FLEXI PRO Servo Drive

CANopen for CAN and EtherCAT Drives

Reference Manual

Manual Revision: 3.0
Firmware Version: 1.4.4

SEE IT BEFORE IT HAPPENS

MOTOR POWER COMPANY

Revision History

Document Revision	Date	Remarks
3.0	Oct. 2013	Release for firmware 1.4.4
2.2	May 2013	Minor fixes
2.1	Jan. 2013	General release for firmware 1.3.2
2.0	Jan. 2013	Preliminary Release
1.0	Aug. 2012	Internal release

Firmware Revision
1.4.4

Important Notice

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To order products, contactinfo@motorpowerco.it

For all other inquiries regarding FLEXI PRO drives or other Motor Power Company products, contact: info@motorpowerco.it

Contents

1   Introduction

1.1   About This Manual

FLEXI PRO drive functionality is configured using various commands and variables, which are communicated over the serial port or over CAN bus.

This manual describes the implementation of CiA 402 and 301 CANopen protocols in the FLEXI PRO digital servo drive. This manual is not meant to replace the CANopen specifications, or to reproduce them.

This manual is intended for skilled personnel who have been trained to work with the equipment described.

1.2   Documentation Set for the FLEXI PRO

This manual is part of a documentation set. The entire set consists of the following:

- **FLEXI PRO Quick Start Guide.** Basic setup and operation of the drive.
- **FLEXI PRO User Manual**. Hardware installation, configuration and operation.
- **FLEXI PRO VarCom Reference Manual**. Parameters and commands used to program the FLEXI PRO.
- **FLEXI PRO CANopen for CAN and EtherCAT Drives Reference Manual.** FLEXI PRO implementation of CANopen protocol for CAN and EtherCAT.

1.3   Manual Format – Object Dictionary

The CAN objects are presented and described in the following format:

*nnnn*h - Object Name

Object Description

Index	*nnnn*
Description	Description of the object
Object Code	Variable | Array | Record
Data Type	Integer8 | Integer16 | Integer32 Unsigned8 | Unsigned16 | Unsigned32 Real32 | Visible_String
Category	Optional | Mandatory
VarCom	VarCom equivalent

Entry Description for Variable and Record Objects

Access	Read/Write| Read Only | Constant
PDO Mapping	Yes | No
Value Range	Discrete values and ranges of values.
Default Value	The object's default value.
Units	When the object value implies units of measure, these units are specified.

Entry Description for Array Objects

Sub-Index	*nnn*
Description	Description of the sub-index
Object Code	Variable | Array | Record
Data Type	Integer8 | Integer16 | Integer32 Unsigned8 | Unsigned16 Unsigned32 | Real32 | Visible_String
Category	Optional | Mandatory
Access	Read/Write| Read Only | Constant
PDO Mapping	Yes | No
Value Range	Discrete values and ranges of values.
Default Value	The object's default value.
Units	When the object value implies units of measure, these units are specified.

2   CAN Cabling and Setup

2.1   Typical FLEXI PRO CAN Hardware Configuration
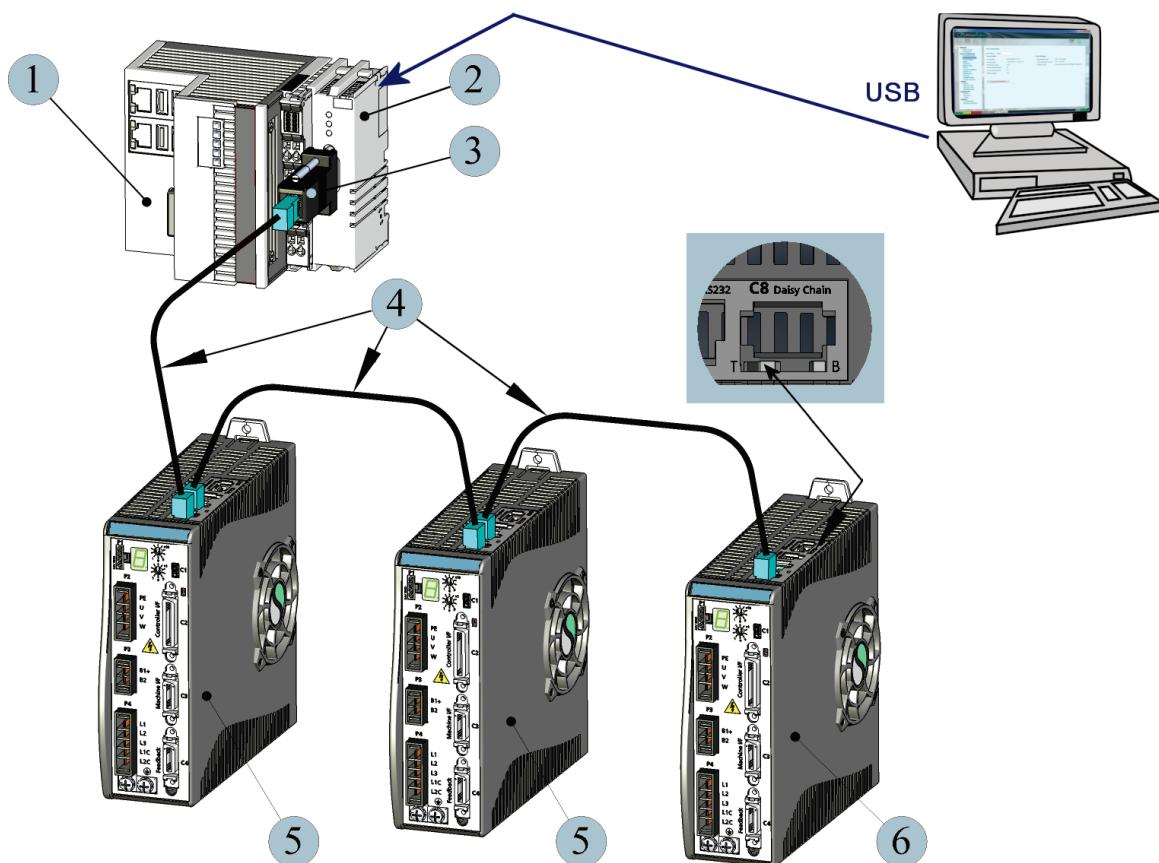
Figure 2-1. Typical FLEXI PRO CAN Configuration

1	PLC or embedded PC

2	CAN bus module*

	D9 to RJ45 adapter*, with following pin assignments

3	**Function**	**FLEXI PRO RJ45 Pin**	**D9 Connector Pin**
	CAN High	1	7
	CAN Low	2	2
	Functional Ground	3	3
	CAN Shield	4	5
	Functional Ground	5	6

4	RJ45 cables
5	FLEXI PRO with internal termination set to 0Ω (towards T)
6	Last FLEXI PRO, with internal terminator set to 120Ω (away from T)

* A 120Ω termination resistor is required at the beginning of the chain.

Be sure the required **EDS file** is installed in the controller. You can download the file from the Motor Power Company website or contact Technical Support.

For additional information, refer to the *FLEXI PRO User Manual.*

2.2   FLEXI PRO Node Address

Within the CANopen network, a unique node address (identification number) must be allocated to each individual CANopen device. The FLEXI PRO node address is set using two 10-position rotary switches, accessible from the front of the unit.

Each switch has 10 positions:

- The upper switch positions are set as tens: 10, 20, 30 … 90
- The lower switch positions are set as ones: 0, 1, 2 … 9
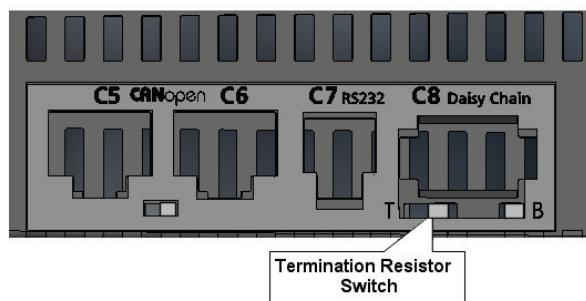
Notes: If two or more drives are connected to the network, address 0 cannot be used. Only a singular drive may have the address 0.

Two drives in the same network cannot have the same address.

2.3   FLEXI PRO Termination Resistor Switch

Note the Termination Resistor switch located on the top of the drive next to the daisy chain connector (C8). Using a small screwdriver or similar tool, set the switch to the correct position:

- **Towards T** (default): 120Ω termination resistor not in use.
- **Away from T**: Used when the drive is the last drive in a chain. The drive provides the 120Ω termination resistor between CAN high and CAN low.

Using any RJ45 cables:

- Connect the host to the drive on interface **C5**.
- Connect the next node to interface **C6**.

Note: A 120Ω termination resistor is also required at the beginning of the chain, on either the CAN bus module, or the D9 to RJ45 adapter.

For additional wiring information, refer to the *FLEXI PRO User Manual.*

In addition, to enable CAN communication, the RS-232 (VarCom) command COMMODE must be set to 1.

2.4   FLEXI PRO CAN Bit Rate

FLEXI PRO has an automatic bit rate detection mechanism that is executed on power up. During the initialization phase the drive listens to messages on the bus and automatically adjusts its bit rate setting.

Once the bit rate is determined, the drive's status becomes pre-operational, and the drive transmits a boot up message containing the drive's node ID.

For the automatic bit rate detection mechanism to work, there must be bus traffic. This means that a master and at least one slave must be present on the bus and communicating at the same bit rate.

It is also possible to set the manual bit rate using the RS-232 (VarCom) command CANBITRATE. This command takes one of the following values:
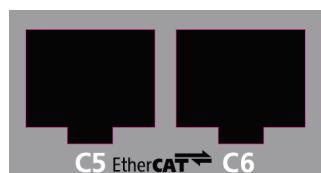
- 1 for 125 kilobit per second
- 2 for 250 kilobit per second
- 3 for 500 kilobit per second
- 4 for 1000 kilobit per second (1 megabit)

After setting the CANBITRATE value, you must issue a RS-232 (VarCom) command SAVE, and then power cycle the drive. The bit rate will then be set.

2.5   FLEXI PRO EtherCAT Communication

Using any RJ45 cables:

- Connect the host to the drive on interface **C5**.
- Connect the next node to interface **C6**.

Be sure the required **XML file** is installed in the controller. You can download the file from the Motor Power Company website or contact Technical Support.

For additional information, refer to the *FLEXI PRO User Manual*.

3   CANopen Basics

3.1   Device Communication

The FLEXI PRO communication interface follows the CiA CANopen specifications (can-cia.org), as follows:

- DS-301: Communication Profile for Industrial Systems
- DS 402: Device Profile for Drives and Motion Control
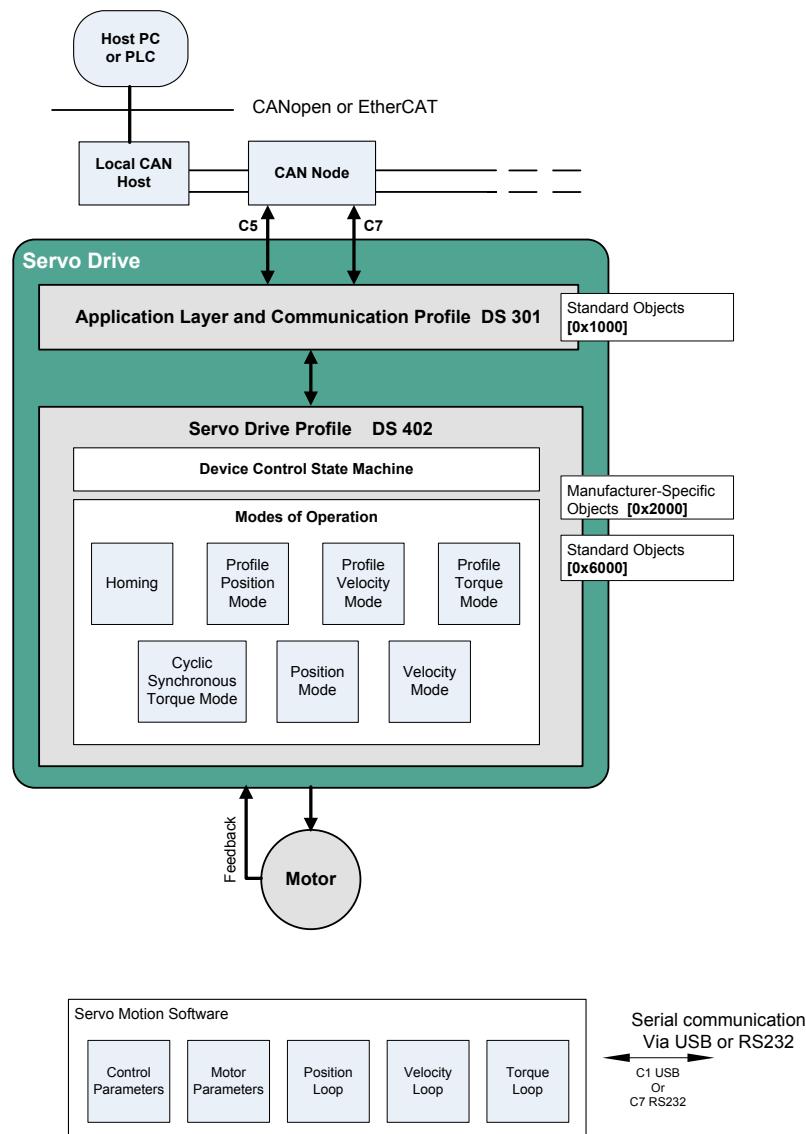
Figure 3-1. Communication Architecture

Device Control	Starting and stopping of the drive and several mode-specific commands are executed by the state machine.
Modes of Operation	The operating mode defines the behavior of the drive.

3.2   Communication Objects

Communication objects are used for exchanging process and service data, for process or system time synchronization, for error state supervision, and for control and monitoring of node states. These objects are defined by their structure, transmission types and their CAN identifier.

Service Data Communication

Service data objects (SDOs) provides direct access to object entries in the CANopen device object dictionary. As these object entries contain data of arbitrary size and data type, the SDOs are used to transfer multiple data sets (each containing an arbitrary large block of data) from a client to a server and vice versa. The client controls, via a multiplexer (index and sub-index of the object dictionary), which data set is transferred. The content of the data set is defined within the object dictionary.

In general, an SDO is transferred as a sequence of segments. Prior to transferring the segments there is an initialization phase in which client and server prepare for transferring the segments. For SDOs, it is also possible to transfer a data set of up to four bytes during the initialization phase. This mechanism is called SDO expedited transfer.

The client always initiates an SDO transfer for any type of transfer. The owner of the accessed object dictionary is the server of the SDO. Either the client or the server can take the initiative to abort the transfer of an SDO.

By means of an SDO, a peer-to-peer communication channel between two CANopen devices is established. A CANopen device supports more than one SDO. One supported Server-SDO is the default case (Default SDO).

Process Data Communication

Process data objects (PDOs) perform real-time data transfer. The transfer of PDOs is performed without any protocol overhead.

The PDOs correspond to objects in the object dictionary and provide the interface to the application objects. Data type and mapping of application objects into a PDO is determined by a corresponding default PDO mapping structure within the object dictionary. FLEXI PRO supports variable PDO mapping; therefore, the number of PDOs and the mapping of application objects into a PDO may be transmitted to a CANopen device during the configuration process, by applying the SDO services to the corresponding objects of the object dictionary.

PDOs are used for both data transmission and data reception – termed Transmit-PDO (TPDO) and Receive-PDO (RPDO), respectively. CANopen devices supporting TPDO are PDO producers, and CANopen devices supporting RPDO are called PDO consumers. FLEXI PRO supports both. The PDO communication parameter describes the communication capabilities of the PDO. The PDO mapping parameter contains information about the contents of the PDO.

For each PDO, a pair of communication and mapping parameters is mandatory.

By default 4 TPDOs and 4 RPDOs are implemented in the FLEXI PRO:

- TPDO 1 – Statusword, 6041h, 16 bits

- TPDO 2 – Position actual value, 6064h, 32 bits
  and Velocity actual value, 606Ch, 32 bits

- TPDO 3 –Current actual value, 6077h, 16 bits

- TPDO 4 – Digital inputs, 60FDh, 32 bits
- RPDO 1 – Controlword, 6040h, 16 bits
- RPDO 2 – Target position, 607Ah, 32 bits
  and Target velocity, 6081h, 32 bits
- RPDO 3 – Target velocity, 60FFh, 32 bits
- RPDO 4 – Target torque, 6071h, 16 bits

3.3   Object Units

Table 3-1. Unit Dimensions

Unit Dimension	Definition
Position units	The units are: (object 6091h sub-index 1 ÷ 6091h sub-index 2) × (object 6092h sub-index 1 ÷ 6092h sub-index 2)
	For example:

	Assuming:
	    object 6091h sub-index 1 = 360
	    object 6091h sub-index 2 = 1
	    object 6092h sub-index 1 = 1
	    object 6092h sub-index 2 = 1

	and the actual position reading = 720

	Then:
	    720 ÷ [(360÷1) × (1÷1)] = 2
	    (= 2 revolutions)

Velocity units	The units are: (object 6091h sub-index 1 ÷ 6091h sub-index 2) × (object 6092h sub-index 1 ÷ 6092h sub-index 2)
	For example:

	Assuming:
	    object 6091h sub-index 1 = 360
	    object 6091h sub-index 2 = 1
	    object 6092h sub-index 1 = 1
	    object 6092h sub-index 2 = 1

	and the actual velocity reading = 720

	Then:
	    720 ÷ [(360÷1) × (1÷1)] = 2
	    (= 2 revolutions per second)

Unit Dimension	Definition

Acceleration units	The units are: (object 6091h sub-index 1 ÷ 6091h sub-index 2) × (object 6092h sub-index 1 ÷ 6092h sub-index 2)
	
	For example:
	
	Assuming:
	    object 6091h sub-index 1 = 360
	    object 6091h sub-index 2 = 1
	    object 6092h sub-index 1 = 1
	    object 6092h sub-index 2 = 1
	
	and the actual acceleration reading = 720
	
	Then:
	    720 ÷ [(360÷1) × (1÷1)] = 2
	    (= 2 revolutions per second^2)

Current units	The units are derived from object 6075h (Motor Rated Current) The value of this object is user defined, in mA. After setting a value for 6075h, all other current objects must receive values defined in 1/1000 (one-thousandth) of 6075h. For example: Assuming 6075h has a value of 20000 mA, then to set a value of 20000 mA for 6071h (Target Torque), write 1000 for 6071h. The calculation is: (1000÷1000) × 2000 = 2000

3.4   Object Access Types

Table 3-2. Object Access Types

Unit Dimension	Definition
Read/Write	Read and write access
Read Only	Read only
Constant	Read only access, value is constant

3.5   Errors and Faults

Service Request Error Codes

Table 3-3 lists the service request error (abort) codes, which the drive sends to the master device when the master issues an invalid SDO request to the FLEXI PRO.

For example, if you write a parameter value to the drive, but the value is higher than allowed, the drive will respond by sending error code: 0604004Dh (value is out of range).

Table 3-3. Service Request Error Codes

Error Code	Description
0500004Ch	Waiting for enable; configuration cannot be executed
0500004Eh	The EnDat encoder is currently busy
05000053h	The drive configuration is invalid
05000064h	Failed to configure the velocity loop
05000069h	The drive is currently in Hold mode
0500006Ah	The value or service is not currently available
0500006Bh	No phase found on Tamagawa encoder
0500006Dh	The requested functionality is currently in use and not available
0500006Eh	The function is not supported on the input/output
0500006Fh	The argument must be an even number
05030060h	The motor peak rated current conflicts with the motor continuous rated current (MICONT > MIPEAK)
05030061h	The drive peak rated current conflicts with the drive continuous rated current conflict (DICONT > DIPEAK)
0504004Fh	Motor and encoder type mismatch
05040050h	Linear motor and encoder type mismatch
05040052h	The actual Harmonic current correction is out-of-range
05040054h	The position encoder resolution value is invalid
05040055h	The motor commutation type is invalid
05040056h	The velocity limit is invalid
05040057h	The drive peak rated current is invalid (sinusoidal peak)
05040058h	The motor peak rated current is invalid
05040059h	The drive bus voltage is invalid
0504005Ah	The motor minimum line-to-line inductance is invalid
0504005Bh	The number of motor poles is invalid
0504005Ch	The resolution in number of lines of the encoder equivalent output is invalid
0504005Eh	The homing type is invalid
05040065h	Reserved (unused) homing type
06000048h	The procedure is not yet completed
06000049h	The drive is active
0600004Ah	The drive is inactive
0600004Bh	The drive is currently busy and cannot execute the command
06000051h	Feedback is not properly defined
0600005Fh	The operation mode is invalid
06000062h	Active disable is in progress
06000067h	Password protected

Error Code	Description
06000068h	Burning active
0600006Ch	Input/output is not supported
06000070h	Saving of parameters failed
06000071h	The parameter is not available for modification
06000072h	Internal firmware fault
0604004Dh	Value is out of range
06040063h	The input value must be an integer
06040066h	The value is invalid for the current command
0606005D	Flash fault occurred

Emergency Error Codes (Faults)

Upon detection of device-internal errors, the FLEXI PRO will transmit emergency message frames over the CANopen network using COB-ID EMCY. An emergency message frame will be transmitted only once per error event and consists of the error code and the actual state of the Error Register object.

Table 3-4. Emergency Message Frame

Byte	0	1	2	3	4	5	6	7
Description	Emergency error code		Error register	Manufacturer-specific				
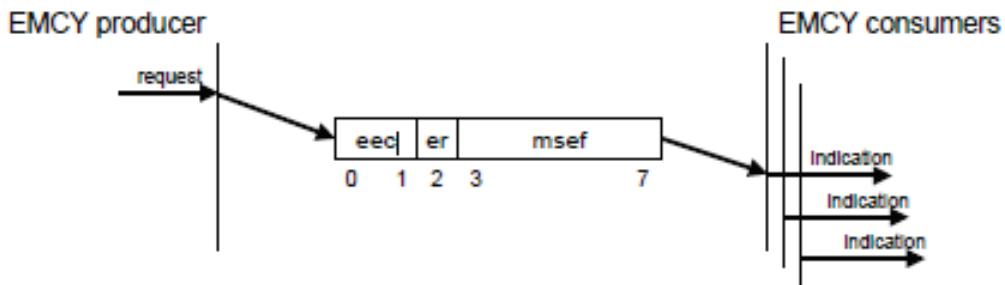
Table 3-5 lists the fault (emergency error) codes. When an illegal state occurs in the drive, the FLEXI PRO sends the code to the master device as object 603Fh (Error Code).

Whenever the value of 603Fh is not zero, there is a fault in the drive. The CANopen state machine enters Fault mode, and the FLEXI PRO cannot be enabled.
If, for example, the Motor Feedback interface cable is unplugged from the FLEXI PRO, the motion control of the drive will not function; the drive will send the code 7383h (A/B line break fault) to the master device as object 603Fh (Error Code).

Table 3-5. Emergency Error Codes (Faults)

Fault Code	Description	7-Segment Display
2214h	Over-current	P
2310h	Motor foldback	F2
2311h	Drive foldback	F1
2380h	Current sensors offset out-of-range	e109
2381h	Motor phase disconnection	r27
3110h	Over-voltage	o
3120h	Under-voltage	u
3180h	Regen over-current	n1
3181h	STO (safe torque off) is not connected	n
3182h	Bus voltage measurement circuit failure	e108
4080h	Integrated power module over-temperature	t2
4081h	Control board over-temperature	t3
4310h	Drive over-temperature	t1
4410h	Motor over-temperature	H
5111h	Control +15V out-of-range	o15
5111h	Control -15V out-of-range	o-15
5180h	Drive 5V out-of-range	05
5180h	5V out of range	o5
5530h	Power board EEPROM fault	e107
5581h	Control digital board EEPROM fault	e106
5582h	CAN voltage supply fault	A4
5583h	Self test failed	e105
5584h	Parameter memory checksum failure	e
5585h	Parameter memory checksum failure	e
5586h	Failure writing to flash memory	E
6381h	Drive not configured	-1
6581h	FPGA configuration failure	e101
7111h	Index line break	r5
7112h	Open load on the power brake output	n41
7113h	Short circuit on the power brake output	n42
7114h	Fieldbus - Target position exceeds velocity limit	Fb1
7115h	Fieldbus - Target position exceeds acceleration/ deceleration limits	Fb2
7116h	EtherCAT cable disconnected	Fb3
7117h	Fieldbus target command lost	Fb4
7180h	Secondary encoder (feedback) index break	r17

Fault Code	Description	7-Segment Display
7181h	Secondary encoder (feedback) A/B line break	r18
7182h	Pulse & direction input line break	r25
7380h	Feedback communication error	r20
7381h	Nikon encoder (feedback) operation fault	r21
7382h	Tamagawa feedback initialization failed	r24
7383h	A/B Line break	r4
7384h	Illegal Halls	r6
7385h	Tamagawa battery low voltage	b
7386h	PLL synchronization failed	b1
7388h	Tamagawa abs operational fault	r26
7781h	Motor setup failed	-5
7782h	Phase find failed	r23
7783h	Encoder simulation frequency too high	r9
7784h	EnDat sine (feedback) communication failed	r10
7785h	A/B out-of-range	r8
7786h	Sine encoder quadrature	r14
7787h	Sine/cosine calibration invalid	r15
7788h	Encoder (feedback) 5V over-current	r16
7789h	Secondary encoder (feedback) 5V over-current	r19
778Ah	Sensorless initialization	r30
778Bh	Resolver initialization failed	r28
778Ch	Stall fault	F3
778Dh	PFB Off checksum invalid	r34
778Eh	PFB Off data mismatch	r35
778Fh	No PFB Off data	r36
7790h	FPGA version mismatch	e120
7791h	Emergency stop issued	n3
7792h	Endat2x feedback faults	r32
8180h	Drive locked	b
8481h	Velocity over-speed exceeded	j
8611h	Maximum position/velocityerror exceeded	J1 / J2

4   Communication Objects

The following communication profile objects have been implemented in FLEXI PRO.

For more information, refer to the specific CAN documentation.

1000h - Device Type
1001h - Error Register
1002h - Manufacturer Status Register
1003h - Predefined Error Field
1005h - COB-ID SYNC Message
1006h - Communication Cycle Period
1007h - Synchronous Window Length
1008h - Manufacturer Device Name
1009h - Manufacturer Hardware Version
100Ah - Manufacturer Software Version
1010h - Store Parameter Field
1011h - Restore Default Parameters
1014h - COB-ID EMCY
1015h - Inhibit Time Emergency
1016h - Heartbeat Consumer Time
1017h - Producer Heartbeat Time
1018h - Identity Object
1019h - Synchronous Counter Overflow Value
1200h - Server SDO Parameter 1
1201h - Server SDO Parameter 2
1400h - Receive PDO Communication Parameter 1
1401h - Receive PDO Communication Parameter 2
1402h - Receive PDO Communication Parameter 3
1403h - Receive PDO Communication Parameter 4
1600h - Receive PDO Mapping Parameter 1
1601h - Receive PDO Mapping Parameter 2
1602h - Receive PDO Mapping Parameter 3
1603h - Receive PDO Mapping Parameter 4
1800h - Transmit PDO Communication Parameter 1
1801h - Transmit PDO Communication Parameter 2
1802h - Transmit PDO Communication Parameter 3
1803h - Transmit PDO Communication Parameter 4
1A00h - Transmit PDO Mapping Parameter 1
1A01h - Transmit PDO Mapping Parameter 2
1A02h - Transmit PDO Mapping Parameter 3
1A03h - Transmit PDO Mapping Parameter 4

1000h – Device Type

Object Description

Index	1000
Description	Contains information about the device type and functionality. It is comprised of a 16-bit field that describes the device profile used, and a second 16-bit field that gives additional information about optional functionality of the device.
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory

Entry Description

Access	Constant
PDO Mapping	No
Default Value	4325778
Range	0 to 4294967295
Units	Not Applicable

1001h – Error Register

Object Description

Index	1001
Description	An error register for the device.
	A field of 8 bits, each of which indicates a particular type of error. If a bit is set to 1, the specified error has occurred.
	Bit Description
	0 = Generic error
	1 = Current
	2 = Voltage
	3 = Temperature
	4 = Communication error (overrun, error state)
	5 = Device profile specific
	6 = Reserved
	7 = Manufacturer specific
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

1002h – Manufacturer Status Register

Object Description

Index	1002
Description	A common status register for manufacturer specific purposes.
Object Code	Variable
Data Type	Unsigned32
Category	Optional

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1003h – Predefined Error Field

Object Description

Index	1003
Description	Holds errors that occurred in the device and have been signaled via the Emergency object. It is an error history.
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	000
Description	Number of errors. Contains the number of actual errors recorded in the array, starting at sub-index 1. It can read 0 if no error is registered, or 1 if an error is registered. Writing a 0 to sub-index 0 deletes the entire error history.
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 254
Units	Not Applicable

Sub-Index	001 – 002 – 003 – 004 – 005 006 – 007 – 008 – 009 – 010
Description	Standard error field
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1005h – COB-ID SYNC Message

Object Description

Index	1005
Description	Defines the COB-ID of the synchronization object (SYNC). The device generates a SYNC message if bit 30 is set. The meaning of other bits is the same as for other communication objects.
Object Code	Variable
Data Type	Unsigned32
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	128
Range	1 to 4294967295
Units	Not Applicable

1006h – Communication Cycle Period

Object Description

Index	1006
Description	Defines the communication cycle period. It is 0 if not used.
Object Code	Variable
Data Type	Unsigned32
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	µs

1007h – Synchronous Window Length

Object Description

Index	1007
Description	Defines the length of the time window for synchronous messages. It is 0 if not used.
Object Code	Variable
Data Type	Unsigned32
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	µs

1008h – Manufacturer Device Name

Object Description

Index	1008
Description	The manufacturer's name of the device
Object Code	Variable
Data Type	Visible_String
Category	Optional

Entry Description

Access	Constant
PDO Mapping	No
Default Value	FLEXI PRO drive
Range	Not Applicable
Units	Not Applicable

1009h – Manufacturer Hardware Version

Object Description

Index	1009
Description	The version number of the manufacturer's hardware.
Object Code	Variable
Data Type	Visible_String
Category	Optional

Entry Description

Access	Constant
PDO Mapping	No
Default Value	Control:00 Power:00
Range	Not Applicable
Units	Not Applicable

100Ah – Manufacturer Software Version

Object Description

Index	100A
Description	The version number of the manufacturer's software.
Object Code	Variable
Data Type	Visible_String
Category	Optional

Entry Description

Access	Constant
PDO Mapping	No
Default Value	Not Applicable (depends on firmware)
Range	Not Applicable
Units	Not Applicable

1010h – Store Parameter Field

Object Description

Index	1010
Description	Saves parameters in non-volatile memory. Sub-index 1: All parameters Sub-index 2: Communication parameters Sub-index 3: Application parameters Sub-index 4-127: Manufacturer defined parameters Writing 65766173h (ASCII value of "save") to the appropriate sub-index saves the parameters.
Object Code	Array
Data Type	Unsigned32
Category	Optional
VarCom	SAVE

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	0 to 127
Units	Not Applicable

Sub-Index	001
Description	Saves all parameters
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Saves communication parameters
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Saves application parameters
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1011h − Restore Default Parameters

Object Description

Index	1010
Description	Loads all parameters from non-volatile memory. Sub-index 1: All parameters Sub-index 2: Communication parameters Sub-index 3: Application parameters Sub-index 4-127: Manufacturer defined parameters Writing 64616F6Ch (ASCII value of "load") to the appropriate sub-index restores the parameters.
Object Code	Array
Data Type	Unsigned32
Category	Optional
VarCom	LOAD

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	0 to 127
Units	Not Applicable

Sub-Index	001
Description	Restores all default parameters
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Restores communication default parameters
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Restores application default parameters
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	00000000
Range	0 to 4294967295
Units	Not Applicable

1014h – COB-ID EMCY

Object Description

Index	1014
Description	Defines the COB-ID of the Emergency object (EMCY)
Object Code	Variable
Data Type	Unsigned32
Category	Optional

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	128
Range	1 to 4294967295
Units	Not Applicable

1015h – Inhibit Time Emergency

Object Description

Index	1015
Description	Defines the inhibit time used for emergency message.
Object Code	Variable
Data Type	Unsigned16
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 millisecond (ms)

1016h – Heartbeat Consumer Time

Object Description

Index	1016
Description	The consumer heartbeat time defines the expected heartbeat cycle time and thus has to be higher than the corresponding producer heartbeat time configured on the device producing this heartbeat. Monitoring starts after the reception of the first heartbeat. If the consumer heartbeat time is 0, the corresponding entry is not used. **Bit Description** 31-24 = Must be 0 for each sub-index 23-16 = Node ID 15-0 = Heartbeat time
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	1
Range	1 to 127
Units	Not Applicable

Sub-Index	001
Description	Consumer heartbeat time 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 50331647
Units	Not Applicable

1017h – Producer Heartbeat Time

Object Description

Index	1017
Description	This object defines the cycle time of the heartbeat, which must be a multiple of 1 millisecond. It is 0 if not used.
Object Code	Variable
Data Type	Unsigned16
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	milliseconds (ms)

1018h – Identity Object

Object Description

Index	1018
Description	Contains general information about the device.
	Sub-index 1: Defines a unique value allocated to each manufacturer.
	Sub-index 2: Defines the manufacturer product code (device version).
	Sub-index 3: Defines the revision number
	Bit 31-16 = major revision number
	Bit 15-0 = minor revision number
	Sub-index 4: Defines the manufacturer serial number.
Object Code	Record
Data Type	Not Applicable
Category	Mandatory

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	RO
PDO Mapping	No
Default Value	4
Range	1 to 4
Units	Not Applicable

Sub-Index	001
Description	Vendor ID
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	737
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Product code
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	1
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Revision number
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Serial number
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1019h – Synchronous Counter Overflow Value

Object Description

Index	1019
Description	Defines whether a counter is mapped into the SYNC message, and the highest possible value of the counter. 0 = SYNC message transmitted with length 0 1 = Reserved 2..240 = SYNC message transmitted with length 1, first data byte contains the counter value 241..255 = Reserved
Object Code	Variable
Data Type	Unsigned8
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 240
Units	Not Applicable

1200h – Server SDO Parameter 1

Object Description

Index	1200
Description	Contains the parameters for the SDOs for which the device is the server.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	COB-ID client to server
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	1536
Range	1536 to 3221225471
Units	Not Applicable

Sub-Index	002
Description	COB-ID server to client
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	1408
Range	1408 to 3221225471
Units	Not Applicable

1201h – Server SDO Parameter 2

Object Description

Index	1200
Description	Contains the parameters for the SDOs for which the device is the server.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	2 to 3
Units	Not Applicable

Sub-Index	001
Description	COB-ID client to server
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	2147483648
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	COB-ID server to client
Object Code	Variable
Data Type	Unsigned32
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	2147483648
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Node ID of the SDO client
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read Only
PDO Mapping	No
Default Value	127
Range	0 to 127
Units	Not Applicable

1400h – Receive PDO Communication Parameter 1

Object Description

Index	1400
Description	Contains the communication parameters of the current PDO the device is able to receive. Sub-index 0: Defines the number of PDO-parameters implemented. Sub-index 1: Defines the COB-ID. If bit 31 is set, the PDO is disabled. Sub-index 2: Defines the transmission type. Sub-index 3: Defines the inhibit time.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	2 to 5
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	512
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	255
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit time
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

1401h − Receive PDO Communication Parameter 2

Object Description

Index	1401
Description	Contains the communication parameters of the current PDO the device is able to receive. Sub-index 0: Defines the number of PDO-parameters implemented. Sub-index 1: Defines the COB-ID. If bit 31 is set, the PDO is disabled. Sub-index 2: Defines the transmission type. Sub-index 3: Defines the inhibit time.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	2 to 5
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	768
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission Type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	255
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit Time
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

1402h − Receive PDO Communication Parameter 3

Object Description

Index	1402
Description	Contains the communication parameters of the current PDO the device is able to receive. Sub-index 0: Defines the number of PDO-parameters implemented. Sub-index 1: Defines the COB-ID. If bit 31 is set, the PDO is disabled. Sub-index 2: Defines the transmission type. Sub-index 3: Defines the inhibit time.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	2 to 5
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1024
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission Type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit Time
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

1403h – Receive PDO Communication Parameter 4

Object Description

Index	1403	
Description	Contains the communication parameters of the current PDO the device is able to receive.	
	Sub-index 0: Defines the number of PDO-parameters implemented.	
	Sub-index 1: Defines the COB-ID. If bit 31 is set, the PDO is disabled.	
	Sub-index 2: Defines the transmission type.	
	Sub-index 3: Defines the inhibit time.	
Object Code	Record	
Data Type	Not Applicable	
Category	Optional	

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	2 to 5
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1280
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission Type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit Time
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

1600h − Receive PDO Mapping Parameter 1

Object Description

Index	1600
Description	Contains the mapping for the PDOs the device is able to receive.
	Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are received with the corresponding PDO.
	Sub-indices 1 to *number of entries*: Contain information about the mapped application variables.These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 64
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1614807056
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1616904200
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1601h – Receive PDO Mapping Parameter 2

Object Description

Index	1601
Description	Contains the mapping for the PDOs the device is able to receive.
	Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are received with the corresponding PDO.
	Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits.
	This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 64
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1618608160
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1619066912
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1602h – Receive PDO Mapping Parameter 3

Object Description

Index	1602
Description	Contains the mapping for the PDOs the device is able to receive.
	Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are received with the corresponding PDO.
	Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits.
	This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 64
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1627324448
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1603h – Receive PDO Mapping Parameter 4

Object Description

Index	1603
Description	Contains the mapping for the PDOs the device is able to receive. Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are received with the corresponding PDO. Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits. This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 64
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1618018320
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1627259168
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1800h – Transmit PDO Communication Parameter 1

Object Description

Index	1800
Description	Contains the communication parameters of the current PDO the device is able to transmit.
	Sub-index 0: Defines the number of PDO-parameters implemented.
	Sub-index 1: Describes the COB-ID. If bit 31 is set, the PDO is disabled.
	Sub-index 2: Defines the transmission type.
	Sub-index 3: Defines the inhibit time.
	Sub-index 4: Reserved
	Sub-index 5: Defines the event time
	Sub-index 6: Defines the SYNC start value.
	Start value 0 = SYNC message has no data content.
	Start value 1 to 240 = SYNC message has 1 byte data. This data byte is considered a counter value. The SYNC message whose counter value equals the SYNC start value is considered the first received SYNC message.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	5
Range	2 to 6
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	384
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit time
Variable	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

Sub-Index	004
Description	Compatibility entry
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	005
Description	Event timer
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	ms

1801h – Transmit PDO Communication Parameter 2

Object Description

Index	1801
Description	Contains the communication parameters of the current PDO the device is able to transmit.
	Sub-index 0: Defines the number of PDO-parameters implemented.
	Sub-index 1: Describes the COB-ID. If bit 31 is set, the PDO is disabled.
	Sub-index 2: Defines the transmission type.
	Sub-index 3: Defines the inhibit time.
	Sub-index 4: Reserved
	Sub-index 5: Defines the event time
	Sub-index 6: Defines the SYNC start value.
	Start value 0 = SYNC message has no data content.
	Start value 1 to 240 = SYNC message has 1 byte data. This data byte is considered a counter value. The SYNC message whose counter value equals the SYNC start value is considered the first received SYNC message.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	5
Range	2 to 6
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	640
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission Type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit Time
Variable	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

Sub-Index	004
Description	Compatibility Entry
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	005
Description	Event Timer
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	ms

1802h – Transmit PDO Communication Parameter 3

Object Description

Index	1802
Description	Contains the communication parameters of the current PDO the device is able to transmit. Sub-index 0: Defines the number of PDO-parameters implemented. Sub-index 1: Describes the COB-ID. If bit 31 is set, the PDO is disabled. Sub-index 2: Defines the transmission type. Sub-index 3: Defines the inhibit time. Sub-index 4: Reserved Sub-index 5: Defines the event time Sub-index 6: Defines the SYNC start value. Start value 0 = SYNC message has no data content. Start value 1 to 240 = SYNC message has 1 byte data. This data byte is considered a counter value. The SYNC message whose counter value equals the SYNC start value is considered the first received SYNC message.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	5
Range	2 to 6
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	896
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit time
Variable	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

Sub-Index	004
Description	Compatibility entry
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	005
Description	Event Timer
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	ms

1803h – Transmit PDO Communication Parameter 4

Object Description

Index	1803
Description	Contains the communication parameters of the current PDO the device is able to transmit. Sub-index 0: Defines the number of PDO-parameters implemented. Sub-index 1: Describes the COB-ID. If bit 31 is set, the PDO is disabled. Sub-index 2: Defines the transmission type. Sub-index 3: Defines the inhibit time. Sub-index 4: Reserved Sub-index 5: Defines the event time Sub-index 6: Defines the SYNC start value. Start value 0 = SYNC message has no data content. Start value 1 to 240 = SYNC message has 1 byte data. This data byte is considered a counter value. The SYNC message whose counter value equals the SYNC start value is considered the first received SYNC message.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	5
Range	2 to 6
Units	Not Applicable

Sub-Index	001
Description	COB-ID used by PDO
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1152
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Transmission type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 255
Units	Not Applicable

Sub-Index	003
Description	Inhibit Time
Variable	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	100 µs

Sub-Index	004
Description	Compatibility entry
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	005
Description	Event timer
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	ms

1A00h – Transmit PDO Mapping Parameter 1

Object Description

Index	1A00
Description	Contains the mapping for the PDOs the device is able to transmit. Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are transmitted with the corresponding PDO. Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits. This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1614872592
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1616969736
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1A01h – Transmit PDO Mapping Parameter 2

Object Description

Index	1A01
Description	Contains the mapping for the PDOs the device is able to transmit.
	Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are transmitted with the corresponding PDO.
	Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits.
	This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1617166368
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1617690656
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

1A02h – Transmit PDO Mapping Parameter 3

Object Description

Index	1A02
Description	Contains the mapping for the PDOs the device is able to transmit.
	Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are transmitted with the corresponding PDO.
	Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits.
	This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	4
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1618477072
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1618214928
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping Entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	552730640
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	553189392
Range	0 to 4294967295
Units	Not Applicable

1A03h – Transmit PDO Mapping Parameter 4

Object Description

Index	1A03
Description	Contains the mapping for the PDOs the device is able to transmit.
	Sub-index 0: Defines the number of valid entries in the mapping record. This number of entries is also the number of the application variables that are transmitted with the corresponding PDO.
	Sub-indices 1 to *number of entries*: Contain information about the mapped application variables. These entries describe the PDO contents by their index, sub-index and length. All three values are hexadecimal coded. The length entry defines the length of the object in bits.
	This parameter can be used to verify the overall mapping length. It is mandatory.
Object Code	Record
Data Type	Not Applicable
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Mandatory
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Mapping entry 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1627193376
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Mapping entry 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	548798496
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	003
Description	Mapping entry 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	004
Description	Mapping entry 4
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

5   Manufacturer-Specific Objects

2002h – Configuration Command

Object Description

Index	2002
Description	Performs a configuration sequence of the drive according to its internal parameters. Writing 01 initiates the configuration command.
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	CONFIG

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

2003h – CL BEMF Gain

Object Description

Index	2003
Description	The feedforward BEMF compensation ratio for the current control.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KCBEMF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0 to 2.0
Units	Not Applicable

2004h – Current DQ Axis Compensation

Object Description

Index	2004
Description	**Not intended for user unless instructed by Technical Support.** Current DQ axis compensation
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KCDQCOMP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0 to 1.0
Units	Not Applicable

2006h – Current KI Gain

Object Description

Index	2006
Description	The current controller integrator gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KCI

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0 to 100.0
Units	Not Applicable

2007h – Current KP Gain

Object Description

Index	2007
Description	The current controller proportional gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KCP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0 to 100.0
Units	Not Applicable

2008h – Current Controller D Integrator

Object Description

Index	2008
Description	**Not intended for user unless instructed by Technical Support.** The value of the current controller D integrator.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	KCIMEMD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Not Applicable

2009h – Current Controller Q Integrator

Object Description

Index	2009
Description	**Not intended for user unless instructed by Technical Support.** The value of the current controller Q integrator.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	KCIMEMQ

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648to 2147483647
Units	Not Applicable

200Ah – HD Anti-Vibration Filter

Object Description

Index	200A
Description	**Not intended for user unless instructed by Technical Support.** HD anti-vibration filter
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBGAIN2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0 to 1000.0
Range	0
Units	Not Applicable

200Bh – HD Anti-Resonance Sharpness

Object Description

Index	200B
Description	**Not intended for user unless instructed by Technical Support.** HD anti-resonance sharpness
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBSHARP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.5
Range	0.00999999977648 to 10.0
Units	Not Applicable

200Ch – HD Anti-Vibration Gain

Object Description

Index	200C
Description	**Not intended for user unless instructed by Technical Support.** HD anti-vibration gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBGAIN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 10000.0
Units	Rad×10-3/N

200Dh – Absolute Feedback Offset

Object Description

Index	200D
Description	The initial absolute position after power-cycle.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	ABSOFFSET

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

200Fh – Field Bus Unit Scaling

Object Description

Index	200F
Description	Field bus unit scaling for internal counts stating how many bits of 32-bit position are for number of revolutions.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	FBSCALE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	12
Range	0 to 20
Units	Not Applicable

2010h – Velocity Loop Bandwidth

Object Description

Index	2010
Description	The velocity control loop bandwidth for the pole placement controller.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	BW

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	30
Range	10 to 600
Units	Hz

2013h – Current CL VD

Object Description

Index	2013
Description	**Not intended for user unless instructed by Technical Support.** The voltage command to the D component.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	CLVD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

2014h – Current CL VQ

Object Description

Index	2014
Description	**Not intended for user unless instructed by Technical Support.** The voltage command to the Q component.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	CLVQ

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

2015h – Drive Name

Object Description

Index	2015
Description	The name assigned to the drive.
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	DRIVENAME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2016h – Electrical Position

Object Description

Index	2016
Description	The electrical angle position in 16-bit resolution.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ELECTANGLE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	65536/electrical cycle

2017h – HD Derivative Gain

Object Description

Index	2017
Description	HD derivative gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLD

Entry Description

Access	Read/Write
PDO Mapping	0.0
Default Value	0.0
Range	0.0 to 2000.0
Units	hertz (Hz)

2018h – HD Integral Gain

Object Description

Index	2018
Description	HD integral gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLI

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 200.0
Units	hertz (Hz)

2019h – HD Derivative-Integral Gain

Object Description

Index	2019
Description	HD derivative-integral gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLIV

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 400.0
Units	hertz (Hz)

201Ah – HD Proportional Gain

Object Description

Index	201A
Description	HD proportional gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 400.0
Units	hertz (Hz)

201Bh – HD Adaptive Gain Scale Factor

Object Description

Index	201B
Description	HD adaptive gain scale factor
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLUSERGAIN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0010000000475 to 3.0
Units	Not Applicable

201Ch – Position Acceleration Feedforward to Current

Object Description

Index	201C
Description	The position acceleration feedforward to current loop.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPAFRC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-1000.0. to 1000.0
Units	Not Applicable

201Dh – Position Acceleration Feedforward

Object Description

Index	201D
Description	The position acceleration feedforward.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPAFRV

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-1000.0 to 1000.0
Units	Not Applicable

201Eh – Position Derivative Gain

Object Description

Index	201E
Description	The position derivative gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPD

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 1000.0
Units	Not Applicable

201Fh – Position Proportional Adaptive Gain

Object Description

Index	201F
Description	The position adaptive proportional gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 4.0
Units	Not Applicable

2020h – Position Integral Gain

Object Description

Index	2020
Description	The position integral gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPI

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 1000.0
Units	hertz (Hz)

2021h – Position Integral Saturation Output

Object Description

Index	2021
Description	The position integral saturation output.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	KPISATOUT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user velocity units

2022h – Position Proportional Gain

Object Description

Index	2022
Description	The position proportional gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0 to 1200.0
Units	Not Applicable

2023h – Position Velocity Feedforward

Object Description

Index	2023
Description	The position control velocity feedforward.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPVFR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-1000.0 to 1000.0
Units	Not Applicable

2024h – Motor Type

Object Description

Index	2024
Description	Motor type
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	MOTORTYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 2
Units	Not Applicable

2025h – Velocity Feedforward Ratio

Object Description

Index	2025
Description	The velocity feedforward ratio.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KVFR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 1.0
Units	Not Applicable

2026h – Velocity Integrator

Object Description

Index	2026
Description	The velocity integral gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KVI

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 200000.0
Units	hertz (Hz)

2027h – Velocity Gain

Object Description

Index	2027
Description	The velocity proportional gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KVP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.00999999977648
Range	0.0 to 1000000.0
Units	Not Applicable

2028h – Mechanical Angle

Object Description

Index	2028
Description	The position of the motor in revolutions.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MECHANGLE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	65536/electrical cycle

2029h – Encoder Type

Object Description

Index	2029
Description	The type of motor encoder
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MENCTYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	11
Range	0 to 11
Units	Not Applicable

202Ah – Motor Encoder Index Position

Object Description

Index	202A
Description	The motor encoder index position.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MENCZPOS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	120
Range	0 to 359
Units	Electrical degree

202Bh – Motor and Feedback Direction

Object Description

Index	202B
Description	The direction and polarity of the motor and feedback.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MFBDIR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 7
Units	Not Applicable

202Ch – Point-to-Point Move Low Pass Filter

Object Description

Index	202C
Description	The low pass filter for point-to-point move.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	MOVESMOOTHLPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	5000
Range	10 to 5000
Units	Not Applicable

202Dh – Motor Feedback Mode

Object Description

Index	202D
Description	Motor feedback mode. Enables/disables the resolution enhancement mechanism.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MFBMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 1
Units	Not Applicable

202Eh − Motor Foldback Status

Object Description

Index	202E
Description	Motor foldback status. Indicates whether the motor foldback limit has dropped below the application current limits.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MFOLD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

202Fh − Motor Foldback Delay Time

Object Description

Index	202F
Description	Motor foldback delay time. The time delay for motor foldback; foldback is the amount of time the system current can exceed 6075h (MICONT) before the drive enters motor foldback state.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MFOLDD

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	5.0
Range	1.0 to 2400.0
Units	seconds (s)

2030h − Motor Foldback Disable

Object Description

Index	2030
Description	Motor foldback disable. Enables/disables motor foldback protection.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MFOLDDIS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2031h − Motor Foldback Recovery Time

Object Description

Index	2031
Description	The recovery time for motor foldback.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MFOLDR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	70.0
Range	5.0 to 3600.0
Units	seconds (s)

2032h − Motor Foldback Time Constant

Object Description

Index	2032
Description	The time constant for motor foldback.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MFOLDT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	5.0
Range	1.0 to 1200.0
Units	seconds (s)

2033h − Motor Foldback Current

Object Description

Index	2033
Description	The current limit derived from the motor foldback mechanism. Foldback condition occurs when 2033h (MIFOLD) goes below 6072h (ILIM).
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MIFOLD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	mA

2034h – Motor Foldback Fault Threshold

Object Description

Index	2034
Description	The motor foldback fault threshold.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MIFOLDFTHRESH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	mA

2035h – Motor Foldback Warning Threshold

Object Description

Index	2035
Description	The motor foldback fault warning threshold.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MIFOLDWTHRESH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	mA

2036h – Motor Peak Current

Object Description

Index	2036
Description	The peak rated current of the motor
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MIPEAK

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	mA

2037h – Rotor Inertia

Object Description

Index	2037
Description	The rotor inertia for rotary motors
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MJ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.019999999553
Range	0.0 to 200000
Units	$kg \times m^2 \times 10^{-3}$

2038h – Torque Constant for Linear Motors

Object Description

Index	2038
Description	The motor torque constant for linear motors.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MKF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.01600000076
Range	0.0010000000475 to 1000.0
Units	Not Applicable

2039h – Torque Constant

Object Description

Index	2039
Description	The motor torque constant.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MKT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.01600000076
Range	0.0010000000475 to 65.0
Units	Not Applicable

203Ah − Motor Inductance

Object Description

Index	203A
Description	The motor minimum line-to-line inductance.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	ML

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0010000000475 to 1000.0
Units	megahertz (MHz)

203Bh − Adaptive Gain Value at Continuous Motor Current

Object Description

Index	203B
Description	The current loop adaptive gain value at continuous motor current.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MLGAINC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.10000000149 to 1.0
Units	Not Applicable

203Ch – Adaptive Gain Value at Peak Motor Current

Object Description

Index	203C
Description	The current loop adaptive gain value at peak motor current.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MLGAINP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.10000000149 to 1.0
Units	Not Applicable

203Dh – Rotor Coil Mass (Linear Motor)

Object Description

Index	203D
Description	The moveable mass of linear motor without payload.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MMASS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 10000.0
Units	kilogram (kg)

203Eh – Motor Commutation Type

Object Description

Index	203E
Description	The type of motor commutation - brushless or brush.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MOTORCOMMTYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

203Fh – Motor Name

Object Description

Index	203F
Description	The name assigned to the motor
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	MOTORNAME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2040h – Phase Disconnect Scan

Object Description

Index	2040
Description	Enables/disables detection of wire breaks in motor phases.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MOTORPHASESCAN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2041h – Motor Setup

Object Description

Index	2041
Description	Starts an automatic procedure for setting commutation variables. Write 1 to enter this mode.
Object Code	Variable
Data Type	Integer8
Category	Optional
VarCom	MOVESMOOTHLPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2042h – Motor Setup Status

Object Description

Index	2042
Description	The status of the automatic motor setup procedure, 2041h (MOTORSETUP).
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MOVESMOOTHLPFHZ

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

2043h – Commutation Offset

Object Description

Index	2043
Description	The resolver/encoder phase relative to the standard commutation table.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MPHASE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 359
Units	degrees (°)

2044h – Drive Temperature

Object Description

Index	2044
Description	The temperature of the drive control and power boards (Celsius degrees). Sub-index 1 = Control board temperature Sub-index 2 = Power board temperature
Object Code	Array
Data Type	Integer16
Category	Optional
VarCom	DRIVETEMP

Entry Description

Sub-Index	000
Description	Number of entries
Category	Optional
Data Type	Unsigned8
Access	Read Only
PDO Mapping	No
Default Value	2
Range	0 to 2
Units	Not Applicable

Sub-Index	001
Description	Control Temperature
Category	Optional
Data Type	Integer16
Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Celsius degrees (°C)

Sub-Index	002
Description	Power Temperature
Category	Optional
Data Type	Integer16
Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Celsius degrees (°C)

2045h – Feedback Direction

Object Description

Index	2045
Description	Feedback positive direction.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	DIR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2046h – Disabling Mode

Object Description

Index	2046
Description	Defines if and how Disabling mode is used for stopping the motor
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	DISMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 5
Units	Not Applicable

2047h – Capture Input Position Offset

Object Description

Index	2047
Description	Deceleration distance. The target position offset value, relative to the position captured at a stop triggered by an input (input mode 15).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	DECDIST

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

2048h – Capture Input Position Offset 2

Object Description

Index	2048
Description	Deceleration distance 2. The target position offset value, relative to the position captured at a stop triggered by an input (input mode 16).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	DECDIST2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

2049h – Quick Stop Deceleration Time

Object Description

Index	2049
Description	The deceleration time for an Active Disabling/emergency stop.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	DECSTOPTIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 6500
Units	milliseconds (ms)

204Ah – Active Disabling Speed Threshold

Object Description

Index	204A
Description	The velocity below which the motor is considered stopped by Active Disable.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	DISSPEED

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 2147483647
Units	CAN user velocity units

204Bh – Active Disabling Time

Object Description

Index	204B
Description	The time delay after 0204Ah (DISSPEED) is reached until drive is disabled by Active Disabling.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	DISTIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	10
Range	0 to 6500
Units	millisecond (ms)

204Ch – Factory Restore

Object Description

Index	204C	
Description	Restores all configuration variables to factory default settings. Writing 01 initiates the factory restore command.	
Object Code	Variable	
Data Type	Unsigned8	
Category	Optional	
VarCom	FACTORYRESTORE	

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

204Dh – Feedback Type

Object Description

Index	204D
Description	The type of motor feedback.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	FEEDBACKTYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	2
Range	1 to 9
Units	Not Applicable

204Eh – Velocity Loop Output Filter Parameter 1

Object Description

Index	204E
Description	Velocity loop output filter first parameter.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	FILTHZ1

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	200
Range	1 to 10000
Units	hertz (Hz)

204Fh – Velocity Loop Output Filter Parameter 2

Object Description

Index	204F
Description	Velocity loop output filter second parameter.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	FILTHZ2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	200
Range	1 to 10000
Units	hertz (Hz)

2050h – Velocity Loop Output Filter

Object Description

Index	2050
Description	Defines the type of velocity loop output filter.
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	FILTMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 6
Units	Not Applicable

2051h – Foldback Status

Object Description

Index	2051
Description	Indicates whether the drive foldback limit (IFOLD) has dropped below the applications current limits (ILIM).
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	FOLD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

2052h – Friction Compensation Negative Current

Object Description

Index	2052
Description	The current added to the current command when the commanded velocity is negative. Limited by 207Bh (DIPEAK).
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	FRICINEG

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-2147483648 to 2147483647
Units	milliampere (mA)

2053h – Friction Compensation Positive Current

Object Description

Index	2053
Description	The current added to the current command when the commanded velocity is positive. Limited by 207Bh (DIPEAK).
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	FRICIPOS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-2147483648 to 2147483647
Units	milliampere (mA)

2054h – Friction Compensation Negative Velocity Hysteresis

Object Description

Index	2054
Description	The velocity hysteresis in the negative direction for the friction compensation mechanism.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	FRICNVHYST

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

2055h – Friction Compensation Positive Velocity Hysteresis

Object Description

Index	2055
Description	The velocity hysteresis in the positive direction for the friction compensation mechanism
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	FRICPVHYST

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

2056h – Halls State

Object Description

Index	2056
Description	The state of the Hall commutation sensors. Sub-index 1 = Hall U Sub-index 2 = Hall V Sub-index 3 = Hall W
Object Code	Array
Data Type	Unsigned8
Category	Optional
VarCom	HALLS

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	0 to 3
Units	Not Applicable

Sub-Index	001
Description	Hall U
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

Sub-Index	002
Description	Hall V
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

Sub-Index	003
Description	Hall W
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2057h – Invert Hall Signals

Object Description

Index	2057
Description	Inverts the polarity of the Hall signals associated with motor phases UVW. Sub-index 1, value 1 = inverts Hall U Sub-index 2, value 1 = inverts Hall V Sub-index 3, value 1 = inverts Hall W
Object Code	Array
Data Type	Unsigned8
Category	Optional
VarCom	HALLSINV

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	3
Range	0 to 3
Units	Not Applicable

Sub-Index	001
Description	Hall U
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

Sub-Index	002
Description	Hall V
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

Sub-Index	003
Description	Hall W
Category	Optional
Data Type	Unsigned8
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2058h – Hall Signals Type

Object Description

Index	2058
Description	Defines the connection of Hall sensors to the drive: single-ended or differential inputs.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	HALLSTYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 2
Units	Not Applicable

2059h – Harmonic Correction Feedback

Object Description

Index	2059
Description	**Not intended for user unless instructed by Technical Support.** Harmonic correction feedback
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	HCFB

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

205Ah – Harmonic Correction Feedback Parameter1

Object Description

Index	205A
Description	**Not intended for user unless instructed by Technical Support.** Harmonic correction feedback parameter 1.
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	4
Range	4
Units	Not Applicable

Sub-Index	001
Description	Configuration
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Argument 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0
Units	40

Sub-Index	003
Description	Argument 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 359
Units	Not Applicable

Sub-Index	004
Description	Argument 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user position units

205Bh – Harmonic Correction Feedback Parameter 2

Object Description

Index	205B
Description	**Not intended for user unless instructed by Technical Support.** Harmonic correction feedback parameter 2.
Object Code	Array
Data Type	Unsigned32
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	4
Range	0 to 4
Units	Not Applicable

Sub-Index	001
Description	Configuration
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Argument 1
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 40
Units	Not Applicable

Sub-Index	003
Description	Argument 2
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 359
Units	Not Applicable

Sub-Index	004
Description	Argument 3
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535FFFF
Units	CAN user position units

205Ch – Harmonic Correction Current

Object Description

Index	205C
Description	**Not intended for user unless instructed by Technical Support.** Actual Harmonic correction current.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	HCICMD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	milliampere (mA)

205Dh – Harmonic Current ICMD Parameter 1

Object Description

Index	205D
Description	**Not intended for user unless instructed by Technical Support.** Harmonic correction current command parameter 1.
Object Code	Record
Data Type	Contains 5 fields; see sub-indices.
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	4
Range	0 to 4
Units	Not Applicable

Sub-Index	001
Description	Configuration
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Entry Description

Sub-Index	002
Description	Argument 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 40
Units	Not Applicable

Sub-Index	003
Description	Argument 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 359
Units	Not Applicable

Sub-Index	004
Description	Argument 3
Object Code	Variable
Data Type	Real32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-3.40282346639e+038 to 3.40282346639e+038
Units	Not Applicable

205Eh – Harmonic Current ICMD Parameter 2

Object Description

Index	205E
Description	**Not intended for user unless instructed by Technical Support.** Harmonic correction current command parameter 2.
Object Code	Record
Data Type	Contains 5 fields; see sub-indices.
Category	Optional

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	4
Range	0 to 4
Units	Not Applicable

Sub-Index	001
Description	Configuration
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Entry Description

Sub-Index	002
Description	Argument 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 40
Units	Not Applicable

Sub-Index	003
Description	Argument 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 359
Units	Not Applicable

Sub-Index	004
Description	Argument 3
Object Code	Variable
Data Type	Real32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	-3.40282346639e+038 to 3.40282346639e+038
Units	Not Applicable

205Fh – HD Current LPF Rise Time

Object Description

Index	205F
Description	HD current filter low pass filter rise time.
Object Code	Variable
Data Type	Real32
Category	Optional

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	9.0
Range	0.0 to 30.0
Units	milliseconds (ms)

2060h – HD Current Filter Damping

Object Description

Index	2060
Description	**Not intended for user unless instructed by Technical Support.** HD current filter damping.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	NLFILTDAMPING

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 100
Units	percentage (%)

2061h – Current Notch Filter Center

Object Description

Index	2061
Description	**Not intended for user unless instructed by Technical Support.** HD current filter - notch filter center.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	NLNOTCHCENTER

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100
Range	100 to 10000
Units	hertz (Hz)

2062h – HD Current Notch Filter Bandwidth

Object Description

Index	2062
Description	**Not intended for user unless instructed by Technical Support.** HD current filter - notch filter bandwidth.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	NLNOTCHBW

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 500
Units	hertz (Hz)

2063h – Hold Position Command

Object Description

Index	2063
Description	Instructs motor whether to maintain its position. 0 = Do not hold position 1 = Hold position
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	HOLD

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2064h – Hardware Position External

Object Description

Index	2064
Description	The position as measured by an external feedback device.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	HWPEXT

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	counts

2065h – Hardware Position

Object Description

Index	2065
Description	The position (in counts) as measured by the feedback device.
Object Code	Variable
Data Type	UNSIGNED64
Category	Optional
VarCom	HWPOS

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

2066h – Current D Axis

Object Description

Index	2066
Description	In vector control, indicates the value perpendicular to 2067h (IQ)
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ID

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Current units

2067h – Current Q Axis

Object Description

Index	2067
Description	In vector control, indicates the current for the torque. This value is perpendicular to 2066h (ID).
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	IQ

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Current units

2068h – Current Feedforward LPF

Object Description

Index	2068
Description	The corner frequency of a first-order filter of the feedforward low pass filter.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	IFFLPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	80
Range	10 to 1000
Units	hertz (Hz)

2069h – Drive Foldback Current Limit

Object Description

Index	2069
Description	The current limit derived from the foldback mechanism Foldback condition occurs when 2069h (IFOLD) goes below 6072h (ILIM).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IFOLD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Current units

206Ah – Drive Foldback Fault Threshold

Object Description

Index	206A
Description	The current threshold for declaring a fault due to foldback.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	IFOLDFTHRESH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Current units

206Bh – Drive Foldback Warning Threshold

Object Description

Index	206B
Description	The current threshold for declaring a warning due to foldback. Threshold warning is declared when 2069h (IFOLD) goes below 206Ah (IFOLDFTHRESH).
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	IFOLDWTHRESH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	Current units

206Ch – Gravity Compensation

Object Description

Index	206C
Description	Value added to the current loop command to compensate for gravity or similar constant interference.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IGRAV

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Current units

206Dh – Encoder Index Initialization

Object Description

Index	206D
Description	Detects when the encoder index is crossed and sets 202Ah (MENCZPOS). 0 = Index not found 1 = Index found
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	INDEXFIND

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

206Eh – Encoder Initialization Status

Object Description

Index	206E
Description	The state of the index search and initialization procedure 206Dh (INDEXFIND). 0 = The index search was not started. 1 = Search for index is running. 2 = Index capture is done.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	INDEXFINDST

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

206Fh – Encoder Index Position Feedback

Object Description

Index	206F
Description	The position feedback value captured at the encoder index position.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	INDEXPFB

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

2070h – Input Inversion

Object Description

Index	2070
Description	The inversion state of each digital input. The index should be written first. Then, writing the value executes the actual input inversion.
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	ININV

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Index
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	1 to 11
Units	Not Applicable

Sub-Index	002
Description	Value
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2071h – Dynamic Brake Current

Object Description

Index	2071
Description	Maximum current for dynamic braking. Limited by 207Bh (DIPEAK).
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	ISTOP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 150000
Units	milliampere (mA)

2072h – Phase U Actual Current

Object Description

Index	2072
Description	The actual current at phase U (of UVW).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IU

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	milliampere (mA)

2073h – Phase U Current Offset

Object Description

Index	2073
Description	The current offset of phase U (of UVW).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IUOFFSET

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	milliampere (mA)

2074h – Phase V Actual Current

Object Description

Index	2074
Description	The actual current at phase V (of UVW).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IV

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Current units

2075h – Phase V Current Offset

Object Description

Index	2975
Description	The current offset of phase V (of UVW).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IVOFFSET

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	milliampere (mA)

2076h – Zero Procedure Current

Object Description

Index	2076
Description	The current for the Zero procedure.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	IZERO

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100
Range	0 to 150000
Units	milliampere (mA)

2077h – Position Integral Saturation Input

Object Description

Index	2077
Description	Position Integral Saturation Input
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KPISATIN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 10000.0
Units	Not Applicable

2078h – Negative Limit Switch Status

Object Description

Index	2078
Description	The state of the hardware limit switches as configured by the digital inputs, in the negative direction.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	LIMSWITCHNEG

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2079h – Positive Limit Switch Status

Object Description

Index	2079
Description	The state of the hardware limit switches as configured by the digital inputs, in the positive direction.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	LIMSWITCHPOS

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

207Ah – Load to Motor Inertia Ratio

Object Description

Index	207A
Description	The ratio of the load inertia to the motor inertia.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	LMJR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 600.0
Units	Not Applicable

207Bh – Drive Peak Current

Object Description

Index	207B
Description	The peak rated current of the drive (sinusoidal peak).
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	DIPEAK

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	25455
Range	1 to 4294967295
Units	millampere (mA)

207Ch − Drive Continuous Current

Object Description

Index	207C
Description	The continuous rated current for the drive (sinusoidal peak).
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	DICONT

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	8485
Range	1 to 4294967295
Units	milliampere (mA)

207Dh − Motor Pitch

Object Description

Index	207D
Description	The pitch of a linear motor.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MPITCH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	32
Range	1 to 100000
Units	millimeters (mm)

207Eh – Motor Poles

Object Description

Index	207E
Description	The number of individual poles (not pairs) in the motor.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	MPOLES

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	2
Range	2 to 80
Units	poles

207Fh – Motor Resistance

Object Description

Index	207F
Description	The motor resistance.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 10.0
Units	Ohm (Ω)

2080h – Motor Resolver Poles

Object Description

Index	2080
Description	The number of individual poles in the resolver feedback device.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	MRESPOLES

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	2
Range	2 to 80
Units	poles

2081h – Motor Rated Torque

Object Description

Index	2081
Description	Motor rated torque
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MRT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	2000
Range	1 to 4294967295
Units	millinewton meter (mNm)

2082h – Current KCFF Gain

Object Description

Index	2082
Description	The current controller feed-forward gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KCFF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0 to 100.0
Range	1.0
Units	Not Applicable

2083h – Torque Commutation Angle Advance at Motor Continuous Current

Object Description

Index	2083
Description	The torque-related commutation angle advance at motor continuous current rating.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MTANGLC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 45
Units	degrees (°)

2084h – Torque Commutation Angle Advance at Motor Peak Current

Object Description

Index	2084
Description	The torque-related commutation angle advance at motor peak current.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MTANGLP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 45
Units	degrees (°)

2085h – Velocity Commutation Angle Advance at Motor Maximum Speed

Object Description

Index	2085
Description	The velocity-related commutation angle advance at motor maximum speed.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MVANGLF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 90
Units	degrees (°)

2086h – Velocity Commutation Angle Advance at Motor Maximum Speed/2

Object Description

Index	2086
Description	The velocity-related commutation angle advance at motor maximum speed/2.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MVANGLH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 90
Units	degrees (°)

2087h – HD Spring Filter

Object Description

Index	2087
Description	**Not intended for user unless instructed by Technical Support.** HD spring filter
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	NLAFFLPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	7000
Range	10 to 7000
Units	hertz (Hz)

2088h – PFB Backup

Object Description

Index	2088
Description	PFB backup. Reads the PFB values from non-volatile memory that were saved by the PFB backup process.
Object Code	Variable
Data Type	Integer 32
Category	Optional
VarCom	PFBBACKUP

Entry Description

Access	Read only
PDO Mapping	no
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

2089h – PFB Backup Mode

Object Description

Index	2089
Description	PFB backup mode. Enables and disables the 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.
Object Code	Variable
Data Type	Unsigned integer 16
Category	Optional
VarCom	PFBBACKUPMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

208Ah − HD Maximum Adaptive Gain

Object Description

Index	208A
Description	**Not intended for user unless instructed by Technical Support.** HD maximum adaptive gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLMAXGAIN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	1.0 to 5.0
Units	Not Applicable

208Bh − HD Current Filter − Second Notch Filter Bandwidth

Object Description

Index	208B
Description	**Not intended for user unless instructed by Technical Support.** HD current filter - second notch filter bandwidth
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	NLNOTCH2BW

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 500
Units	hertz (Hz)

208Ch – HD Current Filter – Second Notch Filter Center

Object Description

Index	208C
Description	**Not intended for user unless instructed by Technical Support.** HD current filter - second notch filter center
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	NLNOTCH2CENTER

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100
Range	100 to 10000
Units	hertz (Hz)

208Dh – Emergency or Controlled Stop Current Limit

Object Description

Index	208D
Description	The current limit during an emergency or controlled stop
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MOVESMOOTHLPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0010000000475 to 1.0
Units	Not Applicable

208Eh – Position Command

Object Description

Index	208E
Description	Position command
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PCMD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

208Fh – HD Flexibility Compensation

Object Description

Index	208F
Description	**Not intended for user unless instructed by Technical Support.** HD spring gain.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLPEAFF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 200000.0
Units	hertz (Hz)

2090h – Home Status

Object Description

Index	2090
Description	Homing status
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	PCMD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

2091h – HD Spring Deceleration Ratio

Object Description

Index	2091
Description	**Not intended for user unless instructed by Technical Support.** HD spring deceleration ratio
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLPEDFFRATIO

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0 to 1.99899995327
Units	Not Applicable

2093h − HD Autotune Command

Object Description

Index	2093
Description	**Not intended for user unless instructed by Technical Support.** Starts the HD autotuning procedure.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	NLTUNE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 3
Units	Not Applicable

2094h − HD Autotune Procedure Parameter

Object Description

Index	2094
Description	**Not intended for user unless instructed by Technical Support.** HD autotuning procedure parameter.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	NLTUNEPARAM

Entry Description

Access	Not Applicable
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

2095h – Position Feedback Offset

Object Description

Index	2095
Description	Position feedback offset
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PBFOFFSET

Entry Description

Access	Not Applicable
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2096h – HD Anti Vibration Filter

Object Description

Index	2096
Description	**Not intended for user unless instructed by Technical Support.** HD anti-resonance center frequency.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	400.000030518
Range	5.0 to 400.0
Units	hertz (Hz)

2097h – HD Anti Vibration Filter 2

Object Description

Index	2097
Description	**Not intended for user unless instructed by Technical Support.** HD position error filter frequency.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBHZ2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	400.000030518
Range	5.0 to 400.0
Units	hertz (Hz)

2098h – HD Autotune Timeout

Object Description

Index	2098
Description	**Not intended for user unless instructed by Technical Support.** Timeout of the HD autotuning procedure.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	NLTUNETIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 20000
Units	millisecond (ms)

2099h – Current Level 1 for Digital Output Definition

Object Description

Index	2099
Description	The first current value for a condition that controls a digital output.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	OUTILVL1

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 150000
Units	milliampere (mA)

209Ah – Current Level 2 for Digital Output Definition

Object Description

Index	209A
Description	The second current value for a condition that controls a digital output.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	OUTILVL2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 150000
Units	milliampere (mA)

209Bh – Output Inversion

Object Description

Index	209B
Description	The inversion state of each digital output. The index should be written first. Then, writing the value executes the actual output inversion.
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	OUTINV

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Index
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 7
Units	Not Applicable

Sub-Index	002
Description	Value
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

209Ch – Output Mode

Object Description

Index	209C
	Defines the function of each digital input.
	The index should be written first. Then, writing the value assigns the actual function to the corresponding output index.
	Function codes:
	0 = Idle
	1 = Active (enabled)
	2 = Brake
	3 = Fault exists (alarm)
	4 = In position
	5 = Stopped
	6 = Foldback
	7 = Current level
	8 = Current range
	9 = Velocity level
	10 = Velocity range
	11 = Position level
	12 = Position range
	13 = Battery low voltage warning Tamagawa 17 bit Encoder
	14 = Warning on
	15 = Faults or disabled
	16 = Battery low voltage fault Tamagawa 17 bit Encoder
	17 = Wake No Shake succeeded.
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	OUTMODE

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Output index
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1
Units	Not Applicable

Sub-Index	002
Description	Function code
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0
Units	Not Applicable

209Dh – Position Level 1 for Digital Output Definition

Object Description

Index	209D
Description	The first position value for a condition that controls a digital output.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	OUTPLVL1

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

209Eh – Position Level 2 for Digital Output Definition

Object Description

Index	209E
Description	The second position value for a condition that controls a digital output.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	OUTPLVL2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

209Fh – Velocity Level 1 for Digital Output Definition

Object Description

Index	209F
Description	The first velocity value for a condition that controls a digital output.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	OUTVLVL1

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

20A0h – Velocity Level 2 for Digital Output Definition

Object Description

Index	20A0
Description	The second velocity value for a condition that controls a digital output.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	OUTVLVL2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648to 2147483647
Units	CAN user velocity units

20A1h – Over-Voltage Threshold

Object Description

Index	20A1
Description	The level for detection of a bus over-voltage condition.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	OVTHRESH

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	volt (V)

20A2h - Software Enable Status

Object Description

Index	20A2
Description	Software enable status
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	SWEN

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20A3h – Position Loop Position Error

Object Description

Index	20A3
Description	Position error value used by the position loop.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PELOOP

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

20A4h – Phase Find Command

Object Description

Index	20A4
Description	Starts a procedure that initializes commutation for incremental encoder systems. Writing 1 initiates the Phase Find command.
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	PHASEFIND

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20A5h – Forced Electrical Position

Object Description

Index	20A5
Description	The position in one revolution.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	PHASEFINDANGLE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	65536/electrical cycle

20A6h – Phase Find Gain

Object Description

Index	20A6
Description	Adjusts the gain of the phase finding mechanism.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	PHASEFINDGAIN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0.0 to 10.0
Units	Not Applicable

20A7h – Phase Find Current

Object Description

Index	20A7
Description	Adjusts the current of the phase finding mechanism. Limited by 6073h (IMAX).
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	PHASEFINDI

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	150000
Units	milliampere (mA)

20A8h – Phase Find Mode

Object Description

Index	20A8
Description	Defines commutation for phase finding. 0 = Injects test signals and analyzes motor behavior to initialize commutation. 2 = Soft start - increases current at a known commutation angle (wake-no-shake). 11 = Manual commutation offset. Commutation offset is defined by the value of 20A5h (PHASEFINDANGLE).
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	PHASEFINDMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 11
Units	Not Applicable

20A9h – Phase Find Status

Object Description

Index	20A9
Description	The state of the phase finding procedure for incremental encoders. 0 = Not started 1 = Running 2 = Succeeded 3 = Failed
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	PHASEFINDST

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20AAh – Phase Find Duration

Object Description

Index	20AA
Description	Limits the duration of phase finding 20A8h (PHASEFINDMODE) in soft start mode (input 2).
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	PHASEFINDTIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100
Range	0 to 10000
Units	milliseconds (ms)

20ABh – Position Loop Controller Mode

Object Description

Index	20AB
Description	Defines the type of position loop controller. 0 = Standard cascaded position controller. 1 = HD position controller .
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	POSCONTROLMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20ACh – Software Position Limit Mode

Object Description

Index	20AC
Description	Enables/disables software position limits.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	POSLIMMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20ADh – PRB Generator Frequency

Object Description

Index	20AD
Description	**Not intended for user unless instructed by Technical Support.**
	Defines the frequency for PRB excitation.
	For pseudo binary noise (208Fh sub-index 1 = 0, 1), this object has no effect.
	For sine and square wave generators (208Fh sub-index 1 = 2 or 208Fh sub-index 1 = 3), this object defines the frequency of the sine and square wave generator, respectively.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	PRBFRQ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100.0
Range	0.0 to 5000.0
Units	hertz (Hz)

20AEh – PRB Generator Mode

Object Description

Index	20AE	
Description	**Not intended for user unless instructed by Technical Support.** Defines if and how the PRB signal generator is activated: 0 = PRB generator not activated 1 = PRB generator activated only during recording 2 = PRB generator activated continuously	
Object Code	Variable	
Data Type	Unsigned16	
Category	Optional	
VarCom	PRBMODE	

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 2
Units	Not Applicable

20AFh – PRB Generator Configuration

Object Description

Index	20AF

Description	**Not intended for user unless instructed by Technical Support.**
	PRB generator configuration.
	Signal Type:
	    0 - 8 bit random noise
	    1 - 10 bit random noise
	    2 - sine wave
	    3 - square wave
	Current Amplitude is limited with the Max Current (6073h).
	Velocity Amplitude is limited with the Max Profile Velocity (607Fh).
	Counter Period is relative to current loop update rate.

Object Code	Record
Data Type	PRB_PAR
Category	Optional
VarCom	PRBPARAM

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	5
Range	5
Units	Not Applicable

Sub-Index	001
Description	Signal type
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 3
Units	Not Applicable

Sub-Index	002
Description	Current Amplitude
Object Code	Variable
Data Type	Integer32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648to 2147483647
Units	Amp I

Sub-Index	003
Description	Velocity amplitude
Object Code	Variable
Data Type	Integer32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648to 2147483647
Units	Amp V

Sub-Index	004
Description	Counter period
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	005
Description	Configuration
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20B0h – PTP Generator Target Error

Object Description

Index	20B0
Description	The target error during a motion profile (the distance remaining to the destination in a point-to-point move).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PTPTE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

20B1h – PTP Generator Velocity Command

Object Description

Index	20B1
Description	The derivative of the position command profile, in velocity units.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PTPVCMD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

20B2h – PWM Frequency

Object Description

Index	20B2
Description	The frequency of the PWM signals.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	PWMFRQ

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0.0
Range	-3.40282346639e+038 to 3.40282346639e+038
Units	kilohertz (kHz)

20B3h – Gearmode

Object Description

Index	20B3
Description	Gear operation mode
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	GEARMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4
Units	Not Applicable

20B4h – PWM Saturation Ratio

Object Description

Index	20B4
Description	**Not intended for user unless instructed by Technical Support.** The duration of current saturation within a commutation cycle.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	PWMSATRATIO

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.5
Range	0.5 to 1.5
Units	Not Applicable

20B5h – Position Error in Position Flag

Object Description

Index	20B5
Description	Position error in position flag
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	INPOS

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20B6h – Machine Hardware Position External

Object Description

Index	20B6
Description	**Not intended for user unless instructed by Technical Support.** Hardware position external (DSP)
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	HWPEXTMACHN

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-2147483648 to 2147483647
Units	Not Applicable

20B8h – Fault Relay Status

Object Description

Index	20B8
Description	The state of the fault relay. 0 = Relay open 1 = Relay closed
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	RELAY

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20B9h – Fault Relay Mode

Object Description

Index	20B9
Description	Defines how the fault relay operates. 0 = Relay opens upon fault. 1 = Relay opens upon disable.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	RELAYMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20BAh – Remote Hardware Enable Status

Object Description

Index	20BA
Description	Indicates the state of the external hardware enable input. 0 = Remote enable input off. 1 = Remote enable input on.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	REMOTE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20BBh – Resolver Amplitude Range

Object Description

Index	20BB
Description	The acceptable range of deviation of resolver sine/cosine signals (as a percentage).
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	RESAMPLRANGE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	35
Range	0 to 100
Units	percentage (%)

20BCh – Resolver Conversion Bandwidth

Object Description

Index	20BC
Description	Resolver conversion bandwidth.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	RESBW

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	300
Range	200 to 800
Units	hertz (Hz)

20BDh – Save/Load Status

Object Description

Index	20BD
Description	Save/load status
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

20BEh – Sine/Cosine Calibration Command

Object Description

Index	20BE
Description	Activates a procedure that calibrates the resolver sine/cosine signals.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	SININIT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20BFh – Sine/Cosine Calibration Mode

Object Description

Index	20BF
Description	Enables/disables automatic calibration of sine/cosine signals.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	SININITMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20C0h – Sine/Cosine Calibration Status

Object Description

Index	20C0
Description	The state of resolver calibration procedure.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	SININITST

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20C1h – Sine/Cosine Calibration Parameters

Object Description

Index	20C1
Description	Returns the parameters for calibration of the resolver sine and cosine signals.
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	SINPARAM

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20C2h – Synchronization Mode

Object Description

Index	20C2
Description	Defines the method used to synchronize the drive clock to an external sync signal: 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)
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	SYNCSOURCE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 5
Units	Not Applicable

20C3h – Tracking Factor

Object Description

Index	20C3
Description	The derivative factor for tracking with PDFF velocity controller.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	TF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100
Range	0 to 200
Units	percentage (%)

20C4h – Motor Over-Temperature

Object Description

Index	20C4
Description	The state of the motor thermostat input that indicates an over-temperature condition: 0 = Thermostat input closed (normal) or ignored, when 20C6h (THERMODE) = 3 1 = Thermostat input open, indicating overheating
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	THERM

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20C5h – Motor Over-Temperature Clear Fault Level

Object Description

Index	20C5
Description	The level at which a motor over-temperature fault is cleared.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	THERMCLEARLEVEL

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	100
Range	0 to 1000000
Units	Ohm (Ω)

20C6h – Motor Over-Temperature Mode

Object Description

Index	20C6
Description	Defines how the drive will respond to an over-temperature fault: 0 = Disable drive immediately. 3 = Ignore thermostat input. 4 = Issue warning only. 5 = Issue warning; if condition persists after 20C8h (THERMTIME), issue fault.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	THERMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 5
Units	Not Applicable

20C7h – Motor Temperature

Object Description

Index	20C7
Description	The motor temperature.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	THERMREADOUT

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Ohm (Ω)

20C8h – Motor Over-Temperature Time

Object Description

Index	20C8
Description	The number of seconds after detection of motor over-temperature until the drive opens the fault relay.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	THERMTIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	30
Range	0 to 300
Units	seconds (s)

20C9h – Motor Over-Temperature Fault Level

Object Description

Index	20C9
Description	The motor over-temperature fault level.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	THERMTRIPLEVEL

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	150
Range	0 to 1000000
Units	Ohm (Ω)

20CAh – Motor Over-Temperature Type

Object Description

Index	20CA
Description	The type of motor temperature sensor: 0 = Positive temperature coefficient (PTC) 1 = Negative temperature coefficient (NTC)
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	THERMTYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20CBh – Tamagawa Multi-Turn Reset

Object Description

Index	20CB
Description	Resets the counter of a Tamagawa multi-turn encoder. Writing 01 initiates the command.
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	TMTURNRESET

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20CCh – Run Time

Object Description

Index	20CC
Description	The total elapsed run time of the drive since production (cannot be reset).
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	TRUN

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20CDh – Under-Voltage Mode

Object Description

Index	20CD
Description	Defines how the drive will respond to an under-voltage fault: 0 = Latches fault immediately. 1 = Shows warning only (when disabled, does not display warning). 2 = Shows warning, then waits 20D0h (UVTIME) before the fault is latched (when disabled, does not display warning). 3 = Fault only if under-voltage exists and drive is enabled.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UVMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 3
Units	Not Applicable

20CEh – Under-Voltage Recovery Mode

Object Description

Index	20CE
Description	Defines how the drive will recover from an under-voltage fault: 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.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UVRECOVER

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20CFh – Under-Voltage Threshold

Object Description

Index	20CF
Description	The level for detection of an under-voltage condition.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UVTHRESH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1000
Units	volt (V)

20D0h – Under-Voltage Time

Object Description

Index	20D0
Description	The length of time an under-voltage warning is displayed before it is latched in 20CDh (UVMODE) = 2.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UVTIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	30
Range	0 to 300
Units	seconds (s)

20D1h – Bus Voltage (DC)

Object Description

Index	20D1
Description	Drive bus voltage used for current controller design.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	VBUS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	320
Range	10 to 850
Units	volt (V)

20D3h – Velocity Error

Object Description

Index	20D3
Description	The velocity error of velocity loop.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	VE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

20D4h – Velocity Loop Controller

Object Description

Index	20D4
Description	Defines the type of velocity loop controller: 0 = PI controller: uses 2026h (KVP), 2027h (KVI) 1 = PDFF controller: uses 2025h (KVP), 2026h (KVI), 2027h (KVFR) 2 = Standard pole placement controller: uses 2037h (MJ), 2039h (MKT), 2010h (BW), 207Ah (LMJR), 20C3h (TF) 3 = Extended polynomial controller: uses 20DBh (VR), 20DAh (VH), 20D8h (VF), and VarCom VD. – *Still in development.* 4 = High frequency pole placement controller: (uses 2037h (MJ), 2039h (MKT), 2010h (BW), 207Ah (LMJR), 20C3h (TF) 5 = HD velocity control with integrator: 2018h (KNLI), 2019h (KNLIV) 6 = HD velocity control without integrator
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	VELCONTROLMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 6
Units	Not Applicable

20D5h – Velocity Design Structure

Object Description

Index	20D5
Description	**Not intended for user unless instructed by Technical Support.** Velocity design structure. 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 standard cascaded position controller: Position Loop Controller Mode (20ABh) = 0.
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	VELDESIGN

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20D6h – Velocity Filter Mode

Object Description

Index	20D6
Description	The type of filter for extracting a velocity signal from the position feedback: 0 = No filter 1 = First order filter 2 = Observer type I 3 = Observer type II
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	VELFILTMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 3
Units	Not Applicable

20D7h – Drive Version

Object Description

Index	20D7
Description	The firmware version of drive.
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	VER

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20D8h – Velocity Loop Output Filter

Object Description

Index	20D8
Description	**Not intended for user unless instructed by Technical Support.** User defined velocity loop output filter.
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	VF

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	8
Range	0 to 65535
Units	Not Applicable

Sub-Index	001
Description	Velocity loop output filter parameter 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	002
Description	Velocity loop output filter parameter 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	003
Description	Velocity loop output filter parameter 3
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	004
Description	Velocity loop output filter parameter 4
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	005
Description	Velocity loop output filter parameter 5
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	006
Description	Velocity loop output filter parameter 6
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	007
Description	Velocity loop output filter parameter 7
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	008
Description	Configuration
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20D9h – Velocity Loop Input Filter

Object Description

Index	20D9
Description	**Not intended for user unless instructed by Technical Support.** User defined velocity loop input filter
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	VFI

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	8
Range	0 to 65535
Units	Not Applicable

Sub-Index	001
Description	User defined velocity loop input filter parameter 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	002
Description	User defined velocity loop input filter parameter 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	003
Description	User defined velocity loop input filter parameter 3
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	004
Description	User defined velocity loop input filter parameter 4
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	005
Description	User defined velocity loop input filter parameter 5
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	006
Description	User defined velocity loop input filter parameter 6
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	007
Description	User defined velocity loop input filter parameter 7
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	008
Description	Configuration
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20DAh – Advanced Pole Placement H Polynomial

Object Description

Index	20DA
Description	**Not intended for user unless instructed by Technical Support.** Advanced Pole Placement H Polynomial
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	VH

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	13
Range	0 to 65535
Units	Not Applicable

Sub-Index	001
Description	Advanced pole placement H polynomial parameter 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	002
Description	Advanced pole placement H polynomial parameter 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	003
Description	Advanced pole placement H polynomial parameter 3
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	004
Description	Advanced pole placement H polynomial parameter 4
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	005
Description	Advanced pole placement H polynomial parameter 5
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	006
Description	Advanced pole placement H polynomial parameter 6
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	007
Description	Advanced pole placement H polynomial parameter 7
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	008
Description	Advanced pole placement H polynomial parameter 8
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	009
Description	Advanced pole placement H polynomial parameter 9
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	010
Description	Advanced pole placement H polynomial parameter 10
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	011
Description	Advanced pole placement H polynomial parameter 11
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	012
Description	Advanced pole placement H polynomial parameter 12
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	013
Description	Configuration
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20DBh – Advanced Pole Placement R Polynomial

Object Description

Index	20DB
Description	**Not intended for user unless instructed by Technical Support.** Advanced Pole Placement R Polynomial
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	VR

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	11
Range	0 to 65535
Units	Not Applicable

Sub-Index	001
Description	Advanced pole placement R polynomial parameter 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	002
Description	Advanced pole placement R polynomial parameter 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	003
Description	Advanced pole placement R polynomial parameter 3
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	004
Description	Advanced pole placement R polynomial parameter 4
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	005
Description	Advanced pole placement R polynomial parameter 5
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	006
Description	Advanced pole placement R polynomial parameter 6
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	007
Description	Advanced pole placement R polynomial parameter 7
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	008
Description	Advanced pole placement R polynomial parameter 8
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	009
Description	Advanced pole placement R polynomial parameter 9
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	010
Description	Advanced pole placement R polynomial parameter 10
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	011
Description	Configuration
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20DCh – Wake No Shake Status

Object Description

Index	20DC
Description	**Not intended for user unless instructed by Technical Support.** Wake No Shake Status.
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	WNSERR

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20DDh – Display Warnings

Object Description

Index	20DD
Description	Lists all warnings that have occurred since buffer was cleared.
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	WRN

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20DEh – External Encoder Resolution

Object Description

Index	20DE
Description	The resolution of the external encoder.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	XENCRES

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Not Applicable

20DFh – Zeroing Command

Object Description

Index	20DF
Description	Enables/disables the resolver/encoder Zeroing mode.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ZERO

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	65535

20E0h – Input Mode

Object Description

Index	20E0
Description	Defines the function of each digital input.
	The index should be written first. Then, writing the value
	assigns the actual function to the corresponding input index.
	Function codes:
	0 - Idle
	1 - Remote enable
	2 - Reset faults
	3 - PLL synchronization
	4 - Emergency stop
	5 - Limit switch positive
	6 - Limit switch negative
	7 - Reserved
	8 - Homing
	9 - Script
	10 - Script bit 0
	11 - Script bit 1
	12 - Script bit 2
	13 - Script bit 3
	14 - Script bit 4
	15 - Deceleration by DECDIST On
	16 - Deceleration by DECDIST2 On
	17 - Pulse signal (input 5 only)
	18 - Direction signal (input 6 only)
	19 - Script execution upon change in input
Object Code	Array
Data Type	Unsigned16
Category	Optional
VarCom	INMODE

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2

Units	Not Applicable

Sub-Index	001
Description	Input Index
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 11
Units	Not Applicable

Sub-Index	002
Description	Function Code
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 19
Units	Not Applicable

20E1h – Rotary Address Switch

Object Description

Index	20E1
Description	The rotary switch position that defines the drive communication address
Object Code	Variable
Data Type	Visible_String
Category	Optional
VarCom	ADDR

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20E2h – Test 7-Segment Display

Object Description

Index	20E2
Description	Tests the 7-segment display on drive front panel
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	DISPLAYTEST

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20E3h – Encoder Simulation Mode

Object Description

Index	20E3
Description	Defines whether encoder simulation is active.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ENCOUTMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20E4h – Encoder Simulation Resolution

Object Description

Index	20E4
Description	The resolution of the encoder simulation output (in number of lines).
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	ENCOUTRES

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	2048
Range	±10,000,000, but not 0
Units	number of lines

20E5h – Encoder Simulation Index Position

Object Description

Index	20E5
Description	The index offset value of the encoder simulation output.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	ENCOUTZPOS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 40000000
Units	counts

20E6h – Record Done Indicator

Object Description

Index	20E6
Description	Indicates whether the recording is complete and data is available.
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	RECDONE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

20E7h – Get Recorded Data

Object Description

Index	20E7
Description	Get recorded data
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	GET

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	6
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	PacketSelect
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	002
Description	Domain
Object Code	Variable
Data Type	Domain
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

Sub-Index	003
Description	Data length
Object Code	Variable
Data Type	Integer16
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 32768
Units	Not Applicable

Sub-Index	004
Description	Data status
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	005
Description	RT Data Ack
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	006
Description	Number of channels
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20E8h – Trigger Recording

Object Description

Index	20E8
Description	Trigger recording
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	RECTRIG

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	5
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Variable
Object Code	Variable
Data Type	Visible_String
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

Sub-Index	002
Description	Domain
Object Code	Variable
Data Type	Domain
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

Sub-Index	003
Description	Pre-trig
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	004
Description	EdgePlr
Object Code	Variable
Data Type	Optional
Category	Unsigned8
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	005
Description	Activate
Object Code	Variable
Data Type	Optional
Category	Unsigned8
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

20E9h – Cancel Recording

Object Description

Index	20E9
Description	Record Off
Object Code	Variable
Data Type	Optional
Category	Unsigned8
VarCom	RECOFF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20EAh – Record

Object Description

Index	20EA
Description	Record command
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	RECORD

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Not Applicable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	9
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Sample time
Object Code	Not Applicable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

Sub-Index	002
Description	Number of points
Object Code	Not Applicable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 65535
Units	Not Applicable

Sub-Index	003 – 004 – 005 – 006 – 007 – 008
Description	Var1 – Var2 – Var3 – Var4 – Var5 - Var6
Object Code	Not Applicable
Data Type	Visible_String
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

Sub-Index	009
Description	Activate
Object Code	Not Applicable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

20EBh – Recording Status

Object Description

Index	20EB
Description	Recording status
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	RECING

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

20ECh – Ready to Record

Object Description

Index	20EC
Description	Ready to record
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	RECRDY

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

20EDh – HD Autotune Status

Object Description

Index	20ED
Description	**Not intended for user unless instructed by Technical Support.** HD autotuning status
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	NLTUNEST

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Not Applicable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	StatusSelect
Object Code	Not Applicable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4
Units	Not Applicable

Sub-Index	002
Description	Domain
Object Code	Not Applicable
Data Type	Domain
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

20EEh – Drive and Motor Maximum Velocity

Object Description

Index	20EE
Description	Maximum velocity for a drive and motor
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	VMAX

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Not Applicable

20EFh – Dead Time Compensation Minimal Level

Object Description

Index	20EF
Description	**Not intended for user unless instructed by Technical Support.** Minimal current level to start compensate dead time effect.
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KCD

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1.0
Range	0 to 10
Units	Not Applicable

20F0h – Drive and Motor Maximum Current

Object Description

Index	20F0
Description	Maximum current for a drive and motor combination.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	IMAX

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	150000
Units	milliampere (mA)

20F1h – Motor Encoder Resolution

Object Description

Index	20F1
Description	The resolution of the motor encoder in number of lines per revolution of the motor.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MENCRES

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	2048
Range	16 to 10000000
Units	Lines per revolution

20F2h – Analog Input 1

Object Description

Index	20F2
Description	The value of analog input 1.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN1

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-32768 to 32767
Units	volt (V)

20F3h – Analog Input 1 Deadband

Object Description

Index	20F3
Description	The deadband range of analog input 1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ANIN1DB

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	volt (V)

20F4h – Analog Input 1 Current Scaling

Object Description

Index	20F4
Description	The scaling value of the analog current command from input 1.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	ANIN1ISCALE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	volt (V)

20F5h – Analog Input 1 Low Pass Filter

Object Description

Index	20F5
Description	The corner frequency of a first order filter that is applied to analog input 1.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN1LPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	hertz (Hz)

20F6h – Analog Input 1 Offset

Object Description

Index	20F6
Description	The offset voltage for analog input 1.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN1OFFSET

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	volt (V)

20F7h – Analog Input 1 Velocity Scaling

Object Description

Index	20F7
Description	The scaling value of the analog velocity command from input 1
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	ANIN1VSCALE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	volt (V)

20F8h – Analog Input 1 Zeroing

Object Description

Index	20F8
Description	Zeroes the value of analog input 1 by modifying the analog offset value.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ANIN1ZERO

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

20F9h – Analog Input 2

Object Description

Index	20F9
Description	The value of analog input 2
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN2

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-32768 to 32767
Units	volt (V)

20FAh – Analog Input 2 Deadband

Object Description

Index	20FA
Description	The deadband range of analog input 2
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ANIN2DB

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	volt (V)

20FBh – Analog Input 2 Current Scaling

Object Description

Index	20FB
Description	The scaling value of the analog current command from input 2.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	ANIN2ISCALE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	volt (V)

20FCh – Analog Input 2 Low Pass Filter

Object Description

Index	20F
Description	The corner frequency of a first order filter that is applied to analog input 1.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN2LPFHZ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	hertz (Hz)

20FDh – Analog Input 2 Offset

Object Description

Index	20FD
Description	The offset voltage for analog input 2.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN2OFFSET

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	volt (V)

20FEh – Analog Input 2 Velocity Scaling

Object Description

Index	20FE
Description	The scaling value of the analog velocity command from input 2
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	volt (V)

20FFh – Analog Input 2 Zeroing

Object Description

Index	20FF
Description	Zeroes the value of analog input 1 by modifying the analog offset value.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ANIN2ZERO

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

2100h – Analog Input 2 Mode

Object Description

Index	2100
Description	Analog input 2 mode
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ANIN2MODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-1 to 2
Units	Not Applicable

2101h – Motor Winding Estimation

Object Description

Index	2101
Description	**Not intended for user unless instructed by Technical Support.** Motor winding estimation
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	ESTMOTORPARAM

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2102h – Motor Winding Estimation Status

Object Description

Index	2102
Description	**Not intended for user unless instructed by Technical Support.** Status of the motor winding estimation procedure.
Object Code	Not Applicable
Data Type	Not Applicable
Category	Optional
VarCom	ESTMOTORPARAMST

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	null
Range	Not Applicable
Units	Not Applicable

2103h – Homing Command

Object Description

Index	2013
Description	Start homing
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	HOMECMD

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

2104h – Current Level for Homing on Hard Stop

Object Description

Index	2104
Description	Current level for homing on hardstop
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	HOMEIHARDSTOP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2106h – Current Loop Compatibility Mode

Object Description

Index	2106
Description	Current loop compatibility mode
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	KCMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2108h – Point-to-Point Move Average

Object Description

Index	2108
Description	**Not intended for user unless instructed by Technical Support.** Point-to-point move averaging number
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	MOVESMOOTHAVG

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2109h – Point-to-Point Move Smoothing Mode

Object Description

Index	2109
Description	Point-to-point move smoothing mode
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	MOVESMOOTHMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

210Ah – HD Anti-Vibration Reduced Factor for KNLD

Object Description

Index	210A
Description	**Not intended for user unless instructed by Technical Support.** HD anti-vibration reduced factor for KNLD
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBKNLD

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

210Bh – Load to Motor Inertia Ratio for Anti-Vibration Only

Object Description

Index	210B
Description	**Not intended for user unless instructed by Technical Support.** Load to motor inertia ratio for anti-vibration only
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBLMJR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

210Ch – HD Anti-Resonance Filter Divider

Object Description

Index	210C
Description	**Not intended for user unless instructed by Technical Support.** HD anti-resonance filter divider
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

210Dh – HD Current Filter Low Pass Filter Rise Time

Object Description

Index	210D
Description	**Not intended for user unless instructed by Technical Support.** HD current filter low pass filter rise time
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLFILTT1

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2113h – Drive Ready

Object Description

Index	2113
Description	Drive ready
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	READY

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2114h – Drive Status

Object Description

Index	2114
Description	Drive status message
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	ST

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Unsigned8
Data Type	Not Applicable
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Status select
Object Code	Unsigned8
Data Type	Not Applicable
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 255
Units	Not Applicable

Sub-Index	002
Description	Domain
Object Code	Not Applicable
Data Type	Not Applicable
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2115h – Step Command

Object Description

Index	2115
Description	Step command
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	Not Applicable

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	6
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Duration1
Object Code	Variable
Data Type	Unsigned16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

Sub-Index	002
Description	Velocity1
Object Code	Variable
Data Type	Integer32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Not Applicable

Sub-Index	003
Description	Duration2
Object Code	Variable
Data Type	Integer16
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

Sub-Index	004
Description	Velocity2
Object Code	Variable
Data Type	Integer32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	Not Applicable

Sub-Index	005
Description	Activate
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

Sub-Index	006
Description	Select
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 1
Units	Not Applicable

2116h – Position Motion Ended

Object Description

Index	2116
Description	Position Motion Ended
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	STOPPED

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2117h – Units Linear Acc/Dec

Object Description

Index	2117
Description	Units Linear Acc/Dec
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UNITSLINACC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2118h – Units Linear Position

Object Description

Index	2118
Description	Units Linear Position
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UNITSLINPOS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2119h – Units Linear Velocity

Object Description

Index	2119
Description	Units Linear Velocity
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UNITSLINVEL

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

211Ah – Units Rotary Acc/Dec

Object Description

Index	211A
Description	Units Rotary Acc/Dec
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UNITSROTACC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

211Bh – Units Rotary Position

Object Description

Index	211B
Description	Units Rotary Position
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UNITSROTPOS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

211Ch – Units Rotary Velocity

Object Description

Index	211C
Description	Units Rotary Velocity
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	UNITSROTVEL

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

211Dh – Velocity Filter Pole Frequency

Object Description

Index	211D
Description	Velocity filter pole frequency
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	VELFILTFRQ

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

211Eh – Gear

Object Description

Index	211E
Description	Engages and disengages gearing
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	GEAR

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2120h – Gear Acceleration Threshold

Object Description

Index	2120
Description	Maximum acceleration for gearing
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	GEARACCTHRESH

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2121h – Gear Filter Acceleration Feedforward

Object Description

Index	2121
Description	Gear filter acceleration feedforward
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	GEARFILTAFF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2122h – Gear Filter Mode

Object Description

Index	2122
Description	Defines whether gear filter is activated
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	GEARFILTMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2123h – Gear Filter Depth

Object Description

Index	2123
Description	Gear filter depth (in 0.25 ms quanta)
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	GEARFILTT1

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2124h – Gear Filter Velocity and Acceleration Depth

Object Description

Index	2124
Description	Gear filter velocity and acceleration filter depth (in 0.25 ms quanta)
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	GEARFILTT2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2125h – Gear Filter Velocity Feedforward

Object Description

Index	2125
Description	Gear filter velocity feedforward
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	GEARFILTVELFF

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2126h – Gear Ratio Multiplier

Object Description

Index	2126
Description	Gear command multiplier value
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	GEARIN

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1
Range	-32769 to 32767
Units	Not Applicable

2127h – Gearing Input Interpolation Mode

Object Description

Index	2127
Description	Defines the type of limits for gear following
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	GEARINMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2128h – Gear Following Limits Mode

Object Description

Index	2128
Description	Defines the type of limits for gear following
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	GEARLIMITSMODE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

2129h – Gear Ratio Divider

Object Description

Index	2129
Description	Gear command divider value
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	GEAROUT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 32767
Units	Not Applicable

212Ah – Drive Info

Object Description

Index	212A
Description	Returns information about the drive
Object Code	Record
Data Type	Not Applicable
Category	Optional
VarCom	INFO

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	001
Description	Status Select
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	2
Range	0 to 255
Units	Not Applicable

Sub-Index	002
Description	Domain
Object Code	Not Applicable
Data Type	Not Applicable
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	0
Range	Not Applicable
Units	Not Applicable

212Bh – Torque Window

Object Description

Index	212B
Description	Torque window
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	254
Range	0 to 4294967295
Units	Not Applicable

212Ch – Block Control Word

Object Description

Index	212C
Description	Blocks bit 4 (enable) in the control word (6040h).
	0 = bit 4 in control word can be written in operational state only.
	0x1234 = bit 4 in control word can be written in all communication states.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

212Dh – HD Anti-Vibration Sharpness2

Object Description

Index	212D
Description	**Not intended for user unless instructed by Technical Support.**
	HD position error filter sharpness
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	NLANTIVIBSHARP2

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.5
Range	0.00999999977648 to 10.0
Units	Not Applicable

212Eh – HD Derivative Gain

Object Description

Index	212E
Description	HD derivative gain
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLIDV

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 1.0
Units	Not Applicable

212Fh – HD Integral Gain Factor

Object Description

Index	212F
Description	HD integral gain factor
Object Code	Variable
Data Type	Real32
Category	Optional
VarCom	KNLIINT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0.0
Range	0.0 to 2000.00
Units	hertz (Hz)

6   Standard Servo Drive Objects

The following standard device profile objects are implemented in the FLEXI PRO.
For more information, refer to the relevant CAN documentation.

603Fh - Error Code
6040h - Controlword
6041h – Statusword
605Dh – Halt Option Code
6060h - Modes of Operation
6061h - Modes of Operation Display
6062h – Position Demand Value
6064h - Position Actual Value
6065h - Following Error Window
6066h – Following Error Time Out
6067h – Position Window
6068h – Position Window Time
606Ch - Velocity Actual Value
606Dh - Velocity Window
606Eh - Velocity Window Time
606Fh - Velocity Threshold
6070h - Velocity Threshold Time
6071h - Target Torque
6073h - Maximum Current
6074h – Torque Demand Value
6075h - Motor Rated Current
6078h - Current Actual Value
6079h - DC Link Circuit Voltage
607Ah - Target Position
607Ch - Home Offset
607Dh - Software Position Limit
607Eh – Polarity
607Fh - Max Profile Velocity

6080h - Max Motor Speed
6081h - Profile Velocity
6083h - Profile Acceleration
6084h - Profile Deceleration
6085h - Quick Stop Deceleration
608Fh - Position Encoder Resolution
6091h - Gear Ratio
6092h - Feed Constant
6098h - Homing Mode
6099h - Homing Speeds
609Ah - Homing Acceleration
60B0h – Position Offset
60C0h – Interpolation Sub Mode
60C2h - Interpolation Time Period
60C5h – Max Acceleration
60C6h – Max Deceleration
60F2h – Position Option Code
60F4h – Following Error Actual Value
60FDh - Digital Inputs
60FEh - Digital Outputs
60FFh - Target Velocity
6502h – Supported Drive Modes

603Fh – Error Code

Object Description

Index	603F
Description	Indicates the error code of the last error that occurred in the drive device.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	FLT

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

6040h – Controlword

Object Description

Index	6040
Description	Defines the CiA-402 FSA, CiA-402 modes and manufacturer-specific entities. This object is organized bit-wise. The bits have the following meaning: **Bit Description** 0 = switch on 1 = enable voltage 2 = quick stop 3 = enable operation 4-6 = mode-specific 7 = fault reset 8 = halt 9 = mode-specific 10 = reserved 11-15 = manufacturer-specific
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write

PDO Mapping	Yes
Default Value	0
Range	0 to 65535
Units	Not Applicable

6041h – Statusword

Object Description

Index	6041
Description	Indicates the current state of the FSA, the operation mode and manufacturer-specific entities. This object is organized bit-wise. The bits have the following meaning: **Bit Description** 0 = ready to switch on 1 = switched on 2 = operation enabled 3 = fault 4 = voltage enabled 5 = quick stop 6 = switch on disabled 7 = warning 8 = manufacturer-specific 9 = remote 10 = target reached 11 = internal limit active 12-13 = mode-specific 14-15 = manufacturer-specific
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	0 to 65535
Units	Not Applicable

605Dh − Halt Option Code

Object Description

Index	605D
Description	Indicates what action is performed when the halt function is executed. The slow down ramp is the deceleration value of the mode of operations.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-32768 to 32767
Units	Not Applicable

6060h – Modes of Operation

Object Description

Index	6060
Description	The requested operational mode. The following values are valid: 0 = no mode change / no mode assigned 1 = profile position mode 3 = profile velocity mode 4 = profile torque mode 5 = reserved 6 = homing mode 7 = interpolated position mode 8 = cyclic synchronous position mode 9 = cyclic synchronous velocity mode 10 = cyclic synchronous torque mode -x = manufacturer-specific -1= gear mode The actual operation mode is reflected in the Modes of Operation Display object.
Object Code	Variable
Data Type	Integer8
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Write
PDO Mapping	Yes
Default Value	0
Range	-128 to 10
Units	Not Applicable

6061h – Modes of Operation Display

Object Description

Index	6061
Description	Indicates the actual operation mode. The following values are valid: 0 = no mode change / no mode assigned 1 = profile Position mode 2 = velocity mode 3 = profile velocity mode 4 = profile torque mode 5 = reserved 6 = homing mode 7 = interpolated position mode 8 = cyclic synchronous position mode 9 = cyclic synchronous velocity mode 10 = cyclic synchronous torque mode -x = manufacturer-specific -1= gear mode
Object Code	Variable
Data Type	Integer8
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-128 to 10
Units	Not Applicable

6062h – Position Demand Value

Object Description

Index	6062
Description	Indicates the demanded position value
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

6064h – Position Actual Value

Object Description

Index	6064
Description	Indicates the actual value of the position measurement device.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PFB

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

6065h – Following Error Window

Object Description

Index	6065
Description	Maximum allowed position error without producing a fault.
	This object defines the range of tolerated position values symmetrical to the target position. If the position actual value is outside the following error window, a following error occurs. A following error may occur when a drive is blocked, an unreachable profile velocity occurs, or if closed-loop coefficients are wrong.
	If the value of the following error window is 4294967295, the following control is disabled.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	PEMAX (Maximum Position Error)

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1
Range	0 to 4294967295
Units	CAN user position units

6066h – Following Error Time Out

Object Description

Index	6066
Description	The time for a following error condition, after which bit 13 of the statusword is set to 1 in the profile position mode and in the cyclic synchronous position mode. The reaction of the drive when a following error occurs is manufacturer-specific.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	millisecond (ms)

6067h – Position Window

Object Description

Index	6067
Description	The symmetrical range of accepted positions relative to the target_position. If the actual value of the position encoder is within the position window, this target position is considered to reached. If the value of the position_window is 4294967295, the position_window control is switched off.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	PEINPOS

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user position units

6068h – Position Window Time

Object Description

Index	6068
Description	Indicates the time, during which the actual position within the position_window is measured.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	PEINPOSTIME

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	10
Range	0 to 65535
Units	millisecond (ms)

606Bh – Velocity Demand Value

Object Description

Index	606B
Description	The output value of the trajectory generator
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	VCMD

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

606Ch – Velocity Actual Value

Object Description

Index	606C
Description	The actual velocity value derived either from the velocity sensor or the position sensor.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	V

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

606Dh – Velocity Window

Object Description

Index	606D
Description	The velocity window.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	CAN user velocity units

606Eh – Velocity Window Time

Object Description

Index	606E
Description	The velocity window time.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	milliseconds (ms)

606Fh – Velocity Threshold

Object Description

Index	606F
Description	The velocity threshold.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	CAN user velocity units

6070h − Velocity Threshold Time

Object Description

Index	6070
Description	The velocity threshold time.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	millisecond (ms)

6071h − Target Torque

Object Description

Index	6071
Description	The input value for the torque controller in profile torque mode.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	T (Current Command)

Entry Description

Access	Read/Write
PDO Mapping	Yes
Default Value	0
Range	-32768 to 32767
Units	percentage

6073h – Maximum Current

Object Description

Index	6073
Description	The configured maximum permissible torque creating current in the motor.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	ILIM

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	milliampere (mA)

6074h – Torque Demand Value

Object Description

Index	6074
Description	The output value of torque limit function.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	ICMD

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-32768 to 32767
Units	millinewton meter (mNm)

6075h – Motor Rated Current

Object Description

Index	6075
Description	The motor rated current. It is taken from the motor nameplate. Depending on the motor and drive technology this current is DC, peak or rms (root-mean-square) current. All relative current data refers to this value.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MICONT

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	mA

6078h – Current Actual Value

Object Description

Index	6078
Description	Indicates the actual value of the current. It corresponds to thecurrent in the motor.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	I (Motor Current)

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	-32768 to 32767
Units	milliampere (mA)

6079h – DC Link Circuit Voltage

Object Description

Index	6079
Description	The bus voltage measured by sensors on the power module. Indicates the instantaneous DC link current voltage at the drive device.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	VBUSREADOUT (Bus Voltage Measured)

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	millivolt (mV)

607Ah – Target Position

Object Description

Index	607A
Description	The commanded position the drive will move to in position profile mode or cyclic synchronous position mode. The value of this object can be interpreted as absolute or relative depending on bit 6 of the Controlword.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	Yes
Default Value	0
Range	80000000h to 7FFFFFFFh
Units	CAN user position units

607Ch – Home Offset

Object Description

Index	607C
Description	The configured difference between the zero position for the application and the machine home position (found during homing). During homing the machine home position is found and once the homing is completed the zero position is offset
	from the home position by adding the home offset to the home position. All subsequent absolute moves are taken relative to this new zero position.
	If this object is not implemented then the home offset is regarded as zero. The value of this object is in CAN position user units. Negative values indicate the opposite direction.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	HOMEOFFSET

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

607Dh – Software Position Limit

Object Description

Index	607D
Description	The configured maximal and minimal software position limits. These parameters define the absolute position limits for the position demand value and the position actual value. Every new target position is checked against these limits. The limit positions is always relative to the machine home position. Before being compared with the target position they are corrected internally by the home offset as follows: *Corrected min position limit = min position limit - home offset* *Corrected max position limit = max position limit - home offset*
Object Code	Array
Data Type	Integer32
Category	Optional
VarCom	Sub-index 1: POSLIMPOS Sub-index 2: POSLIMNEG

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Minimum software position limit
Object Code	Variable
Data Type	Integer32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

Sub-Index	002
Description	Maximum software position limit
Object Code	Variable
Data Type	Integer32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

607Eh – Polarity

Object Description

Index	607E
Description	Determines the sign of the position demand value or the velocity demandvalue. This object is organized bit-wise. The bits have the following meaning: 7 = position polarity is affected 6 = velocity polarity is affected The bit values have the following meaning: 0 = multiply the demand value by 1 1 = multiply the demand value by -1
Object Code	Variable
Data Type	Unsigned8
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 192
Units	Not Applicable

607Fh – Max Profile Velocity

Object Description

Index	6007F
Description	The maximum velocity allowed in either direction during a profiled motion.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	VLIM (User Velocity Limit)

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user velocity units

6080h – Max Motor Speed

Object Description

Index	6080
Description	The maximum speed allowed for the motor in either direction. It is used to protect the motor and is taken from the motor data sheet.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	MSPEED

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	rpm

6081h – Profile Velocity

Object Description

Index	6081
Description	The configured velocity normally attained at the end of the acceleration ramp during a profiled motion. It is valid for both directions of motion.
	This object is used in the profile position mode and interpolated position mode.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	Yes
Default Value	0
Range	0 to 4294967295
Units	CAN user velocity units

6083h − Profile Acceleration

Object Description

Index	6083
Description	The configured acceleration.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	ACC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user acceleration/deleration units

6084h − Profile Deceleration

Object Description

Index	6084
Description	The configured deceleration value. This object is used in the profile position mode, profile velocity mode, and interpolated position mode.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	DEC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user acceleration/deceleration units

6085h – Quick Stop Deceleration

Object Description

Index	6085
Description	The deceleration rate for an Active Disable/emergency stop.
	The configured deceleration used to stop the motor when the quick stop function is activated.
	This object indicates the deceleration used to stop the motor when the quick stop function is activated and the quick stop option code is set to 2 or 6.
	The quick stop deceleration is also used if the fault reaction option code is 2 and the halt option code is 2.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	DECSTOP

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user acceleration/deceleration units

608Fh – Position Encoder Resolution

Object Description

Index	608F
Description	The resolution of the motor encoder in number of lines per revolution of the motor.
	The position encoder resolution is calculated by the following:
	position encoder resolution = encoder increments ÷ motor revolutions
	The drive must be configured whenever this object is modified.
Object Code	Array
Data Type	Unsigned32
Category	Optional
VarCom	Not Applicable

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Encoder increments
Object Code	Unsigned32
Data Type	Variable
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	2048
Range	1 to 10000000
Units	Not Applicable

Sub-Index	002
Description	Motor revolutions
Object Code	Unsigned32
Data Type	Variable
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 4294967295
Units	Not Applicable

6091h – Gear Ratio

Object Description

Index	6091
Description	The configured number of motor shaft revolutions and number of driving shaft revolutions. The gear ratio is calculated by the following: *gear ratio = motor shaft revolutions ÷ driving shaft revolutions*
Object Code	Array
Data Type	Unsigned32
Category	Optional
VarCom	Sub-index 1: FBGMS Sub-index 2: FBGDS

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Motor revolutions
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Shaft revolutions
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 4294967295
Units	Not Applicable

6092h – Feed Constant

Object Description

Index	6092
Description	The configured feed constant, which is the measurement distance per one revolution of the output shaft of the gearbox. The feed constant is calculated by the following: *feed constant = feed ÷ driving shaft revolutions*
Object Code	Array
Data Type	Unsigned32
Category	Optional
VarCom	Sub-index 1: PNUM Sub-index 2: PDEN

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Feed
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Shaft revolutions
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 4294967295
Units	Not Applicable

6098h – Homing Mode

Object Description

Index	6098
Description	The homing method to be used. The following value definition is valid: 0 = no homing method assigned 1 = homing method 1 to be used . . 36 = homing method 36 to be used -x = manufacturer-specific Refer to the CiA-402 standard for the detailed description of each homing method.
Object Code	Variable
Data Type	Integer8
Category	Optional
VarCom	HOMETYPE

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	1
Range	-192 to 36
Units	Not Applicable

6099h – Homing Speeds

Object Description

Index	6099
Description	The commanded speeds used during homing procedure.
Object Code	Array
Data Type	Unsigned32
Category	Optional
VarCom	Sub-index 1: HOMESPEED1 Sub-index 2: HOMESPEED2

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Fast homing speed. Switch search.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user velocity units

Sub-Index	002
Description	Slow homing speed. Index search.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user velocity units

609Ah – Homing Acceleration

Object Description

Index	609A
Description	The acceleration and deceleration to be used during homing operation.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	HOMEACC

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 4294967295
Units	CAN user acceleration/deceleration units

60B0h – Position Offset

Object Description

Index	60B0
Description	The offset of the target position. The value itself is absolute and thus independent of how often it is transmitted over the communication system; for example, transmitting twice does not double the value. Since the additive position value represents an offset to the target position, it can be also used to control the drive with relative values in regard to the target position. This object is used in the cyclic synchronous position mode.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PFBOFFSET

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	- 2147483648 to 2147483647
Units	CAN user position units

60C0h – Interpolation Submode

Object Description

Index	
Description	The selected interpolation mode.
	The bit values have the following meaning:
	0 = Linear interpolation
	1= Cubic interpolation with position and velocity
	2= Cubic interpolation with position only – strict. Forces the interpolated path to pass via the original position commands sent by the controller. This may cause an abrupt velocity profile when velocity changes.
	3= Cubic interpolation with position only – soft. Does not force the interpolated path to pass via the original position commands sent by the controller, thus resulting in a smoother velocity profile.
	If linear interpolation is the only algorithm available, then it is not necessary to implement this object.
	If the linear interpolation mode is selected, the interpolation data given in the interpolation data record is used.
	If a manufacturer-specific interpolation mode is selected, the corresponding interpolation data record must be implemented in the manufacturer-specific profile area of the object dictionary.
Object Code	Variable
Data Type	Integer16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 3
Units	Not Applicable

60C2h – Interpolation Time Period

Object Description

Index	60C2
Description	The configured interpolation cycle time.
	This object includes the following sub-indices:
	sub-index 1: value of the time
	sub-index 2: dimension index of the time value in sub-index 1
Object Code	Record
Data Type	Interpolation time period record (0080)
Category	Optional
VarCom	Sub-index 1: FBITPRD
	Sub-index 2: FBITIDX

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Interpolation time period value.
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	1
Range	1 to 255
Units	$10^{(\text{interpolation time index})}$ s(econd)

Sub-Index	002
Description	Interpolation time index
Object Code	Variable
Data Type	Integer8
Category	Optional
Access	Read/Write
PDO Mapping	No
Default Value	-3
Range	-128 to 63
Units	Not Applicable

60C5h – Max Acceleration

Object Description

Index	60C5
Description	The maximum acceleration. It is used to limit the acceleration to an acceptable value in order to prevent the motor and the moved mechanics from being damaged.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	4294967295
Range	0 to 4294967295
Units	CAN user acceleration/deceleration units

60C6h – Max Deceleration

Object Description

Index	60C6
Description	The maximum deceleration. It is used to limit the deceleration to an acceptable value in order to prevent the motor and the moved mechanics from being damaged.
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	4294967295
Range	0 to 4294967295
Units	CAN user acceleration/deceleration units

60F2h – Position Option Code

Object Description

Index	60F2
Description	The configured positioning behavior, as described by the profile positioning mode or the interpolated positioning mode.
Object Code	Variable
Data Type	Unsigned16
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	No
Default Value	0
Range	0 to 65535
Units	Not Applicable

60F4h – Following Error Actual Value

Object Description

Index	60F4
Description	The actual value of the following error.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	PE

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user position units

60FCh – Position Demand Internal Value

Object Description

Index	60FC
Description	The output of the trajectory generator in profile position mode.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	0
Range	-2147483648 to 2147483647
Units	increments

60FDh – Digital Inputs

Object Description

Index	60FD
Description	Indicates the state of the digital inputs.
	This object is organized bit-wise. The bits have the following meaning:
	0 = negative limit switch
	1 = positive limit switch
	2 = home switch
	3 = interlock
	16-31 = manufacturer-specific
	The bit values have the following meaning:
	0 = switch is off
	1 = switch is on
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	IN

Entry Description

Access	Read Only
PDO Mapping	Yes
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

60FEh – Digital Outputs

Object Description

Index	60Fr
Description	Indicates the state of the digital outputs. This object is organized bit-wise. The bits have the following meaning: 0 = set brake 16-31 = manufacturer-specific 　This object includes the following sub-indices: 　Sub-index 1: for the physical output value 　Sub-index 2: mask for the physical outputs The bit values for sub-index 1 have the following meaning: 　0 = output is off, brake is not set 　1 = output is on, brake is set The bit values for sub-index 2 have the following meaning: 　0 = disable output; output will not change 　1 = enable output; output will not change
Object Code	Unsigned32
Data Type	Array
Category	Optional
VarCom	OUT

Entry Description

Sub-Index	000
Description	Number of entries
Object Code	Variable
Data Type	Unsigned8
Category	Optional
Access	Read Only
PDO Mapping	No
Default Value	2
Range	2
Units	Not Applicable

Sub-Index	001
Description	Physical outputs
	The CANopen standard specifies a bit in the digital outputs that allows the master to control the brake (bit 0 in object 60FEh sub-index 1). FLEXI PRO does not support this bit.
	Therefore, even if a master defines one of the digital outputs as brake, via object 209Ch, the master cannot write to this output and the FLEXI PRO will control the brake.
	For a master to write to the bit and thus control the brake, the designated output must be defined as idle mode (OUTMODE 0).
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	Yes
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

Sub-Index	002
Description	Output mask
Object Code	Variable
Data Type	Unsigned32
Category	Optional
Access	Read/Write
PDO Mapping	Yes
Default Value	0
Range	0 to 4294967295
Units	Not Applicable

60FFh – Target Velocity

Object Description

Index	60FF
Description	The configured target velocity and is used as input for the trajectory generator.
Object Code	Variable
Data Type	Integer32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read/Write
PDO Mapping	Yes
Default Value	0
Range	-2147483648 to 2147483647
Units	CAN user velocity units

6502h – Supported Drive Modes

Object Description

Index	6502
Description	This object is organized bit-wise. The bits have the following meaning: **Bit Description** 0 = profile position mode 1 = velocity mode 2 = profile velocity mode 3 = profile torque mode 4 = reserved 5 = homing mode 6 = interpolated position mode 7 = cyclic synchronous position mode 8 = cyclic synchronous velocity mode 9 = cyclic synchronous torque mode 10-15 = reserved 16-31 = manufacturer-specific The bit values have the following meaning: 0 = mode is not supported 1 = mode is supported
Object Code	Variable
Data Type	Unsigned32
Category	Optional
VarCom	Not Applicable

Entry Description

Access	Read Only
PDO Mapping	No
Default Value	477
Range	477
Units	Not Applicable

7   CAN Operation

7.1   Device Control and State Machine

The power drive system finite-state automaton (PDS FSA) is a mathematical model that defines the behavior of the power drive system. Because a power drive system is required to provide local control even when the communication network is not functioning properly, the communication FSA and the PDS FSA are only loosely coupled.Figure 7-1 shows how the power drive system operates remotely via the network, or locally.
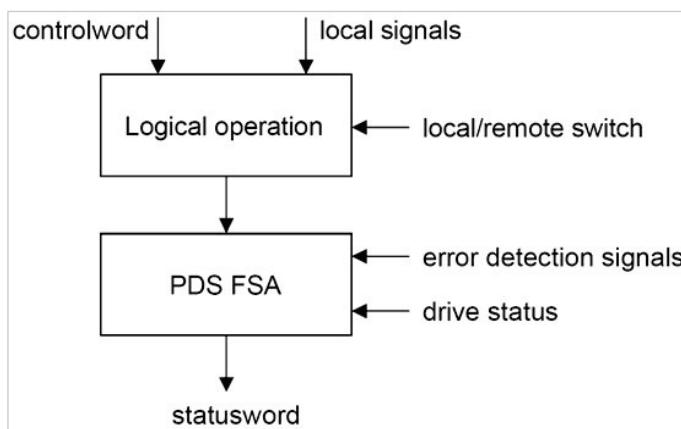
Figure 7-1. Remote and Local Control

The power drive system is operated by the **Controlword** sent by the control device via the network. The state of the power drive system is reported by the **Statusword** produced by the drive device. The FSA is also controlled by error detection signals.

The PDS FSA defines the power drive system status and the possible control sequence of the power drive system. A single state represents a special internal or external behavior. The state of the power drive system also determines which commands are accepted. For example, it is only possible to start a point-to-point move when the drive is in the operation enabled state.

7.2   Indicating the Operating State

After switching on, and when an operating mode is started, the power drive system goes through a number of operating states. The operating states are internally monitored and influenced by monitoring functions

Figure 7-2illustrates the PDS FSA behavior. It takes into consideration the control of the power electronics, in accordance with user commands and internal drive faults.
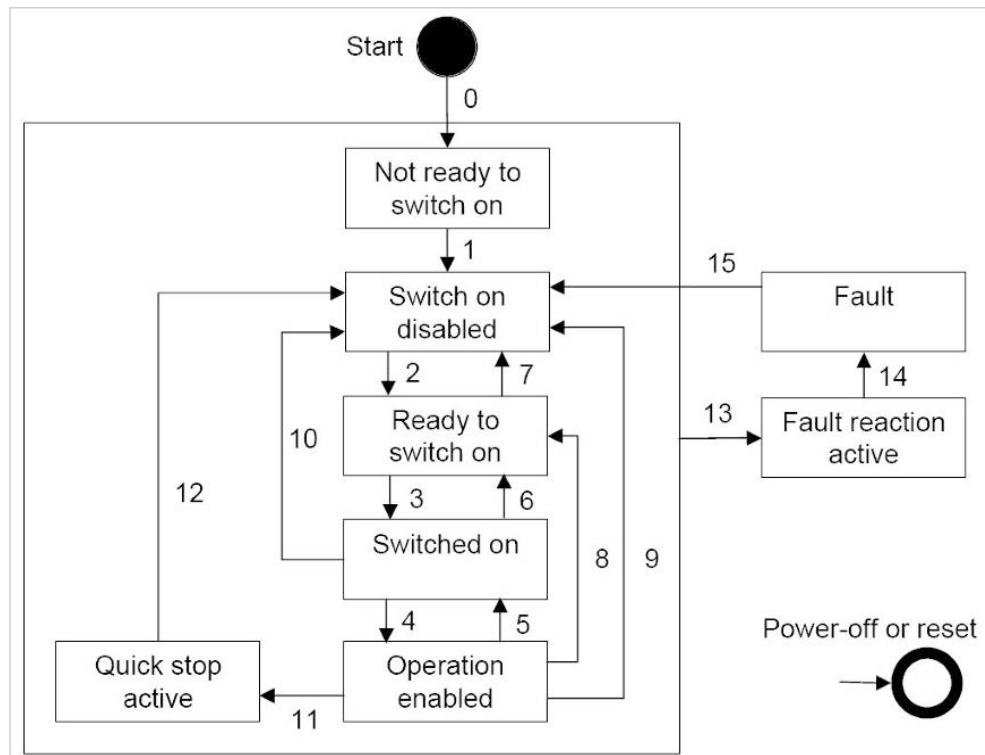
Figure 7-2. Power Drive System State Diagram

Notes:

Not Ready to Switch On	"Not ready to operate" received from the controller.
Switch On Disabled	Ready to operate. Can read and write parameters. Motion functionality cannot be executed.
Ready to Switch On	Ready to operate. Can read and write parameters. Motion functionality cannot be executed. Bus voltage must be switched on.
Operation Enabled	Drive power stage is enabled. No fault is present. Motion functionality can be executed.
Quick Stop Active	Drive was stopped using controlled stop. Power stage is enabled. Motion functionality cannot be executed.
Fault Reaction Active	A fault has occurred. Drive is in the process of ramping down to 0 velocity (Active Disable process).
Fault	A fault has occurred. Power stage is disabled.

Bits 0, 1, 2, 3, 5 and 6 of the parameter Statusword provide information on the operating state.

Operating State		Bit 6: Switch On Disabled	Bit 5: Quick Stop	Bit 3: Fault	Bit 2: Operation Enabled	Bit 1: Switch On	Bit 0: Ready to Switch On
2	Not Ready To Switch On	0	X	0	0	0	0
3	Switch On Disabled	1	X	0	0	0	0
4	Ready To Switch On	0	1	0	0	0	1
5	Switched On	0	1	0	0	1	1
6	Operation Enabled	0	1	0	1	1	1
7	Quick Stop Active	0	0	0	1	1	1
8	Fault Reaction Active	0	X	1	1	1	1
9	Fault	0	X	1	0	0	0

Parameter Name	Bit Assignments	Data Type R/W
Statusword	Bits 0–3 = Status bits Bit 4 = Voltage enabled Bits 5–6 = Status bits Bit 7 = Warning Bit 8 = Reserved Bit 9 = Remote Bit 10 = Target reached Bit 11 = Internal limit is active Bit 12 = Operating mode-specific Bit 13 = Operating mode-specific Bit 14 = Manufacturer-specific Bit 15 = Manufacturer-specific	Unsigned16 Read Only

Notes:

Bit 4	Bit 4=1 indicates whether the DC bus voltage is correct. If the voltage is missing or is too low, the device does not transition from operating state 3 to operating state 4.
Bit 7	If bit 7 (warning) of the statusword is 1, it indicates the presence of a warning condition. Warning is not an error or fault (e.g., temperature limit exceeded, job refused). The status of the PDS FSA does not change. The cause of the warning may be given in the fault code parameter object (603Fh).
Bit 9	If bit 9 is set, the device carries out commands via the fieldbus. If Bit 9 is reset, the device is controlled via a different interface. In such a case, it is still possible to read or write parameters via the fieldbus.
Bit 10	Bit 10 is used for monitoring the current operating mode.
Bit 12	Bit 12 is used for monitoring the current operating mode.
Bit 13	Bit 13 only becomes 1 if an error needs to be resolved prior to further processing.

7.3   Changing the Operating State

The parameter Controlword can be used to switch between operating states.

Parameter Name	Bit Assignments	Data Type R/W
Controlword	Bit 0 = Switch On Bit 1 = Enable Voltage Bit 2 = Quick Stop Bit 3 = Enable Operation Bits 4–6 = Operating Mode specific Bit 7 = Fault Reset Bit 8 = Halt Bit 9 = Reserved Bits 10–15 = Reserved (must be 0) Changed settings become active immediately.	Unsigned16 Read Only

Bits 0, 1, 2, 3 and 7 of the parameter Controlword allow you to switch between the operating states.

Fieldbus Command	State Transitions	State Transition To	Bit 7: Fault Reset	Bit 3: Enable Operat	Bit 2: Quick Stop	Bit 1: Enable Voltage	Bit 0: Switch On
Shutdown	T2, T6, T8	4 Ready To Switch On	X	X	1	1	0
Switch On	T3	5 Switched On	X	X	1	1	1
Disable Voltage	T7, T9, T10, T12	3 Switch On Disabled	X	X	X	0	X
Quick Stop	T7, T10 T11	3 Switch On Disabled 7 Quick Stop Active	X	X	0	1	X
Disable Operation	T5	5 Switched On	X	0	1	1	1
Enable Operation	T4, T16	6 Operation Enabled	X	1	1	1	1
Fault Reset	T15	3 Switch On Disabled	0 » 1	X	X	X	X

Notes:

Bit 4—6   Bits 4 to 6 are used for the operating mode-specific settings.

Bit 8   A Halt can be triggered with bit 8=1.

Bit 9–15   Reserved.

7.4   Starting and Changing an Operating Mode

The parameter Mode of operation (6060h) is used to set the desired operating mode.

Parameter Name	Description	Data Type R/W
Mode of operation	Operating mode **1 Profile Position** **3 Profile Velocity** **4 Profile Torque** **6 Homing** **7 Interpolated Position*** **8 Cyclic Synchronous Position** **9 Cyclic Synchronous Position** **10 Cyclic Synchronous Position** Changed settings become active immediately.	Integer8 Read/Write

* Note: Not supported

The parameter Mode of operation display (6061h) can be used to read the current operating mode.

Parameter Name	Description	Data Type R/W
Mode of operation	Operating mode **1 Profile Position** **3 Profile Velocity** **4 Profile Torque** **6 Homing** **7 Interpolated Position*** **8 Cyclic Synchronous Position** **9 Cyclic Synchronous Position** **10 Cyclic Synchronous Position** Changed settings become active immediately.	Integer8 Read/Write

* Note: Not supported

7.5   Operating Mode Profile Position

Description

In the operating mode Profile Position, a movement to a desired target position is performed.

Procedure

- Set [Mode of operation (6060h)] to operating mode Profile position (1).
- Set [Target position (607Ah)] to the target position (unit = pulse).
- Set [Profile velocity (6081h)] to profile velocity (unit = pulses per second).
- Set [Controlword (6040h)] to start the movement.
- Query [Position actual value (6064h)] to get the actual position of the motor.
- Query [Statusword (6041h)] to get the current status of following error, set-point acknowledge and target reached.

Optional

Additional information on the operating mode Profile Position:

- Query [Position demand value (6062h)] to get the internal reference value (unit = pulse).
- Query [Position actual value (6063h)] to get the actual position value (unit = increments).

Following error:

- Set [Following error window (6065h)] to the permissible following error (unit = pulse).
- Query [Following error actual value (60F4h)] to get the current following error (unit = pulse).

Standstill window:

- Set [Position window (6067h)] to the value for the standstill window. If the difference between the target position and the current motor position remains in the standstill window for the time Position window time (6065h), the target position is considered to have been reached (unit = pulse).
- Set [Position window time (6068h)] to the value for the standstill window. If the difference between the target position and the current motor position remains in the standstill window for the time Position window time (6065h), the target position is considered to have been reached (unit = pulse).

Associated Objects

Index	Sub-index	Object	PDO	Data Type	Takes Effect
6040h	0	Controlword	R_PDO	Unsigned16	Immediately
6041h	0	Statusword	T_PDO	Unsigned16	-
6060h	0	Modes of operation	No	Integer8	Immediately
6061h	0	Modes of operation display	No	Integer8	-
6062h	0	Position demand value	No	Integer32	-
6063h	0	Position actual value	No	Integer32	-
6064h	0	Position actual value	T_PDO	Integer32	-
6065h	0	Following error window	No	Unsigned32	-
6067h	0	Position window	No	Unsigned32	-
6068h	0	Position window time	No	Unsigned16	Immediately
6081h	0	Profile velocity	R_PDO	Unsigned32	Next movement
6091h 6092h	1	Numerator (Position factor)	R_PDO	Unsigned32	Immediately
6091h 6092h	2	Speed constant (Position factor)	R_PDO	Unsigned32	Immediately
60F2h	0	Position option code	No	Unsigned16	Next movement
60F4h	0	Following error actual value	No	Integer32	-
60FCh	0	Position demand value	No	Integer32	-

Example: Profile Position

Starting the Operating Mode

The operating mode must be set in the parameter Mode of operation (6060h). Writing the parameter value activates the operating mode. The movement is started via the Controlword.

Controlword

Bits 4–6 and bit 8 in the parameter Controlword (6040h) start a movement.

Bit 5: Change Setpoint Immediately	Bit 4: New Target Value	Meaning
0	0 » 1	Starts a movement to a target position. Target values transmitted during a movement become immediately effective and are executed at the target. The movement is stopped at the current target position.*
1	0 » 1	Starts a movement to a target position. Target values transmitted during a movement become immediately effective and are executed at the target. The movement is not stopped at the current target position.*

* Note: Target values include target position, target velocity, acceleration and deceleration.

Parameter Value	Meaning
Bit 6 = Absolute / relative	0: Absolute movement 1: Relative movement
Bit 8 = Halt	Stop movement with Halt

Terminating the Operating Mode

The operating mode is terminated when the motor is at a standstill and one of the following conditions is met:

- Target position reached

- Stop caused by Halt or Quick Stop

- Stop caused by an error

Statusword

Information on the current movement is available via bits 10 and 12–15 in the parameter Statusword (6041h).

Parameter Value	Meaning
Bit 10 = Target reached	0 = Target position not reached 1 = Target position reached
Bit 12 = Target value acknowledge	0 = New position possible 1 = New target position accepted
Bit 13 = Following error bit	0 = No following error 1 = Following error
Bit 14 = Manufacturer-specific	
Bit 15 = Manufacturer-specific	

Example Node Address 1

Work Step COB ID / Data
» Set target velocity to 4000 `601 / 23 7A 60 00 A0 0F 00 00` « `581 / 60 7A 60 00 00 00 00 00`

» NMT Start remote node
`0 / 01 00`
« T_PDO2 with Statusword
`281 / 31 66 00 00 00 00`

» Enable power stage with R_PDO1
`201 / 00 00 00 00 00 00`
`201 / 06 00 00 00 00 00`
`201 / 0F 00 00 00 00 00`
« T_PDO1 (operating state: 6 Operation Enabled)
`181 / 37 42 00 00 00 00`

» Starting the operating mode
`601 / 2F 60 60 00 01 00 00 00`
`581 / 60 60 60 00 00 00 00 00`

» Check operating mode*
`601 / 40 61 60 00 00 00 00 00`
« Operating mode active
`581 / 4F 61 60 00 01 61 08 00`

» Issue a move command `601 / 23 40 60 00 00 00 00 1F` « `581 / 60 40 60 00 00 00 00 00`

* Note: The operating mode must be checked until the device has activated the specified operating mode.

7.6   Operating Mode Homing

Description

In the operating mode Homing, a movement is performed to a defined position. This position is defined as the reference point.

Procedure

- Set [Mode of operation (6060h)] to operating mode Homing (6).
- Set [Home offset (607Ch)].
- Set [Home method (6098h)], the value range is 1 to 35 and specifies the different homing methods.
- Set [Home speeds (6099h sub-index 1)] to the value for velocity for the search for the limit switches (unit = min^{-1}).
- Set [Home speeds (6099h sub-index 2)] to the value for velocity for the search for the index pulse (unit = min^{-1}).
- Set [Home acceleration (6099h sub-index 2)] to the value for the acceleration ramp (unit = milliseconds form 0 to 3000 min^{-1}).
- Set [Controlword (6040h)] to start the operating mode.
- Start Homing.
- Query [Statusword (6041h)] to get the device status.

Associated Objects

Index	Sub-index	Object	PDO	Data Type	Takes Effect
6040h	0	Controlword	R_PDO	Unsigned16	Immediately
6041h	0	Statusword	T_PDO	Unsigned16	-
6060h	0	Modes of operation	No	Integer8	Immediately
6061h	0	Modes of operation display	No	Integer8	-
607Ch	0	Home offset	No	Integer32	Next movement
6098h	0	Homing method	No	Integer8	Next movement
6099h	1	Speed during search for switch	No	Unsigned32	Next movement
6099h	2	Speed during search for zero	No	Unsigned32	Next movement
609Ah	0	Homing acceleration	No	Unsigned32	Next movement

Example: Homing

Starting the Operating Mode

The operating mode must be set in the parameter Mode of operation (6060h). Writing the parameter value activates the operating mode.

The movement is started via the Controlword.

Controlword

Bits 4 in the parameter Controlword (6040h) starts a movement, bit 8 terminates the movement.

Parameter Value	Meaning
Bit 4 = Homing operation start	Start Homing
Bit 5 = Reserved	Not relevant for this operating mode
Bit 6 = Reserved	Not relevant for this operating mode
Bit 8 = Halt	Stop movement with Halt

Terminating the Operating Mode

The operating mode is terminated when the motor is at a standstill and one of the following conditions is met:

- Homing successful
- Stop caused by Halt or Quick Stop
- Stop caused by an error

Statusword

Information on the current movement is available via bits 10 and 12–15 in the parameter Statusword (6041h).

Parameter Value	Meaning
Bit 10 = Target reached	0 = Homing not completed 1 = Homing completed
Bit 12 = Homing attained	1 = Homing successfully completed
Bit 13 = Homing error	1 = Homing error
Bit 14 = Manufacturer-specific	
Bit 15 = Manufacturer-specific	

Example Node Address 1

Work Step
COB ID / Data

»	Velocity for searching the limit switch to 100
	601 / 23 99 60 01 64 00 00 00
«	581 / 60 99 60 01 00 00 00 00

»	Velocity for moving away from switch to 10
	601 / 23 99 60 02 0A 00 00 00
«	581 / 60 99 60 02 00 00 00 00

»	NMT Start remote node
	0 / 01 00
«	T_PDO1 with Statusword
	181 / 31 62

»	Enable power stage with R_PDO1
	201 / 00 00
	201 / 06 00
	201 / 0F 00
«	T_PDO1 (operating state: 6 operation enabled)
	181 / 37 42

»	Starting the operating mode
	601 / 2F 60 60 00 06 00 00 00
«	581 / 60 60 60 00 00 00 00 00

»	Check operating mode *
	601 / 40 61 60 00 00 00 00 00
«	Operating mode active
	581 / 4F 61 60 00 06 61 01 00

»	Select method 17
	601 / 2F 98 60 00 11 00 00 00
«	581 / 60 98 60 00 00 00 00 00

»	Start reference movement (Homing operation start)
	201 / 1F 00
«	T_PDO1 reference movement active
	181 / 37 02
«	T_PDO1 reference movement terminated
	181 / 37 D6

* Note: The operating mode must be checked until the device has activated the specified operating mode.

7.7   Operating Mode Profile Velocity

Description

In the operating mode Profile Velocity, a movement is made with a desired target velocity.

Procedure

- Set [Mode of operation (6060)] to operating mode Profile Velocity (3).
- Set [Controlword (6040h)] to start the operating mode.
- Set [Target velocity (60FFh)] to the target velocity. If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled or a Quick Stop is triggered.
- Query [Statusword (6041h)] to get the device status.

Optional

- Query [Velocity demand value (606Bh)] to get the reference velocity.
- Query [Velocity actual value (60C3h)] to get the actual velocity.
- Set [Velocity window (606Dh)] to the value of the velocity window.
- Set [Velocity window time (606Eh)] to the duration in the velocity window required to consider the velocity to have been reached unit = milliseconds).
- Query [Velocity threshold (60F4h)] to set the standstill window.

Associated Objects

Index	Sub-index	Object	PDO	Data Type	Takes Effect
6040h	0	Controlword	R_PDO	Unsigned16	Immediately
6041h	0	Statusword	T_PDO	Unsigned16	-
6060h	0	Modes of Operation	No	Integer8	Immediately
6061h	0	Modes of Operation Display	No	Integer8	-
606Bh	0	Velocity Demand Value	No	Integer32	-
606Ch	0	Velocity Actual Value	No	Integer32	-
606Dh	0	Velocity Window	No	Unsigned16	Immediately
606Eh	0	Velocity Window Time	No	Unsigned16	Immediately
606Fh	0	Velocity Threshold	No	Unsigned16	Immediately
60FFh	0	Target Velocity	No	Integer32	Immediately

Example: Profile Velocity

Starting the Operating Mode

The operating mode must be set in the parameter Mode of operation (6060h). Writing the parameter value activates the operating mode.

The parameter Target velocity (60FFh) starts the movement.

Parameter Name	Description	Data Type R/W
Target Velocity	Target velocity for operating mode Profile Velocity Changed settings become active immediately.	Integer32 Read/Write

Controlword

Bit 8 in parameter **Controlword** (6040h) is used to stop a movement with Halt.

Parameter Value	Meaning
Bit 4 = Reserved	Not relevant for this operating mode
Bit 5 = Reserved	Not relevant for this operating mode
Bit 6 = Reserved	Not relevant for this operating mode
Bit 8 = Halt	Stop movement with Halt
Bit 9 = Change on setpoint	Not relevant for this operating mode

Terminating the Operating Mode

The operating mode is terminated when the motor is at a standstill and one of the following conditions is met:

■ Stop caused by Halt or Quick Stop

■ Stop caused by an error

Statusword

Information on the current movement is available via bits 10 and 12 in the parameter Statusword (6041h).

Parameter Value	Meaning
Bit 10 = Target reached	0 = Target velocity not reached 1 = Target velocity reached
Bit 12 = Velocity	0 = Velocity > 0 1 = Velocity = 0
Bit 14 = Manufacturer-specific	
Bit 15 = Manufacturer-specific	

Example Node Address 1

Work Step
COB ID / Data

» NMT Start remote node
   0 / 01 00
« T_PDO3 with Statusword
   381 / 31 66 00 00 00 00

» Enable power stage with R_PDO3
   201 / 00 00 00 00 00 00
   201 / 06 00 00 00 00 00
   201 / 0F 00 00 00 00 00
« T_PDO3 (operating state: 6 Operation Enabled)
   181 / 37 46 00 00 00 00

» Starting the operating mode
   601 / 2F 60 60 00 03 00 00 00
« 581 / 60 60 60 00 00 00 00 00

» Check operating mode *
   601 / 40 61 60 00 00 00 00 00
« Operating mode active
   581 / 4F 61 60 00 00 00 00 00

» R_PDO3: Specification of target velocity 1000
   301 / E8 03 00 00
« T_PDO2 with Statusword and velocity actual value
   381 / 37 02 00 00 00 00
« Target velocity reached
   381 / 37 06 E8 03 00 00

» Terminate operating mode with Quick Stop with R_PDO3
   401 / 0B 00 00 00 00 00
« T_PDO3 with Statusword
   381 / 17 66 00 00 00 00

» Clear Quick Stop with R_PDO3
   401 / 0F 00 00 00 00 00
« T_PDO3 with Statusword
   381 / 37 46 00 00 00 00

---

* Note: The operating mode must be checked until the device has
activated the specified operating mode.

7.8   Operating Mode Profile Torque

Description

In the operating mode Profile Torque, a movement is made with a desired target torque.

Procedure

- Set [Mode of operation (6060)] to operating mode Profile Torque (4).
- Set [Controlword (6040h)] to start the operating mode.

  When the operating mode is started, the target torque is set to zero.

- Set [Motor rated current (6075)] to a value according to motor specifications (unit = mA).
- Set [Target torque (6071h)] to the value for the target torque (unit = 0.1% of nominal torque. The value is reset to zero if the operating mode is changed, the power stage is disabled or a Quick Stop is triggered.

Optional

- Query [Torque rated current (6075h)] to get the nominal current depending on the motor and the drive (unit = multiples of mA).
- Query [Current actual value (6078h)] to get the actual current (unit = increments of 0.1 % of the nominal current).

Associated Objects

Index	Sub-index	Object	PDO	Data Type	Takes Effect
6040h	0	Controlword	R_PDO	Unsigned16	Immediately
6041h	0	Statusword	T_PDO	Unsigned16	-
6060h	0	Modes of Operation	No	Integer8	Immediately
6061h	0	Modes of Operation Display	No	Integer8	-
6071h	0	Target Torque	R_PDO	Integer16	Immediately
6074h	0	Torque demand value	No	Integer16	-
6075h	0	Motor rated current	No	Unsigned32	-
6087h	0	Torque slope	R_PDO	Unsigned32	Immediately

Example: Profile Torque

Starting the Operating Mode

The operating mode must be set in the parameter Mode of operation (6060h). Writing the parameter value activates the operating mode.

The parameter Target torque (6071h) starts the movement.

Parameter Name	Description	Data Type R/W
Target Torque	Target torque for operating mode Profile Torque. 100.0% corresponds to the continuous stall. In increments of 0.1%. Changed settings become active immediately.	Integer16 Read/Write

Controlword

Bit 8 in parameter Controlword (6040h) is used to stop a movement with Halt.

Parameter Value	Meaning
Bit 4 = Reserved	Not relevant for this operating mode
Bit 5 = Reserved	Not relevant for this operating mode
Bit 6 = Reserved	Not relevant for this operating mode
Bit 8 = Halt	Stop movement with Halt
Bit 9 = Change on setpoint	Not relevant for this operating mode

Terminating the Operating Mode

The operating mode is terminated when the motor is at a standstill and one of the following conditions is met:

■ Stop caused by Halt or Quick Stop

■ Stop caused by an error

Statusword

Information on the movement is available via bit 10 in the parameter **Statusword** (6041h).

Parameter Value	Meaning
Bit 10 = Target reached	0 = Target torque not reached 1 = Target torque reached

Example Node Address 1

Work Step
COB ID / Data
» NMT Start remote node
`0 / 01 00`
« T_PDO1 with Statusword
`181 / 31 62`
» Enable power stage with R_PDO1
`201 / 00 00`
`201 / 06 00`
`201 / 0F 00`
« T_PDO1 (operating state: 6 Operation Enabled)
`181 / 37 62`
» Starting the operating mode
`601 / 2F 60 60 00 04 00 00 00`
« `581 / 60 60 60 00 00 00 00 00`
» Check operating mode*
`601 / 40 61 60 00 00 00 00 00`
« Operating mode active
`581 / 4F 61 60 00 02 00 00 00`
» Target torque set to 100 (10.0%)
`601 / 2B 71 60 00 64 00 00 00`
« `581 / 60 71 60 00 00 00 00 00`
« Target torque reached
`181 / 37 06`
» Terminate operating mode with Quick Stop with R_PDO1
`201 / 0B 00`
« T_PDO1 with Statusword
`181 / 17 66`
» Clear Quick Stop with R_PDO1
`201 / 0F 00`
« T_PDO1 with Statusword
`181 / 37 46`

* Note: The operating mode must be checked until the device has activated the specified operating mode.

8   Defining Gear Ratio and Feed Constant Parameters

8.1   Overview

Configuration of the FLEXI PRO parameters is best performed using the ServoStudio software, which requires serial communication.

Note: The instructions in this document assume that you are familiar with the ServoStudio software.

This application note describes how to define the values of the feed constant and gear ratio parameters in ServoStudio, so that they will be correctly converted into values recognized by a drive operating in a CANopen network with the following profiles:

CANopen Profiles	
Profile Position	See example below
Synchronized Position	Same as Profile Velocity
Profile Velocity	See example below
Synchronized Position	Same as Profile Position
Profile Torque	Not Applicable
Synchronized Torque	Not Applicable

CANopen has two objects for setting the gear ratio and the feed constant conversion factors, each of which has two sub-indices. These objects have four equivalent FLEXI PRO (VarCom) variables, as shown in the following table.

Description	CAN Object	VarCom	Description
Feed Constant	6092h, sub-index 1	**PNUM** Feed Constant (Unit Conversion) Numerator	Conversion factors of the user-defined unit. Used to multiply the **motor revolution** (rotary motors) or the **motor pitch** (linear motors), according to the type of motor (VarCom MOTORTYPE).
	6092h, sub-index 2	**PDEN** Feed Constant (Unit Conversion) Denominator	
Gear Ratio	6091h, sub-index 1	**FBGMS** Fieldbus Gear Ratio - Motor Shaft Scaling	The conversion factor of the fieldbus device's **motor** shaft revolution.
	6091h, sub-index 2	**FBGDS** Fieldbus Gear Ratio - Drive Shaft Scaling	The conversion factor of the fieldbus device's **drive** shaft revolution.

In general, you can modify the values of the sub-indices of both objects.

It is usually sufficient, however, to modify only the PNUM value, as shown in the examples in this application note.

$$Resolution = \frac{PNUM}{PDEN} \times \frac{FBGMS}{FBGDS}$$

$$Resolution = 6092h \times 6091h$$

To modify the gear ratio and feed constant values in ServoStudio, use the **CANopen Units** pane in the **Motion Units** screen.

CANopen Units	
Unit Conversion Numerator 360	**PNUM -** Feed Constant (Unit Conversion) Numerator
Unit Conversion Denominator 1	**PDEN -** Feed Constant (Unit Conversion) Denominator
Fieldbus CANopen Gear Driving Shaft Scaling 1	**FBGMS -** Fieldbus Gear Ratio - Motor Shaft Scaling
Fieldbus CANopen Gear Motor Shaft Scaling 1	**FBGDS -** Fieldbus Gear Ratio - Drive Shaft Scaling

8.2   Simple Rotary Motor

Setting CANopen Units to Represent Revolutions

Position = rev

Velocity = rev/sec

Acceleration = rev/sec^2

PNUM - Feed Constant (Unit Conversion) Numerator	**1**
PDEN - Feed Constant (Unit Conversion) Denominator	1
FBGMS - Fieldbus Gear Ratio - Motor Shaft Scaling	1
FBGDS - Fieldbus Gear Ratio - Drive Shaft Scaling	1

Operating Mode: Profile Position

■   Set Mode of Operation (6060h) to Profile Position mode (1).

■   Set the Target Position (607Ah) value (unit = **revolutions**).

   If object 607Ah is **1**, the motor shaft will rotate one revolution.

■   Set the Profile Velocity (6081h) value (unit = **revolutions** per second).

   If object 6081h is **1**, the motor shaft speed will be 1 rev/sec.

■   Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

■   Set Mode of Operation (6060) to Profile Velocity mode (3).

■   Set Controlword (6040h) to start the operating mode.

■   Set the Target Velocity (60FFh) value.

If object 6081h is **1**, the motor shaft speed will be 1 rev/sec.

If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled, or a quick stop is triggered.

Setting CANopen Units to Represent Degrees

Position = deg

Velocity = deg/sec

Acceleration = deg/sec^2

PNUM - Feed Constant (Unit Conversion) Numerator	**360**
PDEN - Feed Constant (Unit Conversion) Denominator	1
FBGMS - Fieldbus Gear Ratio - Motor Shaft Scaling	1
FBGDS - Fieldbus Gear Ratio - Drive Shaft Scaling	1

Operating Mode: Profile Position

- Set Mode of Operation (6060h) to Profile Position mode (1).
- Set the Target Position (607Ah) value (unit = **degrees**).

  If object 607Ah is **360**, the motor shaft will rotate one revolution.
- Set the Profile Velocity (6081h) value (unit = **degrees** per second).

  If object 6081h is **360**, the motor shaft speed will be 1 rev/sec.
- Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

- Set Mode of Operation (6060) to Profile Velocity mode (3).
- Set Controlword (6040h) to start the operating mode.
- Set the Target Velocity (60FFh) value.

  If object 6081h is **360**, the motor shaft speed will be 360 deg/sec (one revolution per second).

If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled, or a quick stop is triggered.

Setting CANopen Units to Represent Counts

Position = counts

Velocity = counts/sec

Acceleration = counts/sec^2

PNUM - Feed Constant (Unit Conversion) Numerator	*Motor Resolution*
PDEN - Feed Constant (Unit Conversion) Denominator	1
FBGMS - Fieldbus Gear Ratio - Motor Shaft Scaling	1
FBGDS - Fieldbus Gear Ratio - Drive Shaft Scaling	1

This example assumes that the feedback device (i.e., encoder) produces 10,000 counts per 1 motor revolution.

The variable MENCRES defines the resolution of the motor encoder, in number of lines per revolution of the motor for a rotary motor, and in number of lines per pitch for a linear motor.

When an incremental encoder is used, the number of encoder counts per revolution or pitch is obtained by multiplying MENCRES by 4.

Get the value of MENCRES, multiple by 4, and then enter the number as the value of PNUM.

Operating Mode: Profile Position

- Set Mode of Operation (6060h) to Profile Position mode (1).
- Set the Target Position (607Ah) value (unit = **counts**).

    If object 607Ah is **10,000**, the motor shaft will rotate 10,000 counts, which equals one revolution.

- Set the Profile Velocity (6081h) value (unit = **counts** per second).

    If object 6081h is **10,000**, the motor shaft speed will be 10,000 counts/sec (one revolution per second).

- Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

- Set Mode of Operation (6060) to Profile Velocity mode (3).
- Set Controlword (6040h) to start the operating mode.
- Set the Target Velocity (60FFh) value.

    If object 6081h is **10,000**, the motor shaft speed will be 10,000 counts/sec (one revolution per second).

If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled, or a quick stop is triggered.

8.3   Linear Motor

The fundamental parameter of linear motor is the motor pitch – the distance between two successive magnetic poles of the motor. Pitch data is expressed in millimeters.

To read the pitch distance, query object 207Dh, sub-index 0.

In a linear motor, the feedback resolution is defined as the number of encoder counts per the motor pitch distance.

Setting CANopen Units to Represent Motor Pitch

Position = pitch

Velocity = pitch/sec

Acceleration = pitch/sec^2

PNUM - Feed Constant (Unit Conversion) Numerator	**1**
PDEN - Feed Constant (Unit Conversion) Denominator	1
FBGMS - Fieldbus Gear Ratio - Motor Shaft Scaling	1
FBGDS - Fieldbus Gear Ratio - Drive Shaft Scaling	1

Operating Mode: Profile Position

- Set Mode of Operation (6060h) to Profile Position mode (1).
- Set the Target Position (607Ah) value (unit = **motor pitch**).

  If object 607Ah is **1**, the motor shaft will move a distance of 1 pitch.
- Set the Profile Velocity (6081h) value (unit = **counts** per second).

  If object 6081h is **1**, the motor speed will be 1 pitch/sec (one pitch per second).
- Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

- Set Mode of Operation (6060) to Profile Velocity mode (3).
- Set Controlword (6040h) to start the operating mode.
- Set the Target Velocity (60FFh) value.

  If object 6081h is **1**, the motor speed will be 1 pitch/sec.

If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled, or a quick stop is triggered.

Setting CANopen Units to Represent Millimeters

Position = mm

Velocity = mm/sec

Acceleration = mm/sec^2

PNUM - Feed Constant (Unit Conversion) Numerator	*Motor Pitch Distance* [mm]
PDEN - Feed Constant (Unit Conversion) Denominator	1
FBGMS - Fieldbus Gear Ratio - Motor Shaft Scaling	1
FBGDS - Fieldbus Gear Ratio - Drive Shaft Scaling	1

This example assumes that the pitch value is **32.**

Operating Mode: Profile Position

- Set Mode of Operation (6060h) to Profile Position mode (1).
- Set the Target position (607Ah) value (unit = **mm**).

  If object 607Ah is **32**, the motor will move a distance of 1 **mm**
- Set the Profile Velocity (6081h) value (unit = **mm** per second).

If object 6081h is **32**, the motor speed will be 1 **mm/sec**

■ Set Controlword (6040h) to start the operating mode.

Operating Mode: Profile Velocity

■ Set Mode of Operation (6060) to Profile Velocity mode (3).

■ Set Controlword (6040h) to start the operating mode.

■ Set the Target Velocity (60FFh) value.

If object 6081h is **32**, the motor speed will be 1 **mm/sec** (one millimeter per second).

If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled, or a quick stop is triggered.

Setting CANopen Units to Represent Counts

Position = counts

Velocity = counts/sec

Acceleration = counts/sec^2

PNUM - Feed Constant (Unit Conversion) Numerator	*Motor Resolution*
PDEN - Feed Constant (Unit Conversion) Denominator	1
FBGMS - Fieldbus Gear Ratio - Motor Shaft Scaling	1
FBGDS - Fieldbus Gear Ratio - Drive Shaft Scaling	1

The variable MENCRES defines the resolution of the encoder, in number of lines per revolution of the motor for a rotary motor, and number of lines per pitch for a linear motor.

When an incremental encoder is used, the number of encoder counts per motor pitch distance is obtained by multiplying MENCRES by 4

Operating Mode: Profile Position

■ Set Mode of Operation (6060h) to Profile Position mode (1).

■ Set the Target Position (607Ah) value (unit = **counts**).

If object 607Ah is **1**, the motor will move a distance of one count.

■ Set the Profile Velocity (6081h) value (unit = **counts** per second).

If object 6081h is **1**, the motor speed will be 1 counts/sec (one count per second).

■ Set Controlword (6040h) to start the movement.

Operating Mode: Profile Velocity

■ Set Mode of Operation (6060) to Profile Velocity mode (3).

■ Set Controlword (6040h) to start the operating mode.

■ Set the Target Velocity (60FFh) value.

If object 6081h is **1**, the motor speed will be 1 counts/sec (one count per second).

If the power stage is enabled, the new target velocity will become active immediately and the movement will start. The value is reset to zero if the operating mode is changed, the power stage is disabled, or a quick stop is triggered.

8.4   Rotary Motor with Gear or Rotary to Linear Motion Translation Device

If you are using an actual gear or rotary-to-linear motion translation device, set values for the two unit variables, FBGDS and FBGMS, in order to define the translation ratio of the gear.

Examples

1. If using a ball screw that converts **100 motor revs to 1 mm**, set the variables as follows:

    PNUM=1
    PDEN=1
    FBGMS=100
    FBGDS=1

    This produces the following units:

    Position = mm
    Velocity = mm/sec
    Acceleration = mm/sec^2

2. If using a ball screw that converts **3600 rotary degrees to 1 mm**, set the variables as follows:

    PNUM=360
    PDEN=1
    FBGMS=10
    FBGDS=1

    This produces the following units:

    Position = mm
    Velocity = mm/sec
    Acceleration = mm/sec^2

3. If using a ball screw that converts **360 rotary degrees to 10 mm**, set the variables as follows:

    PNUM=360
    PDEN=1
    FBGMS=1
    FBGDS=10

    This produces the following units:

    Position = mm
    Velocity = mm/sec
    Acceleration = mm/sec^2

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