stall **condition** occurs when [I > MICONT] and [I > 0.9×ILIM] and [V < STALLVEL]. A stall **fault** occurs whenever the duration of a stall condition exceeds STALLTIME. The drive's 7-segment display shows **F3** when a stall fault occurs.
Syntax	Read: STALLTIME Write: STALLTIME <*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	0 to 10000
Default value	0 = Fault inhibited
Unit	ms
Non-volatile	Yes
See also	STALLVEL

STALLVEL

Definition	Stall Velocity
Type	Variable (R/W)
Description	The velocity threshold for entering a stall condition. A stall **condition** occurs when [I > MICONT] and [I > 0.9×ILIM] and [V < STALLVEL]. A stall **fault** occurs whenever a stall condition exceeds STALLTIME.
Syntax	Read: STALLVEL Write: STALLVEL<*value*>
Firmware	1.3.2
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): (2^{31} -1) [rpm] If MOTORTYPE 2 (Linear): (2^{31} -1) [mm/s]
Default value	10.000 rpm
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	STALLTIME

STAT

Definition	Drive Status Summary Word
Type	Command
Description	Outputs a drive status summary word.
Firmware	1.0.6
Syntax	STAT
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Hexadecimal
Non-volatile	No

Example	`-->stat`
	`H0023`
	`-->`

See also	ST STATUS

STATUS

Definition	Drive Status Detail Words
Type	Command
Description	Outputs a series of drive status summary words.
Syntax	STATUS
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Hexadecimal
Non-volatile	No

Example	`-->status`
	`H0009 H0000000000060800 H00C0 H0000 H0000 H0000`
	`-->`

See also	ST STAT

STEP

Definition	Step Command
Type	Command
Description	Generates a step or square wave velocity command. This command is similar to the J command, but allows repetition of STEP to create a square wave velocity command.
Syntax	STEP {*duration1*} {*velocity1*} [*duration2 velocity2*]
Firmware	1.0.6
Drive status	Disabled
Range	*duration* 1/2 = unlimited positive value *velocity* 1/2 = -VLIM to +VLIM
Default value	Not Applicable
Unit	*Duration* = ms *Velocity* = If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Not Applicable
See also	ACC J OPMODE RECORD STOP VLIM

STOP

Definition	Stop Motion Command
Type	Command
Description	Stops motion in OPMODE 0 (J and STEP commands) and OPMODE 2 (T command). Unlike the K command, the drive is not disabled using the STOP command. In OPMODE 1 or 3, STOP is ignored.
Note	Do not use STOP to stop motion generated by HOMECMD. To stop a homing procedure, use the command HOMECMD 0.
Syntax	STOP
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	DEC DECSTOP J STEP

STOPPED

Definition	Position Motion Ended
Type	Variable (R)
Description	Reports whether the position profile generated by MOVEINC and MOVEABS has been completed, therefore allowing the next command to be issued. STOPPED is updated while drive is operating in OPMODE 8. It is also updated in OPMODE 0 provided the HD velocity controller is active (VELCONTROLMODE=7).
Syntax	STOPPED
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	-1 =Movement was interrupted (e.g., due to Disable or Hold) 0 = Not completed 1 = Profile completed 2 = Profile completed and drive is in position (INPOS=1)
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	HOLD PEINPOS PEINPOSTIME PEMAX PTPVCMD V VCMD VELCONTROLMODE
CANopen	2116h, sub-index 0

STOPPEDDURATE

Definition	Position Motion Ended
Type	Variable (R/W)
Description	Gets/sets the time, in millisenconds, for which the output that is configured to indicate “stopped” status (OUTMODE *n* 5) remains triggered.
Syntax	Read: STOPPEDDURATE Write: STOPPEDDURATE <*value*>
Firmware	1.41.9
Drive status	Enabled | Disabled
Range	1 to 1000
Default value	0
Unit	ms
Non-volatile	Yes
See also	OUTMODE
CANopen	

SWEN

Definition	Software Enable Status
Type	Variable (R)
Description	Indicates the state of software enable. This condition can be toggled using the EN and K commands.
Syntax	SWEN
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Software enable switch off (K command has been issued) 1 = Software enable switch on (EN command has been issued)
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	ACTIVE EN FLT K READY REMOTE ST SWENMODE
CANopen	20A2h, sub-index 0

SWENMODE

Definition	Software Enable on Power-Up
Type	Variable (R/W)
Description	Gets/sets the state of the Software Enable switch when the drive is powered up. Requires COMMODE=0. SWENMODE is applicable only to drives using serial communication (COMMODE=0). SWENMODE is **not** applicable to drives using CANopen and EtherCAT communication (COMMODE=1).
Syntax	Read: SWENMODE Write: SWENMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Software Enable is off at power-up 1 = Software Enable is on at power-up
Default value	0
Unit	Not applicable
Non-volatile	Yes
See also	ACTIVE COMMODEEN READY SWEN

SYNCSOURCE

Definition	Synchronization Mode
Type	Variable (R/W)
Description	Sets the method used to synchronize the drive clock to an external sync signal. When the drive detects a SYNC signal from EtherCAT or CANopen, it automatically sets SYNCSOURCE to a value of 5 or 6, respectively.
Syntax	Read: SYNCSOURCE Write: SYNCSOURCE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Disabled; no sync 1 = Sync drive clock to controller based on fast digital input 5 2 = Sync drive clock to controller based on fast digital input 6 3 = Sync drive clock based on pulse differential input (Pulse & Direction) 4 = Sync signal source is pulse input from Machine I/F 5 = Automatically set in EtherCAT drive (EC and EB models). Read only. 6 = Automatically set in CAN drive (AF model). Read only.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	INMODE
CANopen	20C2h, sub-index 0

T

Definition	Current Command
Type	Command
Description	Sets the current in OPMODE 2 (serial current mode). This command is subject to current limits, clamps, and digital filtering, and it is set to zero whenever the drive is enabled or disabled. The commands STOP and K , and changing the operating mode, also zero the value of T.
Syntax	T Queries T {*current* [*duration*]} Writes
Firmware	1.0.6
Drive status	Enabled
Range	Not Applicable
Default value	Not Applicable
Unit	*current* = A (peak) *duration* = ms
Non-volatile	Not Applicable
See also	I ICMD ILIM OPMODE
CANopen	6071h, sub-index 0

TF

Definition	Tracking Factor
Type	Variable (R/W)
Description	Gets/sets the derivative factor for tracking with PDFF velocity controller. 0 = No derivative factor 100 = Derivative factor to match bandwidth and not overshoot. 200 = Derivative factor to match PI control; may overshoot. Intermediate values are interpolated.
Syntax	Read: TF Write: TF <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 200
Default value	100
Unit	%
Non-volatile	Yes
See also	BW LMJR MJ VELCONTROLMODE
CANopen	20C3h, sub-index 0

THERM

Definition	Motor Over-Temperature
Type	Variable (R)
Description	The state of the motor thermostat input, which indicates whether an over-temperature condition exists.
Syntax	THERM
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Thermostat input closed (normal) or ignored (THERMODE 3). 1 = Thermostat input open, indicating overheating
Default value	Not Applicable
Unit	Not applicable
Non-volatile	No
See also	THERMODE THERMREADOUT THERMTRIPLEVEL THERMCLEARLEVEL THERMTIME THERMTYPE
CANopen	20C4h, sub-index 0

THERMCLEARLEVEL

Definition	Motor Over-Temperature Clear Fault Level
Type	Variable (R/W)
Description	The level at which a motor over-temperature fault is cleared.
Syntax	Read: THERMCLEARLEVEL Write: THERMCLEARLEVEL <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000000
Default value	100
Unit	Ohm
Non-volatile	Yes
See also	THERMODE THERMTRIPLEVEL
CANopen	20C5h, sub-index 0

THERMODE

Definition	Motor Over-Temperature Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines how the drive will respond to an over-temperature fault.
Syntax	Read: THERMODE Write: THERMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Disable drive immediately. 3 = Ignore thermostat input. 4 = Issue warning only. 5 = Issue warning; if condition persists after THERMTIME, issue fault.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	THERM THERMCLEARLEVEL THERMREADOUT THERMTIME THERMTRIPLEVEL THERMTYPE
CANopen	20C6h, sub-index 0

THERMREADOUT

Definition	Motor Temperature
Type	Variable (R)
Description	Indicates the value of the motor temperature.
Syntax	THERMREADOUT
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000000
Default value	Not Applicable
Unit	Ohm
Non-volatile	No
See also	THERM THERMODE THERMTIME THERMTYPE
CANopen	20C7h, sub-index 0

THERMTIME

Definition	Motor Over-Temperature Time
Type	Variable (R/W)
Description	Gets/sets the number of seconds the drive will wait after motor over-temperature detection before it opens the fault relay.
Syntax	Read: THERMTIME Write: THERMTIME <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	30
Unit	second
Non-volatile	Yes
See also	THERM THERMODE THERMREADOUT THERMTYPE
CANopen	20C8h, sub-index 0

THERMTRIPLEVEL

Definition	Motor Over-Temperature Fault Level
Type	Variable (R/W)
Description	Indicates the motor over-temperature fault level.
Syntax	THERMTRIPLEVEL
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 1000000
Default value	150
Unit	Ohm
Non-volatile	Yes
See also	THERMCLEARLEVEL THERMODE
CANopen	20C9h, sub-index 0

THERMTYPE

Definition	Motor Over-Temperature Type
Type	Variable (R/W)
Description	Gets/sets the value that indicates the type of motor temperature sensor.
Syntax	Read: THERMTYPE Write: THERMTYPE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Positive temperature coefficient (PTC) 1 = Negative temperature coefficient (NTC)
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	THERM THERMODE THERMREADOUT THERMTIME
CANopen	20CAh, sub-index 0

TMTEMP

Definition	Tamagawa Temperature
Type	Variable (R)
Description	Indicates the temperature of the Tamagawa encoder.
Note	If the drive is not connected to a Tamagawa encoder, the response to TMTEMP will be “MENCTYPE Mismatch”.
Syntax	TMTEMP
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	°C (relevant for Tamagawa encoder only)
Non-volatile	No
See also	MENCTYPE TMTURNRESET

TMTURNRESET

Definition	Tamagawa Multi-Turn Reset
Type	Command
Description	Resets the position counter of a Tamagawa multi-turn encoder.
Note	When using a Tamagawa 17-bit multi-turn encoder, TMTURNRESET must be issued prior to a CLEARFAULT command.
Syntax	TMTURNRESET
Firmware	1.2.12
Drive status	Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable
See also	FEEDBACKTYPE MENCTYPE MTTURNRESET
CANopen	20CBh, sub-index 0

TRUN

Definition	Run Time
Type	Variable (R)
Description	A counter that reports the total elapsed runtime of the drive (in both enabled and disabled state) since production. Cannot be reset.
Syntax	TRUN
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	hours:minutes:seconds
Non-volatile	No
See also	DRIVENAME
CANopen	20CCh, sub-index 0

UNITSLINACC

Definition	Units Linear Acc/Dec
Type	Variable (R/W)
Description	Gets/sets a value that defines the units of acceleration and deceleration variables in a linear system.
Syntax	Read: UNITSLINACC Write: UNITSLINACC <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	1 = mm/s^2
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	MOTORTYPE UNITSLINPOS UNITSLINVEL UNITSROTACC
CANopen	2117h, sub-index 0

UNITSLINPOS

Definition	Units Linear Position
Type	Variable (R/W)
Description	Gets/sets a value that defines the units of position variables in a linear system.
Syntax	Read: UNITSLINPOS Write: UNITSLINPOS <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = pitch (motor cycles) 1 = count (pulses per revolution - PPR lines) 3 = mm
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	MOTORTYPE UNITSLINACC UNITSLINVEL UNITSROTPOS
CANopen	2118h, sub-index 0

UNITSLINVEL

Definition	Units Linear Velocity
Type	Variable (R/W)
Description	Gets/sets a value that defines the units of velocity variables in a linear system.
Syntax	Read: UNITSLINVEL Write: UNITSLINVEL <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	1 = mm/s
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	MOTORTYPE UNITSLINACC UNITSLINPOS UNITSROTVEL
CANopen	2119h, sub-index 0

UNITSROTACC

Definition	Units Rotary Acc/Dec
Type	Variable (R/W)
Description	Gets/sets a value that defines the units of acceleration and deceleration variables in a rotary system.
Syntax	Read: UNITSROTACC Write: UNITSROTACC <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = rps/s 1 = rpm/s 2 = deg/s^2
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	ACC DEC DECSTOP UNITSROTPOS UNITSROTVEL
CANopen	211Ah, sub-index 0

UNITSROTPOS

Definition	Units Rotary Position
Type	Variable (R/W)
Description	Gets/sets a value that defines the units of position variables in a rotary system.
Syntax	Read: UNITSROTPOS Write: UNITSROTPOS <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = (rev) Motor revolutions 1 = (count) Motor feedback counts, multiplied as follows: • Incremental motor feedback = multiplied by 4 (quad) • Resolver motor feedback = multiplied by MRESPOLES • Sine motor feedback = multiplied by 4 and the interpolation level of the sine encoder 2 = (deg) Degrees
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	UNITSROTACC UNITSROTVEL
CANopen	211Bh, sub-index 0

UNITSROTVEL

Definition	Units Rotary Velocity
Type	Variable (R/W)
Description	Gets/sets a value that defines the units of velocity variables in a rotary system.
Syntax	Read: UNITSROTVEL Write: UNITSROTVEL <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = rps 1 = rpm 2 = deg/s
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	UNITSROTACC UNITSROTPOS V VCMD
CANopen	211Ch, sub-index 0

UVMODE

Definition	Under-Voltage Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines how the drive will respond to an under-voltage condition.
Syntax	Read: UVMODE Write: UVMODE <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Latches fault immediately if drive disabled or enabled. 1 = Issues warning if drive enabled. Ignores if drive disabled. 2 = Issues warning if drive enabled, then waits UVTIME before latching the fault. Ignores if drive disabled. 3 = Issues warning if drive disabled. Latches fault immediately if drive enabled.
Default value	0
Unit	Not Applicable
Non-volatile	Yes
See also	UVRECOVER UVTHRESH UVTIME VBUS VBUSREADOUT
CANopen	20CDh, sub-index 0

UVRECOVER

Definition	Under-Voltage Recovery Mode
Type	Variable (R/W)
Description	Gets/sets a value that defines how the drive will recover from an under-voltage fault.
Syntax	Read: UVRECOVER Write: UVRECOVER <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 = Recovers by toggling drive from disable to enable condition after the under-voltage condition clears. 1 = Automatically recovers when the under-voltage condition clears.
Default value	0
Unit	Not applicable
Non-volatile	Yes
See also	UVMODE UVTHRESH UVTIME VBUS VBUSREADOUT
CANopen	20CEh, sub-index 0

UVTHRESH

Definition	Under-Voltage Threshold
Type	Variable (R/W)
Description	Gets/set the level for detection of an under-voltage condition.
Syntax	Read: UVTHRESH Write: UVTHRESH <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	90 to 1000
Default value	100
Unit	V
Non-volatile	Yes
See also	UVMODE UVRECOVER UVTIME VBUS VBUSREADOUT
CANopen	20CFh, sub-index 0

UVTIME

Definition	Under-Voltage Time
Type	Variable (R/W)
Description	Gets/sets the amount of time that an under-voltage warning will be displayed ("u") before it is latched in UVMODE 2. In UVMODE 3, the time begins when the drive is enabled.
Syntax	Read: UVTIME Write: UVTIME <*value*>
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	0 to 300
Default value	30
Unit	second
Non-volatile	Yes
See also	UVMODE UVRECOVER UVTHRESH VBUS VBUSREADOUT
CANopen	20D0h, sub-index 0

V

Definition	Velocity
Type	Variable (R)
Description	Indicates the velocity of the motor measured by the primary feedback.
Syntax	V
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): (2^{31} -1) [rpm] If MOTORTYPE 2 (Linear): (2^{31} -1) [mm/s]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	No
See also	UNITSROTVEL VCMD
CANopen	606Ch, sub-index 0

VBUS

Definition	Bus Voltage (DC)
Type	Variable (R/W)
Description	Gets/sets the drive bus voltage, used for current controller design. VBUS also affects the value of VMAX. When the value of VBUS is changed, CONFIG is required.
Syntax	Read: VBUS Write: VBUS <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	10 to 850
Default value	320
Unit	V
Non-volatile	Yes
See also	OVTHRESH UVMODE UVTHRESH VBUSREADOUT
CANopen	20D1h, sub-index 0

VBUSREADOUT

Definition	Bus Voltage Measured
Type	Variable (R)
Description	Indicates the bus voltage measured by sensors on the power module.
Syntax	VBUSREADOUT
Firmware	1.0.6
Drive status	Disabled
Range	Hardware-defined
Default value	Not Applicable
Unit	V
Non-volatile	No
See also	OVTHRESH UVMODE UVTHRESH VBUS
CANopen	6079h, sub-index 0

VCMD

Definition	Velocity Command
Type	Variable (R)
Description	Indicates the velocity command generated either directly (serial or analog), or as the output of the position controller.
Syntax	VCMD
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	If MOTORTYPE 0 (Rotary): (2^{31} -1) [rpm] If MOTORTYPE 2 (Linear): (2^{31} -1) [mm/s]
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	No
See also	OPMODE UNITSROTVEL V
CANopen	606Bh, sub-index 0

VD

Definition	Advanced Pole Placement D Polynomial
Type	Variable (R/W)
Description	Extended velocity controller D-polynomial.
Syntax	Read: VD Write: VD 0 0 0 0 0 0 0 0
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	0 0 0 0 0 0 0 0
Unit	Not Applicable
Non-volatile	Yes
See also	VELCONTROLMODE VF VH VR

VE

Definition	Velocity Error
Type	Variable (R)
Description	The velocity error of velocity loop
Syntax	VE
Firmware	1.2.12
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	No
See also	V VCMD
CANopen	20D3h, sub-index 0

VELCMDMOVEAVG

Definition	Velocity Command Moving Average Filter
Type	Variable (R/W)
Description	This command sets the moving average filter that is applied to the velocity command value in OPMODE 0 and OPMODE 1. The moving average filter is applied immediately after the ramp generator.
Syntax	Read: VELCMDMOVEAVG Write: VELCMDMOVEAVG <*value*>
Firmware	1.40.0
Drive status	Disabled
Range	0 to 255875
Default value	0
Unit	µs (must be a multiple of 125)
Non-volatile	Yes

Example	`--> VELCMDMOVEAVG`
	`750`
	`-->BAUDRATE 1125`
	`-->`

See also	

VELCONTROLMODE

Definition	Velocity Loop Controller
Type	Variable (R/W)
Description	Gets/sets a value that defines the type of velocity loop controller.
Syntax	Read: VELCONTROMODE Write: VELCONTROMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = PI controller (uses KVP, KVI) 1 = PDFF controller (uses KVP, KVI, KVFR) 2 = Standard pole placement controller (uses MJ, MKT, BW, LMJR, TF) 7 = HD velocity loop with integrator (uses KNLD, KNLP)
Note	VELCONTROLMODE 7 provides the advantages of the HD nonlinear controller for velocity control. Use the Autotuning procedure to first tune the position loop, and then switch to the velocity loop (VELCONTROLMODE 7)
Default value	7
Unit	Not applicable
Non-volatile	Yes
See also	ICMD IGRAV VF
CANopen	20D4h, sub-index 0

VELCONTROLOUT

Definition	Velocity Loop Controller Output
Type	Variable (R)
Description	Velocity loop controller output
Syntax	VELCONTROLOUT
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	A
Non-volatile	No
See also	VELFILTMODE

VELDESIGN

Definition	Velocity Design Conversion
Type	Command
Description	Returns a conversion of the internal velocity controller as set by one of the standard velocity control modes to a general extended polynomial controller structure. Applicable only to linear position controller (POSCONTROLMODE 0).
Syntax	VELDESIGN
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable

Example	`-->veldesign`
	`VD = 0 0 0 0 0 32767`
	`VH = 31644 20 0 0 0 0 0 0`
	`VR = 31644 20 0 0 0 0`

See also	FILTMODE POSCONTROLMODE VD VELCONTROLMODE VF VH VR
CANopen	20D5h, sub-index 0

VELFILTFRQ

Definition	Velocity Filter Pole Frequency
Type	Variable (R/W)
Description	When VELFILTMODE=1, sets the first order filter, which is applied to the velocity feedback signal before applying the velocity controller.
Syntax	VELFILTFRQ <*value*>
Firmware	1.3.2
Drive status	Disabled
Range	20 to 2000
Default value	440
Unit	Hz
Non-volatile	Yes
See also	
CANopen	211Dh, sub-index 0

VELFILTMODE

Definition	Velocity Filter Mode
Type	Variable (R/W)
Description	Gets/sets the type of filter that is used for extraction of a velocity signal from the position feedback.
Syntax	Read: VELFILTMODE Write: VELFILTMODE <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	0 = No filter 1 = First order filter
Default value	1
Unit	Not Applicable
Non-volatile	Yes
See also	FILTMODE V VELCONTROLMODE
CANopen	20D6h, sub-index 0

VEMAX

Definition	Maximum Velocity Error
Type	Variable (R/W)
Description	Maximum velocity error value that does not produce a fault.
Syntax	Read: VEMAX Write: VEMAX <*value*>
Firmware	1.4.4
Drive status	Enabled | Disabled
Range	0 to 6000 [rpm]
Default value	0
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	PEMAX VLIM

VER

Definition	Drive Version
Type	Command
Syntax	VER
Description	Displays the firmware version.
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	Not Applicable

Example	`-->ver`
	`Digital Servo Drive`
	`---------------------------------------`
	`Firmware Version: 1.15.19`
	`FPGA Version     : 1.79 November 12 2014`
	`Resident Version: 1.2.1`
	`-->`

See also	INFO
CANopen	20D7h, sub-index 1

VF

Definition	Velocity Loop Output Filter
Type	Variable (R/W)
Description	User defined velocity loop output filter. Requires FILTMODE 6. or controller output filter in VELCONTROLMODE 3).
Syntax	Read: VF Write: VF 1 0 0 0 0 0 0
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	1 0 0 0 0 0 0
Unit	Not applicable
Non-volatile	Yes
See also	FILTMODE VD VELCONTROLMODE VH VR
CANopen	20D8h, sub-index 1

VFI

Definition	Velocity Loop Input Filter
Type	Variable (R/W)
Description	User defined velocity loop input filter.
Syntax	Read: VFI Write: VFI 1 0 0 0 0 0 0
Firmware	1.2.12
Drive status	Disabled
Range	Not Applicable
Default value	1 0 0 0 0 0 0
Unit	Not Applicable
Non-volatile	Yes
See also	VELCONTROLMODE VF
CANopen	20D9h, sub-index 1

VH

Definition	Advanced Pole Placement H Polynomial
Type	Variable (R/W)
Description	Extended velocity controller H-polynomial.
Syntax	Read: VH Write: VH 0 0 0 0 0 0 0 0 0 0 0 0
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	0 0 0 0 0 0 0 0 0 0 0 0
Unit	Not applicable
Non-volatile	Yes
See also	VD VELCONTROLMODE VF VR
CANopen	20DAh, sub-index 1

VLIM

Definition	User Velocity Limit
Type	Variable (R/W)
Description	Gets/sets the application velocity limit, allowing the user to limit the motor’s maximum velocity. VLIM limits the velocity command that will be accepted from the user (using the J command in OPMODE 0) or issued by the control loops (in OPMODE 1). VLIM is an independent variable that is not calculated from hardware parameters. However, VLIM cannot exceed the maximum speed of the motor, as defined by MSPEED. VLIM is similar to ILIM (used in OPMODE 2 and OPMODE 3). VLIM serves the following purposes: ■ Protects delicate loads (equipment). If the actual motor speed exceeds the value of VLIM, the drive will issue and over-speed fault. ■ Limits the CANopen/EtherCAT reference command. If the reference command exceeds the value of VLIM, the drive will issue a fault. ■ Limits the speed of internal profile position (MOVEINC, MOVEABS) and profile velocity commands (J, STEP). When the value of VLIM is changed, CONFIG is required. When using EtherCAT/CANopen communication, changing the value of object 607h does not require configuration.
Syntax	Read: VLIM Write: VLIM <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	10 to VMAX
Default value	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = 16.667 UNITSROTVEL 1 = 10.000 UNITSROTVEL 2 = 6000.000 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 533.333
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	Yes
See also	MSPEED VMAX
CANopen	607Fh, sub-index 0

VMAX

Definition	Maximum Velocity
Type	Variable (R)
Description	Displays the maximum velocity for a drive and motor combination. VMAX is based on maximum motor speed.
Syntax	VMAX
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	10 to MSPEED
Default value	If MOTORTYPE 0 (Rotary): UNITSROTVEL 0 = 161.166 UNITSROTVEL 1 = 9669.946 UNITSROTVEL 2 = 58019.675 If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = 5157.304
Unit	If MOTORTYPE 0 (Rotary): If UNITSROTVEL 0 =rps If UNITSROTVEL 1 =rpm If UNITSROTVEL 2 =deg/s If MOTORTYPE 2 (Linear): UNITSLINVEL 1 = mm/s
Non-volatile	No
See also	MKT MSPEED VBUSVLIM
CANopen	20EEh, sub-index 0

VR

Definition	Advanced Pole Placement R Polynomial
Type	Variable (R/W)
Description	Extended velocity controller R-polynomial.
Syntax	Read: VR Write: VR 0 0 0 0 0 0 0 0 0 0
Firmware	1.0.6
Drive status	Disabled
Range	Not Applicable
Default value	0 0 0 0 0 0 0 0 0 0
Unit	Not Applicable
Non-volatile	Yes
See also	VELCONTROLMODE
CANopen	20DBh, sub-index 1

WNSERR

Definition	Wake No Shake Status
Type	Variable (R)
Description	PHASEFINDMODE 2 state.
Syntax	WNSERR
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not Applicable
Default value	Not Applicable
Unit	Not Applicable
Non-volatile	No
See also	PHASEFIND PHASEFINDMODE PHASEFINDST
CANopen	20DCh, sub-index 0

WRN

Definition	Display Warnings
Type	Command
Description	Lists the warnings that have occurred since the buffer was last cleared.
Syntax	WRN
Firmware	1.0.6
Drive status	Enabled | Disabled
Range	Not applicable
Default value	Not applicable
Unit	Not applicable
Non-volatile	Not applicable

Example	`-->wrn`
	`WRN 7  Encoder init: Halls switch not found`
	`WRN 8  Encoder init: Index not detected`
	`-->`

See also	FLT FLTHIST
CANopen	20DDh, sub-index 0

XENCRES

Definition	External Encoder Resolution
Type	Variable (R/W)
Description	Gets/sets the resolution of the external encoder, in number of pulses per revolution. For sine encoder, gets/sets the number of sine cycles per revolution of the motor.
Syntax	Read: XENCRES Write: XENCRES <*value*>
Firmware	1.0.6
Drive status	Disabled
Range	100 to 10000000
Default value	2048
Unit	MOTORTYPE=0 (Rotary): lines per revolution (LPR) MOTORTYPE=2 (Linear): lines per pitch (LPP)
Non-volatile	Yes
See also	GEARIN GEARMODE GEAROUT
CANopen	20DEh, sub-index 0

ZERO

Definition	Zeroing Command
Type	Command
Description	Activates Zeroing mode, which locks the rotor in place by passing a fixedcurrent through two phases. This is useful for determining the commutation offset (MPHASE) on motors that have a resolver or absolute encoder. When Zeroing is activated, the drive rotates and locks the motor at the fixed electrical angle with a fixed current (IZERO). Locking occurs after stopping briefly at a temporary location to overcome static friction or after starting at an electrical angle 180° away from the final locked position. The number of motor electrical cycles per one mechanical revolution is equal to the number of pairs of magnets. Each pair of magnets in the motor creates a 0—360 degree electrical cycle. Therefore, if the motor has 8 individual magnetic poles (MPOLES), the motor can be locked at four different places in one mechanical revolution. After the motor has locked (meaning it is in a position at which PE is less than PEINPOS), ZEROST returns a suggested MPHASE value according to the procedure, but does not automatically set it.
Syntax	ZERO {0|1}
Firmware	1.0.6
Drive status	Disabled
Range	0 = Zeroing not activated 1 = Zeroing activated
Default value	0
Unit	Not Applicable
Non-volatile	Not applicable

Example	`-->k`
	`-->zero 1`
	`-->en`
	`-->zerost`
	`Zero Ended, MPHASE = 28`
	
	`-->k`
	`-->mphase 28`
	`-->en`

See also	FEEDBACKTYPE IZERO MPHASE MPOLES PHASEFIND ZEROST

CANopen	20DF, sub-index 0

ZEROST

Definition	Zeroing MPHASE Value
Type	Variable (R)
Description	After running ZERO command, querying ZEROST returns the value of MPHASE that should be set for proper commutation. This may be useful when MOTORSETUP is unsuccessful. The accuracy of the commutation which is initialized this way depends on the load and friction of the system.
Syntax	ZEROST
Firmware	1.4.4
Drive status	Enabled
Range	Not Applicable
Default value	Not Applicable
Unit	Electrical degree
Non-volatile	No
See also	MOTORSETUP MPHASE ZERO
CANopen	217Bh, sub-index 1

4 Serial Communication

Serial Communication Overview

The serial communication link enables communication between the drive and host (terminal, PC, or high-level controller) using ASCII-coded messages transmitted over an asynchronous, multi-drop line.

When the host and drive communicate through serial communication, a proprietary set of commands and variables, called **VarCom**, are used to configure, control and monitor the drive.

The communication interface can be a graphical software interface, such as ServoStudio, or a user-designed application, or a basic terminal.

This chapter describes the serial communication protocol used by the drive and its host.

Serial Communication Specifications

Communications port	RS232, USB
Baud rate	115200 bits per second (bps)
Start bits	1
Data bits	8
Stop bits	1
Parity	None
Hardware handshake	None
Software handshake	None
Character	ASCII code
Data error check	8-bit checksum

Control Code Definitions

Name	Symbol	Hex
Line feed	<LF>	0Ah
Carriage return	<CR>	0Dh
Space	<SP>	20h
Delay	<DLY>	Indicates delay due to internal drive processing of information

Communication Summary

Drive-to-Terminal Transmission	Terminal-to-Drive Transmission	Protocol Flags (Variables)
■ Character echoes ■ Prompts ■ Variable values ■ Error/fault messages	■ Commands ■ Variable values ■ Variable queries	ECHO MSGPROMPT CHECKSUM

Data Transmission Format

To enable proper serial communication between the drive and the host, they must both use the same data transmission format:

- Full-duplex
- 8 bits per character
- No parity
- 1 start bit
- 1 stop bit
- Baud rate: 115200 bps
- Hardware: RS232 or USB serial port

Drive Addressing

For more information, refer to the drive user manual.

CDHD: The drive can be addressed and controlled on a single-line RS232 (C7 interface), or on a daisy-chained RS232 (C8 interface), or a USB (C1 interface) line. The CDHD has two rotary switches for setting the drive address.

DDHD: The DDHD can be addressed and controlled on a daisy-chained RS232 line. The DDHD has a rotary switch for setting the node address.

Single-Line Configuration

In a single-line RS232 configuration, the drive is connected to the C7 interface, and assigned address 0 by setting both rotary switches to 0.

By default, the rotary switches are set to 0, and the drive assumes a single-line configuration.

Daisy-Chain (Multi-Drop) Configuration

In a daisy-chain RS232 configuration, all drives must be daisy-chained through the C8 interface. Each drive must have a unique address to enable its identification on the network. When configuring a daisy-chain, address 0 cannot be used.

You can communicate with any or all drives on the daisy-chain from any RS232 or USB port on any of the daisy-chained drives.

- To communicate with an individual drive in a daisy-chain, enter the following at the prompt:

  \x <Enter>

  Where **x** = the address setting of the drive.

- To communicate simultaneously with all drives on the chain, enter the following at the prompt:

  *** <Enter>**

  This is called global addressing. When using global addressing, no character echo to the terminal occurs.

Variables and Commands

When the host and drive are communicating through a serial connection, VarCom is used to configure, control and monitor the drive. The VarCom set of functions includes:

- **Commands**: instruct the drive to perform an operation.
- **Read-only variables**: calculated and/or set by the drive, and used to monitor the drive and its operational status.

  To read a variable, type the VarCom mnemonic followed by <Enter> (carriage return, CR). The drive returns the value of the variable.
- **Read/Write variables**: used to configure and monitor the drive.

  To set a variable value, type the VarCom mnemonic, a space (or =), the value, and then <Enter> (carriage return, CR).

Data Control

The drive can process approximately 16 characters per millisecond (at 115200 baud rate).

The operating system recognizes backspaces and resets upon receipt of an <Esc> character.

The following VarCom variables allow you to configure communication responses between drive and host.

ECHO	Enables/disables the serial port character echo. If echo is enabled, characters received via the serial port are echoed back to the serial port and displayed on the computer monitor. ECHO 0 = Serial port echo disabled ECHO 1 = Serial port echo enabled ECHO allows the host to check the validity of the information received by the drive.
MSGPROMPT	Defines whether asynchronous messages and the prompt from the drive are sent to the serial port (and to the host computer) 0 = Messages and prompt disabled 1 = Messages and prompt enabled
CHECKSUM	Enables/disables checksum protection on the message. 0 = Message checksum disabled (default) 1 = Message checksum enabled The checksum is an 8-bit value, displayed within brackets < >. For example, 0x1F checksum is displayed as <1F> at the end of the message before the carriage return.

Message Format

The message format is the structure by which the drive processes ASCII-coded messages. Messages from the host to the drive are used to send commands, to set variables, or to query the drive. Messages from the drive to the host contain the response to queries.

This message format has two main elements: **message unit** and **message termination**, as shown in the following figure.

The checksum utility is optional.

Note: *Start* has no significance; it simply represents the drive waiting for the host to send a message.

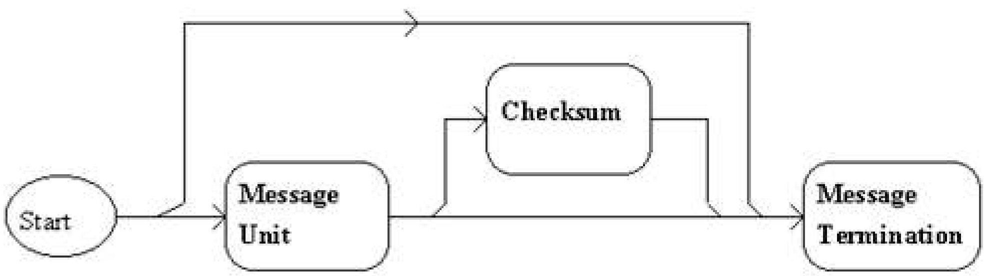


Figure 4-1. Message Format

Message Unit

A message unit is a block of information tha is transmitted on the communications link. The basic message unit is shown in the following figure.

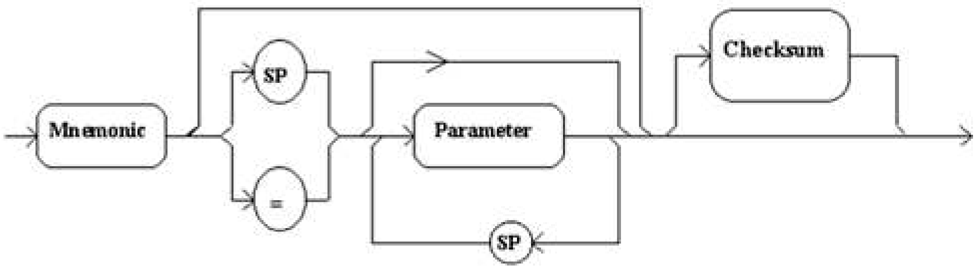


Figure 4-2. Message Unit

A message unit includes a header (VarCom mnemonic) with or ithout parameters. The header defines the context of the parameters that follow it. Messages sent from the host to the drives always have headers. Messages from the drive to the host do not generally include a header.

When used, parameters are separated from the mnemonic by either a space or an assignment operator. Parameters must be separated by spaces.

The drive can receive only a single message unit in a message format.

Message Termination

Message termination refers to the end of the message being sent.

Messages transmitted by the host are terminated by a carriage return (CR) – ASCII character 0DH.

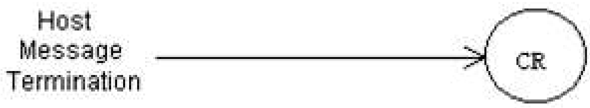


Figure 4-3. Host Message Termination Format

Messages transmitted by the drive are teminated by a carriage return/line feed (CR/LF) combination – ASCII characters 0DH/0AH.

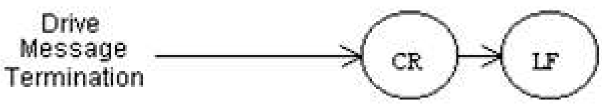


Figure 4-4. Drive Message Termination Format

The drive also accepts a message termintion sent without any additional information.

Complete Message Format with Checksum

The CHECKSUM block is used only when CHECKSUM command is set.

The drive is configured to accept incoming messages with or without checksum, and to append checksum to outgoing message according to the CHECKSUM variable.

Checksum is represented by two ASCII digits within brackets <> preceding the <CR>.

The complete message format is shown in the following figure.

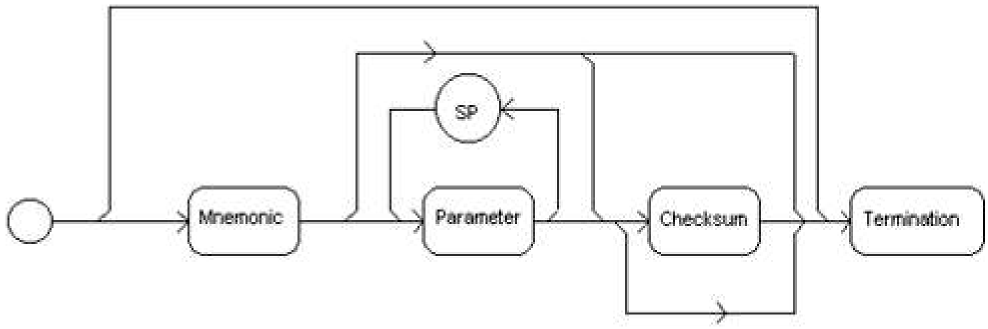


Figure 4-5. Complete Message Format

Units

Within a message or command, units are enlosed in brackets [ ]. For example:

- Message to drive: MPOLES
- Message from drive: 4 [poles]

When a command from the host contains units, the drive ignores the unit information.

Asynchronous Error Messages

The asynchronous error message function is enabled by the variable MSGPROMPT.

- If this function is enabled, and an error or fault occurs, the drive transmits a brief error message to the host.
- If the function is disabled, the error message is transmitted after a <CR> message termination is detected by the drive. This occurs whenever the host sends a message to the drive.

The variable MSGPROMPT also controls the prompt sent by the drive at the end of a message.

- If echoing is enabled, the characters in the message are all echoed before the error message is transmitted. Even though an error has occurred and its message returned to the host, the drive still accepts new incoming messages and attempts to execute them.
- If echoing is disabled, the error message is transmitted after the <CR> message termination is detected by the drive.

The drive must detect a new error or fault before transmitting an error message.

Examples of Serial Protocol

The following examples demonstrate serial protocol between the drive and a host.

Issuing a Command or Variable

In Examples 1 through 5, drive parameters are defined as:

```
ADDR 0

CHECKSUM 0
```

```
ECHO 1
MSGPROMPT 1
```

Example 1 – Command

EN (drive enable)

Sequence #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
User Enters	**E**		**N**		**<CR>**						
Drive Returns		**E**		**N**		**<CR>**	**<LF>**	**<DLY>**	**-**	**-**	**>**

Displayed on terminal:

```
-->EN
-->
```

Example 2 – Command/Variable – Returns Multiple Lines of Values

This type of command typically has a longer delay due to the large amount of data that is output to the screen.

DUMP (return drive parameter values)

Sequence #	1	2	3	4	5	6	7	8	9	10
User Enters	**D**		**U**		**M**		**P**		**<CR>**	
Drive Returns		**D**		**U**		**M**		**P**		**<CR>**

Sequence #	11	12	13	14	15	16	17	18
User Enters								
Drive Returns	**<LF>**	**<DLY>**	**<VAR1>**	**<SP>**	**<VAL1>**	**<CR>**	**<LF>**	**<VAR2>**

Sequence #	19	20	21	22	23	24	25	26
User Enters								
Drive Returns	**<SP>**	**<VAL2>**	**<CR>**	**<LF>**	**<VAR*n*>**	**<SP>**	**<VAL*n*>**	**<LF>**

Sequence #	27	28	29	30
User Enters				
Drive Returns	**<CR>**	**-**	**-**	**>**

Displayed on terminal:

```
-->DUMP
-->var1 val1
-->var2 val2
-->varn valn
```

Example 3 – Command/Variable – Returns Multiple Values

J (jog)

Sequence #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
User Enters	**J**		**<CR>**							
Drive Returns		**J**		**<CR>**	**<LF>**	**<DLY>**	**<VAL1>**	**<SP>**	**<VAL2>**	**<CR>**

Sequence #	11	12	13	14
User Enters				
Drive Returns	**<LF>**	**-**	**-**	**>**

Displayed on terminal:

```
-->J
-->nnnnn nnnnn
-->
```

Example 4 – Reading a Variable Value

MPOLES (single pole motor with value 2)

Sequence #	1	2	3	4	5	6	7	8	9	10
User Enters	**M**		**P**		**O**		**L**		**E**	
Drive Returns		**M**		**P**		**O**		**L**		**E**

Sequence #	11	12	13	14	15	16	17	18	19	20
User Enters	**S**		**<CR>**							
Drive Returns		**S**		**<CR>**	**<LF>**	**<DLY>**	**2**	**<SP>**	**[**	**p**

Sequence #	21	22	23	24	25	26	27	28	29	30	31
User Enters											
Drive Returns	**o**	**l**	**e**	**s**	**]**	**<CR>**	**<LF>**	**<DLY>**	**-**	**-**	**>**

Displayed on terminal:

```
-->MPOLES
2 [poles]
-->
```

Example 5 – Defining a Variable Value

ACC (acceleration with value 50000)

Sequence #	1	2	3	4	5	6	7	8	9	10
User Enters	**A**		**C**		**C**		**=**		**5**	
Drive Returns		**A**		**C**		**C**		**=**		**5**

Sequence #	11	12	13	14	15	16	17	18	19	20
User Enters	**0**		**0**		**0**		**0**		**<CR>**	
Drive Returns		**0**		**0**		**0**		**0**		**<CR>**

Sequence #	21	22	23	24	25
User Enters					
Drive Returns	**<LF>**	**<DLY>**	**-**	**-**	**>**

Displayed on terminal:

```
-->ACC=50000
-->
```

Multi-Drop Mode

In Examples 6 and 7, drive parameter values are defined as:

```
ADDR 3
```

```
ECHO 1
```

```
MSGPROMPT 1
```

Example 6 – Addressing a Daisy-Chained Drive

The range of values for ADDR is 0 to 99. A value other than 0 puts the system in Multi-drop mode, which results in a different prompt.

Sequence #	1	2	3	4	5	6	7	8	9	10	11
User Enters	****		**3**		**<CR>**						
Drive Returns		****		**3**		**<CR>**	**<LF>**	**<DLY>**	**3**	**-**	**>**

Displayed on terminal:

```
-->\3
3->
```

Example 7 – Reading a Variable

IMAX (drive current limit)

Sequence #	1	2	3	4	5	6	7	8	9	10
User Enters	**I**		**M**		**A**		**X**		**<CR>**	
Drive Returns		**I**		**M**		**A**		**X**		**<CR>**

Sequence #	11	12	13	14	15	16	17	18	19	20
User Enters										
Drive Returns	**<LF>**	**1**	**5**	**.**	**6**	**9**	**7**	**<CR>**	**<LF>**	**<DLY>**

Sequence #	21	22	23
User Enters			
Drive Returns	**3**	**-**	**>**

Displayed on terminal:

```
-->IMAX
3->15.697
3->
```

Serial Checksum

Example 8 – Variable

In this example, drive parameters are defined as:

```
ADDR 0
CHECKSUM 1
ECHO 1
MSGPROMPT 1
```

ACC (acceleration) with value 25000

Sequence #	1	2	3	4	5	6	7	8	9	10
User Enters	**A**		**C**		**C**		**=**		**2**	
Drive Returns		**A**		**C**		**C**		**=**		**2**

Sequence #	11	12	13	14	15	16	17	18	19	20
User Enters	**5**		**0**		**0**		**0**		**<**	
Drive Returns		**5**		**0**		**0**		**0**		**<**

Sequence #	21	22	23	24	25	26	27	28	29	30	31
User Enters	**F**		**B**		**>**		**<CR>**				
Drive Returns		**F**		**B**		**>**		**<CR>**	**-**	**-**	**>**

Character	Hex Value	ASCII Value
A	41	65
C	43	67
C	43	67
=	3D	61
2	32	50
5	35	53
0	30	48
0	30	48
0	30	48

```
Checksum=0xFF& (0x41+0x43+0x43+0x3d+0x32+0x35+0x30+0x30+0x30)
=0xFF & 0x01FB=0xFB
```

Note: Enter the last two characters of the HEX VALUE sum before the <CR>. Between brackets < >

Displayed on terminal:

```
//setting the checksum
-->CHECKSUM 1
//sending command to the drive with checksum appended
-->ACC=25000<FB>
//checking the actual value stored at the drive
-->ACC
//the reply is appended by checksum
25000.000[rpm/s]<7E>
-->
```

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for CDHD and DDHD